BASS
TECHNIK FÜR GEWINDE

**PERFORMANCE** CONNECTS

**LEISTUNG** VERBINDET

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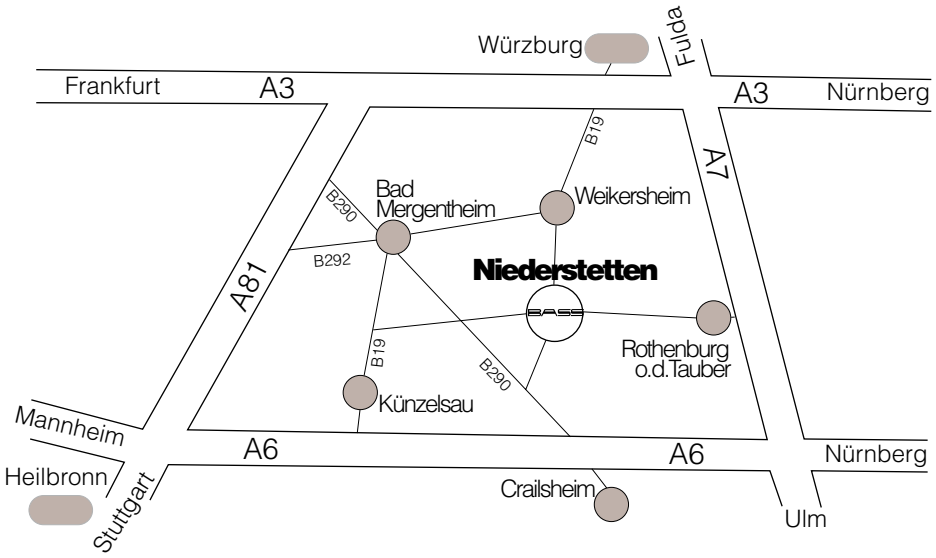


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## UNSER UNTERNEHMEN

Wir sind ein dynamisches, mittelständisches Familienunternehmen in Baden-Württemberg. Seit 1947 werden am Standort Niederstetten qualitativ hochwertige Gewindewerkzeuge für den nationalen und internationalen Markt produziert. Für unsere Kunden sind wir der Spezialist und Partner für leistungsstarke, effiziente und prozesssichere Gewindebearbeitung. Hohe Kundenzufriedenheit in Verbindung mit hoher Qualität ist unsere oberste Maxime.

## OUR COMPANY

We are a dynamic, medium-sized family-owned company which has its place of business in Southern Germany. We are producing high quality threading tools for national and international markets at our location in Niederstetten since 1947. For our customers we are the specialist and partner for high-perfomance, efficient and reliable thread machining. Our dictum is a high customer satisfaction in combination with high-quality service and products.

## NOTRE ENTREPRISE

Nous sommes une entreprise familiale dynamique, fondée en 1947, située à Niederstetten dans le Sud de l'Allemagne, spécialisée dans la conception, la fabrication et la commercialisation d'outils de taraudage haut de gamme pour le marché intérieur et les marchés internationaux. BASS est votre partenaire, spécialiste des solutions de taraudage performantes, efficaces et fiables. Offrir une qualité irréprochable du produit et du service ainsi que la satisfaction de nos clients sont notre crédo.

## NUESTRA EMPRESA

Somos una mediana empresa familiar dinámica domiciliada en Alemania del sur en la ciudad de Niederstetten. Desde 1947 aquí mismo producimos herramientas de roscado de alta calidad para el mercado nacional e internacional. Para nuestros clientes somos el especialista y socio competente para el mecanizado de roscas potente, eficiente y fiable. Nuestro precepto principal es offrir productos y servicios de alta calidad para realizar la más grande satisfacción del cliente.

## LA NOSTRA AZIENDA

Siamo una dinamica impresa familiare del sud della Germania. Dal 1947 vengono prodotti a Niederstetten dei maschi di filettatura di alta qualità per il mercato interno e quello internazionale. Per i nostri clienti siamo specialisti e partner per la lavorazione di filettature efficienti ed affidabili. Alta qualità e soddisfazione dei clienti sono la nostra massima priorità.

www.bass-tools.de

| **Typenbezeichnungen**<br>types / types / tipi / tipos | **Beispiele**<br>examples / exemples / esempi / ejemplos | **S. / p.** |
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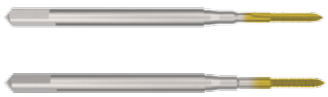
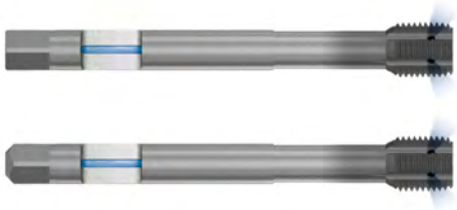
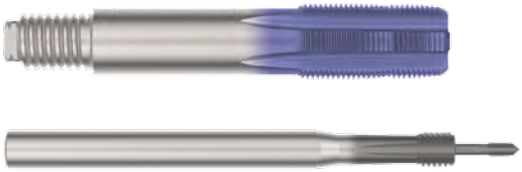
| **Kleine Abmessungen ab Ø 1,0 mm**<br>small dimensions starting with Ø 1.0 mm /<br>petites dimensions à partir de Ø 1,0 mm /<br>piccole dimensioni da Ø 1,0 mm /<br>dimensiones pequeñas a partir de Ø 1,0 mm |  | 24 / 26 / 28 / 32 / 34 / 48 / 50 / 52 / 64 / 66 / 68 / 76 / 108 / 114 / 118 / 130 |
| **Verlängerte Werkzeuge**<br>tools with extended shank /<br>outils à queue extra-longue /<br>maschi prolungati /<br>herramientas con mango alargado | | 78-81 |
| **Schafttoleranz h6**<br>shank tolerance h6 /<br>tolérance Ø queue /<br>tolleranza gambo h6 /<br>tolerancia del mango h6 | | 34-39 / 44-45 / 60-62 / 68-77 / 85-89 / 92-93 / 134-139 |
| **Vollhartmetall (VHM)**<br>solid carbide /<br>carbure monobloc /<br>metallo duro /<br>metal duro | | 36-38 / 44-45 / 72-75 / 89 |
| **Gewindeschneidfutter und Zubehör**<br>tap holders and accessories /<br>mandrins de taraudage et accessoires /<br>maschiatori ed accessori /<br>mandriles y accesorios | | 184-203 |
| **MMS-Werkzeuge**<br>MQL tools /<br>outils MQL (micro lubrification) /<br>utensili MQL /<br>herramientas MQL |  | 74-75 / 85 / 93 |
| **Sonderwerkzeuge für jede Produktgruppe**<br>special tools of all product groups /<br>outils spéciaux pour tous les groupes de produits /<br>utensili speciali per ogni gruppo di prodotto /<br>herramientas especiales para cada grupo de productos |  | **Nicht im Katalog - auf Anfrage**<br>not in the catalogue - on request / hors catalogue - sur demande / non a catalogo - a richiesta / no figuran en el catálogo - a solicitar |

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| M | GFS N KA TICN 2 x D | 162 |
| M | GFS TIH KA TICN | 163 |
| MF | GFS N KA | 164 |
| MF | GFS N KA TICN | 164 |
| G | GFS N KA | 165 |
| G | GFS N KA TICN | 165 |
| UNC | GFS N KA | 166 |
| UNC | GFS N KA TICN | 166 |
| UNF | GFS N KA | 167 |
| UNF | GFS N KA TICN | 167 |
| NPT | GFS N KA | 168 |
| NPT | GFS N KA TICN | 168 |
| NPTF | GFS N KA | 169 |
| NPTF | GFS N KA TICN | 169 |
| M | BGF W KA | 171 |
| M | BGF W KA FNT | 171 |
| MF | BGF W KA | 172 |
| MF | BGF W KA FNT | 172 |
| | BFW | 180 |
| | GFK | 180 |
| | AFK | 181 |
| | VHM-Gewindefräsplatten / solid carbide milling cutter inserts / plaquettes en carbure monobloc / inserti in metallo duro / placas de metal duro | 182 |
| | | |
| | HST SYNCHRO | 187-188 |
| | HST SYNCHRO MMS | 194 |
| | HST SYNCHRO QCA | 190-191 |
| | HST SYNCHRO SL | 189 |
| | SYNCHRO V | 192 |
| | | |


## Handelsmarken
Trademarks / Marques / Marchi commerciali / Marcas comerciales

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## Handhabung der Anwendungstabelle

use of the application table / mode d'emploi du tableau d'applications / utilizzo della tabella d'impiego / uso de la tabla de uso

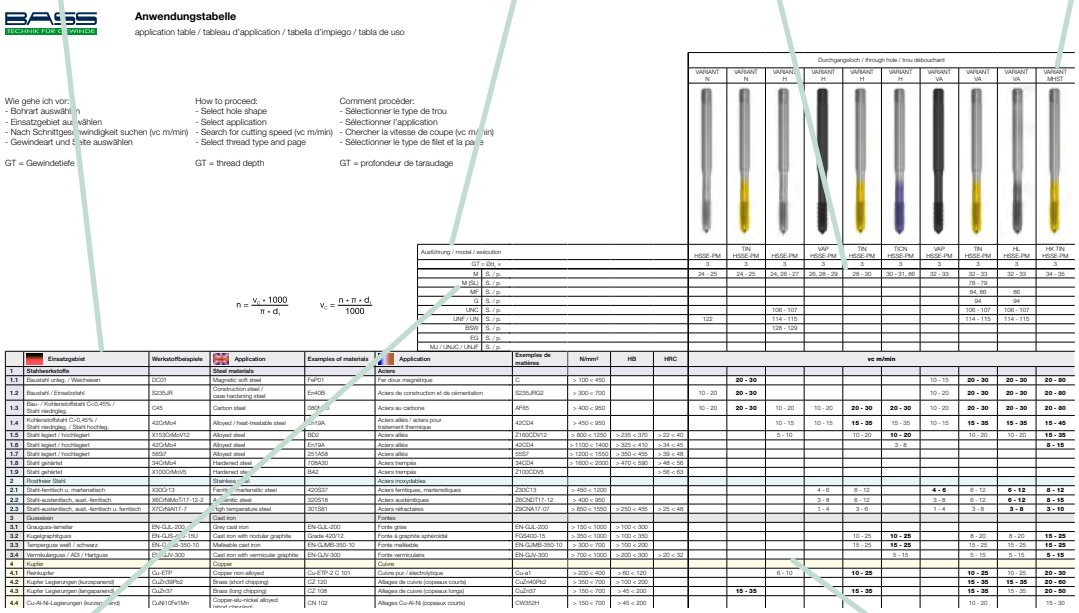
**Mit der Anwendungstabelle auf Seite 11-23 können Sie schnell und komfortabel das passende Werkzeug für Ihren Anwendungsfall finden.**
With our application table on page 11-23 you can quickly and comfortably find the right tool for your application. / Vous trouverez l'outil adapté à votre application sur le tableau de préconisations en pages 11-23. / Nella tabella d'impiego a pagina 11-23 può trovare velocemente e facilmente il maschio adatto per la Sua applicazione. / Para encontrar la herramienta apropiada para su aplicación, véase la tabla de uso en p. 11-23.

**Einsatzgebiet**
application / application / applicazione / aplicación

**Gewindeart**
type of thread / type de filetage / tipo di filetto / tipo de rosca

**Katalogseite**
page / page / pagina / página

**Typenbezeichnung**
types / type / tipo / tipo



BASS TECHNIK FÜR GEWINDE

**Anwendungstabelle**
application table / tableau d'application / tabella d'impiego / tabla de uso

Wie gehe ich vor:
- Bohrart auswählen
- Einsatzgebiet auswählen
- Nach Schnittgeschwindigkeit suchen (vc m/min)
- Gewindeart und Seite auswählen

GT = Gewindetiefe

How to proceed:
- Select hole shape
- Select application
- Search for cutting speed (vc m/min)
- Select thread type and page

GT = thread depth

Comment procéder:
- Sélectionner le type de trou
- Sélectionner l'application
- Chercher la vitesse de coupe (vc m/min)
- Sélectionner le type de filet et la page

GT = profondeur de taraudage

$$n = \frac{v_c \cdot 1000}{\pi \cdot d_1} \qquad v_c = \frac{n \cdot \pi \cdot d_1}{1000}$$

| Ausführung / model / exécution | | VARIANT N | VARIANT N | VARIANT H | VARIANT H | VARIANT H | VARIANT H | VARIANT VA | VARIANT VA | VARIANT VA | VARIANT MHST |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GT = d1 x | | | | | | | | | | | |
| | | HSSE-PM | TiN HSSE-PM | HSSE-PM | VAP HSSE-PM | TiN HSSE-PM | TiCN HSSE-PM | VAP HSSE-PM | TiN HSSE-PM | HL HSSE-PM | HK TiN HSSE-PM |
| M | S. / p. | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| M (SL) | S. / p. | 24 - 25 | 24 - 29 | 24, 26 - 27 | 26, 28 - 29 | 28 - 30 | 30 - 31, 86 | 32 - 33 | 32 - 33 | 32 - 33 | 34 - 35 |
| MF | S. / p. | | | | | | | | 78 - 79 | | |
| G | S. / p. | | | | | | | | 84, 86 | 86 | |
| UNC | S. / p. | | | 106 - 107 | | | | | 94 | 94 | |
| UNF / UN | S. / p. | 122 | | 114 - 115 | | | | | 106 - 107 | 106 - 107 | |
| BSW | S. / p. | | | 128 - 129 | | | | | 114 - 115 | 114 - 115 | |
| EG | S. / p. | | | | | | | | | | |
| MJ / UNJC / UNJF | S. / p. | | | | | | | | | | |

| | Einsatzgebiet | Werkstoffbeispiele | Application | Examples of materials | Application | Exemples de matières | N/mm² | HB | HRC | vc m/min | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **Stahlwerkstoffe** | | **Steel materials** | | **Aciers** | | | | | | | | | | | | | |
| 1.1 | Baustahl unleg. / Weicheisen | DC01 | Magnetic soft steel | FePO1 | Fer doux magnétique | C | > 100 < 450 | | | | **20 - 30** | | | | | 10 - 15 | **20 - 30** | **20 - 30** | **20 - 80** |
| 1.2 | Baustahl / Einsatzstahl | S235JR | Construction steel / case hardening steel | Er40B | Aciers de construction et de cémentation | S235JRG2 | > 300 < 700 | | | 10 - 20 | **20 - 30** | | | | | 10 - 20 | **20 - 30** | **20 - 30** | **20 - 80** |
| 1.3 | Bau- / Kohlenstoffstahl C<0,45% / Stahl niedrigleg. | C45 | Carbon steel | C60 | Aciers au carbone | AF65 | > 400 < 950 | | | 10 - 20 | **20 - 30** | 10 - 20 | **20 - 30** | **20 - 30** | 10 - 20 | **20 - 30** | **20 - 30** | **20 - 80** |
| 1.4 | Kohlenstoffstahl C>0,45% / Stahl niedrigleg. / Stahl hochleg. | 42CrMo4 | Alloyed / heat-treatable steel | Er19A | Aciers alliés / aciers pour traitement thermique | 42CD4 | > 450 < 950 | | | | | 10 - 15 | 10 - 15 | **15 - 35** | 15 - 35 | 10 - 15 | **15 - 35** | **15 - 35** | **15 - 45** |
| 1.5 | Stahl legiert / hochlegiert | X153CrMoV12 | Alloyed steel | BD2 | Aciers alliés | Z160CDV12 | > 800 < 1250 | > 235 < 370 | > 22 < 40 | | | 5 - 10 | | 10 - 20 | **10 - 20** | | 10 - 20 | 10 - 20 | **15 - 35** |
| 1.6 | Stahl legiert / hochlegiert | 42CrMo4 | Alloyed steel | Er19A | Aciers alliés | 42CD4 | > 1100 < 1400 | > 325 < 410 | > 34 < 45 | | | | | | 3 - 8 | | | | **8 - 15** |
| 1.7 | Stahl legiert / hochlegiert | S690 | Alloyed steel | 25TA08 | Aciers alliés | S55T | > 1200 < 1550 | > 350 < 455 | > 39 < 48 | | | | | | | | | | |
| 1.8 | Stahl gehärtet | 34CrMo4 | Hardened steel | 70SA30 | Aciers trempés | 34CD4 | > 1600 < 2000 | > 470 < 590 | > 48 < 56 | | | | | | | | | | |
| 1.9 | Stahl gehärtet | X100CrMoV5 | Hardened steel | BA2 | Aciers trempés | Z100CDV5 | | | > 56 < 63 | | | | | | | | | | |
| 2 | Rostfreier Stahl | | Stainless | | Aciers inoxydables | | | | | | | | | | | | | | |
| 2.1 | Stahl-ferritisch u. martensitisch | X30Cr13 | Ferritic / martensitic steel | 420S37 | Aciers ferritiques, martensitiques | Z30C13 | > 450 < 1200 | | | | | | 4 - 6 | 6 - 12 | | **4 - 6** | 6 - 12 | **6 - 12** | **8 - 12** |
| 2.2 | Stahl-austenitisch, aust.-ferritisch | X6CrNiMoTi17-12-2 | Austenitic steel | 320S18 | Aciers austénitiques | Z6CNDT17-12 | > 400 < 950 | | | | | | 3 - 8 | 6 - 12 | | 3 - 8 | 6 - 12 | **6 - 12** | **8 - 15** |
| 2.3 | Stahl-austenitisch, aust.-ferritisch u. ferritisch | X7CrNiAl17-7 | High temperature steel | 301S81 | Aciers réfractaires | Z8CNA17-07 | > 850 < 1550 | > 250 < 455 | > 25 < 48 | | | | 1 - 4 | 3 - 8 | | 1 - 4 | 3 - 8 | **3 - 8** | **3 - 10** |
| 3 | Gusseisen | | Cast iron | | Fontes | | | | | | | | | | | | | | |
| 3.1 | Grauguss-lamellar | EN-GJL-200 | Grey cast iron | EN-GJL-200 | Fonte gris | EN-GJL-200 | > 150 < 1000 | > 100 < 300 | | | | | | | | | | | |
| 3.2 | Kugelgrafitguss | EN-GJS-400-15U | Cast iron with nodular graphite | Grade 420/12 | Fonte à graphite sphéroïdal | FGS400-15 | > 350 < 1000 | > 100 < 350 | | | | | | 10 - 25 | **10 - 25** | | 8 - 20 | 8 - 20 | **15 - 25** |
| 3.3 | Temperguss weiß / schwarz | EN-GJMB-350-10 | Malleable cast iron | EN-GJMB-350-10 | Fonte malléable | EN-GJMB-350-10 | > 300 < 700 | > 100 < 200 | | | | | | 15 - 25 | **15 - 25** | | 15 - 25 | 15 - 25 | **15 - 25** |
| 3.4 | Vermikulaguss / AD / Hartguss | EN-GJV-300 | Cast iron with vermicular graphite | EN-GJV-300 | Fonte vermiculaire | EN-GJV-300 | > 700 < 1000 | > 200 < 300 | > 20 < 32 | | | | | | 5 - 15 | | 5 - 15 | 5 - 15 | **5 - 15** |
| 4 | Kupfer | | Copper | | Cuivre | | | | | | | | | | | | | | |
| 4.1 | Reinkupfer | Cu-ETP | Copper non-alloyed | Cu-ETP-2 C 101 | Cuivre pur / électrolytique | Cu-a1 | > 200 < 400 | > 60 < 120 | | | | 6 - 10 | | **10 - 25** | | | **10 - 25** | 10 - 25 | **20 - 30** |
| 4.2 | Kupfer Legierungen (kurzspanend) | CuZn39Pb2 | Brass (short chipping) | CZ 120 | Alliages de cuivre (copeaux courts) | CuZn40Pb2 | > 350 < 700 | > 100 < 200 | | | | | | | | | **15 - 35** | **15 - 35** | **20 - 60** |
| 4.3 | Kupfer Legierungen (langspanend) | CuZn37 | Brass (long chipping) | CZ 108 | Alliages de cuivre (copeaux longs) | CuZn37 | > 150 < 700 | > 45 < 200 | | | **15 - 35** | | | **15 - 35** | | | **15 - 35** | 15 - 35 | **20 - 80** |
| 4.4 | Cu-Al-Ni-Legierungen (kurzspanend) | CuNi10Fe1Mn | Copper-alu-nickel alloyed (short chipping) | CN 102 | Alliages Cu-Al-Ni (copeaux courts) | CW352H | > 150 < 700 | > 45 < 200 | | | | | | | | | 10 - 20 | | 15 - 30 |

**M (SL)**
Werkzeuge mit langem Schaft / tools with long shank / outils à queue extra-longue / maschi con gambo extra lungo / herramientas con mango largo

**Schnittwertempfehlung**
cutting values / valeurs de coupe préconisées / velocità di taglio raccomandata / velocidad de corte recomendada

## Generelle Informationen

general information / information générale / informazioni generali / información general

**Werkzeuge aus HSSE-PM mit einem Schaft-Ø kleiner 6 mm und größer 12 mm haben generell die Schafttoleranz h9. Angaben im Katalog können abweichen.**
Tools made out of HSSE-PM with a shank diameter of < 6 mm or > 12 mm have shank tolerance h9. Data stated in the catalog may differ. / D'une façon générale, la tolérance de queue des outils en HSSE-PM est h9 pour Ø queue < 6 mm ou > 12 mm. Ce détail n'apparaît pas dans le catalogue. / I maschi in HSSE-PM con un diametro gambo inferiore a 6 mm hanno in generale la tolleranza h9. Le informazioni nel catalogo possono differire. / Herramientas de HSSE-PM con un diámetro del mango < 6 mm o > 12 mm generalmente tienen la tolerancia del mango h9. Datos en el catálogo pueden diferir.

**Gewindebohrer und Gewindefurcher werden bis einschließlich Abmessung M6, bzw. UNC & UNF 1/4" mit Spitze gefertigt. Hiervon ausgenommen sind Werkzeuge mit Anschnittform E sowie Werkzeuge mit KA. Werkzeuge mit Anschnittform B werden bis Abmessung M8, bzw. UNC & UNF 5/16" mit Spitze gefertigt. Abbildungen im Katalog können abweichen.**
Taps and roll taps are manufactured with a center point up to dimension M6 or UNC or UNF 1/4" – except tools with chamfer form E or with internal coolant KA. Taps with chamfer form B are manufactured with a center point up to dimension M8 or UNC or UNF 5/16". Illustrations in the catalog may differ. // Les tarauds coupants et à refouler sont dotés d'une pointe jusqu'à M6 ou UNC ou UNF 1/4" à l'exception des outils à entrée courte type E et à lubrification interne axiale KA. Les outils à entrée forme B sont dotés d'une pointe jusqu'à M8 ou UNC ou UNF 5/16". Les illustrations du catalogue peuvent ne pas correspondre aux spécifications des produits. // Maschi a tagliare e maschi a rullare vengono prodotti con punta fino alla dimensione M6 compresa cioè UNC & UNF 1/4". Questo non include i maschi con imbocco E come anche maschi con lubrificazione interna assiale. Maschi con imbocco B vengono prodotti fino alla dimensione M8 con punta cioè UNC & UNF 5/16". Le illustrazioni nel catalogo possono differire. // Machos y laminadores son producidos con punta hasta diámetro M6 o UNC o UNF 1/4" – excepto herramientas con entrada forma E o con refrigeración interior KA. Herramientas con entrada forma B son producidas con punta hasta diámetro M8 o UNC o UNF 5/16". Ilustraciones en el catálogo pueden variar.

**Bei Werkzeugen mit einem Aufmaß von 0,1 mm ist der Vorbohrdurchmesser um 0,1 mm zu vergrößern.**
For tools with an allowance of 0.1 mm, the bore hole diameter has to be enlarged by 0.1 mm. / Augmenter le diamètre d'avant-trou de 0,1 mm pour les outils ayant une surcote de 0,1 mm. / Per maschi con una maggiorazione di 0,1 mm, il diametro del preforo deve essere aumentato di 0,1 mm. / Para herramientas con una sobremedida de 0,1 mm. el diámetro del agujero tiene que ser aumentado 0,1 mm.

**Der angegebene Fräserdurchmesser Ød1 kann vom tatsächlichen abweichen. Es gilt der auf dem Werkzeug beschriftete Durchmesser.**
The stated Ø d1 can differ from the actual milling cutter Ø. The effective Ø is marked on the tool. / Le diamètre théorique de la fraise Ø d1 peut s'écarter de la valeur réelle. Prendre en considération le diamètre gravé sur l'outil. / Il diametro specificato della fresa Ø d1 potrebbe differire dal reale. Vale il Ø d1 marcato sull'utensile. / El diámetro d1 indicado en el catálogo puede diferir del Ø real de la fresa. El Ø correcto está marcado en el mango de la herramienta.

## Gewindebohrer

machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

| | | |
|---|---|---|
| **VARIANT®** | » gerade Nuten mit Schälanschnitt<br>» Anschnittform B / 3,5 - 5,5 Gänge | » für Durchgangslochgewinde<br>» Spanabfuhr erfolgt in Vorschubrichtung |
| | » straight flutes and spiral point<br>» chamfer form B / 3,5 - 5,5 threads | » for through hole<br>» chip evacuation forwards |
| | » goujures droites, coupe GUN<br>» entrée B / 3,5 - 5,5 filets | » pour trous débouchants<br>» évacuation des copeaux dans le sens de l'avance |
| | » scanalature diritte con imbocco corretto<br>» imbocco forma B / 3,5 - 5,5 filetti | » per foro passante<br>» evacuazione truciolo nel senso di avanzamento |
| | » ranuras rectas y entrada helicoidal<br>» entrada forma B / 3,5 - 5,5 hilos de rosca | » para agujero pasante<br>» evacuación hacia adelante de la viruta |
| **VARIO®** | » gerade Spannuten<br>» Anschnittform C / 2 - 3 Gänge<br>» Anschnittform E / 1,5 - 2 Gänge | » für Durchgangs- und Sacklochgewinde<br>» für kurzspanende Werkstoffe<br>» Späne werden in den Nuten aufgenommen |
| | » straight flutes<br>» chamfer form C / 2 - 3 threads<br>» chamfer form E / 1,5 - 2 threads | » for through and blinde hole<br>» for short-chipping materials<br>» flutes pick up the chips |
| | » goujures droites<br>» entrée C / 2 - 3 filets<br>» entrée E / 1,5 - 2 filets | » pour trous débouchants et borgnes<br>» pour matières à copeaux courts<br>» les copeaux remontent dans les goujures |
| | » scanalature diritte<br>» imbocco forma C / 2 - 3 filetti<br>» imbocco forma E / 1,5 - 2 filetti | » per foro passante e foro cieco<br>» per materiali a truciolo corto<br>» il truciolo resta nelle scanalature |
| | » ranuras rectas<br>» entrada forma C / 2 - 3 hilos de rosca<br>» entrada forma E / 1,5 - 2 hilos de rosca | » para agujero ciego y agujero pasante<br>» para materiales de viruta corta<br>» evacuación de viruta para las ranuras |
| **AVANT®** | » 12 - 25° rechtsgedrallte Spannuten<br>» Anschnittform C / 2 - 3 Gänge<br>» Anschnittform E / 1,5 - 2 Gänge | » für Sacklochgewinde bis 2xd Gewindetiefe<br>» Spanabfuhr erfolgt in Schaftrichtung |
| | » spiral flute 12 - 25°<br>» chamfer form C / 2 - 3 threads<br>» chamfer form E / 1,5 - 2 threads | » for blind hole, thread depth up to 2xd<br>» chip evacuation backwards |
| | » goujures hélicoidales 12 - 25°<br>» entrée C / 2 - 3 filets<br>» entrée E / 1,5 - 2 filets | » pour trous borgnes, jusqu'à 2xd<br>» évacuation des copeaux vers la queue |
| | » elica destra 12 - 25°<br>» imbocco forma C / 2 - 3 filetti<br>» imbocco forma E / 1,5 - 2 filetti | » per foro cieco fino a 2xd<br>» evacuazione truciolo verso il gambo |
| | » hélice a derecha 12 - 25°<br>» entrada forma C / 2 - 3 hilos de rosca<br>» entrada forma E / 1,5 - 2 hilos de rosca | » para agujero ciego, profundidad de rosca hasta 2xd<br>» evacuación hacia atrás de la viruta |
| **DOMINANT®** | » 38 - 45° rechtsgedrallte Spannuten<br>» Anschnittform C / 2 - 3 Gänge<br>» Anschnittform E / 1,5 - 2 Gänge | » für Sacklochgewinde bis 3xd Gewindetiefe<br>» Spanabfuhr erfolgt in Schaftrichtung |
| | » spiral flute 38 - 45°<br>» chamfer form C / 2 - 3 threads<br>» chamfer form E / 1,5 - 2 threads | » for blind hole, thread depth up to 3xd<br>» chip evacuation backwards |
| | » goujures hélicoïdales 38 - 45°<br>» entrée C / 2 - 3 filets<br>» entrée E / 1,5 - 2 filets | » pour trous borgnes jusqu'à 3xd<br>» évacuation des copeaux vers la queue |
| | » elica destra 38 - 45°<br>» imbocco forma C / 2 - 3 filetti<br>» imbocco forma E / 1,5 - 2 filetti | » per foro cieco fino a 3xd<br>» evacuazione truciolo verso il gambo |
| | » hélice a derecha 38 - 45°<br>» entrada forma C / 2 - 3 hilos de rosca<br>» entrada forma E / 1,5 - 2 hilos de rosca | » para agujero ciego, profundidad de rosca hasta 3xd<br>» evacuación hacia atrás de la viruta |

## Gewindefurcher
roll taps / tarauds à refouler / maschi a rullare / laminadores

| | | |
|---|---|---|
| **DURAMAX®** | » mit und ohne Schmiernuten<br>» Anschnittform C / 2 - 3 Gänge<br>» Anschnittform E / 1,5 - 2 Gänge | » für Durchgangs- und Sacklochgewinde<br>» für formbare Werkstoffe bis 1.200 N/mm² |
| | » with or without oil grooves<br>» chamfer form C / 2 - 3 threads<br>» chamfer form E / 1,5 - 2 threads | » for through and blind hole<br>» for formable materials up to 1.200 N/mm² |
| | » avec et sans rainures de lubrification<br>» entrée C / 2 - 3 filets<br>» entrée E / 1,5 - 2 filets | » pour trous débouchants et borgnes<br>» pour matières ductiles, jusqu'à 1.200 N/mm² |
| | » con e senza scanalature per lubrificazione<br>» imbocco forma C / 2 - 3 filetti<br>» imbocco forma E / 1,5 - 2 filetti | » per foro passante e foro cieco<br>» per materiali duttili fino a 1.200 N/mm² |
| | » sin o con canales de aceite<br>» entrada forma C / 2 - 3 de rosca<br>» entrada forma E / 1,5 - 2 de rosca | » para agujero ciego y agujero pasante<br>» para materiales maleables hasta 1.200 N/mm² |

## Werkstoff
materials / matières / materiali / materiales

| | |
|---|---|
| **HSSE-PM** | Pulvermetallurgischer Schnellarbeitsstahl / powder metal / acier fritté / acciaio super rapido in polvere / acero rápido sinterizado |
| **VHM** | Vollhartmetall / made of solid carbide / carbure monobloc / in metallo duro / de metal duro |

## Sonstige Kurzbezeichnungen
other abbreviations / autres abréviations / altre abbreviazioni / otras abreviaciones

| | |
|---|---|
| **AK** | MMS-Übergabe am Vierkant mit Außenkegel / disposal of MQL at the square with external cone / carré à cône externe pour raccordement MQL / quantità minimale di lubrificazione esterna / cuadrado con cono externo para refrigeración interior MMS-MQL |
| **AZ** | ausgesetzte Zähne / interrupted threads / filets alternés / con denti alternati / con rosca interrumpida |
| **FL** | mit langen Nuten / with long flutes / avec goujures extra-longues / con scanalature extra lunghe / con ranuras largas |
| **HK** | mit hohem Kern / with high core / avec fond calibré / con nocciolo rinforzato / alto diámetro menor de rosca |
| **KA** | Kühlmittelzufuhr axial / axial coolant / lubrification interne axiale / lubrificazione interna assiale / refrigeración interior axial |
| **KR** | Kühlmittelzufuhr radial / radial coolant / lubrification interne radiale / lubrificazione interna radiale / refrigeración interior radial |
| **LH** | linksschneidend / left hand / filetage à gauche / filettatura sinistra / izquierda |
| **LSP** | Linksspirale / left spiral flute / hélice à gauche / elica sinistra / hélice izquierda |
| **MG** | Fächernut / multi-groove / rainure en queue d'aronde / scanalatura a ventaglio / multi ranura |
| **MKR** | Minimalmengenschmierung radial / radial interior coolant for minimum quantity lubrication / microlubrification interne en goujures / quantità minimale di lubrificazione radiale / refrigeración interior radial MMS-MQL |
| **RSP** | Rechtsspirale / right spiral flute / hélice à droite / elica destra / hélice derecha |
| **SL** | Werkzeuge mit langem Schaft / tools with long shank / outils à queue extra-longue / maschi con gambo extra lungo / herramientas con mango largo |
| **SR** | Werkzeuge mit kurzem Schaft / tools with short shank / outils à queue extra-courte / maschi con gambo corto / herramientas con mango corto |
| **TS** | Schaft für Trumpfmaschinen / shank for Trumpf machines / queue pour machines Trumpf / gambo per macchine Trumpf / mango para máquinas Trumpf |
| **1** | verstärkter Schaft / reinforced shank / queue renforcée / gambo rinforzato / mango reforzado |
| **2** | Überlaufschaft / reduced shank / queue dégagée / gambo passante / mango pasante |
| **h6** | Schafttoleranz / shank tolerance / tolérance queue / tolleranza gambo / tolerancia del mango |

## Einsatzgebiete
applications / applications / applicazione / aplicaciones

| | |
|---|---|
| **GAL** | für Aluminiumgusslegierungen / for cast aluminium / pour fonte d'aluminium / per alluminio fuso / para aleaciones de aluminio |
| **GG** | für Grauguss / for grey cast iron / pour fonte grise / per ghisa grigia / para fundición gris |
| **H** | für hochfeste Werkstoffe / for high resistant materials / pour matières réfractaires / per materiali ad alta resistenza / para materiales resistentes a altas temperaturas |
| **HO** | für hochfeste Werkstoffe, ohne Nuten / for high resistant materials, without oil grooves / pour matières réfractaires, sans rainures / per materiali ad alta resistenza, senza canalini / para materiales resistentes a altas temperaturas, sin canales de aceite |
| **HZ** | für zähe Werkstoffe / for tough materials / pour matières tenaces / per materiali tenaci / para materiales tenaces |
| **MHST** | für synchronisierten Einsatz / for synchronized employment / pour broche synchrone / per maschiature sincronizzate / para mecanizado sincronizado |
| **MS** | für Messing / for brass / pour laiton / per ottone / para latón |
| **N** | für normale Werkstoffe / for normal materials / pour matières courantes / per materiali normali / para materiales normales |
| **NB** | für Blechbearbeitungen / for sheet metal processing / usinage de la tôle / per la lavorazione della lamiera / tratamiento para chapa metálica |
| **NO** | für normale Werkstoffe, ohne Nuten / for normal materials, without oil grooves / pour matières courantes, sans rainures / per materiali normali, senza scanalature / para materiales normales, sin canales de aceite |
| **NI** | für Nickel und Nickellegierungen / for nickel and nickel alloys / pour nickel et alliages de nickel / per nickel e leghe di nickel / para níquel y aleaciones de níquel |
| **SH** | für gehärtete Stähle >48 HRC / for hardened steel >HRC 48 / pour aciers trempés >48 HRC / per acciaio temprato >48 HRC / para acero endurecido >HRC 48 |
| **TIH** | für Titan- u. Nickellegierungen sowie hochfeste Stähle / for titanium and nickel alloys and for high resistant materials / pour alliages de titane et de nickel et pour aciers réfractaires / per leghe di titanio e nickel e acciai ad alta resistenza / para aleaciones de titanio y de níquel y para aceros resistentes a altas temperaturas |
| **VA** | für rostfreie Stähle / for stainless steel / pour aciers inoxydables / per acciai inossidabili / para aceros inoxidables |
| **W** | für weiche Werkstoffe / for soft materials / pour matières tendres / per materiali dolci / para materiales blandos |
| **WM** | Werkzeugmachersatz, Nr. 1 mit Führungszapfen / tool set, no. 1 with cylindrical pilot / jeu de tarauds à main, n° 1 avec pilote / set di attrezzi, n. 1 con guida / juego de herramientas, núm. 1 con piloto cilíndrico |

## Beschichtungen und Oberfächenbehandlungen
coatings and surface finishings / revêtements et traitements de surface / rivestimenti e trattamenti superficiali / recubrimientos y acabados superficiales

| | | | | | |
|---|---|---|---|---|---|
| **BT** | **FNT** | **HL** | **TICN** | **TIN** | **VAP** |

# Anwendungstabelle

application table / tableau d'application / tabella d'impiego / tabla de uso

Wie gehe ich vor:
- Bohrart auswählen
- Einsatzgebiet auswählen
- Nach Schnittgeschwindigkeit suchen (vc m/min)
- Gewindeart und Seite auswählen

GT = Gewindetiefe

How to proceed:
- Select hole shape
- Select application
- Search for cutting speed (vc m/min)
- Select thread type and page

GT = thread depth

Comment procéder:
- Sélectionner le type de trou
- Sélectionner l'application
- Chercher la vitesse de coupe (vc m/min)
- Sélectionner le type de filet et la page

GT = profondeur de taraudage

$$n = \frac{v_c * 1000}{\pi * d_1} \qquad v_c = \frac{n * \pi * d_1}{1000}$$

| Ausführung / model / exécution | |
|---|---|
| GT = $Ød_1$ × | |
| M | S. / p. |
| M (SL) | S. / p. |
| MF | S. / p. |
| G | S. / p. |
| UNC | S. / p. |
| UNF / UN | S. / p. |
| BSW | S. / p. |
| EG | S. / p. |
| MJ / UNJC / UNJF | S. / p. |

| | Einsatzgebiet | Werkstoffbeispiele | Application | Examples of materials | Application |
|---|---|---|---|---|---|
| 1 | **Stahlwerkstoffe** | | **Steel materials** | | **Aciers** |
| 1.1 | Baustahl unleg. / Weicheisen | DC01 | Magnetic soft steel | FeP01 | Fer doux magnétique |
| 1.2 | Baustahl / Einsatzstahl | S235JR | Construction steel / case hardening steel | En40B | Aciers de construction et de cémentation |
| 1.3 | Bau- / Kohlenstoffstahl C<0,45% / Stahl niedrigleg. | C45 | Carbon steel | 080M46 | Aciers au carbone |
| 1.4 | Kohlenstoffstahl C>0,45% / Stahl niedrigleg. / Stahl hochleg. | 42CrMo4 | Alloyed / heat-treatable steel | En19A | Aciers alliés / aciers pour traitement thermique |
| 1.5 | Stahl legiert / hochlegiert | X153CrMoV12 | Alloyed steel | BD2 | Aciers alliés |
| 1.6 | Stahl legiert / hochlegiert | 42CrMo4 | Alloyed steel | En19A | Aciers alliés |
| 1.7 | Stahl legiert / hochlegiert | 56Si7 | Alloyed steel | 251A58 | Aciers alliés |
| 1.8 | Stahl gehärtet | 34CrMo4 | Hardened steel | 708A30 | Aciers trempés |
| 1.9 | Stahl gehärtet | X100CrMoV5 | Hardened steel | BA2 | Aciers trempés |
| 2 | Rostfreier Stahl | | Stainless steel | | Aciers inoxydables |
| 2.1 | Stahl-ferritisch u. martensitisch | X30Cr13 | Ferritic / martensitic steel | 420S37 | Aciers ferritiques, martensitiques |
| 2.2 | Stahl-austenitisch, aust.-ferritisch | X6CrNiMoTi17-12-2 | Austenitic steel | 320S18 | Aciers austénitiques |
| 2.3 | Stahl-austenitisch, aust.-ferritisch u. ferritisch | X7CrNiAl17-7 | High temperature steel | 301S81 | Aciers réfractaires |
| 3 | Gusseisen | | Cast iron | | Fontes |
| 3.1 | Grauguss-lamellar | EN-GJL-200 | Grey cast iron | EN-GJL-200 | Fonte grise |
| 3.2 | Kugelgraphitguss | EN-GJS-400-15U | Cast iron with nodular graphite | Grade 420/12 | Fonte à graphite sphéroïdal |
| 3.3 | Temperguss weiß / schwarz | EN-GJMB-350-10 | Malleable cast iron | EN-GJMB-350-10 | Fonte malléable |
| 3.4 | Vermikularguss / ADI / Hartguss | EN-GJV-300 | Cast iron with vermicular graphite | EN-GJV-300 | Fonte vermiculaire |
| 4 | Kupfer | | Copper | | Cuivre |
| 4.1 | Reinkupfer | Cu-ETP | Copper non-alloyed | Cu-ETP-2 C 101 | Cuivre pur / électrolytique |
| 4.2 | Kupfer Legierungen (kurzspanend) | CuZn39Pb2 | Brass (short chipping) | CZ 120 | Alliages de cuivre (copeaux courts) |
| 4.3 | Kupfer Legierungen (langspanend) | CuZn37 | Brass (long chipping) | CZ 108 | Alliages de cuivre (copeaux longs) |
| 4.4 | Cu-Al-Ni-Legierungen (kurzspanend) | CuNi10Fe1Mn | Copper-alu-nickel alloyed (short chipping) | CN 102 | Alliages Cu-Al-Ni (copeaux courts) |
| 4.5 | Cu-Al-Ni-Legierungen (langspanend) | CuAl10NiFe4 | Copper-alu-nickel alloyed (long chipping) | CA 104 | Alliages Cu-Al-Ni (copeaux longs) |
| 4.6 | Kupfer Sonderlegierungen (bis Ampco 20) | CuAl10Fe3Mn2 | Special copper alloyed ≤ Ampco 20 | CA 105 | Alliages de cuivre spéciaux ≤ Q 18 |
| 4.7 | Kupfer Sonderlegierungen (ab Ampco 21) | CuAl13Fe4,5 | Special copper alloyed ≥ Ampco 21 | AMPCO 21 | Alliages de cuivre spéciaux ≥ Q 18 |
| 5 | Aluminium / Magnesium | | Aluminium / Magnesium | | Aluminium / Magnésium |
| 5.1 | Aluminium Si-Gehalt ≤0,5% | EN AW-Al99,0 | Alu wrought alloy Si ≤0,5% | 1B | Alu non alliés / alliages corroyés d'alu / Si ≤0,5 % |
| 5.2 | Aluminium Si-Gehalt ≤6% | EN AC-AlSi6Cu4 | Alu alloyed Si ≤6% | LM22 | Fontes d'alu ≤6 % Si |
| 5.3 | Aluminium Si-Gehalt >6% | EN AC-AlSi10Mg(a) | Alu alloyed Si >6% | LM9 | Fontes d'alu >6 % Si |
| 5.4 | Magnesium und Magnesiumlegierungen | MgMn2 | Magnesium wrought alloy | MAG 101 | Alliages corroyés de magnésium |
| 6 | Titan | | Titanium | | Titane |
| 6.1 | Titan unlegiert | Ti 99,7 | Titanium non-alloyed | TA.2 | Titane pur |
| 6.2 | Titan legiert | TiAl6V4 | Titanium alloyed | TA.10 | Alliages de titane |
| 6.3 | Titan legiert | TiAl6V4 | Titanium alloyed | TA.10 | Alliages de titane |
| 7 | Nickel | | Nickel | | Nickel |
| 7.1 | Nickel unlegiert | Ni 99,6 | Nickel non-alloyed | BS3072: NA11 | Nickel pur |
| 7.2 | Nickel legiert | NiCu30Fe | Nickel alloyed | BS3072: NA13 | Alliages de nickel |
| 7.3 | Nickel legiert | NiCr19NbMo | Nickel alloyed | INCONELalloy718 | Alliages de nickel |
| 8 | Kunststoffe | | Synthetics | | Matières synthétiques |
| 8.1 | Thermoplaste (langspanend) | Polystyrol | Thermoplastic (long chipping) | Styreme | Thermoplastiques (copeaux longs) |
| 8.2 | Duroplaste (kurzspanend) | Toulnell | Duroplastic (short chipping) | Toufnell | Matières thermodurcissables (copeaux courts) |
| 8.3 | faserverstärkte Kunststoffe | CFK | Fibre-reinforced plastic | Carbonfibre | Matières synthétiques renforcées par fibres |
| 9 | Sonderwerkstoffe | | Special materials | | Matières spéciaux |
| 9.1 | Kobalt Legierungen | Stellite 27 | Cobalt alloyed | | Alliages à base de cobalt |
| 9.2 | Wolfram Legierungen | Densimet W | Tungsten alloyed | | Alliages de tungstène |
| 9.3 | Titancarbid Hartstoffe | Ferro Titanit | TIC-hard material | | Carbure de titane |
| 9.4 | Graphit | Graphit R8430 | Graphite | | Graphite |

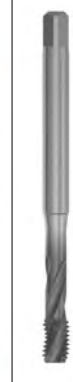
| | | | | Durchgangsloch / through hole / trou débouchant | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | VARIANT N | VARIANT N | VARIANT H | VARIANT H | VARIANT H | VARIANT H | VARIANT VA | VARIANT VA | VARIANT VA | VARIANT MHST |
| | | | | | | | | | | | | | |
| | | | | | TIN HSSE-PM | HSSE-PM | VAP HSSE-PM | TIN HSSE-PM | TICN HSSE-PM | VAP HSSE-PM | TIN HSSE-PM | HL HSSE-PM | HK TIN HSSE-PM |
| | | | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| | | | | 24 - 25 | 24 - 25 | 24, 26 - 27 | 26, 28 - 29 | 28 - 30 | 30 - 31, 86 | 32 - 33 | 32 - 33 | 32 - 33 | 34 - 35 |
| | | | | | | | | | | | 78 - 79 | | |
| | | | | | | | | | | | 84, 86 | 86 | |
| | | | | | | | | | | | 94 | 94 | |
| | | | | | | 106 - 107 | | | | | 106 - 107 | 106 - 107 | |
| | | | | 122 | | 114 - 115 | | | | | 114 - 115 | 114 - 115 | |
| | | | | | | 128 - 129 | | | | | | | |
| **Exemples de matières** | **N/mm²** | **HB** | **HRC** | **vc m/min** | | | | | | | | | |
| C | > 100 < 450 | | | | **20 - 30** | | | | | 10 - 15 | **20 - 30** | **20 - 30** | **20 - 80** |
| S235JRG2 | > 300 < 700 | | | 10 - 20 | **20 - 30** | | | | | 10 - 20 | **20 - 30** | **20 - 30** | **20 - 80** |
| AF65 | > 400 < 950 | | | 10 - 20 | **20 - 30** | 10 - 20 | 10 - 20 | **20 - 30** | **20 - 30** | 10 - 20 | **20 - 30** | **20 - 30** | **20 - 80** |
| 42CD4 | > 450 < 950 | | | | | 10 - 15 | 10 - 15 | **15 - 35** | 15 - 35 | 10 - 15 | **15 - 35** | **15 - 35** | **15 - 45** |
| Z160CDV12 | > 800 < 1250 | > 235 < 370 | > 22 < 40 | | | 5 - 10 | | 10 - 20 | **10 - 20** | | 10 - 20 | 10 - 20 | **15 - 35** |
| 42CD4 | > 1100 < 1400 | > 325 < 410 | > 34 < 45 | | | | | | 3 - 8 | | | | **8 - 15** |
| 55S7 | > 1200 < 1550 | > 350 < 455 | > 39 < 48 | | | | | | | | | | |
| 34CD4 | > 1600 < 2000 | > 470 < 590 | > 48 < 56 | | | | | | | | | | |
| Z100CDV5 | | | > 56 < 63 | | | | | | | | | | |
| Z30C13 | > 450 < 1200 | | | | | | 4 - 6 | 6 - 12 | | **4 - 6** | 6 - 12 | **6 - 12** | **8 - 12** |
| Z6CNDT17-12 | > 400 < 950 | | | | | | 3 - 8 | 6 - 12 | | 3 - 8 | 6 - 12 | **6 - 12** | **8 - 15** |
| Z9CNA17-07 | > 850 < 1550 | > 250 < 455 | > 25 < 48 | | | | 1 - 4 | 3 - 6 | | 1 - 4 | 3 - 8 | **3 - 8** | **3 - 10** |
| EN-GJL-200 | > 150 < 1000 | > 100 < 300 | | | | | | | | | | | |
| FGS400-15 | > 350 < 1000 | > 100 < 350 | | | | | | 10 - 25 | **10 - 25** | | 8 - 20 | 8 - 20 | **15 - 25** |
| EN-GJMB-350-10 | > 300 < 700 | > 100 < 200 | | | | | | 15 - 25 | **15 - 25** | | 15 - 25 | 15 - 25 | **15 - 25** |
| EN-GJV-300 | > 700 < 1000 | > 200 < 300 | > 20 < 32 | | | | | | 5 - 15 | | 5 - 15 | 5 - 15 | **5 - 15** |
| Cu-a1 | > 200 < 400 | > 60 < 120 | | | | 6 - 10 | | **10 - 25** | | | **10 - 25** | 10 - 25 | **20 - 30** |
| CuZn40Pb2 | > 350 < 700 | > 100 < 200 | | | | | | | | | **15 - 35** | **15 - 35** | **20 - 60** |
| CuZn37 | > 150 < 700 | > 45 < 200 | | | **15 - 35** | | | **15 - 35** | | | **15 - 35** | 15 - 35 | **20 - 50** |
| CW352H | > 150 < 700 | > 45 < 200 | | | | | | | | | 10 - 20 | | 15 - 30 |
| CuAl9Ni5Fe3Mn | > 500 < 750 | > 150 < 220 | | | | 6 - 12 | | 12 - 20 | **15 - 25** | | **15 - 25** | | 15 - 25 |
| CuAl9Fe3Mn2 | > 550 < 650 | > 160 < 190 | | | | | | | | | | | |
| AMPCO 21 | > 700 < 1500 | > 200 < 440 | > 21 < 47 | | | | | | | | | | |
| 1050A | > 100 < 700 | > 30 < 200 | | **10 - 25** | | | | | | | | | |
| A-S5U3 | > 150 < 700 | > 45 < 200 | | **10 - 25** | **15 - 40** | | | | | | **15 - 40** | **15 - 40** | **20 - 60** |
| A-S10G | > 150 < 900 | > 45 < 265 | | | **15 - 40** | | | | | | **15 - 40** | **15 - 40** | **20 - 60** |
| G-M2 | > 150 < 500 | > 45 < 150 | | | | | | | **20 - 30** | | | | **25 - 40** |
| T-40 | > 300 < 700 | > 90 < 200 | | | | | | | | 5 - 10 | | | |
| T-A6V | > 450 < 900 | > 135 < 265 | > 14 < 27 | | | | | | | | | | |
| T-A6V | > 900 < 1250 | > 265 < 370 | > 27 < 40 | | | | | | | | | | |
| Ni-0,1 | > 400 < 600 | > 120 < 175 | | | **8 - 15** | | | | | | **8 - 15** | | **10 - 25** |
| Nu30 | > 400 < 1200 | > 120 < 350 | > 12 < 39 | | | | | | | | 3 - 6 | | **4 - 8** |
| NC 19 FeNb | > 1200 < 1550 | > 350 < 455 | > 39 < 48 | | | | | | | | | | |
| Polystyrène | > 20 < 80 | | | 10 - 25 | **10 - 25** | | | | | | **10 - 25** | | **15 - 30** |
| Touffnell | > 80 < 110 | | | | | | | | | | | | |
| CFK | > 800 < 1500 | > 235 < 440 | | | | | | | | | | | |
| | > 400 < 2000 | > 120 < 590 | | | | | | | | | | | |
| | > 1400 < 1800 | > 410 < 530 | > 44 < 52 | | | | | | | | | | |
| | | > 440 < 495 | > 47 < 50 | | | | | | | | | | |
| | > 38 < 60 | | | | | | | | | | | | |



**Werkzeug gut geeignet**
Werkzeug geeignet

**Tool well suitable**
Tool suitable

**Outil conseillé**
Outil adapté

| Durchgangsloch / through hole / trou débouchant | | | Durchgangsloch und Sackloch / through and blind hole / trou débouchant et borgne | | | | Sackloch / blind hole / trou borgne | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VARIANT MHST | VARIANT TIH | VARIANT NI | VARIO H | VARIO GG | VARIO GG | VARIO MS | AVANT H15 | AVANT H15 | AVANT H15 | AVANT H15 | AVANT H25 | AVANT GAL15 | AVANT TIH13 | AVANT NI13 |
| | | | | | | | | | | |  | | | |
| KR HK TIN HSSE-PM | TICN HSSE-PM | TICN HSSE-PM | KA TICN HSSE-PM | TICN HSSE-PM | KA TICN HSSE-PM | HSSE-PM | HSSE-PM | TICN HSSE-PM | KA TICN HSSE-PM | KA HL SL FL HSSE-PM | HL HSSE-PM | KA TICN HSSE-PM | TICN HSSE-PM | TICN HSSE-PM |
| 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2,5 | 2,5 | 2,5 |
| 34 - 35 | 34 - 35 | | 36 | 38 - 39 | 38 - 39 | 40 | 40 - 41 | 40 - 42 | 40 - 41 | 79 | 42 - 44 | 44 - 45 | 44 - 45 | |
| | | | | 78 - 79 | | | | | | | | | | |
| | 86 | | | 87 | 87 | | 87 | 87 | 88 | | 88 | 88 | 89 | |
| | | | | 94 | | | 95 | | | | 95 | | | |
| | | | | 106 - 107 | | | | | | | | | | |
| | | | | 114 - 115 | | | 116, 123 | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | 134 - 139 | 134 - 139 | | | | | | | | | | | 134 - 139 | 134 - 139 |
| **vc m/min** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **20 - 80** | | | | | | | | | | | | | | |
| **20 - 80** | | | | | | | | | | **15 - 35** | **20 - 30** | | | |
| **20 - 80** | | | | | | | | | | **15 - 35** | **20 - 30** | | | |
| **15 - 45** | 20 - 30 | | 15 - 35 | | | | 10 - 15 | **15 - 35** | **15 - 35** | **15 - 35** | **15 - 35** | **15 - 35** | | |
| **15 - 35** | **10 - 25** | | **10 - 20** | | | | 5 - 10 | **10 - 20** | **10 - 20** | **10 - 20** | **10 - 20** | **10 - 20** | **10 - 25** | |
| **8 - 15** | **3 - 12** | | 4 - 10 | | | | | 4 - 10 | 4 - 10 | **4 - 10** | **5 - 8** | 4 - 10 | **3 - 10** | |
| | 3 - 10 | **2 - 4** | | | | | | | | | | | | **2 - 4** |
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| **8 - 12** | | | | | | | | | | | 6 - 12 | | | |
| **8 - 15** | | | | | | | | | | | 6 - 12 | | | |
| **3 - 10** | | | | | | | | | | | **3 - 6** | | | |
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| | | | 20 - 30 | **20 - 40** | **20 - 60** | | | 20 - 30 | 20 - 30 | 20 - 30 | | | | |
| **15 - 25** | **15 - 25** | | 15 - 25 | 15 - 25 | **15 - 25** | | | **10 - 25** | **10 - 25** | **10 - 25** | | **10 - 25** | **15 - 25** | |
| **15 - 25** | **15 - 25** | | 15 - 25 | 15 - 25 | **15 - 25** | | | **15 - 25** | **15 - 25** | **15 - 25** | | **15 - 25** | **15 - 25** | |
| **5 - 15** | **5 - 15** | | 5 - 15 | 5 - 15 | **5 - 15** | | | 5 - 15 | 5 - 15 | 5 - 15 | | 5 - 15 | **5 - 15** | |
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| **20 - 30** | | | | | | | 6 - 10 | | | | | | | |
| **20 - 60** | | | | | | **10 - 35** | 15 - 35 | | | | 15 - 35 | | | |
| **20 - 50** | | | **15 - 35** | | | | 10 - 25 | **15 - 35** | **15 - 35** | | **15 - 35** | **15 - 35** | | |
| **15 - 30** | **10 - 20** | | **10 - 20** | | | 5 - 15 | 5 - 15 | **10 - 20** | **10 - 20** | | | **10 - 20** | **10 - 20** | |
| 15 - 25 | **15 - 25** | | **15 - 25** | | | | 10 - 15 | **15 - 25** | **15 - 25** | | | **15 - 25** | **15 - 25** | |
| | **5 - 12** | | **8 - 12** | | | | 8 - 12 | **8 - 12** | **8 - 12** | | | **8 - 12** | **5 - 12** | |
| | | | | | | | | | | | | | | 1 - 2 |
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| | | | | | | | | | | | **15 - 40** | | | |
| **20 - 60** | | | | | | | | | | | 15 - 35 | **15 - 40** | | |
| **20 - 60** | | | | | | | | | | | 15 - 35 | **15 - 40** | | |
| **25 - 40** | **25 - 35** | | **25 - 35** | **25 - 35** | **25 - 35** | | | **25 - 35** | **25 - 35** | | | **25 - 35** | **25 - 35** | |
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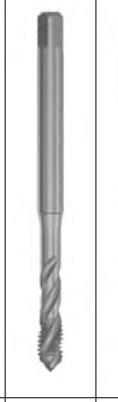
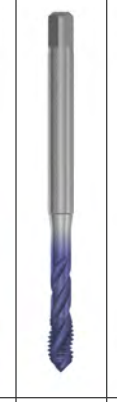
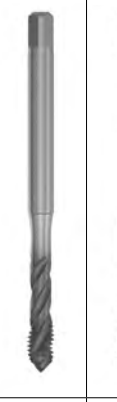
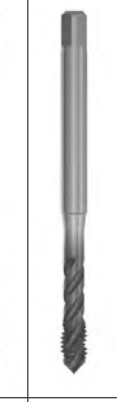
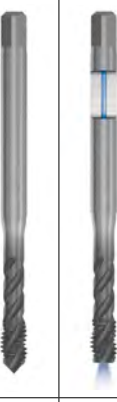
| | **5 - 12** | | | | | | | | | | | | **5 - 10** | |
| | **5 - 12** | | | | | | | | | | | | **5 - 12** | |
| | **2 - 4** | | | | | | | | | | | | **2 - 4** | |
| | | | | | | | | | | | | | | |
| **10 - 25** | | | | | | | | | | | | | | |
| **4 - 8** | **3 - 6** | | | | | | | | | | | | **3 - 6** | |
| | | **2 - 3** | | | | | | | | | | | | **2 - 3** |
| | | | | | | | | | | | | | | |
| **15 - 30** | | | | | | | | | | | | | | |
| | | | 5 - 15 | **5 - 15** | **5 - 15** | 5 - 15 | | | | | | | | |
| | | | | **3 - 10** | **3 - 10** | 3 - 10 | | | | | | | | |
| | | | | | | | | | | | | | | |
| | **1 - 2** | | | | | | | | | | | | 1 - 2 | |
| | | **2 - 3** | | | | | | | | | | | | **2 - 3** |
| | | | | | | | | | | | | | | |
| | | | | | **5 - 15** | | | | | | | | | |

**Werkzeug gut geeignet**
Werkzeug geeignet

**Tool well suitable**
Tool suitable

**Outil conseillé**
Outil adapté

| DOMINANT N38 | DOMINANT N38 | DOMINANT HZ38 | DOMINANT HZ38 | DOMINANT HZ38 | DOMINANT HZ38 | DOMINANT HZ38 | DOMINANT VA45 | DOMINANT VA45 | DOMINANT VA45 | DOMINANT VA45 | DOMINANT VA45 | DOMINANT MHST45 | DOMINANT MHST45 | DOMINANT MHST45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | | | |  |  | | |  | | |  | |  |  |
| HSSE-PM | TIN HSSE-PM | HSSE-PM | VAP HSSE-PM | TIN HSSE-PM | TICN HSSE-PM | HL HSSE-PM | HSSE-PM | VAP HSSE-PM | TIN HSSE-PM | HL HSSE-PM | KA HL HSSE-PM | HK TIN HSSE-PM | HK HL HSSE-PM | KA HK HL HSSE-PM |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 46 - 47 | 46 - 47 | 48 - 49 | 48 - 49 | 50 - 51 | 50 - 51 | 50 - 51 | 52 - 53 | 52 - 53 | 54 - 56 | 56 - 59 | 56 - 57 | 60 - 61 | 60 - 62 | 60 |
| | | | | | | | 80 - 81 | | | 80 - 81 | | | | |
| | | 90 | | 90 | | 90 | 90 | | 91 | 84, 91 | | | | |
| | | 95 | | 95 | | 96 | 96 | | 96 | 96 | | | | |
| | | 108 - 109 | | | | 108 - 109 | 108 - 109 | | 110 - 111 | 110 - 111 | | | | |
| | | 116, 117, 123 | | | | 116 - 117 | 118 - 119 | | 118 - 119 | 118 - 119 | | | | |
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| | | | | | | | | | | 130 - 133 | | | | |
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| **vc m/min** | | | | | | | | | | | | | | |
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| | **20 - 30** | | | | | | | 10 - 15 | 20 - 30 | **20 - 30** | **20 - 30** | 20 - 60 | **20 - 60** | **20 - 60** |
| 10 - 20 | **20 - 30** | 10 - 20 | 10 - 20 | 20 - 30 | | **20 - 30** | | 10 - 20 | 20 - 30 | **20 - 30** | **20 - 30** | 20 - 60 | **20 - 60** | **20 - 60** |
| 10 - 20 | **20 - 30** | 10 - 20 | 10 - 20 | 20 - 30 | | **20 - 30** | 10 - 20 | 10 - 20 | 20 - 30 | **20 - 30** | **20 - 30** | 20 - 60 | **20 - 60** | **20 - 60** |
| | | 10 - 15 | 10 - 15 | 15 - 35 | **15 - 35** | **15 - 35** | 10 - 15 | 10 - 15 | 15 - 35 | **15 - 35** | **15 - 35** | 15 - 45 | **15 - 45** | **15 - 45** |
| | | 5 - 10 | | 10 - 20 | **10 - 20** | **10 - 20** | 5 - 10 | 5 - 10 | 10 - 20 | **10 - 20** | **10 - 20** | 15 - 35 | **15 - 35** | **15 - 35** |
| | | | | | 4 - 10 | | | | 5 - 8 | 5 - 8 | 5 - 8 | 8 - 12 | **8 - 12** | **8 - 12** |
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| | | | 4 - 8 | | | 6 - 12 | | 4 - 6 | 6 - 12 | **6 - 12** | **6 - 12** | 8 - 12 | **8 - 12** | **8 - 12** |
| | | | 4 - 8 | | | 6 - 12 | | 4 - 8 | 6 - 12 | **6 - 12** | **6 - 12** | 8 - 15 | **8 - 15** | **8 - 15** |
| | | | | | | 3 - 6 | | | 3 - 6 | **3 - 6** | **3 - 6** | 3 - 10 | **3 - 10** | **3 - 10** |
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| | | | | | 10 - 25 | 10 - 25 | | | | | 8 - 15 | | 15 - 25 | 15 - 25 |
| | | | | | 15 - 25 | 15 - 25 | | | | 15 - 25 | 15 - 25 | | 15 - 25 | 15 - 25 |
| | | | | | 5 - 15 | 5 - 15 | | | | 5 - 15 | 5 - 15 | | 5 - 15 | 5 - 15 |
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| | | 4 - 8 | | 10 - 25 | | | | | 10 - 25 | | 10 - 25 | **20 - 30** | | **20 - 30** |
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| 10 - 25 | 15 - 35 | 10 - 25 | | 15 - 35 | | | 10 - 25 | | **15 - 35** | | 15 - 35 | **20 - 50** | | **20 - 50** |
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| | | 10 - 15 | 10 - 15 | **15 - 25** | **15 - 25** | | 10 - 15 | | **15 - 25** | | | **15 - 25** | | |
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| **10 - 25** | | | | | | | **10 - 25** | | 15 - 35 | **15 - 35** | **15 - 35** | 15 - 35 | **15 - 35** | **15 - 35** |
| 10 - 25 | **15 - 40** | | | | | | 10 - 25 | | **15 - 40** | **15 - 40** | **15 - 40** | **20 - 60** | **20 - 60** | **20 - 60** |
| 10 - 20 | **15 - 40** | | | | | | 10 - 20 | | **15 - 40** | **15 - 40** | **15 - 40** | **20 - 60** | **20 - 60** | **20 - 60** |
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| | | | | | | | | | 8 - 15 | **8 - 15** | **8 - 15** | **10 - 25** | **10 - 25** | **10 - 25** |
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| 10 - 25 | **10 - 25** | | | | | | **10 - 25** | | 10 - 25 | | | | | |
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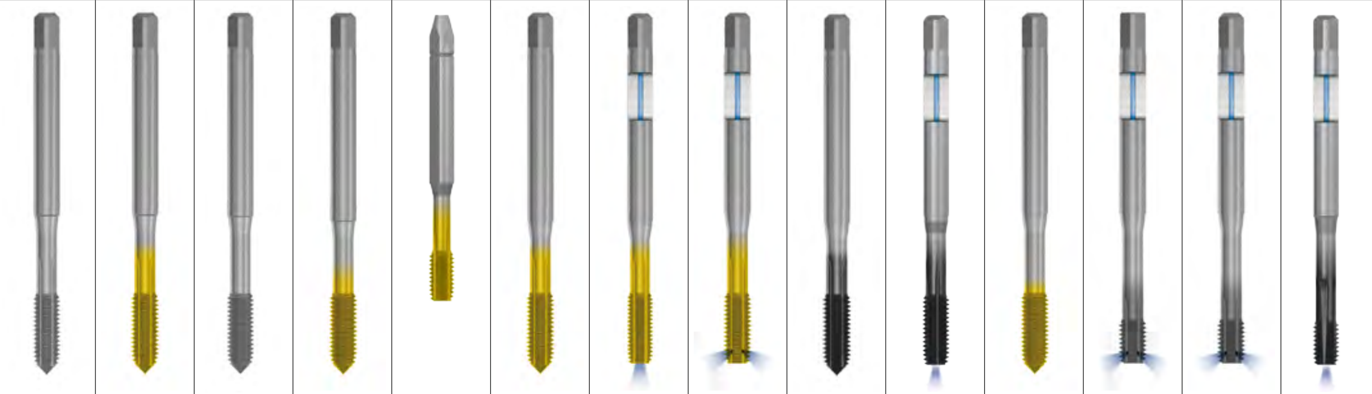
**Werkzeug gut geeignet**
Werkzeug geeignet

**Tool well suitable**
Tool suitable

**Outil conseillé**
Outil adapté

| Durchgangsloch und Sackloch / through and blind hole / trou débouchant et borgne | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DURAMAX N | DURAMAX N | DURAMAX NO | DURAMAX NO | DURAMAX NB | DURAMAX H | DURAMAX H | DURAMAX H | DURAMAX H | DURAMAX H | DURAMAX HO | DURAMAX GAL | DURAMAX GAL | DURAMAX GAL |
|  | | | | | | | | | | | | | |
| HSSE-PM | TIN HSSE-PM | HSSE-PM | TIN HSSE-PM | TIN TS HSSE-PM | TIN HSSE-PM | KA TIN HSSE-PM | KR TIN HSSE-PM | BT HSSE-PM | KA BT HSSE-PM | TIN HSSE-PM | MKR HL HSSE-PM | MKR AK HL HSSE-PM | MKA BT MG HSSE-PM |
| 3 | 3 | 3 | 3 | | 3 | 3 | 3 | | | 3 | 3 | 3 | |
| 64 | 64 - 66 | 66 | 66, 68 | 76 - 77 | 68 - 69 | 70 - 71 | 70 - 71 | 70 - 71 | 72 - 73 | 72 | 74 - 75 | 74 - 75 | 74 |
| | 80 | | | | | | | | | | | | |
| | 85, 92 | | | | 92 | 92 | | 85, 93 | | | 93 | 93 | 85, 93 |
| | 97 | | | | | | | | | | | | |
| | 112 - 113 | | | | | | | | | | | | |
| | 120 - 121 | | | | | | | | | | | | |
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| **vc m/min** | | | | | | | | | | | | | |
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| | **20 - 30** | | 20 - 30 | **20 - 30** | **20 - 30** | **20 - 30** | **20 - 30** | **20 - 35** | **20 - 35** | 20 - 30 | | | |
| | **20 - 50** | | 20 - 50 | **20 - 50** | **20 - 50** | **20 - 50** | **20 - 50** | **20 - 55** | **20 - 55** | 20 - 50 | | | |
| | **20 - 30** | | 20 - 30 | **20 - 30** | **20 - 30** | **20 - 30** | **20 - 30** | **20 - 35** | **20 - 35** | 20 - 30 | | | |
| | **15 - 30** | | 15 - 30 | **15 - 30** | **15 - 30** | **15 - 30** | **15 - 30** | **15 - 35** | **15 - 35** | 15 - 30 | | | 15 - 35 |
| | **10 - 20** | | 10 - 20 | **10 - 20** | **10 - 20** | **10 - 20** | **10 - 20** | **10 - 25** | **10 - 25** | 10 - 20 | | | **10 - 25** |
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| | **6 - 12** | | 6 - 12 | **6 - 12** | **6 - 12** | **6 - 12** | **6 - 12** | **6 - 15** | **6 - 15** | 6 - 12 | | | |
| | **8 - 12** | | 8 - 12 | **8 - 12** | **8 - 12** | **8 - 12** | **8 - 12** | **8 - 15** | **8 - 15** | 8 - 12 | | | |
| | 4 - 10 | | 4 - 10 | 4 - 10 | **4 - 10** | **4 - 10** | **4 - 10** | **4 - 12** | **4 - 12** | 4 - 10 | | | |
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| 4 - 8 | 10 - 30 | 4 - 8 | **10 - 30** | 10 - 35 | 10 - 30 | 10 - 30 | 10 - 30 | 10 - 35 | 10 - 35 | **10 - 30** | | | |
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| | **15 - 35** | | 15 - 35 | **15 - 35** | **15 - 35** | **15 - 35** | **15 - 35** | **15 - 40** | **15 - 40** | 15 - 35 | | | |
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| 15 - 30 | | 15 - 30 | | | | | | 15 - 40 | 15 - 40 | | **20 - 40** | **20 - 40** | **20 - 50** |
| 10 - 25 | **20 - 40** | 10 - 25 | 20 - 40 | **20 - 40** | **20 - 40** | **20 - 40** | **20 - 40** | **20 - 60** | **20 - 60** | 20 - 40 | **20 - 40** | **20 - 40** | **20 - 60** |
| | **15 - 40** | | 15 - 40 | **15 - 40** | **15 - 40** | **15 - 40** | **15 - 40** | **15 - 50** | **15 - 50** | 15 - 40 | **15 - 40** | **15 - 40** | **15 - 50** |
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| **10 - 15** | | 10 - 15 | | | | | | | | | | | |
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| | **10 - 25** | | 10 - 25 | **10 - 25** | **10 - 25** | **10 - 25** | **10 - 25** | **10 - 25** | **10 - 25** | 10 - 25 | **10 - 25** | **10 - 25** | **10 - 25** |
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**Werkzeug gut geeignet** Werkzeug geeignet

**Tool well suitable** Tool suitable

**Outil conseillé** Outil adapté

# Anwendungstabelle

application table / tableau d'application / tabella d'impiego / tabla de uso

Come procedere:
- Scegliere il tipo di foro
- Scegliere il gruppo di materiale
- Cercare la velocità di taglio (vc m/min)
- Scegliere il tipo di filettatura e la pagina

GT = profondità del filetto

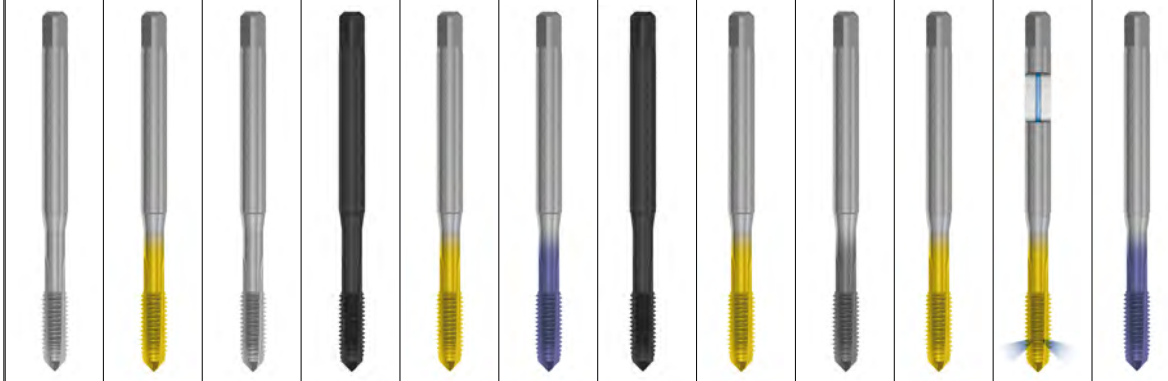
Cómo proceder:
- Seleccionar el tipo de agujero
- Seleccionar la aplicación
- Buscar la velocidad de corte (Vc m/min)
- Seleccionar el tipo de rosca y la página

GT = profundidad de rosca

$$n = \frac{v_c * 1000}{\pi * d_1} \qquad v_c = \frac{n * \pi * d_1}{1000}$$

| modello / modelo | |
|---|---|
| GT = $Ød_1$ × | |
| M | S. / p. |
| M (SL) | S. / p. |
| MF | S. / p. |
| G | S. / p. |
| UNC | S. / p. |
| UNF / UN | S. / p. |
| BSW | S. / p. |
| EG | S. / p. |
| MJ / UNJC / UNJF | S. / p. |

| | Impiego | Designazione dei materiali | Aplicación | Ejemplo de materiales | N/mm² | |
|---|---|---|---|---|---|---|
| 1 | **Acciai** | | **Aceros** | | | |
| 1.1 | Ferro magnetico dolce | DC01 | Acero magnético suave | DC01 | > 100 < 450 | |
| 1.2 | Acciaio da costruzione e da cementazione | Fe360B-FN | Acero de construcción / acero de cementación | A360B-NE | > 300 < 700 | |
| 1.3 | Acciaio al carbonio | C45 | Acero al carbono | C45 | > 400 < 950 | |
| 1.4 | Acciaio legato / bonificato | G40CrMo4 | Acero aleado | 40CrMo4 | > 450 < 950 | |
| 1.5 | Acciaio legato | X155CrVMo12-1KU | Acero aleado templado y revenido | X153CrMoV12 | > 800 < 1250 | |
| 1.6 | Acciaio legato | G40CrMo4 | Acero aleado templado y revenido | 40CrMo4 | > 1100 < 1400 | |
| 1.7 | Acciaio legato | 56Si7 | Acero aleado templado y revenido | 56Si7 (F.144) | > 1200 < 1550 | |
| 1.8 | Acciaio temprato | 35CrMo4F | Acero endurecido | 34CrMo4 | > 1600 < 2000 | |
| 1.9 | Acciaio temprato | X100CrMoV5-1KU | Acero endurecido | X100CrMoV5 | | |
| 2 | Acciai inossidabili | | Acero inoxidable | | | |
| 2.1 | Acciai ferritici / martensiti | X31Cr13KU | Acero ferritico, martensitico | X30Cr13 | > 450 < 1200 | |
| 2.2 | Acciai austenitici | X6CrNiMoTi17-12-2 | Austenitico | X6CrNiMoTi17-12-2 | > 400 < 950 | |
| 2.3 | Acciai termostabili | X7CrNiAl17-7 | Aleac. Cr-Ni resist. a elevadas temperaturas | X7CrNiAl17-7 | > 850 < 1550 | |
| 3 | Ghisa | | Fundición gris | | | |
| 3.1 | Ghisa grigia | EN-GJL-200 | Fundición gris | EN-GJL-200 | > 150 < 1000 | |
| 3.2 | Ghisa sferoidale | GS400-12 | Fundición esferoidal | EN-GJS-400-15U | > 350 < 1000 | |
| 3.3 | Ghisa temprata | EN-GJMB-350-10 | Fundición maleable, nodular | EN-GJMB-350-10 | > 300 < 700 | |
| 3.4 | Ghisa vermiculare | EN-GJV-300 | Fundición gris compactada | EN-GJV-300 | > 700 < 1000 | |
| 4 | Rame | | Cobre | | | |
| 4.1 | Rame puro / elettrolitico | Cu-ETP | Cobre puro | Cu-ETP | > 200 < 400 | |
| 4.2 | Ottone (truciolo corto) | CuZn39Pb2 | Latón (viruta corta) | CuZn39Pb2 | > 350 < 700 | |
| 4.3 | Ottone (truciolo lungo) | P-CuZn37 | Latón (viruta larga) | CuZn37 | > 150 < 700 | |
| 4.4 | Leghe di Cu-Al-Ni (truciolo corto) | CW352H | Aleaciones Cu-Al-Ni (viruta corta) | CW352H | > 150 < 700 | |
| 4.5 | Leghe di Cu-Al-Ni (truciolo lungo) | CW307G | Aleaciones Cu-Al-Ni (viruta larga) | CW307G | > 500 < 750 | |
| 4.6 | Leghe Cu-Al-Fe ≤ Ampco 20 | CW306G | Aleaciones Cu-Al-Fe ≤ Ampco 20 | CW306G | > 550 < 650 | |
| 4.7 | Leghe Cu-Al-Fe ≥ Ampco 21 | AMPCO 21 | Aleaciones Cu-Al-Fe ≥ Ampco 21 | AMPCO 21 | > 700 < 1500 | |
| 5 | Alluminio / Magnesio | | Aluminio / Magnesio | | | |
| 5.1 | Alluminio puro / leghe plastificabili d'alluminio Si ≤0,5% | 4507 | Aluminio puros Si ≤0,5% | L-3051 | > 100 < 700 | |
| 5.2 | Alluminio legato Si ≤6% | G-Al5,5Cu | Aluminio aleado Si ≤6% | Al-6Si4Cu | > 150 < 700 | |
| 5.3 | Alluminio legato Si >6% | G-AlSi9Mg | Aluminio aleado Si >6% | L-2560 | > 150 < 900 | |
| 5.4 | Leghe plastificabili di magnesio | AZ 81hp | Aleaciones forjables de magnesio | AZ 81hp | > 150 < 500 | |
| 6 | Titanio | | Titanio | | | |
| 6.1 | Titanio puro | Titanium Grade 2 | Titanio puro | Ti-P02 | > 300 < 700 | |
| 6.2 | Leghe di titanio | Titanium Grade 5 | Titanio aleado | Ti-P63 | > 450 < 900 | |
| 6.3 | Leghe di titanio | Titanium Grade 5 | Titanio aleado | Ti-P63 | > 900 < 1250 | |
| 7 | Nickel | | Níquel | | | |
| 7.1 | Nickel puro | Nickel 200 | Níquel puro | Nickel 200 | > 400 < 600 | |
| 7.2 | Leghe di nickel | MONEL 400 | Níquel aleado | MONEL 400 | > 400 < 1200 | |
| 7.3 | Leghe di nickel | INCONEL 718 | Níquel aleado | INCONEL 718 | > 1200 < 1550 | |
| 8 | Materie plastiche | | Sintéticos | | | |
| 8.1 | Materiali termoplastici (truciolo lungo) | | Termoplásticos (viruta larga) | | > 20 < 80 | |
| 8.2 | Materiali duroplastici (truciolo corto) | | Duroplásticos (viruta corta) | | > 80 < 110 | |
| 8.3 | Materiali plastici filamente rinforzati | | Materiales plásticos reforzados | | > 800 < 1500 | |
| 9 | Materiali speciali | | Materiales especiales | | | |
| 9.1 | Leghe a base di cobalto | | Aleaciones de base de cobalto | | > 400 < 2000 | |
| 9.2 | Leghe di tungsteno | | Tungsteno aleado | | > 1400 < 1800 | |
| 9.3 | Carburo di titanio | | Materiales duros TIC | | | |
| 9.4 | Grafite | | Grafito | | > 38 < 60 | |

| | | foro passante / agujero pasante | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | VARIANT N | VARIANT N | VARIANT H | VARIANT H | VARIANT H | VARIANT H | VARIANT VA | VARIANT VA | VARIANT VA | VARIANT MHST | VARIANT MHST | VARIANT TIH |
| | |  | | | | | | | | | | | |
| | | HSSE-PM | TIN HSSE-PM | HSSE-PM | VAP HSSE-PM | TIN HSSE-PM | TICN HSSE-PM | VAP HSSE-PM | TIN HSSE-PM | HL HSSE-PM | HK TIN HSSE-PM | KR HK TIN HSSE-PM | TICN HSSE-PM |
| | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| | | 24 - 25 | 24 - 25 | 24, 26 - 27 | 26, 28 - 29 | 28 - 30 | 30 - 31, 86 | 32 - 33 | 32 - 33 | 32 - 33 | 34 - 35 | 34 - 35 | 34 - 35 |
| | | | | | | | | | 78 - 79 | | | | |
| | | | | | | | | | 84, 86 | 86 | | | 86 |
| | | | | | | | | | 94 | 94 | | | |
| | | | | 106 - 107 | | | | | 106 - 107 | 106 - 107 | | | |
| | | 122 | | 114 - 115 | | | | | 114 - 115 | 114 - 115 | | | |
| | | | | 128 - 129 | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | 134 - 139 |
| **HB** | **HRC** | **vc m/min** | | | | | | | | | | | |
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| | | | **20 - 30** | | | | | 10 - 15 | **20 - 30** | **20 - 30** | **20 - 80** | **20 - 80** | |
| | | 10 - 20 | **20 - 30** | | | | | 10 - 20 | **20 - 30** | **20 - 30** | **20 - 80** | **20 - 80** | |
| | | 10 - 20 | **20 - 30** | 10 - 20 | 10 - 20 | **20 - 30** | **20 - 30** | 10 - 20 | **20 - 30** | **20 - 30** | **20 - 80** | **20 - 80** | |
| | | | | 10 - 15 | 10 - 15 | **15 - 35** | 15 - 35 | 10 - 15 | **15 - 35** | **15 - 35** | **15 - 45** | **15 - 45** | 20 - 30 |
| > 235 < 370 | > 22 < 40 | | | 5 - 10 | | 10 - 20 | **10 - 20** | | 10 - 20 | 10 - 20 | **15 - 35** | **15 - 35** | **10 - 25** |
| > 325 < 410 | > 34 < 45 | | | | | | 3 - 8 | | | | **8 - 15** | **8 - 15** | **3 - 12** |
| > 350 < 455 | > 39 < 48 | | | | | | | | | | | | 3 - 10 |
| > 470 < 590 | > 48 < 56 | | | | | | | | | | | | |
| | > 56 < 63 | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | 4 - 6 | 6 - 12 | | **4 - 6** | 6 - 12 | **6 - 12** | **8 - 12** | **8 - 12** | |
| | | | | | 3 - 8 | 6 - 12 | | 3 - 8 | 6 - 12 | **6 - 12** | **8 - 15** | **8 - 15** | |
| > 250 < 455 | > 25 < 48 | | | | 1 - 4 | 3 - 6 | | 1 - 4 | 3 - 8 | **3 - 8** | **3 - 10** | **3 - 10** | |
| | | | | | | | | | | | | | |
| > 100 < 300 | | | | | | | | | | | | | |
| > 100 < 350 | | | | | | 10 - 25 | **10 - 25** | | 8 - 20 | 8 - 20 | **15 - 25** | **15 - 25** | **15 - 25** |
| > 100 < 200 | | | | | | 15 - 25 | **15 - 25** | | 15 - 25 | 15 - 25 | **15 - 25** | **15 - 25** | **15 - 25** |
| > 200 < 300 | > 20 < 32 | | | | | | 5 - 15 | | 5 - 15 | 5 - 15 | **5 - 15** | **5 - 15** | **5 - 15** |
| | | | | | | | | | | | | | |
| > 60 < 120 | | | | 6 - 10 | | **10 - 25** | | | **10 - 25** | 10 - 25 | **20 - 30** | **20 - 30** | |
| > 100 < 200 | | | | | | | | | **15 - 35** | **15 - 35** | **20 - 60** | **20 - 60** | |
| > 45 < 200 | | | **15 - 35** | | | **15 - 35** | | | **15 - 35** | 15 - 35 | **20 - 50** | **20 - 50** | |
| > 45 < 200 | | | | | | | | | 10 - 20 | | 15 - 30 | **15 - 30** | **10 - 20** |
| > 150 < 220 | | | | 6 - 12 | | 12 - 20 | **15 - 25** | | **15 - 25** | | 15 - 25 | 15 - 25 | **15 - 25** |
| > 160 < 190 | | | | | | | | | | | | | **5 - 12** |
| > 200 < 440 | > 21 < 47 | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| > 30 < 200 | | **10 - 25** | | | | | | | | | | | |
| > 45 < 200 | | **10 - 25** | **15 - 40** | | | | | | **15 - 40** | **15 - 40** | **20 - 60** | **20 - 60** | |
| > 45 < 265 | | | **15 - 40** | | | | | | **15 - 40** | **15 - 40** | **20 - 60** | **20 - 60** | |
| > 45 < 150 | | | | | | | **20 - 30** | | | | **25 - 40** | **25 - 40** | **25 - 35** |
| | | | | | | | | | | | | | |
| > 90 < 200 | | | | | | | | 5 - 10 | | | | | **5 - 12** |
| > 135 < 265 | > 14 < 27 | | | | | | | | | | | | **5 - 12** |
| > 265 < 370 | > 27 < 40 | | | | | | | | | | | | **2 - 4** |
| | | | | | | | | | | | | | |
| > 120 < 175 | | | **8 - 15** | | | | | | **8 - 15** | | **10 - 25** | **10 - 25** | |
| > 120 < 350 | > 12 < 39 | | | | | | | | 3 - 6 | | **4 - 8** | **4 - 8** | **3 - 6** |
| > 350 < 455 | > 39 < 48 | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | 10 - 25 | **10 - 25** | | | | | | **10 - 25** | | **15 - 30** | **15 - 30** | |
| | | | | | | | | | | | | | |
| > 235 < 440 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| > 120 < 590 | | | | | | | | | | | | | **1 - 2** |
| > 410 < 530 | > 44 < 52 | | | | | | | | | | | | |
| > 440 < 495 | > 47 < 50 | | | | | | | | | | | | |
| | | | | | | | | | | | | | |



**Utensile consigliato**
Utensile adatto

**Herramienta recomendada**
Herramienta apropiada

| | foro passante e cieco / agujero pasante y ciego | | | | foro cieco / agujero ciego | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VARIANT NI | VARIO H | VARIO GG | VARIO GG | VARIO MS | AVANT H15 | AVANT H15 | AVANT H15 | AVANT H15 | AVANT H25 | AVANT GAL15 | AVANT TIH13 | AVANT NI13 | DOMINANT N38 |
| | | | | | | | | | | | | | |
| TICN HSSE-PM | KA TICN HSSE-PM | TICN HSSE-PM | KA TICN HSSE-PM | HSSE-PM | HSSE-PM | TICN HSSE-PM | KA TICN HSSE-PM | KA HL SL FL HSSE-PM | HL HSSE-PM | KA TICN HSSE-PM | TICN HSSE-PM | TICN HSSE-PM | HSSE-PM |
| 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2,5 | 2,5 | 2,5 | 3 |
| | 36 | 38 - 39 | 38 - 39 | 40 | 40 - 41 | 40 - 42 | 40 - 41 | 79 | 42 - 44 | 44 - 45 | 44 - 45 | | 46 - 47 |
| | | 78 - 79 | | | | | | | | | | | |
| | | 87 | 87 | | 87 | 87 | 88 | | 88 | 88 | 89 | | |
| | | 94 | | | 95 | | | | 95 | | | | |
| | | 106 - 107 | | | | | | | | | | | |
| | | 114 - 115 | | | 116, 123 | | | | | | | | |
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| | | | | | | | | | | | | | |
| 134 - 139 | | | | | | | | | | | 134 - 139 | 134 - 139 | |
| | | | | | | | | **vc m/min** | | | | | |
| | | | | | | | | | | | | | |
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| | | | | | | | | **15 - 35** | **20 - 30** | | | | 10 - 20 |
| | | | | | | | | **15 - 35** | **20 - 30** | | | | 10 - 20 |
| | 15 - 35 | | | | 10 - 15 | **15 - 35** | **15 - 35** | **15 - 35** | **15 - 35** | **15 - 35** | | | |
| | **10 - 20** | | | | 5 - 10 | **10 - 20** | **10 - 20** | **10 - 20** | **10 - 20** | **10 - 20** | **10 - 25** | | |
| | 4 - 10 | | | | | 4 - 10 | 4 - 10 | **4 - 10** | **5 - 8** | 4 - 10 | **3 - 10** | | |
| **2 - 4** | | | | | | | | | | | | **2 - 4** | |
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| | | | | | | | | | **3 - 6** | | | | |
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| | 20 - 30 | **20 - 40** | **20 - 60** | | | 20 - 30 | 20 - 30 | 20 - 30 | | | | | |
| | 15 - 25 | 15 - 25 | **15 - 25** | | | **10 - 25** | **10 - 25** | **10 - 25** | | **10 - 25** | **15 - 25** | | |
| | 15 - 25 | 15 - 25 | **15 - 25** | | | **15 - 25** | **15 - 25** | **15 - 25** | | **15 - 25** | **15 - 25** | | |
| | 5 - 15 | 5 - 15 | **5 - 15** | | | 5 - 15 | 5 - 15 | 5 - 15 | | 5 - 15 | **5 - 15** | | |
| | | | | | | | | | | | | | |
| | | | | | 6 - 10 | | | | | | | | |
| | | | | **10 - 35** | 15 - 35 | | | | 15 - 35 | | | | |
| | **15 - 35** | | | | 10 - 25 | **15 - 35** | **15 - 35** | | **15 - 35** | **15 - 35** | | | 10 - 25 |
| | **10 - 20** | | | 5 - 15 | 5 - 15 | **10 - 20** | **10 - 20** | | | **10 - 20** | **10 - 20** | | |
| | **15 - 25** | | | | 10 - 15 | **15 - 25** | **15 - 25** | | | **15 - 25** | **15 - 25** | | |
| | **8 - 12** | | | | 8 - 12 | **8 - 12** | **8 - 12** | | | **8 - 12** | **5 - 12** | | |
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| | | | | | | | | | **15 - 40** | | | | **10 - 25** |
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| | **25 - 35** | **25 - 35** | **25 - 35** | | | **25 - 35** | **25 - 35** | | | **25 - 35** | **25 - 35** | | |
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| **2 - 3** | | | | | | | | | | | | **2 - 3** | |
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| | 5 - 15 | **5 - 15** | **5 - 15** | 5 - 15 | | | | | | | | | |
| | | **3 - 10** | **3 - 10** | 3 - 10 | | | | | | | | | |
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| **2 - 3** | | | | | | | | | | | | **2 - 3** | |
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| | | | **5 - 15** | | | | | | | | | | |

**Utensile consigliato**
Utensile adatto

**Herramienta recomendada**
Herramienta apropiada

| foro cieco / agujero ciego | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DOMINANT N38 | DOMINANT HZ38 | DOMINANT HZ38 | DOMINANT HZ38 | DOMINANT HZ38 | DOMINANT HZ38 | DOMINANT VA45 | DOMINANT VA45 | DOMINANT VA45 | DOMINANT VA45 | DOMINANT VA45 | DOMINANT MHST45 | DOMINANT MHST45 | DOMINANT MHST45 |
| | | | | | | | | | | | | | |
| TIN HSSE-PM | HSSE-PM | VAP HSSE-PM | TIN HSSE-PM | TICN HSSE-PM | HL HSSE-PM | HSSE-PM | VAP HSSE-PM | TIN HSSE-PM | HL HSSE-PM | KA HL HSSE-PM | HK TIN HSSE-PM | HK HL HSSE-PM | KA HK HL HSSE-PM |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 46 - 47 | 48 - 49 | 48 - 49 | 50 - 51 | 50 - 51 | 50 - 51 | 52 - 53 | 52 - 53 | 54 - 56 | 56 - 59 | 56 - 57 | 60 - 61 | 60 - 62 | 60 |
| | | | | | | 80 - 81 | | | 80 - 81 | | | | |
| | 90 | | 90 | | 90 | 90 | | 91 | 84, 91 | | | | |
| | 95 | | 95 | | 96 | 96 | | 96 | 96 | | | | |
| | 108 - 109 | | | | 108 - 109 | 108 - 109 | | 110 - 111 | 110 - 111 | | | | |
| | 116, 117, 123 | | | | 116 - 117 | 118 - 119 | | 118 - 119 | 118 - 119 | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | 130 - 133 | | | | |
| | | | | | | | | | | | | | |
| **vc m/min** | | | | | | | | | | | | | |
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| **20 - 30** | | | | | | | 10 - 15 | 20 - 30 | **20 - 30** | **20 - 30** | 20 - 60 | **20 - 60** | **20 - 60** |
| **20 - 30** | 10 - 20 | 10 - 20 | 20 - 30 | | **20 - 30** | | 10 - 20 | 20 - 30 | **20 - 30** | **20 - 30** | 20 - 60 | **20 - 60** | **20 - 60** |
| **20 - 30** | 10 - 20 | 10 - 20 | 20 - 30 | | **20 - 30** | 10 - 20 | 10 - 20 | 20 - 30 | **20 - 30** | **20 - 30** | 20 - 60 | **20 - 60** | **20 - 60** |
| | 10 - 15 | 10 - 15 | 15 - 35 | **15 - 35** | **15 - 35** | 10 - 15 | 10 - 15 | 15 - 35 | **15 - 35** | **15 - 35** | 15 - 45 | **15 - 45** | **15 - 45** |
| | 5 - 10 | | 10 - 20 | **10 - 20** | **10 - 20** | 5 - 10 | 5 - 10 | 10 - 20 | **10 - 20** | **10 - 20** | 15 - 35 | **15 - 35** | **15 - 35** |
| | | | | 4 - 10 | | | | 5 - 8 | 5 - 8 | 5 - 8 | 8 - 12 | **8 - 12** | **8 - 12** |
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| | | 4 - 8 | | | 6 - 12 | | 4 - 6 | 6 - 12 | **6 - 12** | **6 - 12** | 8 - 12 | **8 - 12** | **8 - 12** |
| | | 4 - 8 | | | 6 - 12 | | 4 - 8 | 6 - 12 | **6 - 12** | **6 - 12** | 8 - 15 | **8 - 15** | **8 - 15** |
| | | | | | 3 - 6 | | | 3 - 6 | **3 - 6** | **3 - 6** | 3 - 10 | **3 - 10** | **3 - 10** |
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| | | | | | | | | | 20 - 30 | 20 - 30 | | | 20 - 60 |
| | | | | 10 - 25 | 10 - 25 | | | | | 8 - 15 | | 15 - 25 | 15 - 25 |
| | | | | 15 - 25 | 15 - 25 | | | | 15 - 25 | 15 - 25 | | 15 - 25 | 15 - 25 |
| | | | | 5 - 15 | 5 - 15 | | | | 5 - 15 | 5 - 15 | | 5 - 15 | 5 - 15 |
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| | 4 - 8 | | 10 - 25 | | | | | 10 - 25 | | 10 - 25 | **20 - 30** | | **20 - 30** |
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| 15 - 35 | 10 - 25 | | 15 - 35 | | | 10 - 25 | | **15 - 35** | | 15 - 35 | **20 - 50** | | **20 - 50** |
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| | 10 - 15 | 10 - 15 | **15 - 25** | **15 - 25** | | 10 - 15 | | **15 - 25** | | | **15 - 25** | | |
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| | | | | | | **10 - 25** | | 15 - 35 | **15 - 35** | **15 - 35** | 15 - 35 | **15 - 35** | **15 - 35** |
| **15 - 40** | | | | | | 10 - 25 | | **15 - 40** | **15 - 40** | **15 - 40** | **20 - 60** | **20 - 60** | **20 - 60** |
| **15 - 40** | | | | | | 10 - 20 | | **15 - 40** | **15 - 40** | **15 - 40** | **20 - 60** | **20 - 60** | **20 - 60** |
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| | | | | | | | | 8 - 15 | **8 - 15** | **8 - 15** | **10 - 25** | **10 - 25** | **10 - 25** |
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| **10 - 25** | | | | | | **10 - 25** | | 10 - 25 | | | | | |
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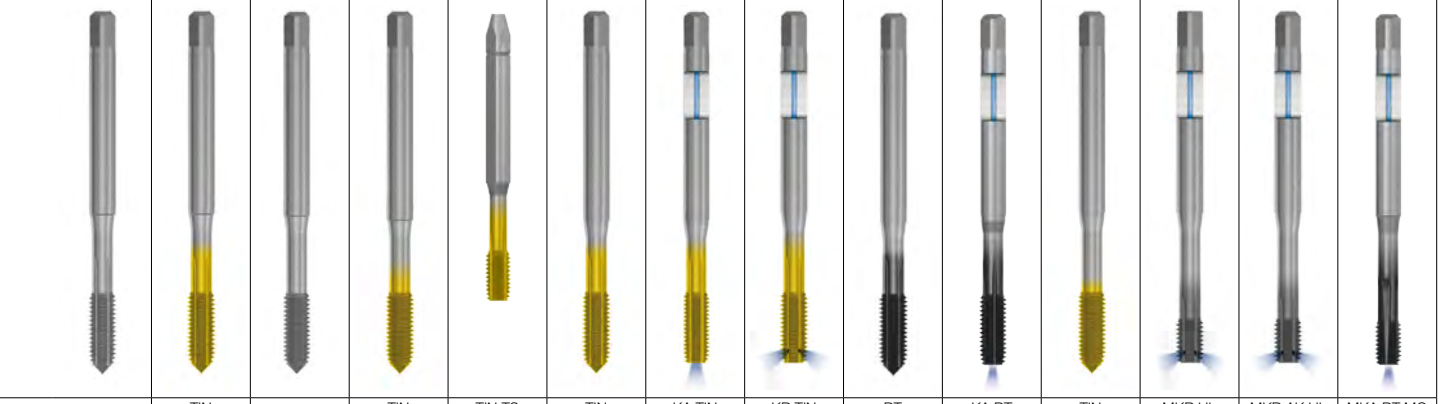
**Utensile consigliato**
Utensile adatto

**Herramienta recomendada**
Herramienta apropiada

foro passante e cieco / agujero pasante y ciego

| DURAMAX N | DURAMAX N | DURAMAX NO | DURAMAX NO | DURAMAX NB | DURAMAX H | DURAMAX H | DURAMAX H | DURAMAX H | DURAMAX H | DURAMAX HO | DURAMAX GAL | DURAMAX GAL | DURAMAX GAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | | | | | | | | | | | | | |
| HSSE-PM | TIN HSSE-PM | HSSE-PM | TIN HSSE-PM | TIN TS HSSE-PM | TIN HSSE-PM | KA TIN HSSE-PM | KR TIN HSSE-PM | BT HSSE-PM | KA BT HSSE-PM | TIN HSSE-PM | MKR HL HSSE-PM | MKR AK HL HSSE-PM | MKA BT MG HSSE-PM |
| 3 | 3 | 3 | 3 | | 3 | 3 | 3 | | | 3 | 3 | 3 | |
| 64 | 64 - 66 | 66 | 66, 68 | 76 - 77 | 68 - 69 | 70 - 71 | 70 - 71 | 70 - 71 | 72 - 73 | 72 | 74 - 75 | 74 - 75 | 74 |
| | 80 | | | | | | | | | | | | |
| | 85, 92 | | | | 92 | 92 | | 85, 93 | | | 93 | 93 | 85, 93 |
| | 97 | | | | | | | | | | | | |
| | 112 - 113 | | | | | | | | | | | | |
| | 120 - 121 | | | | | | | | | | | | |
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| **vc m/min** | | | | | | | | | | | | | |
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| | **20 - 30** | | 20 - 30 | **20 - 30** | **20 - 30** | **20 - 30** | **20 - 30** | **20 - 35** | **20 - 35** | 20 - 30 | | | |
| | **20 - 50** | | 20 - 50 | **20 - 50** | **20 - 50** | **20 - 50** | **20 - 50** | **20 - 55** | **20 - 55** | 20 - 50 | | | |
| | **20 - 30** | | 20 - 30 | **20 - 30** | **20 - 30** | **20 - 30** | **20 - 30** | **20 - 35** | **20 - 35** | 20 - 30 | | | |
| | **15 - 30** | | 15 - 30 | **15 - 30** | **15 - 30** | **15 - 30** | **15 - 30** | **15 - 35** | **15 - 35** | 15 - 30 | | | 15 - 35 |
| | **10 - 20** | | 10 - 20 | **10 - 20** | **10 - 20** | **10 - 20** | **10 - 20** | **10 - 25** | **10 - 25** | 10 - 20 | | | **10 - 25** |
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| | **6 - 12** | | 6 - 12 | **6 - 12** | **6 - 12** | **6 - 12** | **6 - 12** | **6 - 15** | **6 - 15** | 6 - 12 | | | |
| | **8 - 12** | | 8 - 12 | **8 - 12** | **8 - 12** | **8 - 12** | **8 - 12** | **8 - 15** | **8 - 15** | 8 - 12 | | | |
| | 4 - 10 | | 4 - 10 | 4 - 10 | **4 - 10** | **4 - 10** | **4 - 10** | **4 - 12** | **4 - 12** | 4 - 10 | | | |
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| 4 - 8 | 10 - 30 | 4 - 8 | **10 - 30** | 10 - 35 | 10 - 30 | 10 - 30 | 10 - 30 | 10 - 35 | 10 - 35 | **10 - 30** | | | |
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| | **15 - 35** | | 15 - 35 | **15 - 35** | **15 - 35** | **15 - 35** | **15 - 35** | **15 - 40** | **15 - 40** | 15 - 35 | | | |
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| 15 - 30 | | 15 - 30 | | | | | | 15 - 40 | 15 - 40 | | **20 - 40** | **20 - 40** | **20 - 50** |
| 10 - 25 | **20 - 40** | 10 - 25 | 20 - 40 | **20 - 40** | **20 - 40** | **20 - 40** | **20 - 40** | **20 - 60** | **20 - 60** | 20 - 40 | **20 - 40** | **20 - 40** | **20 - 60** |
| | **15 - 40** | | 15 - 40 | **15 - 40** | **15 - 40** | **15 - 40** | **15 - 40** | **15 - 50** | **15 - 50** | 15 - 40 | **15 - 40** | **15 - 40** | **15 - 50** |
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| **10 - 15** | | 10 - 15 | | | | | | | | | | | |
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| | **10 - 25** | | 10 - 25 | **10 - 25** | **10 - 25** | **10 - 25** | **10 - 25** | **10 - 25** | **10 - 25** | 10 - 25 | **10 - 25** | **10 - 25** | **10 - 25** |
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**Utensile consigliato**
Utensile adatto

**Herramienta recomendada**
Herramienta apropiada

# Anwendungstabelle

application table / tableau d'application / tabella d'impiego / tabla de uso

Wie gehe ich vor:
- Bohrart auswählen
- Einsatzgebiet auswählen
- Nach Schnittgeschwindigkeit suchen (vc m/min)
- Gewindeart und Seite auswählen

GT = Gewindetiefe

How to proceed:
- Select hole shape
- Select application
- Search for cutting speed (vc m/min)
- Select thread type and page

GT = thread depth

Comment procéder:
- Sélectionner le type de trou
- Sélectionner l'application
- Chercher la vitesse de coupe (vc m/min)
- Sélectionner le type de filet et la page

GT = profondeur de taraudage

Come procedere:
- Scegliere il tipo di foro
- Scegliere il gruppo di materiale
- Cercare la velocità di taglio (vc m/min)
- Scegliere il tipo di filettatura e la pagina

GT = profondità del filetto

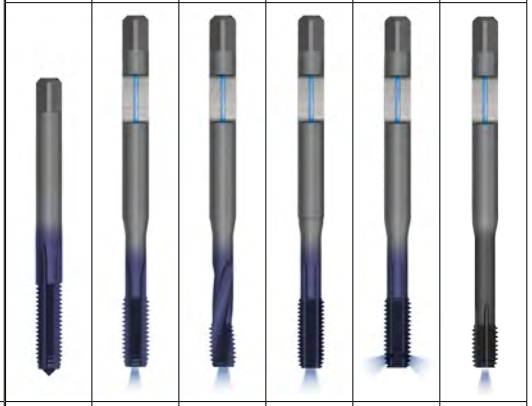
Cómo proceder:
- Seleccionar el tipo de agujero
- Seleccionar la aplicación
- Buscar la velocidad de corte (vc m/min)
- Seleccionar el tipo de rosca y la página

GT = profundidad de rosca

$$v_c = \frac{n * \pi * d_1}{1000}$$

$$n = \frac{v_c * 1000}{\pi * d_1}$$

| | Einsatzgebiet | Application | Application | Impiego |
|---|---|---|---|---|
| 1 | **Stahlwerkstoffe** | **Steel materials** | **Aciers** | **Acciai** |
| 1.1 | Baustahl unleg. / Weicheisen | Magnetic soft steel | Fer doux magnétique | Ferro magnetico dolce |
| 1.2 | Baustahl / Einsatzstahl | Construction steel / case hardening steel | Aciers de construction et de cémentation | Acciaio da costruzione e da cement-azione |
| 1.3 | Bau- / Kohlenstoffstahl C<0,45% / Stahl niedrigleg. | Carbon steel | Aciers au carbone | Acciaio al carbonio |
| 1.4 | Kohlenstoffstahl C>0,45% / Stahl niedrigleg. / Stahl hochleg. | Alloyed / heat-treatable steel | Aciers alliés / aciers pour traitement thermique | Acciaio legato / bonificato |
| 1.5 | Stahl legiert / hochlegiert | Alloyed steel | Aciers alliés | Acciaio legato |
| 1.6 | Stahl legiert / hochlegiert | Alloyed steel | Aciers alliés | Acciaio legato |
| 1.7 | Stahl legiert / hochlegiert | Alloyed steel | Aciers alliés | Acciaio legato |
| 1.8 | Stahl gehärtet | Hardened steel | Aciers trempés | Acciaio temprato |
| 1.9 | Stahl gehärtet | Hardened steel | Aciers trempés | Acciaio temprato |
| 2 | Rostfreier Stahl | Stainless steel | Aciers inoxydables | Acciai inossidabili |
| 2.1 | Stahl-ferritisch u. martensitisch | Ferritic / martensitic steel | Aciers ferritiques, martensitiques | Acciai ferritici / martensiti |
| 2.2 | Stahl-austenitisch, aust.-ferritisch | Austenitic steel | Aciers austénitiques | Acciai austenitici |
| 2.3 | Stahl-austenitisch, aust.-ferritisch u. ferritisch | High temperature steel | Aciers réfractaires | Acciai termostabili |
| 3 | Gusseisen | Cast iron | Fontes | Ghisa |
| 3.1 | Grauguss-lamellar | Grey cast iron | Fonte grise | Ghisa grigia |
| 3.2 | Kugelgraphitguss | Cast iron with nodular graphite | Fonte à graphite sphéroïdal | Ghisa sferoidale |
| 3.3 | Temperguss weiß / schwarz | Malleable cast iron | Fonte malléable | Ghisa temprata |
| 3.4 | Vermikularguss / ADI / Hartguss | Cast iron with vermicular graphite | Fonte vermiculaire | Ghisa vermiculare |
| 4 | Kupfer | Copper | Cuivre | Rame |
| 4.1 | Reinkupfer | Copper non-alloyed | Cuivre pur / électrolytique | Rame puro / elettrolitico |
| 4.2 | Kupfer Legierungen (kurzspanend) | Brass (short chipping) | Alliages de cuivre (copeaux courts) | Ottone (truciolo corto) |
| 4.3 | Kupfer Legierungen (langspanend) | Brass (long chipping) | Alliages de cuivre (copeaux longs) | Ottone (truciolo lungo) |
| 4.4 | Cu-Al-Ni-Legierungen (kurzspanend) | Copper-alu-nickel alloyed (short chipping) | Alliages Cu-Al-Ni (copeaux courts) | Leghe di Cu-Al-Ni (truciolo corto) |
| 4.5 | Cu-Al-Ni-Legierungen (langspanend) | Copper-alu-nickel alloyed (long chipping) | Alliages Cu-Al-Ni (copeaux longs) | Leghe di Cu-Al-Ni (truciolo lungo) |
| 4.6 | Kupfer Sonderlegierungen (bis Ampco 20) | Special copper alloyed ≤ Ampco 20 | Alliages de cuivre spéciaux ≤ Q 18 | Leghe Cu-Al-Fe ≤ Ampco 20 |
| 4.7 | Kupfer Sonderlegierungen (ab Ampco 21) | Special copper alloyed ≥ Ampco 21 | Alliages de cuivre spéciaux ≥ Q 18 | Leghe Cu-Al-Fe ≥ Ampco 21 |
| 5 | Aluminium / Magnesium | Aluminium / Magnesium | Aluminium / Magnésium | Alluminio / Magnesio |
| 5.1 | Aluminium Si-Gehalt ≤0,5% | Alu wrought alloy Si ≤0,5% | Alu non alliés / alliages corroyés d'alu / Si ≤0,5 % | Alluminio puro / leghe plastificabili d'alluminio Si ≤0,5% |
| 5.2 | Aluminium Si-Gehalt ≤6% | Alu alloyed Si ≤6% | Fontes d'alu ≤6 % Si | Alluminio legato Si ≤6% |
| 5.3 | Aluminium Si-Gehalt >6% | Alu alloyed Si >6% | Fontes d'alu >6 % Si | Alluminio legato Si >6% |
| 5.4 | Magnesium und Magnesiumlegierungen | Magnesium wrought alloy | Alliages corroyés de magnésium | Leghe plastificabili di magnesio |
| 6 | Titan | Titanium | Titane | Titanio |
| 6.1 | Titan unlegiert | Titanium non-alloyed | Titane pur | Titanio puro |
| 6.2 | Titan legiert | Titanium alloyed | Alliages de titane | Leghe di titanio |
| 6.3 | Titan legiert | Titanium alloyed | Alliages de titane | Leghe di titanio |
| 7 | Nickel | Nickel | Nickel | Nickel |
| 7.1 | Nickel unlegiert | Nickel non-alloyed | Nickel pur | Nickel puro |
| 7.2 | Nickel legiert | Nickel alloyed | Alliages de nickel | Leghe di nickel |
| 7.3 | Nickel legiert | Nickel alloyed | Alliages de nickel | Leghe di nickel |
| 8 | Kunststoffe | Synthetics | Matières synthétiques | Materie plastiche |
| 8.1 | Thermoplaste (langspanend) | Thermoplastic (long chipping) | Thermoplastiques (copeaux longs) | Materiali termoplastici (truciolo lungo) |
| 8.2 | Duroplaste (kurzspanend) | Duroplastic (short chipping) | Matières thermodurcissables (copeaux courts) | Materiali duroplastici (truciolo corto) |
| 8.3 | faserverstärkte Kunststoffe | Fibre-reinforced plastic | Matières synthétiques renforcées par fibres | Materiali plastici filamente rinforzati |
| 9 | Sonderwerkstoffe | Special materials | Matières spéciaux | Materiali speciali |
| 9.1 | Kobalt Legierungen | Cobalt alloyed | Alliages à base de cobalt | Leghe a base di cobalto |
| 9.2 | Wolfram Legierungen | Tungsten alloyed | Alliages de tungstène | Leghe di tungsteno |
| 9.3 | Titancarbid Hartstoffe | TIC-hard material | Carbure de titane | Carburo di titanio |
| 9.4 | Graphit | Graphite | Graphite | Grafite |



| | | | | VARIO SH | VARIO GG | AVANT GAL15 | DURAMAX H | DURAMAX H | DURAMAX GAL |
|---|---|---|---|---|---|---|---|---|---|
| | | | Ausführung / model / exécution / modello / modelo | TICN SR VHM | KA TICN VHM | KA TICN VHM | KA TICN VHM | KR TICN VHM | KA HL VHM |
| | | | GT = Ød, × | 2, 5 | 3 | 2, 5 | 3 | 3 | |
| | | M | S. / p. | 36 - 37 | 38 | 44 - 45 | 72 - 73 | 72 | 74 - 75 |
| | | MF | S. / p. | | | 89 | | | |
| **Aplicación** | **N/mm²** | **HB** | **HRC** | **vc m/min** | | | | | |
| **Aceros** | | | | | | | | | |
| Acero magnético suave | > 100 < 450 | | | | | | **30 - 40** | **30 - 40** | |
| Acero de construcción / acero de cementación | > 300 < 700 | | | | | | **20 - 60** | **20 - 60** | |
| Acero al carbono | > 400 < 950 | | | | | | **20 - 60** | **20 - 60** | |
| Acero aleado | > 450 < 950 | | | | | **15 - 35** | **20 - 50** | **20 - 50** | |
| Acero aleado templado y revenido | > 800 < 1250 | > 235 < 370 | > 22 < 40 | | | **10 - 20** | **15 - 35** | **15 - 35** | |
| Acero aleado templado y revenido | > 1100 < 1400 | > 325 < 410 | > 34 < 45 | | | 4 - 10 | | | |
| Acero aleado templado y revenido | > 1200 < 1550 | > 350 < 455 | > 39 < 48 | | | | | | |
| Acero endurecido | > 1600 < 2000 | > 470 < 590 | > 48 < 56 | **2 - 4** | | | | | |
| Acero endurecido | | | > 56 < 63 | **1 - 3** | | | | | |
| Acero inoxidable | | | | | | | | | |
| Acero ferritico, martensitico | > 450 < 1200 | | | | | | **10 - 25** | **10 - 25** | |
| Austenitico | > 400 < 950 | | | | | | **10 - 25** | **10 - 25** | |
| Aleac. Cr-Ni resist. a elevadas temperaturas | > 850 < 1550 | > 250 < 455 | > 25 < 48 | | | | **10 - 25** | **10 - 25** | |
| Fundición gris | | | | | | | | | |
| Fundición gris | > 150 < 1000 | > 100 < 300 | | | **40 - 80** | | | | |
| Fundición esferoidal | > 350 < 1000 | > 100 < 350 | | | **25 - 50** | **30 - 70** | | | |
| Fundición maleable, nodular | > 300 < 700 | > 100 < 200 | | | **25 - 50** | **30 - 70** | | | |
| Fundición gris compactada | > 700 < 1000 | > 200 < 300 | > 20 < 32 | | **20 - 40** | **20 - 40** | | | |
| Cobre | | | | | | | | | |
| Cobre puro | > 200 < 400 | > 60 < 120 | | | | | 25 - 50 | **25 - 50** | |
| Latón (viruta corta) | > 350 < 700 | > 100 < 200 | | | | | | | |
| Latón (viruta larga) | > 150 < 700 | > 45 < 200 | | | | | **25 - 60** | **25 - 60** | |
| Aleaciones Cu-Al-Ni (viruta corta) | > 150 < 700 | > 45 < 200 | | | | **20 - 40** | | | |
| Aleaciones Cu-Al-Ni (viruta larga) | > 500 < 750 | > 150 < 220 | | | | | | | |
| Aleaciones Cu-Al-Fe ≤ Ampco 20 | > 550 < 650 | > 160 < 190 | | | | **12 - 25** | | | |
| Aleaciones Cu-Al-Fe ≥ Ampco 21 | > 700 < 1500 | > 200 < 440 | > 21 < 47 | **5 - 10** | | | | | |
| Aluminio / Magnesio | | | | | | | | | |
| Aluminio puros Si ≤0,5% | > 100 < 700 | > 30 < 200 | | | | | 25 - 80 | **25 - 80** | **30 - 90** |
| Aluminio aleado Si ≤6% | > 150 < 700 | > 45 < 200 | | | | **30 - 70** | **30 - 80** | **30 - 80** | **30 - 90** |
| Aluminio aleado Si >6% | > 150 < 900 | > 45 < 265 | | | | **30 - 60** | **30 - 60** | **30 - 60** | **30 - 70** |
| Aleaciones forjables de magnesio | > 150 < 500 | > 45 < 150 | | | **30 - 60** | **50 - 70** | | | |
| Titanio | | | | | | | | | |
| Titanio puro | > 300 < 700 | > 90 < 200 | | | | | | | |
| Titanio aleado | > 450 < 900 | > 135 < 265 | > 14 < 27 | | | | | | |
| Titanio aleado | > 900 < 1250 | > 265 < 370 | > 27 < 40 | | | | | | |
| Níquel | | | | | | | | | |
| Níquel puro | > 400 < 600 | > 120 < 175 | | | | | **12 - 35** | **12 - 35** | |
| Níquel aleado | > 400 < 1200 | > 120 < 350 | > 12 < 39 | | | | | | |
| Níquel aleado | > 1200 < 1550 | > 350 < 455 | > 39 < 48 | | | | | | |
| Sintéticos | | | | | | | | | |
| Termoplásticos (viruta larga) | > 20 < 80 | | | | | | | | |
| Duroplásticos (viruta corta) | > 80 < 110 | | | | **20 - 40** | | | | |
| Materiales plásticos reforzados | > 800 < 1500 | > 235 < 440 | | | **5 - 20** | **5 - 25** | | | |
| Materiales especiales | | | | | | | | | |
| Aleaciones de base de cobalto | > 400 < 2000 | > 120 < 590 | | **4 - 8** | **4 - 8** | | | | |
| Tungsteno aleado | > 1400 < 1800 | > 410 < 530 | > 44 < 52 | **4 - 8** | 4 - 8 | | | | |
| Materiales duros TIC | | > 440 < 495 | > 47 < 50 | **4 - 8** | | | | | |
| Grafito | > 38 < 60 | | | | **20 - 50** | | | | |

**Werkzeug gut geeignet**
Werkzeug geeignet

**Tool well suitable**
Tool suitable

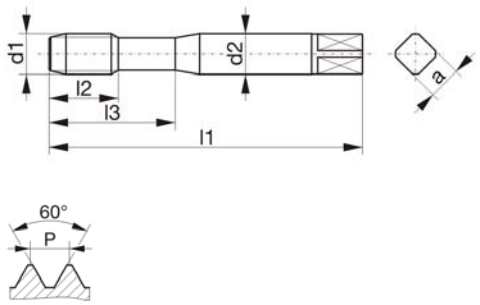
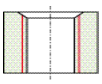
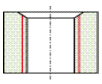
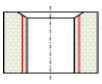
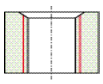
**Utensile consigliato**
Utensile adatto

**Outil conseillé**
Outil adapté

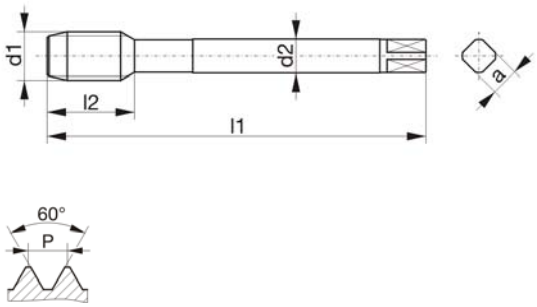
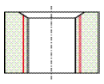
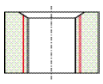
**Herramienta recomendada**
Herramienta apropiada

# Maschinengewindebohrer

machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 1 N | VARIANT 1 N | VARIANT 1 N | VARIANT 1 H |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.3 / 5.1-5.2 8.1** | **1.1-1.3 / 4.3 5.2-5.3 / 7.1 8.1** | **1.2-1.3 / 5.1-5.2 8.1** | **1.3-1.5 / 4.1 4.5** |
| **Ausführung / model / exécution / modello / modelo** | | TIN | LH | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO2/6H | ISO2/6H | ISO1/4H |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 |

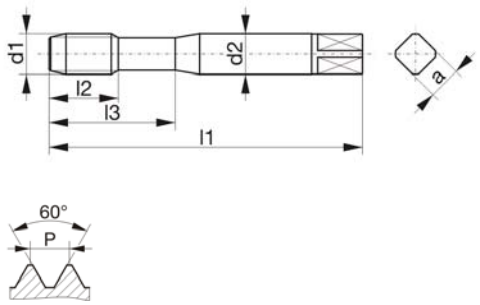
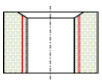
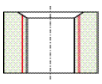
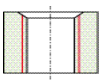
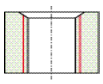
| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 1,2 | 0,25 | 40 | 6 | - | 2,5 | 2,1 | 0,95 | | | | 108301 |
| M | 1,4 | 0,3 | 40 | 7 | - | 2,5 | 2,1 | 1,1 | | | | 108302 |
| M | 3 | 0,5 | 56 | 10 | 18 | 3,5 | 2,7 | 2,5 | 105339 | 105449 | 105436 | |
| M | 4 | 0,7 | 63 | 12 | 21 | 4,5 | 3,4 | 3,3 | 105347 | 105451 | 105438 | |
| M | 5 | 0,8 | 70 | 14 | 25 | 6 | 4,9 | 4,2 | 105365 | 105452 | 105439 | |
| M | 6 | 1 | 80 | 16 | 30 | 6 | 4,9 | 5 | 105369 | 105453 | 105441 | |
| M | 8 | 1,25 | 90 | 18 | 35 | 8 | 6,2 | 6,8 | 105411 | 105456 | 105442 | |
| M | 10 | 1,5 | 100 | 20 | 39 | 10 | 8 | 8,5 | 105320 | 105446 | 105434 | |

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 2 N | VARIANT 2 N | | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.3 / 5.1-5.2 8.1** | **1.1-1.3 / 4.3 5.2-5.3 / 7.1 8.1** | | |
| **Ausführung / model / exécution / modello / modelo** | | TIN | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO2/6H | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | | |

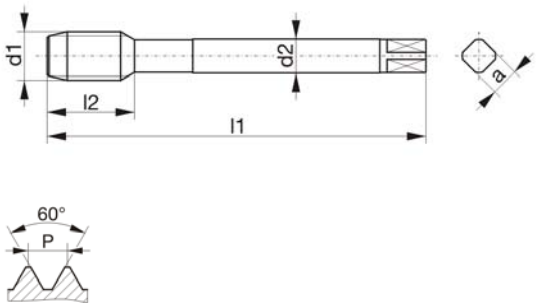
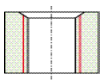
| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| M | 12 | 1,75 | 110 | 24 | - | 9 | 7 | 10,2 | 105610 | 105718 |
| M | 16 | 2 | 110 | 27 | - | 12 | 9 | 14 | 105617 | 105720 |
| M | 20 | 2,5 | 140 | 32 | - | 16 | 12 | 17,5 | 105627 | 105722 |

# Maschinengewindebohrer

machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 1 H | VARIANT 1 H | VARIANT 1 H | VARIANT 1 H |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.3-1.5 / 4.1 4.5** | **1.3-1.5 / 4.1 4.5** | **1.3-1.5 / 4.1 4.5** | **1.3-1.4 / 2.1-2.3** |
| **Ausführung / model / exécution / modello / modelo** | | | | VAP |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO3/6G | 7G | ISO1/4H |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 |

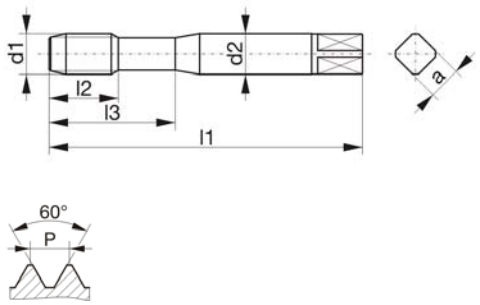
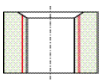
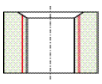
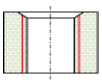
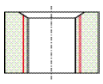
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 1,2 | 0,25 | 40 | 5,5 | - | 2,5 | 2,1 | 0,95 | | | | 038372 |
| M | 1,4 | 0,3 | 40 | 7 | - | 2,5 | 2,1 | 1,1 | | | | 000091 |
| M | 1,6 | 0,35 | 40 | 8 | - | 2,5 | 2,1 | 1,25 | 108303 | | | |
| M | 1,7 | 0,35 | 40 | 8 | - | 2,5 | 2,1 | 1,3 | 108304 | | | |
| M | 2 | 0,4 | 45 | 9 | - | 2,8 | 2,1 | 1,6 | 108312 | | | |
| M | 2,2 | 0,45 | 45 | 9 | - | 2,8 | 2,1 | 1,75 | 108313 | | | |
| M | 2,3 | 0,4 | 45 | 9 | - | 2,8 | 2,1 | 1,85 | 108314 | | | |
| M | 2,5 | 0,45 | 50 | 9 | 14 | 2,8 | 2,1 | 2,05 | 108315 | | | |
| M | 2,6 | 0,45 | 50 | 9 | 14 | 2,8 | 2,1 | 2,15 | 108316 | | | |
| M | 3 | 0,5 | 56 | 10 | 18 | 3,5 | 2,7 | 2,5 | 108324 | 108356 | 033607 | |
| M | 3,5 | 0,6 | 56 | 11 | 20 | 4 | 3 | 2,9 | 108325 | | | |
| M | 4 | 0,7 | 63 | 12 | 21 | 4,5 | 3,4 | 3,3 | 108328 | 108358 | 038361 | |
| M | 5 | 0,8 | 70 | 14 | 25 | 6 | 4,9 | 4,2 | 108347 | 108359 | 108376 | |
| M | 6 | 1 | 80 | 16 | 30 | 6 | 4,9 | 5 | 108349 | 108360 | 038362 | |
| M | 8 | 1,25 | 90 | 18 | 35 | 8 | 6,2 | 6,8 | 108380 | 108361 | 108377 | |
| M | 10 | 1,5 | 100 | 20 | 39 | 10 | 8 | 8,5 | 108305 | 108352 | 108373 | |

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 2<br>H | | | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  <br> | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.3-1.5 / 4.1 4.5** | | | |
| **Ausführung / model / exécution / modello / modelo** | | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | | | |

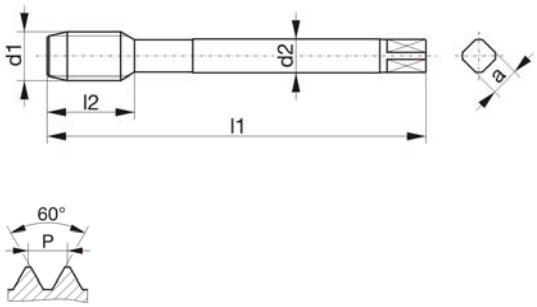
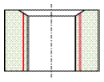
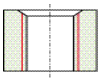
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|
| M | 6 | 1 | 80 | 16 | - | 4,5 | 3,4 | 5 | 108538 |
| M | 8 | 1,25 | 90 | 18 | - | 6 | 4,9 | 6,8 | 108542 |
| M | 10 | 1,5 | 100 | 20 | - | 7 | 5,5 | 8,5 | 108506 |
| M | 12 | 1,75 | 110 | 24 | - | 9 | 7 | 10,2 | 108507 |
| M | 14 | 2 | 110 | 25 | - | 11 | 9 | 12 | 108511 |
| M | 16 | 2 | 110 | 27 | - | 12 | 9 | 14 | 108513 |
| M | 20 | 2,5 | 140 | 32 | - | 16 | 12 | 17,5 | 108518 |
| M | 24 | 3 | 160 | 36 | - | 18 | 14,5 | 21 | 108522 |
| M | 27 | 3 | 160 | 36 | - | 20 | 16 | 24 | 108524 |
| M | 30 | 3,5 | 180 | 40 | - | 22 | 18 | 26,5 | 108525 |
| M | 33 | 3,5 | 180 | 40 | - | 25 | 20 | 29,5 | 108526 |
| M | 36 | 4 | 200 | 50 | - | 28 | 22 | 32 | 108527 |
| M | 39 | 4 | 200 | 50 | - | 32 | 24 | 35 | 108528 |
| M | 42 | 4,5 | 200 | 50 | - | 32 | 24 | 37,5 | 108530 |
| M | 45 | 4,5 | 220 | 55 | - | 36 | 29 | 40,5 | 108531 |
| M | 48 | 5 | 250 | 60 | - | 36 | 29 | 43 | 038315 |
| M | 52 | 5 | 250 | 60 | - | 40 | 32 | 47 | 038338 |
| M | 56 | 5,5 | 250 | 60 | - | 40 | 32 | 50,5 | 038339 |

# Maschinengewindebohrer

machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 1 H | VARIANT 1 H | VARIANT 1 H | VARIANT 1 H |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.3-1.4 / 2.1-2.3** | **1.3-1.5 / 2.1-2.3 3.2-3.3 / 4.1 4.3 / 4.5** | **1.3-1.5 / 2.1-2.3 3.2-3.3 / 4.1 4.3 / 4.5** | **1.3-1.5 / 2.1-2.3 3.2-3.3 / 4.1 4.3 / 4.5** |
| **Ausführung / model / exécution / modello / modelo** | VAP | TIN | TIN | TIN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO1/4H | ISO2/6H | ISO3/6G |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 |

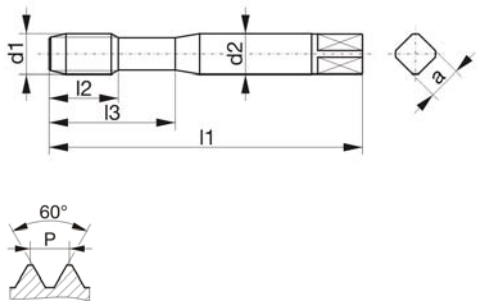
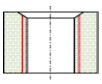
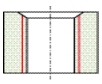
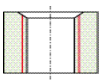
| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 1,2 | 0,25 | 40 | 5,5 | - | 2,5 | 2,1 | 0,95 | | 008819 | |
| M | 1,4 | 0,3 | 40 | 7 | - | 2,5 | 2,1 | 1,1 | | 006715 | |
| M | 1,6 | 0,35 | 40 | 8 | - | 2,5 | 2,1 | 1,25 | 108417 | 006800 | |
| M | 1,7 | 0,35 | 40 | 8 | - | 2,5 | 2,1 | 1,3 | 038370 | 015516 | |
| M | 2 | 0,4 | 45 | 9 | - | 2,8 | 2,1 | 1,6 | 110253 | 108405 | |
| M | 2,2 | 0,45 | 45 | 9 | - | 2,8 | 2,1 | 1,75 | 110254 | 108406 | |
| M | 2,3 | 0,4 | 45 | 9 | - | 2,8 | 2,1 | 1,85 | 038371 | 004334 | |
| M | 2,5 | 0,45 | 50 | 9 | 14 | 2,8 | 2,1 | 2,05 | 110255 | 108407 | |
| M | 2,6 | 0,45 | 50 | 9 | 14 | 2,8 | 2,1 | 2,15 | 004336 | 014604 | |
| M | 3 | 0,5 | 56 | 10 | 18 | 3,5 | 2,7 | 2,5 | 110256 | 108408 | 108367 |
| M | 3,5 | 0,6 | 56 | 11 | 20 | 4 | 3 | 2,9 | 010672 | 108409 | |
| M | 4 | 0,7 | 63 | 12 | 21 | 4,5 | 3,4 | 3,3 | 110259 | 108410 | 108368 |
| M | 5 | 0,8 | 70 | 14 | 25 | 6 | 4,9 | 4,2 | 110262 | 108412 | 108369 |
| M | 6 | 1 | 80 | 16 | 30 | 6 | 4,9 | 5 | 110264 | 108413 | 108370 |
| M | 8 | 1,25 | 90 | 18 | 35 | 8 | 6,2 | 6,8 | 110268 | 108415 | 108371 |
| M | 10 | 1,5 | 100 | 20 | 39 | 10 | 8 | 8,5 | 110251 | 108403 | 108364 |

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 2 H | | VARIANT 2 H | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.3-1.4 / 2.1-2.3** | | **1.3-1.5 / 2.1-2.3 3.2-3.3 / 4.1 4.3 / 4.5** | |
| **Ausführung / model / exécution / modello / modelo** | VAP | | TIN | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | | ISO2/6H | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | | h9 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | | B / 3,5-5,5 | |

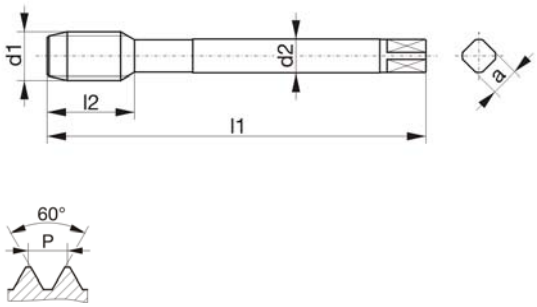
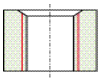
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| M | 6 | 1 | 80 | 16 | - | 4,5 | 3,4 | 5 | 002288 | 108566 |
| M | 8 | 1,25 | 90 | 18 | - | 6 | 4,9 | 6,8 | 110292 | 002368 |
| M | 10 | 1,5 | 100 | 20 | - | 7 | 5,5 | 8,5 | 110279 | 002367 |
| M | 12 | 1,75 | 110 | 24 | - | 9 | 7 | 10,2 | 110281 | 108555 |
| M | 14 | 2 | 110 | 25 | - | 11 | 9 | 12 | 110282 | 108557 |
| M | 16 | 2 | 110 | 27 | - | 12 | 9 | 14 | 110283 | 108558 |
| M | 18 | 2,5 | 125 | 32 | - | 14 | 11 | 15,5 | 110285 | 108560 |
| M | 20 | 2,5 | 140 | 32 | - | 16 | 12 | 17,5 | 110286 | 108561 |
| M | 22 | 2,5 | 140 | 32 | - | 18 | 14,5 | 19,5 | 110287 | |
| M | 24 | 3 | 160 | 36 | - | 18 | 14,5 | 21 | 110288 | 108563 |

# Maschinengewindebohrer

machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 1 H | VARIANT 1 H | VARIANT 1 H | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.3-1.5 / 2.1-2.3 3.2-3.3 / 4.1 4.3 / 4.5** | **1.3-1.5 / 2.1-2.3 3.2-3.3 / 4.1 4.3 / 4.5** | **1.3-1.6 / 3.2-3.4 4.5 / 5.4** | |
| **Ausführung / model / exécution / modello / modelo** | TIN | TIN | TICN | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 7G | 6H+0,1 | ISO2/6H | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 | |

| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 3 | 0,5 | 56 | 10 | 18 | 3,5 | 2,7 | 2,5 | 004297 | | 108395 |
| M | 3,5 | 0,6 | 56 | 11 | 20 | 4 | 3 | 2,9 | | | 108396 |
| M | 4 | 0,7 | 63 | 12 | 21 | 4,5 | 3,4 | 3,3 | 004298 | 004352 | 108397 |
| M | 5 | 0,8 | 70 | 14 | 25 | 6 | 4,9 | 4,2 | 108378 | 004353 | 108398 |
| M | 6 | 1 | 80 | 16 | 30 | 6 | 4,9 | 5 | 004346 | 004354 | 108399 |
| M | 8 | 1,25 | 90 | 18 | 35 | 8 | 6,2 | 6,8 | 108379 | 108416 | 108400 |
| M | 10 | 1,5 | 100 | 20 | 39 | 10 | 8 | 8,5 | 004347 | 003298 | 108391 |

| Typenbezeichnung / type / type / tipo / tipo | | | VARIANT 2<br>H | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  <br> | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** | | |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | | | **1.3-1.6 / 3.2-3.4 4.5 / 5.4** | |
| **Ausführung / model / exécution / modello / modelo** | | | TICN | |
| **Werkstoff / tool material / substrat / materiale / material** | | | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | | ISO2/6H | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | | | h9 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | | | B / 3,5-5,5 | |

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|
| M | 6 | 1 | 80 | 16 | - | 4,5 | 3,4 | 5 | 108552 |
| M | 8 | 1,25 | 90 | 18 | - | 6 | 4,9 | 6,8 | 108553 |
| M | 12 | 1,75 | 110 | 24 | - | 9 | 7 | 10,2 | 108546 |
| M | 14 | 2 | 110 | 25 | - | 11 | 9 | 12 | 108547 |
| M | 16 | 2 | 110 | 27 | - | 12 | 9 | 14 | 108548 |
| M | 18 | 2,5 | 125 | 32 | - | 14 | 11 | 15,5 | 108549 |
| M | 20 | 2,5 | 140 | 32 | - | 16 | 12 | 17,5 | 108550 |
| M | 22 | 2,5 | 140 | 32 | - | 18 | 14,5 | 19,5 | 003574 |
| M | 24 | 3 | 160 | 36 | - | 18 | 14,5 | 21 | 108551 |

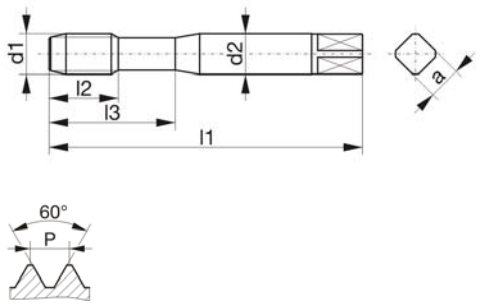
# Maschinengewindebohrer

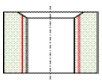
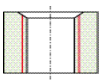
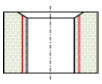
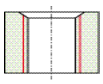
machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

## M-Metrisches ISO-Regelgewinde DIN 13

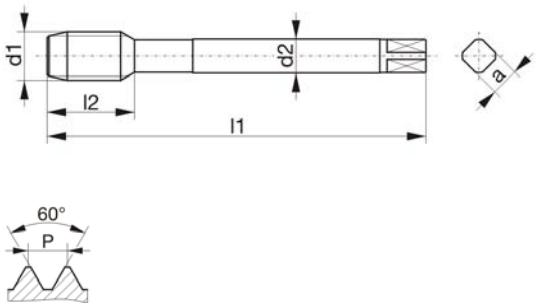
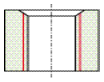
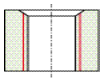
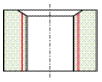
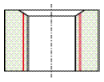
ISO Metric coarse thread DIN 13
Filetage métrique ISO DIN 13
Filettatura metrica ISO DIN 13
Rosca métrica ISO DIN 13

**DIN 371**




| Typenbezeichnung / type / type / tipo / tipo | VARIANT 1 VA | VARIANT 1 VA | VARIANT 1 VA | VARIANT 1 VA |
|---|---|---|---|---|
| | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.4 / 2.1-2.3 6.1** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.5 5.2-5.3 / 7.1-7.2 8.1** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.5 5.2-5.3 / 7.1-7.2 8.1** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.3 5.2-5.3** |
| **Ausführung / model / exécution / modello / modelo** | VAP | TIN | TIN | HL |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO2/6H | ISO3/6G | ISO2/6H |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 |

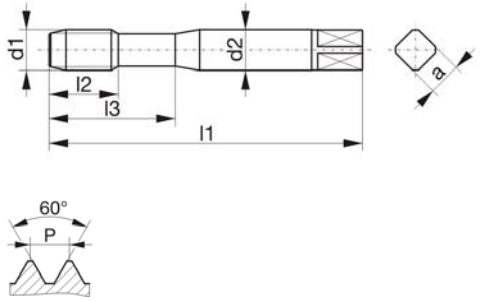
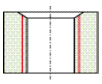
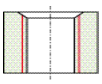
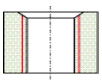
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 2 | 0,4 | 45 | 9 | - | 2,8 | 2,1 | 1,6 | 004355 | 005402 | | 027258 |
| M | 2,5 | 0,45 | 50 | 9 | 14 | 2,8 | 2,1 | 2,05 | 004358 | 004371 | | 323059 |
| M | 2,6 | 0,45 | 50 | 9 | 14 | 2,8 | 2,1 | 2,15 | 022688 | 013891 | | |
| M | 3 | 0,5 | 56 | 10 | 18 | 3,5 | 2,7 | 2,5 | 004360 | 004370 | 004372 | 022977 |
| M | 4 | 0,7 | 63 | 12 | 21 | 4,5 | 3,4 | 3,3 | 004362 | 004369 | 004373 | 020720 |
| M | 5 | 0,8 | 70 | 14 | 25 | 6 | 4,9 | 4,2 | 004363 | 003420 | 004374 | 022978 |
| M | 6 | 1 | 80 | 16 | 30 | 6 | 4,9 | 5 | 004364 | 003421 | 004375 | 022979 |
| M | 8 | 1,25 | 90 | 18 | 35 | 8 | 6,2 | 6,8 | 004366 | 003422 | 004376 | 022980 |
| M | 10 | 1,5 | 100 | 20 | 39 | 10 | 8 | 8,5 | 004368 | 003423 | 004377 | 022981 |

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 2 VA | VARIANT 2 VA | VARIANT 2 VA | VARIANT 2 VA |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.4 / 2.1-2.3 6.1** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.5 5.2-5.3 / 7.1-7.2 8.1** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.5 5.2-5.3 / 7.1-7.2 8.1** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.3 5.2-5.3** |
| **Ausführung / model / exécution / modello / modelo** | VAP | TIN | TIN | HL |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO2/6H | ISO3/6G | ISO2/6H |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 |

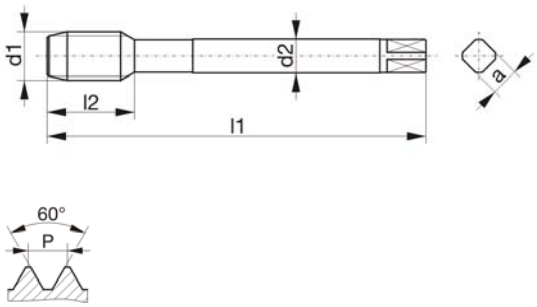
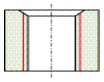
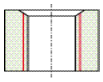
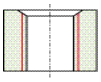
| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 10 | 1,5 | 100 | 20 | - | 7 | 5,5 | 8,5 | 004378 | 004382 | | 024297 |
| M | 12 | 1,75 | 110 | 24 | - | 9 | 7 | 10,2 | 004379 | 004383 | 027248 | 023819 |
| M | 14 | 2 | 110 | 25 | - | 11 | 9 | 12 | | 007996 | 052409 | 031365 |
| M | 16 | 2 | 110 | 27 | - | 12 | 9 | 14 | 004380 | 004384 | | 024313 |
| M | 18 | 2,5 | 125 | 32 | - | 14 | 11 | 15,5 | | 710350 | | |
| M | 20 | 2,5 | 140 | 32 | - | 16 | 12 | 17,5 | 004381 | 004385 | | 024649 |
| M | 24 | 3 | 160 | 36 | - | 18 | 14,5 | 21 | 008920 | 008921 | | 031367 |
| M | 27 | 3 | 160 | 36 | - | 20 | 16 | 24 | 033973 | 011373 | | 031368 |
| M | 30 | 3,5 | 180 | 40 | - | 22 | 18 | 26,5 | 031427 | 372021 | | 031369 |
| M | 36 | 4 | 200 | 50 | - | 28 | 22 | 32 | 025573 | 372024 | | 031371 |

# Maschinengewindebohrer

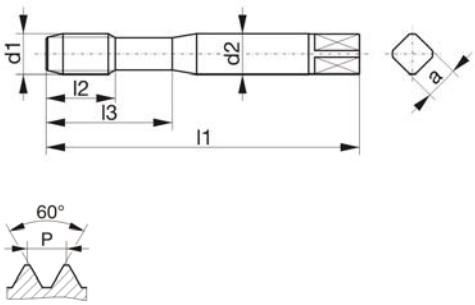
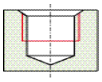
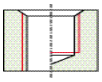
machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 1 MHST | VARIANT 1 MHST | VARIANT 1 TIH | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 371**<br>  <br> | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.6 / 2.1-2.3 3.2-3.4 / 4.1-4.5 5.2-5.4 / 7.1-7.2 8.1** | **1.1-1.6 / 2.1-2.3 3.2-3.4 / 4.1-4.5 5.2-5.4 / 7.1-7.2 8.1** | **1.4-1.7 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** | |
| **Ausführung / model / exécution / modello / modelo** | HK TIN | KR HK TIN | TICN | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6HX | 6HX | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | h6 | h6 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 | |

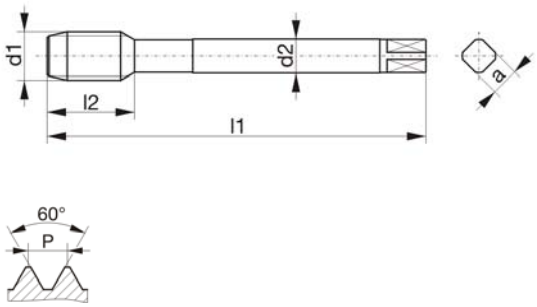
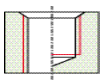
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 2 | 0,4 | 45 | 9 | - | 2,8 | 2,1 | 1,6 | | | 108837 |
| M | 2,2 | 0,45 | 45 | 9 | - | 2,8 | 2,1 | 1,75 | | | 108838 |
| M | 2,5 | 0,45 | 50 | 9 | - | 2,8 | 2,1 | 2,05 | | | 108839 |
| M | 3 | 0,5 | 56 | 10 | 18 | 3,5 | 2,7 | 2,5 | 107309 | | |
| M | 3 | 0,5 | 56 | 11 | - | 3,5 | 2,7 | 2,5 | | | 108840 |
| M | 3,5 | 0,6 | 56 | 11 | 20 | 4 | 3 | 2,9 | 107310 | | |
| M | 3,5 | 0,6 | 56 | 12 | - | 4 | 3 | 2,9 | | | 108841 |
| M | 4 | 0,7 | 63 | 12 | 21 | 4,5 | 3,4 | 3,3 | 107311 | | |
| M | 4 | 0,7 | 63 | 13 | - | 4,5 | 3,4 | 3,3 | | | 108842 |
| M | 4,5 | 0,75 | 70 | 16 | - | 6 | 4,9 | 3,7 | | | 108843 |
| M | 5 | 0,8 | 70 | 14 | 25 | 6 | 4,9 | 4,2 | 107312 | | |
| M | 5 | 0,8 | 70 | 16 | - | 6 | 4,9 | 4,2 | | | 108844 |
| M | 6 | 1 | 80 | 16 | 30 | 6 | 4,9 | 5 | 107313 | 107316 | 108845 |
| M | 8 | 1,25 | 90 | 18 | 35 | 8 | 6,2 | 6,8 | 107314 | 107317 | 108846 |
| M | 10 | 1,5 | 100 | 20 | 39 | 10 | 8 | 8,5 | 107308 | 107315 | 108836 |

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 2 MHST | VARIANT 2 MHST | VARIANT 2 TIH | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.6 / 2.1-2.3 3.2-3.4 / 4.1-4.5 5.2-5.4 / 7.1-7.2 8.1** | **1.1-1.6 / 2.1-2.3 3.2-3.4 / 4.1-4.5 5.2-5.4 / 7.1-7.2 8.1** | **1.4-1.7 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** | |
| **Ausführung / model / exécution / modello / modelo** | HK TIN | KR HK TIN | TICN | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6HX | 6HX | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | h6 | h6 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 | |

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 12 | 1,75 | 110 | 24 | - | 9 | 7 | 10,2 | 107318 | 019348 | 108868 |
| M | 14 | 2 | 110 | 25 | - | 11 | 9 | 12 | | | 000115 |
| M | 16 | 2 | 110 | 27 | - | 12 | 9 | 14 | 107319 | 019349 | 108869 |

| Typenbezeichnung / type / type / tipo / tipo | VARIO 1 H | VARIO 1 SH | | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 2184-1 VARIO 1 H / ~DIN 2184-2 VARIO 1 SH**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.4-1.6 / 3.1-3.4 4.3-4.6 / 5.4 8.2** | **1.8-1.9 / 4.7 9.1-9.3** | | |
| **Ausführung / model / exécution / modello / modelo** | KA TICN | TICN SR | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | VHM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | 6HX | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h6 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | | |

| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| M | 3 | 0,5 | 40 | 11 | - | 3,5 | 2,7 | 2,5 | | 050232 |
| M | 4 | 0,7 | 45 | 13 | - | 4,5 | 3,4 | 3,3 | | 037121 |
| M | 5 | 0,8 | 50 | 16 | - | 6 | 4,9 | 4,2 | | 037122 |
| M | 6 | 1 | 56 | 18 | - | 6 | 4,9 | 5 | | 037123 |
| M | 6 | 1 | 80 | 16 | 30 | 6 | 4,9 | 5 | 111670 | |
| M | 8 | 1,25 | 63 | 25 | - | 8 | 6,2 | 6,8 | | 037124 |
| M | 8 | 1,25 | 90 | 18 | 35 | 8 | 6,2 | 6,8 | 111671 | |
| M | 10 | 1,5 | 100 | 20 | 39 | 10 | 8 | 8,5 | 111669 | |
| M | 10 | 1,5 | 70 | 30 | - | 10 | 8 | 8,5 | | 037125 |

| Typenbezeichnung / type / type / tipo / tipo | | VARIO 2 SH | | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 2184-2**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** | |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | | **1.8-1.9 / 4.7 9.1-9.3** | | |
| **Ausführung / model / exécution / modello / modelo** | | TICN SR | | |
| **Werkstoff / tool material / substrat / materiale / material** | | VHM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | 6HX | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | | h6 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | | C / 2-3 | | |

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|
| M | 12 | 1,75 | 75 | 24 | - | 9 | 7 | 10,2 | 037126 |
| M | 16 | 2 | 80 | 27 | - | 12 | 9 | 14 | 037127 |

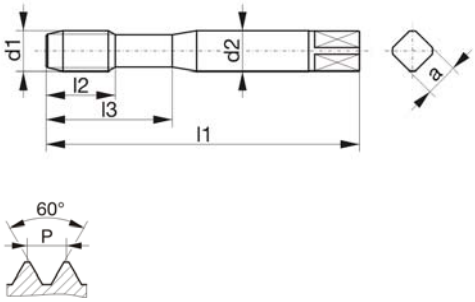
# Maschinengewindebohrer

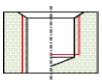
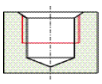
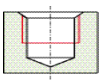
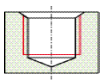
machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

## M-Metrisches ISO-Regelgewinde DIN 13

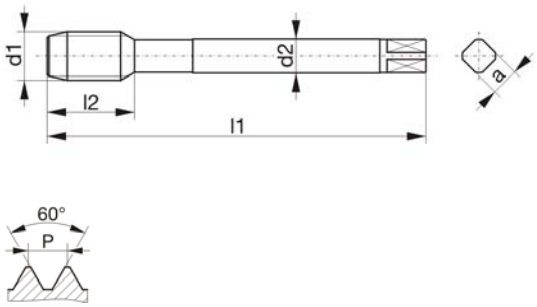
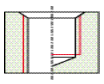
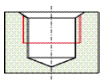
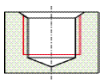
ISO Metric coarse thread DIN 13
Filetage métrique ISO DIN 13
Filettatura metrica ISO DIN 13
Rosca métrica ISO DIN 13

**DIN 371**




| Typenbezeichnung / type / type / tipo / tipo | VARIO 1 GG | VARIO 1 GG | VARIO 1 GG | VARIO 1 GG |
|---|---|---|---|---|
| | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **3.1-3.4 / 5.4 8.2-8.3** | **3.1-3.4 / 5.4 8.2-8.3 / 9.4** | **3.1-3.4 / 5.4 8.2-8.3 / 9.1-9.2 9.4** | **3.1-3.4 / 5.4 8.2-8.3 / 9.4** |
| **Ausführung / model / exécution / modello / modelo** | TICN | KA TICN | KA TICN | KA TICN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | VHM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6HX | 6HX | 6HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h6 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | E / 1,5-2 |

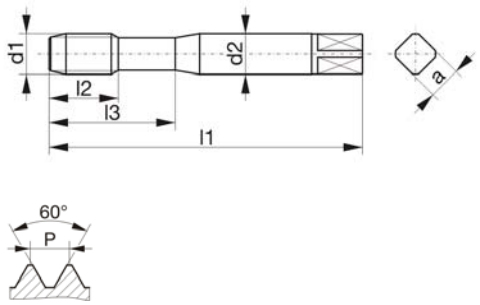
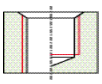
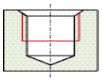
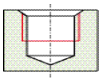
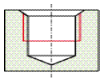
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 3 | 0,5 | 56 | 10 | 18 | 3,5 | 2,7 | 2,5 | 103941 | | | |
| M | 4 | 0,7 | 63 | 12 | 21 | 4,5 | 3,4 | 3,3 | 103942 | | | |
| M | 5 | 0,8 | 70 | 14 | 25 | 6 | 4,9 | 4,2 | 103943 | 002701 | 004573 | |
| M | 6 | 1 | 80 | 16 | 30 | 6 | 4,9 | 5 | 103944 | 107323 | 004574 | 107327 |
| M | 8 | 1,25 | 90 | 18 | 35 | 8 | 6,2 | 6,8 | 103946 | 107324 | 004575 | 107328 |
| M | 10 | 1,5 | 100 | 20 | 39 | 10 | 8 | 8,5 | 103939 | 107321 | 004576 | 107326 |

| Typenbezeichnung / type / type / tipo / tipo | VARIO 2 GG | VARIO 2 GG | | VARIO 2 GG |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **3.1-3.4 / 5.4 8.2-8.3** | **3.1-3.4 / 5.4 8.2-8.3 / 9.4** | | **3.1-3.4 / 5.4 8.2-8.3 / 9.4** |
| **Ausführung / model / exécution / modello / modelo** | TICN | KA TICN | | KA TICN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6HX | | 6HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h6 | | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | | E / 1,5-2 |

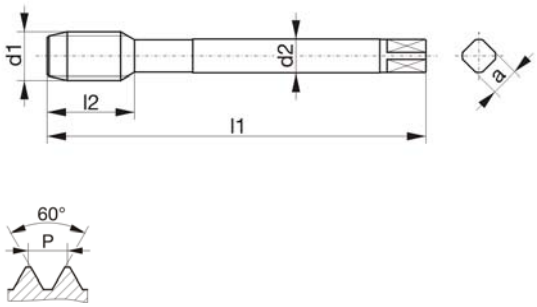
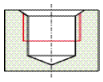
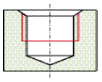
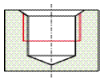
| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 10 | 1,5 | 100 | 20 | - | 7 | 5,5 | 8,5 | 105179 | | |
| M | 12 | 1,75 | 110 | 24 | - | 9 | 7 | 10,2 | 105180 | 107336 | 107342 |
| M | 14 | 2 | 110 | 25 | - | 11 | 9 | 12 | 105181 | 107337 | |
| M | 16 | 2 | 110 | 27 | - | 12 | 9 | 14 | 105182 | 107338 | 004723 |
| M | 20 | 2,5 | 140 | 32 | - | 16 | 12 | 17,5 | 105184 | 107340 | |

# Maschinengewindebohrer

machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

| Typenbezeichnung / type / type / tipo / tipo | VARIO 1 MS | AVANT 1 H15 | AVANT 1 H15 | AVANT 1 H15 |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **4.2 / 4.4 8.2-8.3** | **1.4-1.5 / 4.1-4.6** | **1.4-1.6 / 3.1-3.4 4.3-4.6 / 5.4** | **1.4-1.6 / 3.1-3.4 4.3-4.6 / 5.4** |
| **Ausführung / model / exécution / modello / modelo** | | | TICN | KA TICN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | ISO2/6H | ISO2/6H | ISO2/6H |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | C / 2-3 |

| | Ød$_1$ | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 3 | 0,5 | 56 | 10 | 18 | 3,5 | 2,7 | 2,5 | 103462 | 107393 | 107424 | |
| M | 3,5 | 0,6 | 56 | 11 | 20 | 4 | 3 | 2,9 | 103463 | | | |
| M | 4 | 0,7 | 63 | 12 | 21 | 4,5 | 3,4 | 3,3 | 103464 | 107394 | 107425 | |
| M | 5 | 0,8 | 70 | 14 | 25 | 6 | 4,9 | 4,2 | 103470 | 107405 | 107426 | |
| M | 6 | 1 | 80 | 16 | 30 | 6 | 4,9 | 5 | 103471 | 107406 | 107427 | 111685 |
| M | 8 | 1,25 | 90 | 18 | 35 | 8 | 6,2 | 6,8 | 103478 | 107412 | 107428 | 111686 |
| M | 10 | 1,5 | 100 | 20 | 39 | 10 | 8 | 8,5 | | 107387 | 107423 | 111684 |

| Typenbezeichnung / type / type / tipo / tipo | | AVANT 2 H15 | AVANT 2 H15 | AVANT 2 H15 |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** | |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | | **1.4-1.5 / 4.1-4.6** | **1.4-1.6 / 3.1-3.4 4.3-4.6 / 5.4** | **1.4-1.6 / 3.1-3.4 4.3-4.6 / 5.4** |
| **Ausführung / model / exécution / modello / modelo** | | | TICN | KA TICN |
| **Werkstoff / tool material / substrat / materiale / material** | | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | ISO2/6H | ISO2/6H | ISO2/6H |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | | C / 2-3 | C / 2-3 | C / 2-3 |

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 12 | 1,75 | 110 | 24 | - | 9 | 7 | 10,2 | 107801 | 107861 | 111714 |
| M | 14 | 2 | 110 | 25 | - | 11 | 9 | 12 | 107803 | 107862 | |
| M | 16 | 2 | 110 | 27 | - | 12 | 9 | 14 | 107807 | 107863 | 111715 |
| M | 18 | 2,5 | 125 | 32 | - | 14 | 11 | 15,5 | 107809 | 018738 | |
| M | 20 | 2,5 | 140 | 32 | - | 16 | 12 | 17,5 | 107811 | 002362 | 004475 |
| M | 24 | 3 | 160 | 36 | - | 18 | 14,5 | 21 | 107813 | 107864 | 021155 |

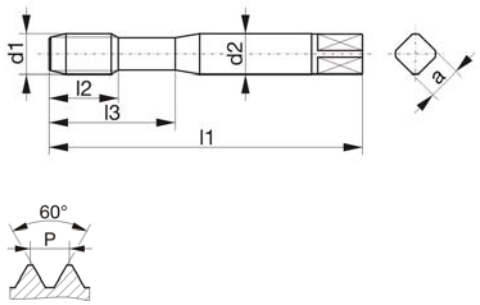
# Maschinengewindebohrer

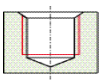
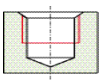
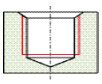
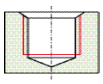
machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

## M-Metrisches ISO-Regelgewinde DIN 13

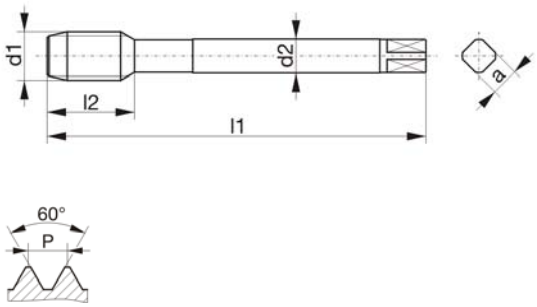
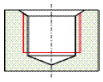
ISO Metric coarse thread DIN 13
Filetage métrique ISO DIN 13
Filettatura metrica ISO DIN 13
Rosca métrica ISO DIN 13

**DIN 371**




| Typenbezeichnung / type / type / tipo / tipo | AVANT 1 H15 | AVANT 1 H15 | AVANT 1 H15 | AVANT 1 H25 |
|---|---|---|---|---|
| | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.4-1.6 / 3.1-3.4 4.3-4.6 / 5.4** | **1.4-1.6 / 3.1-3.4 4.3-4.6 / 5.4** | **1.4-1.6 / 3.1-3.4 4.3-4.6 / 5.4** | **1.2-1.6 / 2.1-2.3 4.2-4.3 / 5.1-5.3** |
| **Ausführung / model / exécution / modello / modelo** | TICN | TICN | TICN | HL |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO3/6G | ISO3/6G | 6HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | E / 1,5-2 | C / 2-3 | E / 1,5-2 | E / 1,5-2 |

| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 3 | 0,5 | 56 | 10 | 18 | 3,5 | 2,7 | 2,5 | 024303 | 004432 | 007372 | |
| M | 4 | 0,7 | 63 | 12 | 21 | 4,5 | 3,4 | 3,3 | 004439 | 004433 | 004470 | |
| M | 4 | 0,7 | 63 | 8 | 21 | 4,5 | 3,4 | 3,3 | | | | 038067 |
| M | 5 | 0,8 | 70 | 14 | 25 | 6 | 4,9 | 4,2 | 004440 | 004435 | 004471 | |
| M | 5 | 0,8 | 70 | 9 | 25 | 6 | 4,9 | 4,2 | | | | 038065 |
| M | 6 | 1 | 80 | 10 | 30 | 6 | 4,9 | 5 | | | | 035797 |
| M | 6 | 1 | 80 | 16 | 30 | 6 | 4,9 | 5 | 107419 | 004436 | 004472 | |
| M | 8 | 1,25 | 90 | 13 | 35 | 8 | 6,2 | 6,8 | | | | 035798 |
| M | 8 | 1,25 | 90 | 18 | 35 | 8 | 6,2 | 6,8 | 107420 | 004437 | 004473 | |
| M | 10 | 1,5 | 100 | 15 | 39 | 10 | 8 | 8,5 | | | | 035799 |
| M | 10 | 1,5 | 100 | 20 | 39 | 10 | 8 | 8,5 | 004441 | 004438 | 004474 | |

| Typenbezeichnung / type / type / tipo / tipo | | | | AVANT 2 H25 |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** | | | |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | | | | **1.2-1.6 / 2.1-2.3 4.2-4.3 / 5.1-5.3** |
| **Ausführung / model / exécution / modello / modelo** | | | | HL |
| **Werkstoff / tool material / substrat / materiale / material** | | | | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | | | 6HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | | | | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | | | | E / 1,5-2 |

| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|
| M | 12 | 1,75 | 110 | 18 | - | 9 | 7 | 10,2 | 035800 |
| M | 14 | 2 | 110 | 20 | - | 11 | 9 | 12 | 035801 |
| M | 16 | 2 | 110 | 20 | - | 12 | 9 | 14 | 035802 |

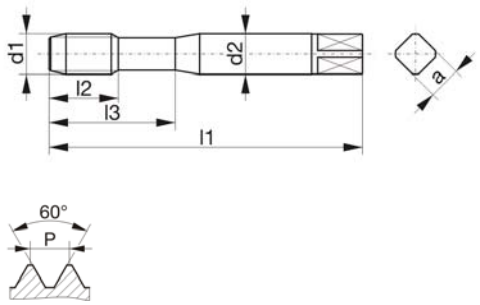
# Maschinengewindebohrer

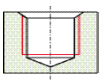
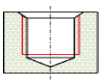
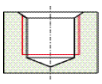
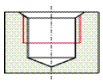
machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

## M-Metrisches ISO-Regelgewinde DIN 13

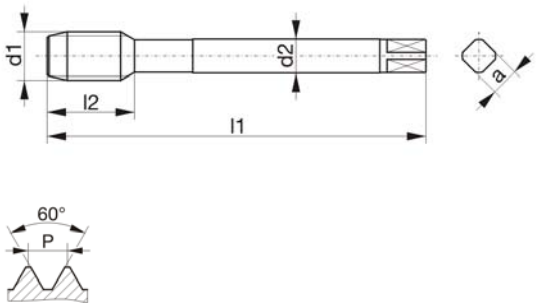
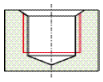
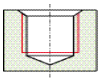
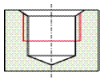
ISO Metric coarse thread DIN 13
Filetage métrique ISO DIN 13
Filettatura metrica ISO DIN 13
Rosca métrica ISO DIN 13

**DIN 371**




| Typenbezeichnung / type / type / tipo / tipo | AVANT 1 H25 | AVANT 1 GAL15 | AVANT 1 GAL15 | AVANT 1 TIH13 |
|---|---|---|---|---|
| | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.6 / 2.1-2.3 4.2-4.3 / 5.1-5.3** | **1.4-1.6 / 3.2-3.4 4.3-4.6 / 5.2-5.4** | **1.4-1.6 / 3.2-3.4 4.4 / 4.6 5.2-5.4 / 8.3** | **1.5-1.6 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** |
| **Ausführung / model / exécution / modello / modelo** | HL | KA TICN | KA TICN | TICN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | VHM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6GX | 6HX | 6HX | 6HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h6 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | E / 1,5-2 | E / 1,5-2 | E / 1,5-2 | C / 2-3 |

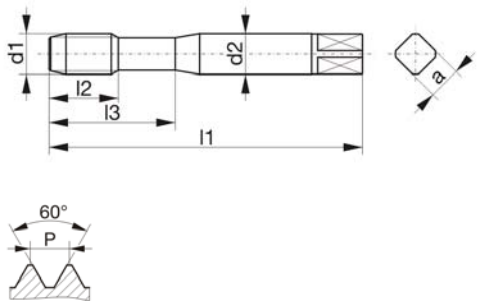
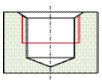
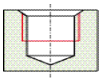
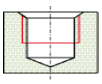
| Ød1 | | P | l1 | l2 | l3 | Ød2 | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 3 | 0,5 | 56 | 11 | - | 3,5 | 2,7 | 2,5 | | | | 108755 |
| M | 4 | 0,7 | 63 | 13 | - | 4,5 | 3,4 | 3,3 | | | | 108756 |
| M | 4 | 0,7 | 63 | 8 | 21 | 4,5 | 3,4 | 3,3 | 038191 | | | |
| M | 5 | 0,8 | 70 | 16 | - | 6 | 4,9 | 4,2 | | | | 108757 |
| M | 5 | 0,8 | 70 | 9 | 25 | 6 | 4,9 | 4,2 | 038192 | 036973 | | |
| M | 6 | 1 | 80 | 10 | 30 | 6 | 4,9 | 5 | 038193 | 035274 | 037093 | |
| M | 6 | 1 | 80 | 16 | 30 | 6 | 4,9 | 5 | | | | 108758 |
| M | 8 | 1,25 | 90 | 13 | 35 | 8 | 6,2 | 6,8 | 038194 | 034631 | 037095 | |
| M | 8 | 1,25 | 90 | 18 | 35 | 8 | 6,2 | 6,8 | | | | 108759 |
| M | 10 | 1,5 | 100 | 15 | 39 | 10 | 8 | 8,5 | 038196 | 036974 | 037082 | |
| M | 10 | 1,5 | 100 | 20 | 39 | 10 | 8 | 8,5 | | | | 108754 |

| Typenbezeichnung / type / type / tipo / tipo | | AVANT 2 GAL15 | AVANT 2 GAL15 | AVANT 2 TIH13 |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** | |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | | **1.4-1.6 / 3.2-3.4 4.3-4.6 / 5.2-5.4** | **1.4-1.6 / 3.2-3.4 4.4 / 4.6 5.2-5.4 / 8.3** | **1.5-1.6 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** |
| **Ausführung / model / exécution / modello / modelo** | | KA TICN | KA TICN | TICN |
| **Werkstoff / tool material / substrat / materiale / material** | | HSSE-PM | VHM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | 6HX | 6HX | 6HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | | h6 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | | E / 1,5-2 | E / 1,5-2 | C / 2-3 |

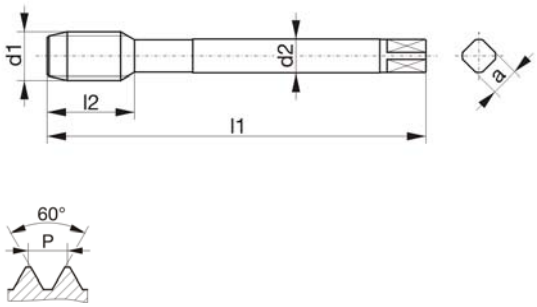
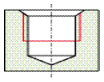
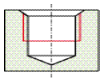
| | **Ød$_1$** | **P** | **l$_1$** | **l$_2$** | **l$_3$** | **Ød$_2$** | **a** | | **Identnummer / identification number / code article / codice / número de identificación** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 12 | 1,75 | 110 | 18 | - | 9 | 7 | 10,2 | 036975 | 037096 | |
| M | 12 | 1,75 | 110 | 24 | - | 9 | 7 | 10,2 | | | 108793 |
| M | 16 | 2 | 110 | 27 | - | 12 | 9 | 14 | | | 108794 |

# Maschinengewindebohrer

machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 1 N38 | DOMINANT 1 N38 | DOMINANT 1 N38 | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 371**<br>  <br> | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.3 / 4.3 5.1-5.3 / 8.1** | **1.1-1.3 / 4.3 5.2-5.3 / 8.1** | **1.2-1.3 / 4.3 5.1-5.3 / 8.1** | |
| **Ausführung / model / exécution / modello / modelo** | | TIN | LH | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO2/6H | ISO2/6H | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | |

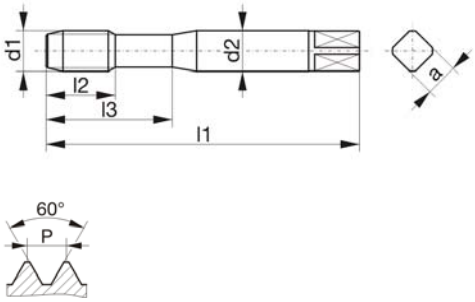
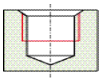
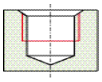
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 3 | 0,5 | 56 | 7 | 18 | 3,5 | 2,7 | 2,5 | 103622 | 103732 | 103718 |
| M | 4 | 0,7 | 63 | 8 | 21 | 4,5 | 3,4 | 3,3 | 103627 | 103734 | 103719 |
| M | 5 | 0,8 | 70 | 9 | 25 | 6 | 4,9 | 4,2 | 103651 | 103735 | 103720 |
| M | 6 | 1 | 80 | 10 | 30 | 6 | 4,9 | 5 | 103655 | 103736 | 103721 |
| M | 8 | 1,25 | 90 | 13 | 35 | 8 | 6,2 | 6,8 | 103698 | 103738 | 103724 |
| M | 10 | 1,5 | 100 | 15 | 39 | 10 | 8 | 8,5 | 103587 | 103727 | 103716 |

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 2 N38 | DOMINANT 2 N38 | | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  <br> | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.3 / 4.3 5.1-5.3 / 8.1** | **1.1-1.3 / 4.3 5.2-5.3 / 8.1** | | |
| **Ausführung / model / exécution / modello / modelo** | | TIN | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO2/6H | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | | |

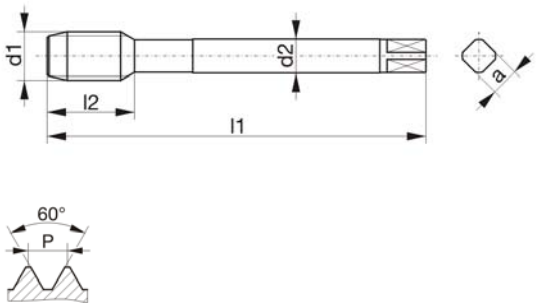
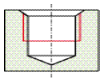
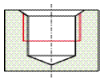
| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| M | 12 | 1,75 | 110 | 18 | - | 9 | 7 | 10,2 | 104755 | 104852 |
| M | 16 | 2 | 110 | 20 | - | 12 | 9 | 14 | 104765 | 104855 |
| M | 20 | 2,5 | 140 | 25 | - | 16 | 12 | 17,5 | 104773 | 104859 |

# Maschinengewindebohrer

machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 1 HZ38 | DOMINANT 1 HZ38 | | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 371**<br>  <br> | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.5 / 4.1 4.3 / 4.5** | **1.2-1.4 / 2.1-2.2 4.5** | | |
| **Ausführung / model / exécution / modello / modelo** | | VAP | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO2/6H | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | | |

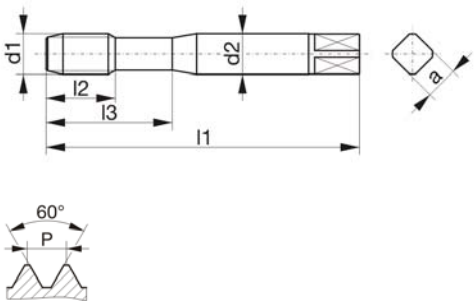
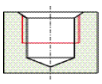
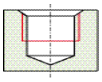
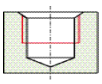
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| M | 2 | 0,4 | 45 | 9 | - | 2,8 | 2,1 | 1,6 | 111228 | 110332 |
| M | 2,5 | 0,45 | 50 | 5 | 14 | 2,8 | 2,1 | 2,05 | 111231 | 110333 |
| M | 3 | 0,5 | 56 | 7 | 18 | 3,5 | 2,7 | 2,5 | 111233 | 006839 |
| M | 4 | 0,7 | 63 | 8 | 21 | 4,5 | 3,4 | 3,3 | 111235 | 005768 |
| M | 5 | 0,8 | 70 | 9 | 25 | 6 | 4,9 | 4,2 | 111245 | 004923 |
| M | 6 | 1 | 80 | 10 | 30 | 6 | 4,9 | 5 | 111247 | 111288 |
| M | 8 | 1,25 | 90 | 13 | 35 | 8 | 6,2 | 6,8 | 111262 | 004922 |
| M | 10 | 1,5 | 100 | 15 | 39 | 10 | 8 | 8,5 | 111221 | 111287 |

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 2 HZ38 | DOMINANT 2 HZ38 | | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.5 / 4.1 4.3 / 4.5** | **1.2-1.4 / 2.1-2.2 4.5** | | |
| **Ausführung / model / exécution / modello / modelo** | | VAP | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO2/6H | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | | |

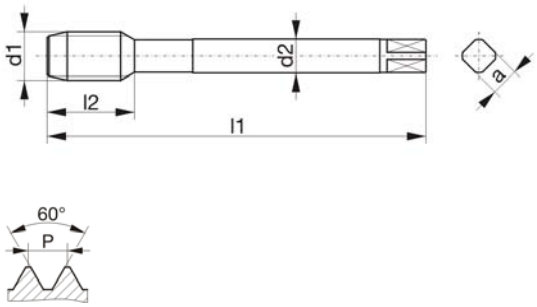
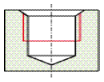
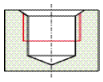
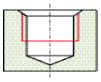
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| M | 10 | 1,5 | 100 | 15 | - | 7 | 5,5 | 8,5 | 111357 | |
| M | 12 | 1,75 | 110 | 18 | - | 9 | 7 | 10,2 | 111359 | 111413 |
| M | 14 | 2 | 110 | 20 | - | 11 | 9 | 12 | 111363 | 006840 |
| M | 16 | 2 | 110 | 20 | - | 12 | 9 | 14 | 111365 | 111414 |
| M | 18 | 2,5 | 125 | 25 | - | 14 | 11 | 15,5 | 111368 | 005769 |
| M | 20 | 2,5 | 140 | 25 | - | 16 | 12 | 17,5 | 111371 | 005770 |
| M | 22 | 2,5 | 140 | 25 | - | 18 | 14,5 | 19,5 | 111374 | 111415 |
| M | 24 | 3 | 160 | 30 | - | 18 | 14,5 | 21 | 111376 | 005771 |
| M | 27 | 3 | 160 | 30 | - | 20 | 16 | 24 | 111379 | 111416 |
| M | 30 | 3,5 | 180 | 35 | - | 22 | 18 | 26,5 | 111380 | 111417 |
| M | 33 | 3,5 | 180 | 35 | - | 25 | 20 | 29,5 | 111381 | 111418 |
| M | 36 | 4 | 200 | 40 | - | 28 | 22 | 32 | 111382 | 006332 |
| M | 39 | 4 | 200 | 40 | - | 32 | 24 | 35 | 019602 | 018496 |
| M | 42 | 4,5 | 200 | 40 | - | 32 | 24 | 37,5 | 019107 | 034745 |
| M | 45 | 4,5 | 220 | 45 | - | 36 | 29 | 40,5 | 019604 | 038695 |
| M | 48 | 5 | 250 | 50 | - | 36 | 29 | 43 | 019605 | 018498 |
| M | 52 | 5 | 250 | 55 | - | 40 | 32 | 47 | 019606 | 033212 |
| M | 56 | 5,5 | 250 | 55 | - | 40 | 32 | 50,5 | 007163 | 038712 |

# Maschinengewindebohrer

machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 1 HZ38 | DOMINANT 1 HZ38 | DOMINANT 1 HZ38 | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.5 / 4.1 4.3 / 4.5** | **1.4-1.6 / 3.2-3.4 4.5** | **1.2-1.5 / 2.1-2.3 3.2-3.4** | |
| **Ausführung / model / exécution / modello / modelo** | TIN | TICN | HL | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO2/6H | ISO2/6H | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | |

| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 2 | 0,4 | 45 | 9 | - | 2,8 | 2,1 | 1,6 | 111277 | | 022329 |
| M | 2,5 | 0,45 | 50 | 5 | 14 | 2,8 | 2,1 | 2,05 | 111257 | | 018419 |
| M | 3 | 0,5 | 56 | 7 | 18 | 3,5 | 2,7 | 2,5 | 111279 | 037175 | 044886 |
| M | 4 | 0,7 | 63 | 8 | 21 | 4,5 | 3,4 | 3,3 | 111280 | 037176 | 774006 |
| M | 5 | 0,8 | 70 | 9 | 25 | 6 | 4,9 | 4,2 | 111281 | 037178 | 015172 |
| M | 6 | 1 | 80 | 10 | 30 | 6 | 4,9 | 5 | 111282 | 037181 | 044887 |
| M | 8 | 1,25 | 90 | 13 | 35 | 8 | 6,2 | 6,8 | 111285 | 111273 | 036159 |
| M | 10 | 1,5 | 100 | 15 | 39 | 10 | 8 | 8,5 | 111274 | 111269 | 044888 |

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 2 HZ38 | DOMINANT 2 HZ38 | DOMINANT 2 HZ38 | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.5 / 4.1 4.3 / 4.5** | **1.4-1.6 / 3.2-3.4 4.5** | **1.2-1.5 / 2.1-2.3 3.2-3.4** | |
| **Ausführung / model / exécution / modello / modelo** | TIN | TICN | HL | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO2/6H | ISO2/6H | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | |

| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 10 | 1,5 | 100 | 15 | - | 7 | 5,5 | 8,5 | 004476 | | 048898 |
| M | 12 | 1,75 | 110 | 18 | - | 9 | 7 | 10,2 | 111399 | 037182 | 036157 |
| M | 14 | 2 | 110 | 20 | - | 11 | 9 | 12 | 111401 | | 044889 |
| M | 16 | 2 | 110 | 20 | - | 12 | 9 | 14 | 111402 | 004910 | 042207 |
| M | 18 | 2,5 | 125 | 25 | - | 14 | 11 | 15,5 | 111405 | | 044890 |
| M | 20 | 2,5 | 140 | 25 | - | 16 | 12 | 17,5 | 111406 | 037184 | 044560 |
| M | 22 | 2,5 | 140 | 25 | - | 18 | 14,5 | 19,5 | 111408 | | 109365 |
| M | 24 | 3 | 160 | 30 | - | 18 | 14,5 | 21 | 002040 | 002327 | 034555 |

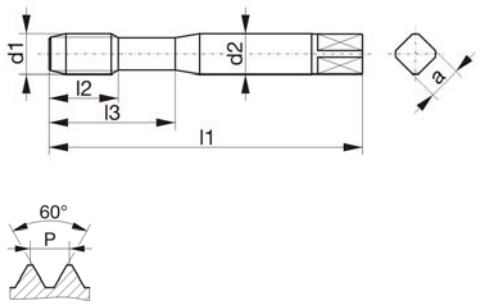
# Maschinengewindebohrer

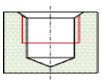
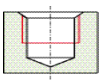
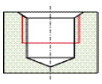
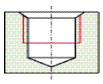
machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

## M-Metrisches ISO-Regelgewinde DIN 13

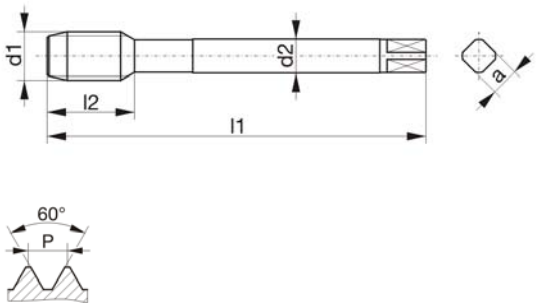
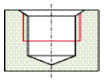
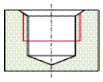
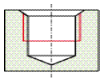
ISO Metric coarse thread DIN 13
Filetage métrique ISO DIN 13
Filettatura metrica ISO DIN 13
Rosca métrica ISO DIN 13

**DIN 371**




| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 1 VA45 | DOMINANT 1 VA45 | DOMINANT 1 VA45 | DOMINANT 1 VA45 |
|---|---|---|---|---|
| | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.3-1.5 / 4.3 4.5 / 5.1-5.3 8.1** | **1.3-1.5 / 4.3 4.5 / 5.1-5.3 8.1** | **1.3-1.5 / 4.3 4.5 / 5.1-5.3 8.1** | **1.1-1.5 / 2.1-2.2 6.1** |
| **Ausführung / model / exécution / modello / modelo** | | | | VAP |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO3/6G | 7G | ISO2/6H |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | C / 2-3 |

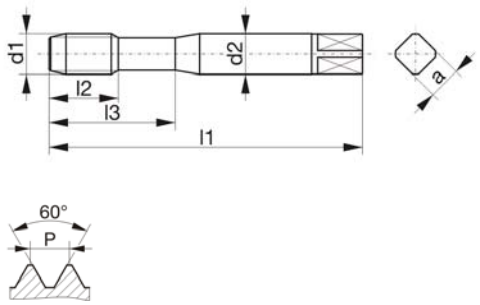
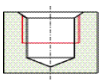
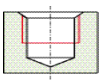
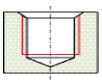
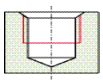
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 2 | 0,4 | 45 | 9 | - | 2,8 | 2,1 | 1,6 | 038343 | 038351 | | |
| M | 2,5 | 0,45 | 50 | 9 | 14 | 2,8 | 2,1 | 2,05 | 038344 | 038350 | 038363 | |
| M | 3 | 0,5 | 56 | 7 | 18 | 3,5 | 2,7 | 2,5 | 024650 | 024682 | 024867 | 013741 |
| M | 3,5 | 0,6 | 56 | 7 | 20 | 4 | 3 | 2,9 | 033230 | | | |
| M | 4 | 0,7 | 63 | 8 | 21 | 4,5 | 3,4 | 3,3 | 019921 | 024683 | 024868 | 013748 |
| M | 5 | 0,8 | 70 | 9 | 25 | 6 | 4,9 | 4,2 | 019922 | 024685 | 024869 | 013750 |
| M | 6 | 1 | 80 | 10 | 30 | 6 | 4,9 | 5 | 019923 | 024686 | 024870 | 013751 |
| M | 7 | 1 | 80 | 10 | 30 | 7 | 5,5 | 6 | 108999 | | | |
| M | 8 | 1,25 | 90 | 13 | 35 | 8 | 6,2 | 6,8 | 024651 | 024687 | 024871 | 013753 |
| M | 10 | 1,5 | 100 | 15 | 39 | 10 | 8 | 8,5 | 024652 | 024688 | 024872 | 013755 |

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 2 VA45 | DOMINANT 2 VA45 | | DOMINANT 2 VA45 |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.3-1.5 / 4.3 4.5 / 5.1-5.3 8.1** | **1.3-1.5 / 4.3 4.5 / 5.1-5.3 8.1** | | **1.1-1.5 / 2.1-2.2 6.1** |
| **Ausführung / model / exécution / modello / modelo** | | | | VAP |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO3/6G | | ISO2/6H |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | | C / 2-3 |

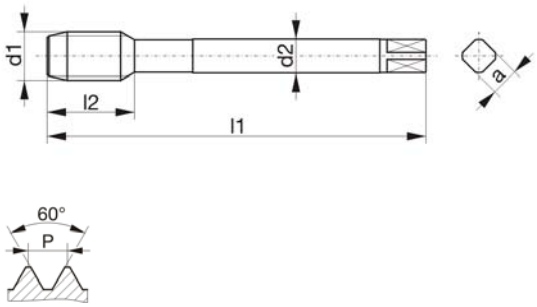
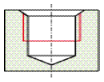
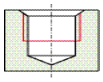
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 5 | 0,8 | 70 | 9 | - | 3,5 | 2,7 | 4,2 | 024653 | | |
| M | 6 | 1 | 80 | 10 | - | 4,5 | 3,4 | 5 | 024654 | | |
| M | 8 | 1,25 | 90 | 13 | - | 6 | 4,9 | 6,8 | 024655 | | |
| M | 10 | 1,5 | 100 | 15 | - | 7 | 5,5 | 8,5 | 024656 | | |
| M | 12 | 1,75 | 110 | 18 | - | 9 | 7 | 10,2 | 024657 | 024700 | 013778 |
| M | 14 | 2 | 110 | 20 | - | 11 | 9 | 12 | 024658 | | 013779 |
| M | 16 | 2 | 110 | 20 | - | 12 | 9 | 14 | 024659 | 024702 | 013780 |
| M | 18 | 2,5 | 125 | 25 | - | 14 | 11 | 15,5 | 024660 | | 054018 |
| M | 20 | 2,5 | 140 | 25 | - | 16 | 12 | 17,5 | 024661 | | 020523 |
| M | 22 | 2,5 | 140 | 25 | - | 18 | 14,5 | 19,5 | 024662 | | |
| M | 24 | 3 | 160 | 30 | - | 18 | 14,5 | 21 | 024663 | | 028849 |
| M | 27 | 3 | 160 | 30 | - | 20 | 16 | 24 | 024664 | | |
| M | 30 | 3,5 | 180 | 35 | - | 22 | 18 | 26,5 | 024666 | | |
| M | 33 | 3,5 | 180 | 35 | - | 25 | 20 | 29,5 | 024667 | | |
| M | 36 | 4 | 200 | 40 | - | 28 | 22 | 32 | 024668 | | |

# Maschinengewindebohrer

machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 1 VA45 | DOMINANT 1 VA45 | DOMINANT 1 VA45 | DOMINANT 1 VA45 |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 371**<br>  <br> | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.6 / 2.1-2.3 4.1 / 4.3 / 4.5 5.1-5.3 / 7.1 8.1** | **1.1-1.6 / 2.1-2.3 4.1 / 4.3 / 4.5 5.1-5.3 / 7.1 8.1** | **1.1-1.6 / 2.1-2.3 4.1 / 4.3 / 4.5 5.1-5.3 / 7.1 8.1** | **1.1-1.6 / 2.1-2.3 4.1 / 4.3 / 4.5 5.1-5.3 / 7.1 8.1** |
| **Ausführung / model / exécution / modello / modelo** | TIN | TIN | TIN | TIN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO3/6G | ISO3/6G | 7G |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | E / 1,5-2 | C / 2-3 |

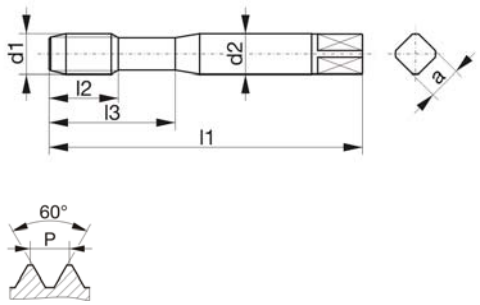
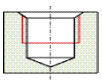
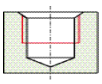
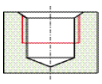
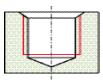
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 3 | 0,5 | 56 | 7 | 18 | 3,5 | 2,7 | 2,5 | 013744 | 024689 | 035906 | 024873 |
| M | 4 | 0,7 | 63 | 8 | 21 | 4,5 | 3,4 | 3,3 | 013767 | 024690 | 024695 | 024874 |
| M | 5 | 0,8 | 70 | 9 | 25 | 6 | 4,9 | 4,2 | 013768 | 024691 | 024696 | 024875 |
| M | 6 | 1 | 80 | 10 | 30 | 6 | 4,9 | 5 | 010964 | 024692 | 024697 | 024876 |
| M | 8 | 1,25 | 90 | 13 | 35 | 8 | 6,2 | 6,8 | 013770 | 024693 | 024698 | 024877 |
| M | 10 | 1,5 | 100 | 15 | 39 | 10 | 8 | 8,5 | 013771 | 024694 | 024699 | 024878 |

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 2 VA45 | DOMINANT 2 VA45 | | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.6 / 2.1-2.3 4.1 / 4.3 / 4.5 5.1-5.3 / 7.1 8.1** | **1.1-1.6 / 2.1-2.3 4.1 / 4.3 / 4.5 5.1-5.3 / 7.1 8.1** | | |
| **Ausführung / model / exécution / modello / modelo** | TIN | TIN | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO3/6G | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | | |

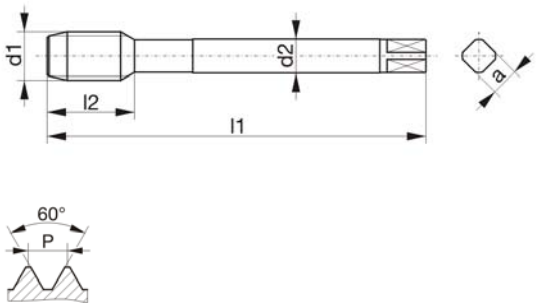
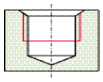
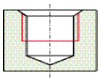
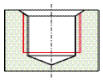
| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| M | 8 | 1,25 | 90 | 13 | - | 6 | 4,9 | 6,8 | 025078 | |
| M | 10 | 1,5 | 100 | 15 | - | 7 | 5,5 | 8,5 | 025079 | |
| M | 12 | 1,75 | 110 | 18 | - | 9 | 7 | 10,2 | 013781 | 024704 |
| M | 16 | 2 | 110 | 20 | - | 12 | 9 | 14 | 013787 | 024706 |
| M | 20 | 2,5 | 140 | 25 | - | 16 | 12 | 17,5 | 019067 | |
| M | 24 | 3 | 160 | 30 | - | 18 | 14,5 | 21 | 017495 | |

# Maschinengewindebohrer

machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 1 VA45 | DOMINANT 1 VA45 | DOMINANT 1 VA45 | DOMINANT 1 VA45 |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 371**<br>  <br> | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.6 / 2.1-2.3 4.1 / 4.3 / 4.5 5.1-5.3 / 7.1 8.1** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | **1.1-1.6 / 2.1-2.3 3.1-3.4 / 4.1 4.3 / 5.1-5.3 7.1-7.2** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** |
| **Ausführung / model / exécution / modello / modelo** | TIN | HL | KA HL | HL |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6H+0,1 | ISO2/6H | ISO2/6H | ISO2/6H |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | E / 1,5-2 |

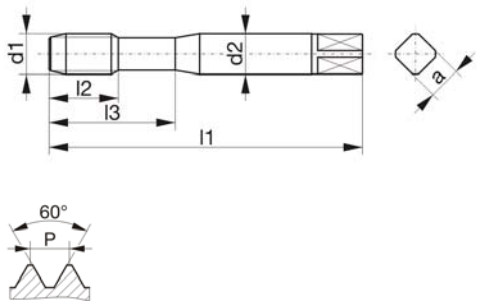
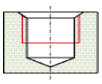
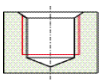
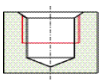
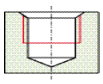
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 3 | 0,5 | 56 | 7 | 18 | 3,5 | 2,7 | 2,5 | 024879 | 013746 | | 024673 |
| M | 4 | 0,7 | 63 | 8 | 21 | 4,5 | 3,4 | 3,3 | 024880 | 013756 | | 024674 |
| M | 5 | 0,8 | 70 | 9 | 25 | 6 | 4,9 | 4,2 | 024881 | 013758 | 024670 | 024675 |
| M | 6 | 1 | 80 | 10 | 30 | 6 | 4,9 | 5 | 024882 | 013764 | 016409 | 024676 |
| M | 8 | 1,25 | 90 | 13 | 35 | 8 | 6,2 | 6,8 | 024883 | 013765 | 017414 | 023066 |
| M | 10 | 1,5 | 100 | 15 | 39 | 10 | 8 | 8,5 | 024884 | 013766 | 024671 | 024194 |

| Typenbezeichnung / type / type / tipo / tipo | | DOMINANT 2 VA45 | DOMINANT 2 VA45 | DOMINANT 2 VA45 |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** | |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | **1.1-1.6 / 2.1-2.3 3.1-3.4 / 4.1 4.3 / 5.1-5.3 7.1-7.2** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** |
| **Ausführung / model / exécution / modello / modelo** | | HL | KA HL | HL |
| **Werkstoff / tool material / substrat / materiale / material** | | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | ISO2/6H | ISO2/6H | ISO2/6H |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | | C / 2-3 | C / 2-3 | E / 1,5-2 |

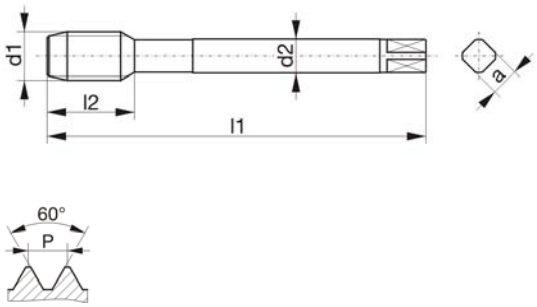
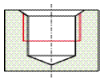
| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 12 | 1,75 | 110 | 18 | - | 9 | 7 | 10,2 | 013782 | 017415 | 024677 |
| M | 14 | 2 | 110 | 20 | - | 11 | 9 | 12 | 013785 | | |
| M | 16 | 2 | 110 | 20 | - | 12 | 9 | 14 | 013788 | 014597 | 107474 |
| M | 18 | 2,5 | 125 | 25 | - | 14 | 11 | 15,5 | 019460 | | |
| M | 20 | 2,5 | 140 | 25 | - | 16 | 12 | 17,5 | 019068 | 024334 | 126054 |
| M | 22 | 2,5 | 140 | 25 | - | 18 | 14,5 | 19,5 | 031363 | | |
| M | 24 | 3 | 160 | 30 | - | 18 | 14,5 | 21 | 019461 | | |
| M | 30 | 3,5 | 180 | 35 | - | 22 | 18 | 26,5 | 109941 | | |

# Maschinengewindebohrer

machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 1 VA45 | DOMINANT 1 VA45 | DOMINANT 1 VA45 | DOMINANT 1 VA45 |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** |
| **Ausführung / model / exécution / modello / modelo** | HL | HL | HL | HL |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO3/6G | ISO3/6G | 7G | 6H+0,1 |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | E / 1,5-2 | C / 2-3 | C / 2-3 |

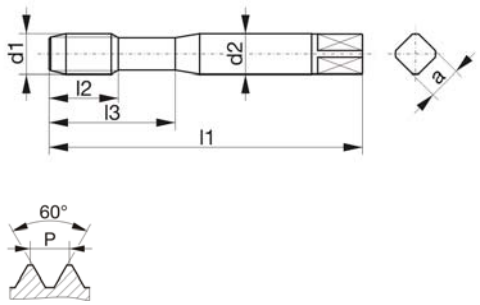
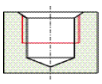
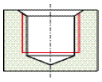
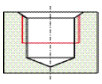
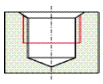
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 3 | 0,5 | 56 | 7 | 18 | 3,5 | 2,7 | 2,5 | 036080 | 025080 | 112427 | 036282 |
| M | 4 | 0,7 | 63 | 8 | 21 | 4,5 | 3,4 | 3,3 | 112439 | 038373 | 112428 | 036283 |
| M | 5 | 0,8 | 70 | 9 | 25 | 6 | 4,9 | 4,2 | 112441 | 038374 | 112429 | 036284 |
| M | 6 | 1 | 80 | 10 | 30 | 6 | 4,9 | 5 | 112438 | 034513 | 112430 | 033185 |
| M | 8 | 1,25 | 90 | 13 | 35 | 8 | 6,2 | 6,8 | 015456 | 038375 | 031904 | 033186 |
| M | 10 | 1,5 | 100 | 15 | 39 | 10 | 8 | 8,5 | 015457 | 038376 | 034567 | 033187 |

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 2 VA45 | | | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | | | |
| **Ausführung / model / exécution / modello / modelo** | HL | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO3/6G | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | | | |

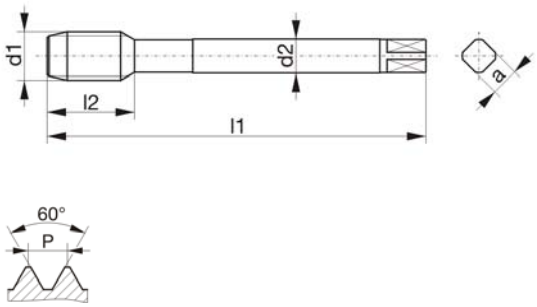
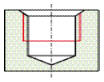
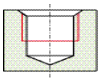
| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|
| M | 12 | 1,75 | 110 | 18 | - | 9 | 7 | 10,2 | 027471 |
| M | 16 | 2 | 110 | 20 | - | 12 | 9 | 14 | 112451 |

# Maschinengewindebohrer

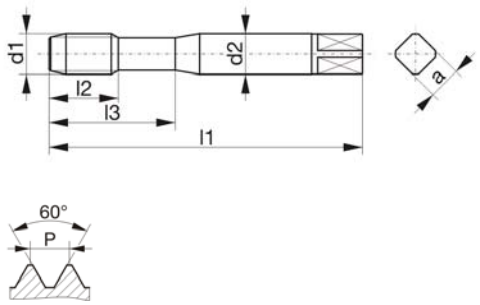
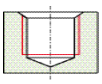
machine taps / tarauds machine / maschi a macchina / machos para roscado a máquina

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 1 MHST45 | DOMINANT 1 MHST45 | DOMINANT 1 MHST45 | DOMINANT 1 MHST45 |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.6 / 2.1-2.3 4.1 / 4.3 / 4.5 5.1-5.3 / 7.1** | **1.1-1.6 / 2.1-2.3 4.1 / 4.3 / 4.5 5.1-5.3 / 7.1** | **1.1-1.7 / 2.1-2.3 3.2-3.4 / 5.1-5.3 7.1-7.2** | **1.1-1.7 / 2.1-2.3 3.1-3.4 / 4.1 4.3 / 5.1-5.3 7.1-7.2** |
| **Ausführung / model / exécution / modello / modelo** | HK TIN | HK TIN | HK HL | KA HK HL |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6HX | 6HX | 6HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | h6 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | E / 1,5-2 | C / 2-3 | C / 2-3 |

| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 3 | 0,5 | 56 | 7 | 18 | 3,5 | 2,7 | 2,5 | 107276 | 107287 | 036347 | |
| M | 4 | 0,7 | 63 | 8 | 21 | 4,5 | 3,4 | 3,3 | 107277 | 107288 | 034383 | |
| M | 5 | 0,8 | 70 | 9 | 25 | 6 | 4,9 | 4,2 | 107278 | 107289 | 036348 | 036364 |
| M | 6 | 1 | 80 | 10 | 30 | 6 | 4,9 | 5 | 107279 | 107290 | 036349 | 036361 |
| M | 8 | 1,25 | 90 | 13 | 35 | 8 | 6,2 | 6,8 | 107281 | 107291 | 036350 | 030591 |
| M | 10 | 1,5 | 100 | 15 | 39 | 10 | 8 | 8,5 | 107271 | 107286 | 036351 | 036362 |

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 2 MHST45 | | DOMINANT 2 MHST45 | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.6 / 2.1-2.3 4.1 / 4.3 / 4.5 5.1-5.3 / 7.1** | | **1.1-1.7 / 2.1-2.3 3.2-3.4 / 5.1-5.3 7.1-7.2** | |
| **Ausführung / model / exécution / modello / modelo** | HK TIN | | HK HL | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | | 6HX | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | | h6 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | | C / 2-3 | |

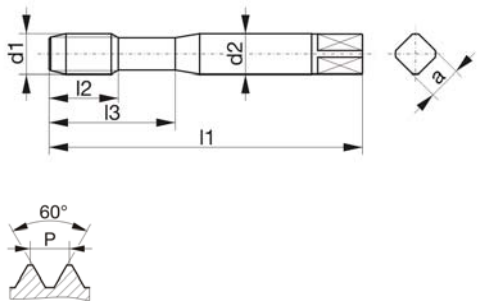
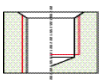
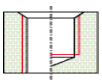
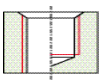
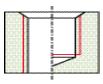
| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| M | 12 | 1,75 | 110 | 18 | - | 9 | 7 | 10,2 | 107299 | 036352 |
| M | 16 | 2 | 110 | 20 | - | 12 | 9 | 14 | | 036353 |

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 1 MHST45 | | | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 371**<br>  <br> | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.7 / 2.1-2.3 3.2-3.4 / 5.1-5.3 7.1-7.2** | | | |
| **Ausführung / model / exécution / modello / modelo** | HK HL | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | E / 1,5-2 | | | |

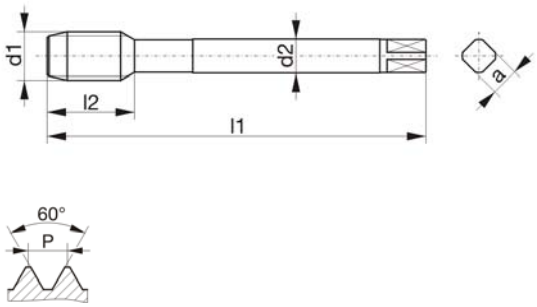
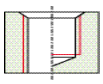
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|
| M | 3 | 0,5 | 56 | 7 | 18 | 3,5 | 2,7 | 2,5 | 036354 |
| M | 4 | 0,7 | 63 | 8 | 21 | 4,5 | 3,4 | 3,3 | 036355 |
| M | 5 | 0,8 | 70 | 9 | 25 | 6 | 4,9 | 4,2 | 036363 |
| M | 6 | 1 | 80 | 10 | 30 | 6 | 4,9 | 5 | 036356 |
| M | 8 | 1,25 | 90 | 13 | 35 | 8 | 6,2 | 6,8 | 036357 |
| M | 10 | 1,5 | 100 | 15 | 39 | 10 | 8 | 8,5 | 036358 |

# Gewindefurcher

roll taps / tarauds à refouler / maschi a rullare / laminadores

| Typenbezeichnung / type / type / tipo / tipo | DURAMAX 1 N | DURAMAX 1 N | DURAMAX 1 N | DURAMAX 1 N |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 2174**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **4.1 / 5.1-5.2 6.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** |
| **Ausführung / model / exécution / modello / modelo** | | TIN | TIN | TIN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6HX | 6HX | 6GX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | E / 1,5-2 | C / 2-3 |

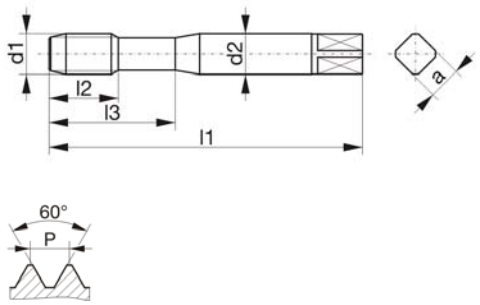
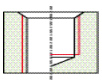
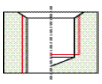
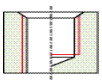
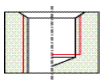
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 2 | 0,4 | 45 | 9 | - | 2,8 | 2,1 | 1,82 | 106360 | 106542 | | |
| M | 2,5 | 0,45 | 50 | 9 | 14 | 2,8 | 2,1 | 2,3 | | 106543 | | |
| M | 3 | 0,5 | 56 | 10 | 18 | 3,5 | 2,7 | 2,8 | 106365 | 106545 | 106508 | 106471 |
| M | 3,5 | 0,6 | 56 | 11 | 20 | 4 | 3 | 3,25 | 106366 | 106546 | | |
| M | 4 | 0,7 | 63 | 12 | 21 | 4,5 | 3,4 | 3,7 | 106367 | 106547 | 106509 | 106473 |
| M | 5 | 0,8 | 70 | 14 | 25 | 6 | 4,9 | 4,65 | 106383 | 106550 | 106510 | 106474 |
| M | 6 | 1 | 80 | 16 | 30 | 6 | 4,9 | 5,55 | 000081 | 106552 | 106511 | 106475 |
| M | 8 | 1,25 | 90 | 18 | 35 | 8 | 6,2 | 7,45 | 106491 | 106555 | 106512 | 106476 |
| M | 10 | 1,5 | 100 | 20 | 39 | 10 | 8 | 9,35 | 106338 | 106541 | 106507 | 106466 |

| Typenbezeichnung / type / type / tipo / tipo | | DURAMAX 2 N | | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 2174**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** | |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | | |
| **Ausführung / model / exécution / modello / modelo** | | TIN | | |
| **Werkstoff / tool material / substrat / materiale / material** | | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | 6HX | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | | C / 2-3 | | |

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|
| M | 12 | 1,75 | 110 | 24 | - | 9 | 7 | 11,2 | 106755 |
| M | 14 | 2 | 110 | 25 | - | 11 | 9 | 13,1 | 106757 |
| M | 16 | 2 | 110 | 27 | - | 12 | 9 | 15,1 | 106758 |

# Gewindefurcher

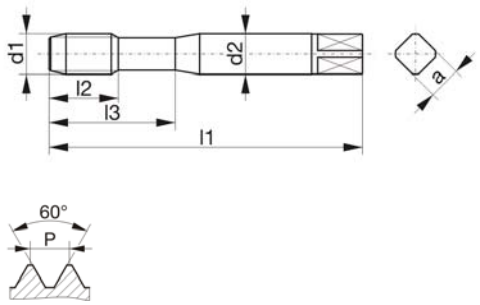
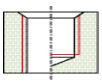
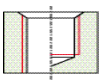
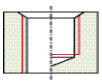
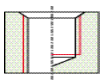
roll taps / tarauds à refouler / maschi a rullare / laminadores

| Typenbezeichnung / type / type / tipo / tipo | DURAMAX 1 N | DURAMAX 1 NO | DURAMAX 1 NO | DURAMAX 1 NO |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 2174**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **4.1 / 5.1-5.2 6.1** | **4.1 / 5.1-5.2 6.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** |
| **Ausführung / model / exécution / modello / modelo** | TIN | | | TIN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 7GX | 4HX | 6HX | 4HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | C / 2-3 |

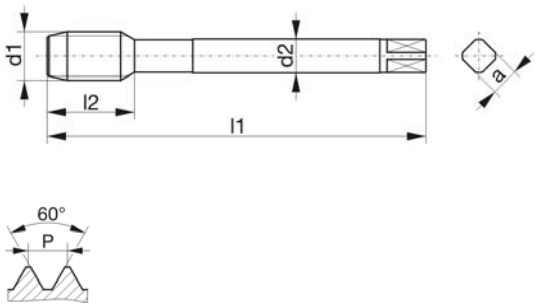
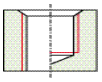
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 1 | 0,25 | 40 | 5,5 | - | 2,5 | 2,1 | 0,88 | | 019223 | | 019226 |
| M | 1,2 | 0,25 | 40 | 6 | - | 2,5 | 2,1 | 1,08 | | 019224 | | 018409 |
| M | 1,4 | 0,3 | 40 | 7 | - | 2,5 | 2,1 | 1,26 | | 019225 | | 019228 |
| M | 1,6 | 0,35 | 40 | 8 | - | 2,5 | 2,1 | 1,44 | | | 004721 | |
| M | 1,7 | 0,35 | 40 | 8 | - | 2,5 | 2,1 | 1,54 | | | 024708 | |
| M | 1,8 | 0,35 | 40 | 8 | - | 2,5 | 2,1 | 1,64 | | | 024709 | |
| M | 2 | 0,4 | 45 | 9 | - | 2,8 | 2,1 | 1,82 | | | 106387 | |
| M | 2,5 | 0,45 | 50 | 9 | 14 | 2,8 | 2,1 | 2,3 | | | 106388 | |
| M | 3 | 0,5 | 56 | 10 | 18 | 3,5 | 2,7 | 2,8 | | | 106389 | |
| M | 3,5 | 0,6 | 56 | 11 | 20 | 4 | 3 | 3,25 | | | 106390 | |
| M | 4 | 0,7 | 63 | 12 | 21 | 4,5 | 3,4 | 3,7 | 106487 | | 106391 | |
| M | 5 | 0,8 | 70 | 14 | 25 | 6 | 4,9 | 4,65 | 106488 | | 106395 | |
| M | 6 | 1 | 80 | 16 | 30 | 6 | 4,9 | 5,55 | 106489 | | 106397 | |
| M | 8 | 1,25 | 90 | 18 | 35 | 8 | 6,2 | 7,45 | 106490 | | 106419 | |
| M | 10 | 1,5 | 100 | 20 | 39 | 10 | 8 | 9,35 | 007877 | | 106384 | |

# Gewindefurcher

roll taps / tarauds à refouler / maschi a rullare / laminadores

| Typenbezeichnung / type / type / tipo / tipo | DURAMAX 1 NO | DURAMAX 1 NO | DURAMAX 1 H | DURAMAX 1 H |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 2174**<br>  <br> | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** |
| **Ausführung / model / exécution / modello / modelo** | TIN | TIN | TIN | TIN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6GX | 6HX | 6GX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | C / 2-3 |

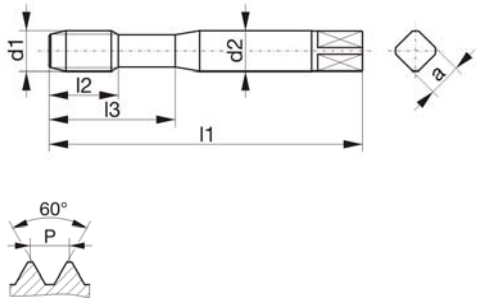
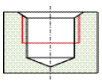
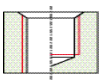
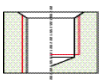
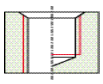
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 1,6 | 0,35 | 40 | 8 | - | 2,5 | 2,1 | 1,44 | 009995 | | | |
| M | 1,7 | 0,35 | 40 | 8 | - | 2,5 | 2,1 | 1,54 | 024710 | | | |
| M | 1,8 | 0,35 | 40 | 8 | - | 2,5 | 2,1 | 1,64 | 024711 | | | |
| M | 2 | 0,4 | 45 | 9 | - | 2,8 | 2,1 | 1,82 | 106428 | 106400 | | |
| M | 2,5 | 0,45 | 50 | 9 | 14 | 2,8 | 2,1 | 2,3 | 106429 | 106401 | | |
| M | 3 | 0,5 | 56 | 10 | 18 | 3,5 | 2,7 | 2,8 | 106430 | 106402 | 107193 | |
| M | 3,5 | 0,6 | 56 | 11 | 20 | 4 | 3 | 3,25 | 106431 | 106403 | | |
| M | 4 | 0,7 | 63 | 12 | 21 | 4,5 | 3,4 | 3,7 | 106432 | 106404 | 107194 | |
| M | 5 | 0,8 | 70 | 14 | 25 | 6 | 4,9 | 4,65 | 106434 | 106405 | 107196 | |
| M | 6 | 1 | 80 | 16 | 30 | 6 | 4,9 | 5,55 | 106435 | 106406 | 107222 | 107227 |
| M | 8 | 1,25 | 90 | 18 | 35 | 8 | 6,2 | 7,45 | 106437 | 106407 | 107231 | 107228 |
| M | 10 | 1,5 | 100 | 20 | 39 | 10 | 8 | 9,35 | 106247 | 106399 | 107190 | 107223 |

| Typenbezeichnung / type / type / tipo / tipo | | | DURAMAX 2 H | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 2174**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** | | |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | | | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | |
| **Ausführung / model / exécution / modello / modelo** | | | TIN | |
| **Werkstoff / tool material / substrat / materiale / material** | | | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | | 6HX | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | | | h6 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | | | C / 2-3 | |

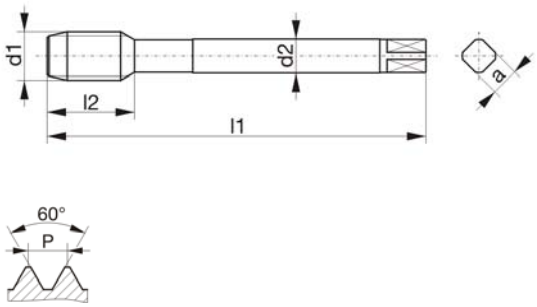
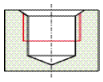
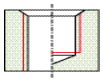
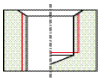
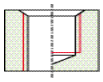
| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|
| M | 12 | 1,75 | 110 | 24 | - | 9 | 7 | 11,2 | 107248 |
| M | 14 | 2 | 110 | 25 | - | 11 | 9 | 13,1 | 024514 |
| M | 16 | 2 | 110 | 27 | - | 12 | 9 | 15,1 | 107249 |
| M | 20 | 2,5 | 140 | 32 | - | 16 | 12 | 18,8 | 020147 |
| M | 24 | 3 | 160 | 36 | - | 18 | 14,5 | 22,6 | 024715 |

# Gewindefurcher

roll taps / tarauds à refouler / maschi a rullare / laminadores

| Typenbezeichnung / type / type / tipo / tipo | DURAMAX 1 H | DURAMAX 1 H | DURAMAX 1 H | DURAMAX 1 H |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 2174**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** |
| **Ausführung / model / exécution / modello / modelo** | KA TIN | KR TIN | BT | BT |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6HX | 6HX | 6HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | h6 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | E / 1,5-2 |

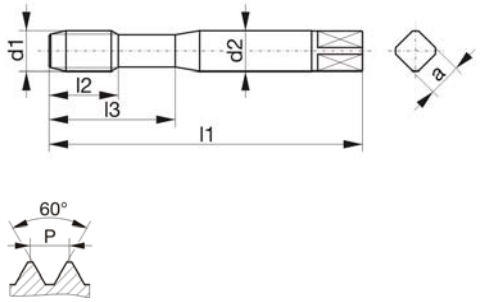
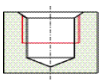
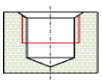
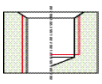
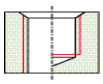
| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 3 | 0,5 | 56 | 10 | 18 | 3,5 | 2,7 | 2,8 | | | 052508 | 058435 |
| M | 4 | 0,7 | 63 | 12 | 21 | 4,5 | 3,4 | 3,7 | | | 050403 | 059126 |
| M | 5 | 0,8 | 70 | 14 | 25 | 6 | 4,9 | 4,65 | 107240 | | 054125 | 059112 |
| M | 6 | 1 | 80 | 16 | 30 | 6 | 4,9 | 5,55 | 107241 | 107243 | 050145 | 059113 |
| M | 8 | 1,25 | 90 | 18 | 35 | 8 | 6,2 | 7,45 | 004724 | 001989 | 051431 | 056453 |
| M | 10 | 1,5 | 100 | 20 | 39 | 10 | 8 | 9,35 | 004725 | 004726 | 054822 | 059115 |

| Typenbezeichnung / type / type / tipo / tipo | DURAMAX 2 H | DURAMAX 2 H | DURAMAX 2 H | DURAMAX 2 H |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 2174**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** |
| **Ausführung / model / exécution / modello / modelo** | KA TIN | KR TIN | BT | BT |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6HX | 6HX | 6HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | h6 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | E / 1,5-2 |

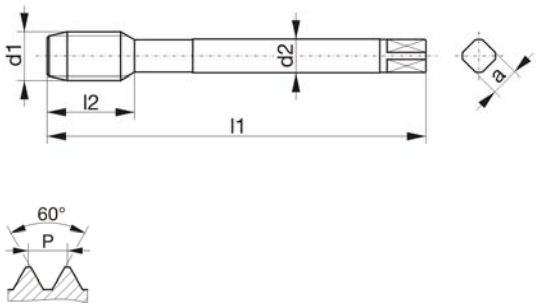
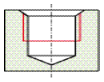
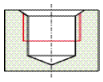
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 12 | 1,75 | 110 | 24 | - | 9 | 7 | 11,2 | 004967 | 007517 | 053680 | 059117 |
| M | 14 | 2 | 110 | 25 | - | 11 | 9 | 13,1 | | 022052 | | |
| M | 16 | 2 | 110 | 27 | - | 12 | 9 | 15,1 | 005117 | 007156 | 054869 | |
| M | 18 | 2,5 | 125 | 32 | - | 14 | 11 | 16,8 | | 030708 | | |
| M | 20 | 2,5 | 140 | 32 | - | 16 | 12 | 18,8 | 014362 | 019905 | 060184 | |
| M | 22 | 2,5 | 140 | 32 | - | 18 | 14,5 | 20,8 | | 033591 | | |
| M | 24 | 3 | 160 | 36 | - | 18 | 14,5 | 22,6 | 030657 | 030760 | 060185 | |
| M | 27 | 3 | 160 | 36 | - | 20 | 16 | 25,6 | | 030786 | | |
| M | 30 | 3,5 | 180 | 40 | - | 22 | 18 | 28,3 | | 030787 | | |
| M | 33 | 3,5 | 180 | 40 | - | 25 | 20 | 31,3 | | 033592 | | |
| M | 36 | 4 | 200 | 50 | - | 28 | 22 | 34,1 | | 030788 | | |
| M | 39 | 4 | 200 | 50 | - | 32 | 24 | 37,1 | | 033593 | | |
| M | 42 | 4,5 | 200 | 50 | - | 32 | 24 | 39,8 | | 032577 | | |
| M | 45 | 4,5 | 220 | 55 | - | 36 | 29 | 42,8 | | 033594 | | |
| M | 48 | 5 | 250 | 60 | - | 36 | 29 | 45,6 | | 033595 | | |

# Gewindefurcher

roll taps / tarauds à refouler / maschi a rullare / laminadores

| Typenbezeichnung / type / type / tipo / tipo | DURAMAX 1 H | DURAMAX 1 H | DURAMAX 1 H | DURAMAX 1 HO |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 2174**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.1-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.1-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** |
| **Ausführung / model / exécution / modello / modelo** | KA BT | KA TICN | KR TICN | TIN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | VHM | VHM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6HX | 6HX | 6HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | h6 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | E / 1,5-2 | C / 2-3 |

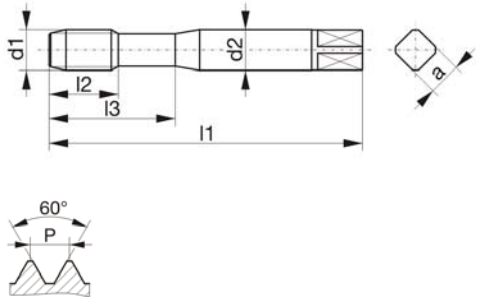
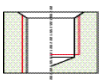
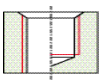
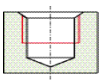
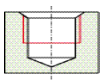
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 3 | 0,5 | 56 | 10 | 18 | 3,5 | 2,7 | 2,8 | | | | 107198 |
| M | 4 | 0,7 | 63 | 12 | 21 | 4,5 | 3,4 | 3,7 | | | | 107200 |
| M | 5 | 0,8 | 70 | 14 | 25 | 6 | 4,9 | 4,65 | 054569 | 004830 | | 107201 |
| M | 6 | 1 | 80 | 16 | 30 | 6 | 4,9 | 5,55 | 051434 | 004831 | 029523 | 107202 |
| M | 8 | 1,25 | 90 | 18 | 35 | 8 | 6,2 | 7,45 | 051435 | 004832 | 029524 | 107213 |
| M | 10 | 1,5 | 100 | 20 | 39 | 10 | 8 | 9,35 | 051436 | 004828 | 029525 | 107197 |

| Typenbezeichnung / type / type / tipo / tipo | DURAMAX 2 H | DURAMAX 2 H | | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 2174**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.1-5.3 / 7.1** | | |
| **Ausführung / model / exécution / modello / modelo** | KA BT | KA TICN | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | VHM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6HX | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | h6 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | | |

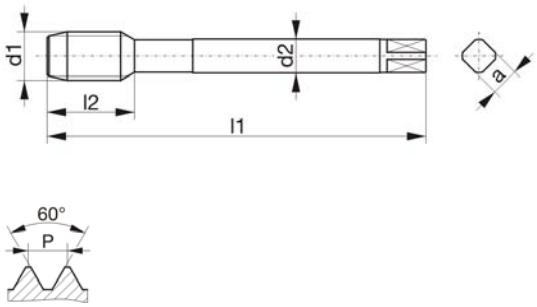
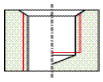
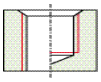
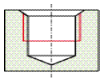
| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| M | 12 | 1,75 | 110 | 24 | - | 9 | 7 | 11,2 | 053762 | 004833 |
| M | 16 | 2 | 110 | 27 | - | 12 | 9 | 15,1 | 053763 | 027274 |

# Gewindefurcher

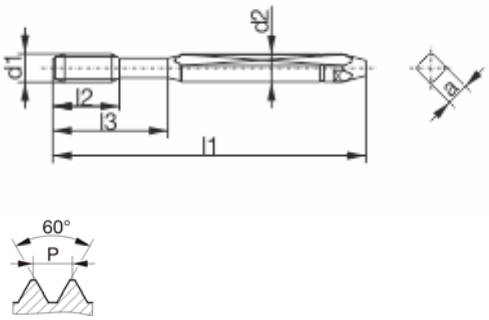
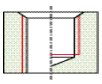
roll taps / tarauds à refouler / maschi a rullare / laminadores

| Typenbezeichnung / type / type / tipo / tipo | DURAMAX 1 GAL | DURAMAX 1 GAL | DURAMAX 1 GAL | DURAMAX 1 GAL |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 2174**<br>  <br> | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **5.1-5.3 / 7.1** | **5.1-5.3 / 7.1** | **5.1-5.3 / 7.1** | **5.1-5.3 / 7.1** |
| **Ausführung / model / exécution / modello / modelo** | MKR HL | MKR AK HL | MKA BT MG | KA HL |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | VHM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6HX | 6HX | 6HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | h6 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | E / 1,5-2 | E / 1,5-2 | E / 1,5-2 | E / 1,5-2 |

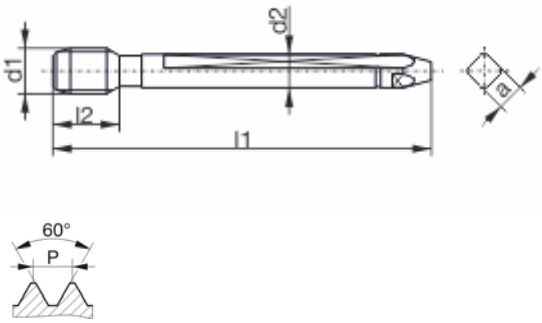
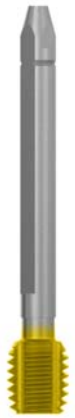
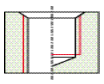
| | **Ød$_1$** | **P** | **l$_1$** | **l$_2$** | **l$_3$** | **Ød$_2$** | **a** | | **Identnummer / identification number / code article / codice / número de identificación** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 5 | 0,8 | 70 | 9 | 25 | 6 | 4,9 | 4,65 | 037102 | 037694 | | |
| M | 6 | 1 | 80 | 10 | 30 | 6 | 4,9 | 5,55 | 037103 | 037697 | 059620 | 059273 |
| M | 7 | 1 | 80 | 10 | 30 | 7 | 5,5 | 6,55 | | | 059625 | |
| M | 8 | 1,25 | 90 | 13 | 35 | 8 | 6,2 | 7,45 | 037104 | 037699 | 059628 | 060508 |
| M | 10 | 1,5 | 100 | 15 | 39 | 10 | 8 | 9,35 | 037105 | 037701 | 059636 | 049316 |

| Typenbezeichnung / type / type / tipo / tipo | | DURAMAX 2 GAL | DURAMAX 2 GAL | DURAMAX 2 GAL |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 2174**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** | |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | | **5.1-5.3 / 7.1** | **5.1-5.3 / 7.1** | **5.1-5.3 / 7.1** |
| **Ausführung / model / exécution / modello / modelo** | | MKR HL | MKR AK HL | KA HL |
| **Werkstoff / tool material / substrat / materiale / material** | | HSSE-PM | HSSE-PM | VHM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | 6HX | 6HX | 6HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | | h6 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | | E / 1,5-2 | E / 1,5-2 | E / 1,5-2 |

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 12 | 1,75 | 110 | 18 | - | 9 | 7 | 11,2 | 039303 | 039299 | |
| M | 12 | 1,75 | 110 | 24 | - | 9 | 7 | 11,2 | | | 060509 |

| **Typenbezeichnung / type / type / tipo / tipo** | **DURAMAX 1 NB** | | | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | | | |
| **Ausführung / model / exécution / modello / modelo** | TIN TS | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | | | |

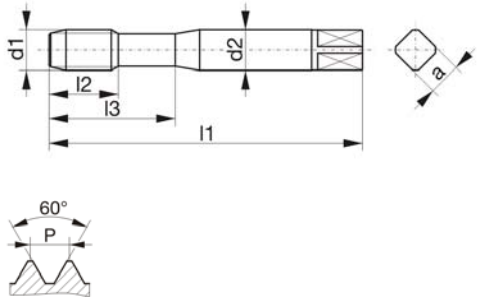
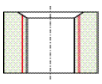
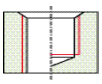
| **Ød$_1$** | | **P** | **l$_1$** | **l$_2$** | **l$_3$** | **Ød$_2$** | **a** | | **Identnummer / identification number / code article / codice / número de identificación** |
|---|---|---|---|---|---|---|---|---|---|
| M | 2,5 | 0,45 | 68 | 12 | 25 | 6 | 4,9 | 2,3 | 056826 |
| M | 3 | 0,5 | 68 | 12 | 25 | 6 | 4,9 | 2,8 | 056827 |
| M | 4 | 0,7 | 68 | 12 | 25 | 6 | 4,9 | 3,7 | 056828 |
| M | 5 | 0,8 | 68 | 12 | 25 | 6 | 4,9 | 4,65 | 056830 |
| M | 6 | 1 | 68 | 12 | 25 | 6 | 4,9 | 5,55 | 056831 |

| Typenbezeichnung / type / type / tipo / tipo | DURAMAX 2 NB | | | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>  |  | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | | | |
| **Ausführung / model / exécution / modello / modelo** | TIN TS | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | | | |

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|
| M | 8 | 1,25 | 68 | 12 | - | 6 | 4,9 | 7,45 | 056832 |
| M | 10 | 1,5 | 68 | 12 | - | 6 | 4,9 | 9,35 | 056833 |

## Maschinengewindebohrer mit extra langem Schaft

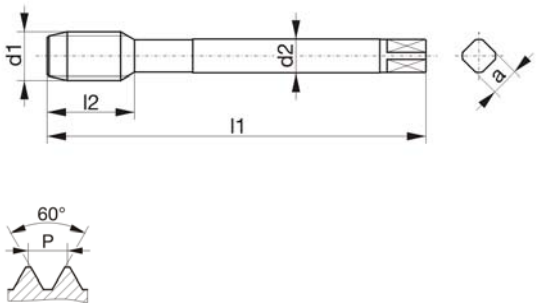
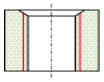
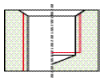
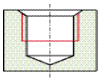
machine taps with extra-long shank / tarauds machine avec queue extra-longue / maschi a macchina con gambo extra-lungo / machos para roscado a máquina con mango extra-largo

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 1 VA | VARIO 1 GG | | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**~DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.5 5.2-5.3 / 7.1-7.2 8.1** | **3.1-3.4 / 5.4 8.2-8.3** | | |
| **Ausführung / model / exécution / modello / modelo** | TIN SL | TICN SL | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | 6HX | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | C / 2-3 | | |

| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| M | 3 | 0,5 | 100 | 10 | 18 | 3,5 | 2,7 | 2,5 | 024890 | |
| M | 4 | 0,7 | 125 | 12 | 21 | 4,5 | 3,4 | 3,3 | 024891 | 024716 |
| M | 5 | 0,8 | 140 | 14 | 25 | 6 | 4,9 | 4,2 | 024892 | 024718 |
| M | 6 | 1 | 160 | 16 | 30 | 6 | 4,9 | 5 | 024893 | 024717 |
| M | 8 | 1,25 | 180 | 18 | 35 | 8 | 6,2 | 6,8 | 024894 | 024719 |
| M | 10 | 1,5 | 200 | 20 | 39 | 10 | 8 | 8,5 | 024895 | 024720 |

## Maschinengewindebohrer mit extra langem Schaft

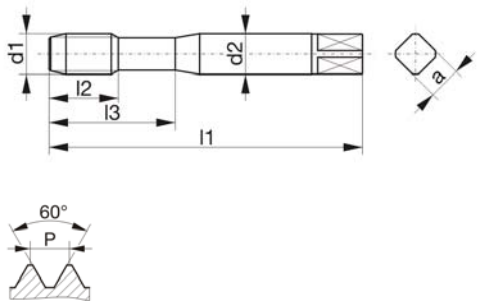
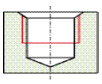
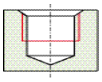
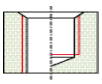
machine taps with extra-long shank / tarauds machine avec queue extra-longue / maschi a macchina con gambo extra-lungo / machos para roscado a máquina con mango extra-largo

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 2 VA | VARIO 2 GG | AVANT 2 H15 | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**~DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.5 5.2-5.3 / 7.1-7.2 8.1** | **3.1-3.4 / 5.4 8.2-8.3** | **1.2-1.6 / 3.1-3.4** | |
| **Ausführung / model / exécution / modello / modelo** | TIN SL | TICN SL | KA HL SL FL | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | 6HX | 6HX | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | C / 2-3 | C / 2-3 | |

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 6 | 1 | 160 | 16 | - | 4,5 | 3,4 | 5 | 024904 | | |
| M | 8 | 1,25 | 180 | 18 | - | 6 | 4,9 | 6,8 | 024905 | | |
| M | 10 | 1,5 | 200 | 20 | - | 7 | 5,5 | 8,5 | 024906 | | |
| M | 12 | 1,75 | 140 | 24 | - | 9 | 7 | 10,2 | | | 037112 |
| M | 12 | 1,75 | 220 | 24 | - | 9 | 7 | 10,2 | 024907 | 024722 | |
| M | 14 | 2 | 220 | 25 | - | 11 | 9 | 12 | 024908 | | |
| M | 16 | 2 | 140 | 28 | - | 12 | 9 | 14 | | | 037113 |
| M | 16 | 2 | 220 | 27 | - | 12 | 9 | 14 | 024909 | 024723 | |
| M | 18 | 2,5 | 190 | 32 | - | 14 | 11 | 15,5 | | | 037114 |
| M | 20 | 2,5 | 210 | 32 | - | 16 | 12 | 17,5 | | | 037115 |
| M | 20 | 2,5 | 280 | 32 | - | 16 | 12 | 17,5 | 024910 | | |
| M | 24 | 3 | 240 | 36 | - | 18 | 14,5 | 21 | | | 037116 |
| M | 27 | 3 | 240 | 36 | - | 20 | 16 | 24 | | | 037117 |
| M | 30 | 3,5 | 270 | 40 | - | 22 | 18 | 26,5 | | | 037118 |
| M | 33 | 3,5 | 270 | 40 | - | 25 | 20 | 29,5 | | | 037119 |
| M | 36 | 4 | 300 | 50 | - | 28 | 22 | 32 | | | 037120 |

## Gewindewerkzeuge mit extra langem Schaft

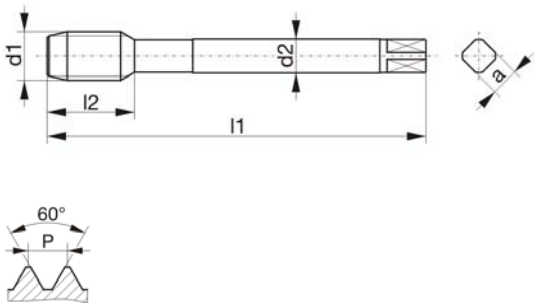
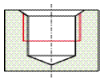
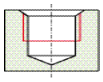
taps with extra-long shank / tarauds avec queue extra-longue / maschi con gambo extra-lungo / machos con mango extra-largo

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 1 VA45 | DOMINANT 1 VA45 | DURAMAX 1 N | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**~DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.3-1.5 / 4.3 4.5 / 5.1-5.3 8.1** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | |
| **Ausführung / model / exécution / modello / modelo** | SL | HL SL | TIN SL | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO2/6H | 6HX | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | |

| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 3 | 0,5 | 100 | 10 | 18 | 3,5 | 2,7 | 2,8 | | | 024901 |
| M | 3 | 0,5 | 100 | 7 | 18 | 3,5 | 2,7 | 2,5 | 033431 | 024896 | |
| M | 4 | 0,7 | 125 | 12 | 21 | 4,5 | 3,4 | 3,7 | | | 005028 |
| M | 4 | 0,7 | 125 | 8 | 21 | 4,5 | 3,4 | 3,3 | 038702 | 024897 | |
| M | 5 | 0,8 | 140 | 14 | 25 | 6 | 4,9 | 4,65 | | | 024225 |
| M | 5 | 0,8 | 140 | 9 | 25 | 6 | 4,9 | 4,2 | 710204 | 024898 | |
| M | 6 | 1 | 160 | 10 | 30 | 6 | 4,9 | 5 | 031413 | 017486 | |
| M | 6 | 1 | 160 | 16 | 30 | 6 | 4,9 | 5,55 | | | 024191 |
| M | 8 | 1,25 | 180 | 13 | 35 | 8 | 6,2 | 6,8 | 038703 | 024899 | |
| M | 8 | 1,25 | 180 | 18 | 35 | 8 | 6,2 | 7,45 | | | 024902 |
| M | 10 | 1,5 | 200 | 15 | 39 | 10 | 8 | 8,5 | 038701 | 024900 | |
| M | 10 | 1,5 | 200 | 20 | 39 | 10 | 8 | 9,35 | | | 024903 |

## Maschinengewindebohrer mit extra langem Schaft

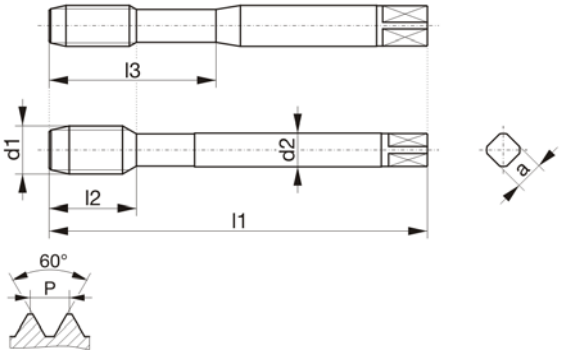
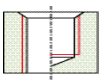
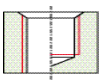
machine taps with extra-long shank / tarauds machine avec queue extra-longue / maschi a macchina con gambo extra-lungo / machos para roscado a máquina con mango extra-largo

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 2 VA45 | DOMINANT 2 VA45 | | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**~DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.3-1.5 / 4.3 4.5 / 5.1-5.3 8.1** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | | |
| **Ausführung / model / exécution / modello / modelo** | SL | HL SL | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO2/6H | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | | |

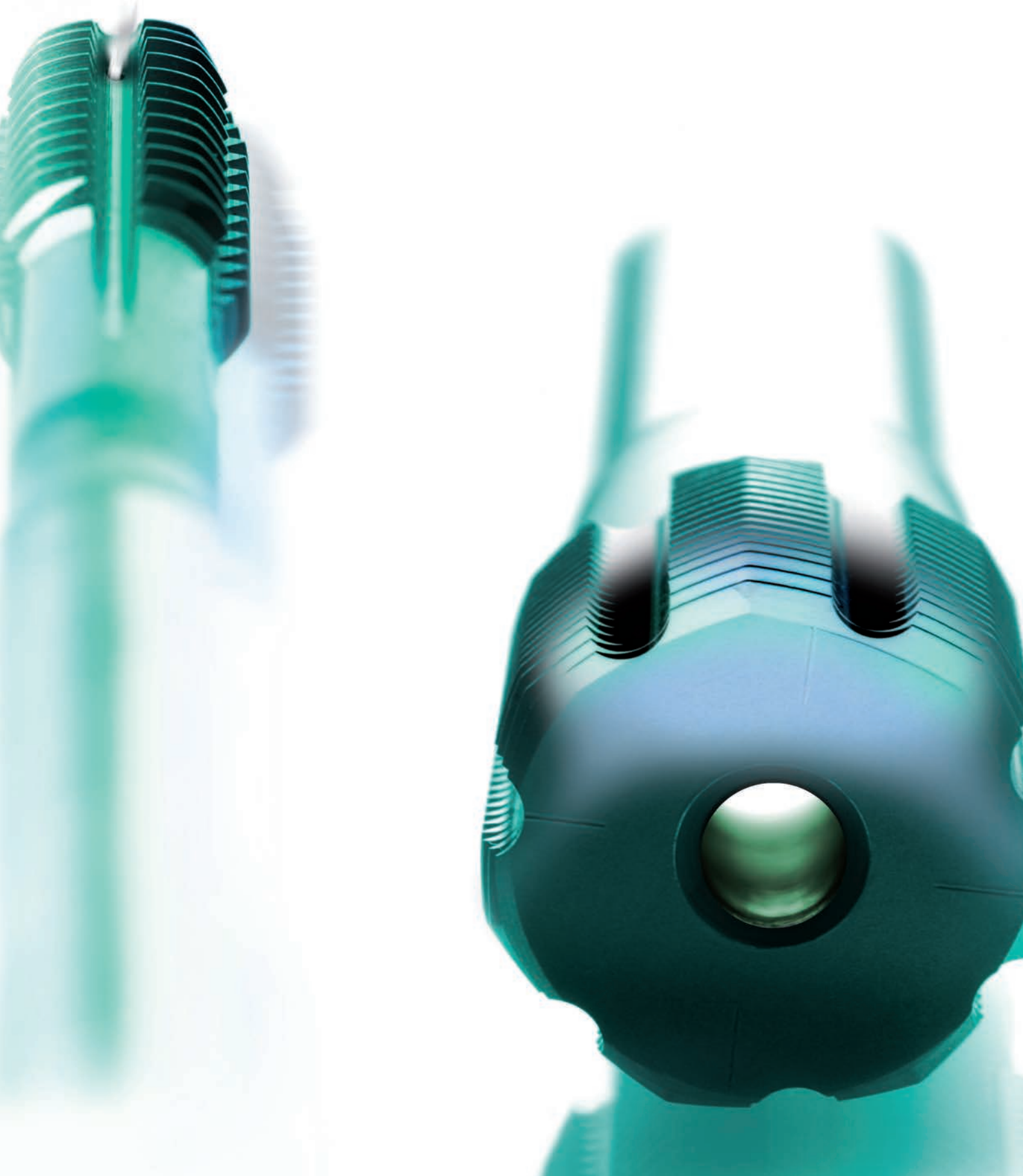
| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| M | 6 | 1 | 160 | 10 | - | 4,5 | 3,4 | 5 | 038706 | 024911 |
| M | 8 | 1,25 | 180 | 13 | - | 6 | 4,9 | 6,8 | 038707 | 024912 |
| M | 10 | 1,5 | 200 | 15 | - | 7 | 5,5 | 8,5 | 038704 | 024913 |
| M | 12 | 1,75 | 220 | 18 | - | 9 | 7 | 10,2 | 034530 | 024914 |
| M | 14 | 2 | 220 | 20 | - | 11 | 9 | 12 | 038705 | 024915 |
| M | 16 | 2 | 220 | 20 | - | 12 | 9 | 14 | 030041 | 024916 |
| M | 20 | 2,5 | 280 | 25 | - | 16 | 12 | 17,5 | 037252 | 024917 |

# Handgewindebohrer

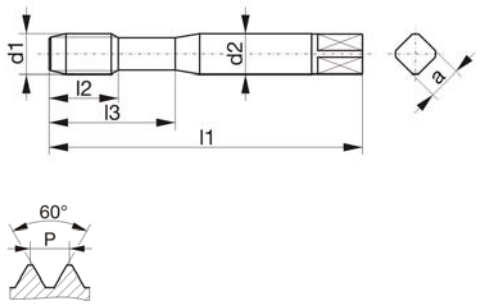
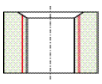
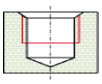
hand taps / tarauds à main / maschi a mano / machos de mano

| Typenbezeichnung / type / type / tipo / tipo | HGB 1 WM 3S | HGB 2 WM 3S | | |
|---|---|---|---|---|
| **M-Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>**DIN 352**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.5-1.7 / 2.1-2.3 3.1-3.4 / 4.7 5.4-5.5 6.2-6.3 /7.1-7.3 8.3 / 9.1** | **1.5-1.7 / 2.1-2.3 3.1-3.4 / 4.7 5.4-5.5 6.2-6.3 /7.1-7.3 8.3 / 9.1** | | |
| **Ausführung / model / exécution / modello / modelo** | set / jeu | set / jeu | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6HX | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | | |

| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| M | 3 | 0,5 | 40 | 10 | 18 | 3,5 | 2,7 | 2,5 | 004816 | |
| M | 4 | 0,7 | 45 | 12 | 21 | 4,5 | 3,4 | 3,3 | 004817 | |
| M | 5 | 0,8 | 50 | 14 | 25 | 6 | 4,9 | 4,2 | 004818 | |
| M | 6 | 1 | 56 | 16 | 27 | 6 | 4,9 | 5 | 004819 | |
| M | 8 | 1,25 | 63 | 18 | - | 6 | 4,9 | 6,8 | | 004820 |
| M | 10 | 1,5 | 70 | 20 | - | 7 | 5,5 | 8,5 | | 004810 |
| M | 12 | 1,75 | 75 | 24 | - | 9 | 7 | 10,2 | | 004811 |
| M | 16 | 2 | 80 | 27 | - | 12 | 9 | 14 | | 004813 |
| M | 20 | 2,5 | 95 | 32 | - | 16 | 12 | 17,5 | | 004815 |

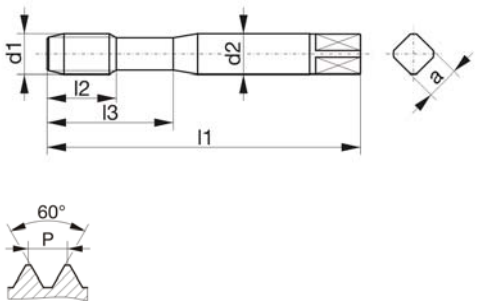
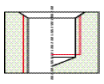
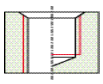
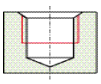


MF

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 1 VA | DOMINANT 1 VA45 | | |
|---|---|---|---|---|
| **MF-Metrisches ISO-Feingewinde DIN 13**<br>ISO Metric fine thread DIN 13<br>Filetage métrique ISO à pas fin DIN 13<br>Filettatura metrica ISO passo fine DIN 13<br>Rosca métrica fina ISO DIN 13<br>**DIN 371**<br>  <br> | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.5 5.2-5.3 / 7.1-7.2 8.1** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | | |
| **Ausführung / model / exécution / modello / modelo** | TIN | HL | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO2/6H | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | C / 2-3 | | |

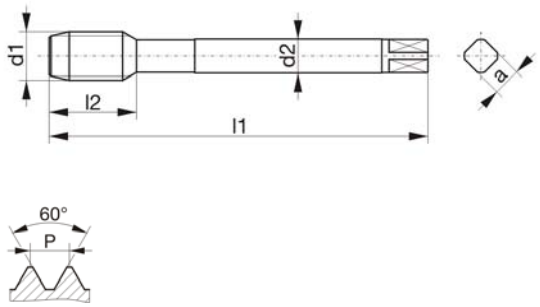
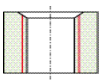
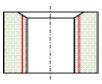
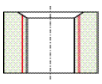
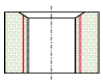
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| M | 4 | 0,5 | 63 | 8 | 21 | 4,5 | 3,4 | 3,5 | 024725 | |
| M | 5 | 0,5 | 70 | 9 | 25 | 6 | 4,9 | 4,5 | 024726 | 024731 |
| M | 6 | 0,5 | 80 | 10 | 30 | 6 | 4,9 | 5,5 | 024727 | |
| M | 6 | 0,75 | 80 | 10 | 30 | 6 | 4,9 | 5,2 | | 024733 |
| M | 6 | 0,75 | 80 | 16 | 30 | 6 | 4,9 | 5,2 | 024728 | |
| M | 7 | 0,75 | 80 | 14 | 30 | 7 | 5,5 | 6,2 | 013489 | |

MF

| Typenbezeichnung / type / type / tipo / tipo | DURAMAX 1 N | DURAMAX 1 H | DURAMAX 1 GAL | |
|---|---|---|---|---|
| **MF-Metrisches ISO-Feingewinde DIN 13**<br>ISO Metric fine thread DIN 13<br>Filetage métrique ISO à pas fin DIN 13<br>Filettatura metrica ISO passo fine DIN 13<br>Rosca métrica fina ISO DIN 13<br>**DIN 2174**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **5.1-5.3 / 7.1** | |
| **Ausführung / model / exécution / modello / modelo** | TIN | BT | MKA BT MG | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6HX | 6HX | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h6 | h6 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | E / 1,5-2 | |

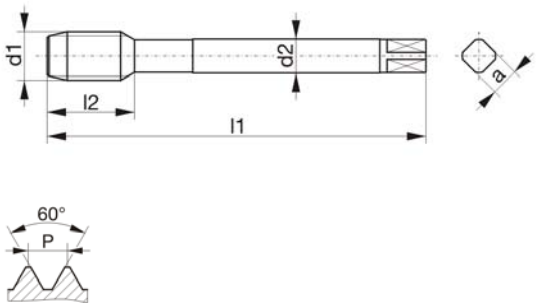
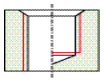
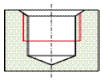
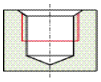
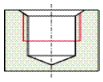
| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 4 | 0,5 | 63 | 8 | 21 | 4,5 | 3,4 | 3,8 | 002238 | | |
| M | 5 | 0,5 | 70 | 9 | 25 | 6 | 4,9 | 4,8 | 106592 | | |
| M | 6 | 0,5 | 80 | 10 | 30 | 6 | 4,9 | 5,8 | 106593 | | |
| M | 6 | 0,75 | 80 | 14 | 30 | 6 | 4,9 | 5,65 | 106594 | | |
| M | 8 | 1 | 90 | 13 | 35 | 8 | 6,2 | 7,55 | | | 059626 |
| M | 8 | 1 | 90 | 18 | 35 | 8 | 6,2 | 7,55 | | 060199 | |
| M | 9 | 1 | 90 | 13 | 35 | 9 | 7 | 8,55 | | | 059631 |
| M | 10 | 1 | 90 | 12 | 39 | 10 | 8 | 9,55 | | | 059634 |
| M | 10 | 1 | 90 | 18 | 39 | 10 | 8 | 9,55 | | 054868 | |
| M | 10 | 1,25 | 90 | 18 | 39 | 10 | 8 | 9,45 | | 060200 | |

MF

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 2 H | VARIANT 2 VA | VARIANT 2 VA | VARIANT 2 TIH |
|---|---|---|---|---|
| **MF-Metrisches ISO-Feingewinde DIN 13**<br>ISO Metric fine thread DIN 13<br>Filetage métrique ISO à pas fin DIN 13<br>Filettatura metrica ISO passo fine DIN 13<br>Rosca métrica fina ISO DIN 13<br>**DIN 374**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.3-1.6 / 3.2-3.4 4.5 / 5.4** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.5 5.2-5.3 / 7.1-7.2 8.1** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.3 5.2-5.3** | **1.4-1.7 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** |
| **Ausführung / model / exécution / modello / modelo** | TICN | TIN | HL | TICN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO2/6H | ISO2/6H | 6HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 |

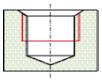
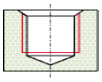
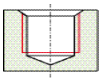
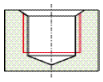
| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 8 | 1 | 90 | 18 | - | 6 | 4,9 | 7 | | 004092 | 043044 | |
| M | 10 | 1 | 90 | 18 | - | 7 | 5,5 | 9 | 000536 | 004093 | 043043 | 033748 |
| M | 10 | 1,25 | 100 | 20 | - | 7 | 5,5 | 8,8 | | 010324 | 048899 | |
| M | 12 | 0,75 | 100 | 20 | - | 9 | 7 | 11,2 | | | 048900 | |
| M | 12 | 1 | 100 | 20 | - | 9 | 7 | 11 | | | 042020 | |
| M | 12 | 1,25 | 100 | 22 | - | 9 | 7 | 10,8 | | 010325 | 034630 | |
| M | 12 | 1,5 | 100 | 22 | - | 9 | 7 | 10,5 | 108611 | 004094 | 048868 | 011138 |
| M | 14 | 1 | 100 | 22 | - | 11 | 9 | 13 | | | 044423 | |
| M | 14 | 1,25 | 100 | 22 | - | 11 | 9 | 12,8 | | | 048901 | |
| M | 14 | 1,5 | 100 | 22 | - | 11 | 9 | 12,5 | 108613 | 004095 | 048902 | 011139 |
| M | 16 | 1 | 100 | 22 | - | 12 | 9 | 15 | | | 039590 | |
| M | 16 | 1,5 | 100 | 22 | - | 12 | 9 | 14,5 | 108614 | 004096 | 038216 | 029718 |
| M | 18 | 1,5 | 110 | 25 | - | 14 | 11 | 16,5 | | 019500 | 038217 | 030926 |
| M | 20 | 1 | 125 | 25 | - | 16 | 12 | 19 | | | 038285 | |
| M | 20 | 1,5 | 125 | 25 | - | 16 | 12 | 18,5 | | 019347 | 038218 | 029217 |
| M | 22 | 1,5 | 125 | 25 | - | 18 | 14,5 | 20,5 | | 026304 | 038219 | |
| M | 24 | 1,5 | 140 | 28 | - | 18 | 14,5 | 22,5 | | 024793 | 048903 | |

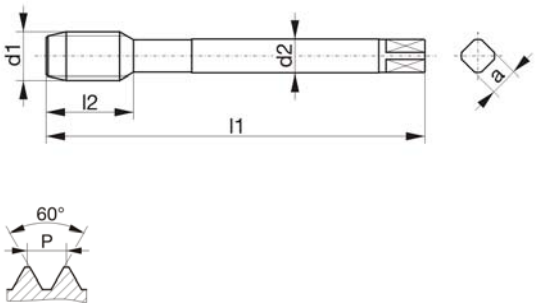
MF

| Typenbezeichnung / type / type / tipo / tipo | VARIO 2 GG | VARIO 2 GG | AVANT 2 H15 | AVANT 2 H15 |
|---|---|---|---|---|
| **MF-Metrisches ISO-Feingewinde DIN 13**<br>ISO Metric fine thread DIN 13<br>Filetage métrique ISO à pas fin DIN 13<br>Filettatura metrica ISO passo fine DIN 13<br>Rosca métrica fina ISO DIN 13<br>**DIN 374**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **3.1-3.4 / 5.4 8.2-8.3** | **3.1-3.4 / 5.4 8.2-8.3 / 9.4** | **1.4-1.5 / 4.1-4.6** | **1.4-1.6 / 3.1-3.4 4.3-4.6 / 5.4** |
| **Ausführung / model / exécution / modello / modelo** | TICN | KA TICN | | TICN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6HX | ISO2/6H | ISO2/6H |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h6 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | C / 2-3 |

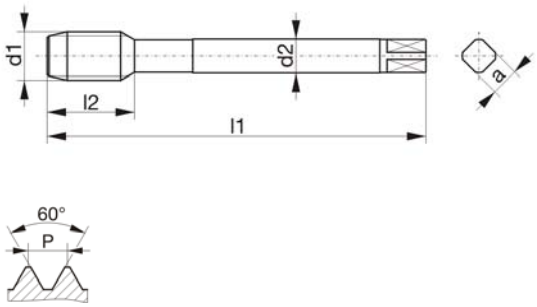
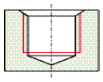
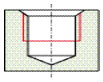
| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 10 | 1 | 90 | 18 | - | 7 | 5,5 | 9 | 105245 | 003050 | 107877 | 107908 |
| M | 12 | 1,5 | 100 | 22 | - | 9 | 7 | 10,5 | 002495 | 004188 | 107882 | 107912 |
| M | 14 | 1,5 | 100 | 22 | - | 11 | 9 | 12,5 | 105249 | 004189 | 107884 | 107913 |
| M | 16 | 1,5 | 100 | 22 | - | 12 | 9 | 14,5 | 004187 | 004190 | 107885 | 107914 |
| M | 18 | 1,5 | 110 | 25 | - | 14 | 11 | 16,5 | | | 107886 | |
| M | 20 | 1,5 | 125 | 25 | - | 16 | 12 | 18,5 | | | 107890 | |

MF

| Typenbezeichnung / type / type / tipo / tipo | AVANT 2 H15 | AVANT 2 H15 | AVANT 2 H25 | AVANT 2 GAL15 |
|---|---|---|---|---|
| **MF-Metrisches ISO-Feingewinde DIN 13**<br>ISO Metric fine thread DIN 13<br>Filetage métrique ISO à pas fin DIN 13<br>Filettatura metrica ISO passo fine DIN 13<br>Rosca métrica fina ISO DIN 13<br>**DIN 374** | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.4-1.6 / 3.1-3.4 4.3-4.6 / 5.4** | **1.4-1.6 / 3.1-3.4 4.3-4.6 / 5.4** | **1.2-1.6 / 2.1-2.3 4.2-4.3 / 5.1-5.3** | **1.4-1.6 / 3.2-3.4 4.3-4.6 / 5.2-5.4** |
| **Ausführung / model / exécution / modello / modelo** | KA TICN | KA TICN | HL | KA TICN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO2/6H | 6HX | 6HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | E / 1,5-2 | E / 1,5-2 | E / 1,5-2 |

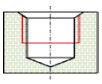
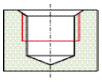
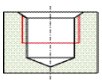
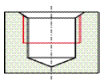


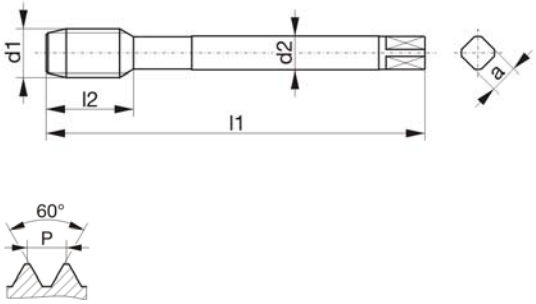

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 8 | 1 | 90 | 13 | - | 6 | 4,9 | 7 | | | 035803 | |
| M | 10 | 1 | 90 | 12 | - | 7 | 5,5 | 9 | | | 035804 | 036976 |
| M | 10 | 1 | 90 | 18 | - | 7 | 5,5 | 9 | 004097 | 004099 | | |
| M | 10 | 1,25 | 100 | 15 | - | 7 | 5,5 | 8,8 | | | | 036977 |
| M | 12 | 1,25 | 100 | 15 | - | 9 | 7 | 10,8 | | | | 036978 |
| M | 12 | 1,5 | 100 | 15 | - | 9 | 7 | 10,5 | | | 035805 | 036979 |
| M | 12 | 1,5 | 100 | 22 | - | 9 | 7 | 10,5 | 111733 | 004100 | | |
| M | 14 | 1,5 | 100 | 15 | - | 11 | 9 | 12,5 | | | 039298 | 036980 |
| M | 14 | 1,5 | 100 | 22 | - | 11 | 9 | 12,5 | 002244 | 111730 | | |
| M | 16 | 1,5 | 100 | 15 | - | 12 | 9 | 14,5 | | | 035806 | 036981 |
| M | 16 | 1,5 | 100 | 22 | - | 12 | 9 | 14,5 | 004098 | | | |

| Typenbezeichnung / type / type / tipo / tipo | AVANT 2 GAL15 | AVANT 2 TIH13 | | |
|---|---|---|---|---|
| **MF-Metrisches ISO-Feingewinde DIN 13**<br>ISO Metric fine thread DIN 13<br>Filetage métrique ISO à pas fin DIN 13<br>Filettatura metrica ISO passo fine DIN 13<br>Rosca métrica fina ISO DIN 13<br>**DIN 374**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.4-1.6 / 3.2-3.4 4.4 / 4.6 5.2-5.4 / 8.3** | **1.5-1.6 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** | | |
| **Ausführung / model / exécution / modello / modelo** | KA TICN | TICN | | |
| **Werkstoff / tool material / substrat / materiale / material** | VHM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6HX | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | h6 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | E / 1,5-2 | C / 2-3 | | |

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| M | 10 | 1 | 90 | 12 | - | 7 | 5,5 | 9 | 037097 | |
| M | 10 | 1 | 90 | 18 | - | 7 | 5,5 | 9 | | 036466 |
| M | 10 | 1,25 | 100 | 15 | - | 7 | 5,5 | 8,8 | 037088 | |
| M | 12 | 1,25 | 100 | 15 | - | 9 | 7 | 10,8 | 037098 | |
| M | 12 | 1,5 | 100 | 15 | - | 9 | 7 | 10,5 | 037099 | |
| M | 12 | 1,5 | 100 | 24 | - | 9 | 7 | 10,5 | | 038383 |
| M | 14 | 1,5 | 100 | 15 | - | 11 | 9 | 12,5 | 039777 | |
| M | 14 | 1,5 | 100 | 22 | - | 11 | 9 | 12,5 | | 031464 |
| M | 16 | 1,5 | 100 | 15 | - | 12 | 9 | 14,5 | 039778 | |
| M | 16 | 1,5 | 100 | 22 | - | 12 | 9 | 14,5 | | 676053 |
| M | 18 | 1,5 | 110 | 25 | - | 14 | 11 | 16,5 | | 038384 |
| M | 20 | 1,5 | 125 | 25 | - | 16 | 12 | 18,5 | | 038385 |

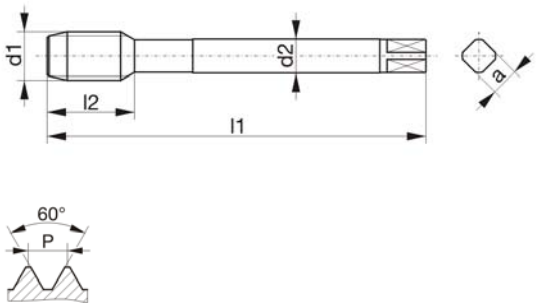
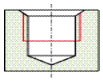
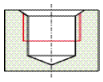
MF

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 2 HZ38 | DOMINANT 2 HZ38 | DOMINANT 2 HZ38 | DOMINANT 2 VA45 |
|---|---|---|---|---|
| **MF-Metrisches ISO-Feingewinde DIN 13**<br>ISO Metric fine thread DIN 13<br>Filetage métrique ISO à pas fin DIN 13<br>Filettatura metrica ISO passo fine DIN 13<br>Rosca métrica fina ISO DIN 13<br>**DIN 374** | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.5 / 4.1 4.3 / 4.5** | **1.2-1.5 / 4.1 4.3 / 4.5** | **1.2-1.5 / 2.1-2.3 3.2-3.4** | **1.3-1.5 / 4.3 4.5 / 5.1-5.3 8.1** |
| **Ausführung / model / exécution / modello / modelo** | | TIN | HL | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO2/6H | ISO2/6H | ISO2/6H |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | C / 2-3 |



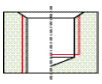
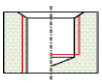
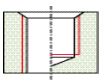
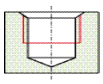

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 8 | 1 | 90 | 13 | - | 6 | 4,9 | 7 | 111452 | | 048904 | 024794 |
| M | 10 | 1 | 90 | 12 | - | 7 | 5,5 | 9 | 111420 | 111454 | 036158 | 024796 |
| M | 10 | 1,25 | 100 | 15 | - | 7 | 5,5 | 8,8 | 111421 | | 048905 | 024797 |
| M | 12 | 1 | 100 | 15 | - | 9 | 7 | 11 | 111422 | | 048907 | 024798 |
| M | 12 | 1,25 | 100 | 15 | - | 9 | 7 | 10,8 | 111423 | | 048912 | 024799 |
| M | 12 | 1,5 | 100 | 15 | - | 9 | 7 | 10,5 | 111424 | 111458 | 048914 | 024800 |
| M | 14 | 1 | 100 | 15 | - | 11 | 9 | 13 | 111425 | | 048915 | 024801 |
| M | 14 | 1,5 | 100 | 15 | - | 11 | 9 | 12,5 | 111426 | 111460 | 048916 | 024802 |
| M | 16 | 1 | 100 | 15 | - | 12 | 9 | 15 | 111428 | | 048917 | 024803 |
| M | 16 | 1,5 | 100 | 15 | - | 12 | 9 | 14,5 | 111429 | 111461 | 048918 | 024804 |
| M | 18 | 1,5 | 110 | 18 | - | 14 | 11 | 16,5 | 111430 | | 048919 | 024806 |
| M | 20 | 1 | 125 | 18 | - | 16 | 12 | 19 | | | | 024807 |
| M | 20 | 1,5 | 125 | 18 | - | 16 | 12 | 18,5 | 111432 | 111463 | 048920 | 024808 |
| M | 22 | 1,5 | 125 | 18 | - | 18 | 14,5 | 20,5 | 111434 | | 048921 | 024809 |
| M | 24 | 1,5 | 140 | 20 | - | 18 | 14,5 | 22,5 | 111436 | | 022311 | 024810 |
| M | 26 | 1,5 | 140 | 20 | - | 18 | 14,5 | 24,5 | | | | 024811 |

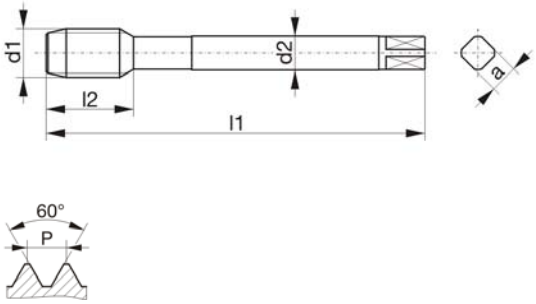
MF

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 2 VA45 | DOMINANT 2 VA45 | | |
|---|---|---|---|---|
| **MF-Metrisches ISO-Feingewinde DIN 13**<br>ISO Metric fine thread DIN 13<br>Filetage métrique ISO à pas fin DIN 13<br>Filettatura metrica ISO passo fine DIN 13<br>Rosca métrica fina ISO DIN 13<br>**DIN 374**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.6 / 2.1-2.3 4.1 / 4.3 / 4.5 5.1-5.3 / 7.1 8.1** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | | |
| **Ausführung / model / exécution / modello / modelo** | TIN | HL | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | ISO2/6H | ISO2/6H | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | | |

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| M | 8 | 1 | 90 | 13 | - | 6 | 4,9 | 7 | 018363 | 023356 |
| M | 10 | 1 | 90 | 12 | - | 7 | 5,5 | 9 | 019482 | 023357 |
| M | 10 | 1,25 | 100 | 15 | - | 7 | 5,5 | 8,8 | 024813 | 027465 |
| M | 12 | 1 | 100 | 15 | - | 9 | 7 | 11 | 024814 | 036339 |
| M | 12 | 1,25 | 100 | 15 | - | 9 | 7 | 10,8 | 024815 | 034629 |
| M | 12 | 1,5 | 100 | 15 | - | 9 | 7 | 10,5 | 019493 | 023358 |
| M | 14 | 1 | 100 | 15 | - | 11 | 9 | 13 | 024816 | 027337 |
| M | 14 | 1,5 | 100 | 15 | - | 11 | 9 | 12,5 | 021639 | 021645 |
| M | 16 | 1 | 100 | 15 | - | 12 | 9 | 15 | 109982 | 036338 |
| M | 16 | 1,5 | 100 | 15 | - | 12 | 9 | 14,5 | 023354 | 023359 |
| M | 18 | 1,5 | 110 | 18 | - | 14 | 11 | 16,5 | 024817 | 027875 |
| M | 20 | 1 | 125 | 18 | - | 16 | 12 | 19 | 024450 | 036343 |
| M | 20 | 1,5 | 125 | 18 | - | 16 | 12 | 18,5 | 023355 | 023360 |
| M | 22 | 1,5 | 125 | 18 | - | 18 | 14,5 | 20,5 | 024818 | 036340 |
| M | 24 | 1,5 | 140 | 20 | - | 18 | 14,5 | 22,5 | 024819 | 035828 |
| M | 26 | 1,5 | 140 | 20 | - | 18 | 14,5 | 24,5 | 029495 | 035627 |

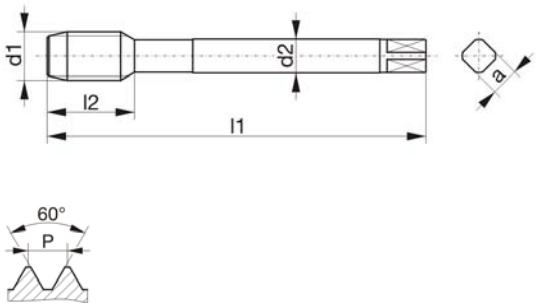
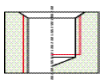
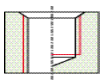
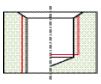
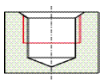
MF

| Typenbezeichnung / type / type / tipo / tipo | DURAMAX 2 N | DURAMAX 2 N | DURAMAX 2 H | DURAMAX 2 H |
|---|---|---|---|---|
| **MF-Metrisches ISO-Feingewinde DIN 13**<br>ISO Metric fine thread DIN 13<br>Filetage métrique ISO à pas fin DIN 13<br>Filettatura metrica ISO passo fine DIN 13<br>Rosca métrica fina ISO DIN 13<br>**DIN 2174** | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** |
| **Ausführung / model / exécution / modello / modelo** | TIN | TIN | TIN | KA TIN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6GX | 6HX | 6HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | C / 2-3 |



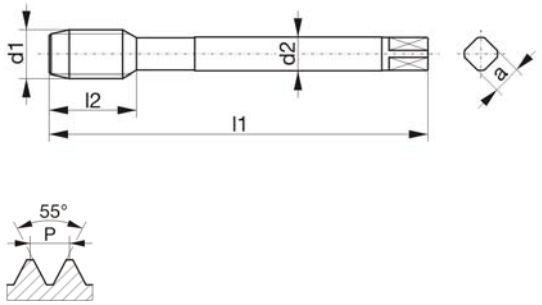
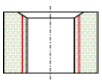
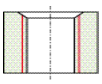
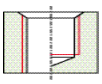

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 8 | 1 | 90 | 18 | - | 6 | 4,9 | 7,55 | 106838 | | | |
| M | 10 | 1 | 90 | 18 | - | 7 | 5,5 | 9,55 | 106824 | 106804 | 024838 | 025703 |
| M | 10 | 1,25 | 100 | 20 | - | 7 | 5,5 | 9,45 | 106825 | | | |
| M | 12 | 1 | 100 | 22 | - | 9 | 7 | 11,55 | 106826 | | | |
| M | 12 | 1,25 | 100 | 22 | - | 9 | 7 | 11,45 | 106827 | 004244 | | |
| M | 12 | 1,5 | 100 | 22 | - | 9 | 7 | 11,35 | 106828 | 004245 | 024839 | 025704 |
| M | 14 | 1 | 100 | 22 | - | 11 | 9 | 13,55 | 106829 | | | |
| M | 14 | 1,5 | 100 | 22 | - | 11 | 9 | 13,35 | 106830 | 106806 | 024840 | 020658 |
| M | 16 | 1 | 100 | 22 | - | 12 | 9 | 15,55 | 106832 | | | |
| M | 16 | 1,5 | 100 | 22 | - | 12 | 9 | 15,35 | 106833 | 004246 | 016834 | 025705 |
| M | 18 | 1 | 110 | 25 | - | 14 | 11 | 17,55 | 024835 | | | |
| M | 18 | 1,5 | 110 | 25 | - | 14 | 11 | 17,35 | 106834 | | | |
| M | 20 | 1 | 125 | 25 | - | 16 | 12 | 19,55 | 009208 | | | |
| M | 20 | 1,5 | 125 | 25 | - | 16 | 12 | 19,35 | 106835 | | | |
| M | 22 | 1,5 | 125 | 25 | - | 18 | 14,5 | 21,35 | 106836 | | | |
| M | 24 | 1,5 | 140 | 28 | - | 18 | 14,5 | 23,35 | 012687 | | | |
| M | 26 | 1,5 | 140 | 28 | - | 18 | 14,5 | 25,35 | 106837 | | | |
| M | 30 | 1,5 | 150 | 28 | - | 22 | 18 | 29,35 | 024837 | | | |

MF

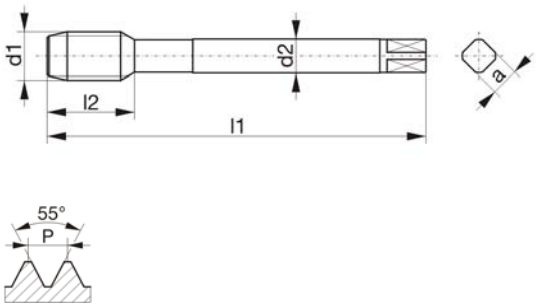
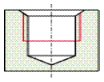
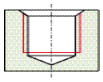
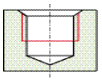
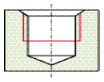
| Typenbezeichnung / type / type / tipo / tipo | DURAMAX 2 H | DURAMAX 2 GAL | DURAMAX 2 GAL | DURAMAX 2 GAL |
|---|---|---|---|---|
| **MF-Metrisches ISO-Feingewinde DIN 13**<br>ISO Metric fine thread DIN 13<br>Filetage métrique ISO à pas fin DIN 13<br>Filettatura metrica ISO passo fine DIN 13<br>Rosca métrica fina ISO DIN 13<br>**DIN 2174**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | **5.1-5.3 / 7.1** | **5.1-5.3 / 7.1** | **5.1-5.3 / 7.1** |
| **Ausführung / model / exécution / modello / modelo** | BT | MKR HL | MKR AK HL | MKA BT MG |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6HX | 6HX | 6HX | 6HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | h6 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | E / 1,5-2 | E / 1,5-2 | E / 1,5-2 |

| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 8 | 1 | 90 | 13 | - | 6 | 4,9 | 7,55 | | 009097 | | |
| M | 10 | 1 | 90 | 12 | - | 7 | 5,5 | 9,55 | | 037106 | 037704 | |
| M | 10 | 1,25 | 100 | 15 | - | 7 | 5,5 | 9,45 | | 037107 | 037706 | |
| M | 12 | 1 | 100 | 22 | - | 9 | 7 | 11,55 | 060201 | | | |
| M | 12 | 1,25 | 100 | 15 | - | 9 | 7 | 11,45 | | 037108 | 037708 | |
| M | 12 | 1,25 | 100 | 22 | - | 9 | 7 | 11,45 | 060202 | | | |
| M | 12 | 1,5 | 100 | 15 | - | 9 | 7 | 11,35 | | 037109 | 037710 | |
| M | 12 | 1,5 | 100 | 22 | - | 9 | 7 | 11,35 | 055569 | | | |
| M | 12 | 1,5 | 100 | 15 | - | 9 | 7 | 11,35 | | | | 059638 |
| M | 14 | 1,5 | 100 | 15 | - | 11 | 9 | 13,35 | | 037110 | 037712 | 059639 |
| M | 14 | 1,5 | 100 | 22 | - | 11 | 9 | 13,35 | 060260 | | | |
| M | 16 | 1,5 | 100 | 15 | - | 12 | 9 | 15,35 | | 037111 | 037714 | |
| M | 16 | 1,5 | 100 | 22 | - | 12 | 9 | 15,35 | 055150 | | | |
| M | 18 | 1,5 | 110 | 25 | - | 14 | 11 | 17,35 | 052934 | | | |
| M | 20 | 1,5 | 125 | 25 | - | 16 | 12 | 19,35 | 060203 | | | |
| M | 24 | 1,5 | 140 | 28 | - | 18 | 14,5 | 23,35 | 060204 | | | |

G
Rp
Rc

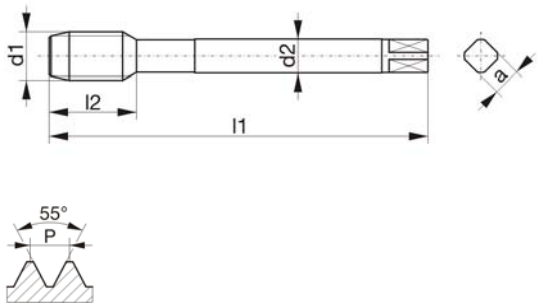
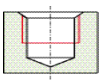
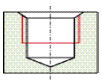
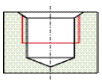
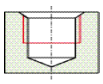
| Typenbezeichnung / type / type / tipo / tipo | VARIANT 2 VA | VARIANT 2 VA | VARIO 2 GG | |
|---|---|---|---|---|
| **G-Rohrgewinde DIN EN ISO 228**<br>British standard pipe thread DIN EN ISO 228<br>Filetage pas du gaz DIN EN ISO 228<br>Filettatura Whitworth gas DIN EN ISO 228<br>Rosca para tubo norma británica DIN EN ISO 228<br>**DIN 5156**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.5 5.2-5.3 / 7.1-7.2 8.1** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.3 5.2-5.3** | **3.1-3.4 / 5.4 8.2-8.3** | |
| **Ausführung / model / exécution / modello / modelo** | TIN | HL | TICN | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | C / 2-3 | |

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| G | 1/8" | 28 | 90 | 18 | - | 7 | 5,5 | 8,8 | 005191 | 038737 | 105288 |
| G | 1/4" | 19 | 100 | 22 | - | 11 | 9 | 11,8 | 005190 | 045668 | 105287 |
| G | 3/8" | 19 | 100 | 22 | - | 12 | 9 | 15,25 | 005193 | 045669 | 105290 |
| G | 1/2" | 14 | 125 | 25 | - | 16 | 12 | 19 | 005192 | 045671 | 105286 |
| G | 5/8" | 14 | 125 | 25 | - | 18 | 14,5 | 21 | | 048922 | |
| G | 3/4" | 14 | 140 | 28 | - | 20 | 16 | 24,5 | 005196 | 045673 | 105289 |
| G | 1" | 11 | 160 | 30 | - | 25 | 20 | 30,75 | 005189 | 045674 | 004583 |

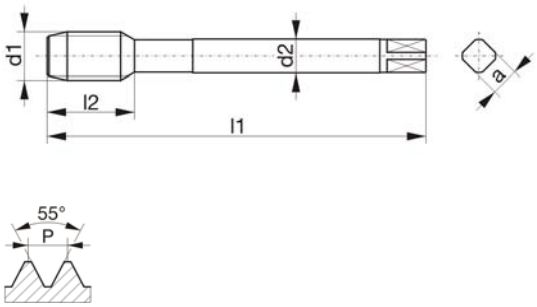
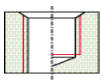
| Typenbezeichnung / type / type / tipo / tipo | AVANT 2 H15 | AVANT 2 H25 | DOMINANT 2 HZ38 | DOMINANT 2 HZ38 |
|---|---|---|---|---|
| **G-Rohrgewinde DIN EN ISO 228**<br>British standard pipe thread DIN EN ISO 228<br>Filetage pas du gaz DIN EN ISO 228<br>Filettatura Whitworth gas DIN EN ISO 228<br>Rosca para tubo norma británica DIN EN ISO 228<br>**DIN 5156**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.4-1.5 / 4.1-4.6** | **1.2-1.6 / 2.1-2.3 4.2-4.3 / 5.1-5.3** | **1.2-1.5 / 4.1 4.3 / 4.5** | **1.2-1.5 / 4.1 4.3 / 4.5** |
| **Ausführung / model / exécution / modello / modelo** | | HL | | TIN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | E / 1,5-2 | C / 2-3 | C / 2-3 |

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| G | 1/8" | 28 | 90 | 12 | - | 7 | 5,5 | 8,8 | | 043467 | 111476 | 111485 |
| G | 1/8" | 28 | 90 | 18 | - | 7 | 5,5 | 8,8 | 107938 | | | |
| G | 1/4" | 19 | 100 | 15 | - | 11 | 9 | 11,8 | | 043468 | 111475 | 111484 |
| G | 1/4" | 19 | 100 | 20 | - | 11 | 9 | 11,8 | 107936 | | | |
| G | 3/8" | 19 | 100 | 15 | - | 12 | 9 | 15,25 | | 043469 | 111478 | 111487 |
| G | 3/8" | 19 | 100 | 22 | - | 12 | 9 | 15,25 | 107940 | | | |
| G | 1/2" | 14 | 125 | 18 | - | 16 | 12 | 19 | | 043470 | 111474 | 111483 |
| G | 1/2" | 14 | 125 | 25 | - | 16 | 12 | 19 | 107935 | | | |
| G | 3/4" | 14 | 140 | 20 | - | 20 | 16 | 24,5 | | 043471 | 111477 | 111486 |
| G | 1" | 11 | 160 | 24 | - | 25 | 20 | 30,75 | | 043472 | 111471 | 111482 |

G
Rp
Rc

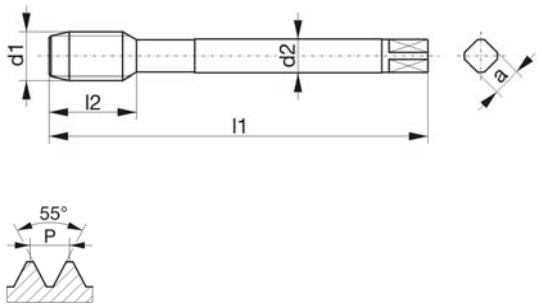
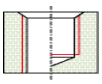
| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 2 HZ38 | DOMINANT 2 VA45 | DOMINANT 2 VA45 | DOMINANT 2 VA45 |
|---|---|---|---|---|
| **G-Rohrgewinde DIN EN ISO 228**<br>British standard pipe thread DIN EN ISO 228<br>Filetage pas du gaz DIN EN ISO 228<br>Filettatura Whitworth gas DIN EN ISO 228<br>Rosca para tubo norma británica DIN EN ISO 228<br>**DIN 5156**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.5 / 2.1-2.3 3.2-3.4** | **1.3-1.5 / 4.3 4.5 / 5.1-5.3 8.1** | **1.1-1.6 / 2.1-2.3 4.1 / 4.3 / 4.5 5.1-5.3 / 7.1 8.1** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** |
| **Ausführung / model / exécution / modello / modelo** | HL | | TIN | HL |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | C / 2-3 |

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| G | 1/8" | 28 | 90 | 12 | - | 7 | 5,5 | 8,8 | 036288 | 024849 | 024856 | 026956 |
| G | 1/4" | 19 | 100 | 15 | - | 11 | 9 | 11,8 | 043785 | 024850 | 024857 | 026957 |
| G | 3/8" | 19 | 100 | 15 | - | 12 | 9 | 15,25 | 048937 | 024851 | 024858 | 026958 |
| G | 1/2" | 14 | 125 | 18 | - | 16 | 12 | 19 | 048924 | 024852 | 024859 | 026959 |
| G | 5/8" | 14 | 125 | 18 | - | 18 | 14,5 | 21 | 048938 | | 024860 | 038377 |
| G | 3/4" | 14 | 140 | 20 | - | 20 | 16 | 24,5 | 048936 | 024854 | 024861 | 032554 |
| G | 1" | 11 | 160 | 24 | - | 25 | 20 | 30,75 | 048923 | 024855 | 024862 | 030112 |

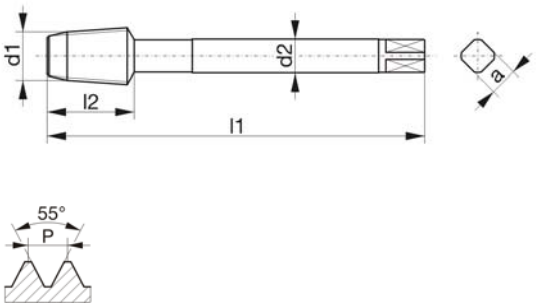
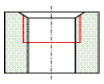
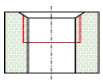
| Typenbezeichnung / type / type / tipo / tipo | DURAMAX 2 N | | | |
|---|---|---|---|---|
| **G-Rohrgewinde DIN EN ISO 228**<br>British standard pipe thread DIN EN ISO 228<br>Filetage pas du gaz DIN EN ISO 228<br>Filettatura Whitworth gas DIN EN ISO 228<br>Rosca para tubo norma británica DIN EN ISO 228<br>**DIN 2189**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | | | |
| **Ausführung / model / exécution / modello / modelo** | TIN | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | | | |

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|
| G | 1/8" | 28 | 90 | 18 | - | 7 | 5,5 | 9,25 | 106866 |
| G | 1/4" | 19 | 100 | 22 | - | 11 | 9 | 12,5 | 106865 |
| G | 3/8" | 19 | 100 | 22 | - | 12 | 9 | 16 | 106868 |
| G | 1/2" | 14 | 125 | 25 | - | 16 | 12 | 20 | 106864 |
| G | 3/4" | 14 | 140 | 28 | - | 20 | 16 | 25,5 | 106867 |
| G | 1" | 11 | 160 | 30 | - | 25 | 20 | 32 | 024215 |

G
Rp
Rc

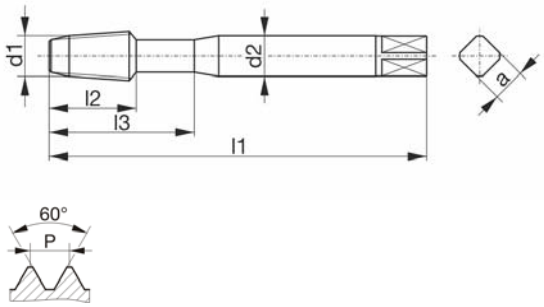
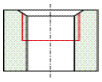
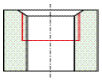
| **Typenbezeichnung / type / type / tipo / tipo** | **VARIO 2 N** | | | |
|---|---|---|---|---|
| **Rp-Zylindrisches Rohrgewinde DIN EN 10226-1**<br>British standard pipe thread DIN EN 10226-1<br>Filetage Whitworth cylindrique DIN EN 10226-1<br>Filettatura cilindrica interna Whitworth DIN EN 10226-1<br>Rosca cilíndrica interna para tubo norma británica Whitworth DIN EN 10226-1<br>**DIN 5156**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.3 / 4.2 5.1-5.3** | | | |
| **Ausführung / model / exécution / modello / modelo** | | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | | | |

| **Ød$_1$** | | **P** | **l$_1$** | **l$_2$** | **l$_3$** | **Ød$_2$** | **a** | | **Identnummer / identification number / code article / codice / número de identificación** |
|---|---|---|---|---|---|---|---|---|---|
| Rp | 1/8" | 28 | 90 | 16 | - | 7 | 5,5 | 8,6 | 110032 |
| Rp | 1/4" | 19 | 100 | 22 | - | 11 | 9 | 11,5 | 110031 |
| Rp | 3/8" | 19 | 100 | 22 | - | 12 | 9 | 15 | 110036 |
| Rp | 1/2" | 14 | 125 | 25 | - | 16 | 12 | 18,5 | 110030 |
| Rp | 3/4" | 14 | 140 | 28 | - | 20 | 16 | 24 | 110035 |
| Rp | 1" | 11 | 160 | 30 | - | 25 | 20 | 30,25 | 110027 |
| Rp | 1.1/4" | 11 | 170 | 30 | - | 32 | 24 | 39 | 110029 |
| Rp | 1.1/2" | 11 | 190 | 32 | - | 36 | 29 | 44,85 | 110028 |

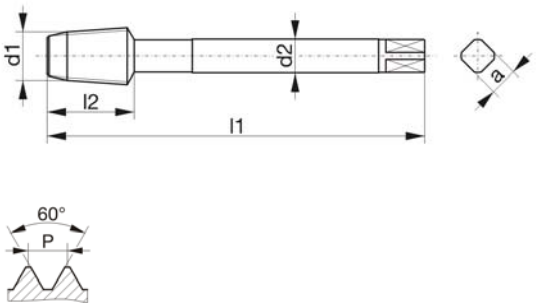
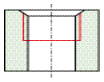
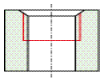
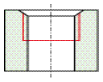
| Typenbezeichnung / type / type / tipo / tipo | VARIO 2 N | VARIO 2 H | | |
|---|---|---|---|---|
| **Rc-Kegeliges Rohrgewinde DIN EN 10226-2 und ISO 7/1 kegelig 1:16**<br>Whitworth-Pipe thread DIN EN 10226-2 and ISO 7/1 tapered 1:16<br>Filetage pas du gaz Whitworth DIN EN 10226-2 et ISO 7/1 conique 1:16<br>Filettatura conica Whitworth DIN EN 10226-2 e ISO 7/1 conico 1:16<br>Rosca cónica Whitworth DIN EN 10226-2 e ISO 7/1 cónico 1:16<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.3 / 4.2 5.1-5.3** | **1.2-1.3 / 5.2** | | |
| **Ausführung / model / exécution / modello / modelo** | | VAP | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | | |

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| Rc | 1/8" | 28 | 90 | 13 | - | 7 | 5,5 | 8,3 | 110044 | 110057 |
| Rc | 1/4" | 19 | 100 | 20 | - | 11 | 9 | 11,1 | 110043 | 110056 |
| Rc | 3/8" | 19 | 110 | 20 | - | 12 | 9 | 14,5 | 110047 | 110059 |
| Rc | 1/2" | 14 | 125 | 26 | - | 16 | 12 | 18 | 110042 | 110055 |
| Rc | 3/4" | 14 | 140 | 26 | - | 20 | 16 | 23,5 | 110046 | 110058 |
| Rc | 1" | 11 | 150 | 32 | - | 25 | 20 | 29,75 | 110039 | 110054 |

NPT
NPTF
NPSM
NPSF

| Typenbezeichnung / type / type / tipo / tipo | | VARIO 1 HZ | AVANT 1 VA15 | |
|---|---|---|---|---|
| **NPT-Amerikanisches Standard Rohrgewinde ASME B1.20.1 kegelig 1:16**<br>American standard taper pipe threadASME B1.20.1 tapered 1:16<br>Filetage conique américain tube ASME B1.20.1 conique 1:16<br>Filettatura conica americana ASME B1.20.1 conico 1:16<br>Rosca cónica para tubo norma americana<br>ASME B1.20.1 cónico 1:16<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** | |  |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | | **1.1-1.5 / 2.1-2.3 3.1-3.3 / 4.4 5.1-5.3** | **1.1-1.5 / 2.1-2.3 3.1-3.3 / 4.1-4.5** | |
| **Ausführung / model / exécution / modello / modelo** | | AZ TIN | VAP | |
| **Werkstoff / tool material / substrat / materiale / material** | | HSSE-PM | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | | h9 | h9 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | | C / 2-3 | C / 2-3 | |

| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| NPT | 1/16" | 27 | 80 | 13 | - | 8 | 6,2 | 6,15 | | 107955 |
| NPT | 1/8" | 27 | 90 | 13 | - | 11 | 9 | 8,4 | 111349 | 107958 |
| NPT | 1/4" | 18 | 100 | 22 | - | 14 | 11 | 11,1 | 111348 | 107957 |
| NPT | 3/8" | 18 | 110 | 20 | - | 16 | 12 | 14,3 | 111351 | 107961 |

| Typenbezeichnung / type / type / tipo / tipo | VARIO 2 N | VARIO 2 HZ | AVANT 2 VA15 | |
|---|---|---|---|---|
| **NPT-Amerikanisches Standard Rohrgewinde ASME B1.20.1 kegelig 1:16**<br>American standard taper pipe threadASME B1.20.1 tapered 1:16<br>Filetage conique américain tube ASME B1.20.1 conique 1:16<br>Filettatura conica americana ASME B1.20.1 conico 1:16<br>Rosca cónica para tubo norma americana<br>ASME B1.20.1 cónico 1:16<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.3 / 4.2 5.1-5.3** | **1.1-1.5 / 2.1-2.3 3.1-3.3 / 4.4 5.1-5.3** | **1.1-1.5 / 2.1-2.3 3.1-3.3 / 4.1-4.5** | |
| **Ausführung / model / exécution / modello / modelo** | | AZ TIN | VAP | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | |

| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NPT | 1/16" | 27 | 80 | 13 | - | 6 | 4,9 | 6,15 | 104417 | | |
| NPT | 1/8" | 27 | 90 | 13 | - | 7 | 5,5 | 8,4 | 104420 | | |
| NPT | 1/4" | 18 | 100 | 23 | - | 11 | 9 | 11,1 | 104419 | | |
| NPT | 3/8" | 18 | 110 | 20 | - | 12 | 9 | 14,3 | 104424 | | |
| NPT | 1/2" | 14 | 125 | 26 | - | 16 | 12 | 17,9 | 104418 | | |
| NPT | 1/2" | 14 | 125 | 26 | - | 18 | 14,4 | 17,9 | | 111347 | 107956 |
| NPT | 3/4" | 14 | 140 | 26 | - | 20 | 16 | 23,2 | 104423 | | |
| NPT | 3/4" | 14 | 140 | 26 | - | 22 | 18 | 23,2 | | 111350 | 107960 |
| NPT | 1" | 11,5 | 150 | 32 | - | 25 | 20 | 29 | 104414 | | |
| NPT | 1" | 11,5 | 150 | 32 | - | 28 | 22 | 29 | | 111344 | 107952 |
| NPT | 1.1/4" | 11,5 | 160 | 32 | - | 32 | 24 | 37,7 | 104416 | | 107954 |
| NPT | 1.1/2" | 11,5 | 160 | 32 | - | 36 | 29 | 44 | | | 107953 |
| NPT | 1.1/2" | 11,5 | 180 | 32 | - | 36 | 29 | 44 | 104415 | | |

NPT
NPTF
NPSM
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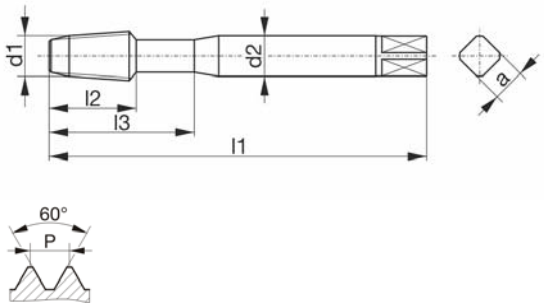
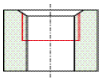
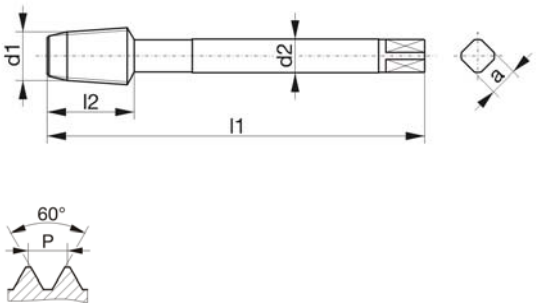
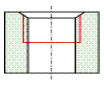
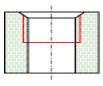
NPTF
NPSM
NPSF

| **Typenbezeichnung / type / type / tipo / tipo** | | **AVANT 1 VA15** | | |
|---|---|---|---|---|
| **NPTF-Amerikanisches Standard Rohrgewinde ASME B1.20.3 kegelig 1:16**<br>American standard taper pipe thread ASME B1.20.3 tapered 1:16<br>Filetage conique américain tube ASME B1.20.3 conique 1:16<br>Filettatura conica americana ASME B1.20.3 conico 1:16<br>Rosca cónica para tubo norma americana<br>ASME B1.20.3 cónico 1:16<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** | |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | | **1.1-1.5 / 2.1-2.3 3.1-3.3 / 4.1-4.5** | | |
| **Ausführung / model / exécution / modello / modelo** | | VAP | | |
| **Werkstoff / tool material / substrat / materiale / material** | | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | | C / 2-3 | | |

| **Ød$_1$** | | **P** | **l$_1$** | **l$_2$** | **l$_3$** | **Ød$_2$** | **a** | | **Identnummer / identification number / code article / codice / número de identificación** |
|---|---|---|---|---|---|---|---|---|---|
| NPTF | 1/16" | 27 | 80 | 13 | - | 8 | 6,2 | 6,1 | 107973 |
| NPTF | 1/8" | 27 | 90 | 13 | - | 11 | 9 | 8,4 | 107976 |
| NPTF | 1/4" | 18 | 100 | 22 | - | 14 | 11 | 11 | 107975 |
| NPTF | 3/8" | 18 | 110 | 20 | - | 16 | 12 | 14,3 | 107979 |

| Typenbezeichnung / type / type / tipo / tipo | VARIO 2 N | AVANT 2 VA15 | | |
|---|---|---|---|---|
| **NPTF-Amerikanisches Standard Rohrgewinde ASME B1.20.3 kegelig 1:16**<br>American standard taper pipe thread ASME B1.20.3 tapered 1:16<br>Filetage conique américain tube ASME B1.20.3 conique 1:16<br>Filettatura conica americana ASME B1.20.3 conico 1:16<br>Rosca cónica para tubo norma americana<br>ASME B1.20.3 cónico 1:16<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.3 / 4.2 5.1-5.3** | **1.1-1.5 / 2.1-2.3 3.1-3.3 / 4.1-4.5** | | |
| **Ausführung / model / exécution / modello / modelo** | | VAP | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | | |

| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| NPTF | 1/8" | 27 | 90 | 13 | - | 7 | 5,5 | 8,4 | 104433 | |
| NPTF | 1/4" | 18 | 100 | 20 | - | 11 | 9 | 11,1 | 104432 | |
| NPTF | 3/8" | 18 | 110 | 20 | - | 12 | 9 | 14,3 | 104436 | |
| NPTF | 1/2" | 14 | 125 | 26 | - | 16 | 12 | 17,6 | 104431 | |
| NPTF | 1/2" | 14 | 125 | 26 | - | 18 | 14,4 | 17,6 | | 107974 |
| NPTF | 3/4" | 14 | 140 | 26 | - | 20 | 16 | 23 | 104435 | |
| NPTF | 3/4" | 14 | 140 | 26 | - | 22 | 18 | 23 | | 107978 |
| NPTF | 1" | 11,5 | 150 | 32 | - | 28 | 22 | 29 | | 107970 |

NPT
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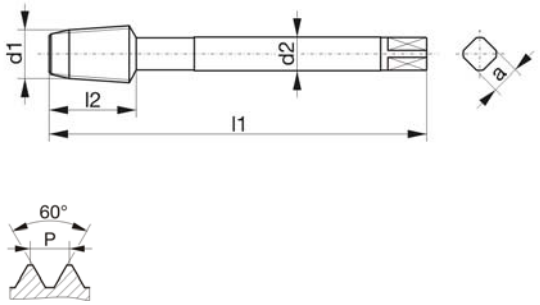
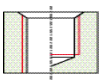
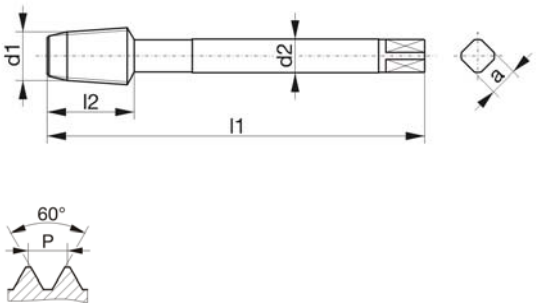
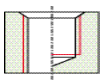
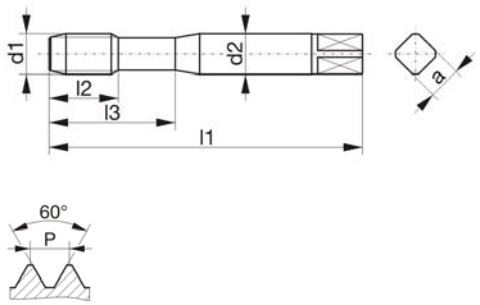
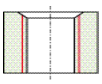
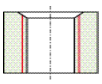
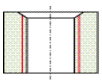
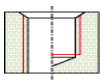
NPSM
NPSF

| **Typenbezeichnung / type / type / tipo / tipo** | **VARIO 2 N** | | | |
|---|---|---|---|---|
| **NPSM-Gewinde ASME B1.20.1**<br>American standard straight pipe thread ASME B1.20.1<br>Filetage pas du gaz cylindrique américain ASME B1.20.1<br>Filettatura gas cilindrica americana ASME B1.20.1<br>Rosca de tubo recta norma americana ASME B1.20.1<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.3 / 4.2 5.1-5.3** | | | |
| **Ausführung / model / exécution / modello / modelo** | | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | | | |

| **Ød$_1$** | | | **P** | **l$_1$** | **l$_2$** | **l$_3$** | **Ød$_2$** | **a** | | **Identnummer / identification number / code article / codice / número de identificación** |
|---|---|---|---|---|---|---|---|---|---|---|
| NPSM | 1/8" | - | 27 | 90 | 16 | - | 7 | 5,5 | 9,1 | 109775 |
| NPSM | 1/4" | - | 18 | 100 | 22 | - | 11 | 9 | 12 | 109774 |
| NPSM | 3/8" | - | 18 | 100 | 22 | - | 12 | 9 | 15,5 | 109778 |
| NPSM | 1/2" | - | 14 | 125 | 25 | - | 16 | 12 | 19 | 109773 |
| NPSM | 3/4" | - | 14 | 140 | 28 | - | 20 | 16 | 24,5 | 109777 |

| Typenbezeichnung / type / type / tipo / tipo | VARIO 2 N | | | |
|---|---|---|---|---|
| **NPSF-Gewinde ASME B1.20.3**<br>Thread ASME B1.20.3<br>Filetage ASME B1.20.3<br>Filettatura ASME B1.20.3<br>Rosca ASME B1.20.3<br>  <br> | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.3 / 4.2 5.1-5.3** | | | |
| **Ausführung / model / exécution / modello / modelo** | | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | | | |

| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|---|
| NPSF | 1/8" | - | 27 | 90 | 16 | - | 7 | 5,5 | 8,7 | 108935 |
| NPSF | 1/4" | - | 18 | 100 | 22 | - | 11 | 9 | 11,3 | 108934 |
| NPSF | 3/8" | - | 18 | 100 | 22 | - | 12 | 9 | 14,75 | 108937 |
| NPSF | 1/2" | - | 14 | 125 | 25 | - | 16 | 12 | 18,25 | 108933 |
| NPSF | 3/4" | - | 14 | 140 | 28 | - | 20 | 16 | 23,5 | 108936 |

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 1 H | VARIANT 1 VA | VARIANT 1 VA | VARIO 1 GG |
|---|---|---|---|---|
| **UNC-Grobgewinde ASME B1.1**<br>Unified coarse thread ASME B1.1<br>Filetage américain à pas gros ASME B1.1<br>Filettatura grossa unificata ASME B1.1<br>Rosca unificada gruesa ASME B1.1<br>**~DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.3-1.5 / 4.1 4.5** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.5 5.2-5.3 / 7.1-7.2 8.1** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.3 5.2-5.3** | **3.1-3.4 / 5.4 8.2-8.3** |
| **Ausführung / model / exécution / modello / modelo** | | TIN | HL | TICN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 2B | 2B | 2B | 2BX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 | C / 2-3 |

UNC
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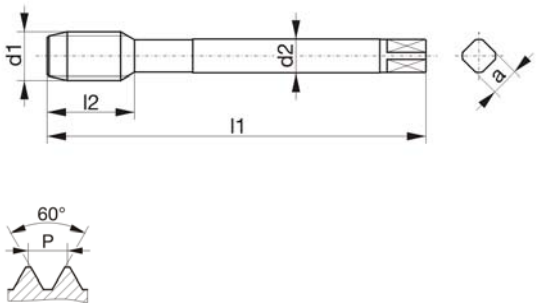
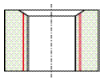
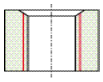
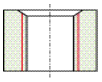
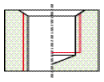
| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNC | No4 | - | 40 | 56 | 10 | 18 | 3,5 | 2,7 | 2,35 | 108450 | | | |
| UNC | No5 | - | 40 | 56 | 10 | 18 | 3,5 | 2,7 | 2,65 | 108451 | | | |
| UNC | No6 | - | 32 | 56 | 11 | 20 | 4 | 3 | 2,85 | 108452 | | | |
| UNC | No8 | - | 32 | 63 | 12 | 21 | 4,5 | 3,4 | 3,5 | 108453 | | | |
| UNC | No10 | - | 24 | 70 | 14 | 25 | 6 | 4,9 | 3,9 | 108447 | 005222 | 045660 | |
| UNC | No12 | - | 24 | 80 | 16 | 30 | 6 | 4,9 | 4,5 | | | 048939 | |
| UNC | 1/4" | - | 20 | 80 | 16 | 30 | 7 | 5,5 | 5,1 | 108438 | 005223 | 042477 | 038709 |
| UNC | 5/16" | - | 18 | 90 | 18 | 35 | 8 | 6,2 | 6,6 | 108446 | 005224 | 042478 | 029297 |
| UNC | 3/8" | - | 16 | 100 | 20 | 39 | 10 | 8 | 8 | 108439 | 005225 | 045663 | 025300 |

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 2 H | VARIANT 2 VA | VARIANT 2 VA | VARIO 2 GG |
|---|---|---|---|---|
| **UNC-Grobgewinde ASME B1.1**<br>Unified coarse thread ASME B1.1<br>Filetage américain à pas gros ASME B1.1<br>Filettatura grossa unificata ASME B1.1<br>Rosca unificada gruesa ASME B1.1<br>**~DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.3-1.5 / 4.1 4.5** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.5 5.2-5.3 / 7.1-7.2 8.1** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.3 5.2-5.3** | **3.1-3.4 / 5.4 8.2-8.3** |
| **Ausführung / model / exécution / modello / modelo** | | TIN | HL | TICN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 2B | 2B | 2B | 2BX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 | C / 2-3 |

UNC
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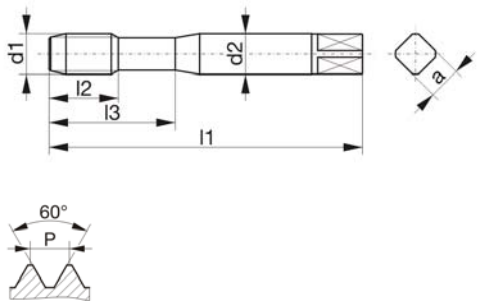
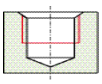
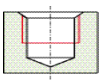
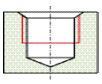
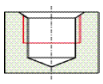
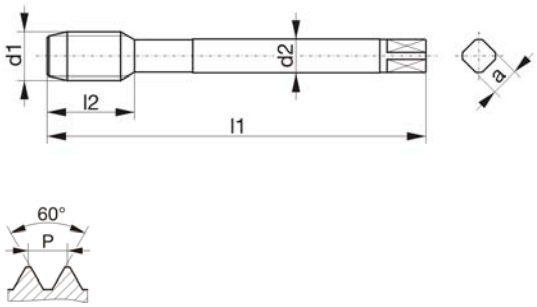
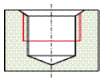
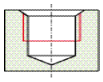
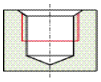
| Ød$_1$ | | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNC | 7/16" | - | 14 | 100 | 22 | - | 8 | 6,2 | 9,4 | | | 048943 | |
| UNC | 1/2" | - | 13 | 110 | 24 | - | 9 | 7 | 10,8 | 108670 | 005226 | 042480 | 105293 |
| UNC | 9/16" | - | 12 | 110 | 20 | - | 11 | 9 | 12,2 | | | 048942 | |
| UNC | 5/8" | - | 11 | 110 | 27 | - | 12 | 9 | 13,5 | 108676 | 005227 | 042125 | 017232 |
| UNC | 3/4" | - | 10 | 125 | 32 | - | 14 | 11 | 16,5 | 108673 | 005228 | 045665 | 038710 |
| UNC | 7/8" | - | 9 | 140 | 32 | - | 18 | 14,5 | 19,5 | | | 042126 | 105298 |
| UNC | 1" | - | 8 | 160 | 36 | - | 18 | 14,5 | 22,25 | 108667 | 005230 | 045666 | 038708 |

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 1 HZ38 | DOMINANT 1 HZ38 | DOMINANT 1 VA45 | DOMINANT 1 VA45 |
|---|---|---|---|---|
| **UNC-Grobgewinde ASME B1.1**<br>Unified coarse thread ASME B1.1<br>Filetage américain à pas gros ASME B1.1<br>Filettatura grossa unificata ASME B1.1<br>Rosca unificada gruesa ASME B1.1<br>**~DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.5 / 4.1 4.3 / 4.5** | **1.2-1.5 / 2.1-2.3 3.2-3.4** | **1.3-1.5 / 4.3 4.5 / 5.1-5.3 8.1** | **1.3-1.5 / 4.3 4.5 / 5.1-5.3 8.1** |
| **Ausführung / model / exécution / modello / modelo** | | HL | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 2B | 2B | 2B | 3B |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | C / 2-3 |

UNC
UNF
UNEF
UN

| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNC | No2 | - | 56 | 45 | 9 | - | 2,8 | 2,1 | 1,85 | 107581 | | 024068 | |
| UNC | No3 | - | 48 | 50 | 9 | 14 | 2,8 | 2,1 | 2,1 | 107582 | | 024949 | |
| UNC | No4 | - | 40 | 56 | 7 | 18 | 3,5 | 2,7 | 2,35 | 107583 | | 024950 | 024961 |
| UNC | No5 | - | 40 | 56 | 7 | 18 | 3,5 | 2,7 | 2,65 | 107584 | | 024951 | 024962 |
| UNC | No6 | - | 32 | 56 | 7 | 20 | 4 | 3 | 2,85 | 107585 | | 024952 | 024963 |
| UNC | No8 | - | 32 | 63 | 8 | 21 | 4,5 | 3,4 | 3,5 | 107586 | | 024953 | 024964 |
| UNC | No10 | - | 24 | 70 | 9 | 25 | 6 | 4,9 | 3,9 | | 048946 | 024954 | 024965 |
| UNC | No12 | - | 24 | 80 | 10 | 30 | 6 | 4,9 | 4,5 | | 048947 | | |
| UNC | 1/4" | - | 20 | 80 | 10 | 30 | 7 | 5,5 | 5,1 | 107566 | 048945 | 024956 | 024967 |
| UNC | 5/16" | - | 18 | 90 | 13 | 35 | 8 | 6,2 | 6,6 | 107578 | 048948 | 024957 | 024968 |
| UNC | 3/8" | - | 16 | 100 | 15 | 39 | 10 | 8 | 8 | 107568 | 048164 | 024958 | 024969 |

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 2 HZ38 | DOMINANT 2 HZ38 | DOMINANT 2 VA45 | |
|---|---|---|---|---|
| **UNC-Grobgewinde ASME B1.1**<br>Unified coarse thread ASME B1.1<br>Filetage américain à pas gros ASME B1.1<br>Filettatura grossa unificata ASME B1.1<br>Rosca unificada gruesa ASME B1.1<br>**~DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.5 / 4.1 4.3 / 4.5** | **1.2-1.5 / 2.1-2.3 3.2-3.4** | **1.3-1.5 / 4.3 4.5 / 5.1-5.3 8.1** | |
| **Ausführung / model / exécution / modello / modelo** | | HL | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 2B | 2B | 2B | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | |

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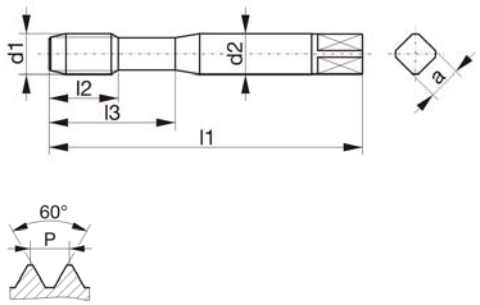
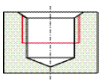
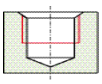
| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNC | 7/16" | - | 14 | 100 | 18 | - | 8 | 6,2 | 9,4 | 108241 | 048950 | 024970 |
| UNC | 1/2" | - | 13 | 110 | 18 | - | 9 | 7 | 10,8 | 108231 | 048102 | 024971 |
| UNC | 9/16" | - | 12 | 110 | 20 | - | 11 | 9 | 12,2 | 108243 | 048951 | 024972 |
| UNC | 5/8" | - | 11 | 110 | 20 | - | 12 | 9 | 13,5 | 108240 | 048166 | 024973 |
| UNC | 3/4" | - | 10 | 125 | 25 | - | 14 | 11 | 16,5 | 108234 | 048167 | 024974 |
| UNC | 7/8" | - | 9 | 140 | 25 | - | 18 | 14,5 | 19,5 | 108242 | 048949 | 024975 |
| UNC | 1" | - | 8 | 160 | 30 | - | 18 | 14,5 | 22,25 | 108224 | 023449 | 024976 |
| UNC | 1.1/8" | - | 7 | 180 | 35 | - | 22 | 18 | 25 | | | 024977 |
| UNC | 1.1/4" | - | 7 | 180 | 35 | - | 22 | 18 | 28 | | | 024978 |
| UNC | 1.3/8" | - | 6 | 200 | 40 | - | 28 | 22 | 30,75 | | | 024979 |
| UNC | 1.1/2" | - | 6 | 200 | 40 | - | 28 | 22 | 34 | | | 024980 |

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 1 VA45 | DOMINANT 1 VA45 | | |
|---|---|---|---|---|
| **UNC-Grobgewinde ASME B1.1**<br>Unified coarse thread ASME B1.1<br>Filetage américain à pas gros ASME B1.1<br>Filettatura grossa unificata ASME B1.1<br>Rosca unificada gruesa ASME B1.1<br>**~DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.6 / 2.1-2.3 4.1 / 4.3 / 4.5 5.1-5.3 / 7.1 8.1** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | | |
| **Ausführung / model / exécution / modello / modelo** | TIN | HL | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 2B | 2B | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | | |

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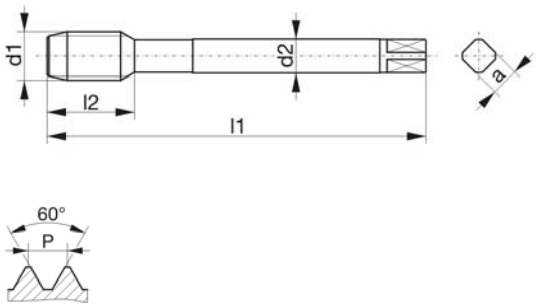
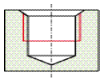
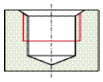
| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| UNC | No10 | - | 24 | 70 | 9 | 25 | 6 | 4,9 | 3,9 | 021499 | |
| UNC | 1/4" | - | 20 | 80 | 10 | 30 | 7 | 5,5 | 5,1 | 021500 | 021509 |
| UNC | 5/16" | - | 18 | 90 | 13 | 35 | 8 | 6,2 | 6,6 | 021501 | 021513 |
| UNC | 3/8" | - | 16 | 100 | 15 | 39 | 10 | 8 | 8 | 021502 | 021514 |

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 2 VA45 | DOMINANT 2 VA45 | | |
|---|---|---|---|---|
| **UNC-Grobgewinde ASME B1.1**<br>Unified coarse thread ASME B1.1<br>Filetage américain à pas gros ASME B1.1<br>Filettatura grossa unificata ASME B1.1<br>Rosca unificada gruesa ASME B1.1<br>**~DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.6 / 2.1-2.3 4.1 / 4.3 / 4.5 5.1-5.3 / 7.1 8.1** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | | |
| **Ausführung / model / exécution / modello / modelo** | TIN | HL | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 2B | 2B | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | | |

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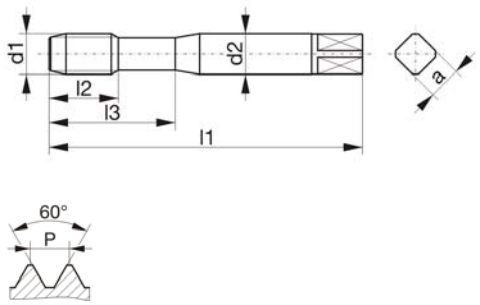
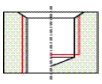
| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| UNC | 7/16" | - | 14 | 100 | 18 | - | 8 | 6,2 | 9,4 | 021503 | 021515 |
| UNC | 1/2" | - | 13 | 110 | 18 | - | 9 | 7 | 10,8 | 021504 | 021516 |
| UNC | 5/8" | - | 11 | 110 | 20 | - | 12 | 9 | 13,5 | 021506 | 021517 |
| UNC | 3/4" | - | 10 | 125 | 25 | - | 14 | 11 | 16,5 | 021507 | 021518 |
| UNC | 1" | - | 8 | 160 | 30 | - | 18 | 14,5 | 22,25 | 024981 | 038378 |

| Typenbezeichnung / type / type / tipo / tipo | DURAMAX 1 N | | | |
|---|---|---|---|---|
| **UNC-Grobgewinde ASME B1.1**<br>Unified coarse thread ASME B1.1<br>Filetage américain à pas gros ASME B1.1<br>Filettatura grossa unificata ASME B1.1<br>Rosca unificada gruesa ASME B1.1<br>**~DIN 2174**<br>  <br> | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3<br>4.1 / 4.3<br>5.2-5.3 / 7.1** | | | |
| **Ausführung / model / exécution / modello / modelo** | TIN | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 2BX | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | | | |

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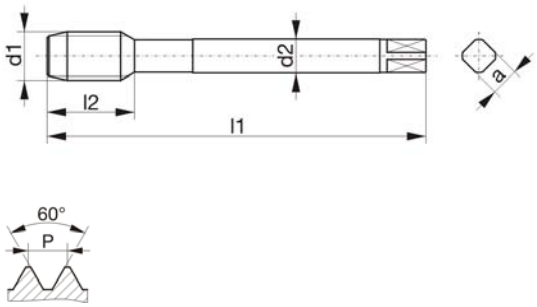
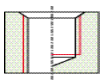
| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|---|
| UNC | No10 | - | 24 | 70 | 14 | 25 | 6 | 4,9 | 4,35 | 106620 |
| UNC | 1/4" | - | 20 | 80 | 16 | 30 | 7 | 5,5 | 5,8 | 106617 |
| UNC | 5/16" | - | 18 | 90 | 18 | 35 | 8 | 6,2 | 7,3 | 106619 |
| UNC | 3/8" | - | 16 | 100 | 20 | 39 | 10 | 8 | 8,8 | 106618 |

| Typenbezeichnung / type / type / tipo / tipo | DURAMAX 2 N | | | |
|---|---|---|---|---|
| **UNC-Grobgewinde ASME B1.1**<br>Unified coarse thread ASME B1.1<br>Filetage américain à pas gros ASME B1.1<br>Filettatura grossa unificata ASME B1.1<br>Rosca unificada gruesa ASME B1.1<br>**~DIN 2174**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | | | |
| **Ausführung / model / exécution / modello / modelo** | TIN | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 2BX | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | | | |

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| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|---|
| UNC | 7/16" | - | 14 | 100 | 22 | - | 8 | 6,2 | 10,3 | 106875 |
| UNC | 1/2" | - | 13 | 110 | 24 | - | 9 | 7 | 11,8 | 106872 |

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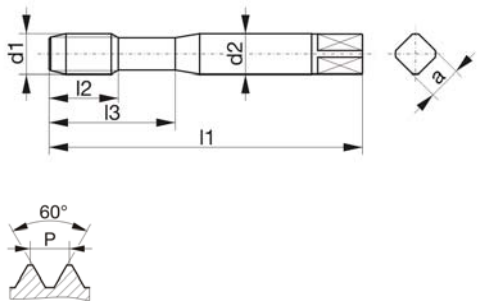
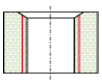
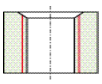
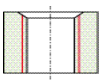
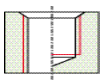
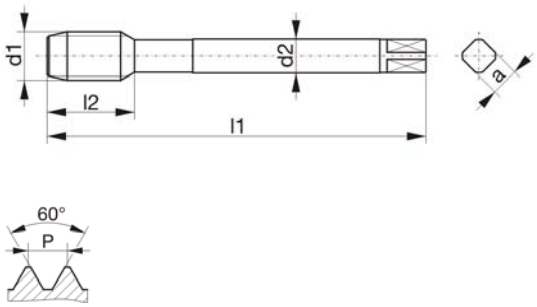
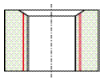
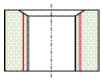
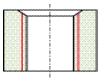
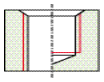
| Typenbezeichnung / type / type / tipo / tipo | VARIANT 1 H | VARIANT 1 VA | VARIANT 1 VA | VARIO 1 GG |
|---|---|---|---|---|
| **UNF-Feingewinde ASME B1.1**<br>Unified fine thread ASME B1.1<br>Filetage américain à pas fin ASME B1.1<br>Filettatura fine unificata ASME B1.1<br>Rosca unificada fina ASME B1.1<br>**~DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.3-1.5 / 4.1 4.5** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.5 5.2-5.3 / 7.1-7.2 8.1** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.3 5.2-5.3** | **3.1-3.4 / 5.4 8.2-8.3** |
| **Ausführung / model / exécution / modello / modelo** | | TIN | HL | TICN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 2B | 2B | 2B | 2BX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 | C / 2-3 |

| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNF | No2 | - | 64 | 45 | 9 | - | 2,8 | 2,1 | 1,85 | 108495 | | | |
| UNF | No3 | - | 56 | 50 | 9 | 14 | 2,8 | 2,1 | 2,15 | 108496 | | | |
| UNF | No4 | - | 48 | 56 | 10 | 18 | 3,5 | 2,7 | 2,4 | 108497 | | | |
| UNF | No5 | - | 44 | 56 | 10 | 18 | 3,5 | 2,7 | 2,7 | 108498 | | | |
| UNF | No6 | - | 40 | 56 | 11 | 20 | 4 | 3 | 2,95 | 108499 | | | |
| UNF | No8 | - | 36 | 63 | 12 | 21 | 4,5 | 3,4 | 3,5 | 108500 | | | |
| UNF | No10 | - | 32 | 70 | 14 | 25 | 6 | 4,9 | 4,1 | 108492 | 005245 | 045675 | |
| UNF | No12 | - | 28 | 80 | 16 | 30 | 6 | 4,9 | 4,6 | 108494 | | 048952 | |
| UNF | 1/4" | - | 28 | 80 | 16 | 30 | 7 | 5,5 | 5,5 | 108456 | 005244 | 042481 | 035872 |
| UNF | 5/16" | - | 24 | 90 | 18 | 35 | 8 | 6,2 | 6,9 | 108483 | 005246 | 042483 | 103962 |
| UNF | 3/8" | - | 24 | 90 | 18 | 39 | 10 | 8 | 8,5 | 108458 | 005247 | 033290 | 108485 |

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 2 H | VARIANT 2 VA | VARIANT 2 VA | VARIO 2 GG |
|---|---|---|---|---|
| **UNF-Feingewinde ASME B1.1**<br>Unified fine thread ASME B1.1<br>Filetage américain à pas fin ASME B1.1<br>Filettatura fine unificata ASME B1.1<br>Rosca unificada fina ASME B1.1<br>**~DIN 374**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.3-1.5 / 4.1 4.5** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.5 5.2-5.3 / 7.1-7.2 8.1** | **1.1-1.5 / 2.1-2.3 3.2-3.4 / 4.1-4.3 5.2-5.3** | **3.1-3.4 / 5.4 8.2-8.3** |
| **Ausführung / model / exécution / modello / modelo** | | TIN | HL | TICN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 2B | 2B | 2B | 2BX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | B / 3,5-5,5 | C / 2-3 |

| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNF | 7/16" | - | 20 | 100 | 22 | - | 8 | 6,2 | 9,9 | | 005248 | 033289 | |
| UNF | 1/2" | - | 20 | 100 | 22 | - | 9 | 7 | 11,5 | 108687 | 005249 | 042484 | 105302 |
| UNF | 9/16" | - | 18 | 100 | 22 | - | 11 | 9 | 12,9 | | | 048963 | |
| UNF | 5/8" | - | 18 | 100 | 22 | - | 12 | 9 | 14,5 | 108712 | 005250 | 042486 | 038711 |
| UNF | 3/4" | - | 16 | 110 | 25 | - | 14 | 11 | 17,5 | 108688 | 005251 | 045667 | 108486 |
| UNF | 7/8" | - | 14 | 125 | 25 | - | 18 | 14,5 | 20,4 | | | 048962 | 015962 |
| UNF | 1" | - | 12 | 140 | 28 | - | 18 | 14,5 | 23,25 | 108683 | 005252 | 048953 | |

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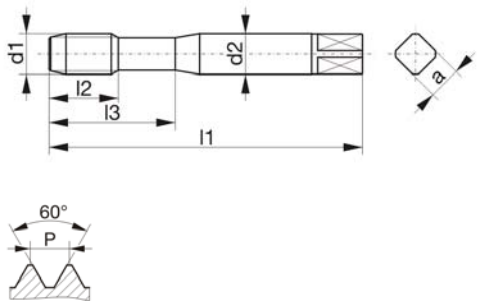
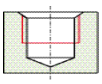
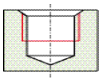
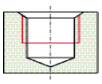
| Typenbezeichnung / type / type / tipo / tipo | AVANT 1 H15 | DOMINANT 1 HZ38 | DOMINANT 1 HZ38 | |
|---|---|---|---|---|
| **UNF-Feingewinde ASME B1.1**<br>Unified fine thread ASME B1.1<br>Filetage américain à pas fin ASME B1.1<br>Filettatura fine unificata ASME B1.1<br>Rosca unificada fina ASME B1.1<br>**~DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.4-1.5 / 4.1-4.6** | **1.2-1.5 / 4.1 4.3 / 4.5** | **1.2-1.5 / 2.1-2.3 3.2-3.4** | |
| **Ausführung / model / exécution / modello / modelo** | | | HL | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 2B | 2B | 2B | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | |

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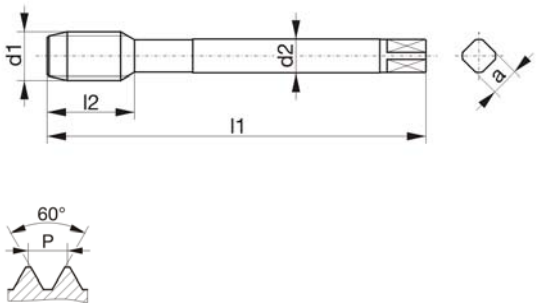
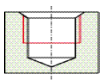
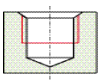
| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNF | No10 | - | 32 | 70 | 14 | 25 | 6 | 4,9 | 4,1 | 107453 | | |
| UNF | No10 | - | 32 | 70 | 9 | 25 | 6 | 4,9 | 4,1 | | 107619 | 048964 |
| UNF | 1/4" | - | 28 | 80 | 10 | 30 | 7 | 5,5 | 5,5 | | 107598 | 048965 |
| UNF | 1/4" | - | 28 | 80 | 16 | 30 | 7 | 5,5 | 5,5 | 107448 | | |
| UNF | 5/16" | - | 24 | 90 | 13 | 35 | 8 | 6,2 | 6,9 | | 107614 | 048967 |
| UNF | 5/16" | - | 24 | 90 | 18 | 35 | 8 | 6,2 | 6,9 | 107452 | | |
| UNF | 3/8" | - | 24 | 90 | 12 | 39 | 10 | 8 | 8,5 | | 107601 | 048966 |
| UNF | 3/8" | - | 24 | 90 | 18 | 39 | 10 | 8 | 8,5 | 107449 | | |

| Typenbezeichnung / type / type / tipo / tipo | | DOMINANT 2 HZ38 | DOMINANT 2 HZ38 | |
|---|---|---|---|---|
| **UNF-Feingewinde ASME B1.1**<br>Unified fine thread ASME B1.1<br>Filetage américain à pas fin ASME B1.1<br>Filettatura fine unificata ASME B1.1<br>Rosca unificada fina ASME B1.1<br>**~DIN 374**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** | |  |  | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | | **1.2-1.5 / 4.1 4.3 / 4.5** | **1.2-1.5 / 2.1-2.3 3.2-3.4** | |
| **Ausführung / model / exécution / modello / modelo** | | | HL | |
| **Werkstoff / tool material / substrat / materiale / material** | | HSSE-PM | HSSE-PM | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | 2B | 2B | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | | h9 | h9 | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | | C / 2-3 | C / 2-3 | |

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| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| UNF | 7/16" | - | 20 | 100 | 18 | - | 8 | 6,2 | 9,9 | 108265 | 048977 |
| UNF | 1/2" | - | 20 | 100 | 15 | - | 9 | 7 | 11,5 | 108258 | 048969 |
| UNF | 9/16" | - | 18 | 100 | 15 | - | 11 | 9 | 12,9 | 108267 | 048978 |
| UNF | 5/8" | - | 18 | 100 | 15 | - | 12 | 9 | 14,5 | 108264 | 048975 |
| UNF | 3/4" | - | 16 | 110 | 18 | - | 14 | 11 | 17,5 | 108259 | 048970 |
| UNF | 7/8" | - | 14 | 125 | 18 | - | 18 | 14,5 | 20,4 | 108266 | 048976 |
| UNF | 1" | - | 12 | 140 | 20 | - | 18 | 14,5 | 23,25 | 108253 | 048968 |

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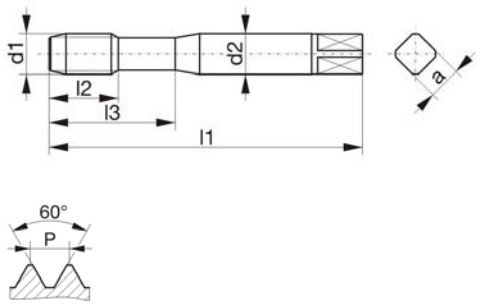
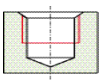
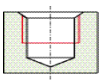
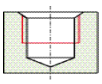
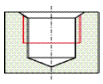
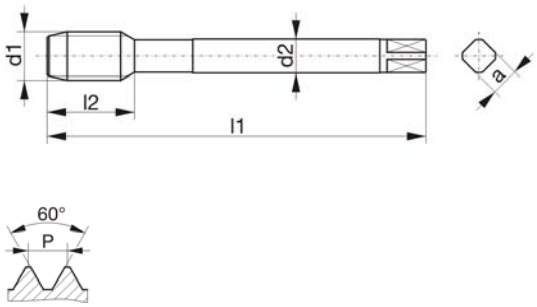
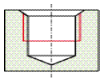
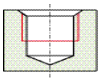
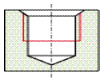
| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 1 VA45 | DOMINANT 1 VA45 | DOMINANT 1 VA45 | DOMINANT 1 VA45 |
|---|---|---|---|---|
| **UNF-Feingewinde ASME B1.1**<br>Unified fine thread ASME B1.1<br>Filetage américain à pas fin ASME B1.1<br>Filettatura fine unificata ASME B1.1<br>Rosca unificada fina ASME B1.1<br>**~DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.3-1.5 / 4.3 4.5 / 5.1-5.3 8.1** | **1.3-1.5 / 4.3 4.5 / 5.1-5.3 8.1** | **1.1-1.6 / 2.1-2.3 4.1 / 4.3 / 4.5 5.1-5.3 / 7.1 8.1** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** |
| **Ausführung / model / exécution / modello / modelo** | | | TIN | HL |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 2B | 3B | 2B | 2B |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | C / 2-3 | C / 2-3 |

| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNF | No3 | - | 56 | 50 | 9 | 14 | 2,8 | 2,1 | 2,15 | 025017 | 025026 | | |
| UNF | No4 | - | 48 | 56 | 7 | 18 | 3,5 | 2,7 | 2,4 | 025018 | 025027 | | |
| UNF | No5 | - | 44 | 56 | 7 | 18 | 3,5 | 2,7 | 2,7 | 025019 | 025028 | | |
| UNF | No6 | - | 40 | 56 | 7 | 20 | 4 | 3 | 2,95 | 025020 | 025029 | | |
| UNF | No8 | - | 36 | 63 | 8 | 21 | 4,5 | 3,4 | 3,5 | 025021 | 025030 | | |
| UNF | No10 | - | 32 | 70 | 9 | 25 | 6 | 4,9 | 4,1 | 025022 | 025031 | 021537 | 028948 |
| UNF | 1/4" | - | 28 | 80 | 10 | 30 | 7 | 5,5 | 5,5 | 025023 | 025032 | 021539 | 021547 |
| UNF | 5/16" | - | 24 | 90 | 13 | 35 | 8 | 6,2 | 6,9 | 025024 | 025033 | 021540 | 021548 |
| UNF | 3/8" | - | 24 | 90 | 12 | 39 | 10 | 8 | 8,5 | 025025 | 025034 | 021541 | 027334 |

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 2 VA45 | | DOMINANT 2 VA45 | DOMINANT 2 VA45 |
|---|---|---|---|---|
| **UNF-Feingewinde ASME B1.1**<br>Unified fine thread ASME B1.1<br>Filetage américain à pas fin ASME B1.1<br>Filettatura fine unificata ASME B1.1<br>Rosca unificada fina ASME B1.1<br>**~DIN 374**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.3-1.5 / 4.3 4.5 / 5.1-5.3 8.1** | | **1.1-1.6 / 2.1-2.3 4.1 / 4.3 / 4.5 5.1-5.3 / 7.1 8.1** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** |
| **Ausführung / model / exécution / modello / modelo** | | | TIN | HL |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 2B | | 2B | 2B |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | | h9 | h9 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | | C / 2-3 | C / 2-3 |

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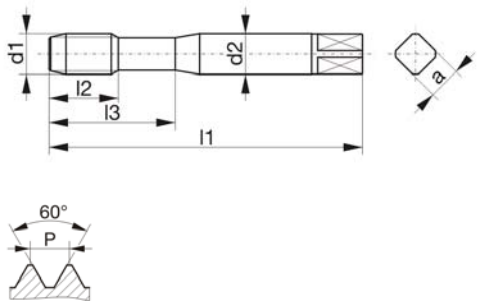
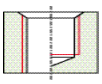
| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNF | 7/16" | - | 20 | 100 | 18 | - | 8 | 6,2 | 9,9 | 025035 | 021542 | 031214 |
| UNF | 1/2" | - | 20 | 100 | 15 | - | 9 | 7 | 11,5 | 025036 | 021543 | 029009 |
| UNF | 9/16" | - | 18 | 100 | 15 | - | 11 | 9 | 12,9 | 025037 | | |
| UNF | 5/8" | - | 18 | 100 | 15 | - | 12 | 9 | 14,5 | 025038 | 021544 | 021553 |
| UNF | 3/4" | - | 16 | 110 | 18 | - | 14 | 11 | 17,5 | 025039 | 021545 | 107460 |
| UNF | 7/8" | - | 14 | 125 | 18 | - | 18 | 14,5 | 20,4 | 025040 | 025046 | 038380 |
| UNF | 1" | - | 12 | 140 | 20 | - | 18 | 14,5 | 23,25 | 025041 | 025047 | 038379 |
| UNF | 1.1/8" | - | 12 | 150 | 22 | - | 22 | 18 | 26,5 | 025042 | | |
| UNF | 1.1/4" | - | 12 | 150 | 22 | - | 22 | 18 | 29,5 | 025043 | | |
| UNF | 1.3/8" | - | 12 | 170 | 24 | - | 28 | 22 | 32,75 | 025044 | | |
| UNF | 1.1/2" | - | 12 | 170 | 24 | - | 28 | 22 | 36 | 025045 | | |

| Typenbezeichnung / type / type / tipo / tipo | DURAMAX 1 N | | | |
|---|---|---|---|---|
| **UNF-Feingewinde ASME B1.1**<br>Unified fine thread ASME B1.1<br>Filetage américain à pas fin ASME B1.1<br>Filettatura fine unificata ASME B1.1<br>Rosca unificada fina ASME B1.1<br>**~DIN 2174**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3<br>4.1 / 4.3<br>5.2-5.3 / 7.1** | | | |
| **Ausführung / model / exécution / modello / modelo** | TIN | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 2BX | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | | | |

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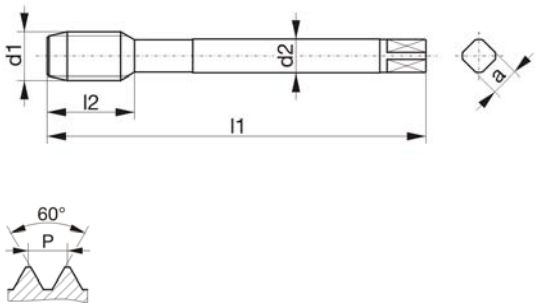
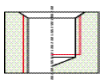
| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|---|
| UNF | No10 | - | 32 | 70 | 14 | 25 | 6 | 4,9 | 4,45 | 106654 |
| UNF | 1/4" | - | 28 | 80 | 16 | 30 | 7 | 5,5 | 5,95 | 106650 |
| UNF | 5/16" | - | 24 | 90 | 18 | 35 | 8 | 6,2 | 7,45 | 106653 |
| UNF | 3/8" | - | 24 | 90 | 18 | 39 | 10 | 8 | 9,05 | 106652 |

| Typenbezeichnung / type / type / tipo / tipo | DURAMAX 2 N | | | |
|---|---|---|---|---|
| **UNF-Feingewinde ASME B1.1**<br>Unified fine thread ASME B1.1<br>Filetage américain à pas fin ASME B1.1<br>Filettatura fine unificata ASME B1.1<br>Rosca unificada fina ASME B1.1<br>**~DIN 2174**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.5 / 2.1-2.3 4.1 / 4.3 5.2-5.3 / 7.1** | | | |
| **Ausführung / model / exécution / modello / modelo** | TIN | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 2BX | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | | | |

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| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|---|
| UNF | 7/16" | - | 20 | 100 | 22 | - | 8 | 6,2 | 10,55 | 106891 |
| UNF | 1/2" | - | 20 | 100 | 22 | - | 9 | 7 | 12,15 | 106888 |

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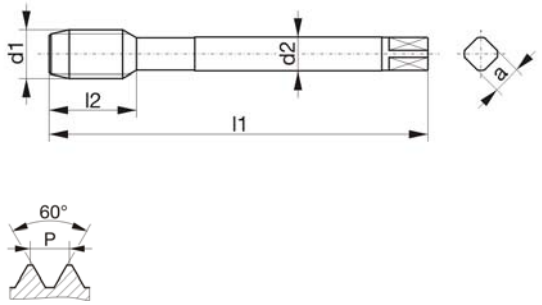
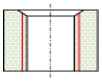
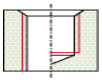
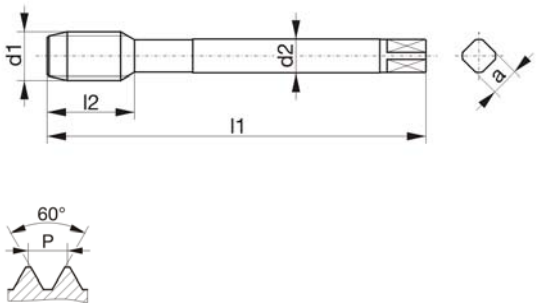
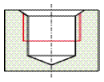
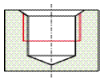
| Typenbezeichnung / type / type / tipo / tipo | VARIANT 2 N | VARIO 2 N | | |
|---|---|---|---|---|
| **UNEF-Extrafeingewinde ASME B1.1**<br>Unified extra fine thread ASME B1.1<br>Filetage américain à pas extra fin ASME B1.1<br>Filettatura extra fine unificata ASME B1.1<br>Rosca unificada extra-fina ASME B1.1<br>**~DIN 374**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.3 / 5.1-5.2 8.1** | **1.2-1.3 / 4.2 5.1-5.3** | | |
| **Ausführung / model / exécution / modello / modelo** | | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 2B | 2B | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | C / 2-3 | | |

| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| UNEF | 3/8" | - | 32 | 90 | 16 | - | 7 | 5,5 | 8,7 | 109963 | 109930 |
| UNEF | 7/16" | - | 28 | 90 | 16 | - | 8 | 6,2 | 10,2 | 109966 | 109933 |
| UNEF | 1/2" | - | 28 | 100 | 20 | - | 9 | 7 | 11,8 | 109960 | 109926 |
| UNEF | 9/16" | - | 24 | 100 | 22 | - | 11 | 9 | 13,2 | 109969 | 109935 |
| UNEF | 5/8" | - | 24 | 100 | 20 | - | 12 | 9 | 14,8 | 109965 | 109932 |
| UNEF | 11/16" | - | 24 | 110 | 20 | - | 14 | 11 | 16,4 | | 109925 |
| UNEF | 3/4" | - | 20 | 110 | 25 | - | 14 | 11 | 17,8 | | 109929 |
| UNEF | 13/16" | - | 20 | 125 | 25 | - | 16 | 12 | 19,4 | | 109927 |
| UNEF | 7/8" | - | 20 | 125 | 25 | - | 18 | 14,5 | 21 | | 109934 |
| UNEF | 1" | - | 20 | 140 | 28 | - | 18 | 14,5 | 24,15 | | 109914 |
| UNEF | 1.1/16" | - | 18 | 140 | 28 | - | 20 | 16 | 25,6 | | 109915 |
| UNEF | 1.1/8" | - | 18 | 150 | 28 | - | 22 | 18 | 27,2 | | 109918 |
| UNEF | 1.1/4" | - | 18 | 150 | 28 | - | 22 | 18 | 30,35 | | 109917 |
| UNEF | 1.5/16" | - | 18 | 170 | 30 | - | 28 | 22 | 31,95 | | 109922 |
| UNEF | 1.3/8" | - | 18 | 170 | 30 | - | 28 | 22 | 33,5 | | 109921 |
| UNEF | 1.1/2" | - | 18 | 170 | 30 | - | 28 | 22 | 36,75 | | 109916 |

| Typenbezeichnung / type / type / tipo / tipo | AVANT 2 H15 | DOMINANT 2 HZ38 | | |
|---|---|---|---|---|
| **UN-Gewinde ASME B1.1 8 Gang**<br>Unified thread ASME B1.1 8 thread series<br>Filetage américain ASME B1.1 série de 8 filets<br>Filettatura unificata ASME B1.1 serie di 8 filetti<br>Rosca unificada ASME B1.1 serie 8 hilos<br>**~DIN 374**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.4-1.5 / 4.1-4.6** | **1.2-1.5 / 4.1 4.3 / 4.5** | | |
| **Ausführung / model / exécution / modello / modelo** | | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 2B | 2B | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | C / 2-3 | | |

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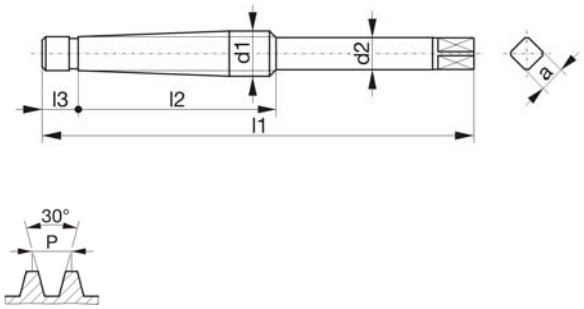
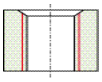
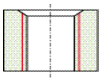
| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| UN | 1.1/8" | - | 8 | 180 | 35 | - | 22 | 18 | 25,4 | | 005264 |
| UN | 1.1/8" | - | 8 | 180 | 40 | - | 22 | 18 | 25,4 | 108003 | |
| UN | 1.1/4" | - | 8 | 180 | 35 | - | 22 | 18 | 28,5 | | 005265 |
| UN | 1.1/4" | - | 8 | 180 | 40 | - | 22 | 18 | 28,5 | 108002 | |
| UN | 1.3/8" | - | 8 | 200 | 35 | - | 28 | 22 | 31,8 | | 005266 |
| UN | 1.3/8" | - | 8 | 200 | 40 | - | 28 | 22 | 31,8 | 108006 | |
| UN | 1.1/2" | - | 8 | 200 | 35 | - | 28 | 22 | 35 | | 005267 |
| UN | 1.1/2" | - | 8 | 200 | 40 | - | 28 | 22 | 35 | 108001 | |
| UN | 1.5/8" | - | 8 | 200 | 35 | - | 32 | 24 | 38,1 | | 005268 |
| UN | 1.3/4" | - | 8 | 200 | 35 | - | 36 | 29 | 41,3 | | 005269 |
| UN | 1.7/8" | - | 8 | 225 | 35 | - | 36 | 29 | 44,5 | | 005270 |
| UN | 2" | - | 8 | 225 | 35 | - | 40 | 32 | 47,7 | | 005271 |

| Typenbezeichnung / type / type / tipo / tipo | AVANT 2 H05 | AVANT 2 H05 | | |
|---|---|---|---|---|
| **Tr-Metrisches ISO Trapezgewinde DIN 103**<br>Metric ISO trapezoidal thread DIN 103<br>Filetage métrique ISO trapézoïdal DIN 103<br>Filettatura trapezoidale ISO DIN 103<br>Rosca trapezoidal métrica ISO DIN 103<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.4 / 5.2** | **1.2-1.4 / 5.2** | | |
| **Ausführung / model / exécution / modello / modelo** | LSP | RSP LH | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 7H | 7H | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | | | | |

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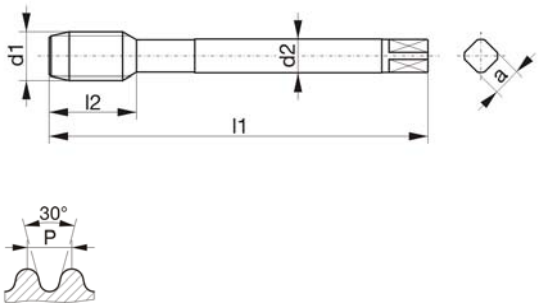
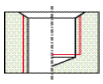
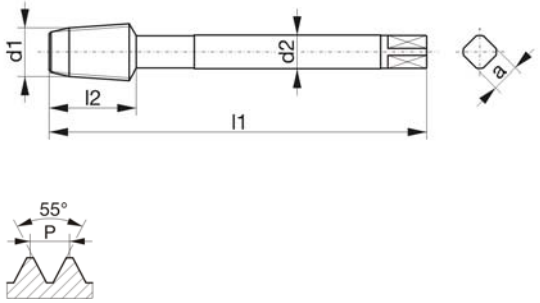
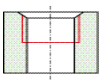
| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tr | 10 | x | 2 | 135 | 60 | 8 | 7 | 5,5 | 8,2 | 107016 | 107041 |
| Tr | 12 | x | 3 | 175 | 90 | 12 | 8 | 6,2 | 9,2 | 107019 | |
| Tr | 14 | x | 3 | 180 | 90 | 12 | 10 | 8 | 11,2 | 107021 | 107043 |
| Tr | 14 | x | 4 | 215 | 120 | 14 | 10 | 8 | 10,25 | 107022 | |
| Tr | 16 | x | 4 | 220 | 120 | 14 | 11 | 9 | 12,25 | 107025 | 107045 |
| Tr | 18 | x | 4 | 225 | 120 | 14 | 12 | 9 | 14,25 | 107027 | 107046 |
| Tr | 20 | x | 4 | 230 | 120 | 14 | 14 | 11 | 16,25 | 107029 | 107047 |
| Tr | 22 | x | 5 | 265 | 150 | 18 | 16 | 12 | 17,25 | 107031 | 107049 |
| Tr | 24 | x | 5 | 275 | 150 | 18 | 18 | 14,5 | 19,25 | 107034 | 107050 |
| Tr | 28 | x | 5 | 285 | 150 | 18 | 22 | 18 | 23,25 | 107036 | |
| Tr | 30 | x | 6 | 320 | 180 | 21 | 22 | 18 | 24,25 | 107037 | 107052 |

| Typenbezeichnung / type / type / tipo / tipo | VARIO 2 N | | | |
|---|---|---|---|---|
| **Rd-Rundgewinde DIN 405**<br>Round thread DIN 405<br>Filetage rond DIN 405<br>Filettatura tonda DIN 405<br>Rosca redonda DIN 405<br>  <br> | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.3 / 4.2 5.1-5.3** | | | |
| **Ausführung / model / exécution / modello / modelo** | | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 7H | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | | | |

| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|---|
| Rd | 10 | x | 1/10 | 110 | 22 | - | 9 | 7 | 8 | 110150 |
| Rd | 12 | x | 1/10 | 110 | 25 | - | 11 | 9 | 10 | 110151 |
| Rd | 14 | x | 1/8 | 110 | 28 | - | 12 | 9 | 11,5 | 110152 |
| Rd | 16 | x | 1/8 | 125 | 32 | - | 14 | 11 | 13,5 | 110153 |

| **Typenbezeichnung / type / type / tipo / tipo** | **VARIO 2 N** | | | |
|---|---|---|---|---|
| **W-Gasflaschenventilgewinde kegelig DIN EN ISO 11363-1 / DIN 477**<br>Tapered thread for gas cylinder valves DIN EN ISO 11363-1 / DIN 477<br>Filetage conique pour robinets de bouteilles à gaz DIN EN ISO 11363-1 / DIN 477<br>Filettatura conica per valvole di bombole a gas DIN EN ISO 11363-1 / DIN 477<br>Rosca cónica para bombonas de gas DIN EN ISO 11363-1 / DIN 477<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.3 / 4.2 5.1-5.3** | | | |
| **Ausführung / model / exécution / modello / modelo** | | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | | | |

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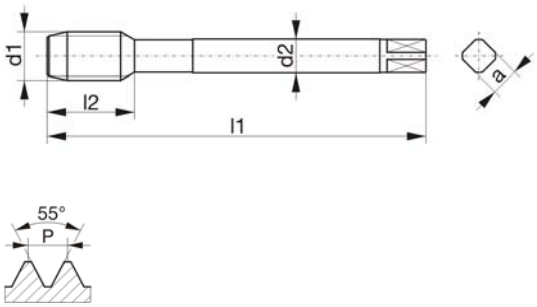
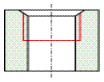
| **Ød$_1$** | | | **P** | **l$_1$** | **l$_2$** | **l$_3$** | **Ød$_2$** | **a** | | **Identnummer / identification number / code article / codice / número de identificación** |
|---|---|---|---|---|---|---|---|---|---|---|
| 17E / W | 19,8 | - | 14 | 95 | 27 | - | 16 | 12 | 14,7 | 110003 |
| 25E / W | 28,8 | - | 14 | 132 | 33,5 | - | 22 | 18 | 22,7 | 110004 |
| W | 31,3 | - | 14 | 132 | 34 | - | 25 | 20 | 25,2 | 110005 |

| **Typenbezeichnung / type / type / tipo / tipo** | **VARIO 2 N** | | | |
|---|---|---|---|---|
| **W-Gasflaschenventilgewinde zylindrisch DIN 477**<br>Cylindrical thread for gas cylinder valves DIN 477<br>Filetage cylindrique pour robinets de bouteilles à gaz DIN 477<br>Filettatura cilindrica per valvole di bombole a gas DIN 477<br>Rosca cilíndrica para bombonas de gas DIN 477<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.2-1.3 / 4.2 5.1-5.3** | | | |
| **Ausführung / model / exécution / modello / modelo** | | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | C / 2-3 | | | |

| **Ød$_1$** | | | **P** | **l$_1$** | **l$_2$** | **l$_3$** | **Ød$_2$** | **a** | | **Identnummer / identification number / code article / codice / número de identificación** |
|---|---|---|---|---|---|---|---|---|---|---|
| W | 21,8 | - | 14 | 125 | 25 | - | 18 | 14,5 | 19,75 | 110007 |
| W | 24,32 | - | 14 | 140 | 28 | - | 18 | 14,5 | 22,25 | 110008 |

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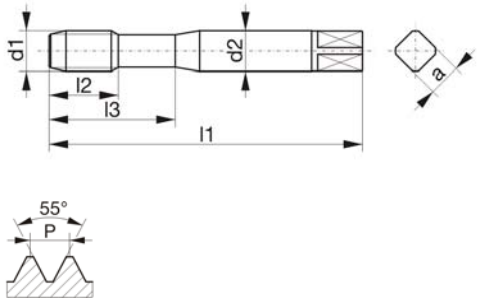
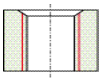
| Typenbezeichnung / type / type / tipo / tipo | VARIANT 1<br>H | | | |
|---|---|---|---|---|
| **BSW-Whitworth Gewinde BS 84**<br>British standard Whitworth thread BS 84<br>Filetage British standard Whitworth BS 84<br>Filettatura Whitworth standard inglese BS 84<br>Rosca norma británica Whitworth BS 84<br>**~DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application<br>adatto per lavorazione di / aplicación** | **1.3-1.5 / 4.1<br>4.5** | | | |
| **Ausführung / model / exécution / modello / modelo** | | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | med. | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | | | |

Tr
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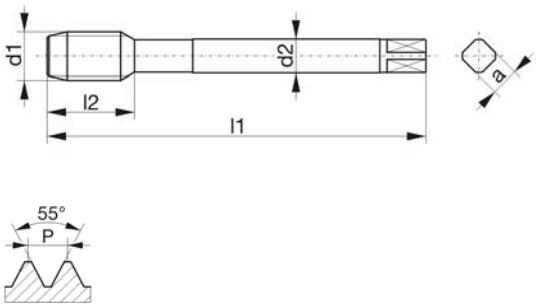
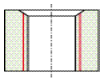
W
BSW
EG

| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|---|
| BSW | 1/4" | - | 20 | 80 | 16 | 30 | 7 | 5,5 | 5,1 | 108430 |
| BSW | 5/16" | - | 18 | 90 | 18 | 35 | 8 | 6,2 | 6,5 | 108435 |
| BSW | 3/8" | - | 16 | 100 | 20 | 39 | 10 | 8 | 7,9 | 108434 |

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 2<br>H | | | |
|---|---|---|---|---|
| **BSW-Whitworth Gewinde BS 84**<br>British standard Whitworth thread BS 84<br>Filetage British standard Whitworth BS 84<br>Filettatura Whitworth standard inglese BS 84<br>Rosca norma británica Whitworth BS 84<br>**~DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  | | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.3-1.5 / 4.1 4.5** | | | |
| **Ausführung / model / exécution / modello / modelo** | | | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | med. | | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | | | |

| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|---|
| BSW | 1/2" | - | 12 | 110 | 24 | - | 9 | 7 | 10,5 | 108635 |
| BSW | 5/8" | - | 11 | 110 | 27 | - | 12 | 9 | 13,5 | 108637 |
| BSW | 3/4" | - | 10 | 125 | 32 | - | 14 | 11 | 16,4 | 108636 |
| BSW | 7/8" | - | 9 | 140 | 32 | - | 18 | 14,5 | 19,25 | 108638 |
| BSW | 1" | - | 8 | 160 | 36 | - | 18 | 14,5 | 22 | 108634 |

Tr
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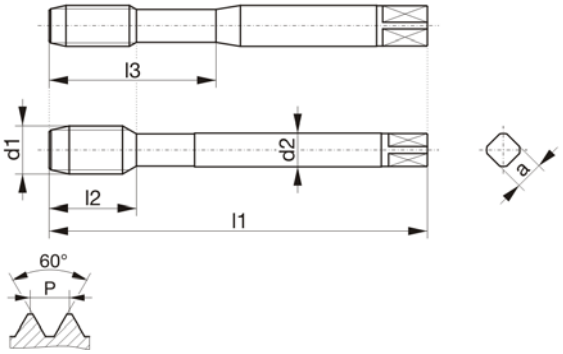
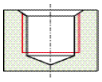
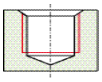
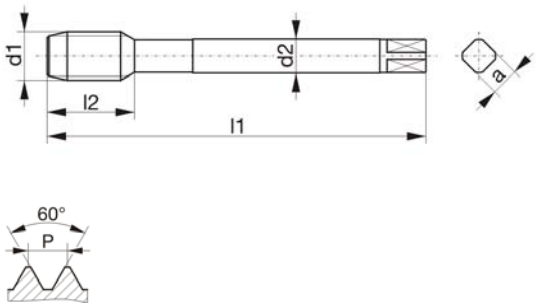
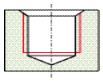
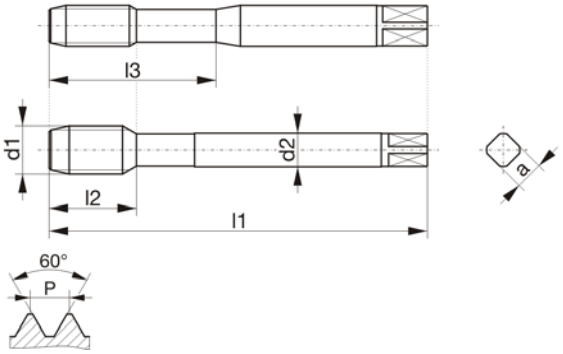
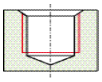
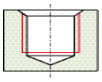
BSW
EG

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 1 VA45 | DOMINANT 2 VA45 | | |
|---|---|---|---|---|
| **EG M-Metrisches ISO Regelgewinde DIN 8140**<br>Metric ISO thread DIN 8140<br>Filetage métrique (pour filets rapportés) DIN 8140<br>Filettatura metrica DIN 8140<br>Rosca métrica DIN 8140<br>**DIN 40435**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | | |
| **Ausführung / model / exécution / modello / modelo** | HL | HL | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 6H mod | 6H mod | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | E / 1,5-2 | E / 1,5-2 | | |

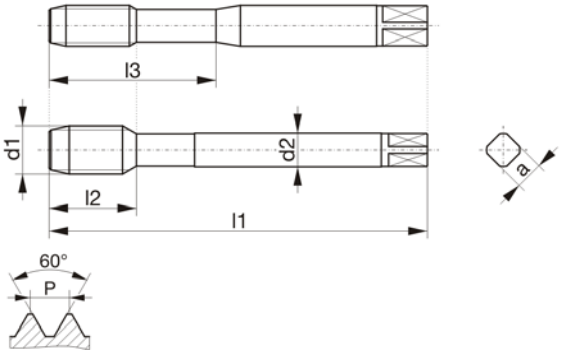
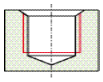
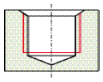
| Ød$_1$ | | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|
| EG-M | 2 | 0,4 | 50 | 9 | 14 | 2,8 | 2,1 | 2,1 | 025654 | |
| EG-M | 2,5 | 0,45 | 56 | 7 | 18 | 3,5 | 2,7 | 2,65 | 025655 | |
| EG-M | 3 | 0,5 | 63 | 8 | 21 | 4,5 | 3,4 | 3,15 | 025658 | |
| EG-M | 3,5 | 0,6 | 70 | 9 | 25 | 6 | 4,9 | 3,7 | 025659 | |
| EG-M | 4 | 0,7 | 70 | 9 | 25 | 6 | 4,9 | 4,2 | 025660 | |
| EG-M | 5 | 0,8 | 80 | 10 | 30 | 6 | 4,9 | 5,25 | 025661 | |
| EG-M | 6 | 1 | 90 | 13 | 35 | 8 | 6,2 | 6,3 | 025663 | |
| EG-M | 8 | 1,25 | 100 | 15 | 39 | 10 | 8 | 8,4 | 025664 | |
| EG-M | 10 | 1,5 | 100 | 15 | - | 9 | 7 | 10,5 | | 025665 |
| EG-M | 12 | 1,75 | 110 | 20 | - | 11 | 9 | 12,5 | | 025667 |
| EG-M | 16 | 2 | 125 | 25 | - | 14 | 11 | 16,5 | | 110494 |
| EG-M | 20 | 2,5 | 160 | 30 | - | 18 | 14,5 | 20,8 | | 025668 |

| Typenbezeichnung / type / type / tipo / tipo | | DOMINANT 2 VA45 | | |
|---|---|---|---|---|
| **EG MF-Metrisches ISO Feingewinde DIN 8140**<br>Metric ISO fine thread DIN 8140<br>Filetage métrique ISO à pas fin (pour filets rapportés) DIN 8140<br>Filettatura metrica ISO passo fine DIN 8140<br>Rosca métrica fina ISO DIN 8140<br>**DIN 40435**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** | |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | | |
| **Ausführung / model / exécution / modello / modelo** | | HL | | |
| **Werkstoff / tool material / substrat / materiale / material** | | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | | 6H mod | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | | E / 1,5-2 | | |

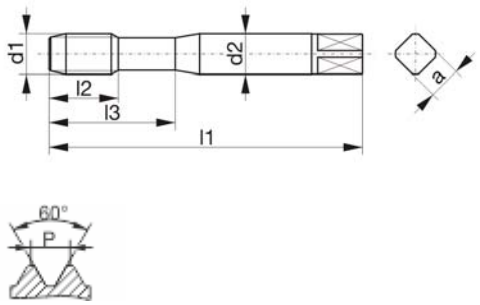
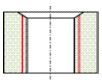
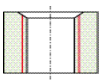
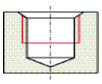
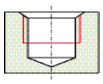
| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación |
|---|---|---|---|---|---|---|---|---|---|---|
| EG-MF | 8 | x | 1 | 90 | 12 | - | 7 | 5,5 | 8,3 | 025669 |
| EG-MF | 10 | x | 1 | 100 | 15 | - | 9 | 7 | 10,3 | 025670 |
| EG-MF | 12 | x | 1 | 100 | 15 | - | 11 | 9 | 12,3 | 025671 |
| EG-MF | 12 | x | 1,5 | 100 | 15 | - | 11 | 9 | 12,5 | 025672 |
| EG-MF | 14 | x | 1,25 | 100 | 15 | - | 12 | 9 | 14,4 | 025673 |
| EG-MF | 14 | x | 1,5 | 100 | 15 | - | 12 | 9 | 14,5 | 025674 |
| EG-MF | 16 | x | 1,5 | 110 | 18 | - | 14 | 11 | 16,5 | 025675 |
| EG-MF | 20 | x | 1,5 | 125 | 18 | - | 18 | 14,5 | 20,5 | 025676 |

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 1 VA45 | DOMINANT 2 VA45 | | |
|---|---|---|---|---|
| **EG UNC-Grobgewinde ASME B18.29.1**<br>Unified coarse thread ASME B18.29.1<br>Filetage américain à pas gros (pour filets rapportés) ASME B18.29.1<br>Filettatura grossa unificata ASME B18.29.1<br>Rosca unificada gruesa ASME B18.29.1<br>**DIN 2184-1**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | | |
| **Ausführung / model / exécution / modello / modelo** | HL | HL | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 3B | 3B | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | E / 1,5-2 | E / 1,5-2 | | |

| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EG-UNC | No3 | - | 48 | 56 | 7 | 20 | 4 | 3 | 2,7 | 025678 | |
| EG-UNC | No4 | - | 40 | 63 | 8 | 21 | 4,5 | 3,4 | 3,1 | 025679 | |
| EG-UNC | No5 | - | 40 | 63 | 8 | 21 | 4,5 | 3,4 | 3,4 | 025680 | |
| EG-UNC | No6 | - | 32 | 70 | 9 | 25 | 6 | 4,9 | 3,8 | 025681 | |
| EG-UNC | No8 | - | 32 | 80 | 10 | 30 | 6 | 4,9 | 4,4 | 025682 | |
| EG-UNC | No10 | - | 24 | 80 | 10 | 30 | 7 | 5,5 | 5,2 | 025683 | |
| EG-UNC | 1/4" | - | 20 | 90 | 13 | 35 | 8 | 6,2 | 6,7 | 025685 | |
| EG-UNC | 5/16" | - | 18 | 100 | 15 | 39 | 10 | 8 | 8,4 | 025689 | |
| EG-UNC | 3/8" | - | 16 | 100 | 15 | - | 9 | 7 | 10 | | 025687 |
| EG-UNC | 7/16" | - | 14 | 110 | 20 | - | 11 | 9 | 11,7 | | 025690 |
| EG-UNC | 1/2" | - | 13 | 110 | 20 | - | 12 | 9 | 13,3 | | 025684 |
| EG-UNC | 5/8" | - | 11 | 125 | 25 | - | 14 | 11 | 16,5 | | 025688 |
| EG-UNC | 3/4" | - | 10 | 140 | 25 | - | 18 | 14,5 | 19,75 | | 025686 |

| Typenbezeichnung / type / type / tipo / tipo | DOMINANT 1 VA45 | DOMINANT 2 VA45 | | |
|---|---|---|---|---|
| **EG UNF-Feingewinde ASME B18.29.1**<br>Unified fine thread ASME B18.29.1<br>Filetage américain à pas fin (pour filets rapportés) ASME B18.29.1<br>Filettatura fine unificata ASME B18.29.1<br>Rosca unificada fina ASME B18.29.1<br>**DIN 2184-1**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  | | |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | **1.1-1.6 / 2.1-2.3 3.1 / 3.3-3.4 5.1-5.3 / 7.1-7.2** | | |
| **Ausführung / model / exécution / modello / modelo** | HL | HL | | |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | | |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 3B | 3B | | |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h9 | h9 | | |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | E / 1,5-2 | E / 1,5-2 | | |

| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EG-UNF | No6 | - | 40 | 70 | 9 | 25 | 6 | 4,9 | 3,7 | 025697 | |
| EG-UNF | No8 | - | 36 | 80 | 10 | 30 | 6 | 4,9 | 4,4 | 025701 | |
| EG-UNF | No10 | - | 32 | 80 | 10 | 30 | 6 | 4,9 | 5,1 | 025698 | |
| EG-UNF | 1/4" | - | 28 | 90 | 13 | 35 | 8 | 6,2 | 6,6 | 025699 | |
| EG-UNF | 5/16" | - | 24 | 90 | 12 | 39 | 10 | 8 | 8,25 | 025700 | |
| EG-UNF | 3/8" | - | 24 | 90 | 12 | - | 8 | 6,2 | 9,8 | | 025694 |
| EG-UNF | 7/16" | - | 20 | 100 | 15 | - | 9 | 7 | 11,5 | | 025696 |
| EG-UNF | 1/2" | - | 20 | 100 | 15 | - | 11 | 9 | 13,1 | | 025692 |
| EG-UNF | 5/8" | - | 18 | 110 | 18 | - | 14 | 11 | 16,25 | | 025695 |
| EG-UNF | 3/4" | - | 16 | 125 | 18 | - | 16 | 12 | 19,5 | | 025693 |

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 1 TIH | VARIANT 1 NI | AVANT 1 TIH13 | AVANT 1 NI13 |
|---|---|---|---|---|
| **MJ-Regelgewinde DIN ISO 5855**<br>Metric coarse thread DIN ISO 5855<br>Filetage métrique DIN ISO 5855<br>Filettatura metrica DIN ISO 5855<br>Rosca métrica DIN ISO 5855<br>**~DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.4-1.7 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** | **1.7 / 7.3 / 9.2** | **1.5-1.6 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** | **1.7 / 4.7 / 7.3 9.2** |
| **Ausführung / model / exécution / modello / modelo** | TICN | TICN | TICN | TICN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 4HX | 4HX | 4HX | 4HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | h6 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | C / 2-3 | C / 2-3 |

| Ød$_1$ | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MJ | 3 | 0,5 | 56 | 11 | - | 3,5 | 2,7 | 2,6 | 108817 | 048997 | 111040 | 046259 |
| MJ | 4 | 0,7 | 63 | 13 | - | 4,5 | 3,4 | 3,4 | 108819 | 049020 | 111041 | 049025 |
| MJ | 5 | 0,8 | 70 | 16 | - | 6 | 4,9 | 4,3 | 108821 | 049021 | 111042 | 049027 |
| MJ | 6 | 1 | 80 | 16 | 30 | 6 | 4,9 | 5,1 | 112069 | | 111043 | |
| MJ | 6 | 1 | 80 | 19 | - | 6 | 4,9 | 5,1 | | 049022 | | 049028 |
| MJ | 8 | 1,25 | 90 | 18 | 35 | 8 | 6,2 | 6,9 | 108823 | 049023 | 111044 | 035391 |
| MJ | 10 | 1,5 | 100 | 20 | 39 | 10 | 8 | 8,7 | 112071 | 049024 | 111051 | 035392 |

MJ
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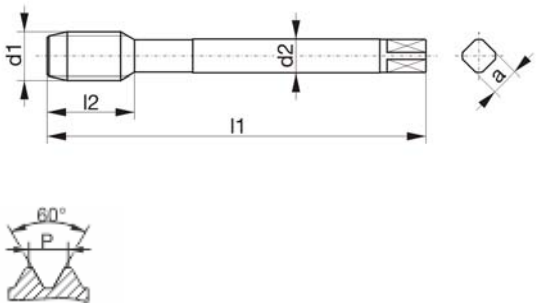
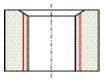
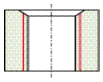
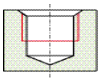
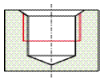
| Typenbezeichnung / type / type / tipo / tipo | VARIANT 2 TIH | VARIANT 2 NI | AVANT 2 TIH13 | AVANT 2 NI13 |
|---|---|---|---|---|
| **MJ-Regelgewinde DIN ISO 5855**<br>Metric coarse thread DIN ISO 5855<br>Filetage métrique DIN ISO 5855<br>Filettatura metrica DIN ISO 5855<br>Rosca métrica DIN ISO 5855<br>**DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.4-1.7 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** | **1.7 / 7.3 / 9.2** | **1.5-1.6 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** | **1.7 / 4.7 / 7.3 9.2** |
| **Ausführung / model / exécution / modello / modelo** | TICN | TICN | TICN | TICN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 4HX | 4HX | 4HX | 4HX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | h6 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | C / 2-3 | C / 2-3 |

| | Ød$_1$ | P | l$_1$ | l$_2$ | l$_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MJ | 12 | 1,75 | 110 | 24 | - | 9 | 7 | 10,5 | 112073 | 049029 | 111052 | 035393 |

MJ
UNJC
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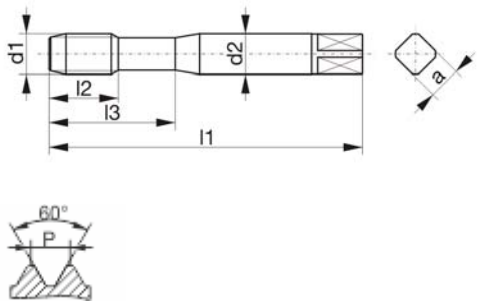
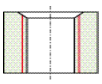
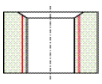
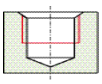
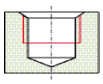
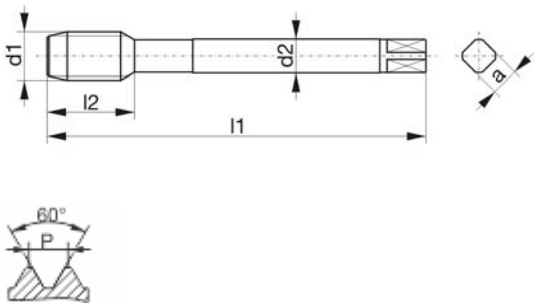
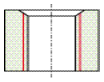
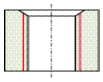
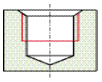
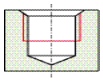
| Typenbezeichnung / type / type / tipo / tipo | VARIANT 1 TIH | VARIANT 1 NI | AVANT 1 TIH13 | AVANT 1 NI13 |
|---|---|---|---|---|
| **UNJC-Grobgewinde ASME B1.15 und ISO 3161**<br>Unified coarse thread ASME B1.15 and ISO 3161<br>Filetage américain à pas gros ASME B1.15 et ISO 3161<br>Filettatura grossa unificata ASME B1.15 e ISO 3161<br>Rosca unificada gruesa ASME B1.15 e ISO 3161<br>**~DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.4-1.7 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** | **1.7 / 7.3 / 9.2** | **1.5-1.6 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** | **1.7 / 4.7 / 7.3 9.2** |
| **Ausführung / model / exécution / modello / modelo** | TICN | TICN | TICN | TICN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 3BX | 3BX | 3BX | 3BX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | h6 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | C / 2-3 | C / 2-3 |

| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNJC | No4 | - | 40 | 56 | 11 | - | 3,5 | 2,7 | 2,3 | 017688 | 049032 | 108765 | 049041 |
| UNJC | No6 | - | 32 | 56 | 12 | - | 4 | 3 | 2,8 | 109548 | 049033 | 108766 | 049042 |
| UNJC | No8 | - | 32 | 63 | 13 | - | 4,5 | 3,4 | 3,5 | 109550 | 049034 | 109308 | 049043 |
| UNJC | No10 | - | 24 | 70 | 16 | - | 6 | 4,9 | 3,9 | 017684 | 049035 | 108764 | 049044 |
| UNJC | 1/4" | - | 20 | 80 | 16 | 30 | 7 | 5,5 | 5,2 | 109551 | | 109309 | |
| UNJC | 1/4" | - | 20 | 80 | 20 | - | 7 | 5,5 | 5,2 | | 049036 | | 049045 |
| UNJC | 5/16" | - | 18 | 90 | 18 | 35 | 8 | 6,2 | 6,7 | 109552 | 049039 | 109310 | 049047 |
| UNJC | 3/8" | - | 16 | 100 | 20 | 39 | 10 | 8 | 8,1 | 110826 | 049037 | 006325 | 049046 |

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 2 TIH | VARIANT 2 NI | AVANT 2 TIH13 | AVANT 2 NI13 |
|---|---|---|---|---|
| **UNJC-Grobgewinde ASME B1.15 und ISO 3161**<br>Unified coarse thread ASME B1.15 and ISO 3161<br>Filetage américain à pas gros ASME B1.15 et ISO 3161<br>Filettatura grossa unificata ASME B1.15 e ISO 3161<br>Rosca unificada gruesa ASME B1.15 e ISO 3161<br>**~DIN 376**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.4-1.7 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** | **1.7 / 7.3 / 9.2** | **1.5-1.6 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** | **1.7 / 4.7 / 7.3 9.2** |
| **Ausführung / model / exécution / modello / modelo** | TICN | TICN | TICN | TICN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 3BX | 3BX | 3BX | 3BX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | h6 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | C / 2-3 | C / 2-3 |

| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNJC | 1/2" | - | 13 | 110 | 24 | - | 9 | 7 | 10,9 | 109554 | 049040 | 108796 | 049049 |

MJ
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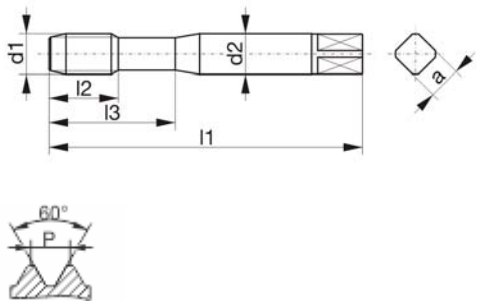
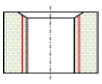
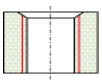
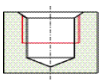
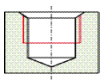
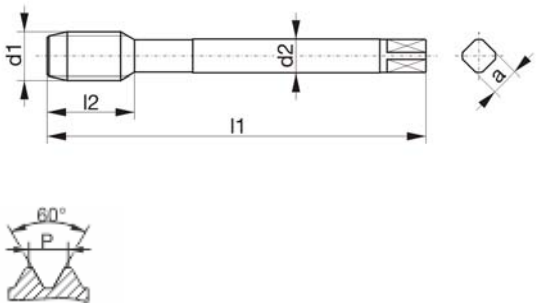
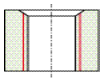
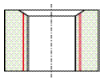
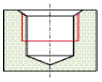
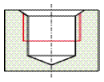
| Typenbezeichnung / type / type / tipo / tipo | VARIANT 1 TIH | VARIANT 1 NI | AVANT 1 TIH13 | AVANT 1 NI13 |
|---|---|---|---|---|
| **UNJF-Feingewinde ASME B1.15 und ISO 3161**<br>Unified fine thread ASME B1.15 and ISO 3161<br>Filetage américain à pas fin ASME B1.15 et ISO 3161<br>Filettatura fine unificata ASME B1.15 e ISO 3161<br>Rosca unificada fina ASME B1.15 e ISO 3161<br>**~DIN 371**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.4-1.7 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** | **1.7 / 7.3 / 9.2** | **1.5-1.6 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** | **1.7 / 4.7 / 7.3 9.2** |
| **Ausführung / model / exécution / modello / modelo** | TICN | TICN | TICN | TICN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 3BX | 3BX | 3BX | 3BX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | h6 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | C / 2-3 | C / 2-3 |

| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNJF | No4 | - | 48 | 56 | 11 | - | 3,5 | 2,7 | 2,4 | 109304 | 049074 | 109220 | 049116 |
| UNJF | No6 | - | 40 | 56 | 12 | - | 4 | 3 | 2,95 | 109305 | 049076 | 109207 | 049117 |
| UNJF | No8 | - | 36 | 63 | 13 | - | 4,5 | 3,4 | 3,6 | 109306 | 049077 | 109208 | 049118 |
| UNJF | No10 | - | 32 | 70 | 16 | - | 6 | 4,9 | 4,15 | 013425 | 049054 | 109231 | 049119 |
| UNJF | 1/4" | - | 28 | 80 | 16 | 30 | 7 | 5,5 | 5,6 | 013424 | | 109209 | |
| UNJF | 1/4" | - | 28 | 80 | 20 | - | 7 | 5,5 | 5,6 | | 029648 | | 030282 |
| UNJF | 5/16" | - | 24 | 90 | 18 | 35 | 8 | 6,2 | 7 | 104661 | 049080 | 109211 | 049121 |
| UNJF | 3/8" | - | 24 | 90 | 18 | 39 | 10 | 8 | 8,6 | 109307 | 049079 | 109232 | 049120 |

| Typenbezeichnung / type / type / tipo / tipo | VARIANT 2 TIH | VARIANT 2 NI | AVANT 2 TIH13 | AVANT 2 NI13 |
|---|---|---|---|---|
| **UNJF-Feingewinde ASME B1.15 und ISO 3161**<br>Unified fine thread ASME B1.15 and ISO 3161<br>Filetage américain à pas fin ASME B1.15 et ISO 3161<br>Filettatura fine unificata ASME B1.15 e ISO 3161<br>Rosca unificada fina ASME B1.15 e ISO 3161<br>**~DIN 374**<br>  | | | | |
| **Bohrung / bore / type de trou / fori / tipos de agujeros** |  |  |  |  |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | **1.4-1.7 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** | **1.7 / 7.3 / 9.2** | **1.5-1.6 / 3.2-3.4 4.4-4.6 / 5.4 6.1-6.3 / 7.2 9.1** | **1.7 / 4.7 / 7.3 9.2** |
| **Ausführung / model / exécution / modello / modelo** | TICN | TICN | TICN | TICN |
| **Werkstoff / tool material / substrat / materiale / material** | HSSE-PM | HSSE-PM | HSSE-PM | HSSE-PM |
| **Gewindetoleranz / thread tolerance / tolérance du filetage / tolleranza di filettatura / tolerancia de la rosca** | 3BX | 3BX | 3BX | 3BX |
| **Schafttoleranz / shank tolerance / tolérance de queue / tolleranza del gambo / tolerancia del mango** | h6 | h6 | h6 | h6 |
| **Anschnitt / chamfer / entrée / imbocco / entrada** | B / 3,5-5,5 | B / 3,5-5,5 | C / 2-3 | C / 2-3 |

| Ød$_1$ | | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_2$ | a | | Identnummer / identification number / code article / codice / número de identificación | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNJF | 1/2" | - | 20 | 100 | 22 | - | 9 | 7 | 11,5 | 013428 | 049082 | 109212 | 049122 |

MJ
UNJC
UNJF

**VHM-Gewindefräser, VHM-Bohrgewindefräser** 140 - 172
solid carbide thread milling cutters, solid carbide drill and thread milling cutters /
fraises à fileter en carbure monobloc, fraises à percer-fileter en carbure monobloc /
frese a filettare in metallo duro, utensili in metallo duro per foratura e fresatura delle filettature /
fresas de roscado de metal duro, broca-fresas de metal duro

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come procedere - spiegazione della tabella d'impiego / cómo proceder - explicación de la tabla de uso

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application specifications / spécificités d'application / specificazione di applicazione / especificaciones de aplicación

**Prozessbeschreibung**
machining steps / comment procéder / lavorazione / instrucciones

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|---|---|
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| | | |
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| GFA N | - M | 154 |
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| GFS N | - M (2×D) | 162 |
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| GFS N | - MF | 164 |
| GFS N | - G | 165 |
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| GFS N | - NPT | 168 |
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**Erklärung zur Anwendungstabelle VHM-Gewindefräser, VHM-Bohrgewindefräser**

Wie gehe ich vor?
- Welche Bearbeitung wird ausgeführt?
a) Gewindefräsen einer Abmessung, GFA S. 153 ff
b) Gewindefräsen bei tiefen und kleinen Gewinden, GFD S. 156 f
c) Gewindefräsen verschiedener Abmessungen, GFM S. 158 f
d) Senken und Gewindefräsen, GFS S. 160 ff
e) Bohren, Senken und Gewindefräsen, BGF S. 170 ff
- Einsatzgebiet auswählen
- Schnittgeschwindigkeit (Vc m/min) der Tabelle entnehmen
- fz mm/Z aus Tabelle entnehmen (min. und max.)

**Spiegazione della tabella d'impiego frese a filettare in metallo duro, utensili in metallo duro per foratura e fresatura delle filettature**

Come procedere:
- Lavorazione da eseguire
a) Fresatura di filetti di un solo diametro, GFA vedi pagina 153 e seguenti
b) Fresatura di filetti profondi e piccoli, GFD vedi pagina 156 e seguenti
c) Fresatura di filetti di diametri differenti, GFM vedi pagina 158 e seguenti
d) Svasatura e fresatura di filetti, GFS vedi pagina 160 e seguenti
e) Foratura, svasatura e fresatura di filetti, BGF vedi pagina 170 e seguenti
- Scegliere l'impiego
- Velocità di taglio (Vc m/min) vedi tabella
- Avanzamento per dente (fz mm/Z) vedi tabella (min. e max.)

**Explanation of the application table solid carbide thread milling cutters, solid carbide drill and thread milling cutters**

How to proceed:
- Which machining steps are to be carried out?
a) Thread milling of one particular thread size, GFA see page 153 and the following
b) Milling of deep threads and in small dimensions, GFD see page 156 and the following
c) Thread milling of different thread diameters, GFM see page 158 and the following
d) Countersinking and thread milling, GFS see page 160 and the following
e) Drilling, countersinking and thread milling, BGF see page 170 and the following
- Select application
- Cutting speed (Vc m/min) see table
- Feed per tooth (fz mm/Z) see table (min. and max.)

**Explicación de la tabla de uso fresas de roscado de metal duro, broca-fresas de metal duro**

Cómo proceder:
- ¿Qué operaciones de mecanizado quiere realizar?
a) Fresado de roscas de un diámetro, GFA véase página 153 ss.
b) Fresado de rosca para profundidades de rosca pequeñas y grandes, GFD véase página 156 ss.
c) Fresado de roscas de diámetros diferentes, GFM véase página 158 ss.
d) Avellanado y fresado de roscas, GFS véase página 160 ss.
e) Taladrado, avellanado y fresado de roscas, BGF véase página 170 ss.
- Seleccionar la aplicación
- Velocidad de corte (Vc m/min) véase tabla
- Avance por diente (fz mm/Z) véase tabla (min. y max.)

**Explication du tableau d'application fraises à fileter en carbure monobloc, fraises à percer-fileter en carbure monobloc**

Comment procéder:
- Opérations a réaliser
a) Réalisation d'un seul diamètre de filetage, GFA voir page 153 et suivantes
b) Fraisage de filetages profonds de petits diamètres, GFD voir page 156 et suivantes
c) Réalisation de plusieurs diamètres de filetage, GFM voir page 158 et suivantes
d) Chanfreinage et réalisation d'un seul diamètre de filetage, GFS voir page 160 et suivantes
e) Perçage, chanfreinage et réalisation d'un seul diamètre de filetage, BGF voir page 170 et suivantes
- Sélectionnez l'application
- Vitesse de coupe (Vc m/min) voir tableau
- Avance par dent (fz mm/Z) voir tableau (min. et max.)

Beschichtung / coating / revêtement / rivestimento / recubrimiento

| | Einsatzgebiet | Werkstoff-beispiele | Application | Examples of materials | Application | Exemples de matières | Impieghi | Designazione dei materiali | Aplicaión | Ejemplo de materiales |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **Stahlwerkstoffe** | | **Steel materials** | | **Aciers** | | **Acciai** | | **Aceros** | |
| 1.1 | Baustahl unleg. / Weicheisen | DC01 | Magnetic soft steel | FeP01 | Fer doux magnétique | C | Ferro magnetico dolce | DC01 | Acero magnético suave | DC01 |
| 1.2 | Baustahl / Einsatzstahl | S235JR | Construction steel / case hardening steel | En40B | Aciers de construction et de cémentation | S235JRG2 | Acciaio da costruzione e da cementazione | Fe360B-FN | Acero de construcción / acero de cementación | A360B-NE |
| 1.3 | Bau- / Kohlenstoffstahl C<0,45% / Stahl niedrigleg. | C45 | Carbon steel | 080M46 | Aciers au carbone | AF65 | Acciaio al carbonio | C45 | Acero al carbono | C45 |
| 1.4 | Kohlenstoffstahl C>0,45% / Stahl niedrigleg. / Stahl hochleg. | 42CrMo4 | Alloyed / heat-treatable steel | En19A | Aciers alliés / aciers pour traitement thermique | 42CD4 | Acciaio legato / bonificato | G40CrMo4 | Acero aleado | 40CrMo4 |
| 1.5 | Stahl legiert / hochlegiert | X153CrMoV12 | Alloyed steel | BD2 | Aciers alliés | Z160CDV12 | Acciaio legato | X155CrVMo12-1KU | Acero aleado templado y revenido | X153CrMoV12 |
| 1.6 | Stahl legiert / hochlegiert | 42CrMo4 | Alloyed steel | En19A | Aciers alliés | 42CD4 | Acciaio legato | G40CrMo4 | Acero aleado templado y revenido | 40CrMo4 |
| 1.7 | Stahl legiert / hochlegiert | 56Si7 | Alloyed steel | 251A58 | Aciers alliés | 55S7 | Acciaio legato | 56Si7 | Acero aleado templado y revenido | 56Si7 (F.144) |
| 1.8 | Stahl gehärtet | 34CrMo4 | Hardened steel | 708A30 | Aciers trempés | 34CD4 | Acciaio temprato | 35CrMo4F | Acero endurecido | 34CrMo4 |
| 1.9 | Stahl gehärtet | X100CrMoV5 | Hardened steel | BA2 | Aciers trempés | Z100CDV5 | Acciaio temprato | X100CrMoV5-1KU | Acero endurecido | X100CrMoV5 |
| 2 | **Rostfreier Stahl** | | **Stainless steel** | | **Aciers inoxydables** | | **Acciai inossidabili** | | **Acero inoxidable** | |
| 2.1 | Stahl-ferritische und martensitisch | X30Cr13 | Ferritic / martensitic steel | 420S37 | Aciers ferritiques, martensitiques | Z30C13 | Acciai ferritici / martensiti | X31Cr13KU | Acero ferritico, martensitico | X30Cr13 |
| 2.2 | Stahl-austenitisch, aust.-ferritisch | X6CrNiMo-Ti17-12-2 | Austenitic steel | 320S18 | Aciers austénitiques | Z6CNDT17-12 | Acciai austenitici | X6CrNiMo-Ti17-12-2 | Austenitico | X6CrNiMo-Ti17-12-2 |
| 2.3 | Stahl-austenitisch, aust.-ferritisch u. ferritisch | X7CrNiAl17-7 | High temperature steel | 301S81 | Aciers réfractaires | Z9CNA17-07 | Acciai termostabili | X7CrNiAl17-7 | Aleac. Cr-Ni resist. a elevadas temperaturas | X7CrNiAl17-7 |
| 3 | **Gusseisen** | | **Cast iron** | | **Fontes** | | **Ghisa** | | **Fundición gris** | |
| 3.1 | Grauguss-lamellar | EN-GJL-200 | Grey cast iron | EN-GJL-200 | Fonte grise | EN-GJL-200 | Ghisa grigia | EN-GJL-200 | Fundición gris | EN-GJL-200 |
| 3.2 | Kugelgraphitguss | EN-GJS-400-15U | Cast iron with nodular graphite | Grade420/12 | Fonte à graphite sphéroïdal | FGS400-15 | Ghisa sferoidale | GS400-12 | Fundición esferoide | EN-GJS-400-15U |
| 3.3 | Temperguss weiß / schwarz | EN-GJMB-350-10 | Malleable cast iron | EN-GJMB-350-10 | Fonte malléable | EN-GJMB-350-10 | Ghisa temprata | EN-GJMB-350-10 | Fundición maleable, nodular | EN-GJMB-350-10 |
| 3.4 | Vermikularguss / ADI / Hartguss | EN-GJV-300 | Cast iron with vermicular graphite | EN-GJV-300 | Fonte vermiculaire | EN-GJV-300 | Ghisa vermiculare | EN-GJV-300 | Fundición gris compactada | EN-GJV-300 |
| 4 | **Kupfer** | | **Copper** | | **Cuivre** | | **Rame** | | **Cobre** | |
| 4.1 | Reinkupfer | Cu-ETP | Copper non-alloyed | Cu-ETP-2 C 101 | Cuivre pur / électrolytique | Cu-a1 | Rame puro / elettrolitico | Cu-ETP | Cobre puro | Cu-ETP |
| 4.2 | Kupfer-Legierungen (kurzspanend) | CuZn39Pb2 | Brass (short chipping) | CZ 120 | Alliages de cuivre (copeaux courts) | CuZn40Pb2 | Ottone (truciolo corto) | CuZn39Pb2 | Latón (viruta corta) | CuZn39Pb2 |
| 4.3 | Kupfer-Legierungen (langspanend) | CuZn37 | Brass (long chipping) | CZ 108 | Alliages de cuivre (copeaux longs) | CuZn37 | Ottone (truciolo lungo) | P-CuZn37 | Latón (viruta larga) | CuZn37 |
| 4.4 | Cu-Al-Ni-Legierungen (kurzspanend) | CuNi10Fe1Mn | Copper-alu-nickel alloyed (short chipping) | CN 102 | Alliages Cu-Al-Ni (copeaux courts) | CW352H | Leghe di Cu-Al-Ni (truciolo corto) | CW352H | Aleaciones Cu-Al-Ni (viruta corta) | CW352H |
| 4.5 | Cu-Al-Ni-Legierungen (langspanend) | CuAl10NiFe4 | Copper-alu-nickel alloyed (long chipping) | CA 104 | Alliages Cu-Al-Ni (copeaux longs) | CuAl9Ni-5Fe3Mn | Leghe di Cu-Al-Ni (truciolo lungo) | CW307G | Aleaciones Cu-Al-Ni (viruta larga) | CW307G |
| 4.6 | Kupfer-Sonderlegierungen (bis Ampco 20) | CuAl10Fe3Mn2 | Special copper alloyed ≤ Ampco 20 | CA 105 | Alliages de cuivre spéciaux ≤ Q 18 | CuAl9Fe3Mn2 | Leghe Cu-Al-Fe ≤ Ampco 20 | CW306G | Aleaciones Cu-Al-Fe ≤ Ampco 20 | CW306G |
| 4.7 | Kupfer-Sonderlegierungen (ab Ampco 21) | CuAl13Fe4,5 | Special copper alloyed ≥ Ampco 21 | AMPCO 21 (Hbz.) | Alliages de cuivre spéciaux ≥ Q 18 | AMPCO 21 (Hbz.) | Leghe Cu-Al-Fe ≥ Ampco 21 | AMPCO 21 (Hbz.) | Aleaciones Cu-Al-Fe ≥ Ampco 21 | AMPCO 21 (Hbz.) |
| 5 | **Aluminium / Magnesium** | | **Aluminium / Magnesium** | | **Aluminium / Magnésium** | | **Alluminio / Magnesio** | | **Aluminio / Magnesio** | |
| 5.1 | Aluminium Si-Gehalt <0,5% | EN AW-Al99,0 | Alu wrought alloy Si <0,5% | 1B | Alu non alliés / alliages corroyés d'alu / Si <0,5 % | 1050A | Alu puro / leghe plastificabili d'alluminio Si <0,5% | 4507 | Alu puros | L-3051 |
| 5.2 | Aluminium Si-Gehalt <6% | EN AC-AlSi6Cu4 | Alu alloyed Si <6% | LM22 | Fontes d'alu <6 % Si | A-S5U3 | Alu legato Si <6% | G-Al5,5Cu | Alu aleado Si <6% | Al-6Si4Cu |
| 5.3 | Aluminium Si-Gehalt >6% | EN AC-AlSi10Mg(a) | Alu alloyed Si >6% | LM9 | Fontes d'alu >6 % Si | A-S10G | Alu legato Si >6% | G-AlSi9Mg | Alu aleado Si >6% | L-2560 |
| 5.4 | Magnesium und Magnesiumlegierungen | MgMn2 | Magnesium wrought alloy | MAG 101 | Alliages corroyés de magnésium | G-M2 | Leghe plastificabili di magnesio | AZ 81hp | Aleaciones forjables de magnesio | AZ 81hp |
| 6 | **Titan** | | **Titanium** | | **Titane** | | **Titanio** | | **Titanio** | |
| 6.1 | Titan unlegiert | Ti 99,7 | Titanium non-alloyed | TA.2 | Titane pur | T-40 | Titanio puro | Titanium Grade 2 (Hbz.) | Titanio puro | Ti-P02 |
| 6.2 | Titan legiert | TiAl6V4 | Titanium alloyed | TA.10 | Alliages de titane | T-A6V | Leghe di titanio | Titanium Grade 5 (Hbz.) | Titanio aleado | Ti-P63 |
| 6.3 | Titan legiert | TiAl6V4 | Titanium alloyed | TA.10 | Alliages de titane | T-A6V | Leghe di titanio | Titanium Grade 5 (Hbz.) | Titanio aleado | Ti-P63 |
| 7 | **Nickel** | | **Nickel** | | **Nickel** | | **Nickel** | | **Niquel** | |
| 7.1 | Nickel unlegiert | Ni 99,6 | Nickel non-alloyed | BS3072: NA11 | Nickel pur | Ni-0,1 | **Nickel** puro | Nickel 200 | Niquel puro | Nickel 200 |
| 7.2 | Nickel legiert | NiCu30Fe | Nickel alloyed | BS3072: NA13 | Alliages de nickel | Nu30 | Leghe di **nickel** | MONEL 400 (Hbz.) | Niquel aleado | MONEL 400 (Hbz.) |
| 7.3 | Nickel legiert | NiCr19NbMo | Nickel alloyed | INCONEL alloy718 | Alliages de nickel | NC 19 FeNb | Leghe di **nickel** | INCONEL 718 (Hbz.) | Niquel aleado | INCONEL 718 (Hbz.) |
| 8 | **Kunststoffe** | | **Synthetics** | | **Matières synthétiques** | | **Materie plastiche** | | **Sintéticos** | |
| 8.1 | Thermoplaste (langspanend) | Polystyrol | Thermoplastic (long chipping) | Styreme | Thermoplastiques (copeaux longs) | Polystyrène | Materiali termoplastici (truciolo lungo) | | Termoplásticos (viruta larga) | |
| 8.2 | Duroplaste (kurzspanend) | Toulnell | Duroplastic (short chipping) | Toufnell | Matières thermodurcissables (copeaux courts) | Touffnell | Materiali duroplastici (truciolo corto) | | Duroplásticos (viruta corta) | |
| 8.3 | faserverstärkte Kunststoffe | CFK | Fibre-reinforced plastic | Carbonfibre | Matières synthétiques renforcées par fibres | CFK | Materiali plastici filamente rinforzati | | Materiales plásticos reforzados | |
| 9 | **Sonderwerkstoffe** | | **Special materials** | | **Matières spéciaux** | | **Materiali speciali** | | **Materiales especiales** | |
| 9.1 | Kobalt Legierungen | Stellite 27 | Cobalt alloyed | | Alliages à base de cobalt | | Leghe a base di cobalto | | Aleaciones de base de cobalto | |
| 9.2 | Wolfram Legierungen | Densimet W | Tungsten alloyed | | Alliages de tungstène | | Leghe di tungsteno | | Tungsteno aleado | |
| 9.3 | Titancarbid Hartstoffe | Ferro Titanit | TIC-hard material | | Carbure de titane | | Carburo di titanio | | Materiales duros TIC | |
| 9.4 | Graphit | Graphit R8430 | Graphite | | Graphite | | Grafite | | Grafito | |

$$n = \frac{v_c * 1000}{\pi * d_1} \qquad v_c = \frac{n * \pi * d_1}{1000} \qquad v_{fA} = v_{fAA} = n * f_z * z$$

BASS TECHNIK FÜR GEWINDE

| | GFA N | | | | GFD N | | | GFM N | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | - | TICN | d < 8 | d > 8 | FNT | d < 8 | d > 8 | - | TICN | fz mm |
| | vc m/min | vc m/min | fz mm | | vc m/min | fz mm | | vc m/min | vc m/min | |
| N/mm² | | | | | | | | | | |
| | | | | | | | | | | |
| >100 <400 | 40 - 80 | 80 - 200 | 0,030 - 0,060 | 0,040 - 0,150 | 80 - 200 | 0,015 - 0,040 | 0,040 - 0,150 | 40 - 80 | 80 - 200 | 0,040 - 0,150 |
| >250 <710 | 40 - 80 | 80 - 200 | 0,015 - 0,060 | 0,040 - 0,150 | 80 - 200 | 0,010 - 0,040 | 0,040 - 0,150 | 40 - 80 | 80 - 200 | 0,040 - 0,150 |
| >400 <850 | 30 - 80 | 60 - 120 | 0,015 - 0,060 | 0,040 - 0,150 | 60 - 120 | 0,010 - 0,040 | 0,040 - 0,150 | 30 - 80 | 60 - 120 | 0,040 - 0,150 |
| >420 <850 | 30 - 80 | 60 - 120 | 0,015 - 0,060 | 0,040 - 0,150 | 60 - 120 | 0,010 - 0,040 | 0,040 - 0,150 | 30 - 80 | 60 - 120 | 0,040 - 0,150 |
| >850 >1200 | 20 - 60 | 40 - 120 | 0,010 - 0,060 | 0,040 - 0,100 | 40 - 120 | 0,005 - 0,040 | 0,040 - 0,100 | 20 - 60 | 40 - 120 | 0,040 - 0,120 |
| >1200 <1400 | 20 - 60 | 40 - 80 | 0,010 - 0,050 | 0,030 - 0,100 | 40 - 80 | 0,005 - 0,035 | 0,030 - 0,100 | 20 - 60 | 40 - 80 | 0,030 - 0,100 |
| >1400 <1600 | 20 - 40 | 30 - 60 | 0,010 - 0,020 | 0,015 - 0,080 | 30 - 60 | 0,005 - 0,015 | 0,015 - 0,080 | 20 - 40 | 30 - 60 | 0,015 - 0,100 |
| >49 <55 HRC | 20 - 40 | 30 - 60 | 0,010 - 0,020 | 0,015 - 0,080 | 30 - 60 | 0,005 - 0,015 | 0,015 - 0,080 | 20 - 40 | 30 - 60 | 0,015 - 0,080 |
| >55 <63 HRC | | | | | | | | | | |
| | | | | | | | | | | |
| >450 <1200 | 20 - 40 | 40 - 100 | 0,010 - 0,050 | 0,020 - 0,150 | 40 - 100 | 0,005 - 0,035 | 0,020 - 0,150 | 20 - 40 | 40 - 100 | 0,030 - 0,080 |
| >450 <850 | 20 - 40 | 30 - 60 | 0,010 - 0,050 | 0,020 - 0,150 | 30 - 60 | 0,005 - 0,035 | 0,020 - 0,150 | 20 - 40 | 30 - 60 | 0,030 - 0,080 |
| >850 <1550 | 20 - 40 | 40 - 80 | 0,010 - 0,040 | 0,020 - 0,100 | 40 - 80 | 0,005 - 0,030 | 0,020 - 0,100 | 20 - 40 | 40 - 80 | 0,030 - 0,080 |
| | | | | | | | | | | |
| >150 <1000 | 80 - 140 | 100 - 200 | 0,020 - 0,100 | 0,040 - 0,150 | 100 - 200 | 0,010 - 0,070 | 0,040 - 0,150 | 80 - 140 | 100 - 200 | 0,040 - 0,100 |
| >350 <1000 | 60 - 120 | 80 - 200 | 0,020 - 0,080 | 0,040 - 0,120 | 80 - 200 | 0,010 - 0,055 | 0,040 - 0,120 | 60 - 120 | 80 - 200 | 0,040 - 0,100 |
| >370 < 700 | 80 - 140 | 100 - 200 | 0,020 - 0,100 | 0,040 - 0,150 | 100 - 200 | 0,010 - 0,070 | 0,040 - 0,150 | 80 - 140 | 100 - 200 | 0,040 - 0,100 |
| >700 <1000 | 60 - 120 | 80 - 200 | 0,020 - 0,080 | 0,040 - 0,120 | 80 - 200 | 0,010 - 0,055 | 0,040 - 0,120 | 60 - 120 | 80 - 200 | 0,040 - 0,080 |
| | | | | | | | | | | |
| >250 <350 | 100 - 300 | 150 - 400 | 0,040 - 0,120 | 0,070 - 0,200 | 150 - 400 | 0,020 - 0,085 | 0,070 - 0,200 | 100 - 300 | 150 - 400 | 0,070 - 0,200 |
| >350 <700 | 100 - 300 | 150 - 400 | 0,040 - 0,120 | 0,070 - 0,200 | 150 - 400 | 0,020 - 0,085 | 0,070 - 0,200 | 100 - 300 | 150 - 400 | 0,070 - 0,200 |
| >350 <700 | 100 - 300 | 150 - 400 | 0,040 - 0,120 | 0,070 - 0,200 | 150 - 400 | 0,020 - 0,085 | 0,070 - 0,200 | 100 - 300 | 150 - 400 | 0,050 - 0,150 |
| >400 <850 | 60 - 120 | 100 - 250 | 0,020 - 0,060 | 0,030 - 0,120 | 100 - 250 | 0,010 - 0,040 | 0,030 - 0,120 | 60 - 120 | 100 - 250 | 0,050 - 0,150 |
| >400 <850 | 60 - 120 | 100 - 250 | 0,020 - 0,060 | 0,030 - 0,120 | 100 - 250 | 0,010 - 0,040 | 0,030 - 0,120 | 60 - 120 | 100 - 250 | 0,050 - 0,150 |
| >400 <700 | 60 - 80 | 60 - 120 | 0,020 - 0,060 | 0,030 - 0,120 | 60 - 120 | 0,010 - 0,040 | 0,030 - 0,120 | 60 - 80 | 60 - 120 | 0,050 - 0,150 |
| >700 <1500 | 60 - 80 | 60 - 120 | 0,010 - 0,040 | 0,020 - 0,100 | 60 - 120 | 0,005 - 0,030 | 0,020 - 0,100 | 60 - 80 | 60 - 120 | 0,020 - 0,080 |
| | | | | | | | | | | |
| >100 <500 | 100 - 300 | 150 - 400 | 0,030 - 0,120 | 0,070 - 0,200 | 150 - 400 | 0,015 - 0,085 | 0,070 - 0,200 | 100 - 300 | 150 - 400 | 0,070 - 0,200 |
| >160 <300 | 100 - 30 | 150 - 400 | 0,030 - 0,120 | 0,070 - 0,200 | 150 - 400 | 0,015 - 0,085 | 0,070 - 0,200 | 100 - 300 | 150 - 400 | 0,070 - 0,200 |
| >300 <600 | 100 - 300 | 150 - 400 | 0,030 - 0,120 | 0,070 - 0,200 | 150 - 400 | 0,015 - 0,085 | 0,070 - 0,200 | 100 - 300 | 150 - 400 | 0,070 - 0,200 |
| >120 <300 | 120 - 200 | 150 - 350 | 0,030 - 0,120 | 0,070 - 0,200 | 150 - 350 | 0,015 - 0,085 | 0,070 - 0,200 | 120 - 200 | 150 - 350 | 0,070 - 0,200 |
| | | | | | | | | | | |
| >250 <700 | 15 - 40 | 30 - 80 | 0,015 - 0,080 | 0,030 - 0,150 | 30 - 80 | 0,010 - 0,055 | 0,030 - 0,150 | 15 - 40 | 30 - 80 | 0,030 - 0,100 |
| >700 <900 | 15 - 40 | 30 - 80 | 0,015 - 0,080 | 0,030 - 0,150 | 30 - 80 | 0,010 - 0,055 | 0,030 - 0,150 | 15 - 40 | 30 - 80 | 0,030 - 0,080 |
| >900 <1400 | 15 - 40 | 30 - 60 | 0,015 - 0,060 | 0,030 - 0,120 | 30 - 60 | 0,010 - 0,040 | 0,030 - 0,120 | 15 - 40 | 30 - 60 | 0,030 - 0,080 |
| | | | | | | | | | | |
| >400 <600 | | 30 - 60 | 0,020 - 0,060 | 0,040 - 0,100 | 30 - 60 | 0,010 - 0,040 | 0,040 - 0,100 | | 30 - 60 | |
| >600 <1200 | | 30 - 60 | 0,020 - 0,060 | 0,040 - 0,100 | 30 - 60 | 0,010 - 0,040 | 0,040 - 0,100 | | 30 - 60 | |
| >1200 <1600 | | 30 - 40 | 0,015 - 0,050 | 0,030 - 0,080 | 30 - 40 | 0,010 - 0,035 | 0,030 - 0,080 | | 30 - 40 | |
| | | | | | | | | | | |
| <80 | 60 - 150 | 100 - 400 | 0,040 - 0,120 | 0,060 - 0,200 | 100 - 400 | 0,020 - 0,085 | 0,060 - 0,200 | 60 - 150 | 100 - 400 | 0,060 - 0,200 |
| <110 | 60 - 150 | 100 - 400 | 0,040 - 0,120 | 0,060 - 0,150 | 100 - 400 | 0,020 - 0,085 | 0,060 - 0,150 | 60 - 150 | 100 - 400 | 0,060 - 0,200 |
| >80 <1500 | | 60 - 100 | 0,040 - 0,120 | 0,060 - 0,150 | 60 - 100 | 0,020 - 0,085 | 0,060 - 0,150 | | 60 - 100 | 0,060 - 0,150 |
| | | | | | | | | | | |
| >500 <1200 | | | 0,020 - 0,060 | 0,040 - 0,100 | | | | | | 0,020 - 0,080 |
| >1400 <1800 | | | 0,010 - 0,020 | 0,015 - 0,080 | | | | | | 0,015 - 0,060 |
| >1500 <1700 | | | 0,010 - 0,020 | 0,015 - 0,080 | | | | | | 0,015 - 0,060 |
| <100 | | | | | | | | | | |

Beschichtung / coating / revêtement / rivestimento / recubrimiento

| | Einsatzgebiet | Werkstoff-beispiele | Application | Examples of materials | Application | Exemples de matières | Impieghi | Designazione dei materiali | Aplicaión | Ejemplo de materiales |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **Stahlwerkstoffe** | | **Steel materials** | | **Aciers** | | **Acciai** | | **Aceros** | |
| 1.1 | Baustahl unleg. / Weicheisen | DC01 | Magnetic soft steel | FeP01 | Fer doux magnétique | C | Ferro magnetico dolce | DC01 | Acero magnético suave | DC01 |
| 1.2 | Baustahl / Einsatzstahl | S235JR | Construction steel / case hardening steel | En40B | Aciers de construction et de cémentation | S235JRG2 | Acciaio da costruzione e da cementazione | Fe360B-FN | Acero de construcción / acero de cementación | A360B-NE |
| 1.3 | Bau- / Kohlenstoffstahl C<0,45% / Stahl niedrigleg. | C45 | Carbon steel | 080M46 | Aciers au carbone | AF65 | Acciaio al carbonio | C45 | Acero al carbono | C45 |
| 1.4 | Kohlenstoffstahl C>0,45% / Stahl niedrigleg. / Stahl hochleg. | 42CrMo4 | Alloyed / heat-treatable steel | En19A | Aciers alliés / aciers pour traitement thermique | 42CD4 | Acciaio legato / bonificato | G40CrMo4 | Acero aleado | 40CrMo4 |
| 1.5 | Stahl legiert / hochlegiert | X153CrMoV12 | Alloyed steel | BD2 | Aciers alliés | Z160CDV12 | Acciaio legato | X155CrVMo12-1KU | Acero aleado templado y revenido | X153CrMoV12 |
| 1.6 | Stahl legiert / hochlegiert | 42CrMo4 | Alloyed steel | En19A | Aciers alliés | 42CD4 | Acciaio legato | G40CrMo4 | Acero aleado templado y revenido | 40CrMo4 |
| 1.7 | Stahl legiert / hochlegiert | 56Si7 | Alloyed steel | 251A58 | Aciers alliés | 55S7 | Acciaio legato | 56Si7 | Acero aleado templado y revenido | 56Si7 (F.144) |
| 1.8 | Stahl gehärtet | 34CrMo4 | Hardened steel | 708A30 | Aciers trempés | 34CD4 | Acciaio temprato | 35CrMo4F | Acero endurecido | 34CrMo4 |
| 1.9 | Stahl gehärtet | X100CrMoV5 | Hardened steel | BA2 | Aciers trempés | Z100CDV5 | Acciaio temprato | X100CrMoV5-1KU | Acero endurecido | X100CrMoV5 |
| 2 | **Rostfreier Stahl** | | **Stainless steel** | | **Aciers inoxydables** | | **Acciai inossidabili** | | **Acero inoxidable** | |
| 2.1 | Stahl-ferritische und martensitisch | X30Cr13 | Ferritic / martensitic steel | 420S37 | Aciers ferritiques, martensitiques | Z30C13 | Acciai ferritici / martensiti | X31Cr13KU | Acero ferritico, martensitico | X30Cr13 |
| 2.2 | Stahl-austenitisch, aust.-ferritisch | X6CrNiMo-Ti17-12-2 | Austenitic steel | 320S18 | Aciers austénitiques | Z6CNDT17-12 | Acciai austenitici | X6CrNiMo-Ti17-12-2 | Austenitico | X6CrNiMo-Ti17-12-2 |
| 2.3 | Stahl-austenitisch, aust.-ferritisch u. ferritisch | X7CrNiAl17-7 | High temperature steel | 301S81 | Aciers réfractaires | Z9CNA17-07 | Acciai termostabili | X7CrNiAl17-7 | Aleac. Cr-Ni resist. a elevadas temperaturas | X7CrNiAl17-7 |
| 3 | **Gusseisen** | | **Cast iron** | | **Fontes** | | **Ghisa** | | **Fundición gris** | |
| 3.1 | Grauguss-lamellar | EN-GJL-200 | Grey cast iron | EN-GJL-200 | Fonte grise | EN-GJL-200 | Ghisa grigia | EN-GJL-200 | Fundición gris | EN-GJL-200 |
| 3.2 | Kugelgraphitguss | EN-GJS-400-15U | Cast iron with nodular graphite | Grade420/12 | Fonte à graphite sphéroïdal | FGS400-15 | Ghisa sferoidale | GS400-12 | Fundición esferoide | EN-GJS-400-15U |
| 3.3 | Temperguss weiß / schwarz | EN-GJMB-350-10 | Malleable cast iron | EN-GJMB-350-10 | Fonte malléable | EN-GJMB-350-10 | Ghisa temprata | EN-GJMB-350-10 | Fundición maleable, nodular | EN-GJMB-350-10 |
| 3.4 | Vermikularguss / ADI / Hartguss | EN-GJV-300 | Cast iron with vermicular graphite | EN-GJV-300 | Fonte vermiculaire | EN-GJV-300 | Ghisa vermiculare | EN-GJV-300 | Fundición gris compactada | EN-GJV-300 |
| 4 | **Kupfer** | | **Copper** | | **Cuivre** | | **Rame** | | **Cobre** | |
| 4.1 | Reinkupfer | Cu-ETP | Copper non-alloyed | Cu-ETP-2 C 101 | Cuivre pur / électrolytique | Cu-a1 | Rame puro / elettrolitico | Cu-ETP | Cobre puro | Cu-ETP |
| 4.2 | Kupfer-Legierungen (kurzspanend) | CuZn39Pb2 | Brass (short chipping) | CZ 120 | Alliages de cuivre (copeaux courts) | CuZn40Pb2 | Ottone (truciolo corto) | CuZn39Pb2 | Latón (viruta corta) | CuZn39Pb2 |
| 4.3 | Kupfer-Legierungen (langspanend) | CuZn37 | Brass (long chipping) | CZ 108 | Alliages de cuivre (copeaux longs) | CuZn37 | Ottone (truciolo lungo) | P-CuZn37 | Latón (viruta larga) | CuZn37 |
| 4.4 | Cu-Al-Ni-Legierungen (kurzspanend) | CuNi10Fe1Mn | Copper-alu-nickel alloyed (short chipping) | CN 102 | Alliages Cu-Al-Ni (copeaux courts) | CW352H | Leghe di Cu-Al-Ni (truciolo corto) | CW352H | Aleaciones Cu-Al-Ni (viruta corta) | CW352H |
| 4.5 | Cu-Al-Ni-Legierungen (langspanend) | CuAl10NiFe4 | Copper-alu-nickel alloyed (long chipping) | CA 104 | Alliages Cu-Al-Ni (copeaux longs) | CuAl9Ni-5Fe3Mn | Leghe di Cu-Al-Ni (truciolo lungo) | CW307G | Aleaciones Cu-Al-Ni (viruta larga) | CW307G |
| 4.6 | Kupfer-Sonderlegierungen (bis Ampco 20) | CuAl10Fe3Mn2 | Special copper alloyed ≤ Ampco 20 | CA 105 | Alliages de cuivre spéciaux ≤ Q 18 | CuAl9Fe3Mn2 | Leghe Cu-Al-Fe ≤ Ampco 20 | CW306G | Aleaciones Cu-Al-Fe ≤ Ampco 20 | CW306G |
| 4.7 | Kupfer-Sonderlegierungen (ab Ampco 21) | CuAl13Fe4,5 | Special copper alloyed ≥ Ampco 21 | AMPCO 21 (Hbz.) | Alliages de cuivre spéciaux ≥ Q 18 | AMPCO 21 (Hbz.) | Leghe Cu-Al-Fe ≥ Ampco 21 | AMPCO 21 (Hbz.) | Aleaciones Cu-Al-Fe ≥ Ampco 21 | AMPCO 21 (Hbz.) |
| 5 | **Aluminium / Magnesium** | | **Aluminium / Magnesium** | | **Aluminium / Magnésium** | | **Alluminio / Magnesio** | | **Aluminio / Magnesio** | |
| 5.1 | Aluminium Si-Gehalt <0,5% | EN AW-Al99,0 | Alu wrought alloy Si <0,5% | 1B | Alu non alliés / alliages corroyés d'alu / Si <0,5 % | 1050A | Alu puro / leghe plastificabili d'alluminio Si <0,5% | 4507 | Alu puros | L-3051 |
| 5.2 | Aluminium Si-Gehalt <6% | EN AC-AlSi6Cu4 | Alu alloyed Si <6% | LM22 | Fontes d'alu <6 % Si | A-S5U3 | Alu legato Si <6% | G-Al5,5Cu | Alu aleado Si <6% | Al-6Si4Cu |
| 5.3 | Aluminium Si-Gehalt >6% | EN AC-AlSi10Mg(a) | Alu alloyed Si >6% | LM9 | Fontes d'alu >6 % Si | A-S10G | Alu legato Si >6% | G-AlSi9Mg | Alu aleado Si >6% | L-2560 |
| 5.4 | Magnesium und Magnesiumlegierungen | MgMn2 | Magnesium wrought alloy | MAG 101 | Alliages corroyés de magnésium | G-M2 | Leghe plastificabili di magnesio | AZ 81hp | Aleaciones forjables de magnesio | AZ 81hp |
| 6 | **Titan** | | **Titanium** | | **Titane** | | **Titanio** | | **Titanio** | |
| 6.1 | Titan unlegiert | Ti 99,7 | Titanium non-alloyed | TA.2 | Titane pur | T-40 | Titanio puro | Titanium Grade 2 (Hbz.) | Titanio puro | Ti-P02 |
| 6.2 | Titan legiert | TiAl6V4 | Titanium alloyed | TA.10 | Alliages de titane | T-A6V | Leghe di titanio | Titanium Grade 5 (Hbz.) | Titanio aleado | Ti-P63 |
| 6.3 | Titan legiert | TiAl6V4 | Titanium alloyed | TA.10 | Alliages de titane | T-A6V | Leghe di titanio | Titanium Grade 5 (Hbz.) | Titanio aleado | Ti-P63 |
| 7 | **Nickel** | | **Nickel** | | **Nickel** | | **Nickel** | | **Niquel** | |
| 7.1 | Nickel unlegiert | Ni 99,6 | Nickel non-alloyed | BS3072: NA11 | Nickel pur | Ni-0,1 | Nickel puro | Nickel 200 | Niquel puro | Nickel 200 |
| 7.2 | Nickel legiert | NiCu30Fe | Nickel alloyed | BS3072: NA13 | Alliages de nickel | Nu30 | Leghe di nickel | MONEL 400 (Hbz.) | Niquel aleado | MONEL 400 (Hbz.) |
| 7.3 | Nickel legiert | NiCr19NbMo | Nickel alloyed | INCONEL alloy718 | Alliages de nickel | NC 19 FeNb | Leghe di nickel | INCONEL 718 (Hbz.) | Niquel aleado | INCONEL 718 (Hbz.) |
| 8 | **Kunststoffe** | | **Synthetics** | | **Matières synthétiques** | | **Materie plastiche** | | **Sintéticos** | |
| 8.1 | Thermoplaste (langspanend) | Polystyrol | Thermoplastic (long chipping) | Styreme | Thermoplastiques (copeaux longs) | Polystyrène | Materiali termoplastici (truciolo lungo) | | Termoplásticos (viruta larga) | |
| 8.2 | Duroplaste (kurzspanend) | Toulnell | Duroplastic (short chipping) | Toufnell | Matières thermodurcissables (copeaux courts) | Touffnell | Materiali duroplastici (truciolo corto) | | Duroplásticos (viruta corta) | |
| 8.3 | faserverstärkte Kunststoffe | CFK | Fibre-reinforced plastic | Carbonfibre | Matières synthétiques renforcées par fibres | CFK | Materiali plastici filamente rinforzati | | Materiales plásticos reforzados | |
| 9 | **Sonderwerkstoffe** | | **Special materials** | | **Matières spéciaux** | | **Materiali speciali** | | **Materiales especiales** | |
| 9.1 | Kobalt Legierungen | Stellite 27 | Cobalt alloyed | | Alliages à base de cobalt | | Leghe a base di cobalto | | Aleaciones de base de cobalto | |
| 9.2 | Wolfram Legierungen | Densimet W | Tungsten alloyed | | Alliages de tungstène | | Leghe di tungsteno | | Tungsteno aleado | |
| 9.3 | Titancarbid Hartstoffe | Ferro Titanit | TIC-hard material | | Carbure de titane | | Carburo di titanio | | Materiales duros TIC | |
| 9.4 | Graphit | Graphit R8430 | Graphite | | Graphite | | Grafite | | Grafito | |

| | GFS N | | | | GFS TIH | | |
|---|---|---|---|---|---|---|---|
| | - | TICN | <8 | >8 | TICN | d < 8 | d > 8 |
| | vc m/min | vc m/min | fz mm | | vc m/min | fz mm | |
| N/mm² | | | | | | | |
| | | | | | | | |
| >100 <400 | 40 - 80 | 80 - 200 | 0,030 - 0,060 | 0,040 - 0,150 | | | |
| >250 <710 | 40 - 80 | 80 - 200 | 0,015 - 0,060 | 0,040 - 0,150 | 80 - 250 | 0,015 - 0,060 | 0,040 - 0,150 |
| >400 <850 | 30 - 80 | 60 - 120 | 0,015 - 0,060 | 0,040 - 0,150 | 60 - 120 | 0,015 - 0,060 | 0,040 - 0,150 |
| >420 <850 | 30 - 80 | 60 - 120 | 0,015 - 0,060 | 0,040 - 0,150 | 60 - 120 | 0,015 - 0,060 | 0,040 - 0,150 |
| >850 >1200 | 20 - 60 | 40 - 120 | 0,010 - 0,060 | 0,040 - 0,100 | 40 - 120 | 0,010 - 0,060 | 0,040 - 0,100 |
| >1200 <1400 | 20 - 60 | 40 - 80 | 0,010 - 0,050 | 0,030 - 0,100 | 40 - 80 | 0,010 - 0,050 | 0,030 - 0,100 |
| >1400 <1600 | 20 - 40 | 30 - 60 | 0,010 - 0,020 | 0,015 - 0,080 | 30 - 60 | 0,010 - 0,020 | 0,015 - 0,080 |
| >49 <55 HRC | 20 - 40 | 30 - 60 | 0,010 - 0,020 | 0,015 - 0,080 | 30 - 60 | 0,010 - 0,020 | 0,015 - 0,080 |
| >55 <63 HRC | | | | | 20 - 40* | 0,003 - 0,005* | 0,005 - 0,010* |
| | | | | | | | |
| >450 <1200 | 20 - 40 | 40 - 100 | 0,010 - 0,050 | 0,020 - 0,150 | | | |
| >450 <850 | 20 - 40 | 30 - 60 | 0,010 - 0,050 | 0,020 - 0,150 | | | |
| >850 <1550 | 20 - 40 | 40 - 80 | 0,010 - 0,040 | 0,020 - 0,100 | 40 - 80 | 0,010 - 0,040 | 0,020 - 0,100 |
| | | | | | | | |
| >150 <1000 | 80 - 140 | 100 - 200 | 0,020 - 0,100 | 0,040 - 0,150 | 100 - 200 | 0,020 - 0,100 | 0,040 - 0,150 |
| >350 <1000 | 60 - 120 | 80 - 200 | 0,020 - 0,080 | 0,040 - 0,120 | 80 - 200 | 0,020 - 0,080 | 0,040 - 0,120 |
| >370 < 700 | 80 - 140 | 100 - 200 | 0,020 - 0,100 | 0,040 - 0,150 | 100 - 200 | 0,020 - 0,100 | 0,040 - 0,150 |
| >700 <1000 | 60 - 120 | 80 - 200 | 0,020 - 0,080 | 0,040 - 0,120 | 80 - 200 | 0,020 - 0,080 | 0,040 - 0,120 |
| | | | | | | | |
| >250 <350 | 100 - 300 | 150 - 400 | 0,040 - 0,120 | 0,070 - 0,200 | | | |
| >350 <700 | 100 - 300 | 150 - 400 | 0,040 - 0,120 | 0,070 - 0,200 | | | |
| >350 <700 | 100 - 300 | 150 - 400 | 0,040 - 0,120 | 0,070 - 0,200 | | | |
| >400 <850 | 60 - 120 | 100 - 250 | 0,020 - 0,060 | 0,030 - 0,120 | | | |
| >400 <850 | 60 - 120 | 100 - 250 | 0,020 - 0,060 | 0,030 - 0,120 | 60 - 80 | 0,020 - 0,060 | 0,030 - 0,120 |
| >400 <700 | 60 - 80 | 60 - 120 | 0,020 - 0,060 | 0,030 - 0,120 | 60 - 80 | 0,020 - 0,060 | 0,030 - 0,120 |
| >700 <1500 | 60 - 80 | 60 - 120 | 0,010 - 0,040 | 0,020 - 0,100 | 60 - 80 | 0,010 - 0,040 | 0,020 - 0,100 |
| | | | | | | | |
| >100 <500 | 100 - 300 | 150 - 400 | 0,030 - 0,120 | 0,070 - 0,200 | | | |
| >160 <300 | 100 - 30 | 150 - 400 | 0,030 - 0,120 | 0,070 - 0,200 | | | |
| >300 <600 | 100 - 300 | 150 - 400 | 0,030 - 0,120 | 0,070 - 0,200 | 100 - 400 | 0,030 - 0,120 | 0,070 - 0,200 |
| >120 <300 | 120 - 200 | 150 - 350 | 0,030 - 0,120 | 0,070 - 0,200 | | | |
| | | | | | | | |
| >250 <700 | 15 - 40 | 30 - 80 | 0,015 - 0,080 | 0,030 - 0,150 | | | |
| >700 <900 | 15 - 40 | 30 - 80 | 0,015 - 0,080 | 0,030 - 0,150 | | | |
| >900 <1400 | 15 - 40 | 30 - 60 | 0,015 - 0,060 | 0,030 - 0,120 | | | |
| | | | | | | | |
| >400 <600 | | 30 - 60 | 0,020 - 0,060 | 0,040 - 0,100 | 30 - 80 | 0,020 - 0,060 | 0,040 - 0,100 |
| >600 <1200 | | 30 - 60 | 0,020 - 0,060 | 0,040 - 0,100 | 30 - 60 | 0,020 - 0,060 | 0,040 - 0,100 |
| >1200 <1600 | | 30 - 40 | 0,015 - 0,050 | 0,030 - 0,080 | 10 - 30 | 0,015 - 0,050 | 0,030 - 0,080 |
| | | | | | | | |
| <80 | 60 - 150 | 100 - 400 | 0,040 - 0,120 | 0,060 - 0,200 | | | |
| <110 | 60 - 150 | 100 - 400 | 0,040 - 0,120 | 0,060 - 0,150 | | | |
| >80 <1500 | | 60 - 100 | 0,040 - 0,120 | 0,060 - 0,150 | | | |
| | | | | | | | |
| >500 <1200 | | | 0,020 - 0,060 | 0,040 - 0,100 | 30 - 50 | 0,020 - 0,060 | 0,040 - 0,100 |
| >1400 <1800 | | | 0,010 - 0,020 | 0,015 - 0,080 | 20 - 40 | 0,010 - 0,020 | 0,015 - 0,080 |
| >1500 <1700 | | | 0,010 - 0,020 | 0,015 - 0,080 | 20 - 40 | 0,010 - 0,020 | 0,015 - 0,080 |
| <100 | | | | | | | |

Gewindefräsen über 60 HRC bedingt möglich
thread milling > HRC 60 with reservations
réalisation de filetages avec fraises > 60 HRC sous réserve
fresatura di filetti sopra 60 HRC è solo possibile sotto riserva
fresado de roscas > 60 HRC bajo reserva

$$n = \frac{v_c * 1000}{\pi * d_1}$$

$$v_c = \frac{n * \pi * d_1}{1000}$$

$$v_{fA} = v_{fAA} = n * f_z * z$$

Beschichtung / coating / revêtement / rivestimento / recubrimiento

| | Einsatzgebiet | Werkstoff-beispiele | Application | Examples of materials | Application | Exemples de matières | Impieghi | Designazione dei materiali | Aplicaión | Ejemplo de materiales |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **Stahlwerkstoffe** | | **Steel materials** | | **Aciers** | | **Acciai** | | **Aceros** | |
| 1.1 | Baustahl unleg. / Weicheisen | DC01 | Magnetic soft steel | FeP01 | Fer doux magnétique | C | Ferro magnetico dolce | DC01 | Acero magnético suave | DC01 |
| 1.2 | Baustahl / Einsatzstahl | S235JR | Construction steel / case hardening steel | En40B | Aciers de construction et de cémentation | S235JRG2 | Acciaio da costruzione e da cementazione | Fe360B-FN | Acero de construcción / acero de cementación | A360B-NE |
| 1.3 | Bau- / Kohlenstoffstahl C<0,45% / Stahl niedrigleg. | C45 | Carbon steel | 080M46 | Aciers au carbone | AF65 | Acciaio al carbonio | C45 | Acero al carbono | C45 |
| 1.4 | Kohlenstoffstahl C>0,45% / Stahl niedrigleg. / Stahl hochleg. | 42CrMo4 | Alloyed / heat-treatable steel | En19A | Aciers alliés / aciers pour traitement thermique | 42CD4 | Acciaio legato / bonificato | G40CrMo4 | Acero aleado | 40CrMo4 |
| 1.5 | Stahl legiert / hochlegiert | X153CrMoV12 | Alloyed steel | BD2 | Aciers alliés | Z160CDV12 | Acciaio legato | X155CrVMo12-1KU | Acero aleado templado y revenido | X153CrMoV12 |
| 1.6 | Stahl legiert / hochlegiert | 42CrMo4 | Alloyed steel | En19A | Aciers alliés | 42CD4 | Acciaio legato | G40CrMo4 | Acero aleado templado y revenido | 40CrMo4 |
| 1.7 | Stahl legiert / hochlegiert | 56Si7 | Alloyed steel | 251A58 | Aciers alliés | 55S7 | Acciaio legato | 56Si7 | Acero aleado templado y revenido | 56Si7 (F.144) |
| 1.8 | Stahl gehärtet | 34CrMo4 | Hardened steel | 708A30 | Aciers trempés | 34CD4 | Acciaio temprato | 35CrMo4F | Acero endurecido | 34CrMo4 |
| 1.9 | Stahl gehärtet | X100CrMoV5 | Hardened steel | BA2 | Aciers trempés | Z100CDV5 | Acciaio temprato | X100CrMoV5-1KU | Acero endurecido | X100CrMoV5 |
| 2 | **Rostfreier Stahl** | | **Stainless steel** | | **Aciers inoxydables** | | **Acciai inossidabili** | | **Acero inoxidable** | |
| 2.1 | Stahl-ferritische und martensitisch | X30Cr13 | Ferritic / martensitic steel | 420S37 | Aciers ferritiques, martensitiques | Z30C13 | Acciai ferritici / martensiti | X31Cr13KU | Acero ferritico, martensitico | X30Cr13 |
| 2.2 | Stahl-austenitisch, aust.-ferritisch | X6CrNiMo-Ti17-12-2 | Austenitic steel | 320S18 | Aciers austénitiques | Z6CNDT17-12 | Acciai austenitici | X6CrNiMo-Ti17-12-2 | Austenitico | X6CrNiMo-Ti17-12-2 |
| 2.3 | Stahl-austenitisch, aust.-ferritisch u. ferritisch | X7CrNiAl17-7 | High temperature steel | 301S81 | Aciers réfractaires | Z9CNA17-07 | Acciai termostabili | X7CrNiAl17-7 | Aleac. Cr-Ni resist. a elevadas temperaturas | X7CrNiAl17-7 |
| 3 | **Gusseisen** | | **Cast iron** | | **Fontes** | | **Ghisa** | | **Fundición gris** | |
| 3.1 | Grauguss-lamellar | EN-GJL-200 | Grey cast iron | EN-GJL-200 | Fonte grise | EN-GJL-200 | Ghisa grigia | EN-GJL-200 | Fundición gris | EN-GJL-200 |
| 3.2 | Kugelgraphitguss | EN-GJS-400-15U | Cast iron with nodular graphite | Grade420/12 | Fonte à graphite sphéroïdal | FGS400-15 | Ghisa sferoidale | GS400-12 | Fundición esferoide | EN-GJS-400-15U |
| 3.3 | Temperguss weiß / schwarz | EN-GJMB-350-10 | Malleable cast iron | EN-GJMB-350-10 | Fonte malléable | EN-GJMB-350-10 | Ghisa temprata | EN-GJMB-350-10 | Fundición maleable, nodular | EN-GJMB-350-10 |
| 3.4 | Vermikularguss / ADI / Hartguss | EN-GJV-300 | Cast iron with vermicular graphite | EN-GJV-300 | Fonte vermiculaire | EN-GJV-300 | Ghisa vermiculare | EN-GJV-300 | Fundición gris compactada | EN-GJV-300 |
| 4 | **Kupfer** | | **Copper** | | **Cuivre** | | **Rame** | | **Cobre** | |
| 4.1 | Reinkupfer | Cu-ETP | Copper non-alloyed | Cu-ETP-2 C 101 | Cuivre pur / électrolytique | Cu-a1 | Rame puro / elettrolitico | Cu-ETP | Cobre puro | Cu-ETP |
| 4.2 | Kupfer-Legierungen (kurzspanend) | CuZn39Pb2 | Brass (short chipping) | CZ 120 | Alliages de cuivre (copeaux courts) | CuZn40Pb2 | Ottone (truciolo corto) | CuZn39Pb2 | Latón (viruta corta) | CuZn39Pb2 |
| 4.3 | Kupfer-Legierungen (langspanend) | CuZn37 | Brass (long chipping) | CZ 108 | Alliages de cuivre (copeaux longs) | CuZn37 | Ottone (truciolo lungo) | P-CuZn37 | Latón (viruta larga) | CuZn37 |
| 4.4 | Cu-Al-Ni-Legierungen (kurzspanend) | CuNi10Fe1Mn | Copper-alu-nickel alloyed (short chipping) | CN 102 | Alliages Cu-Al-Ni (copeaux courts) | CW352H | Leghe di Cu-Al-Ni (truciolo corto) | CW352H | Aleaciones Cu-Al-Ni (viruta corta) | CW352H |
| 4.5 | Cu-Al-Ni-Legierungen (langspanend) | CuAl10NiFe4 | Copper-alu-nickel alloyed (long chipping) | CA 104 | Alliages Cu-Al-Ni (copeaux longs) | CuAl9Ni-5Fe3Mn | Leghe di Cu-Al-Ni (truciolo lungo) | CW307G | Aleaciones Cu-Al-Ni (viruta larga) | CW307G |
| 4.6 | Kupfer-Sonderlegierungen (bis Ampco 20) | CuAl10Fe3Mn2 | Special copper alloyed ≤ Ampco 20 | CA 105 | Alliages de cuivre spéciaux ≤ Q 18 | CuAl9Fe3Mn2 | Leghe Cu-Al-Fe ≤ Ampco 20 | CW306G | Aleaciones Cu-Al-Fe ≤ Ampco 20 | CW306G |
| 4.7 | Kupfer-Sonderlegierungen (ab Ampco 21) | CuAl13Fe4,5 | Special copper alloyed ≥ Ampco 21 | AMPCO 21 (Hbz.) | Alliages de cuivre spéciaux ≥ Q 18 | AMPCO 21 (Hbz.) | Leghe Cu-Al-Fe ≥ Ampco 21 | AMPCO 21 (Hbz.) | Aleaciones Cu-Al-Fe ≥ Ampco 21 | AMPCO 21 (Hbz.) |
| 5 | **Aluminium / Magnesium** | | **Aluminium / Magnesium** | | **Aluminium / Magnésium** | | **Alluminio / Magnesio** | | **Aluminio / Magnesio** | |
| 5.1 | Aluminium Si-Gehalt <0,5% | EN AW-Al99,0 | Alu wrought alloy Si <0,5% | 1B | Alu non alliés / alliages corroyés d'alu / Si <0,5 % | 1050A | Alu puro / leghe plastificabili d'alluminio Si <0,5% | 4507 | Alu puros | L-3051 |
| 5.2 | Aluminium Si-Gehalt <6% | EN AC-AlSi6Cu4 | Alu alloyed Si <6% | LM22 | Fontes d'alu <6 % Si | A-S5U3 | Alu legato Si <6% | G-Al5,5Cu | Alu aleado Si <6% | Al-6Si4Cu |
| 5.3 | Aluminium Si-Gehalt >6% | EN AC-AlSi10Mg(a) | Alu alloyed Si >6% | LM9 | Fontes d'alu >6 % Si | A-S10G | Alu legato Si >6% | G-AlSi9Mg | Alu aleado Si >6% | L-2560 |
| 5.4 | Magnesium und Magnesiumlegierungen | MgMn2 | Magnesium wrought alloy | MAG 101 | Alliages corroyés de magnésium | G-M2 | Leghe plastificabili di magnesio | AZ 81hp | Aleaciones forjables de magnesio | AZ 81hp |
| 6 | **Titan** | | **Titanium** | | **Titane** | | **Titanio** | | **Titanio** | |
| 6.1 | Titan unlegiert | Ti 99,7 | Titanium non-alloyed | TA.2 | Titane pur | T-40 | Titanio puro | Titanium Grade 2 (Hbz.) | Titanio puro | Ti-P02 |
| 6.2 | Titan legiert | TiAl6V4 | Titanium alloyed | TA.10 | Alliages de titane | T-A6V | Leghe di titanio | Titanium Grade 5 (Hbz.) | Titanio aleado | Ti-P63 |
| 6.3 | Titan legiert | TiAl6V4 | Titanium alloyed | TA.10 | Alliages de titane | T-A6V | Leghe di titanio | Titanium Grade 5 (Hbz.) | Titanio aleado | Ti-P63 |
| 7 | **Nickel** | | **Nickel** | | **Nickel** | | **Nickel** | | **Niquel** | |
| 7.1 | Nickel unlegiert | Ni 99,6 | Nickel non-alloyed | BS3072: NA11 | Nickel pur | Ni-0,1 | Nickel puro | Nickel 200 | Niquel puro | Nickel 200 |
| 7.2 | Nickel legiert | NiCu30Fe | Nickel alloyed | BS3072: NA13 | Alliages de nickel | Nu30 | Leghe di nickel | MONEL 400 (Hbz.) | Niquel aleado | MONEL 400 (Hbz.) |
| 7.3 | Nickel legiert | NiCr19NbMo | Nickel alloyed | INCONEL alloy718 | Alliages de nickel | NC 19 FeNb | Leghe di nickel | INCONEL 718 (Hbz.) | Niquel aleado | INCONEL 718 (Hbz.) |
| 8 | **Kunststoffe** | | **Synthetics** | | **Matières synthétiques** | | **Materie plastiche** | | **Sintéticos** | |
| 8.1 | Thermoplaste (langspanend) | Polystyrol | Thermoplastic (long chipping) | Styreme | Thermoplastiques (copeaux longs) | Polystyrène | Materiali termoplastici (truciolo lungo) | | Termoplásticos (viruta larga) | |
| 8.2 | Duroplaste (kurzspanend) | Toulnell | Duroplastic (short chipping) | Toufnell | Matières thermodurcissables (copeaux courts) | Touffnell | Materiali duroplastici (truciolo corto) | | Duroplásticos (viruta corta) | |
| 8.3 | faserverstärkte Kunststoffe | CFK | Fibre-reinforced plastic | Carbonfibre | Matières synthétiques renforcées par fibres | CFK | Materiali plastici filamente rinforzati | | Materiales plásticos reforzados | |
| 9 | **Sonderwerkstoffe** | | **Special materials** | | **Matières spéciaux** | | **Materiali speciali** | | **Materiales especiales** | |
| 9.1 | Kobalt Legierungen | Stellite 27 | Cobalt alloyed | | Alliages à base de cobalt | | Leghe a base di cobalto | | Aleaciones de base de cobalto | |
| 9.2 | Wolfram Legierungen | Densimet W | Tungsten alloyed | | Alliages de tungstène | | Leghe di tungsteno | | Tungsteno aleado | |
| 9.3 | Titancarbid Hartstoffe | Ferro Titanit | TIC-hard material | | Carbure de titane | | Carburo di titanio | | Materiales duros TIC | |
| 9.4 | Graphit | Graphit R8430 | Graphite | | Graphite | | Grafite | | Grafito | |

| | BGF W | | | | | |
|---|---|---|---|---|---|---|
| | | | d < 8 | | d > 8 | |
| | - | FNT | fb mm/U | fz mm | fb mm/U | fz mm |
| | vc m/min | vc m/min | fz mm | | | |
| N/mm² | | | | | | |
| | | | | | | |
| >100 <400 | | | | | | |
| >250 <710 | | | | | | |
| >400 <850 | | | | | | |
| >420 <850 | | | | | | |
| >850 >1200 | | | | | | |
| >1200 <1400 | | | | | | |
| >1400 <1600 | | | | | | |
| >49 <55 HRC | | | | | | |
| >55 <63 HRC | | | | | | |
| | | | | | | |
| >450 <1200 | | | | | | |
| >450 <850 | | | | | | |
| >850 <1550 | | | | | | |
| | | | | | | |
| >150 <1000 | 80 - 120 | 100 - 200 | 0,100 - 0,150 | 0,020 - 0,050 | 0,150 - 0,220 | 0,050 - 0,100 |
| >350 <1000 | 80 - 120 | 100 - 200 | 0,100 - 0,150 | 0,020 - 0,050 | 0,150 - 0,220 | 0,050 - 0,100 |
| >370 < 700 | 80 - 120 | 100 - 200 | 0,100 - 0,150 | 0,020 - 0,050 | 0,150 - 0,220 | 0,050 - 0,100 |
| >700 <1000 | 50 - 80 | 80 - 120 | 0,070 - 0,120 | 0,015 - 0,040 | 0,120 - 0,200 | 0,040 - 0,080 |
| | | | | | | |
| >250 <350 | | | | | | |
| >350 <700 | 100 - 300 | | 0,060 - 0,100 | 0,030 - 0,060 | 0,100 - 0,300 | 0,060 - 0,100 |
| >350 <700 | | | | | | |
| >400 <850 | | | | | | |
| >400 <850 | | | | | | |
| >400 <700 | | | | | | |
| >700 <1500 | | | | | | |
| | | | | | | |
| >100 <500 | 100 - 300 | 150 - 400 | 0,100 - 0,250 | 0,030 - 0,060 | 0,250 - 0,300 | 0,060 - 0,100 |
| >160 <300 | 100 - 300 | 150 - 400 | 0,100 - 0,250 | 0,030 - 0,060 | 0,250 - 0,300 | 0,060 - 0,100 |
| >300 <600 | 100 - 300 | 150 - 400 | 0,100 - 0,250 | 0,030 - 0,060 | 0,250 - 0,300 | 0,060 - 0,100 |
| >120 <300 | 100 - 200 | 100 - 250 | 0,100 - 0,250 | 0,030 - 0,060 | 0,250 - 0,300 | 0,060 - 0,100 |
| | | | | | | |
| >250 <700 | | | | | | |
| >700 <900 | | | | | | |
| >900 <1400 | | | | | | |
| | | | | | | |
| >400 <600 | | | | | | |
| >600 <1200 | | | | | | |
| >1200 <1600 | | | | | | |
| | | | | | | |
| <80 | 60 - 120 | 60 - 120 | 0,100 - 0,250 | 0,030 - 0,060 | 0,250 - 0,300 | 0,060 - 0,100 |
| <110 | 60 - 100 | 60 - 100 | 0,100 - 0,250 | 0,030 - 0,060 | 0,250 - 0,300 | 0,060 - 0,100 |
| >80 <1500 | 40 - 60 | 60 - 80 | 0,100 - 0,150 | 0,020 - 0,050 | 0,150 - 0,250 | 0,050 - 0,080 |
| | | | | | | |
| >500 <1200 | | | | | | |
| >1400 <1800 | | | | | | |
| >1500 <1700 | | | | | | |
| <100 | | | | | | |

$$n = \frac{v_c * 1000}{\pi * d_1}$$

$$v_c = \frac{n * \pi * d_1}{1000}$$

$$v_{fA} = v_{fAA} = n * f_z * z$$

**Vollhartmetall-Gewindefräser für Innengewinde**
solid carbide thread milling cutters for internal threads / fraises à fileter en carbure monobloc pour filetage intérieur / frese a filettare in metallo duro per filetto interno / fresas de roscado de metal duro para roscas interiores

| **Typenbezeichnungen**<br>types / types / tipi / tipos | **Ausführungen**<br>models / exécutions / modelli / modelos | **Vorteil**<br>advantage / avantage / vantaggio / ventaja |
|---|---|---|
| **GFA** | » VHM-Gewindefräser mit Rechtsspiralnuten, innerer Kühlmittelzufuhr und Zylinderschaft<br>» zum Gewindefräsen einer Gewindegröße, für Gewindetiefe 2×D<br>» Oberfläche: blank / TICN<br>» Gewindearten: M / MF | kostengünstiges Werkzeug jeweils nur für eine Abmessung für nahezu sämtliche Werkstoffe |
| | » solid carbide thread milling cutter with spiral flutes, internal coolant and straight shank<br>» for thread milling of one particular thread size, for thread depth 2×D<br>» surface: without coating / TICN<br>» thread types: M / MF | favourably priced tool for one thread size for nearly all materials |
| | » fraise à fileter en carbure monobloc avec goujures hélicoïdales, lubrification interne et queue cylindrique<br>» pour la réalisation d'un seul diamètre de filetage, pour une profondeur de filet 2×D<br>» surface: non revêtu / TICN<br>» types de filetage: M / MF | outil économique pour une seule dimension pour de nombreuses matières |
| | » fresa a filettare in metallo duro con scanalature elicoidali, lubrificazione interna e gambo cilindrico<br>» per fresatura di filetti di una specifica dimensione, per una profondità di filettatura 2×D<br>» superficie: senza rivestimento / TICN<br>» tipo di filettatura: M / MF | prezzo interessante, adatto per lavorare quasi tutti i materiali |
| | » fresa de roscado de metal duro con ranuras helicoidales, refrigeración interna y mango cilíndrico<br>» para fresado de roscas de un diámetro, para una profondidad de rosca de 2×D<br>» superficie: sin recubrimiento / TICN<br>» tipos de roscado: M / MF | herramienta económica para un diámetro para casi todos materiales |
| **GFD** | » VHM-Gewindefräser mit Rechtsspiralnuten, innerer Kühlmittelzufuhr und Zylinderschaft<br>» zum Gewindefräsen einer Gewindegröße, für Gewindetiefe 3×D<br>» Oberfläche: FNT<br>» Gewindearten: M | große Gewindetiefen (bis 3xD) auch bei kleinen Abmessungen, für nahezu sämtliche Werkstoffe |
| | » solid carbide thread milling cutter with spiral flutes, internal coolant and straight shank<br>» for thread milling of one particular thread size, for thread depth 3×D<br>» surface: FNT<br>» thread types: M | deep threads (up to 3xD) also for small dimensions, for almost all materials |
| | » fraise à fileter en carbure monobloc avec goujures hélicoïdales, lubrification interne et queue cylindrique<br>» pour la réalisation d'un seul diamètre de filetage, pour une profondeur de filet de 3×D<br>» surface: FNT<br>» types de filetage: M | filetages profonds (jusqu'à 3xD) à partir des petits diamètres, pour presque toutes les matières |
| | » fresa a filettare in metallo duro con scanalature elicoidali, lubrificazione interna e gambo cilindrico<br>» per fresatura di filetti di una specifica dimensione, per una profondità di filettatura 3×D<br>» superficie: FNT<br>» tipo di filettatura: M | profondità di filettatura (fino a 3xD) anche in piccoli diametri e per quasi tutti i tipi di materiali |
| | » fresa de roscado de metal duro con ranuras helicoidales, refrigeración interna y mango cilíndrico<br>» para fresado de roscas de un diámetro, para una profondidad de rosca de 3×D<br>» superficie: FNT<br>» tipos de roscado: M | profundidades grandes de rosca (hasta 3xd) también para dimensiones pequeñas, para casi todos los materiales |

**Vollhartmetall-Gewindefräser für Innengewinde**
solid carbide thread milling cutters for internal threads / fraises à fileter en carbure monobloc pour filetage intérieur / frese a filettare in metallo duro per filetto interno / fresas de roscado de metal duro para roscas interiores

| **Typenbezeichnungen**<br>types / types / tipi / tipos | **Ausführungen**<br>models / exécutions / modelli / modelos | **Vorteil**<br>advantage / avantage / vantaggio / ventaja |
|---|---|---|
| **GFM**<br> | » VHM-Gewindefräser mit Rechtsspiralnuten, innerer Kühlmittelzufuhr und Zylinderschaft<br>» zum Mehrbereichseinsatz für verschiedene Gewindegrößen mit gleicher Steigung<br>» Oberfläche: blank / TICN<br>» Gewindearten: M / MF | bei gleicher Steigung in großen Abmessungs-bereichen einsetzbar |
| | » solid carbide thread milling cutter with spiral flutes, internal coolant and straight shank<br>» for several applications for different thread diameters with the same pitch<br>» surface: without coating / TICN<br>» thread types: M / MF | applicable for a large range of dimensions with the same pitch |
| | » fraise à fileter en carbure monobloc avec goujures hélicoïdales, lubrification interne et queue cylindrique<br>» pour réalisation de plusieurs diamètres de filetage de même pas<br>» surface: non revêtu / TICN<br>» types de filetage: M / MF | réalisation de différents diamètres de filetage de même pas |
| | » fresa a filettare in metallo duro con scanalature elicoidali, lubrificazione interna e gambo cilindrico<br>» per diverse applicazioni per diametri differenti con passo identico<br>» superficie: senza rivestimento / TICN<br>» tipi di filettatura: M / MF | utilizzabile in varie dimensioni con lo stesso passo |
| | » fresa de roscado de metal duro con ranuras helicoidales, refrigeración interna y mango cilíndrico<br>» para varias aplicaciones para diámetros diferentes con paso idéntico<br>» superficie: sin recubrimiento / TICN<br>» tipos de roscado: M / MF | utilizable para una vasta gama de dimensiones con paso idéntico |
| **GFS**<br> | » VHM-Gewindefräser mit 45° Senkfase, Rechtsspiralnuten, innerer Kühlmittelzufuhr und Zylinderschaft, zum Anfasen und Gewindefräsen einer Gewindegröße<br>» für Gewindetiefe 2×D<br>» Oberfläche: blank / TICN<br>» Gewindearten: M / MF / G / UNC / UNF / NPT / NPTF | hohe Produktivität - Senken und Gewindefräsen ohne Werkzeugwechsel |
| | » solid carbide thread milling cutter with 45° countersink, spiral flutes, internal coolant and straight shank, for countersinking and thread milling of one particular thread size<br>» for thread depth 2×D<br>» surface: without coating / TICN<br>» thread types: M / MF / G / UNC / UNF / NPT / NPTF | high productivity - countersinking and thread milling without tool change |
| | » fraise à fileter en carbure monobloc avec chanfrein à 45°, goujures hélicoïdales, lubrification interne et queue cylindrique, pour chanfreinage et réalisation d'un seul diamètre de filetage<br>» pour une profondeur de filet 2×D<br>» surface: non revêtu / TICN<br>» types de filetage: M / MF / G / UNC / UNF / NPT / NPTF | hautes performances - chanfreinage et fraisage de filetage sans changement d'outil |
| | » frese a filettare in metallo duro con svasatura 45°, scanalature elicoidali, lubrificazione interna e gambo cilindrico, per svasatura e fresatura di filetti di un diametro specifico<br>» per una profondità di filettatura 2×D<br>» superficie: senza rivestimento / TICN<br>» tipi di filettatura: M / MF / G / UNC / UNF / NPT / NPTF | alta produttività - svasatura e maschiatura senza cambio utensile |
| | » fresa de roscado de metal duro con avellanador 45°, ranuras helicoidales, refrigeración interna y mango cilíndrico, para avellanado y fresado de roscas de un diámetro - para una profundidad de rosca de 2×D<br>» superficie: sin recubrimiento / TICN<br>» tipos de roscado: M / MF / G / UNC / UNF / NPT / NPTF | alta productividad - avellanar y fresar sin cambio de herramienta |

**Vollhartmetall-Gewindefräser für Innengewinde**
solid carbide thread milling cutters for internal threads / fraises à fileter en carbure monobloc pour filetage intérieur / frese a filettare in metallo duro per filetto interno / fresas de roscado de metal duro para roscas interiores

| **Typenbezeichnungen**<br>types / types / tipi / tipos | **Ausführungen**<br>models / exécutions / modelli / modelos | **Vorteil**<br>advantage / avantage / vantaggio / ventaja |
|---|---|---|
| **BGF**<br> | » VHM-Bohrgewindefräser mit 45° Senkfase, Rechtsspiralnuten, innerer Kühlmittelzufuhr und Zylinderschaft, zum Kernlochbohren, Anfasen u. Gewindefräsen einer Gewindegröße, für Gewindetiefe 2×D<br>» Oberfläche: blank / FNT<br>» Gewindearten: M / MF | hohe Produktivität - Bohren, Senken und Gewindefräsen ohne Werkzeugwechsel |
| | » Solid carbide drill and thread milling cutter with countersink 45°, spiral flutes, internal coolant and straight shank for drilling, countersinking and thread milling of one particular thread size, for thread depth 2×D<br>» surface: without coating / FNT<br>» thread types: M / MF | high productivity - drilling, countersinking and thread milling without tool change |
| | » Fraise à percer- fileter en carbure monobloc avec chanfrein à 45°, goujures hélicoïdales, lubrification interne et queue cylindrique, pour perçage, chanfreinage et réalisation d'un seul diamètre de filetage, pour une profondeur de filet 2×D<br>» surface: non revêtu / FNT<br>» types de filetage: M / MF | hautes performances - perçage, chanfreinage et fraisage de filetages sans changement d'outil |
| | » frese a filettare in metallo duro con svasatura 45°, scanalature elicoidali, lubrificazione interna e gambo cilindrico, per foratura, svasatura e fresatura di filetti di un diametro specifico, per una profondità di filettatura 2×D<br>» superficie: senza rivestimento / FNT<br>» tipos de filettatura: M / MF | alta produttività - foratura, svasatura e maschiatura senza cambio utensile |
| | » broca-fresa de roscado de metal duro con avellanador 45°, ranuras helicoidales, refrigeración interna y mango cilíndrico, para taladrado, avellanado y fresado de roscas de un diámetro para una profundidad de rosca de 2×D<br>» superficie: sin recubrimiento / FNT<br>» tipos de roscado: M / MF | alta productividad - taladrar, avellanar y fresar sin cambio de herramienta |

## Gewindefräsen mit Vollhartmetall-Gewindefräsern

**Voraussetzungen**
- 3-Achsen-CNC-Steuerung
- ausreichende Werkstück- und Werkzeugspannung
- stabile Maschinenverhältnisse

**Vorteile**
- nur ein Werkzeug für:
  - Durchgangs- und Sackloch
  - für Rechts- und Linksgewinde
  - für sämtliche Toleranzen
- exakte Gewindeposition
- hohe Prozesssicherheit (kurze Frässpäne, Werkzeugbruch führt nicht unmittelbar zum Gewindeausschuss)
- verschiedene Abmessungen mit gleicher Steigung herstellbar
- geringerer Antriebsleistungsbedarf als beim Gewindeschneiden, speziell bei größeren Abmessungen

**Nachteile**
- begrenzte Gewindetiefen (bis max. 3xD)
- um Profilverletzungen zu vermeiden Fräserdurchmesser max. 2/3xD (bei Feingewinde 3/4xD) oder profilkorrigierte Werkzeuge verwenden
- bei Bauteilen mit mehreren gleichen Gewinden andere Verfahren wirtschaftlicher

## Filettatura con frese in metallo duro

**Condizioni**
- controllo CNC 3 assi
- condizioni di lavorazione stabili
- bloccaggio pezzo ed utensile appropiato

**Vantaggi**
- un solo utensile per:
  - foro passante e foro cieco
  - filettatura destra e sinistra
  - tutte le tolleranze
- perfetto centraggio dei filetti
- alta sicurezza di processo (truciolo corto)
- diametri diversi con passo identico
- minor potenza richiesta specialmente nelle maschiature di grosso diametro

**Svantaggi**
- limitata profondità di filetto (massimo 3xD)
- per evitare danni al profilo del filetto la fresa deve avere un D max. di 2/3 del diametro di maschiatura (e 3/4 per passi fini)
- altri sistemi più economici per pezzi con molte filettature uguali

## Thread milling with solid carbide milling cutters

**Conditions**
- 3 axis CNC control
- adequate clamping of workpiece and tool
- stable machining conditions

**Advantages**
- only one tool for:
  - through and blind hole
  - right and left hand threads
  - all tolerances
- exact thread position
- high process security (short chips, tool breakage does not necessarily lead to defective threads)
- different dimensions with the same pitch can be produced
- compared to thread cutting: lower input power needed, especially for large dimensions

**Disadvantages**
- limited thread depth (up to 3xD)
- in order to avoid profile damage: milling cutter diameter max. 2/3xD (3/4xD for fine threads) or use of profile corrected tools
- other more economical procedures for workpieces with several identical threads

## Roscado con fresas de metal duro

**Condiciones**
- control CNC a 3 ejes
- sujeción suficiente de pieza y herramienta
- condiciones estables de máquina

**Ventajas**
- solamente una herramienta para:
  - agujero pasante y agujero ciego
  - rosca derecha y izqierda
  - todas tolerancias
- posición exacta de la rosca
- alta seguridad de proceso (viruta corta, rotura de la herramienta no debe resultar en una rosca deteriorada)
- producción de dimensiones diferentes con paso idéntico
- en comparación con corte de rosca: potencia de accionamiento más bajo, sobre todo para dimensiones largas

**Desventajas**
- limitada profundidad de la rosca (máximo 3xD)
- para evitar deterioro del perfil: diámetro de fresa máximo 2/3xD (3/4xD para roscas finas) o utilizar herramientas con perfil corregido
- otras procedimientos más económicos para piezas con varias roscas idénticas

## Réalisation de filetages à la fraise en carbure monobloc

**Conditions préalables**
- commande numérique CC à 3 axes
- dispositifs de serrage pièce et outil adéquats
- conditions d'opération stables

**Avantages**
- un seul outil pour:
  - trous débouchants et borgnes
  - filetages à droite et à gauche
  - toutes les tolérances
- positionnement précis de l'arête de coupe
- fiabilité accrue des process (copeaux courts). Un bris d'outil n'entraîne pas obligatoirement de non-conformité
- réalisation de différents diamètres de filetages de même pas
- nécessite moins de puissance que pour le taraudage, surtout pour les gros diamètres

**Inconvénients**
- profondeurs de filetage limitées (3xD maxi)
- pour éviter de recouper le profil, le Ø de la fraise ne devra pas excéder 2/3xD pour les pas gros (3/4xD pour les pas fins) ou utiliser des outils à profil corrigé
- autres procédés plus économiques pour les pièces ayant plusieurs filetages identiques

# Prozessbeschreibung für VHM-Gewindefräser GFA

machining steps for solid carbide thread milling cutter GFA /
réalisation d'un filetage avec la fraise GFA /
lavorazione per frese a filettare in metallo duro GFA /
instrucciones para el mecanizado con fresas de roscado de metal duro GFA

1 2 3 4

| Prozessbeschreibung | |
|---|---|
| 1. | Startposition Bohrungsmitte anfahren |
| 2. | Mit Einfahrschleife auf radiale Gewindetiefe fahren |
| 3. | Fräsen des Gewindes, dann Ausfahrschleife in Bohrungsmitte |
| 4. | Wegfahren auf Startposition, Ende der Bearbeitung |

| Lavorazione | |
|---|---|
| 1. | Posizionarsi al centro del foro da maschiare (posizione di partenza) |
| 2. | Avvicinarsi con ciclo decrescente alla profondità del filetto radiale |
| 3. | Fresare la filettatura, dopo ritornare al centro foro |
| 4. | Ritornare alla posizione di partenza, fine della lavorazione |

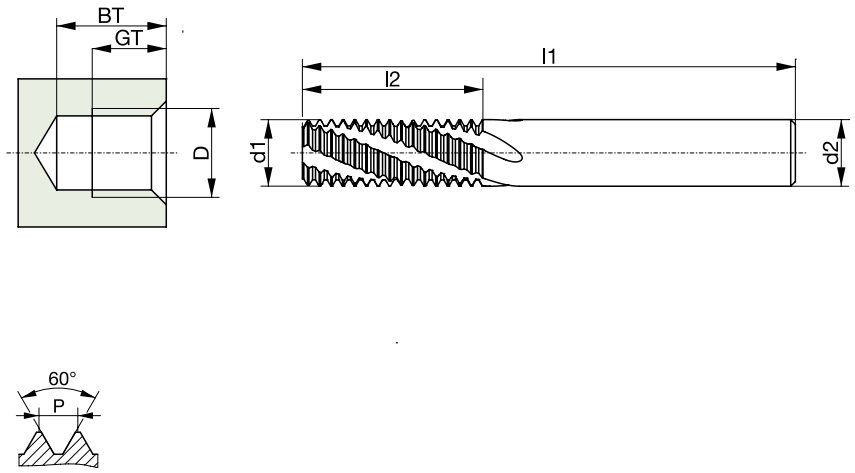
| Machining steps | |
|---|---|
| 1. | Travel to center of machined hole (start position) |
| 2. | Approach to radial thread depth with descending loop |
| 3. | Interpolation machining begins, after machining run-out loop back to center |
| 4. | Return to start position, end of thread milling process |

| Instrucciones | |
|---|---|
| 1. | Posicionar la fresa al centro del agujero (posición de inicio) |
| 2. | Acceso a profundidad de rosca radial con círculo descendente |
| 3. | Fresado de rosca, después ciclo de salida al centro |
| 4. | Regreso a la posición de inicio, mecanizado terminado |

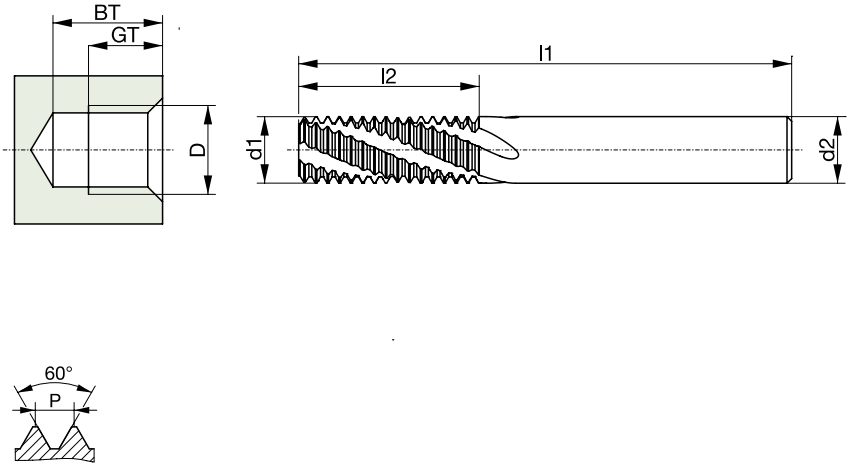
| Comment procéder | |
|---|---|
| 1. | Positionnement au point de départ dans l'axe du perçage |
| 2. | Plongée radiale à la cote nominale sur une trajectoire hélicoïdale |
| 3. | Réalisation du filetage, retour dans l'axe du perçage par une sortie hélicoïdale |
| 4. | Retour au point d'origine, fin du cycle de fraisage |

# VHM-Gewindefräser GFA

solid carbide thread milling cutters GFA / fraises à fileter GFA en carbure monobloc / frese a filettare in metallo duro GFA / fresas de roscado de metal duro GFA

| Typenbezeichnung / type / type / tipo / tipo | GFA N | GFA N |
|---|---|---|
| **Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>  | | |
| **Gewindetiefe / thread length / profondeur de filetage / profondità di filettatura / profundidad de rosca** | 2 x D | 2 x D |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>8.1-8.3 / 9.1-9.3 | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>7.1.-7.3<br>8.1-8.3 / 9.1-9.3 |
| **Zylinderschaft / straight shank / queue cylindrique / gambo cilindrico / mango cilíndrico** | DIN 6535 HA | DIN 6535 HA |
| **Ausführung / model / exécution / modello / modelo** | KA | KA TICN |

| ØD | | P | $l_1$ | $l_2$ | $Ød_1$ | $Ød_2$ | z | GT | BT | | ID | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 6 | 1 | 54 | 14 | 4,70 | 6 | 3 | 12 | 12,5 | 5,0 | 025789 | 025790 |
| M | 8 | 1,25 | 54 | 18 | 5,95 | 6 | 3 | 16 | 17,0 | 6,8 | 025792 | 025793 |
| M | 10 | 1,5 | 64 | 22 | 7,95 | 8 | 4 | 20 | 21,0 | 8,5 | 025794 | 025795 |
| M | 12 | 1,75 | 74 | 27 | 9,95 | 10 | 4 | 24 | 25,0 | 10,2 | 025796 | 025797 |
| M | 14 | 2 | 74 | 31 | 9,95 | 10 | 4 | 28 | 29,0 | 12,0 | 025798 | 025799 |
| M | 16 | 2 | 80 | 35 | 11,95 | 12 | 4 | 32 | 33,0 | 14,0 | 025800 | 025801 |
| M | 18/20 | 2,5 | 90 | 41 | 13,95 | 14 | 4 | 36/40 | 37,5/41,5 | 15,5/17,5 | 025803 | 025805 |

| Typenbezeichnung / type / type / tipo / tipo | GFA N | GFA N |
|---|---|---|
| **Metrisches ISO-Feingewinde DIN 13**<br>ISO Metric fine thread DIN 13<br>Filetage métrique ISO à pas fin DIN 13<br>Filettatura metrica ISO passo fine DIN 13<br>Rosca métrica fina ISO DIN 13<br>  | | |
| **Gewindetiefe / thread length / profondeur de filetage / profondità di filettatura / profundidad de rosca** | 2 x D | 2 x D |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>8.1-8.3 / 9.1-9.3 | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>7.1.-7.3<br>8.1-8.3 / 9.1-9.3 |
| **Zylinderschaft / straight shank / queue cylindrique / gambo cilindrico / mango cilíndrico** | DIN 6535 HA | DIN 6535 HA |
| **Ausführung / model / exécution / modello / modelo** | KA | KA TICN |

| ØD | | | P | $l_1$ | $l_2$ | Ø$d_1$ | Ø$d_2$ | z | GT | BT | | ID | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MF | 6 | x | 0,75 | 54 | 13 | 4,90 | 6 | 3 | 12 | 12,5 | 5,2 | 025806 | 025807 |
| MF | 8 | x | 1 | 54 | 18 | 5,95 | 6 | 3 | 16 | 16,5 | 7,0 | 025808 | 025809 |
| MF | 10 | x | 1 | 64 | 22 | 7,95 | 8 | 4 | 20 | 20,5 | 9,0 | 025810 | 025811 |
| MF | 10 | x | 1,25 | 64 | 22 | 7,95 | 8 | 4 | 20 | 21,0 | 8,8 | 025812 | 025813 |
| MF | 12 | x | 1 | 74 | 26 | 9,95 | 10 | 4 | 24 | 24,5 | 11,0 | 025814 | 025815 |
| MF | 12 | x | 1,5 | 74 | 26 | 9,95 | 10 | 4 | 24 | 25,0 | 10,5 | 025816 | 025817 |

# Prozessbeschreibung für VHM-Gewindefräser GFD

machining steps for solid carbide thread milling cutter GFD /
réalisation d'un filetage avec la fraise GFD /
lavorazione per frese a filettare in metallo duro GFD /
instrucciones para el mecanizado con fresas de roscado de metal duro GFA

1 2 3 4

| Prozessbeschreibung | |
|---|---|
| 1. | Startposition Bohrungsmitte anfahren |
| 2. | Mit Einfahrschleife auf radiale Gewindetiefe fahren |
| 3. | Gewindefräsen zirkular, Gang für Gang auf Gewindetiefe, dann Ausfahrschleife in Bohrungsmitte |
| 4. | Wegfahren auf Startposition, Ende der Bearbeitung |

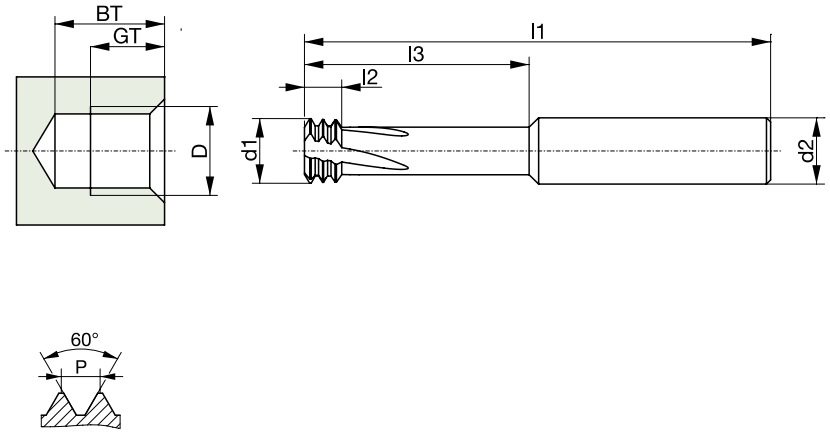
| Lavorazione | |
|---|---|
| 1. | Posizione di partenza: avvicinarsi al centro del foro lavorato |
| 2. | Rientrando sulla profondità del filetto radiale |
| 3. | Fresatura circolare, passo dopo passo sulla profondità del filetto, poi uscita nel centro del foro |
| 4. | Ritornare alla posizione di partenza, fine della lavorazione |

| Machining steps | |
|---|---|
| 1. | Start position: approach to center of machined hole |
| 2. | Approach to radial thread depth with descending loop |
| 3. | circular milling, thread turn after thread turn to the desired thread depth, after machining run-out loop back to center |
| 4. | Return to start position, end of thread milling process |

| Instrucciones | |
|---|---|
| 1. | Posición de salida: acceso al centro del agujero mecanizado |
| 2. | Acceso a profundidad de rosca radial con con círculo cerrado descendente |
| 3. | El mecanizado circular por interpolación comienza acercándose rosca por rosca hasta el final de la profundidad de la rosca. Después del mecanizado el círculo excéntrico vuelve al centro. |
| 4. | Volver a la posición de salida, final del proceso de fresado de rosca. |

| Comment procéder | |
|---|---|
| 1. | Positionnement au point de départ dans l'axe du perçage |
| 2. | Plongée radiale à la cote nominale sur une trajectoire hélicoïdale |
| 3. | Réalisation du filetage en interpolation hélicoïdale jusqu'à la profondeur de taraudage désirée, retour dans l'axe du perçage par une sortie hélicoïdale |
| 4. | Retour au point d'origine, fin du cycle de fraisage |

| Typenbezeichnung / type / type / tipo / tipo | | GFD N |
|---|---|---|
| **Metrisches ISO-Regelgewinde DIN 13 / Metrisches ISO-Feingewinde DIN 13**<br>ISO Metric coarse thread DIN 13 / ISO Metric fine thread DIN 13<br>Filetage métrique ISO DIN 13 / Filetage métrique ISO à pas fin DIN 13<br>Filettatura metrica ISO DIN 13 / Filettatura metrica ISO passo fine DIN 13<br>Rosca métrica ISO DIN 13 / Rosca métrica fina ISO DIN 13 | | |
| **Gewindetiefe / thread length / profondeur de filetage / profondità di filettatura / profundidad de rosca** | | 3 x D |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>7.1.-7.3<br>8.1-8.3 / 9.1-9.3 |
| **Zylinderschaft / straight shank / queue cylindrique / gambo cilindrico / mango cilíndrico** | | DIN 6535 HA |
| **Ausführung / model / exécution / modello / modelo** | | KA FNT |

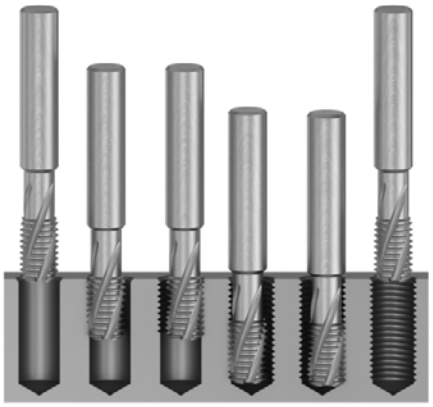



| ØD | | P | $l_1$ | $l_2$ | $l_3$ | Ød$_1$ | Ød$_2$ | z | GT | BT | | ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 1,2 * | 0,25 | 39 | 0,75 | 3,9 | 0,83 | 3 | 3 | 3,6 | 3,8 | 0,95 | 055239 |
| M | 1,4 * | 0,3 | 39 | 0,9 | 4,5 | 0,98 | 3 | 3 | 4,2 | 4,4 | 1,1 | 055240 |
| M | 1,6 * | 0,35 | 39 | 1,05 | 5,2 | 1,12 | 3 | 3 | 4,8 | 5 | 1,25 | 047795 |
| M | 1,8 * | 0,35 | 39 | 1,05 | 5,8 | 1,31 | 3 | 3 | 5,4 | 5,7 | 1,45 | 053818 |
| M | 2 * | 0,4 | 39 | 1,2 | 6,4 | 1,46 | 3 | 4 | 6 | 6,3 | 1,6 | 053698 |
| M | 2,2 * | 0,45 | 39 | 1,35 | 7,1 | 1,60 | 3 | 4 | 6,6 | 6,9 | 1,75 | 054929 |
| M | 2,5 * | 0,45 | 39 | 1,35 | 8 | 1,89 | 3 | 4 | 7,5 | 7,8 | 2,05 | 053715 |
| M | 3 * | 0,5 | 39 | 1,5 | 9,5 | 2,33 | 3 | 4 | 9 | 9,3 | 2,5 | 049357 |
| M | 3,5 * | 0,6 | 39 | 1,8 | 11,1 | 2,71 | 3 | 4 | 10,5 | 11 | 2,9 | 055241 |
| M | 4 | 0,7 | 54 | 2,1 | 12,7 | 3,10 | 6 | 4 | 12 | 12,5 | 3,3 | 037901 |
| M | 5 | 0,8 | 54 | 2,4 | 15,8 | 3,90 | 6 | 4 | 15 | 15,5 | 4,2 | 054809 |
| M | 6 | 1 | 54 | 3 | 19 | 4,70 | 6 | 4 | 18 | 18,5 | 5 | 045440 |
| M | 8 | 1,25 | 64 | 3,75 | 25,4 | 5,95 | 6 | 4 | 24 | 25 | 6,8 | 055242 |
| M | 10 | 1,5 | 70 | 4,5 | 31,7 | 7,95 | 8 | 4 | 30 | 31 | 8,5 | 053814 |

* ≤ M 3,5 ohne Kühlkanal / ≤ M 3,5 without internal coolant / ≤ M 3,5 sans lubrification interne / ≤ M 3,5 senza lubrificazione interna / ≤ M 3,5 sin refrigeración interna

# Prozessbeschreibung für VHM-Gewindefräser GFM für tiefere Gewinde

machining steps for solid carbide thread milling cutters GFM for deeper threads /
réalisation d'un filetage profond avec la fraise GFM en carbure monobloc /
lavorazione per frese a filettare in metallo duro GFM per maschiature profonde /
instrucciones para el mecanizado con fresas de roscado de metal duro GFM para roscados profundos



1 2 3 4 5 6

| Prozessbeschreibung | |
|---|---|
| 1. | Startposition Bohrungsmitte anfahren |
| 2. | Mit Einfahrschleife auf radiale Gewindetiefe fahren |
| 3. | Fräsen des Gewindes, dann Ausfahrschleife in Bohrungsmitte, Zustellung in Z-Richtung um die entsprechende Anzahl von Steigungen |
| 4. | Mit Einfahrschleife auf radiale Gewindetiefe fahren |
| 5. | Fräsen des Gewindes, dann Ausfahrschleife in Bohrungsmitte |
| 6. | Wegfahren auf Startposition, Ende der Bearbeitung |

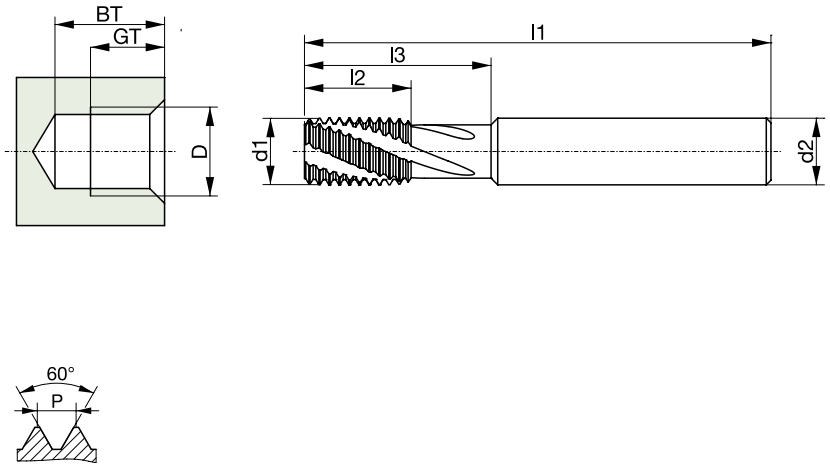
| Lavorazione | |
|---|---|
| 1. | Posizionarsi al centro del foro da maschiare (posizione di partenza) |
| 2. | Avvicinarsi con ciclo decrescente alla profondità del filetto radiale |
| 3. | Fresatura in interpolazione del filetto andando a contatto pezzo in ¼ di giro (prima passata) |
| 4. | Avvicinarsi con ciclo decrescente alla profondità del filetto radiale |
| 5. | Per filettature profonde ripetere il ciclo impostando la profondità del filetto quindi riportarsi al centro del foro |
| 6. | Ritornare alla posizione di partenza |

| Machining steps | |
|---|---|
| 1. | Travel to center of machined hole (start position) |
| 2. | Approach to radial thread depth with descending loop |
| 3. | Interpolation machining begins, after machining runout loop back to center, plunge to desired thread depth |
| 4. | Approach to radial thread depth with descending loop |
| 5. | Interpolation machining continues, after machining run-out loop back to center |
| 6. | Return to start position, end of machining |

| Instrucciones | |
|---|---|
| 1. | Posicionar la fresa al centro del agujero (posición de inicio) |
| 2. | Acceso a profundidad de rosca radial con círculo descendente |
| 3. | Fresado de rosca, después ciclo de salida al centro, bajar a la profundidad de rosca deseada |
| 4. | Acceso a profundidad de rosca radial con círculo descendente |
| 5. | Continuación del mecanizado, ciclo de salida al centro |
| 6. | Regreso a la posición de inicio, mecanizado terminado |

| Comment procéder | |
|---|---|
| 1. | Positionnement au point de départ dans l'axe du perçage |
| 2. | Plongée radiale à la cote nominale sur une trajectoire hélicoïdale |
| 3. | Réalisation du filetage, retour dans l'axe du perçage par une sortie hélicoïdale, plongée à la profondeur de taraudage suivant l'axe Z |
| 4. | Plongée radiale à la cote nominale sur une trajectoire hélicoïdale |
| 5. | Réalisation du filetage, retour dans l'axe du perçage par une sortie hélicoïdale |
| 6. | Retour au point de départ, fin du cycle de fraisage |

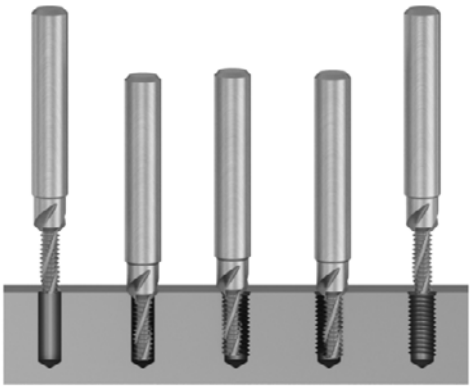
| Typenbezeichnung / type / type / tipo / tipo | GFM N | GFM N |
|---|---|---|
| **Metrisches ISO-Regelgewinde DIN 13 / Metrisches ISO-Feingewinde DIN 13**<br>ISO Metric coarse thread DIN 13 / ISO Metric fine thread DIN 13<br>Filetage métrique ISO DIN 13 / Filetage métrique ISO à pas fin DIN 13<br>Filettatura metrica ISO DIN 13 / Filettatura metrica ISO passo fine DIN 13<br>Rosca métrica ISO DIN 13 / Rosca métrica fina ISO DIN 13 | | |
| **Gewindetiefe / thread length / profondeur de filetage / profondità di filettatura / profundidad de rosca** | = $l_3$ | = $l_3$ |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>8.1-8.3 / 9.1-9.3 | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>7.1.-7.3<br>8.1-8.3 / 9.1-9.3 |
| **Zylinderschaft / straight shank / queue cylindrique / gambo cilindrico / mango cilíndrico** | DIN 6535 HA | DIN 6535 HA |
| **Ausführung / model / exécution / modello / modelo** | KA | KA TICN |




| Ød | P | D ≥ | $l_1$ | $l_2$ | $l_3$ | Ød$_1$ | Ød$_2$ | z | GT | ID | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 0,75 | 12 | 70 | 16 | 25 | 9,95 | 10 | 4 | 25 | 111871 | 111901 |
| 10 | 1 | 12 | 70 | 16 | 25 | 9,95 | 10 | 4 | 25 | 111872 | 111902 |
| 10 | 1,5 | 14 | 70 | 16 | 25 | 9,95 | 10 | 4 | 25 | 111859 | 025461 |
| 12 | 1 | 16 | 80 | 20 | 31 | 11,95 | 12 | 4 | 31 | 111873 | 111903 |
| 12 | 1,5 | 16 | 80 | 20 | 31 | 11,95 | 12 | 4 | 31 | 111874 | 111904 |
| 12 | 2 | 16 | 80 | 20 | 31 | 11,95 | 12 | 4 | 31 | 111875 | 111905 |
| 16 | 1,5 | 22 | 90 | 25 | 40 | 15,95 | 16 | 5 | 40 | 111876 | 111906 |
| 16 | 2 | 22 | 90 | 25 | 40 | 15,95 | 16 | 5 | 40 | 111860 | 111866 |
| 16 | 2,5 | 22 | 90 | 25 | 40 | 15,95 | 16 | 5 | 40 | 111877 | 111907 |
| 18 | 3 | 24 | 102 | 33 | 50 | 17,95 | 18 | 5 | 50 | 024836 | 034447 |
| 20 | 1,5 | 26 | 105 | 33 | 50 | 19,95 | 20 | 5 | 50 | 111878 | 111908 |
| 20 | 2 | 27 | 105 | 33 | 50 | 19,95 | 20 | 5 | 50 | 111879 | 111909 |
| 20 | 3 | 30 | 105 | 33 | 50 | 19,95 | 20 | 5 | 50 | 111880 | 111910 |

## Prozessbeschreibung für VHM-Gewindefräser GFS mit Senkfase

machining steps for solid carbide thread milling cutters GFS with countersink /
réalisation d'un filetage avec la fraise GFS en carbure monobloc avec chanfrein /
lavorazione per frese a filettare in metallo duro GFS con svasatura /
instrucciones para el mecanizado con fresas de roscado de metal duro GFS con avellanador



1 2 3 4 5

| Prozessbeschreibung | |
|---|---|
| 1. | Startposition Bohrungsmitte anfahren |
| 2. | 90° Fase ansenken |
| 3. | Rückzug in Z-Richtung und mit Einfahrschleife auf radiale Gewindetiefe fahren |
| 4. | Fräsen des Gewindes, dann Ausfahrschleife in Bohrungsmitte |
| 5. | Wegfahren auf Startposition, Ende der Bearbeitung |

| Lavorazione | |
|---|---|
| 1. | Posizionarsi al centro del foro da maschiare (posizione di partenza) |
| 2. | Eseguire lo smusso di 90° |
| 3. | Ritiro in direzione Z e rientro nella profondità del filetto radiale |
| 4. | Fresatura in interpolazione del filetto quindi riportarsi a centro foro |
| 5. | Ritornare alla posizione di partenza |

| Machining steps | |
|---|---|
| 1. | Travel to center of machined hole (start position) |
| 2. | 90° countersinking |
| 3. | Withdrawal in Z-direction and approaching to radial thread depth with run-in loop |
| 4. | Interpolation machining begins, after machining run out loop back to center |
| 5. | Return to start position, end of thread milling process |

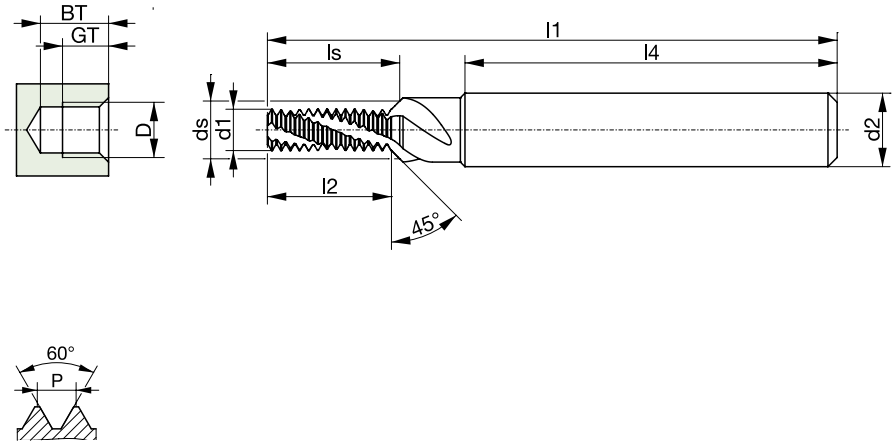
| Instrucciones | |
|---|---|
| 1. | Posicionar la fresa al centro del agujero (posición de inicio) |
| 2. | Avellanado de 90° |
| 3. | Retirada en la direccón Z y aproximación a la profundidad de rosca radial con círculo cerrado. |
| 4. | Fresado de rosca, después ciclo de salida al centro |
| 5. | Regreso a la posición de inicio, mecanizado terminado |

| Comment procéder | |
|---|---|
| 1. | Positionnement au point de départ dans l'axe du perçage |
| 2. | Usinage du chanfrein 90° |
| 3. | Dégagement vers l'axe Z et plongée radiale à la cote nominale sur une trajectoire hélicoïdale. |
| 4. | Réalisation du filetage et retour dans l'axe du perçage par une sortie hélicoïdale |
| 5. | Retour au point d'origine, fin du cycle de fraisage |

## VHM-Gewindefräser GFS mit Senkfase

solid carbide thread milling cutters GFS with countersink / fraises à fileter GFS en carbure monobloc avec chanfrein / frese a filettare in metallo duro GFS con svasatura / fresas de roscado de metal duro GFS con avellanador

| Typenbezeichnung / type / type / tipo / tipo | GFS N | GFS N |
|---|---|---|
| **Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13 | | |
| **Gewindetiefe / thread length / profondeur de filetage / profondità di filettatura / profundidad de rosca** | 1,5 x D | 1,5 x D |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>8.1-8.3 / 9.1-9.3 | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>7.1.-7.3<br>8.1-8.3 / 9.1-9.3 |
| **Zylinderschaft / straight shank / queue cylindrique / gambo cilindrico / mango cilíndrico** | DIN 6535 HA | DIN 6535 HA |
| **Ausführung / model / exécution / modello / modelo** | KA | KA TICN |

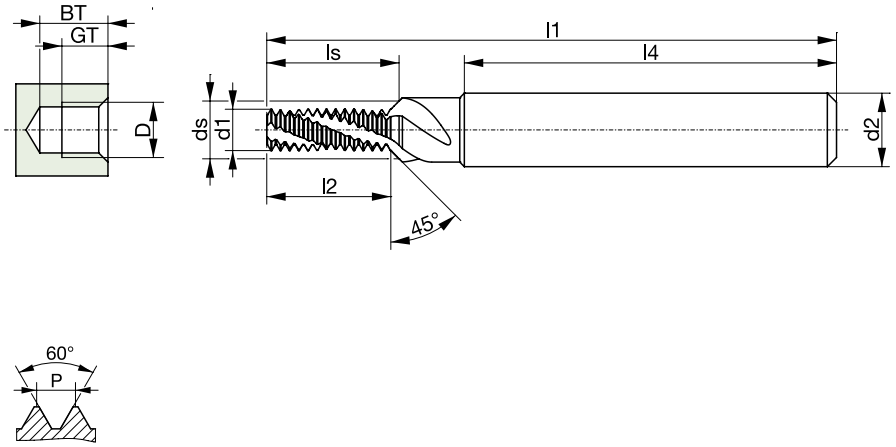



| ØD | | P | $l_1$ | $l_2$ | $l_s$ | $l_4$ | Ød$_1$ | Ød$_2$ | Ød$_s$ | z | GT | BT | | ID | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 4 | 0,7 | 48 | 7 | 7,9 | 36 | 3,10 | 6 | 4,2 | 3 | 6 | 8,4 | 3,3 | 037555 | 033211 |
| M | 5 | 0,8 | 54 | 9 | 9,9 | 36 | 3,90 | 6 | 5,3 | 3 | 7,5 | 10,4 | 4,2 | 037556 | 037128 |
| M | 6 | 1 | 62 | 10 | 11,3 | 36 | 4,70 | 8 | 6,3 | 3 | 9 | 11,8 | 5,0 | 037557 | 037129 |
| M | 8 | 1,25 | 74 | 13 | 14,1 | 40 | 6,40 | 10 | 8,4 | 3 | 12 | 14,6 | 6,8 | 037558 | 037130 |
| M | 10 | 1,5 | 80 | 17 | 18,4 | 45 | 8,10 | 12 | 10,5 | 4 | 15 | 18,9 | 8,5 | 037559 | 037131 |
| M | 12 | 1,75 | 90 | 20 | 21,5 | 45 | 9,95 | 14 | 12,6 | 4 | 18 | 22 | 10,2 | 037560 | 030206 |
| M | 16 | 2 | 102 | 27 | 26,5 | 48 | 13,40 | 18 | 16,8 | 4 | 24 | 27 | 14,0 | 037561 | 030208 |

# VHM-Gewindefräser GFS mit Senkfase

solid carbide thread milling cutters GFS with countersink / fraises à fileter GFS en carbure monobloc avec chanfrein / frese a filettare in metallo duro GFS con svasatura / fresas de roscado de metal duro GFS con avellanador

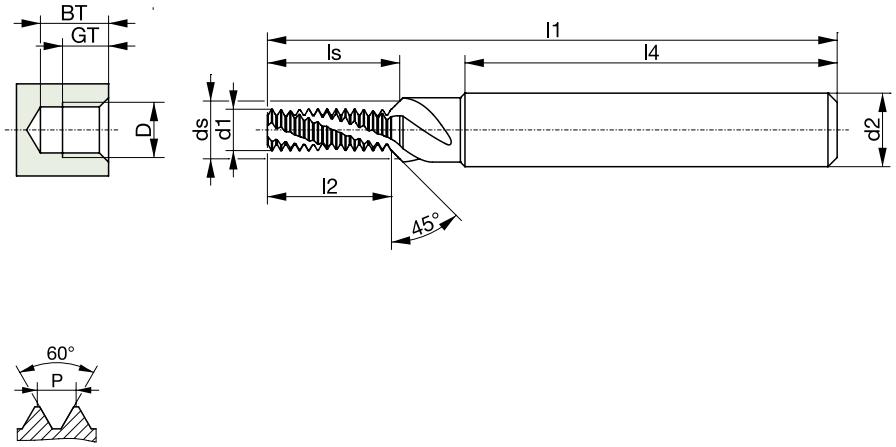
| Typenbezeichnung / type / type / tipo / tipo | GFS N | GFS N |
|---|---|---|
| **Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13 | | |
| **Gewindetiefe / thread length / profondeur de filetage / profondità di filettatura / profundidad de rosca** | 2 x D | 2 x D |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>8.1-8.3 / 9.1-9.3 | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>7.1.-7.3<br>8.1-8.3 / 9.1-9.3 |
| **Zylinderschaft / straight shank / queue cylindrique / gambo cilindrico / mango cilíndrico** | DIN 6535 HA | DIN 6535 HA |
| **Ausführung / model / exécution / modello / modelo** | KA | KA TICN |




| ØD | | P | $l_1$ | $l_2$ | $l_s$ | $l_4$ | Ød$_1$ | Ød$_2$ | Ød$_s$ | z | GT | BT | | ID | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 4 | 0,7 | 48 | 9 | 9,3 | 36 | 3,10 | 6 | 4,2 | 3 | 8 | 9,8 | 3,3 | 111825 | 107092 |
| M | 5 | 0,8 | 54 | 11 | 11,5 | 36 | 3,90 | 6 | 5,3 | 3 | 10 | 12,0 | 4,2 | 111826 | 107093 |
| M | 6 | 1 | 62 | 13 | 14,3 | 36 | 4,70 | 8 | 6,3 | 3 | 12 | 14,8 | 5,0 | 111827 | 107094 |
| M | 8 | 1,25 | 74 | 18 | 19,1 | 40 | 6,40 | 10 | 8,4 | 3 | 16 | 19,6 | 6,8 | 111828 | 107095 |
| M | 10 | 1,5 | 80 | 22 | 22,9 | 45 | 8,10 | 12 | 10,5 | 4 | 20 | 23,4 | 8,5 | 111819 | 107086 |
| M | 12 | 1,75 | 90 | 25 | 26,7 | 45 | 9,95 | 14 | 12,6 | 4 | 24 | 27,2 | 10,2 | 111820 | 107087 |
| M | 14 | 2 | 102 | 31 | 32,5 | 48 | 11,50 | 16 | 14,7 | 4 | 28 | 33,0 | 12,0 | 111821 | 107088 |
| M | 16 | 2 | 102 | 35 | 36,6 | 48 | 13,40 | 18 | 16,8 | 4 | 32 | 37,1 | 14,0 | 111822 | 107089 |
| M | 18/20 | 2,5 | 125 | 41 | 43,2/44,2 | 50 | 13,95 | 22 | 19/21 | 4 | 36/40 | 44,7 | 15,5/17,5 | 111823 | 107090 |

## VHM-Gewindefräser GFS mit Senkfase

solid carbide thread milling cutters GFS with countersink / fraises à fileter GFS en carbure monobloc avec chanfrein / frese a filettare in metallo duro GFS con svasatura / fresas de roscado de metal duro GFS con avellanador

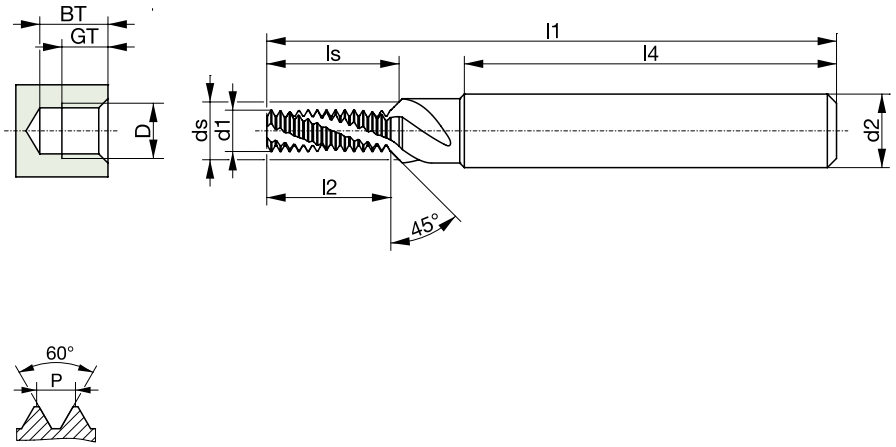
| Typenbezeichnung / type / type / tipo / tipo | | GFS TIH |
|---|---|---|
| **Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>  | | |
| **Gewindetiefe / thread length / profondeur de filetage / profondità di filettatura / profundidad de rosca** | | 2 x D |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | | 1.2-1.9 /2.3<br>3.1-3.4 / 4.5-4.7<br>5.3 / 7.1-7.3<br>9.1-9.3 |
| **Zylinderschaft / straight shank / queue cylindrique / gambo cilindrico / mango cilíndrico** | | DIN 6535 HA |
| **Ausführung / model / exécution / modello / modelo** | | KA TICN |

| ØD | | P | $l_1$ | $l_2$ | $l_s$ | $l_4$ | Ød$_1$ | Ød$_2$ | Ød$_s$ | z | GT | BT | | ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 6 | 1 | 62 | 13 | 14,3 | 36 | 4,70 | 8 | 6,3 | 5 | 12 | 14,8 | 5,0 | 037132 |
| M | 8 | 1,25 | 74 | 18 | 19,1 | 40 | 6,40 | 10 | 8,4 | 5 | 16 | 19,6 | 6,8 | 036164 |
| M | 10 | 1,5 | 80 | 22 | 22,9 | 45 | 8,10 | 12 | 10,5 | 5 | 20 | 23,4 | 8,5 | 037133 |

# VHM-Gewindefräser GFS mit Senkfase

solid carbide thread milling cutters GFS with countersink / fraises à fileter GFS en carbure monobloc avec chanfrein / frese a filettare in metallo duro GFS con svasatura / fresas de roscado de metal duro GFS con avellanador

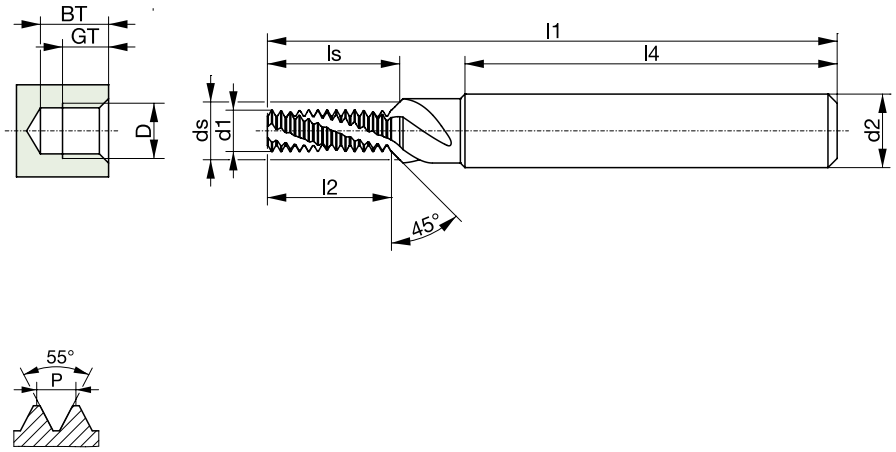
| Typenbezeichnung / type / type / tipo / tipo | GFS N | GFS N |
|---|---|---|
| **Metrisches ISO-Feingewinde DIN 13**<br>ISO Metric fine thread DIN 13<br>Filetage métrique ISO à pas fin DIN 13<br>Filettatura metrica ISO passo fine DIN 13<br>Rosca métrica fina ISO DIN 13 | | |
| **Gewindetiefe / thread length / profondeur de filetage / profondità di filettatura / profundidad de rosca** | 2 x D | 2 x D |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>8.1-8.3 / 9.1-9.3 | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>7.1.-7.3<br>8.1-8.3 / 9.1-9.3 |
| **Zylinderschaft / straight shank / queue cylindrique / gambo cilindrico / mango cilíndrico** | DIN 6535 HA | DIN 6535 HA |
| **Ausführung / model / exécution / modello / modelo** | KA | KA TICN |




| ØD | P | $l_1$ | $l_2$ | $l_s$ | $l_4$ | Ød$_1$ | Ød$_2$ | Ød$_s$ | z | GT | BT | | ID | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MF 6 | x 0,75 | 62 | 13 | 13,8 | 36 | 4,90 | 8 | 6,3 | 3 | 12 | 14,5 | 5,2 | 108883 | 108910 |
| MF 8 | x 0,75 | 74 | 17 | 17,7 | 40 | 6,80 | 10 | 8,4 | 3 | 16 | 18,5 | 7,2 | 108884 | 108911 |
| MF 8 | x 1 | 74 | 18 | 18,4 | 40 | 6,60 | 10 | 8,4 | 3 | 16 | 19,0 | 7,0 | 108885 | 108912 |
| MF 10 | x 1 | 80 | 21 | 22,5 | 45 | 8,50 | 12 | 10,5 | 4 | 20 | 23,0 | 9,0 | 108877 | 108904 |
| MF 10 | x 1,25 | 80 | 22 | 22,9 | 45 | 8,30 | 12 | 10,5 | 4 | 20 | 23,5 | 8,8 | 108878 | 108905 |
| MF 12 | x 1 | 90 | 25 | 26,6 | 45 | 10,40 | 14 | 12,6 | 4 | 24 | 27,5 | 11,0 | 108879 | 108906 |
| MF 12 | x 1,5 | 90 | 26 | 27,5 | 45 | 10,00 | 14 | 12,6 | 4 | 24 | 28,0 | 10,5 | 108880 | 108907 |
| MF 14 | x 1,5 | 102 | 31 | 32,1 | 48 | 12,00 | 16 | 14,7 | 4 | 28 | 33,0 | 12,5 | 108881 | 108908 |
| MF 16 | x 1,5 | 102 | 34 | 35,2 | 48 | 13,90 | 18 | 16,8 | 4 | 32 | 36,0 | 14,5 | 108882 | 108909 |

## VHM-Gewindefräser GFS mit Senkfase

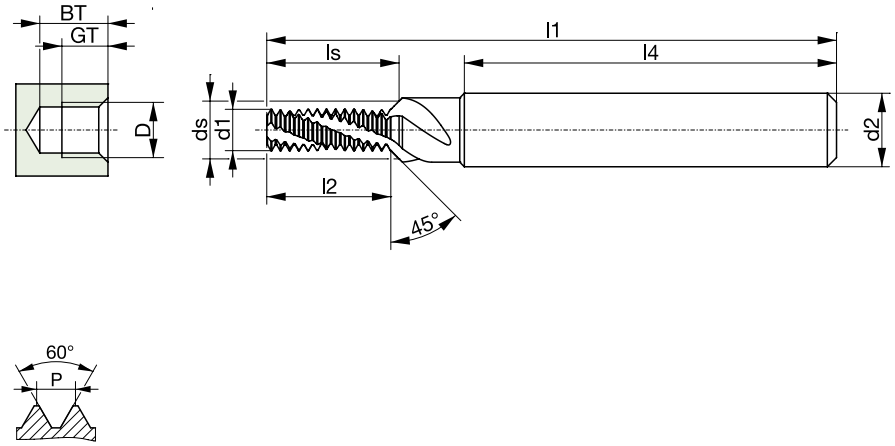
solid carbide thread milling cutters GFS with countersink / fraises à fileter GFS en carbure monobloc avec chanfrein / frese a filettare in metallo duro GFS con svasatura / fresas de roscado de metal duro GFS con avellanador

| Typenbezeichnung / type / type / tipo / tipo | GFS N | GFS N |
|---|---|---|
| **G-Rohrgewinde DIN EN ISO 228**<br>British standard pipe thread DIN EN ISO 228<br>Filetage pas du gaz DIN EN ISO 228<br>Filettatura Whitworth gas DIN EN ISO 228<br>Rosca para tubo norma británica DIN EN ISO 228<br>  | | |
| **Gewindetiefe / thread length / profondeur de filetage / profondità di filettatura / profundidad de rosca** | 2 x D | 2 x D |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>8.1-8.3 / 9.1-9.3 | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>7.1.-7.3<br>8.1-8.3 / 9.1-9.3 |
| **Zylinderschaft / straight shank / queue cylindrique / gambo cilindrico / mango cilíndrico** | DIN 6535 HA | DIN 6535 HA |
| **Ausführung / model / exécution / modello / modelo** | KA | KA TICN |

| ØD | | P | $l_1$ | $l_2$ | $l_s$ | $l_4$ | Ø$d_1$ | Ø$d_2$ | Ø$d_s$ | z | GT | BT | | ID | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| G | 1/8 | 28 | 80 | 21 | 22,3 | 45 | 7,95 | 12 | 10,2 | 4 | 20 | 22,8 | 8,7 | 110806 | 110815 |
| G | 1/4 | 19 | 90 | 29 | 30,1 | 45 | 9,95 | 14 | 13,8 | 4 | 28 | 30,6 | 11,8 | 110805 | 110814 |
| G | 3/8 | 19 | 102 | 35 | 36,9 | 48 | 13,60 | 18 | 17,5 | 4 | 34 | 37,4 | 15,25 | 110807 | 110816 |

# VHM-Gewindefräser GFS mit Senkfase

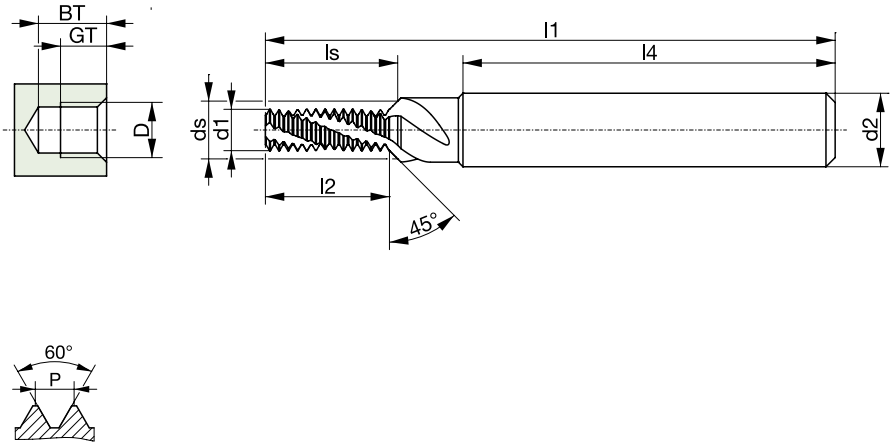
solid carbide thread milling cutters GFS with countersink / fraises à fileter GFS en carbure monobloc avec chanfrein / frese a filettare in metallo duro GFS con svasatura / fresas de roscado de metal duro GFS con avellanador

| Typenbezeichnung / type / type / tipo / tipo | GFS N | GFS N |
|---|---|---|
| **UNC-Grobgewinde ASME B1.1**<br>Unified coarse thread ASME B1.1<br>Filetage américain à pas gros ASME B1.1<br>Filettatura grossa unificata ASME B1.1<br>Rosca unificada gruesa ASME B1.1<br>  | | |
| **Gewindetiefe / thread length / profondeur de filetage / profondità di filettatura / profundidad de rosca** | 2 x D | 2 x D |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>8.1-8.3 / 9.1-9.3 | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>7.1.-7.3<br>8.1-8.3 / 9.1-9.3 |
| **Zylinderschaft / straight shank / queue cylindrique / gambo cilindrico / mango cilíndrico** | DIN 6535 HA | DIN 6535 HA |
| **Ausführung / model / exécution / modello / modelo** | KA | KA TICN |

| ØD | P | $l_1$ | $l_2$ | $l_s$ | $l_4$ | Ø$d_1$ | Ø$d_2$ | Ø$d_s$ | z | GT | BT | | ID | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNC 1/4“ - | 20 | 62 | 15 | 15,6 | 36 | 4,80 | 8 | 6,7 | 3 | 13 | 16,1 | 5,2 | 111534 | 111555 |
| UNC 5/16“ - | 18 | 74 | 18 | 18,7 | 40 | 5,95 | 10 | 8,3 | 3 | 16 | 19,2 | 6,6 | 111536 | 111557 |
| UNC 3/8“ - | 16 | 80 | 21 | 22,6 | 45 | 7,50 | 12 | 10 | 4 | 19 | 23,1 | 8,0 | 111535 | 111556 |
| UNC 7/16“ - | 14 | 80 | 24 | 25,9 | 45 | 7,95 | 12 | 11,7 | 4 | 22 | 26,4 | 9,4 | 111538 | 111559 |
| UNC 1/2“ - | 13 | 90 | 28 | 29,8 | 45 | 10,30 | 14 | 13,3 | 4 | 25 | 30,3 | 10,8 | 111533 | 111554 |

## VHM-Gewindefräser GFS mit Senkfase

solid carbide thread milling cutters GFS with countersink / fraises à fileter GFS en carbure monobloc avec chanfrein / frese a filettare in metallo duro GFS con svasatura / fresas de roscado de metal duro GFS con avellanador

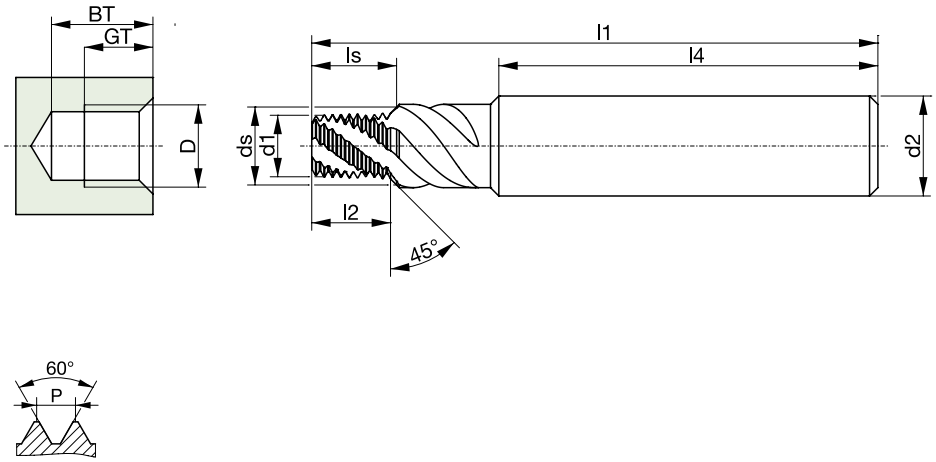
| Typenbezeichnung / type / type / tipo / tipo | GFS N | GFS N |
|---|---|---|
| **UNF-Feingewinde ASME B1.1**<br>Unified fine thread ASME B1.1<br>Filetage américain à pas fin ASME B1.1<br>Filettatura fine unificata ASME B1.1<br>Rosca unificada fina ASME B1.1<br>  <br> | | |
| **Gewindetiefe / thread length / profondeur de filetage / profondità di filettatura / profundidad de rosca** | 2 x D | 2 x D |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>8.1-8.3 / 9.1-9.3 | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>7.1.-7.3<br>8.1-8.3 / 9.1-9.3 |
| **Zylinderschaft / straight shank / queue cylindrique / gambo cilindrico / mango cilíndrico** | DIN 6535 HA | DIN 6535 HA |
| **Ausführung / model / exécution / modello / modelo** | KA | KA TICN |

| ØD | P | $l_1$ | $l_2$ | $l_s$ | $l_4$ | $Ød_1$ | $Ød_2$ | $Ød_s$ | z | GT | BT | | ID | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNF 1/4 - | 28 | 62 | 14 | 14,8 | 36 | 4,80 | 8 | 6,7 | 3 | 13 | 15,3 | 5,5 | 111608 | 111629 |
| UNF 5/16 - | 24 | 74 | 17 | 18,3 | 40 | 5,95 | 10 | 8,3 | 3 | 16 | 18,8 | 6,9 | 111610 | 111631 |
| UNF 3/8 - | 24 | 80 | 21 | 21,6 | 45 | 7,95 | 12 | 10 | 4 | 19 | 22,1 | 8,5 | 111609 | 111630 |
| UNF 7/16 - | 20 | 80 | 25 | 25,9 | 45 | 9,40 | 12 | 11,7 | 4 | 22 | 26,4 | 9,9 | 111612 | 111633 |
| UNF 1/2 - | 20 | 90 | 27 | 28,5 | 45 | 10,90 | 14 | 13,3 | 4 | 25 | 29,0 | 11,5 | 111607 | 111628 |

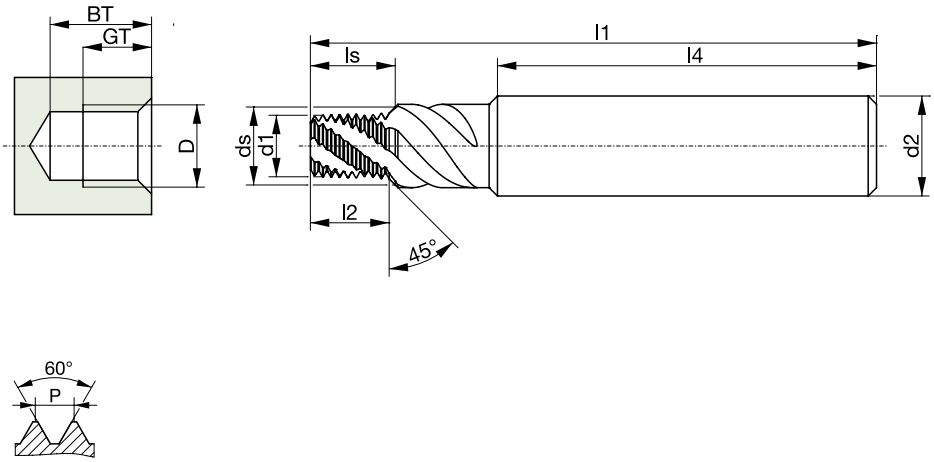
# VHM-Gewindefräser GFS mit Senkfase

solid carbide thread milling cutters GFS with countersink / fraises à fileter GFS en carbure monobloc avec chanfrein / frese a filettare in metallo duro GFS con svasatura / fresas de roscado de metal duro GFS con avellanador

| Typenbezeichnung / type / type / tipo / tipo | GFS N | GFS N |
|---|---|---|
| **NPT-Amerikanisches Standard Rohrgewinde ASME B1.20.1 kegelig 1:16**<br>American standard taper pipe threadASME B1.20.1 tapered 1:16<br>Filetage conique américain tube ASME B1.20.1 conique 1:16<br>Filetattura conica americana ASME B1.20.1 conico 1:16<br>Rosca cónica para tubo norma americana ASME B1.20.1 cónico 1:16 | | |
| **Gewindetiefe / thread length / profondeur de filetage / profondità di filettatura / profundidad de rosca** | = $l_2$ | = $l_2$ |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>8.1-8.3 / 9.1-9.3 | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>7.1.-7.3<br>8.1-8.3 / 9.1-9.3 |
| **Zylinderschaft / straight shank / queue cylindrique / gambo cilindrico / mango cilíndrico** | DIN 6535 HA | DIN 6535 HA |
| **Ausführung / model / exécution / modello / modelo** | KA | KA TICN |



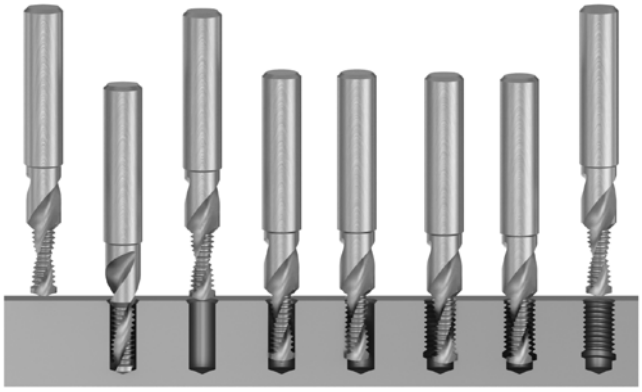

| ØD | P | $l_1$ | $l_2$ | $l_s$ | $l_4$ | Ød$_1$ | Ød$_2$ | Ød$_s$ | z | GT | BT | | ID | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NPT 1/8 - | 27 | 70 | 10 | 11,2 | 45 | 7,30 | 12 | 10,0 | 4 | 9 | 11,7 | 8,5 | 111181 | 111190 |
| NPT 1/4 - | 18 | 80 | 15 | 16,4 | 48 | 9,95 | 16 | 13,1 | 4 | 14 | 16,9 | 11,1 | 111180 | 111189 |
| NPT 3/8 - | 18 | 80 | 15 | 16,9 | 48 | 12,50 | 18 | 16,7 | 4 | 14 | 17,4 | 14,5 | 111182 | 111191 |

| Typenbezeichnung / type / type / tipo / tipo | GFS N | GFS N |
|---|---|---|
| **NPTF-Amerikanisches Standard Rohrgewinde ASME B1.20.3 kegelig 1:16**<br>American standard taper pipe thread ASME B1.20.3 tapered 1:16<br>Filetage conique américain tube ASME B1.20.3 conique 1:16<br>Filetattura conica americana ASME B1.20.3 conico 1:16<br>Rosca cónica para tubo norma americana ASME B1.20.3 cónico 1:16<br>  <br> | | |
| **Gewindetiefe / thread length / profondeur de filetage / profondità di filettatura / profundidad de rosca** | = $l_2$ | = $l_2$ |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>8.1-8.3 / 9.1-9.3 | 1.1-1.8 / 2.1-2.3<br>3.1-3.4 / 4.1-4.7<br>5.1-5.4 / 6.1-6.3<br>7.1.-7.3<br>8.1-8.3 / 9.1-9.3 |
| **Zylinderschaft / straight shank / queue cylindrique / gambo cilindrico / mango cilíndrico** | DIN 6535 HA | DIN 6535 HA |
| **Ausführung / model / exécution / modello / modelo** | KA | KA TICN |

| ØD | P | $l_1$ | $l_2$ | $l_s$ | $l_4$ | Ø$d_1$ | Ø$d_2$ | Ø$d_s$ | z | GT | BT | | ID | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NPTF 1/8 - | 27 | 70 | 10 | 11,2 | 45 | 7,30 | 12 | 10,0 | 4 | 9 | 11,7 | 8,5 | 111199 | 111208 |
| NPTF 1/4 - | 18 | 80 | 15 | 16,4 | 48 | 9,95 | 16 | 13,1 | 4 | 14 | 16,9 | 11,1 | 111198 | 111207 |
| NPTF 3/8 - | 18 | 80 | 15 | 16,9 | 48 | 12,50 | 18 | 16,7 | 4 | 14 | 17,4 | 14,5 | 111200 | 111209 |

# Prozessbeschreibung für VHM-Bohrgewindefräser BGF

machining steps for solid carbide drill and thread milling cutter BGF /
réalisation d'un filetage avec la fraise à percer-fileter en carbure monobloc BGF /
lavorazione foratura e fresatura delle filettature in metallo duro BGF /
instrucciones para el mecanizado con broca-fresa de roscado de metal duro BGF



1 2 3 4 5 6 7 8

| Prozessbeschreibung | |
|---|---|
| 1. | Startposition Bohrungsmitte anfahren |
| 2. | Bohren des Kernloches mit Ansenken der 90° Fase |
| 3. | Rückzug des Werkzeuges aus der Bohrung zum Entspanen |
| 4. | Verfahren auf Startposition des Gewindefräszykluses |
| 5. | Mit Einfahrschleife auf radiale Gewindetiefe fahren |
| 6. | Fräsen des Gewindes |
| 7. | Beenden des Gewindefräsvorganges mit einer Ausfahrschleife |
| 8. | Wegfahren auf Startposition, Ende der Bearbeitung |

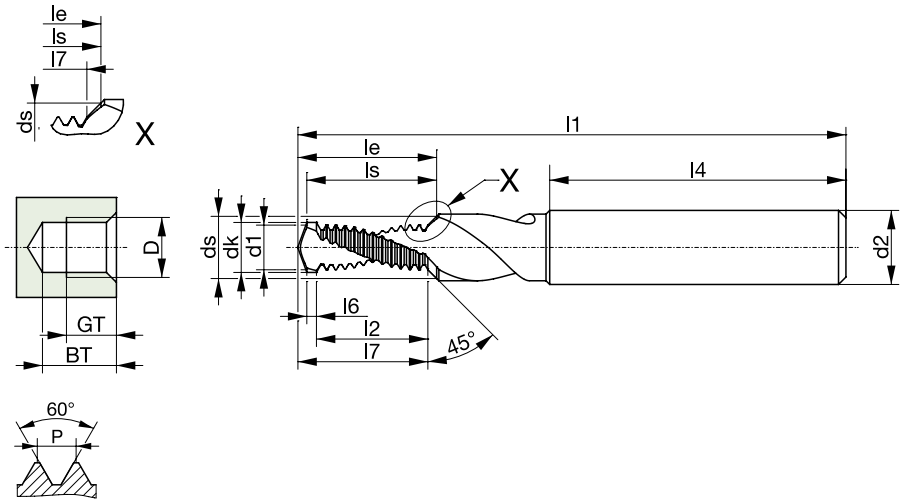
| Machining steps | |
|---|---|
| 1. | Travel to center of machined hole (start position) |
| 2. | Drilling of core diameter and 90° countersinking |
| 3. | Retraction of tool from drilled hole for chip removal |
| 4. | Plunge to desired thread depth |
| 5. | Approach to radial thread depth with descending loop |
| 6. | Thread milling |
| 7. | After machining run-out loop back to center |
| 8. | End of thread milling process |

| Comment procéder | |
|---|---|
| 1. | Positionnement au point de départ dans l'axe du perçage |
| 2. | Usinage du perçage et du chanfrein 90° |
| 3. | Remonter la fraise hors du trou et débourrer |
| 4. | Positionnement au point de départ du cycle de fraisage |

| Comment procéder | |
|---|---|
| 5. | Plongée radiale à la cote nominale sur une trajectoire hélicoïdale |
| 6. | Usinage du filetage |
| 7. | Retour dans l'axe du perçage par une sortie hélicoïdale |
| 8. | Retour au point de départ, fin du cycle de fraisage |

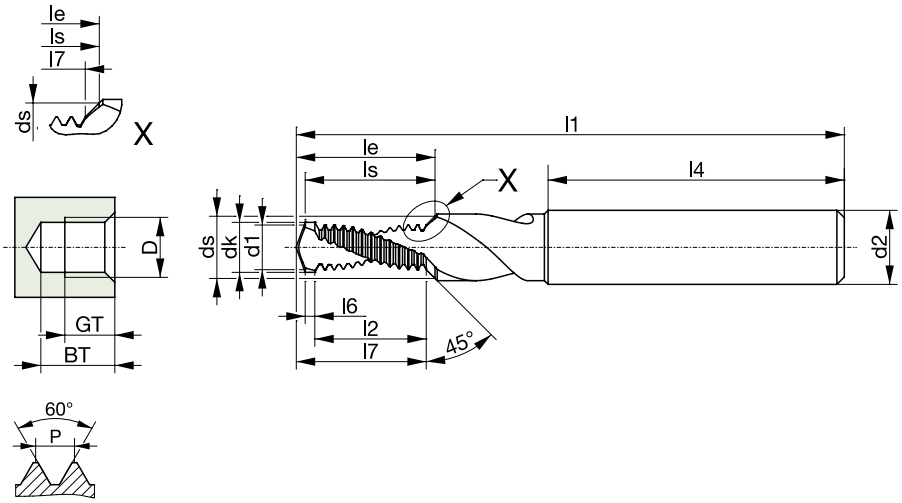
| Lavorazione | |
|---|---|
| 1. | Posizionarsi al centro del foro da maschiare (posizione di partenza) |
| 2. | Eseguire la foratura e lo smusso di 90° |
| 3. | Uscire dal preforo per evacuare i trucioli |
| 4. | Ritornare alla posizione di partenza |
| 5. | Avvicinarsi con ciclo decrescente alla profondità del filetto radiale |
| 6. | Fresatura in interpolazione del filetto |
| 7. | Quindi riportarsi a centro foro |
| 8. | Ritornare alla posizione di partenza |

| Instrucciones | |
|---|---|
| 1. | Posicionar la fresa al centro del agujero (posición de inicio) |
| 2. | Taladrado del agujero y avellanado de 90° |
| 3. | Retracción de la herramienta para evacuación de virutas |
| 4. | Bajar a la porfundidad de rosca deseada |
| 5. | Acceso a profundidad de rosca radial con círculo descendente. |
| 6. | Fresado de rosca |
| 7. | Después ciclo de salida al centro |
| 8. | Regreso a la posición de inicio, mecanizado terminado |

| Typenbezeichnung / type / type / tipo / tipo | BGF W | BGF W |
|---|---|---|
| **Metrisches ISO-Regelgewinde DIN 13**<br>ISO Metric coarse thread DIN 13<br>Filetage métrique ISO DIN 13<br>Filettatura metrica ISO DIN 13<br>Rosca métrica ISO DIN 13<br>  | | |
| **Gewindetiefe / thread length / profondeur de filetage / profondità di filettatura / profundidad de rosca** | 2 x D | 2 x D |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | 3.1-3.4 / 4.2<br>5.1-5.4 / 8.1-8.3 | 3.1-3.4 / 5.1-5.4<br>8.1-8.3 |
| **Zylinderschaft / straight shank / queue cylindrique / gambo cilindrico / mango cilíndrico** | DIN 6535 HA | DIN 6535 HA |
| **Ausführung / model / exécution / modello / modelo** | KA | KA FNT |

| ØD | | | P | $l_1$ | $l_e$ | $l_4$ | $l_6$ | $l_7$ | Ød$_k$ | Ød$_2$ | Ød$_s$ | Ød$_1$ | z | GT / $l_2$ | BT / $l_s$ | ID | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | 3 | * | 0,5 | 49 | 7,3 | 36 | 0,5 | 7 | 2,5 | 6 | 3,2 | 2,45 | 2 | 6 | 6,9 | 025818 | 025819 |
| M | 4 | | 0,7 | 49 | 9,4 | 36 | 0,7 | 9 | 3,3 | 6 | 4,2 | 3,24 | 2 | 8 | 8,9 | 025820 | 025821 |
| M | 5 | | 0,8 | 55 | 11,7 | 36 | 0,8 | 11 | 4,2 | 6 | 5,3 | 4,1 | 2 | 10 | 11 | 025822 | 025823 |
| M | 6 | | 1 | 62 | 14,5 | 36 | 1 | 14 | 5 | 8 | 6,3 | 4,85 | 2 | 12 | 13,7 | 025824 | 025825 |
| M | 8 | | 1,25 | 74 | 18,2 | 40 | 1,3 | 17 | 6,8 | 10 | 8,4 | 6,45 | 2 | 16 | 17,1 | 025828 | 025829 |
| M | 10 | | 1,5 | 79 | 23,4 | 45 | 1,5 | 22 | 8,5 | 12 | 10,5 | 8,08 | 2 | 20 | 22,2 | 025831 | 025832 |
| M | 12 | | 1,75 | 89 | 27,1 | 45 | 1,5 | 26 | 10,3 | 14 | 12,6 | 9,74 | 2 | 24 | 25,6 | 025833 | 025834 |
| M | 14 | | 2 | 102 | 32,8 | 48 | 1,5 | 31 | 12 | 16 | 14,7 | 11,35 | 2 | 28 | 31,1 | 025835 | 025836 |
| M | 16 | | 2 | 102 | 37,1 | 48 | 1,5 | 36 | 14 | 18 | 16,8 | 13,28 | 2 | 32 | 35,2 | 025837 | 025838 |

* M 3 ohne Kühlkanal / M 3 without internal coolant / M 3 sans lubrification interne / M 3 senza lubrificazione interna / M 3 sin refrigeración interna

| Typenbezeichnung / type / type / tipo / tipo | BGF W | BGF W |
|---|---|---|
| **Metrisches ISO-Feingewinde DIN 13**<br>ISO Metric fine thread DIN 13<br>Filetage métrique ISO à pas fin DIN 13<br>Filettatura metrica ISO passo fine DIN 13<br>Rosca métrica fina ISO DIN 13<br>  | | |
| **Gewindetiefe / thread length / profondeur de filetage / profondità di filettatura / profundidad de rosca** | 2 x D | 2 x D |
| **Einsatzgebiet / application / application adatto per lavorazione di / aplicación** | 3.1-3.4 / 4.2<br>5.1-5.4 / 8.1-8.3 | 3.1-3.4 / 5.1-5.4<br>8.1-8.3 |
| **Zylinderschaft / straight shank / queue cylindrique / gambo cilindrico / mango cilíndrico** | DIN 6535 HA | DIN 6535 HA |
| **Ausführung / model / exécution / modello / modelo** | KA | KA FNT |

| ØD | | | P | $l_1$ | $l_e$ | $l_4$ | $l_6$ | $l_7$ | Ø$d_k$ | Ø$d_2$ | Ø$d_s$ | $d_1$ | z | GT / $l_2$ | BT / $l_s$ | ID | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MF | 8 | x | 1 | 74 | 18,8 | 40 | 1 | 18 | 7 | 10 | 8,4 | 6,79 | 2 | 17 | 17,7 | 025839 | 025840 |
| MF | 10 | x | 1 | 79 | 23,2 | 45 | 1 | 22 | 9 | 12 | 10,5 | 8,75 | 2 | 21 | 21,9 | 025841 | 025842 |
| MF | 12 | x | 1 | 89 | 26,4 | 45 | 1 | 26 | 11 | 14 | 12,6 | 10,74 | 2 | 24 | 24,9 | 025843 | 025844 |
| MF | 12 | x | 1,5 | 89 | 28,2 | 45 | 1,5 | 27 | 10,5 | 14 | 12,6 | 10,06 | 2 | 25 | 26,8 | 025845 | 025846 |
| MF | 14 | x | 1,5 | 102 | 31,5 | 48 | 1,5 | 30 | 12,5 | 16 | 14,7 | 12,01 | 2 | 28 | 29,8 | 025847 | |
| MF | 16 | x | 1,5 | 102 | 36,3 | 48 | 1,5 | 35 | 14,5 | 18 | 16,8 | 13,95 | 2 | 33 | 34,3 | 025849 | |

**Gewindefrässysteme mit Wendeplatten** 174 - 183
thread milling systems with inserts / systèmes de fraises à fileter à plaquettes / sistemi di frese per filettare con inserti / sistemas de fresado de rosca con placas

**Wie gehe ich vor? Erklärung zur Anwendungstabelle** 175
how to proceed - explanation of the application table / comment procéder - explication du tableau d'application / come procedere - spiegazione della tabella d'impiego / cómo proceder - explicación de la tabla de uso

**Anwendungstabelle** 176 - 177
application table / tableau d'applications / tabella d'impiego / tabla de uso

**Typenbezeichnungen** 178
types / types / tipi / tipos

**Anwendungsspezifikationen** 179
application specifications / spécificités d'application / specificazione di applicazione / especificaciones de aplicación

**BFW-Gewindefräshalter mit VHM-Gewindefräsplatten** 180
holder with solid carbide milling cutter inserts / porte-outils à plaquettes en carbure monobloc / porta-utensile con inserti in metallo duro / portaherramientas de roscado con placas de metal duro

**GFK-Gewindefräskopf mit VHM-Gewindefräsplatten** 180
thread milling head with solid carbide milling cutter inserts / tête de fraise à fileter à plaquettes en carbure monobloc / teste di frese a filettare con inserti in metallo duro / fresa de roscado con placas de metal duro

**AFK-Aufsteck-Gewindefräskopf mit VHM-Gewindefräsplatten** 181
shell milling head with solid carbide milling cutter inserts / fraise avec alésage à plaquettes en carbure monobloc / frese a manicotto con inserti in metallo duro / portafresas de roscado con placas de metal duro

**VHM-Gewindefräsplatten und Zubehör** 182
solid carbide milling cutter inserts and accessories / plaquettes à fileter en carbure monobloc et accessoires / inserti in metallo duro ed accessori / placas de fresado de metal duro y accesorios

**Erklärung zur Anwendungstabelle**
**Gewindefrässysteme**
**mit Wendeplatten S. 180 ff**

Wie gehe ich vor?
- Welche Anbindung wird benötigt?

a) Zylinderschaft BFW S. 180
b) Gewindefräskopf (Anzugsgewinde M beachten) GFK S. 180
c) Aufsteckfräskopf (Bohr-Ø d2 beachten) AFK S. 181
- Einsatzgebiet auswählen
- Schnittgeschwindigkeit (Vc m/min) der Tabelle entnehmen
- fz mm/Z (min. und max.) der Tabelle entnehmen

**Spiegazione della tabella d'impiego**
**Sistemi di frese per filettare**
**con inserti p. 180 e seguenti**

Come procedere:
- Tipo di attacco

a) Gambo cilindrico BFW vedi pagina 180
b) Teste di frese a filettare (attacco a vite M) GFK vedi pagina 180
c) Frese a manicotti (rispettare il Ø foro d2) AFK vedi pagina 181
- Scegliere l'impiego
- Velocità di taglio (Vc m/min) vedi tabella
- Avanzamento per dente (fz mm/Z) vedi tabella (min. e max.)

**Explanation of the application table**
**Thread milling systems**
**with inserts p. 180 and the following**

How to proceed:
- Which type of adapter do you require?

a) Straight shank BFW see page 180
b) Thread milling head (tightening thread M) GFK see page 180
c) Shell milling head (pay attention to bore hole Ø d2) AFK S. 181
- Select application
- Cutting speed (Vc m/min) see table
- Feed per tooth (fz mm/Z) see table (min. and max.)

**Explicación de la tabla de uso**
**Sistemas de fresado de rosca**
**con placas p. 180 ss.**

Cómo proceder:
- ¿Que tipo de conexión necesite?

a) Mango cilíndrico BFW véase página 180
b) Fresa de roscado (mango roscado M) GFK véase página 180
c) Portafresas de roscado (atención al Ø de taladrado d2) AFK S. 181
- Seleccionar la aplicación
- Velocidad de corte (Vc m/min) véase tabla
- Avance por diente (fz mm/Z) véase tabla (min. y max.)

**Explication du tableau d'application**
**Systèmes de fraises à fileter**
**à plaquettes p. 180 et suivantes**

Comment procéder:
- Type d'attachement

a) Queue cylindrique BFW voir page 180
b) Tête de fraise à fileter (vissage M) GFK voir page 180
c) Fraise avec alésage (respecter le Ø de perçage d2) AFK voir page 181
- Sélectionnez l'application
- Vitesse de coupe (Vc m/min) voir tableau
- Avance par dent (fz mm/Z) voir tableau (mini et maxi)

# Anwendungstabelle

application table / tableau d'application / tabella d'impiego / tabla de uso

| | Einsatzgebiet | Werkstoff-beispiele | Application | Examples of materials | Application | Exemples de matières | Impieghi | Desinazione dei materiali | Aplicaión | Ejemplo de materiales |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **Stahlwerkstoffe** | | **Steel materials** | | **Aciers** | | **Acciai** | | **Aceros** | |
| 1.1 | Baustahl unleg. / Weicheisen | DC01 | Magnetic soft steel | FeP01 | Fer doux magnétique | C | Ferro magnetico dolce | DC01 | Acero magnético suave | DC01 |
| 1.2 | Baustahl / Einsatzstahl | S235JR | Construction steel / case hardening steel | En40B | Aciers de construction et de cémentation | S235JRG2 | Acciaio da costruzione e da cementatione | Fe360B-FN | Acero de construcción / acero de cementación | A360B-NE |
| 1.3 | Bau- / Kohlenstoffstahl C<0,45% / Stahl niedrigleg. | C45 | Carbon steel | 080M46 | Aciers au carbone | AF65 | Acciaio al carbonio | C45 | Acero al carbono | C45 |
| 1.4 | Kohlenstoffstahl C>0,45% / Stahl niedrigleg. / Stahl hochleg. | 42CrMo4 | Alloyed / heat-treatable steel | En19A | Aciers alliés / aciers pour traitement thermique | 42CD4 | Acciaio legato / bonificato | G40CrMo4 | Acero aleado | 40CrMo4 |
| 1.5 | Stahl legiert / hochlegiert | X153CrMoV12 | Alloyed steel | BD2 | Aciers alliés | Z160CDV12 | Acciaio legato | X155CrVMo12-1KU | Acero aleado templado y revenido | X153CrMoV12 |
| 1.6 | Stahl legiert / hochlegiert | 42CrMo4 | Alloyed steel | En19A | Aciers alliés | 42CD4 | Acciaio legato | G40CrMo4 | Acero aleado templado y revenido | 40CrMo4 |
| 1.7 | Stahl legiert / hochlegiert | 56Si7 | Alloyed steel | 251A58 | Aciers alliés | 55S7 | Acciaio legato | 56Si7 | Acero aleado templado y revenido | 56Si7 (F.144) |
| 1.8 | Stahl gehärtet | 34CrMo4 | Hardened steel | 708A30 | Aciers trempés | 34CD4 | Acciaio trempato | 35CrMo4F | Acero endurecido | 34CrMo4 |
| 1.9 | Stahl gehärtet | X100CrMoV5 | Hardened steel | BA2 | Aciers trempés | Z100CDV5 | Acciaio trempato | X100CrMoV5-1KU | Acero endurecido | X100CrMoV5 |
| 2 | **Rostfreier Stahl** | | **Stainless steel** | | **Aciers inoxydables** | | **Acciai inossidabili** | | **Acero inoxidable** | |
| 2.1 | Stahl-ferritische und martensitisch | X30Cr13 | Ferritic / martensitic steel | 420S37 | Aciers ferritiques, martensitiques | Z30C13 | Acciai ferritici / martensiti | X31Cr13KU | Acero ferritico, martensitico | X30Cr13 |
| 2.2 | Stahl-austenitisch, aust.-ferritisch | X6CrNiMo-Ti17-12-2 | Austenitic steel | 320S18 | Aciers austénitiques | Z6CNDT17-12 | Acciai austenitici | X6CrNiMo-Ti17-12-2 | Austenitico | X6CrNiMo-Ti17-12-2 |
| 2.3 | Stahl-austenitisch, aust.-ferritisch u. ferritisch | X7CrNiAl17-7 | High temperature steel | 301S81 | Aciers réfractaires | Z9CNA17-07 | Acciai termostabili | X7CrNiAl17-7 | Aleac. Cr-Ni resist. a elevadas temperaturas | X7CrNiAl17-7 |
| 3 | **Gusseisen** | | **Cast iron** | | **Fontes** | | **Ghisa** | | **Fundición gris** | |
| 3.1 | Grauguss-lamellar | EN-GJL-200 | Grey cast iron | EN-GJL-200 | Fonte grise | EN-GJL-200 | Ghisa grigia | EN-GJL-200 | Fundición gris | EN-GJL-200 |
| 3.2 | Kugelgraphitguss | EN-GJS-400-15U | Cast iron with nodular graphite | Grade420/12 | Fonte à graphite sphéroïdal | FGS400-15 | Ghisa sferoidale | GS400-12 | Fundición esferoide | EN-GJS-400-15U |
| 3.3 | Temperguss weiß / schwarz | EN-GJMB-350-10 | Malleable cast iron | EN-GJMB-350-10 | Fonte malléable | EN-GJMB-350-10 | Ghisa temprata | EN-GJMB-350-10 | Fundición maleable, nodular | EN-GJMB-350-10 |
| 3.4 | Vermikularguss / ADI / Hartguss | EN-GJV-300 | Cast iron with vermicular graphite | EN-GJV-300 | Fonte vermiculaire | EN-GJV-300 | Ghisa vermiculare | EN-GJV-300 | Fundición gris compactada | EN-GJV-300 |
| 4 | **Kupfer** | | **Copper** | | **Cuivre** | | **Rame** | | **Cobre** | |
| 4.1 | Reinkupfer | Cu-ETP | Copper non-alloyed | Cu-ETP-2 C 101 | Cuivre pur / électrolytique | Cu-a1 | Rame puro / elletrolitico | Cu-ETP | Cobre puro | Cu-ETP |
| 4.2 | Kupfer-Legierungen (kurzspanend) | CuZn39Pb2 | Brass (short chipping) | CZ 120 | Alliages de cuivre (copeaux courts) | CuZn40Pb2 | Ottone (truciolo corto) | CuZn39Pb2 | Latón (viruta corta) | CuZn39Pb2 |
| 4.3 | Kupfer-Legierungen (langspanend) | CuZn37 | Brass (long chipping) | CZ 108 | Alliages de cuivre (copeaux longs) | CuZn37 | Ottone (truciolo lungo) | P-CuZn37 | Latón (viruta larga) | CuZn37 |
| 4.4 | Cu-Al-Ni-Legierungen (kurzspanend) | CuNi10Fe1Mn | Copper-alu-nickel alloyed (short chipping) | CN 102 | Alliages Cu-Al-Ni (copeaux courts) | CW352H | Leghe di Cu-Al-Ni (truciolo corto) | CW352H | Aleaciones Cu-Al-Ni (viruta corta) | CW352H |
| 4.5 | Cu-Al-Ni-Legierungen (langspanend) | CuAl10NiFe4 | Copper-alu-nickel alloyed (long chipping) | CA 104 | Alliages Cu-Al-Ni (copeaux longs) | CuAl9Ni-5Fe3Mn | Leghe di Cu-Al-Ni (truciolo lungo) | CW307G | Aleaciones Cu-Al-Ni (viruta larga) | CW307G |
| 4.6 | Kupfer-Sonderlegierungen (bis Ampco 20) | CuAl10Fe3Mn2 | Special copper alloyed ≤ Ampco 20 | CA 105 | Alliages de cuivre spéciaux ≤ Q 18 | CuAl9Fe3Mn2 | Leghe Cu-Al-Fe ≤ Ampco 20 | CW306G | Aleaciones Cu-Al-Fe ≤ Ampco 20 | CW306G |
| 4.7 | Kupfer-Sonderlegierungen (ab Ampco 21) | CuAl13Fe4,5 | Special copper alloyed ≥ Ampco 21 | AMPCO 21 (Hbz.) | Alliages de cuivre spéciaux ≥ Q 18 | AMPCO 21 (Hbz.) | Leghe Cu-Al-Fe ≥ Ampco 21 | AMPCO 21 (Hbz.) | Aleaciones Cu-Al-Fe ≥ Ampco 21 | AMPCO 21 (Hbz.) |
| 5 | **Aluminium / Magnesium** | | **Aluminium / Magnesium** | | **Aluminium / Magnésium** | | **Alluminio / Magnesio** | | **Aluminio / Magnesio** | |
| 5.1 | Aluminium Si-Gehalt <0,5% | EN AW-Al99,0 | Alu wrought alloy Si <0,5% | 1B | Alu non alliés / alliages corroyés d'alu / Si <0,5 % | 1050A | Alu puro / leghe plastificabili d'alluminio Si <0,5% | 4507 | Alu puros | L-3051 |
| 5.2 | Aluminium Si-Gehalt <6% | EN AC-AlSi6Cu4 | Alu alloyed Si <6% | LM22 | Fontes d'alu <6 % Si | A-S5U3 | Alu legato Si <6% | G-Al5,5Cu | Alu aleado Si <6% | Al-6Si4Cu |
| 5.3 | Aluminium Si-Gehalt >6% | EN AC-AlSi10Mg(a) | Alu alloyed Si >6% | LM9 | Fontes d'alu >6 % Si | A-S10G | Alu legato Si >6% | G-AlSi9Mg | Alu aleado Si >6% | L-2560 |
| 5.4 | Magnesium und Magnesiumlegierungen | MgMn2 | Magnesium wrought alloy | MAG 101 | Alliages corroyés de magnésium | G-M2 | Leghe plastificabili di magnesio | AZ 81hp | Aleaciones forjables de magnesio | AZ 81hp |
| 6 | **Titan** | | **Titanium** | | **Titane** | | **Titanio** | | **Titanio** | |
| 6.1 | Titan unlegiert | Ti 99,7 | Titanium non-alloyed | TA.2 | Titane pur | T-40 | Titanio puro | Titanium Grade 2 (Hbz.) | Titanio puro | Ti-P02 |
| 6.2 | Titan legiert | TiAl6V4 | Titanium alloyed | TA.10 | Alliages de titane | T-A6V | Leghe di titanio | Titanium Grade 5 (Hbz.) | Titanio aleado | Ti-P63 |
| 6.3 | Titan legiert | TiAl6V4 | Titanium alloyed | TA.10 | Alliages de titane | T-A6V | Leghe di titanio | Titanium Grade 5 (Hbz.) | Titanio aleado | Ti-P63 |
| 7 | **Nickel** | | **Nickel** | | **Nickel** | | **Nichel** | | **Niquel** | |
| 7.1 | Nickel unlegiert | Ni 99,6 | Nickel non-alloyed | BS3072: NA11 | Nickel pur | Ni-0,1 | Nichel puro | Nickel 200 | Niquel puro | Nickel 200 |
| 7.2 | Nickel legiert | NiCu30Fe | Nickel alloyed | BS3072: NA13 | Alliages de nickel | Nu30 | Leghe di nichel | MONEL 400 (Hbz.) | Niquel aleado | MONEL 400 (Hbz.) |
| 7.3 | Nickel legiert | NiCr19NbMo | Nickel alloyed | INCONEL alloy718 | Alliages de nickel | NC 19 FeNb | Leghe di nichel | INCONEL 718 (Hbz.) | Niquel aleado | INCONEL 718 (Hbz.) |
| 8 | **Kunststoffe** | | **Synthetics** | | **Matières synthétiques** | | **Materie plastiche** | | **Sintéticos** | |
| 8.1 | Thermoplaste (langspanend) | Polystyrol | Thermoplastic (long chipping) | Styreme | Thermoplastiques (copeaux longs) | Polystyrène | Materiali termoplastici (truciolo lungo) | | Termoplásticos (viruta larga) | |
| 8.2 | Duroplaste (kurzspanend) | Toulnell | Duroplastic (short chipping) | Toufnell | Matières thermodurcissables (copeaux courts) | Touffnell | Materiali duroplastici (truciolo corto) | | Duroplásticos (viruta corta) | |
| 8.3 | faserverstärkte Kunststoffe | CFK | Fibre-reinforced plastic | Carbonfibre | Matières synthétiques renforcées par fibres | CFK | Materiali plastici filamente rinforzati | | Materiales plásticos reforzados | |
| 9 | **Sonderwerkstoffe** | | **Special materials** | | **Matières spéciaux** | | **Materiali speciali** | | **Materiales especiales** | |
| 9.1 | Kobalt Legierungen | Stellite 27 | Cobalt alloyed | | Alliages à base de cobalt | | Leghe a base di cobalto | | Aleaciones de base de cobalto | |
| 9.2 | Wolfram Legierungen | Densimet W | Tungsten alloyed | | Alliages de tungstène | | Leghe di tungsteno | | Tungsteno aleado | |
| 9.3 | Titancarbid Hartstoffe | Ferro Titanit | TIC-hard material | | Carbure de titane | | Carburo di titanio | | Materiales duros TIC | |
| 9.4 | Graphit | Graphit R8430 | Graphite | | Graphite | | Grafite | | Grafito | |

| | | BFW / GFK | | | | AFK | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | BFW-017052-G05<br>BFW-017076-G05<br>BFW-020063-G1<br>BFW-020095-G1<br>GFK-02002008-G1 | BFW-030071-G2<br>BFW-030105-G2<br>GFK-03003012-G2 | BFW-033100-G2<br>BFW-033150-G2<br>GFK-03303012-G2 | BFW-050150-G3<br>BFW-050200-G3<br>GFK-04203516-G3<br>GFK-05003516-G3 | AFK-042040-G1<br>AFK-042040-G2<br>AFK-042040-G3 | AFK-052040-G2<br>AFK-052040-G3 | AFK-063050-G2<br>AFK-063050-G3 | AFK-080050-G2<br>AFK-080050-G3 | AFK-100050-G3 |
| | vc m/min | fz mm | | | | | | | | |
| N/mm² | | | | | | | | | | |
| >100 <400 | 170 - 200 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >250 <710 | 170 - 200 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >400 <850 | 170 - 200 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >420 <850 | 170 - 200 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >850 >1200 | 100 - 150 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >1200 <1400 | 100 - 150 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >1400 <1600 | 70 - 100 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >49 <55 HRC | | | | | | | | | | |
| >55 <63 HRC | | | | | | | | | | |
| | | | | | | | | | | |
| >450 <1200 | 70 - 100 | 0,100 - 0,200 | 0,110 - 0,350 | 0,110 - 0,390 | 0,130 - 0,490 | 0,130 - 0,490 | 0,130 - 0,490 | 0,140 - 0,530 | 0,160 - 0,620 | 0,170 - 0,690 |
| >450 <850 | 70 - 100 | 0,100 - 0,200 | 0,110 - 0,350 | 0,110 - 0,390 | 0,130 - 0,490 | 0,130 - 0,490 | 0,130 - 0,490 | 0,140 - 0,530 | 0,160 - 0,620 | 0,170 - 0,690 |
| >850 <1550 | 70 - 100 | 0,100 - 0,200 | 0,110 - 0,350 | 0,110 - 0,390 | 0,130 - 0,490 | 0,130 - 0,490 | 0,130 - 0,490 | 0,140 - 0,530 | 0,160 - 0,620 | 0,170 - 0,690 |
| | | | | | | | | | | |
| >150 <1000 | 170 - 200 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >350 <1000 | 170 - 200 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >370 < 700 | 170 - 200 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >700 <1000 | 170 - 200 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| | | | | | | | | | | |
| >250 <350 | 170 - 200 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >350 <700 | 170 - 200 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >350 <700 | 170 - 200 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >400 <850 | 170 - 200 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >400 <850 | 170 - 200 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >400 <700 | 170 - 200 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >700 <1500 | 70 - 100 | 0,100 - 0,200 | 0,110 - 0,350 | 0,110 - 0,390 | 0,130 - 0,490 | 0,130 - 0,490 | 0,130 - 0,490 | 0,140 - 0,530 | 0,160 - 0,620 | 0,170 - 0,690 |
| | | | | | | | | | | |
| >100 <500 | 300 - 400 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >160 <300 | 300 - 400 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >300 <600 | 300 - 400 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >120 <300 | 300 - 400 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| | | | | | | | | | | |
| >250 <700 | 70 - 100 | 0,100 - 0,200 | 0,110 - 0,350 | 0,110 - 0,390 | 0,130 - 0,490 | 0,130 - 0,490 | 0,130 - 0,490 | 0,140 - 0,530 | 0,160 - 0,620 | 0,170 - 0,690 |
| >700 <900 | 70 - 100 | 0,100 - 0,200 | 0,110 - 0,350 | 0,110 - 0,390 | 0,130 - 0,490 | 0,130 - 0,490 | 0,130 - 0,490 | 0,140 - 0,530 | 0,160 - 0,620 | 0,170 - 0,690 |
| >900 <1400 | 70 - 100 | 0,100 - 0,200 | 0,110 - 0,350 | 0,110 - 0,390 | 0,130 - 0,490 | 0,130 - 0,490 | 0,130 - 0,490 | 0,140 - 0,530 | 0,160 - 0,620 | 0,170 - 0,690 |
| | | | | | | | | | | |
| >400 <600 | 70 - 100 | 0,100 - 0,200 | 0,110 - 0,350 | 0,110 - 0,390 | 0,130 - 0,490 | 0,130 - 0,490 | 0,130 - 0,490 | 0,140 - 0,530 | 0,160 - 0,620 | 0,170 - 0,690 |
| >600 <1200 | 70 - 100 | 0,100 - 0,200 | 0,110 - 0,350 | 0,110 - 0,390 | 0,130 - 0,490 | 0,130 - 0,490 | 0,130 - 0,490 | 0,140 - 0,530 | 0,160 - 0,620 | 0,170 - 0,690 |
| >1200 <1600 | 70 - 100 | 0,100 - 0,200 | 0,110 - 0,350 | 0,110 - 0,390 | 0,130 - 0,490 | 0,130 - 0,490 | 0,130 - 0,490 | 0,140 - 0,530 | 0,160 - 0,620 | 0,170 - 0,690 |
| | | | | | | | | | | |
| <80 | 150 - 300 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| <110 | 150 - 300 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| >80 <1500 | 70 - 100 | 0,120 - 0,230 | 0,130 - 0,390 | 0,130 - 0,390 | 0,150 - 0,500 | 0,170 - 0,460 | 0,170 - 0,460 | 0,220 - 0,800 | 0,250 - 0,930 | 0,280 - 1,030 |
| | | | | | | | | | | |
| >500 <1200 | 70 - 100 | 0,100 - 0,200 | 0,110 - 0,350 | 0,110 - 0,390 | 0,130 - 0,490 | 0,130 - 0,490 | 0,130 - 0,490 | 0,140 - 0,530 | 0,160 - 0,620 | 0,170 - 0,690 |
| >1400 <1800 | | | | | | | | | | |
| >1500 <1700 | | | | | | | | | | |
| <100 | | | | | | | | | | |

**Modulare Frässysteme /**
**thread milling systems with inserts / systèmes de fraises à fileter à plaquettes /**
**sistemi di frese per filettare con inserti / sistemas de fresado de rosca con placas**

| Typenbezeichnung / type / type / tipo / tipo | Ausführungen / models / exécutions / modelli / modelos |
|---|---|
| **BFW** | Gewindefräshalter mit VHM-Gewindefräsplatten für Gewindegrößen ab M20x1,5 und Regelgewinde ab M24; Steigung 0,75-6,0 mm, bzw. 32-4 Gang/1“. Flanken ∢ 60°/ 55°.<br>Einsatz in sämtlichen Werkstoffen, mit innerer Kühlmittelzufuhr, mit Zylinderschaft DIN 1835 B. |
| | Holder with solid carbide milling cutter inserts for fine threads starting with M20x1.5 and standard threads starting with M24; pitch 0.75 - 6.0 mm or 32-4 threads/1“. Flanks ∢ 60°/ 55°.<br>Applicable for all working materials, with internal coolant, with straight shank acc. DIN 1835 B. |
| | Porte-outils à plaquettes en carbure monobloc pour filetages métriques à partir de M20x1,5 pour les pas fins et de M24x3 pour les pas gros pas de 075 - 6,0 mm ou 32-4 f/1“.<br>Flancs ∢ 60°/ 55°. Convient pour toutes les matières, avec lubrification interne, avec queue cylindrique selon DIN 1835 B. |
| | Porta-utensile con inserti in metallo duro per filettature metriche fini a partire da M20x1,5 e metriche da M24 passi 0,75 - 6,0 mm o 32-4 fx1“. Fianchi ∢ 60°/ 55°. Adatto per lavorare quasi tutti i materiali, con lubrificazione interna, con gambo cilindrico secondo DIN 1835 B. |
| | Portaherramientas con placas de metal duro para roscas finas a partir de M20x1,5 y roscas estándares a partir de M24; paso 0,75 - 6,0 mm o 32-4 hilos/1“. Flancos ∢ 60°/ 55°.<br>Aplicable para todos materiales, con refrigeración interna, con mango cilíndrico según DIN 1835 B. |
| **GFK** | Gewindefräskopf mit VHM-Gewindefräsplatten für Gewindegrößen ab M24x1,5 und Regelgewinde ab M27; Steigung 1,5-6,0 mm, bzw. 32-4 Gang/1“.<br>Flanken ∢ 60°/ 55°.<br>Einsatz in sämtlichen Werkstoffen, mit innerer Kühlmittelzufuhr, mit Anzugsgewinde. |
| | Thread milling head with solid carbide milling cutter inserts for fine threads starting with M24x1.5 and standard threads starting with M27; pitch 1.5-6.0 mm or 32-4 threads/1“.<br>Flanks ∢ 60°/ 55°.<br>Applicable for all working materials, with internal coolant, with tightening thread. |
| | Tête de fraise à fileter à plaquettes en carbure monobloc pour filetages métriques à partir de M24x1,5 pour les pas fins et de M27x3 pour les pas gros pas de 075 - 6,0 mm ou 32-4 f/1“.<br>Flancs ∢ 60°/ 55°.<br>Convient pour toutes les matières, avec lubrification interne, avec attachement à visser. |
| | Teste di frese a filettare con inserti in metallo duro per filettature metriche fini a partire da M24x1,5 e metriche da M27 passi 0,75 - 6,0 mm o 32-4 fx1“.<br>Fianchi ∢ 60°/ 55°.<br>Adatto per lavorare quasi tutti i materiali, con lubrificazione interna, e attacco a vite. |
| | Fresa de roscado con placas de metal duro para roscas finas a partir de M24x1,5 y roscas estándares a partir de M27; paso 1,5-6,0 mm o 32-4 hilos/1“. Flancos ∢ 60°/ 55°.<br>Aplicable para todos materiales, con refrigeración interna, con mango roscado. |
| **AFK** | Aufsteck-Gewindefräskopf mit VHM-Gewindefräsplatten für Gewindegrößen ab M54x1,5 und Regelgewinde ab M60; Steigung 0,75-6,0 mm, bzw. 16-4 Gang/1“.<br>Flanken ∢ 60°/ 55°.<br>Einsatz in sämtlichen Werkstoffen, mit innerer Kühlmittelzufuhr. |
| | Shell milling head with solid carbide milling cutter inserts for fine threads starting with M54x1.5 and standard threads starting with M60x5,5; pitch 0.75-6.0 mm or 16-4 threads/1“.<br>Flanks ∢ 60°/ 55°.<br>Applicable for all working materials, with internal coolant. |
| | Fraise avec alésage à plaquettes en carbure monobloc pour filetages métriques à partir de M54x1,5 pour les pas fins et de M60x5,5 pour les pas gros pas de 075 - 6,0 mm ou 16-4 f/1“.<br>Flancs ∢ 60°/ 55°.<br>Convient pour toutes les matières, avec lubrification interne. |
| | Frese a manicotto con inserti in metallo duro per filettature metriche fini a partire da M54x1,5 e metriche da M60 passi 0,75 - 6,0 mm o 32-4 fx1“.<br>Fianchi ∢ 60°/ 55°.<br>Adatto per lavorare quasi tutti i materiali, con lubrificazione interna. |
| | Portafresas de roscado con placas de metal duro para roscas finas a partir de M54x1,5 y roscas estándares a partir de M60; paso 0,75-6,0 mm o 16-4 hilos/1“.<br>Flancos ∢ 60°/ 55°.<br>Aplicable para todos materiales, con refrigeración interna. |

**Gewindefräsen mit Gewindefrässystemen - Wendeplatten**

Um Profilüberschneidungen zu vermeiden sollte der Fräserdurchmesser bei Regelgewinde 2/3 (bei Feingewinden 3/4) vom Nenndurchmesser nicht übersteigen.

**Vorteile**
- nur ein Werkzeug für:
  - unterschiedliche Steigungen und Gewindegrößen
  - Durchgang- und Sackloch
  - sämtliche Toleranzen
- hohe Prozesssicherheit (kurze Frässpäne, Werkzeugbruch führt nicht unbedingt zum Gewindeausschuss)
- hohe Qualität der Gewindeoberfläche
- für große Gewindetiefen geeignet (geringe Schnittkräfte)
- auch bei großen Gewindetiefen absolut zylindrische Gewinde
- für kleine Serien mit wechselnden Steigungen sehr gut geeignet

**Nachteil**
- Bauteile mit mehreren gleichen Gewinden andere Verfahren wirtschaftlicher

**Frese per filettare con inserti**

Per evitare danni al profilo del filetto la fresa deve avere un D max. di 2/3 del diametro di maschiatura (e 3/4 per passi fini).

**Vantaggi**
- un solo utensile per:
  - diversi passi e diametri
  - fori ciechi e passanti
  - tutte le tolleranze
- estrema sicurezza nella esecuzione dei filetti
- alta qualità della superficie dei filetti
- forze di taglio molto basse
- filettature profonde perfettamente assiali
- molto indicate per piccole serie con vari passi

**Svantaggi**
- altri sistemi più economici per pezzi con molte filettature uguali

**Thread milling with thread milling systems - inserts**

In order to avoid profile damage the milling cutter diameter should not exceed 2/3 (3/4 for fine threads) of the nominal diameter.

**Advantages**
- only one tool for:
  - different pitch and thread sizes
  - through and blind hole
  - all tolerances
- high process security (short chips, tool breakage does not necessarily lead to defective threads)
- high thread surface quality
- suitable for large thread depths (low cutting forces)
- completely cylindrical threads also for large thread depth
- well suited for small series with varying pitch

**Disadvantage**
- other more economical procedures for workpieces with several identical threads

**Fresado de rosca con sistemas de fresado de rosca con placas**

Para evitar deterioro del perfil: el diámetro de fresa no debe exceder 2/3xD (3/4xD para roscas finas) del diámetro nominal.

**Ventajas**
- solamente una herramienta para:
  - varias pasos y diámetros
  - agujero pasante y agujero ciego
  - todas las tolerancias
- alta seguridad de proceso (viruta corta, rotura de la herramienta no debe resultar en una rosca deteriorada)
- alta calidad de la superficie de la rosca
- apto para largas profundidades de rosca (fuerzas de corte escasas)
- roscas completamente cilíndricos, también para largas profundidades de rosca
- perfectamente apto para pequeñas series con pasos cambiantes

**Desventaja**
- otras procedimientos más económicos para piezas con varias roscas idénticas

**Fraisage de filetages avec systèmes à plaquettes**

Pour éviter de recouper le profil, le diamètre de la fraise ne devra pas excéder 2/3 du diamètre nominal du filetage à réaliser pour les pas gros (3/4 pour les pas fins).

**Avantages**
- un seul outil pour :
  - filetages de diamètres et de pas différents
  - trous borgnes et débouchants
  - toutes les tolérances
- grande fiabilité du process (copeaux courts, un bris d'outil n'entraîne pas obligatoirement une non-conformité)
- excellente qualité de surface
- convient pour taraudages profonds (efforts de coupe réduits)
- filetages parfaitement cylindriques même pour les taraudages profonds
- convient pour les filetages de pas différents réalisés en petites séries

**Inconvénients**
- autres procédés plus économiques pour les pièces ayant plusieurs filetages identiques

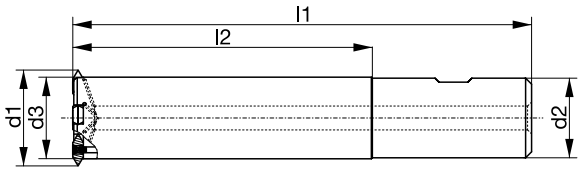
# BFW / GFK

**für Gewinde ab M20×1,5 und Regelgewinde ab M24**
for fine threads starting with M20×1.5 and standard threads starting with M24×3 /
pour filetages métriques à partir de M20×1,5 pour les pas fins et de M24×3 pour les pas gros /
per filettature metriche fini a partire da M20×1,5 e metriche da M24 /
para roscas finas a partir de M20×1,5 y roscas estándares a partir de M24

**Um Profilverletzungen zu vermeiden: Fräserdurchmesser max. ⅔×D (bei Feingewinden ¾×D)**
in order to avoid profile damage: milling cutter diameter max. ⅔×D (¾×D for fine threads) /
pour éviter de recouper le profil, le diamètre de la fraise ne devra pas excéder ⅔×D pour les pas gros (¾×D pour les pas fins) /
per evitare danni al profilo del filetto la fresa deve avere un D max. di ⅔ del diametro di maschiatura (e ¾ per passi fini) /
para evitar deterioro del perfil: diámetro de fresa máximo ⅔×D (¾×D para roscas finas)

## BFW

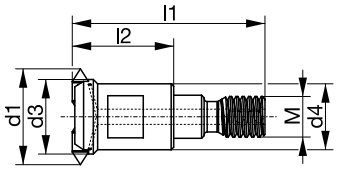
BFW-Gewindefräshalter mit VHM-Gewindefräsplatten mit innerer axialer Kühlmittelzufuhr
BFW holder with solid carbide milling cutter inserts with axial internal coolant /
BFW porte-outils à plaquettes en carbure monobloc avec lubrification interne axiale /
BFW porta-utensile con inserti in metallo duro con lubrificazione interna assiale /
BFW portaherramientas de roscado con placas de metal duro con refrigeración interior axial /



| Typenbezeichnung / type / type / tipo / tipo | l1 | l2 | d1 | d2 | d3 | z | ID |
|---|---|---|---|---|---|---|---|
| BFW-017052-G05 | 102 | 52 | 17,5 | 16 | 13 | 3 | 049748 |
| BFW-017076-G05 | 126 | 76 | 17,5 | 16 | 13 | 3 | 049749 |
| BFW-020063-G1 | 113 | 63 | 20 | 20 | 14,7 | 2 | 102094 |
| BFW-020095-G1 | 145 | 95 | 20 | 20 | 14,7 | 2 | 102095 |
| BFW-030071-G2 | 127 | 71 | 30 | 25 | 23,0 | 2 | 102096 |
| BFW-030105-G2 | 161 | 105 | 30 | 25 | 23,0 | 2 | 102097 |
| BFW-033100-G2 | 161 | 100 | 33 | 32 | 25,5 | 3 | 102098 |
| BFW-033150-G2 | 210 | 150 | 33 | 32 | 25,5 | 3 | 111816 |
| BFW-042150-G3 | 230 | 150 | 42 | 40 | 33 | 4 | 047083 |
| BFW-042200-G3 | 280 | 200 | 42 | 40 | 33 | 4 | 049741 |
| BFW-050150-G3 | 230 | 150 | 50 | 40 | 41,0 | 4 | 111817 |
| BFW-050200-G3 | 280 | 200 | 50 | 40 | 41,0 | 4 | 111818 |

## GFK

GFK Gewindefräskopf mit VHM-Gewindefräsplatten mit innerer axialer Kühlmittelzufuhr DEPO kompatibel
GFK thread milling head with solid carbide milling cutter inserts with axial internal coolant DEPO compatible /
GFK tête de fraise à fileter à plaquettes en carbure monobloc avec lubrification interne axiale compatible avec DEPO /
GFK teste di frese a filettare con inserti in metallo duro con lubrificazione interna assiale DEPO compatibile /
GFK fresa de roscado con placas de metal duro con refrigeración interior axial DEPO compatible

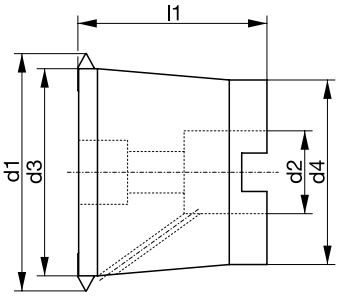


| Typenbezeichnung / type / type / tipo / tipo | l1 | l2 | d1 | d3 | d4 | M | z | ID |
|---|---|---|---|---|---|---|---|---|
| GFK-02002008-G1 | 38 | 20 | 20 | 14,7 | 13 | 8 | 2 | 001971 |
| GFK-03003012-G2 | 52 | 30 | 30 | 23,0 | 21 | 12 | 2 | 001972 |
| GFK-03303012-G2 | 52 | 30 | 33 | 25,5 | 21 | 12 | 3 | 001973 |
| GFK-04203516-G3 | 58 | 35 | 42 | 33,0 | 29 | 16 | 4 | 049742 |
| GFK-05003516-G3 | 58 | 35 | 50 | 41,5 | 29 | 16 | 4 | 003380 |

# AFK

**AFK Aufsteck-Gewindefräskopf mit VHM-Gewindefräsplatten mit innerer radialer Kühlmittelzufuhr**
AFK shell milling head with solid carbide milling cutter inserts with internal radial coolant /
AFK fraise avec alésage avec plaquettes en carbure monobloc avec lubrification interne radiale /
AFK frese a manicotto con inserti in metallo duro con lubrificazione interna radiale /
AFK portafresas de roscado con placas de metal duro con refrigeración interior radial /

**für Gewinde ab Durchmesser 54 mm**
for threads ≥ 54 mm /
pour filets à partir de 54 mm /
per filetti a partire da 54 mm /
para roscas a partir de 54 mm




| Typenbezeichnung / type / type / tipo / tipo | d1 | d2 | d3 | d4 | l1 | z | Spannschraube / screw / vis / vita / tornillo | ID |
|---|---|---|---|---|---|---|---|---|
| AFK-042040-G1 | 42 | 16 | 37 | 32 | 40 | 5 | M 8 | 007479 |
| AFK-042040-G2 | 42 | 16 | 34 | 32 | 40 | 5 | M 8 | 025924 |
| AFK-042040-G3 | 42 | 16 | 33 | 32 | 40 | 4 | M 8 | 025925 |
| AFK-052040-G2 | 52 | 16 | 44 | 38 | 40 | 5 | M 8 | 001969 |
| AFK-052040-G3 | 52 | 16 | 43 | 38 | 40 | 5 | M 8 | 004938 |
| AFK-063050-G2 | 63 | 22 | 55 | 49 | 50 | 6 | M 10 | 001975 |
| AFK-063050-G3 | 63 | 22 | 52 | 49 | 50 | 6 | M 10 | 004937 |
| AFK-080050-G2 | 80 | 27 | 72 | 50 | 50 | 8 | M 12 | 001970 |
| AFK-080050-G3 | 80 | 27 | 70 | 50 | 50 | 8 | M 12 | 004939 |
| AFK-100050-G3 | 100 | 32 | 90 | 78 | 50 | 10 | M 16 | 001974 |

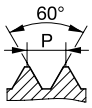
**Um Profilverletzungen zu vermeiden: Fräserdurchmesser max. ⅔×D (bei Feingewinden ¾×D)**
in order to avoid profile damage: milling cutter diameter max. ⅔×D (¾×D for fine threads) /
pour éviter de recouper le profil, le diamètre de la fraise ne devra pas excéder ⅔×D pour les pas gros (¾×D pour les pas fins) /
per evitare danni al profilo del filetto la fresa deve avere un D max. di ⅔ del diametro di maschiatura (e ¾ per passi fini) /
para evitar deterioro del perfil: diámetro de fresa máximo ⅔×D (¾×D para roscas finas)

## Auswechselbare VHM-Gewindefräsplatten und Zubehör

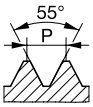
exchangeable solid carbide milling cutter inserts and accessories / plaquettes à fileter interchangeables en carbure monobloc et accessoires / inserti in metallo duro intercambiabili ed accessori / placas de fresado de metal duro intercambiables y accesorios

| | | G0,5 075 | G0,5 150 | G1 075 | G1 150 | G1 250 | G2 075 | G2 150 | G2 250 | G3 150 | G3 300 | G1 014 | G2 014 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60° | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| 55° | | | | | | | | | | | | ● | ● |
| P mm | | 0,75-1,5 | 1,5-3 | 0,75-1,5 | 1,5-2,5 | 2,5-4,0 | 0,75-1,5 | 1,5-2,5 | 2,5-5,5 | 1,5-3,0 | 3,0-6,0 | - | - |
| P Gg/“ TPI | | 32-16 | 16-9 | 32-16 | 16-10 | 10-7 | 32-16 | 16-10 | 10-5 | 16-9 | 9-4 | 14-11 | 14-11 |
| TIN | | 049750 | 049751 | - | - | - | - | - | - | - | - | - | - |
| TIN | | - | - | 111846 | 111847 | 111849 | 111851 | 111852 | 111854 | 111856 | 111857 | 111850 | 111855 |
| FNT | | - | - | 025943 | 025944 | 013996 | 025945 | 007803 | 007802 | 025946 | 018975 | 025947 | 007804 |
| | | 102117 | | | | | 102118 | | | 102116 | | 102117 | 102118 |
| | | 102119 | | | | | | | | 102120 | | 102119 | |
| BFW-017052-G05 | 049748 | ● | ● | | | | | | | | | | |
| BFW-017076-G05 | 049749 | ● | ● | | | | | | | | | | |
| BFW-020063-G1 | 102094 | | | ● | ● | ● | | | | | | ● | |
| BFW-020095-G1 | 102095 | | | ● | ● | ● | | | | | | ● | |
| BFW-030071-G2 | 102096 | | | | | | ● | ● | ● | | | | ● |
| BFW-030105-G2 | 102097 | | | | | | ● | ● | ● | | | | ● |
| BFW-033100-G2 | 102098 | | | | | | ● | ● | ● | | | | ● |
| BFW-033150-G2 | 111816 | | | | | | ● | ● | ● | | | | ● |
| BFW-042150-G3 | 047083 | | | | | | | | | ● | ● | | |
| BFW-042200-G3 | 049741 | | | | | | | | | ● | ● | | |
| BFW-050150-G3 | 111817 | | | | | | | | | ● | ● | | |
| BFW-050200-G3 | 111818 | | | | | | | | | ● | ● | | |
| GFK-02002008-G1 | 001971 | | | ● | ● | ● | | | | | | ● | |
| GFK-03003012-G2 | 001972 | | | | | | ● | ● | ● | | | | ● |
| GFK-03303012-G2 | 001973 | | | | | | ● | ● | ● | | | | ● |
| GFK-04203516-G3 | 049742 | | | | | | | | | ● | ● | | |
| GFK-05003516-G3 | 003380 | | | | | | | | | ● | ● | | |
| AFK-042040-G1 | 007479 | | | ● | ● | ● | | | | | | ● | |
| AFK-042040-G2 | 025924 | | | | | | ● | ● | ● | | | | ● |
| AFK-042040-G3 | 025925 | | | | | | | | | ● | ● | | |
| AFK-052040-G2 | 001969 | | | | | | ● | ● | ● | | | | ● |
| AFK-052040-G3 | 004938 | | | | | | | | | ● | ● | | |
| AFK-063050-G2 | 001975 | | | | | | ● | ● | ● | | | | ● |
| AFK-063050-G3 | 004937 | | | | | | | | | ● | ● | | |
| AFK-080050-G2 | 001970 | | | | | | ● | ● | ● | | | | ● |
| AFK-080050-G3 | 004939 | | | | | | | | | ● | ● | | |
| AFK-100050-G3 | 001974 | | | | | | | | | ● | ● | | |

**2 oder 4 Schneiden pro Wendeplatte bis Steigung 6 mm**
2 or 4 cutting edges per insert up to pitch 6 mm / 2 ou 4 arêtes de coupe par plaquette pour les pas de 6 mm maxi /
inserti con 2 o 4 taglienti fini a passo 6 mm / 2 o 4 cortes per placa hasta paso 6 mm




**Metrisches ISO-Gewinde nach DIN 13 und Unified-Gewinde nach ANSI B1.1 - für Innengewinde**
ISO Metric coarse thread and Unified coarse thread ANSI B1.1 - for internal threads /
Filetage métrique ISO DIN 13 et filetage américain ANSI B1.1 - pour filetage intérieur /
Filettatura metrica ISO e filettatura grossa unificata ANSI B1.1 - per filetto interno /
Rosca métrica ISO y rosca unificada gruesa ANSI B1.1 - para rosca interna




**Whitworth-Gewinde BS 84 und Whitworth-Rohrgewinde DIN EN ISO 228 - für Innengewinde**
Whitworth threads BS 84 and Whitworth pipe threads DIN EN ISO 228 - for internal threads /
Filetage Whitworth BS 84 et filetage Whitworth pas de gaz DIN EN ISO 228 - pour filetage intérieur /
Filettatura Whitworth BS 84 e filettatura Whitworth tubo DIN EN ISO 228 - per filetto interno /
Rosca Whitworth BS 84 y rosca Whitworth tubo DIN EN ISO 228 - para rosca interna

**FNT** **für Trocken- oder Gussbearbeitung**
for dry machining and cast / pour l'usinage à sec ou pour la fonte /
per lavorazione secca e lavorazione di ghisa / para mecanizado seco y mecanizado de fundición

**Gewindeschneidfutter und Zubehör**
tap holders and accessories / mandrins de taraudage et accessoires / maschiatori ed accessori / mandriles y accesorios — 184 - 203

**Lieferumfang & Glossar**
scope of delivery & glossary / matériel fourni avec le mandrin et glossaire / contenuto di consegna & glossario / volumen de entrega & glosario — 186

**Auswahltabelle**
selection table / tableau de sélection / tabella di selezione / tabla de selección — 186

**GEWINDESCHNEIDFUTTER**
tap holders / mandrins / maschiatori / mandriles

HST SYNCHRO — 187 - 188

HST SYNCHRO SL — 189

HST SYNCHRO QCA — 190 - 191

SYNCHRO V — 192

HST SYNCHRO MMS — 194

## ZUBEHÖR
accessories / accessoires / accessori / accesorios

**Schnellwechseleinsatz für ER Spannzange**
quick change adapter for ER collets / attache rapide pour pince ER /
bussole a cambio rapido con pinze ER / adaptador de macho de cambio rápido para pinzas ER — 191

**Weldonspannfutter**
Weldon adapter / adaptateurs Weldon / adattatori Weldon / adaptador Weldon — 193

**Anzugsbolzen**
pull stud / tirettes / tiranti / tornillos de ajuste para mangos — 193

**Gewindebohrzange mit Innenvierkant**
collet with inner square / pinces de taraudage avec carré d'entraînement /
pinza con quadro / pinza de apriete con cuadrado interior — 195

**Spannzange**
collet / pince / pinza / pinza — 196

**Kühlscheibe**
cooling disks / disques d'arrosage / disco per lubrificazione assiale / discos de refrigeración — 196

**Dichtscheibe**
sealing disks / disques d'étanchéité / disco di tenuta / discos de estanqueidad — 197

**Spannmutter**
clamping nuts / écrous de serrage / ghiera di serraggio / tuerca de apriete — 198

**Spannschlüsselsatz**
wrenches / clés de serrage / chiave di serraggio / llaves de apriete — 199

**Drehmomentschlüssel**
torque wrenches / clés dynamométriques / chiave dinamometrica / llaves dinamométricas — 200

**Aufsatz für Drehmomentschlüssel**
torque wrench heads / embouts-clés pour clés dynamométriques /
inserzione per chiave dinamometrica / cabeza de llave dinamométrica — 200 - 201

**Kühlmittelrohr für HSK-Schäfte**
coolant tubes for HSK shanks / raccords d'arrosage pour queues HSK /
raccordi di lubrificazione per gambi HSK / tubos de refrigeración para mangos HSK — 201

**Schlüssel für Kühlmittelrohr**
spanners for coolant tubes / clés pour raccords d'arrosage /
chiave di montaggio per raccordi di lubrificazione / llaves para tubos de refrigeración — 201

**Axialverstellbare Einstellschraube (AES)**
axial adjustment screw (AES) / vis de réglage axial (AES) /
vite di regolazione assiale (AES) / tornillo de ajuste axial (AES) — 202

**Einstellschlüssel für AES**
adjustment spanner for axial adjustment screw (AES) / clé de réglage pour vis de réglage axiale (AES) /
chiave di regolazione vite di tenuta (AES) / llave de ajuste para AES — 202

**MMS-Übergabeelement für HSK-Schäfte**
MQL transfer unit for HSK shanks / raccord d'arrosage MQL pour queues HSK /
tubetto per lubrificazione MQL per mandrini HSK / tubo de refrigeración MQL para mangos HSK — 203

**Montagevorrichtung für HST SYNCHRO**
tool holding fixture for HST SYNCHRO / dispositif de montage pour HST SYNCHRO /
dispositivo di montaggio per HST SYNCHRO / dispositivo de montaje para HST SYNCHRO — 203

**Montageblock**
tool holding / dispositif de montage / dispositivo di montaggio / bloc de montage — 203

Lieferumfang inklusive Spannmutter. Spannschlüsselsatz, Spannzange und Dichtscheibe separat bestellen.

Sonderausführungen unserer Gewindeschneidfutter und anderes Zubehör sowie weiterführende Informationen erhalten Sie auf Anfrage bei unseren Vertriebssachbearbeitern.

C = Druck / T = Zug

Clamping nut is included in delivery. Wrench, collet and sealing disk have to be ordered separately.

Are you interested in special models of our tap holders and other accessories or do you seek further information? Please contact our sales team. We will be glad to assist you.

C = compression / T = tension

Ecrou est compris dans la fourniture. Clés, pince et disque d'étanchéité sont à commander séparément.

Mandrins spéciaux et autres accessoires sur demande.

C = compression / T = traction

La fornitura comprende la ghiera di serraggio. Set di chiave di serraggio, pinza e dischi di tenuta devono essere ordinati a parte.

Siete interessati a maschiatori speciali o ad altri accessori oppure ad ulteriori informazioni? Vi preghiamo di contattare il ns. ufficio vendite. Vi daremo assistenza.

C = compressione / T = trazione

La tuerca de apriete viene incluida con el mandril. Las llaves de apriete, la pinza de apriete y el disco de estanqueidad no son incluidos en la entrega.

Para ofertas de mandriles especiales y otros accesorios o para obtener más información consulten su contacto en el servicio de ventas. Estaremos encantados de atenderles.

C = compresión / T = tracción

## Auswahltabelle

selection table / tableau de sélection / tabella di selezione / tabla de selección

| Typenbezeichnung<br>type<br>type<br>tipo<br>tipo | Gewindebereich<br>thread range<br>plage de taraudage<br>gamma di maschiatura<br>rango de rosca | Empfohlenes Anzugsdrehmoment / max.<br>locking torque recommendation / max.<br>couple de serrage préconisé / maxi.<br>momento torcente di serraggio raccomandato / massimo<br>par de apriete recomendado / máximo |
|---|---|---|
| HST SYNCHRO 10 | M1 - M3 | 6 Nm / 7,5 Nm |
| HST SYNCHRO 20 | M2 - M5 | 16 Nm / 20 Nm |
| HST SYNCHRO 40 / MMS | M4 - M12 | 35 Nm / 44 Nm |
| HST SYNCHRO 40 QCA | M4 - M12 | 28 Nm / 35 Nm |
| HST SYNCHRO 60 / MMS | M8 - M20 | 104 Nm / 130 Nm |
| HST SYNCHRO 60 QCA | M8 - M16 | 28 Nm / 35 Nm |
| HST SYNCHRO 80 | M18 - M30 | 176 Nm / 220 Nm |
| SYNCHRO V 100 | M30 - M48 | 300 Nm / 375 Nm |

## Typenbezeichnung / type / type / tipo / tipo

HST SYNCHRO

**Unser Gewindeschneidfutter mit Zylinderschaft für Standardanwendungen ist in unterschiedlichen Größen erhältlich. Auf Anfrage bieten wir auch weitere Maschinenaufnahmetypen an.**

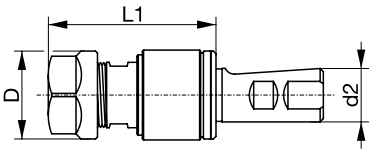
Our tap holder for standard applications is available in different sizes with straight shank. Further shank types on request. /

Mandrin de taraudage pour applications courantes en différentes tailles avec queue cylindrique. Autres types d'attachements machine sur demande. /

Maschiatori per applicazioni standard fornibili in differenti dimensioni con attacchi cilindrici. Ulteriori tipi di attacchi a richiesta.

**Abmessungsbereich von M1 bis M30**
range of dimensions from M2 to M30 /
plage de taraudage de M2 à M30 /
capacità di maschiatura da M2 a M30 /
rango de rosca de M2 a M30

**Zylinderschaft DIN 1835 B/E**
straight shank DIN 1835 B/E /
queue cylindrique DIN 1835 B/E /
gambo cilindrico DIN 1835 B/E /
mango cilíndrico DIN 1835 B/E




| Typenbezeichnung / type / type / tipo / tipo | für / for / pour / per / para | | d2 | L1 | D | C | T | ID |
|---|---|---|---|---|---|---|---|---|
| HST SYNCHRO 10 | M1 - M3 | ER 08 | 12 | 31 | 12 | 0,4 | 0,4 | 049226 |
| HST SYNCHRO 20 | M2 - M5 | ER 11 | 16 | 52 | 19 | 0,5 | 0,5 | 108157 |
| HST SYNCHRO 20 | M2 - M5 | ER 11 | 20 | 52 | 19 | 0,5 | 0,5 | 028012 |
| HST SYNCHRO 20 | M2 - M5 | ER 11 | 25 | 52 | 19 | 0,5 | 0,5 | 026241 |
| HST SYNCHRO 40 | M4 - M12 | ER 20 | 20 | 69 | 34 | 0,5 | 0,5 | 107035 |
| HST SYNCHRO 40 | M4 - M12 | ER 20 | 25 | 69 | 34 | 0,5 | 0,5 | 025116 |
| HST SYNCHRO 60 | M8 - M20 | ER 25 | 20 | 88 | 42 | 0,5 | 0,5 | 107905 |
| HST SYNCHRO 60 | M8 - M20 | ER 25 | 25 | 88 | 42 | 0,5 | 0,5 | 025117 |
| HST SYNCHRO 80 | M18 - M30 | ER 40 | 25 | 117 | 63 | 0,5 | 0,5 | 026242 |

## Typenbezeichnung / type / type / tipo / tipo

## HST SYNCHRO

**Unser Gewindeschneidfutter mit HSK-Anbindung für Standardanwendungen ist in unterschiedlichen Größen erhältlich. Auf Anfrage bieten wir auch weitere Maschinenaufnahmetypen an.**

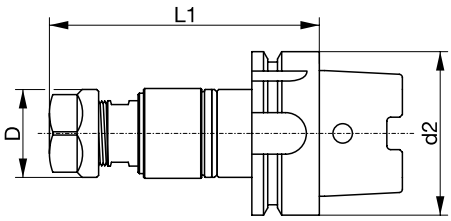
Our tap holder for standard applications is available in different sizes with HSK shank. Further shank types on request. /

Mandrin de taraudage pour applications courantes en différentes tailles pour attachement HSK. Autres types d'attachements machine sur demande. /

Maschiatori per applicazioni standard fornibili in differenti dimensioni con attacchi HSK. Ulteriori tipi di attacchi a richiesta.

**Abmessungsbereich von M4 bis M30**
range of dimensions from M4 to M30 /
plage de taraudage de M4 à M30 /
capacità di maschiatura da M4 a M30 /
rango de rosca de M4 a M30

**HSK-A DIN 69893 A**



| Typenbezeichnung / type / type / tipo / tipo | für / for / pour / per / para | | d2 | L1 | D | C | T | ID |
|---|---|---|---|---|---|---|---|---|
| HST SYNCHRO 40 | M4 - M12 | ER 20 | HSK 63A | 108 | 34 | 0,5 | 0,5 | 025118 |
| HST SYNCHRO 40 | M4 - M12 | ER 20 | HSK 100A | 114 | 34 | 0,5 | 0,5 | 026243 |
| HST SYNCHRO 60 | M8 - M20 | ER 25 | HSK 63A | 127 | 42 | 0,5 | 0,5 | 025119 |
| HST SYNCHRO 60 | M8 - M20 | ER 25 | HSK 100A | 134 | 42 | 0,5 | 0,5 | 026244 |
| HST SYNCHRO 80 | M18 - M30 | ER 40 | HSK 63A | 156 | 63 | 0,5 | 0,5 | 026245 |
| HST SYNCHRO 80 | M18 - M30 | ER 40 | HSK 100A | 163 | 63 | 0,5 | 0,5 | 026246 |

a. A. = auf Anfrage / on request / sur demande / a richiesta / a solicitar

## Typenbezeichnung / type / type / tipo / tipo

**HST SYNCHRO SL**

**Unser Gewindeschneidfutter zur Überwindung von Störkonturen in der Serienfertigung.
Die lange Ausführung ermöglicht die Verwendung von Gewindewerkzeugen in kostengünstigeren Standardlängen. Die Verlängerungen werden in Standardfutter zwischengebaut.**

Our tap holder for the machining of parts with interfering edges in serial production. The extended shank allows the use of favorably priced threading tools in standard lengths. The extensions are integrated into standard tap holders. /

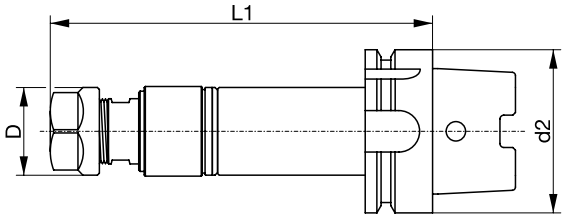
Mandrin de taraudage en version longue pour les trous difficiles d'accès. Cette version longue permet l'utilisation d'outils en longueurs standard plus économiques. Les rallonges sont intégrées dans les mandrins standard. /

Maschiatori per produzione in serie con gambi prolungati, che permettendo l'uso di maschi con lunghezza standard, riducono i costi utensili. Le prolunghe sono utilizzabili su maschiatori standard.

**HSK-A DIN 69893 A**

**Standardverlängerungen 50, 100, 150, 200 mm**
standard extension lengths: 50, 100, 150, 200 mm /
longueurs des rallonges standards : 50, 100, 150, 200 mm /
lunghezze prolunghe standard: 50, 100, 150, 200 mm /
longitudes de alargadera estándares: 50, 100, 150, 200 mm

**Kundenspezifische Lösungen möglich**
customer-specific solutions on request /
autres longueurs sur demande /
a richiesta soluzioni personalizzate /
soluciones personalizadas a solicitar




| Typenbezeichnung / type / type / tipo / tipo | für / for / pour / per / para | | d2 | L1 | D | C | T | ID |
|---|---|---|---|---|---|---|---|---|
| HST SYNCHRO 40 SL50 | M4 - M12 | ER 20 | HSK 63A | 158 | 34 | 0,5 | 0,5 | 034465 |
| HST SYNCHRO 40 SL100 | M4 - M12 | ER 20 | HSK 63A | 208 | 34 | 0,5 | 0,5 | 039890 |
| HST SYNCHRO 40 SL150 | M4 - M12 | ER 20 | HSK 63A | 258 | 34 | 0,5 | 0,5 | 039891 |
| HST SYNCHRO 40 SL200 | M4 - M12 | ER 20 | HSK 63A | 308 | 34 | 0,5 | 0,5 | 039892 |
| HST SYNCHRO 60 SL50 | M8 - M20 | ER 25 | HSK 63A | 177 | 42 | 0,5 | 0,5 | 039893 |
| HST SYNCHRO 60 SL100 | M8 - M20 | ER 25 | HSK 63A | 227 | 42 | 0,5 | 0,5 | 039894 |
| HST SYNCHRO 60 SL150 | M8 - M20 | ER 25 | HSK 63A | 277 | 42 | 0,5 | 0,5 | 039895 |
| HST SYNCHRO 60 SL200 | M8 - M20 | ER 25 | HSK 63A | 327 | 42 | 0,5 | 0,5 | 039896 |

## Typenbezeichnung / type / type / tipo / tipo

**HST SYNCHRO QCA**

**Unser Gewindeschneidfutter mit Schnellwechselsystem. Durch das HST SYNCHRO QCA werden beim Werkzeugwechsel in der Maschine keine Hilfsmittel wie z. B. Spannschlüssel mehr benötigt. Bei Einsatz von handelsüblichen Schnellwechseleinsätzen ergibt sich ein großes radiales Spiel zwischen Gewindeschneidfutter und Schnellwechseleinsatz, welches die Funktion des Futters stark beeinträchtig. Durch den speziell für die Verwendung im HST SYNCHRO entwickelten QCA Schnellwechseleinsatz wird das Spiel auf ein Minimum reduziert. Somit ist die Funktionsfähigkeit wieder hergestellt.**

Our tap holder with quick change system. The HST SYNCHRO QCA allows tool change in the machine without using wrenches. Conventional quick change systems have large radial play between tap holder and quick change adapter, which affects the functioning of the tap holder significantly. The QCA quick change adapter was especially designed for the use in the HST SYNCHRO tap holder. Reducing the play to a minimum, it guarantees reliable functioning. /

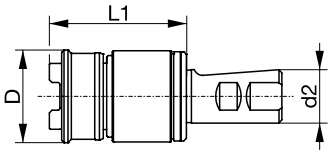
Mandrin de taraudage avec attache rapide permettant un changement d'outils sans clé de serrage ni autre dispositif. L'ensemble HST SYNCHRO + attache rapide QCA sont étudiés pour une utilisation optimale et un jeu minimal contrairement aux attaches rapides conventionnelles, dont le jeu radial avec le mandrin est trop important pour permettre de stabiliser l'opération de taraudage. /

I maschiatori a cambio rapido HST SYNCHRO QCA permettono di cambiare gli utensili senza utilizzare chiavi. Rispetto ai maschiatori tradizionali non hanno praticamente gioco radiale migliorando così la funzionalità. L'inserzione a rapido QCA è stata studiata per eliminare giochi assiali garantendo una perfetta ripetibilità.

**Zylinderschaft DIN 1835 B/E**
straight shank DIN 1835 B/E /
queue cylindrique DIN 1835 B/E /
gambo cilindrico DIN 1835 B/E /
mango cilíndrico DIN 1835 B/E

**Werkzeugwechsel auf der Maschine ohne Schraubenschlüssel**
tool change on the machine without wrench /
changement d'outil sur machine sans clef de serrage /
cambio utensile in macchina senza chiave /
cambio de herramienta en la máquina sin llave

**Abmessungsbereich von M4 bis M16**
range of dimensions from M4 to M16 /
plage de taraudage M4 à M16 /
capacità di maschiatura da M4 a M16 /
rango de rosca de M4 a M16




| Typenbezeichnung / type / type / tipo / tipo | für / for / pour / per / para | | d2 | L1 | D | C | T | ID |
|---|---|---|---|---|---|---|---|---|
| HST SYNCHRO 40 QCA | M4 - M12 | 1 | 25 | 56 | 35 | 0,5 | 0,5 | 037821 |
| HST SYNCHRO 60 QCA | M8 - M16 | 1 | 25 | 72 | 44 | 0,5 | 0,5 | 039847 |

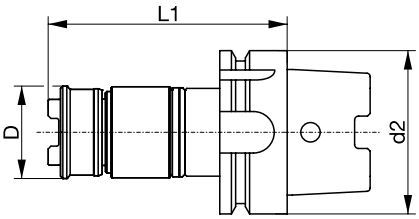
## Typenbezeichnung / type / type / tipo / tipo

**HST SYNCHRO QCA**

**HSK-A DIN 69893 A**

**Werkzeugwechsel auf der Maschine ohne Schraubenschlüssel**
tool change on the machine without wrench /
changement d'outil sur machine sans clef de serrage /
cambio utensile in macchina senza chiave /
cambio de herramienta en la máquina sin llave

**Abmessungsbereich von M4 bis M16**
range of dimensions from M4 to M16 /
plage de taraudage M4 à M16 /
capacità di maschiatura da M4 a M16 /
rango de rosca de M4 a M16

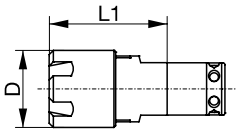


| Typenbezeichnung / type / type / tipo / tipo | für / for / pour / per / para | | d2 | L1 | D | C | T | ID |
|---|---|---|---|---|---|---|---|---|
| HST SYNCHRO 40 QCA | M4 - M12 | 1 | HSK 63A | 95 | 35 | 0,5 | 0,5 | 039874 |
| HST SYNCHRO 60 QCA | M8 - M16 | 1 | HSK 63A | 112 | 44 | 0,5 | 0,5 | 104171 |

## Schnellwechseleinsatz für ER Spannzange

quick change adapter for ER collets / attache rapide pour pince ER / bussole a cambio rapido con pinze ER /
adaptador de cambio rápido para pinzas ER

**speziell entwickelt für das HST SYNCHRO QCA - reduziert das Spiel auf ein Minimum**
specially developed for the HST SYNCHRO QCA - reduces the play to a minimum
conçue pour le mandrin HST SYNCHRO QCA - réduit le jeu au minimum
sviluppate per maschiatore HST SYNCHRO QCA - riducono al minimo i giochi assiali e radiali
especialmente diseñado para HST SYNCHRO QCA - reduce el juego al minimo



| Größe / size / dimension / dimensione / dimensión | | L1 | D | ID |
|---|---|---|---|---|
| 1 | ER 20 | 40 | 28 | 028034 |

## Typenbezeichnung / type / type / tipo / tipo

**SYNCHRO V**

**Gewindeschneidfutter für den großen Abmessungsbereich. Zum axialen Ausgleich von ± 2 mm.**

Tap holder for large dimensions. For compensation of axial deviations of ± 2 mm. /

Mandrin de taraudage pour grandes dimensions. Compensation des oscillations axiales micrométriques dans une fourchette de ± 2 mm. /

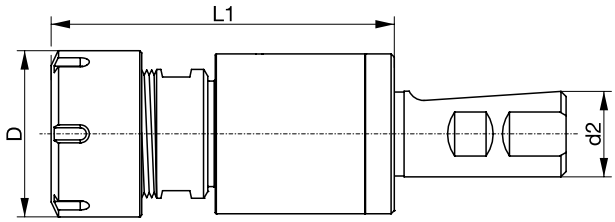
Maschiatore per maschiatura di grande dimensione con compensazione assiale di ± 2 mm. /

Mandril para dimensiones grandes para compensación axial de ± 2 mm.

**Abmessungsbereich von M30 bis M48**
range of dimensions from M30 to M48 /
plage de taraudage M30 à M48 /
capacità di maschiatura da M30 a M48 /
rango de rosca de M30 a M48

**Einstellbarer Anschneiddruck**
adjustable cutting pressure for chamfering /
possibilité d'ajuster l'effort axial à l'attaque du taraudage /
forza di pressione all'imbocco regolabile /
fuerza de entrada ajustable

**Zylinderschaft DIN 1835 B/E**
straight shank DIN 1835 B/E /
queue cylindrique DIN 1835 B/E /
gambo cilindrico DIN 1835 B/E /
mango cilíndrico DIN 1835 B/E



| Typenbezeichnung / type / type / tipo / tipo | für / for / pour / per / para | | d2 | L1 | D | C | T | ID |
|---|---|---|---|---|---|---|---|---|
| SYNCHRO V 100 | M30 - M48 | ER 50 | 40 | 154 | 78 | 2 | 2 | 033779 |

## Weldonspannfutter

Weldon adapter / adaptateurs Weldon / adattatori Weldon / adaptador Weldon

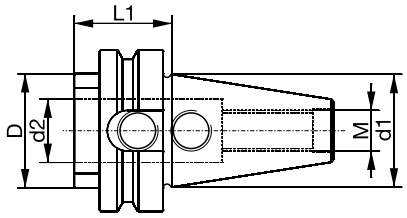
**zur Aufnahme von HST SYNCHRO Zylinderschaftfutter. Ein Adapter für verschiedene HST SYNCHRO Größen.**
for adaption of HST SYNCHRO tap holders with straight shank. One adapter for different HST SYNCHRO sizes. /
pour mandrin HST SYNCHRO à queue cylindrique. Un adaptateur pour plusieurs tailles de mandrins. /
per il montaggio di maschiatori HST SYNCHRO con gambo cilindrico. Un adattatore per varie dimensioni HST SYNCHRO.

**DIN ISO 7388-1 AD für SK 40 und SK 50**
DIN ISO 7388-1 AD for SK 40 and SK 50 /
DIN ISO 7388-1 AD pour SK 40 et SK 50 /
DIN ISO 7388-1 AD per SK 40 e SK 50 /
DIN ISO 7388-1 AD para SK 40 y SK 50

**MAS-BT für BT 40 und BT 50**
MAS-BT for BT 40 and BT 50 /
MAS-BT pour BT 40 et BT 50 /
MAS-BT per SK 40 e SK 50 /
MAS-BT para BT 40 y BT 50

**DIN 2080 für SK 40 und SK 50**
DIN 2080 for SK 40 and SK 50 /
DIN 2080 pour SK 40 et SK 50 /
DIN 2080 per SK 40 e SK 50 /
DIN 2080 para SK 40 y SK 50

**DIN 69893 A für HSK 100A**
DIN 69893 A for HSK 100A /
DIN 69893 A pour HSK 100A /
DIN 69893 A per HSK 100A /
DIN 69893 A para HSK 100A

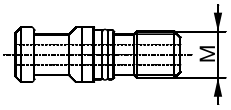



| Typenbezeichnung / type / type / tipo / tipo | d1 | L1 | D | d2 | M | ID |
|---|---|---|---|---|---|---|
| DIN ISO 7388-1 AD kurz / short / court / corto / corto | SK 40 | 35 | 45 | 25 | M16 | 026255 |
| | SK 50 | 35 | 72 | 25 | M24 | 026256 |
| | SK 50 | 35 | 90 | 40 | M24 | 033584 |
| MAS-BT kurz / short / court / corto / corto | BT 40 | 35 | 55 | 25 | M16 | 104144 |
| | BT 50 | 40 | 60 | 25 | M24 | 027609 |
| DIN 2080 kurz / short / court / corto / corto | SK 40 | 24 | 60 | 25 | M16 | 028903 |
| | SK 50 | 34 | 65 | 25 | M24 | 028904 |
| DIN 69893 A | HSK 100A | 120 | 80 | 40 | - | 033583 |

## Anzugsbolzen DIN 69872 Form A-Schaft DIN ISO 7388-1 AD

pull stud DIN 69872 form A shank DIN ISO 7388-1 AD / tirettes DIN 69872 forme A - queue DIN ISO 7388-1 AD /
tiranti DIN 69872 forma A per attacchi DIN ISO 7388-1 AD / tornillos de ajuste para mangos DIN 69872 forma A mango DIN ISO 7388-1 AD

**für die sichere Spannung von SK-Schäften in der Maschine.**
for the secure holding of SK shanks in the machine. /
pour queues SK. /
per fissaggio mandrino su macchine utensile. /
para fijación segura de conos SK en la máquina. /



| Typenbezeichnung / type / type / tipo / tipo | M | ID |
|---|---|---|
| SK 40 | M16 | 029034 |
| SK 50 | M24 | 029035 |

## Typenbezeichnung / type / type / tipo / tipo

**HST SYNCHRO MMS**

**Unser Gewindeschneidfutter für die Minimalmengenschmierung verhindert in Kombination mit unseren MMS-Werkzeugen Versackungen des Kühlschmierstoffs. Dadurch wird sichergestellt, dass die Schmierung an der Bearbeitungsstelle ankommt. Dies gewährleistet eine hohe Standzeit und Prozesssicherheit.**

Our tap holder for minimum quantity lubrication, combined with our MQL threading tools, avoids accumulations of the lubricant ensuring that the lubricant reaches the tool operating area. This guarantees high tool life and process security. /

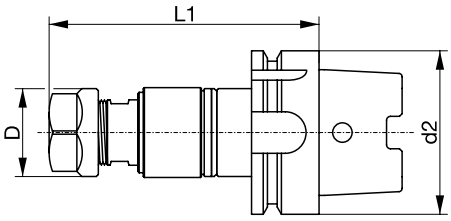
Mandrin de taraudage pour micro-lubrification MQL. L'ensemble mandrin HST SYNCHRO MMS (MQL) + taraud BASS pour MQL est conçu pour réguler le débit du lubrifiant et assurer un arrosage suffisant et sans excès, directement sur la zone de travail garantissant ainsi des tenues élevées et la fiabilité du process. /

I maschiatori HST SYNCHRO MMS in abbinamento con i nostri maschi MQL, sopperiscono a carenze di lubrificazione assicurando una perfetta lubrificazione al tagliente. Ciò permette di lavorare in sicurezza ed avere un'elevata durata degli utensili.

**HSK-A DIN 69893 A**

**für 1- und 2-Kanalsystem**
for 1-channel and 2-channel MQL systems /
pour système MQL à 1 ou 2 voies /
per sistema MQL ad 1 canale e a 2 canali /
para sistema MQL de 1 o 2 canales

**weitere Informationen im MMS-Prospekt**
for further information, see leaflet MMS/MQL /
pour plus d'informations, voir documentation MMS/MQL /
per ulteriori informazioni vedi il prospetto MMS/MQL /
para más información véase folleto MMS/MQL




| Typenbezeichnung / type / type / tipo / tipo | für / for / pour / per / para | | d2 | L1 | D | C | T | ID |
|---|---|---|---|---|---|---|---|---|
| HST SYNCHRO 40 MMS | M4 - M12 | ER 20 | HSK 63A | 108 | 34 | 0,5 | 0,5 | 033815 |
| HST SYNCHRO 60 MMS | M8 - M20 | ER 25 | HSK 63A | 127 | 42 | 0,5 | 0,5 | 041774 |

## Gewindebohrzange mit Innenvierkant - ohne Längenausgleich nach DIN ISO 15488

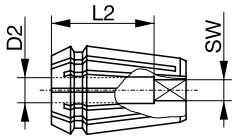
collet with inner square - without length compensation - DIN ISO 15488 / pince de taraudage avec carré d'entraînement - sans compensation de longueur - DIN ISO 15488 / pinze con quadro - senza compensazione - DIN ISO 15488 / pinza de apriete con cuadrado interior - sin compensación axial - DIN ISO 15488

**für die sichere Aufnahme des Gewindewerkzeugs. Durch den Innenvierkant in der Spannzange wird mit dem Vierkant des Gewindewerkzeugs eine formschlüssige Verbindung erzeugt, welche die Drehmomentübertragung gewährleistet.**

for the secure holding of threading tools. The internal square of the collet and the square at the threading tool's shank create a positive fitting that guarantees torque transmission. /

les pinces avec carré garantissent le centrage et l'alignement du taraud, ainsi que la transmission positive du couple de taraudage. /

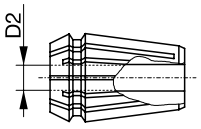
permettono un bloccaggio ottimale del maschio. Il quadro della pinza ed il quadro del maschio creano un accoppiamento di forma positivo che garantisce un'ottima trasmissione del momento torcente.



| Typenbezeichnung / type / type / tipo / tipo | D2 | SW | L2 | ID |
|---|---|---|---|---|
| ER 11-GB | 2,8 | 2,1 | 12,0 | 026349 |
| ER 11-GB | 3,5 | 2,7 | 14,0 | 026350 |
| ER 11-GB | 4,0 | 3,0 | 14,0 | 026351 |
| ER 11-GB | 4,5 | 3,4 | 14,0 | 026352 |
| ER 11-GB | 6,0 | 4,9 | 14,0 | 027043 |
| ER 20-GB | 4,5 | 3,4 | 18,0 | 025183 |
| ER 20-GB | 6,0 | 4,9 | 18,0 | 025185 |
| ER 20-GB | 7,0 | 5,5 | 18,0 | 025186 |
| ER 20-GB | 8,0 | 6,2 | 22,0 | 025187 |
| ER 20-GB | 9,0 | 7,0 | 22,0 | 025188 |
| ER 20-GB | 10,0 | 8,0 | 25,0 | 025189 |
| ER 20-GB | 11,0 | 9,0 | 25,0 | 031010 |
| ER 20-GB | 12,0 | 9,0 | 25,0 | 039966 |
| ER 25-GB | 7,0 | 5,5 | 18,0 | 045001 |
| ER 25-GB | 8,0 | 6,2 | 22,0 | 025190 |
| ER 25-GB | 9,0 | 7,0 | 22,0 | 025191 |
| ER 25-GB | 10,0 | 8,0 | 25,0 | 025205 |
| ER 25-GB | 11,0 | 9,0 | 25,0 | 025206 |
| ER 25-GB | 12,0 | 9,0 | 25,0 | 025207 |
| ER 25-GB | 14,0 | 11,0 | 25,0 | 025208 |
| ER 25-GB | 16,0 | 12,0 | 25,0 | 025209 |
| ER 40-GB | 11,0 | 9,0 | 25,0 | 026353 |
| ER 40-GB | 12,0 | 9,0 | 25,0 | 026354 |
| ER 40-GB | 14,0 | 11,0 | 25,0 | 026355 |
| ER 40-GB | 16,0 | 12,0 | 25,0 | 026356 |
| ER 40-GB | 18,0 | 14,0 / 14,5 | 25,0 | 026357 |
| ER 40-GB | 20,0 | 16,0 | 28,0 | 026358 |
| ER 40-GB | 22,0 | 18,0 | 28,0 | 026359 |
| ER 50-GB | 22,0 | 18,0 | 41,0 | 034335 |
| ER 50-GB | 25,0 | 20,0 | 41,0 | 034336 |
| ER 50-GB | 28,0 | 22,0 | 41,0 | 034337 |
| ER 50-GB | 32,0 | 24,0 | 41,0 | 034338 |

## Spannzange – DIN ISO 15488

collet / pince / pinza / pinza



| Typenbezeichnung / type / type / tipo / tipo | D2 | SW | L2 | ID |
|---|---|---|---|---|
| ER 08 | 2,5 | - | - | 053923 |
| ER 08 | 2,8 | - | - | 053924 |
| ER 08 | 3,5 | - | - | 053925 |
| ER 50 | 36,0 | - | - | 034339 |

## Kühlscheibe für Spannmutter nach DIN ISO 15488 mit innerer Kühlmittelzufuhr

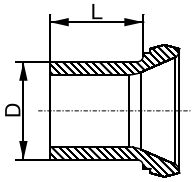
cooling disk for clamping nut DIN ISO 15488 for internal coolant / disque d'arrosage pour écrou de serrage DIN ISO 15488 avec lubrification interne / disco per lubrificazione assiale per ghiera di serraggio DIN ISO 15488 con lubrificazione interna / disco de refrigeración para tuerca de apriete DIN ISO 15488 para refrigeración interior

**für die verbesserte Kühlmittelzufuhr entlang des Schaftes. Bei der Bearbeitung von Durchgangs- und Sackloch mit einem Werkzeug erhöht der Einsatz eines Sacklochwerkzeuges mit axialer Kühlmittelzufuhr in Kombination mit einer Kühlscheibe die Prozesssicherheit. Für die Durchgangslochbearbeitung wird ein Gewindewerkzeug ohne innere Kühlmittelzufuhr empfohlen.**

for improved lubrication along the shank. When tapping through and blind holes, the process security can be increased by using a blind hole tap with coolant bore combined with a cooling disk. For simple through hole machining, we recommend to combine the cooling disk with a spiral pointed tap without internal coolant. /

pour guider le lubrifiant le long de la queue. Combiné avec un outil standard pour trou borgne avec lubrification interne axiale, il autorise le taraudage en trou borgne et en trou débouchant avec un taraud unique. Pour l'usinage de trous débouchants seuls, il est recommandé d'utiliser un outil sans trou d'huile. /

per migliorare la lubrificazione lungo il gambo dei maschi. Nella lavorazione dei fori passanti e ciechi con un maschio, l'uso di un maschio per fori ciechi con lubrificazione interna assiale in combinazione con un disco di lubrificazione aumentano la sicurezza di processo. Per la lavorazione dei fori passanti viene usato un maschio senza lubrificazone interna.



| Typenbezeichnung / type / type / tipo / tipo | D2 | L1 | D | ID |
|---|---|---|---|---|
| ER 20 | 4,5 | 11 | 8,2 | 774015 |
| ER 20 | 6,0 | 11 | 9,4 | 774028 |
| ER 20 | 7,0 | 11 | 10,4 | 040202 |
| ER 20 | 8,0 | 11 | 11,4 | 109796 |
| ER 20 | 9,0 | 11 | 14,0 | 104142 |
| ER 20 | 10,0 | 11 | 14,0 | 705179 |
| ER 20 | 11,0 | 11 | 14,0 | 039969 |
| ER 20 | 12,0 | 11 | 14,0 | 039970 |
| ER 25 | 7,0 | 11 | 10,4 | 048882 |
| ER 25 | 8,0 | 11 | 11,4 | 028786 |
| ER 25 | 9,0 | 11 | 12,9 | 028884 |
| ER 25 | 10,0 | 11 | 13,4 | 028885 |
| ER 25 | 11,0 | 11 | 14,5 | 028886 |
| ER 25 | 12,0 | 11 | 15,4 | 434138 |
| ER 25 | 14,0 | 11 | 17,4 | 028888 |
| ER 25 | 16,0 | 11 | 19,0 | 028717 |

D2 = für Schaft-Ø / for shank Ø / pour Ø queue / per Ø gambo / para Ø mango

## Dichtscheibe für Spannmutter nach DIN ISO 15488 mit innerer Kühlmittelzufuhr

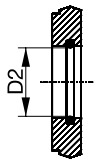
sealing disk for clamping nut DIN ISO 15488 for internal coolant / disque d'étanchéité pour écrou de serrage DIN ISO 15488 avec lubrification interne / disco di tenuta per ghiera di serraggio DIN ISO 15488 con lubrificazione interna / disco de estanqueidad para tuerca de apriete DIN ISO 15488 para refrigeración interior

**stellt sicher, dass das Kühlmedium verlustfrei in das Gewindewerkzeug geführt wird und verhindert eine Verschmutzung der Spannzange.**

ensures that the lubricant is transferred into the threading tool without loss and prevents pollution of the collet. /

concentre le lubrifiant dans l'outil sans aucune déperdition et évite l'encrassement de la pince. /

garantisce che il lubrificante passi attraverso il gambo senza perdere pressione ed evita un insudiciamento della pinza.



| Typenbezeichnung / type / type / tipo / tipo | D2 | ID |
|---|---|---|
| ER 20 | 4,5 - 4,0 | 025197 |
| ER 20 | 6,0 - 5,5 | 025198 |
| ER 20 | 7,0 - 6,5 | 025199 |
| ER 20 | 8,0 - 7,5 | 025200 |
| ER 20 | 9,0 - 8,5 | 025201 |
| ER 20 | 10,0 - 9,5 | 025202 |
| ER 20 | 11,0 - 10,5 | 039967 |
| ER 20 | 12,0 - 11,5 | 039968 |
| ER 25 | 7,0 - 6,5 | 028788 |
| ER 25 | 8,0 - 7,5 | 025203 |
| ER 25 | 9,0 - 8,5 | 025204 |
| ER 25 | 10,0 - 9,5 | 025192 |
| ER 25 | 11,0 - 10,5 | 025193 |
| ER 25 | 12,0 - 11,5 | 025194 |
| ER 25 | 14,0 - 13,5 | 025195 |
| ER 25 | 16,0 - 15,5 | 025196 |
| ER 40 | 14,0 - 13,5 | 026311 |
| ER 40 | 16,0 - 15,0 | 026312 |
| ER 40 | 17,0 - 16,5 | 026318 |
| ER 40 | 18,0 - 17,0 | 026319 |
| ER 40 | 19,0 - 18,5 | 026320 |
| ER 40 | 20,0 - 19,5 | 026321 |
| ER 40 | 21,0 - 20,5 | 026322 |
| ER 40 | 22,0 - 21,5 | 026323 |
| ER 40 | 23,0 - 22,5 | 026324 |
| ER 40 | 24,0 - 23,5 | 026325 |
| ER 40 | 25,0 - 24,5 | 026326 |
| ER 50 | 22,0 - 21,5 | 034341 |
| ER 50 | 25,0 - 24,5 | 034342 |
| ER 50 | 28,0 - 27,5 | 034343 |
| ER 50 | 32,0 - 31,5 | 034344 |
| ER 50 | 36,0 - 35,5 | 034345 |

## Spannmutter DIN ISO 15488 für innere Kühlmittelzufuhr

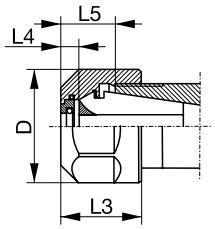
clamping nut DIN ISO 15488 for internal coolant / écrou de serrage DIN ISO 15488 pour lubrification interne / ghiera di serraggio DIN ISO 15488 per lubrificazione interna / tuerca de apriete DIN ISO 15488 para refrigeración interior

**zum einfachen Schließen und Ausbau von Spannzange und Gewindewerkzeug. Das Anziehen der Spannmutter mit montierter Spannzange drückt letztere in die konische Aufnahme im HST SYNCHRO. Die Spannzange schließt sich und hält das Werkzeug sicher in Position. Eine spezielle Innenkontur der Spannmutter ermöglicht ein schnelles und leichtes Entnehmen von Spannzange inklusive Werkzeug. Die Spannmuttern von BASS sind für die innere Kühlmittelzufuhr geeignet und nehmen Dicht- bzw. Kühlscheibe auf.**

for easy assembly of collet and threading tool. The tightening of the clamping nut pushes the collet into the tapered socket in the HST SYNCHRO. The collet closes, tightly fixing the threading tool. The special internal contour of the clamping nut enables quick and easy disassembly of collet and threading tool. BASS clamping nuts are suitable for internal coolant and can be used with sealing or cooling disks. /

pour montage et démontage simples de la pince et de l'outil. Lorsqu'on visse l'écrou après l'avoir assemblé avec la pince, cette dernière exerce une pression et se cale dans l'attachement conique du mandrin HST SYNCHRO. La pince se ferme et maintient l'outil dans cette position. Le profil intérieur de l'écrou permet d'extraire la pince et l'outil de façon simple et rapide. Les écrous de serrage BASS conviennent pour lubrification interne, pour disques d'étanchéité et d'arrosage. /

per un facile montaggio del maschio e pinza. Avvitando la ghiera si spinge la pinza nella sede conica del mandrino bloccando così l'utensile. Un'unghia nella pinza permette durante lo svitaggio l'estrazione della pinza. Le ghiere BASS sono utilizzabili con lubrificazione interna utilizzando il disco di tenuta.

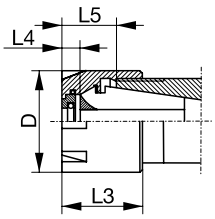



| Typenbezeichnung / type / type / tipo / tipo | D | L3 | L4 | L5 | ID |
|---|---|---|---|---|---|
| ER 08* | 12 | 10,8 | - | 4,3 - 6,1 | 155097 |
| ER 11* | 19 | 11,3 | - | 4,9 - 6,6 | 027088 |
| ERC 20 | 34 | 24,0 | 5,0 | 13,0 - 16,5 | 025210 |
| ERC 25 | 42 | 25,0 | 5,0 | 13,5 - 17,0 | 025211 |
| ERC 40 | 63 | 30,5 | 5,0 | 16,5 - 20,0 | 026267 |
| ERC 50 | 78 | 42,5 | 7,0 | 21,0 - 28,0 | 034340 |

*ER 11 = ohne innere Kühlmittelzufuhr / without internal coolant / sans lubrification interne / senza lubrificazione interna / sin refrigeración interior

## Spannmutter mit minimalem Außendurchmesser für innere Kühlmittelzufuhr

clamping nut with minimal outer diameter for internal coolant / écrou de serrage à diamètre extérieur mini pour lubrification interne / ghiera di serraggio con diametro esterno minimo per lubrificazione interna / tuerca de apriete con diámetro exterior mínimo para refrigeración interior

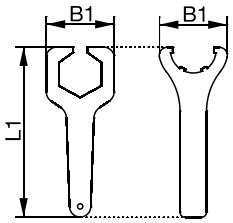


| Typenbezeichnung / type / type / tipo / tipo | D | L3 | L4 | L5 | ID |
|---|---|---|---|---|---|
| ERMC 20 | 28 | 24,0 | 5,0 | 13,0 - 16,5 | 039971 |

## Spannschlüsselsatz

wrenches / clés de serrage / set di chiave di serraggio / llaves de apriete

**zum Anziehen und Gegenhalten der Spannmutter.**
for tightening of the clamping nut. /
pour le serrage des écrous de serrage. /
per serraggio delle ghiere.

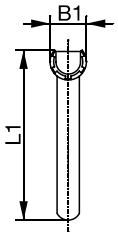


| für / for / pour / per / para | L1 | B1 | ID |
|---|---|---|---|
| ER 08 | 77 | 22 | 155096 |
| ER 11 | 95 | 32 | 047676 |
| ER 20 | 170 | 52 | 047694 |
| ER 25 | 210 | 65 | 047695 |
| ER 40 | 290 | 90 | 047696 |
| ER 50 | 350 | 110 | 047697 |

## Spannschlüssel für Spannmutter mit minimalem Außendurchmesser

wrench for clamping nut with minimal outer diameter / clé de serrage pour écrou de serrage à diamètre extérieur mini / chiave di serraggio per ghiera con diametro esterno minimo / llave de apriete para tuerca de apriete con diámetro exterior mínimo

**zum Anziehen und Gegenhalten der Spannmutter.**
for tightening of the clamping nut. /
pour le serrage des écrous de serrage. /
per serraggio delle ghiere.




| für / for / pour / per / para | L1 | B1 | ID |
|---|---|---|---|
| ERM 20 | 129 | 29 | 047773 |

## Drehmomentschlüssel

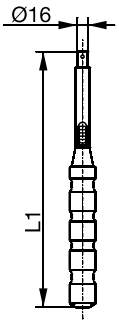
torque wrenches / clés dynamométriques / chiave dinamometrica / llaves dinamométricas

**zum sicheren Anziehen der Spannmutter. Durch Einstellen des empfohlenen Anzugsdrehmoments werden Beschädigungen an Futter und Gewindewerkzeug verhindert. Passende Aufsätze für die jeweilige Spannmuttergröße sind separat erhältlich.**

for secure tightening of the clamping nut. By setting the recommended tightening torque, you avoid damages on tap and tap holder. Suitable torque wrench heads to be ordered separately. /

pour un serrage correct de l'écrou de serrage. Le réglage du couple de serrage conseillé permet d'éviter d'endommager le mandrin et l'outil. Des embouts-clés sont livrables séparément. /

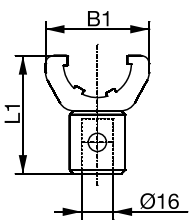
per assicurare un corretto serraggio evitando danni ai maschi o al maschiatore. Le chiavi dinamometriche vanno ordinate a parte.

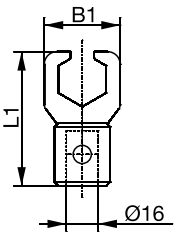


| Spannbereich / torque range / plage de serrage / campo di serraggio / rango de apriete | L1 | ID |
|---|---|---|
| 5 - 20 Nm | 335 | 028994 |
| 20 - 200 Nm | 465 | 029013 |
| 60 - 300 Nm | 565 | 039888 |

## Aufsatz für Drehmomentschlüssel

torque wrench heads / embouts-clés pour clés dynamométriques / inserzione per chiave dinamometrica / cabeza de llave dinamométrica

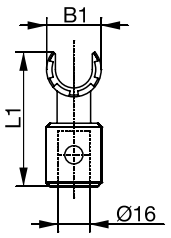


| für / for / pour / per / para | L1 | B1 | ID |
|---|---|---|---|
| ER 11 | 61 | 32 | 029014 |
| ER 20 | 81 | 52 | 029015 |
| ER 25 | 75 | 65 | 029017 |
| ER 40 | 82 | 90 | 029018 |
| ER 50 | 94 | 110 | 039889 |

## Aufsatz für Drehmomentschlüssel für Spannmutter mit minimalem Außendurchmesser

torque wrench head for clamping nut with minimal outer diameter / embout-clé de clé dynamométrique pour écrou de serrage à diamètre extérieur mini / inserzione per chiave dinamometrica per ghiera di serraggio con diametro esterno minimo / cabeza de llave dinamométrica para tuerca de apriete con diámetro exterior mínimo




| für / for / pour / per / para | L1 | B1 | ID |
|---|---|---|---|
| ERM 20 | 68 | 29 | 039975 |

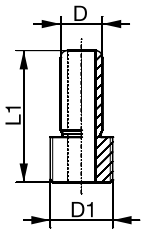
## Kühlmittelrohre für HSK-Schäfte

coolant tubes for HSK shanks / raccords d'arrosage pour queues HSK / raccordi di lubrificazione per gambi HSK / tubos de refrigeración para mangos HSK

**für die sichere Übergabe des Kühlmediums von Maschine zum HST SYNCHRO. Schlüssel zur Befestigung separat erhältlich.**
for the secure coolant supply from the machine to the HST SYNCHRO. Spanner for fastening to be ordered separately. /

pour le bon acheminement du lubrifiant de la machine au mandrin HST SYNCHRO. Clé livrable séparément. /

per una tenuta del lubrificante perfetta tra il CNC ed il maschiatore HST SYNCHRO. La chiave di montaggio va ordinata a parte.



| für / for / pour / per / para | L1 | D1 | D | ID |
|---|---|---|---|---|
| HSK 50A | 32,7 | M16x1 | 10 | 029027 |
| HSK 63A | 36,2 | M18x1 | 12 | 029028 |
| HSK 100A | 43,6 | M24x1,5 | 16 | 029029 |

## Schlüssel für Kühlmittelrohr

spanners for coolant tubes / clés pour raccords d'arrosage / chiave di montaggio per raccordi di lubrificazione / llaves para tubos de refrigeración

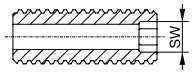
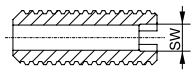
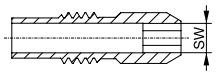
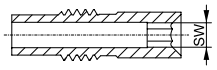
| für / for / pour / per / para | ID |
|---|---|
| HSK 50A | 029031 |
| HSK 63A | 029032 |
| HSK 100A | 029033 |

## Axialverstellbare Einstellschraube (AES)

axial adjustment screw (AES) / vis de réglage axial (AES) / vite di regolazione assiale (AES) / tornillo de ajuste axial (AES)

**zum Einstellen der Auskraglänge des Gewindewerkzeugs aus dem HST SYNCHRO und für eine sichere Übergabe des Kühlschmierstoffs.**

adjusts the protruding length of the threading tool from the HST SYNCHRO and guarantees a secure transfer of the cooling lubricant. / pour le préréglage du taraud dans le mandrin HST SYNCHRO, tout en garantissant le bon acheminement du lubrifiant réfrigérant. / regola la sporgenza della lunghezza dell'utensile dal mandrino HST SYNCHRO e garantisce una perfetta lubrificazione. / para el ajuste de la longitud de voladizo de la herramienta de roscado del HST SYNCHRO y para un suministro seguro del lubricante.

| für Schaft-Ø / for shank Ø / pour Ø queue / per Ø gambo / para Ø mango | für / for / pour / per / para HST SYNCHRO | SW | ID | |
|---|---|---|---|---|
| **KSS - für Werkzeuge mit Innenkühlung** / for tools with internal coolant / pour outils avec trou d'huile / per utensili con lubrificazione interna / para herramientas con refrigeración interior | | | | |
| 4,5 / 6 / 7 / 8 / 9 | 40 / 60 | 3 | 048578 |  |
| 10 / 11 / 12 / 14 / 16 | 40 / 60 | 3 | 040541 | |
| **KSS - für Kühlung entlang des Schaftes** / for lubrication along the shank / pour lubrification le long de la queue / per lubrificazione lungo il gambo / para lubricación por el mango | | | | |
| 4,5 / 6 / 7 / 8 / 9 | 40 / 60 | 3 | 049865 |  |
| 10 / 11 / 12 / 14 / 16 | 40 / 60 | 3 | 050985 | |
| **MMS / MQL – für Außenabdichtung** / for external sealing / avec étanchéité sur cône mâle (extérieur) / per tenuta esterna | | | | |
| 6 / 7 | 40 | 2,5 | 043522 |  |
| 8 / 9 / 10 / 11 / 12 | 40 | 3 | 047625 | |
| 7 | 60 | 2,5 | 043522 | |
| 8 / 9 | 60 | 3 | 047624 | |
| 10 / 11 / 12 / 14 / 16 | 60 | 3 | 047625 | |
| **MMS / MQL – für Innenabdichtung** / for internal sealing / avec étanchéité sur cône femelle (intérieur) / per tenuta interna | | | | |
| 6 / 7 | 40 / 60 | 2,5 | 047627 |  |
| 8 / 9 | 40 | 2,5 | 047628 | |
| 8 / 9 | 60 | 2,5 | 047864 | |
| 10 | 40 / 60 | 3 | 047629 | |
| 11 / 12 / 14 / 16 | 40 / 60 | 3 | 047630 | |

## Einstellschlüssel für AES

adjustment spanner for axial adjustment screw (AES) / clé de réglage pour vis de réglage axiale (AES) / chiave di regolazione vite di tenuta (AES) / llave de ajuste para AES

**der Innensechskantschlüssel mit Überlänge, für die Verstellung der AES auch von der Schaftseite des HST SYNCHRO MMS.**

long hexagon socket wrench, for adjustment of the AES also from the shank-side of the HST SYNCHRO MMS. / clé 6xpans longue, pour réglage de l'AES (vis de réglage axial), utilisable également côté queue du HST SYNCHRO MMS. / chiave esagonale extra lunga per regolare la vite AES dalla parte del mandrino HSK attraverso il maschiatore HST SYNCHRO.

| SW | ID |
|---|---|
| 2,5 | 049664 |
| 3 | 043832 |

## MMS-Übergabeelement für HSK-Schäfte

MQL transfer unit for HSK shanks / raccord d'arrosage MQL pour queues HSK /
tubetto per lubrificazione MQL per mandrini HSK / tubo de refrigeración MQL para mangos HSK

**für die sichere Übergabe des Kühlmediums von Maschine zum HST SYNCHRO MMS. In den Ausführungen für 1- und / oder 2-Kanal-System für den automatischen oder manuellen Wechsel verfügbar. Schlüssel zur Befestigung separat erhältlich.**

for the secure transfer of the lubricant from the machine to the HST SYNCHRO MMS. Available for 1-channel and /or 2-channel system and for automatic or manual tool change. Spanner for assembly to be ordered separately. /

calibré pour le dosage optimal du lubrifiant envoyé dans le mandrin HST SYNCHRO MMS. Disponible pour système à 1 et/ou 2 voies, et pour changement d'outil manuel ou automatique. Clé livrable séparément. /

per un perfetto collegamento tra il mandrino ed il maschiatore HST SYNCHRO MMS. Disponibile per sistema ad 1 canale ed a 2 canali cambio automatico e per cambio manuale. La chiave di montaggio deve essere ordinata a parte.

für manuellen Werkzeugwechsel / for manual tool change /
changement d'outils manuel / cambio utensili manuale

| Kanal-System / channel system / système à 1 voie / 2 voies / sistema di canale / sistema de canales | für / for / pour / per / para | ID |
|---|---|---|
| 1 + 2 | HSK63 | 043521 |

automatischer Werkzeugwechsel / automatic tool change /
changement d'outils manuel / cambio utensili automatico

| Kanal-System / channel system / système à 1 voie / 2 voies / sistema di canale / sistema de canales | für / for / pour / per / para | ID |
|---|---|---|
| 1 | HSK63 | 047632 |
| 2 | HSK63 | 047652 |

## Montagevorrichtung für HST SYNCHRO

tool holding fixture for HST SYNCHRO / dispositif de montage pour HST SYNCHRO /
dispositivo di montaggio per HST SYNCHRO / dispositivo de montaje para HST SYNCHRO

**nimmt das HST SYNCHRO auf, wodurch beim Anziehen der Spannmutter das Gegenhalten durch einen zweiten Schraubenschlüssel entfällt.**

holds the HST SYNCHRO so that the clamping nut can be tightened without the help of a second wrench. /

pour HST SYNCHRO. Ce dispositif permet de supprimer la 2ème clé servant au contre-serrage de l'écrou. /

fissa il maschiatore HST SYNCHRO permettendo di serrare la ghiera senza l'ausilio di una seconda chiave.

| für / for / pour / per / para | ID |
|---|---|
| 20/40/60/80 | 029071 |

## Montageblock

tool holding block / bloc de montage / dispositivo di montaggio / bloque de montaje

**nimmt das HST SYNCHRO auf, wodurch ein beidhändiges Anziehen der Spannmutter ermöglicht wird.**

holds the HST SYNCHRO, allowing a tightening of the clamping nut with both hands. /

pour fixer HST SYNCHRO et permettre le serrage manuel de l'écrou. /

bloccare il maschiatore HST SYNCHRO avvitando la ghiera di fissaggio con entrambe le mani.

| für / for / pour / per / para | ID |
|---|---|
| HSK 50A | 029024 |
| HSK 63A | 029025 |
| HSK 100A | 029026 |

**Oberflächenbehandlungen und -beschichtungen** 206 - 207
surface treatments and coatings / traitements de surface et revêtements / trattamenti superficiali e rivestimenti / acabados superficiales y recubrimientos

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limit of nut thread core Ø and bore hole Ø / limites du Ø du noyau de filetages intérieurs et Ø d'avant-trou / fascia di tolleranza per madreviti Ø di nocciolo e Ø preforo / limite superior e inferior para diámetro de núcleo rosca interna (tuerca) y Ø de taladrado

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chamfer forms / formes d'entrée / forme d'imbocco / formas de entrada

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conversion table / tableau de correspondances / tabella di conversione / tabla de conversión

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**Défaut - Causes Possibles - Remèdes / Problema - Causa - Soluzione** 241 - 247

| | **Schichtaufbau**<br>coating type /<br>type de revêtement /<br>tipo di rivestimento /<br>tipo de recubrimiento | **Einsatzgebiet**<br>application /<br>application /<br>campo di applicazione /<br>campo de aplicación |
|---|---|---|
| <br>**BT** | Aluminium-Chrom-Nitrid<br>aluminium chrome nitride<br>nitrure de chrome aluminium<br>nitruro di cromo-alluminio<br>aluminio nitruro de cromo | langspanende Werkstoffe, Stähle, rostfreie Stähle, Kupfer, langspanende Kupferlegierungen, Aluminium, Aluminiumdruckguss, Stahl > 1000 N/mm², abrasive Werkstoffe<br>long-chipping materials, steel, stainless steel, copper, long-chipping copper alloys, aluminium, aluminium die casting, steel > 1000 N/mm², abrasive materials<br>matières à copeaux longs, aciers, aciers inoxydables, cuivre, alliages de cuivre à copeaux longs, aluminium, aluminiums de fonderie, acier > 1000 N/mm², matériaux abrasifs<br>materiali a truciolo lungo, acciai, acciai inossidabili, rame, rame a truciolo lungo, alluminio, alluminio pressofuso, acciaio > 1000 N/mm², materiali abrasivi |
| <br>**FNT** | Titan-Aluminium-Nitrid - nanostrukturiert<br>nano-structured titanium aluminium nitride<br>nitrure de titane aluminium nanostructuré<br>nitruro di titanio-alluminio nanostrutturato<br>nitruro de aluminio titanio nanoestructurado | Stahl > 1000 N/mm², abrasive Werkstoffe<br>steel > 1000 N/mm², abrasive materials<br>acier > 1000 N/mm², matériaux abrasifs<br>acciaio > 1000 N/mm², materiali abrasivi |
| <br>**HARDLUBE (HL)** | Titan-Aluminiumnitrid + WC/C<br>Wolframcarbid - Kohlenstoff<br>titanium aluminium nitride + WC/C<br>tungsten carbide - carbon<br>nitrure de titane-aluminium + WC/C<br>carbure de tungstène-carbone<br>titanio-nitruro d'alluminio + WC/C<br>carburo di tungsteno - carbido<br>nitruro de aluminio titanio + WC/C<br>carburo de tungsteno - carbon | langspanende Werkstoffe, Stähle, rostfreie Stähle, Kupfer, langspanende Kupferlegierungen, Aluminium, Aluminiumdruckguss<br>long-chipping materials, steel, stainless steel, copper, long-chipping copper alloys, aluminium, aluminium die casting<br>matières à copeaux longs, aciers, aciers inoxydables, cuivre, alliages de cuivre à copeaux longs, aluminium, aluminiums de fonderie<br>materiali a truciolo lungo, acciai, acciai inossidabili, rame, rame a truciolo lungo, alluminio, alluminio pressofuso |
| <br>**TICN** | Titan-Carbonnitrid beschichtet<br>titanium carbo nitride coated<br>carbonitrure de titane<br>titanio-nitruro carbono<br>carbo nitruro de titanio | unlegierte und legierte Stähle ≥ 800 N/mm², abrasive Werkstoffe, Gusseisen, Aluminiumgusslegierungen, Bronze, Titanlegierungen<br>non-alloyed and alloyed steel ≥ 800 N/mm², abrasive materials, cast iron, cast aluminium, bronze, titanium alloys<br>aciers non alliés et alliés ≥ 800 N/mm², matériaux abrasifs, fontes, aluminiums de fonderie, bronze, alliages de titane<br>acciai non legati e legati ≥ 800 N/mm², materiali abrasivi, ghisa, fusione d'alluminio, bronzo, leghe di titanio |
| <br>**TIN** | Titannitrid beschichtet<br>titanium nitride coated<br>nitrure de titane<br>titanio-nitruro<br>nitruro de titanio | un- und niedriglegierte Stähle (≤ 1000 N/mm²) und Nichteisenmetalle<br>non-alloyed and low-alloyed steel (≤ 1000 N/mm²) and non-ferrous metals<br>aciers non alliés et faiblement alliés (≤ 1000 N/mm²) et métaux non-ferreux<br>acciai non legati e basso legati (≤ 1000 N/mm²) e metalli non ferrosi |
| <br>**VAP** | vaporisiert<br>vapoured<br>traitement vapeur<br>vaporizzato<br>vaporizado | Stahl ≤ 700 N/mm², bei weichen und zähen Werkstoffen mit niedrigem Kohlenstoff<br>steel ≤ 700 N/mm² or soft and tough materials with low carbon<br>acier ≤ 700 N/mm² ou matériaux doux et tenaces avec une faible teneur en carbone<br>acciaio ≤ 700 N/mm² per materiali dolci e tenaci con basso contenuto di carbonio |

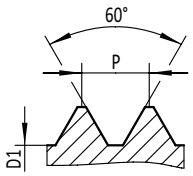
| **Eigenschaften**<br>properties /<br>caractéristiques /<br>caratteristiche /<br>características | **Mikrohärte HV 0,05**<br>micro hardness HV 0.05 /<br>microdureté HV 0,05 /<br>micro durezza Vickers (HV) 0,05 /<br>micro-dureza (HV 0,05) |
|---|---|
| sehr gute Schichtglätte, gleichmäßige Schichtdicke an den Profilkanten und -ecken, hohe Dichte und Schichthärte<br>very smooth coating surface, even coating thickness on profile edges and corners, high density and hardness of the coating<br>surface très lisse, épaisseur de revêtement égale aux arêtes et angles du profil, haute densité et dureté du revêtement | > 3300 |
| hohe Temperaturbeständigkeit, Trockenbearbeitung möglich in Gusseisen, hohe Beständigkeit gegen Abrasivverschleiß, hohe Härte<br>high temperature resistance, suitable for dry processing in cast iron, high resistance against abrasive wear, high hardness<br>bonne résistance à la température, adapté pour usinage à sec des fontes, bonne résistance à l'abrasion, dureté élevée<br>resistenza a temperatura elevata, lavorazione a secco in ghisa, elevata resistenza all'usura, elevata durezza | 3300 |
| hohe Temperaturbeständigkeit, Trockenbearbeitung möglich in Gusseisen, hohe Beständigkeit gegen Abrasivverschleiß, hohe Härte<br>low friction, low adhesion tendency, suitable for minimum quantity lubrication (MQL), good lubrication properties under disadvantageous conditions, good chip formation<br>diminution du frottement, tendance à l'adhérence faible, adapté pour microlubrification (MQL),bonnes caractéristiques de lubrification même sous conditions défavorables, bonne formation des copeaux.<br>basso attrito, bassa tendenza al bloccaggio, possibilità di lubrificazione minimale (MQL), ottime capacità di lubrificazione anche in condizioni disagiate, buona formazione di truciolo | 3000 |
| hohe Härte und Verschleißfestigkeit bei guten Zähigkeitseigenschaften, für hohe mechanische Belastung geeignet<br>high hardness and wear resistance combined with good toughness properties, suitable for high mechanical stress<br>dureté et résistance à l'usure élevées combinées avec de bonnes caractéristiques de ténacité, adapté pour des sollicitations mécaniques sévères<br>elevata durezza e una migliore resistenza all'abrasione, buone caratteristiche di tenacità, adatto per elevati carichi meccanici | 3000 |
| Allround-Schicht vielseitig einsetzbar, mit guten Gleiteigenschaften, sehr verschleißfest, schützt vor Abrasiv- und Adhäsivverschleiß<br>very versatile all-round coating with good sliding properties, very wear-resistant, protection against adhesion and abrasive wear<br>revêtement polyvalent, bonnes propriétés de glissement, haute résistance à l'usure, assure une bonne protection contre les collages et l'abrasion<br>rivestimento allround per uso universale, con buone caratteristiche di scorrimento, molto resistente all'usura | 2300 |
| Aufdampfen nichtmetallischer Oxidschicht (Fe3O4), vermindert Kaltaufschweißen, bessere Schmiermittelhaftung<br>vapor deposition of a non-metallic oxide layer (Fe3O4), reduces cold weldings, improved lubricant adhesion<br>vaporisation d'une couche d'oxyde non métallique (Fe3O4), protection contre les soudures à froid, favorise l'adhésion du lubrifiant<br>vaporizzazione (Fe3O4), elimina la saldatura a freddo, migliora l'aderenza del lubrificante | - |

# Grenzmaße für Muttergewinde Kern-Ø und Vorbohr-Ø

limit of nut thread core Ø and bore hole Ø / limites du Ø du noyau de filetages intérieurs et Ø d'avant-trou / fascia di tolleranza per madreviti Ø di nocciolo e Ø preforo / limite superior e inferior para diámetro de núcleo rosca interna (tuerca) y Ø de taladrado

## Metrische Gewinde

metric threads / filetages métriques / filettature metriche / roscas métricas




### M

**Metrisches ISO Regelgewinde**
**DIN 13 Tol. 6H (M1 - 1,4 = 5H nach DIN ISO 965-1)**
ISO metric coarse thread DIN 13 tol. 6H (M1 - 1.4 = 5H acc. DIN ISO 65-1) / filetage métrique ISO à pas gros DIN 13 tol. 6H (M1 - 1,4 = 5H suivant DIN ISO 965-1) / filettatura metrica ISO DIN 13 tol. 6H (M1 - 1,4 = 5H sec. DIN ISO 965-1) / rosca métrica ISO DIN 13 tol. 6H (M1 - 1,4 = 5 H según DIN ISO 965-1)

| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| M 1 | 0,25 | 0,729 | 0,785 | 0,75 |
| M 1,1 | 0,25 | 0,829 | 0,885 | 0,85 |
| M 1,2 | 0,25 | 0,929 | 0,985 | 0,95 |
| M 1,4 | 0,30 | 1,075 | 1,142 | 1,10 |
| M 1,6 | 0,35 | 1,221 | 1,321 | 1,25 |
| M 1,8 | 0,35 | 1,421 | 1,521 | 1,45 |
| M 2 | 0,40 | 1,567 | 1,679 | 1,60 |
| M 2,2 | 0,45 | 1,713 | 1,838 | 1,75 |
| M 2,5 | 0,45 | 2,013 | 2,138 | 2,05 |
| M 3 | 0,50 | 2,459 | 2,599 | 2,50 |
| M 3,5 | 0,60 | 2,850 | 3,010 | 2,90 |
| M 4 | 0,70 | 3,242 | 3,422 | 3,30 |
| M 4,5 | 0,75 | 3,688 | 3,878 | 3,70 |
| M 5 | 0,80 | 4,134 | 4,334 | 4,20 |
| M 6 | 1,00 | 4,917 | 5,153 | 5,00 |
| M 7 | 1,00 | 5,917 | 6,153 | 6,00 |
| M 8 | 1,25 | 6,647 | 6,912 | 6,80 |
| M 9 | 1,25 | 7,647 | 7,912 | 7,80 |
| M 10 | 1,50 | 8,367 | 8,676 | 8,50 |
| M 11 | 1,50 | 9,376 | 9,676 | 9,50 |
| M 12 | 1,75 | 10,106 | 10,441 | 10,20 |
| M 14 | 2,00 | 11,835 | 12,210 | 12,00 |
| M 16 | 2,00 | 13,835 | 14,210 | 14,00 |
| M 18 | 2,50 | 15,294 | 15,744 | 15,50 |
| M 20 | 2,50 | 17,294 | 17,744 | 17,50 |
| M 22 | 2,50 | 19,294 | 19,744 | 19,50 |
| M 24 | 3,00 | 20,752 | 21,252 | 21,00 |
| M 27 | 3,00 | 23,752 | 24,252 | 24,00 |
| M 30 | 3,50 | 26,211 | 26,771 | 26,50 |
| M 33 | 3,50 | 29,211 | 29,771 | 29,50 |
| M 36 | 4,00 | 31,670 | 32,270 | 32,00 |
| M 39 | 4,00 | 34,670 | 35,270 | 35,00 |
| M 42 | 4,50 | 37,129 | 37,799 | 37,50 |
| M 45 | 4,50 | 40,129 | 40,799 | 40,50 |
| M 48 | 5,00 | 42,587 | 43,297 | 43,00 |
| M 52 | 5,00 | 46,587 | 47,297 | 47,00 |
| M 56 | 5,50 | 50,046 | 50,796 | 50,50 |
| M 60 | 5,50 | 54,046 | 54,796 | 54,50 |
| M 64 | 6,00 | 57,505 | 58,305 | 58,00 |
| M 68 | 6,00 | 61,505 | 62,305 | 62,00 |

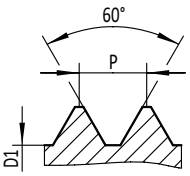
### MF

**Metrisches ISO Feingewinde**
**DIN 13 Tol. 6H (P 0,25 = 5H nach DIN ISO 965-1)**
ISO metric fine thread DIN 13 tol. 6H (P 0.25 = 5H acc. DIN ISO 965-1) / filetage métrique ISO à pas fin DIN 13 tol. 6H (P 0,25 = 5H suivant DIN ISO 965-1) / filettatura metrica ISO passo fine DIN 13 tol. 6H (P 0,25 = 5H sec. DIN ISO 965-1) / rosca métrica fina ISO DIN 13 tol. 6H (P 0,25 = 5H según DIN ISO 965-1)

| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| M 2 | 0,25 | 1,729 | 1,774 | 1,75 |
| M 2,2 | 0,25 | 1,929 | 1,974 | 1,95 |
| M 2,5 | 0,35 | 2,121 | 2,221 | 2,15 |
| M 3 | 0,35 | 2,621 | 2,684 | 2,65 |
| M 3,5 | 0,35 | 3,121 | 3,184 | 3,15 |
| M 4 | 0,50 | 3,459 | 3,599 | 3,50 |
| M 5 | 0,50 | 4,459 | 4,599 | 4,50 |
| M 6 | 0,50 | 5,459 | 5,599 | 5,50 |
| M 6 | 0,75 | 5,188 | 5,378 | 5,20 |
| M 8 | 0,75 | 7,188 | 7,378 | 7,20 |
| M 8 | 1,00 | 6,917 | 7,153 | 7,00 |
| M 10 | 0,75 | 9,188 | 9,378 | 9,20 |
| M 10 | 1,00 | 8,917 | 9,153 | 9,00 |
| M 10 | 1,25 | 8,647 | 8,912 | 8,80 |
| M 12 | 0,75 | 11,188 | 11,378 | 11,20 |
| M 12 | 1,00 | 10,917 | 11,153 | 11,00 |
| M 12 | 1,25 | 10,647 | 10,912 | 10,80 |
| M 12 | 1,50 | 10,376 | 10,676 | 10,50 |
| M 14 | 1,00 | 12,917 | 13,153 | 13,00 |
| M 14 | 1,25 | 12,647 | 12,912 | 12,80 |
| M 14 | 1,50 | 12,376 | 12,676 | 12,50 |
| M 16 | 1,00 | 14,917 | 15,153 | 15,00 |
| M 16 | 1,50 | 14,376 | 14,676 | 14,50 |
| M 18 | 1,00 | 16,917 | 17,153 | 17,00 |
| M 18 | 1,50 | 16,376 | 16,676 | 16,50 |
| M 18 | 2,00 | 15,835 | 16,210 | 16,00 |
| M 20 | 1,00 | 18,917 | 19,153 | 19,00 |
| M 20 | 1,50 | 18,376 | 18,676 | 18,50 |
| M 20 | 2,00 | 17,835 | 18,210 | 18,00 |
| M 22 | 1,00 | 20,917 | 21,153 | 21,00 |
| M 22 | 1,50 | 20,376 | 20,676 | 20,50 |
| M 22 | 2,00 | 19,835 | 20,210 | 20,00 |
| M 24 | 1,00 | 22,917 | 23,153 | 23,00 |
| M 24 | 1,50 | 22,376 | 22,676 | 22,50 |
| M 24 | 2,00 | 21,835 | 22,210 | 22,00 |
| M 26 | 1,00 | 24,917 | 25,153 | 25,00 |
| M 26 | 1,50 | 24,376 | 24,676 | 24,50 |
| M 27 | 1,50 | 25,376 | 25,676 | 25,50 |
| M 27 | 2,00 | 24,835 | 25,210 | 25,00 |
| M 28 | 1,50 | 26,376 | 26,676 | 26,50 |

# Metrische Gewinde

metric threads / filetages métriques / filettature metriche / roscas métricas



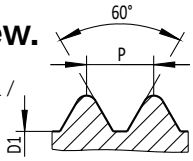

## MF

**Metrisches ISO Feingewinde**
**DIN 13 Tol. 6H (P 0,25 = 5H nach DIN ISO 965-1)**
ISO metric fine thread DIN 13 tol. 6H (P 0.25 = 5H acc. DIN ISO 965-1) / filetage métrique ISO à pas fin DIN 13 tol. 6H (P 0,25 = 5H suivant DIN ISO 965-1) / filettatura metrica ISO passo fine DIN 13 tol. 6H (P 0,25 = 5H sec. DIN ISO 965-1) / rosca métrica fina ISO DIN 13 tol. 6H (P 0,25 = 5H según DIN ISO 965-1)

| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| M 28 | 2,00 | 25,835 | 26,210 | 26,00 |
| M 30 | 1,50 | 28,376 | 28,676 | 28,50 |
| M 30 | 2,00 | 27,835 | 28,210 | 28,00 |
| M 30 | 3,00 | 26,752 | 27,252 | 27,00 |
| M 32 | 1,50 | 30,376 | 30,676 | 30,50 |
| M 32 | 2,00 | 29,835 | 30,210 | 30,00 |
| M 32 | 3,00 | 26,752 | 27,252 | 29,00 |
| M 33 | 1,50 | 31,376 | 31,676 | 31,50 |
| M 33 | 2,00 | 30,835 | 31,210 | 31,00 |
| M 33 | 3,00 | 29,752 | 30,252 | 30,00 |
| M 36 | 1,50 | 34,376 | 34,676 | 34,50 |
| M 36 | 2,00 | 33,835 | 34,210 | 34,00 |
| M 36 | 3,00 | 32,752 | 33,252 | 33,00 |
| M 38 | 1,50 | 36,376 | 36,676 | 36,50 |
| M 39 | 2,00 | 36,835 | 37,210 | 37,00 |
| M 39 | 3,00 | 35,752 | 36,252 | 36,00 |
| M 40 | 1,50 | 38,376 | 38,676 | 38,50 |
| M 40 | 2,00 | 37,835 | 38,210 | 38,00 |
| M 42 | 1,50 | 40,376 | 40,676 | 40,50 |
| M 42 | 2,00 | 39,835 | 40,210 | 40,00 |
| M 42 | 3,00 | 38,752 | 39,252 | 39,00 |
| M 45 | 1,50 | 43,376 | 43,676 | 43,50 |
| M 45 | 2,00 | 42,835 | 43,210 | 43,00 |
| M 45 | 3,00 | 41,752 | 42,252 | 42,00 |
| M 48 | 1,50 | 46,376 | 46,676 | 46,50 |
| M 48 | 2,00 | 45,835 | 46,210 | 46,00 |
| M 48 | 3,00 | 44,752 | 45,252 | 45,00 |
| M 50 | 1,50 | 48,376 | 48,676 | 48,50 |
| M 50 | 2,00 | 47,835 | 48,210 | 48,00 |
| M 50 | 3,00 | 46,752 | 47,252 | 47,00 |
| M 52 | 1,50 | 50,376 | 50,676 | 50,50 |
| M 52 | 2,00 | 49,835 | 50,210 | 50,00 |
| M 52 | 3,00 | 48,752 | 49,252 | 49,00 |

# Luft- und Raumfahrtgew.

aerospace threads / filetages pour l'aéronautique / filettature per l'aeronautica / roscas aeroespaciales




## MJ

**Regelgewinde DIN ISO 5855**
metric coarse thread DIN ISO 5855 / filetage métrique DIN ISO 5855 / filettatura metrica DIN ISO 5855 / rosca métrica DIN ISO 5855

| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| MJ 3 | 0,50 | 2,513 | 2,653 | 2,60 |
| MJ 4 | 0,70 | 3,318 | 3,498 | 3,40 |
| MJ 5 | 0,80 | 4,221 | 4,421 | 4,30 |
| MJ 6 | 1,00 | 5,026 | 5,215 | 5,10 |
| MJ 8 | 1,25 | 6,782 | 6,994 | 6,90 |
| MJ 10 | 1,50 | 8,539 | 8,779 | 8,70 |
| MJ 12 | 1,75 | 10,295 | 10,563 | 10,50 |

## UNJC

**Grobgewinde ASME B1.15 und ISO 3161**
unified coarse thread ASME B1.15 and ISO 3161 / filetage à pas gros ASME B1.15 et ISO 3161 / filettatura grossa unificata ASME B1.15 e ISO 3161 / rosca unificada gruesa AMSE B1.15 e ISO 3161

| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| UNJC No4 | 40 | 2,226 | 2,391 | 2,30 |
| UNJC No6 | 32 | 2,732 | 2,938 | 2,80 |
| UNJC No8 | 32 | 3,393 | 3,599 | 3,50 |
| UNJC No10 | 24 | 3,795 | 4,064 | 3,90 |
| UNJC 1/4" | 20 | 5,113 | 5,387 | 5,20 |
| UNJC 5/16" | 18 | 6,563 | 6,833 | 6,70 |
| UNJC 3/8" | 16 | 7,978 | 8,255 | 8,10 |
| UNJC 1/2" | 13 | 10,796 | 11,093 | 10,90 |

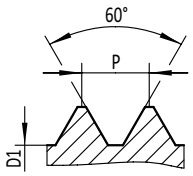
## UNJF

**Feingewinde ASME B1.15 und ISO 3161**
unified fine thread ASME B1.15 and ISO 3161 / filetage à pas fin ASME B1.15 et ISO 3161 / filettatura fine unificata ASME B1.15 e ISO 3161 / rosca unificada fina ASME B1.15 e ISO 3161

| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| UNJF No4 | 48 | 2,329 | 2,467 | 2,40 |
| UNJF No6 | 40 | 2,886 | 3,051 | 2,95 |
| UNJF No8 | 36 | 3,479 | 3,662 | 3,60 |
| UNJF No10 | 32 | 4,053 | 4,253 | 4,15 |
| UNJF 1/4" | 28 | 5,466 | 5,662 | 5,60 |
| UNJF 5/16" | 24 | 6,907 | 7,110 | 7,00 |
| UNJF 3/8" | 24 | 8,494 | 8,680 | 8,60 |
| UNJF 1/2" | 20 | 11,463 | 11,660 | 11,50 |

# Amerikanische Unified Gewinde

American unified threads / filetages américains / filettature unificate americane / roscas americanas unificadas




## UNC

**Grobgewinde ASME B1.1**
unified coarse thread ASME B1.1 / filetage américain ASME B1.1 / filettatura grossa unificata ASME B1.1 / rosca unificada gruesa ASME B1.1

| | P | D1 mm min. 2B / 3B | D1 mm max. 2B | D1 mm max. 3B | |
|---|---|---|---|---|---|
| UNC No1 | 64 | 1,425 | 1,582 | 1,582 | 1,55 |
| UNC No2 | 56 | 1,694 | 1,872 | 1,872 | 1,85 |
| UNC No3 | 48 | 1,941 | 2,146 | 2,146 | 2,10 |
| UNC No4 | 40 | 2,156 | 2,385 | 2,385 | 2,35 |
| UNC No5 | 40 | 2,487 | 2,697 | 2,697 | 2,65 |
| UNC No6 | 32 | 2,642 | 2,896 | 2,893 | 2,85 |
| UNC No8 | 32 | 3,302 | 3,531 | 3,528 | 3,50 |
| UNC No10 | 24 | 3,683 | 3,962 | 3,950 | 3,90 |
| UNC No12 | 24 | 4,343 | 4,597 | 4,590 | 4,50 |
| UNC 1/4" | 20 | 4,978 | 5,258 | 5,250 | 5,10 |
| UNC 5/16" | 18 | 6,401 | 6,731 | 6,680 | 6,60 |
| UNC 3/8" | 16 | 7,798 | 8,153 | 8,082 | 8,00 |
| UNC 7/16" | 14 | 9,144 | 9,550 | 9,441 | 9,40 |
| UNC 1/2" | 13 | 10,592 | 11,024 | 10,881 | 10,80 |
| UNC 9/16" | 12 | 11,989 | 12,446 | 12,301 | 12,20 |
| UNC 5/8" | 11 | 13,386 | 13,868 | 13,693 | 13,50 |
| UNC 3/4" | 10 | 16,307 | 16,840 | 16,624 | 16,50 |
| UNC 7/8" | 9 | 19,177 | 19,761 | 19,520 | 19,50 |
| UNC 1" | 8 | 21,971 | 22,606 | 22,344 | 22,25 |
| UNC 1.1/8" | 7 | 24,638 | 25,349 | 25,082 | 25,00 |
| UNC 1.1/4" | 7 | 27,813 | 28,524 | 28,258 | 28,00 |
| UNC 1.3/8" | 6 | 30,353 | 31,115 | 30,851 | 30,75 |
| UNC 1.1/2" | 6 | 33,528 | 34,290 | 34,026 | 34,00 |
| UNC 1.3/4" | 5 | 38,964 | 39,827 | 39,560 | 39,50 |
| UNC 2" | 4,5 | 44,679 | 45,593 | 45,367 | 45,00 |
| UNC 2.1/4" | 4,5 | 51,029 | 51,943 | 51,717 | 51,50 |
| UNC 2.1/2" | 4 | 56,617 | 57,582 | 57,389 | 57,20 |
| UNC 2.3/4" | 4 | 62,967 | 63,932 | 63,739 | 63,50 |
| UNC 3" | 4 | 69,317 | 70,282 | 70,089 | 69,90 |

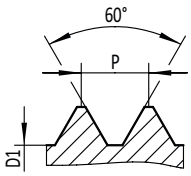
## UNF

**Feingewinde ASME B1.1**
unified fine thread ASME B1.1 / filetage américain à pas fin ASME B1.1 / filettatura fine unificata ASME B1.1 / rosca unificada fina ASME B1.1

| | P | D1 mm min. 2B / 3B | D1 mm max. 2B | D1 mm max. 3B | |
|---|---|---|---|---|---|
| UNF No0 | 80 | 1,181 | 1,306 | 1,306 | 1,25 |
| UNF No1 | 72 | 1,473 | 1,613 | 1,613 | 1,55 |
| UNF No2 | 64 | 1,755 | 1,913 | 1,913 | 1,85 |
| UNF No3 | 56 | 2,024 | 2,197 | 2,197 | 2,15 |
| UNF No4 | 48 | 2,271 | 2,459 | 2,459 | 2,40 |
| UNF No5 | 44 | 2,550 | 2,741 | 2,741 | 2,70 |
| UNF No6 | 40 | 2,819 | 3,023 | 3,012 | 2,95 |
| UNF No8 | 36 | 3,404 | 3,607 | 3,597 | 3,50 |
| UNF No10 | 32 | 3,962 | 4,166 | 4,168 | 4,10 |
| UNF No12 | 28 | 4,496 | 4,724 | 4,717 | 4,60 |
| UNF 1/4" | 28 | 5,359 | 5,588 | 5,563 | 5,50 |
| UNF 5/16" | 24 | 6,782 | 7,036 | 6,995 | 6,90 |
| UNF 3/8" | 24 | 8,382 | 8,636 | 8,565 | 8,50 |
| UNF 7/16" | 20 | 9,728 | 10,033 | 9,947 | 9,90 |
| UNF 1/2" | 20 | 11,328 | 11,608 | 11,524 | 11,50 |
| UNF 9/16" | 18 | 12,751 | 13,081 | 12,969 | 12,90 |
| UNF 5/8" | 18 | 14,351 | 14,681 | 14,554 | 14,50 |
| UNF 3/4" | 16 | 17,323 | 17,678 | 17,546 | 17,50 |
| UNF 7/8" | 14 | 20,269 | 20,676 | 20,493 | 20,40 |
| UNF 1" | 12 | 23,114 | 23,571 | 23,363 | 23,25 |
| UNF 1.1/8" | 12 | 26,289 | 26,746 | 26,538 | 26,50 |
| UNF 1.1/4" | 12 | 29,464 | 29,921 | 29,713 | 29,50 |
| UNF 1.3/8" | 12 | 32,639 | 33,096 | 32,888 | 32,75 |
| UNF 1.1/2" | 12 | 35,814 | 36,269 | 36,063 | 36,00 |

# Amerikanische Unified Gewinde

American unified threads / filetages américains / filettature unificate americane / roscas americanas unificadas




## UN

**Gewinde ASME B1.1**
unified thread ASME B1.1 / filetage américain ASME B1.1 / filettatura unificata ASME B1.1 / rosca unificada ASME B1.1

| | P | D1 mm min. 2B / 3B | D1 mm max. 2B | D1 mm max. 3B | |
|---|---|---|---|---|---|
| UN 1.1/8" | 8 | 25,146 | 25,781 | 25,519 | 25,40 |
| UN 1.1/4" | 8 | 28,321 | 28,956 | 28,694 | 28,50 |
| UN 1.3/8" | 8 | 31,496 | 32,131 | 31,869 | 31,80 |
| UN 1.1/2" | 8 | 34,671 | 35,306 | 35,044 | 35,00 |
| UN 1.5/8" | 8 | 37,846 | 38,481 | 38,219 | 38,10 |
| UN 1.3/4" | 8 | 41,021 | 41,656 | 41,394 | 41,30 |
| UN 1.3/4" | 12 | 42,164 | 42,621 | 42,413 | 42,30 |
| UN 1.7/8" | 8 | 44,196 | 44,831 | 44,569 | 44,50 |
| UN 2" | 8 | 47,371 | 48,006 | 47,744 | 47,70 |
| UN 2" | 12 | 48,514 | 48,971 | 48,763 | 48,70 |

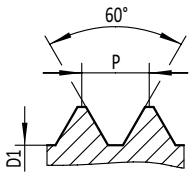
## UNEF

**Extrafeingewinde ASME B1.1**
unified extra fine thread ASME B1.1 / filetage américain à pas extra fin ASME B1.1 / filettatura extra fine unificata ASME B1.1 / rosca unificada extra-fina ASME B1.1

| | P | D1 mm min. 2B / 3B | D1 mm max. 2B | D1 mm max. 3B | |
|---|---|---|---|---|---|
| UNEF No12 | 32 | 4,623 | 4,826 | 4,813 | 4,70 |
| UNEF 1/4" | 32 | 5,486 | 5,690 | 5,662 | 5,55 |
| UNEF 5/16" | 32 | 7,087 | 7,264 | 7,231 | 7,10 |
| UNEF 3/8" | 32 | 8,661 | 8,865 | 8,811 | 8,70 |
| UNEF 7/16" | 28 | 10,135 | 10,338 | 10,290 | 10,20 |
| UNEF 1/2" | 28 | 11,709 | 11,938 | 11,877 | 11,80 |
| UNEF 9/16" | 24 | 13,132 | 13,386 | 13,320 | 13,20 |
| UNEF 5/8" | 24 | 14,732 | 14,986 | 14,907 | 14,80 |
| UNEF 11/16" | 24 | 16,307 | 16,561 | 16,495 | 16,40 |
| UNEF 3/4" | 20 | 17,678 | 17,958 | 17,874 | 17,80 |
| UNEF 13/16" | 20 | 19,253 | 19,558 | 19,461 | 19,40 |
| UNEF 7/8" | 20 | 20,853 | 21,133 | 21,049 | 21,00 |
| UNEF 15/16" | 20 | 22,428 | 22,733 | 22,636 | 22,50 |
| UNEF 1" | 20 | 24,028 | 24,308 | 24,224 | 24,10 |
| UNEF 1.1/16" | 18 | 25,451 | 25,781 | 25,667 | 25,60 |
| UNEF 1.1/8" | 18 | 27,051 | 27,381 | 27,254 | 27,20 |
| UNEF 1.1/4" | 18 | 30,226 | 30,556 | 30,429 | 30,30 |
| UNEF 1.5/16" | 18 | 31,801 | 32,131 | 32,017 | 31,95 |
| UNEF 1.3/8" | 18 | 33,401 | 33,731 | 33,604 | 33,50 |
| UNEF 1.1/2" | 18 | 36,576 | 36,881 | 36,779 | 36,70 |

# Aufnahmegewinde für Gewindeeinsätze

helical coil threads for inserts / filetages pour filets rapportés / filettature EG (per filetti riportati) / roscas para montaje de insertos




## EG M

**Metrisches ISO Regelgewinde DIN 8140**
ISO metric coarse thread EG DIN 8140 / filetage métrique ISO DIN 8140 / filettatura metrica DIN 8140 / rosca métrica DIN 8140

| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| EG M 2 | 0,40 | 2,087 | 2,177 | 2,10 |
| EG M 2,5 | 0,45 | 2,597 | 2,697 | 2,65 |
| EG M 3 | 0,50 | 3,108 | 3,220 | 3,15 |
| EG M 3,5 | 0,60 | 3,630 | 3,755 | 3,70 |
| EG M 4 | 0,70 | 4,152 | 4,292 | 4,20 |
| EG M 5 | 0,80 | 5,174 | 5,344 | 5,25 |
| EG M 6 | 1,00 | 6,217 | 6,407 | 6,30 |
| EG M 7 | 1,00 | 7,217 | 7,407 | 7,30 |
| EG M 8 | 1,25 | 8,217 | 8,483 | 8,40 |
| EG M 9 | 1,25 | 9,217 | 9,483 | 9,40 |
| EG M 10 | 1,50 | 10,324 | 10,560 | 10,50 |
| EG M 11 | 1,50 | 11,324 | 11,560 | 11,50 |
| EG M 12 | 1,75 | 12,379 | 12,644 | 12,50 |
| EG M 14 | 2,00 | 14,433 | 14,733 | 14,50 |
| EG M 16 | 2,00 | 16,433 | 16,733 | 16,50 |
| EG M 18 | 2,50 | 18,541 | 18,986 | 18,80 |
| EG M 20 | 2,50 | 20,541 | 20,896 | 20,80 |

## EG UNF

**Gewinde ASME B18.29.1 und BS 3409**
unified fine thread EG ASME B18.29.1 and BS 3409 / filetage américain à pas fin ASME B18.29.1 et BS 3409 / filettatura fine unificata ASME B18.29.1 e BS 3409 / rosca unificada fina ASME B18.29.1 y BS 3409

| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| EG UNF No2 | 64 | 2,271 | 2,405 | 2,30 |
| EG UNF No3 | 56 | 2,614 | 2,758 | 2,70 |
| EG UNF No4 | 48 | 2,962 | 3,122 | 3,00 |
| EG UNF No6 | 40 | 3,645 | 3,818 | 3,70 |
| EG UNF No8 | 36 | 4,321 | 4,498 | 4,40 |
| EG UNF No10 | 32 | 4,999 | 5,184 | 5,10 |
| EG UNF 1/4" | 28 | 6,546 | 6,721 | 6,60 |
| EG UNF 5/16" | 24 | 8,166 | 8,352 | 8,25 |
| EG UNF 3/8" | 24 | 9,754 | 9,931 | 9,80 |
| EG UNF 7/16" | 20 | 11,387 | 11,585 | 11,50 |
| EG UNF 1/2" | 20 | 12,974 | 13,172 | 13,10 |
| EG UNF 9/16" | 18 | 14,592 | 14,798 | 14,70 |
| EG UNF 5/8" | 18 | 16,180 | 16,386 | 16,25 |
| EG UNF 3/4" | 16 | 19,393 | 19,609 | 19,50 |
| EG UNF 7/8" | 14 | 22,619 | 22,845 | 22,75 |
| EG UNF 1" | 12 | 25,860 | 26,114 | 26,00 |

## EG UNC

**Gewinde ASME B18.29.1 und BS 3409**
unified coarse thread EG ASME B18.29.1 and BS 3409 / filetage américain ASME B18.29.1 et BS 3409 / filettatura grossa unificata ASME B18.29.1 e BS 3409 / rosca unificada gruesa ASME B18.29.1 y BS 3409

| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| EG UNC No1 | 64 | 1,941 | 2,090 | 2,00 |
| EG UNC No2 | 56 | 2,283 | 2,441 | 2,35 |
| EG UNC No3 | 48 | 2,631 | 2,804 | 2,70 |
| EG UNC No4 | 40 | 2,985 | 3,180 | 3,10 |
| EG UNC No5 | 40 | 3,315 | 3,487 | 3,40 |
| EG UNC No6 | 32 | 3,678 | 3,879 | 3,80 |
| EG UNC No8 | 32 | 4,338 | 4,524 | 4,40 |
| EG UNC No10 | 24 | 5,055 | 5,283 | 5,20 |
| EG UNC No12 | 24 | 5,715 | 5,944 | 5,80 |
| EG UNC 1/4" | 20 | 6,624 | 6,868 | 6,70 |
| EG UNC 5/16" | 18 | 8,242 | 8,489 | 8,40 |
| EG UNC 3/8" | 16 | 9,868 | 10,127 | 10,00 |
| EG UNC 7/16" | 14 | 11,506 | 11,783 | 11,70 |
| EG UNC 1/2" | 13 | 13,122 | 13,393 | 13,30 |
| EG UNC 9/16" | 12 | 14,747 | 15,032 | 15,00 |
| EG UNC 5/8" | 11 | 16,375 | 16,673 | 16,50 |
| EG UNC 3/4" | 10 | 19,599 | 19,909 | 19,75 |
| EG UNC 7/8" | 9 | 22,835 | 23,162 | 23,10 |
| EG UNC 1" | 8 | 26,088 | 26,469 | 26,25 |

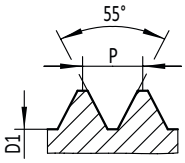
## EG MF

**Metrische ISO Feingewinde DIN 8140**
ISO metric fine thread EG DIN 8140 / filetage métrique ISO à pas fin DIN 8140 / filettatura metrica ISO a passo fine DIN 8140 / rosca métrica fina ISO DIN 8140

| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| EG M 8 | 1,00 | 8,217 | 8,407 | 8,30 |
| EG M 10 | 1,00 | 10,217 | 10,407 | 10,30 |
| EG M 10 | 1,25 | 10,217 | 10,483 | 10,40 |
| EG M 12 | 1,00 | 12,217 | 12,407 | 12,30 |
| EG M 12 | 1,25 | 12,271 | 12,483 | 12,40 |
| EG M 12 | 1,50 | 12,324 | 12,560 | 12,50 |
| EG M 14 | 1,25 | 14,271 | 14,483 | 14,40 |
| EG M 14 | 1,50 | 14,324 | 14,560 | 14,50 |
| EG M 16 | 1,50 | 16,324 | 16,560 | 16,50 |
| EG M 18 | 1,50 | 18,324 | 18,560 | 18,50 |
| EG M 20 | 1,50 | 20,324 | 20,560 | 20,50 |
| EG M 22 | 1,50 | 22,324 | 22,560 | 22,50 |
| EG M 24 | 1,50 | 24,324 | 24,560 | 24,50 |

# Rohrgewinde

pipe threads / filetages pas du gaz / filettature gas / roscas para tubo




## G

### Rohrgewinde DIN EN ISO 228

British standard pipe thread DIN EN ISO 228 / filetage pas du gaz DIN EN ISO 228 / filettatura Whitworth gas DIN EN ISO 228 / rosca para tubo norma británica DIN EN ISO 228

| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| G 1/8" | 28 | 8,566 | 8,848 | 8,80 |
| G 1/4" | 19 | 11,445 | 11,890 | 11,80 |
| G 3/8" | 19 | 14,950 | 15,395 | 15,25 |
| G 1/2" | 14 | 18,631 | 19,172 | 19,00 |
| G 5/8" | 14 | 20,587 | 21,128 | 21,00 |
| G 3/4" | 14 | 24,117 | 24,658 | 24,50 |
| G 7/8" | 14 | 27,877 | 28,418 | 28,25 |
| G 1" | 11 | 30,291 | 30,931 | 30,75 |
| G 1.1/8" | 11 | 34,939 | 35,579 | 35,50 |
| G 1.1/4" | 11 | 38,952 | 39,592 | 39,50 |
| G 1.1/2" | 11 | 44,845 | 45,485 | 45,25 |
| G 1.3/4" | 11 | 50,788 | 51,428 | 51,00 |
| G 2" | 11 | 56,656 | 57,296 | 57,00 |
| G 2.1/4" | 11 | 62,752 | 63,392 | 63,00 |
| G 2.1/2" | 11 | 72,226 | 72,866 | 72,50 |
| G 2.3/4" | 11 | 78,576 | 79,216 | 79,00 |
| G 3" | 11 | 84,926 | 85,566 | 85,30 |
| G 3.1/2" | 11 | 97,372 | 98,012 | 97,70 |
| G 4" | 11 | 110,072 | 110,712 | 110,50 |

## BSF

### Whitworth Feingewinde BS 84

British standard Whitworth fine thread BS 84 / filetage Whitworth à pas fin BS 84 / filettatura Whitworth fine standard inglese BS 84 / rosca norma británica Whitworth de paso fino BS 84

| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| BSF 3/16" | 32 | 3,745 | 4,006 | 4,00 |
| BSF 7/32" | 28 | 4,394 | 4,677 | 4,60 |
| BSF 1/4" | 26 | 5,099 | 5,396 | 5,30 |
| BSF 5/16" | 22 | 6,459 | 6,817 | 6,70 |
| BSF 3/8" | 20 | 7,900 | 8,331 | 8,20 |
| BSF 7/16" | 18 | 9,306 | 9,766 | 9,60 |
| BSF 1/2" | 16 | 10,667 | 11,162 | 11,00 |
| BSF 9/16" | 16 | 12,255 | 12,750 | 12,60 |
| BSF 5/8" | 14 | 13,553 | 14,093 | 14,00 |
| BSF 3/4" | 12 | 16,340 | 16,941 | 16,80 |

## BSF

### Whitworth Feingewinde BS 84

British standard Whitworth fine thread BS 84 / filetage Whitworth à pas fin BS 84 / filettatura Whitworth fine standard inglese BS 84 / rosca norma británica Whitworth de paso fino BS 84

| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| BSF 7/8" | 11 | 19,269 | 19,909 | 19,80 |
| BSF 1" | 10 | 22,148 | 22,834 | 22,70 |
| BSF 1.1/8" | 9 | 24,962 | 25,704 | 25,50 |
| BSF 1.1/4" | 9 | 28,137 | 28,879 | 28,50 |
| BSF 1.3/8" | 8 | 30,860 | 31,673 | 31,50 |
| BSF 1.1/2" | 8 | 34,035 | 34,848 | 34,50 |
| BSF 1.5/8" | 8 | 37,211 | 38,024 | 37,50 |

## BSW

### Whitworth Gewinde BS 84

British Standard Whitworth thread BS 84 / filetage British Standard Whitworth BS 84 / filettatura Whitworth standard inglese BS 84 / rosca norma británica Whitworth BS 84

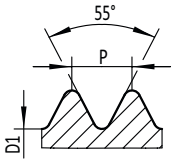
| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| BSW 1/8" | 40 | 2,360 | 2,590 | 2,50 |
| BSW 3/16" | 24 | 3,406 | 3,740 | 3,60 |
| BSW 1/4" | 20 | 4,724 | 5,156 | 5,10 |
| BSW 5/16" | 18 | 6,121 | 6,589 | 6,50 |
| BSW 3/8" | 16 | 7,493 | 7,988 | 7,90 |
| BSW 7/16" | 14 | 8,791 | 9,332 | 9,20 |
| BSW 1/2" | 12 | 9,987 | 10,589 | 10,50 |
| BSW 5/8" | 11 | 12,918 | 13,559 | 13,40 |
| BSW 3/4" | 10 | 15,831 | 16,538 | 16,40 |
| BSW 7/8" | 9 | 18,613 | 19,355 | 19,25 |
| BSW 1" | 8 | 21,336 | 22,149 | 22,00 |
| BSW 1.1/8" | 7 | 23,927 | 24,831 | 24,75 |
| BSW 1.1/4" | 7 | 27,102 | 28,006 | 27,50 |
| BSW 1.3/8" | 6 | 29,558 | 30,555 | 30,00 |
| BSW 1.1/2" | 6 | 32,680 | 33,703 | 33,50 |
| BSW 1.5/8" | 5 | 34,834 | 35,921 | 35,50 |
| BSW 1.3/4" | 5 | 37,943 | 39,136 | 39,00 |
| BSW 1.7/8" | 4,5 | 40,468 | 41,648 | 41,50 |
| BSW 2" | 4,5 | 43,571 | 44,877 | 44,50 |
| BSW 2.1/4" | 4 | 49,017 | 50,465 | 50,00 |
| BSW 2.1/2" | 4 | 55,367 | 56,815 | 56,00 |
| BSW 2.3/4" | 3,5 | 60,554 | 62,182 | 62,00 |
| BSW 3" | 3,5 | 66,904 | 68,532 | 68,00 |

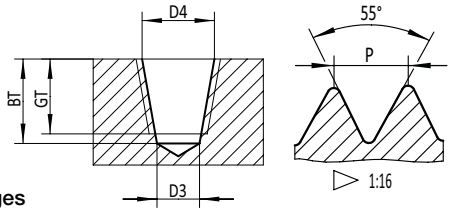
# Grenzmaße für Muttergewinde Kern-Ø und Vorbohr-Ø

limit of nut thread core Ø and bore hole Ø / limites du Ø du noyau de filetages intérieurs et Ø d'avant-trou / fascia di tolleranza per madreviti Ø di nocciolo e Ø preforo / limite superior e inferior para diámetro de núcleo rosca interna (tuerca) y Ø de taladrado

## Rohrgewinde

pipe threads / filetages pas du gaz / filettature gas / roscas para tubo




### Rp

**Zylindrisches Rohrgewinde**
**DIN EN 10226-1**

British standard pipe thread DIN EN 10226-1 / filetage cylindrique Whitworth DIN EN 10226-1 / filettatura cilindrica (cil.) interna Whitworth DIN EN 10226-1 / rosca cilindrica interna para tubo norma británica Whitworth DIN EN 10226-1

| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| Rp 1/8" | 28 | 8,495 | 8,637 | 8,60 |
| Rp 1/4" | 19 | 11,341 | 11,549 | 11,50 |
| Rp 3/8" | 19 | 14,846 | 15,054 | 15,00 |
| Rp 1/2" | 14 | 18,489 | 18,773 | 18,50 |
| Rp 3/4" | 14 | 23,975 | 24,259 | 24,00 |
| Rp 1" | 11 | 30,111 | 30,471 | 30,25 |
| Rp 1.1/4" | 11 | 38,772 | 39,132 | 39,00 |
| Rp 1.1/2" | 11 | 44,665 | 45,025 | 44,85 |
| Rp 2" | 11 | 56,476 | 56,836 | 56,50 |

### Rc

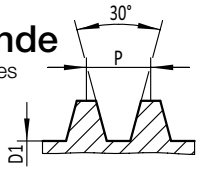
**Kegeliges Rohrgewinde**
**DIN EN 10226-2 und ISO 7/1 kegelig 1:16**

Whitworth pipe thread tapered DIN EN 10226-2 and ISO 7/1 tapered 1:16 / filetage conique Whitworth DIN EN 10226-2 et ISO 7/1 conique 1:16 / filettatura conica (con.) Whitworth DIN EN 10226-2 e ISO 7/1 conico 1:16 / rosca cónica Whitworth DIN EN 10226-2 e ISO 7/1 conico 1:16

| | P | mm D3 zyl. | mm D4 kon. | mm GT | mm BT |
|---|---|---|---|---|---|
| Rc 1/8" | 28 | 8,30 | 8,55 | 8,80 | 10,20 |
| Rc 1/4" | 19 | 11,10 | 11,40 | 13,10 | 15,70 |
| Rc 3/8" | 19 | 14,50 | 14,95 | 13,50 | 16,00 |
| Rc 1/2" | 14 | 18,00 | 18,60 | 17,80 | 21,50 |
| Rc 3/4" | 14 | 23,50 | 24,10 | 19,10 | 22,80 |
| Rc 1" | 11 | 29,75 | 30,25 | 22,70 | 27,30 |
| Rc 1.1/4" | 11 | 38,25 | 38,90 | 25,00 | 30,00 |
| Rc 1.1/2" | 11 | 44,00 | 44,80 | 25,00 | 30,00 |
| Rc 2" | 11 | 55,56 | 56,62 | 29,30 | 34,00 |

## Metrische ISO Trapezgewinde

Metric ISO trapezoidal threads / Filetages métriques trapézoïdaux / Filettature trapezoidali / roscas trapoezoidales métricas




### Tr

**Metrisches ISO Trapezgewinde**
**DIN 103 Tol. 7H**

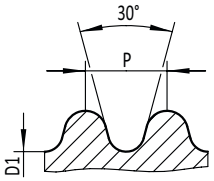
metric ISO trapezoidal thread DIN 103 tol. 7H / filetage métrique trapézoïdal DIN 103 tol. 7H / filettatura trapezoidale ISO DIN 103 tol. 7H / rosca trapezoidal métrica ISO DIN 103 tol. 7H

| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| Tr 10 | 2 | 8,000 | 8,236 | 8,20 |
| Tr 12 | 3 | 9,000 | 9,315 | 9,20 |
| Tr 14 | 3 | 11,000 | 11,315 | 11,25 |
| Tr 14[1] | 4 | 10,500 | 10,875 | 10,50 |
| Tr 16 | 4 | 12,000 | 12,375 | 12,25 |
| Tr 18 | 4 | 14,000 | 14,375 | 14,25 |
| Tr 20 | 4 | 16,000 | 16,375 | 16,25 |
| Tr 22 | 5 | 17,000 | 17,450 | 17,25 |
| Tr 24 | 5 | 19,000 | 19,450 | 19,25 |
| Tr 28 | 5 | 23,000 | 23,450 | 23,25 |
| Tr 30 | 6 | 24,000 | 24,500 | 24,25 |
| Tr 32 | 6 | 26,000 | 26,500 | 26,25 |
| Tr 36 | 6 | 30,000 | 30,500 | 30,25 |
| Tr 38 | 7 | 31,000 | 31,560 | 31,50 |
| Tr 44 | 7 | 37,000 | 37,560 | 37,50 |
| Tr 46 | 8 | 38,000 | 38,630 | 38,50 |
| Tr 50 | 8 | 42,000 | 42,630 | 42,50 |
| Tr 55 | 9 | 46,000 | 46,670 | 46,50 |

[1] nach DIN 103 Ausgabe 1924 / [1] acc. DIN 103 edition 1924 / [1] suivant DIN 103 édition 1924 / [1] sec. DIN 103 edizione 1924 / [1] según DIN 103 edición 1924

## Rundgewinde

Round threads / Filetages ronds / Filettature tonde / Roscas redondas




### Rd

**Rundgewinde**
**DIN 405 Tol. 7H**

round thread DIN 405 tol. 7H / filetage rond DIN 405 tol. 7H / filettatura tonda DIN 405 tol. 7H / rosca redonda DIN 405 tol. 7H

| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| Rd 8 | 10 | 5,714 | 6,274 | 6,00 |
| Rd 10 | 10 | 7,714 | 8,274 | 8,00 |
| Rd 12 | 10 | 9,714 | 10,274 | 10,00 |
| Rd 14 | 8 | 11,142 | 11,812 | 11,50 |
| Rd 16 | 8 | 13,142 | 13,812 | 13,50 |
| Rd 18 | 8 | 15,142 | 15,812 | 15,50 |
| Rd 20 | 8 | 17,142 | 17,812 | 17,50 |
| Rd 22 | 8 | 19,142 | 19,812 | 19,50 |
| Rd 24 | 8 | 21,142 | 21,812 | 21,50 |
| Rd 28 | 8 | 25,142 | 25,812 | 25,50 |

### Tr

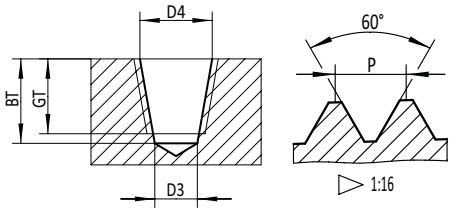
**Metrische ISO Trapezgewinde**
**DIN 103 Tol. 7H**

metric ISO trapezoidal thread DIN 103 tol. 7H / filetage métrique trapézoïdal DIN 103 tol. 7H / filettatura trapezoidale ISO DIN 103 tol. 7H / rosca trapezoidal métrica ISO DIN 103 tol. 7H

| | P | D1 mm min. | D1 mm max. | |
|---|---|---|---|---|
| Tr 60 | 9 | 51,000 | 51,670 | 51,50 |
| Tr 65 | 10 | 55,000 | 55,710 | 55,50 |

# Amerikanische kegelige Rohrgewinde

American pipe threads tapered / filetages coniques américains pour tuyauteries / filettature coniche americane / roscas americanas cónicas para tubo




## NPT

**Amerikanische Standard Rohrgewinde ASME B1.20.1 kegelig 1:16**
American standard taper pipe thread ASME B1.20.1 tapered 1:16 / filetage de tuyauterie standard américain ASME B1.20.1 conique 1:16 / filettatura conica americana ASME B1.20.1 conico 1:16 / Rosca cónica para tubo norma americana ASME B1.20.1 cónico 1:16

| | mm | | | | |
|---|---|---|---|---|---|
| | P | D3 zyl. | D4 kon. | GT | BT |
| NPT 1/16" | 27 | 6,15 | 6,39 | 9,70 | 12,10 |
| NPT 1/8" | 27 | 8,40 | 8,74 | 9,70 | 12,10 |
| NPT 1/4" | 18 | 11,10 | 11,36 | 14,30 | 17,50 |
| NPT 3/8" | 18 | 14,30 | 14,80 | 14,60 | 17,70 |
| NPT 1/2" | 14 | 17,90 | 18,32 | 19,00 | 23,00 |
| NPT 3/4" | 14 | 23,20 | 23,67 | 19,50 | 23,00 |
| NPT 1" | 11,5 | 29,00 | 29,69 | 23,40 | 27,40 |
| NPT 1.1/4" | 11,5 | 37,70 | 38,45 | 23,90 | 28,00 |
| NPT 1.1/2" | 11,5 | 44,00 | 44,52 | 23,90 | 28,40 |
| NPT 2" | 11,5 | 56,00 | 56,56 | 24,30 | 28,40 |

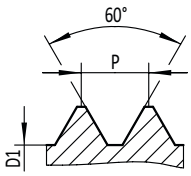
## NPTF

**Amerikanische Standard Rohrgewinde ASME B1.20.3 kegelig 1:16**
American standard taper pipe thread ASME B1.20.3 tapered 1:16 / filetage de tuyauterie standard américain ASME B1.20.3 conique 1:16 / filettatura conica americana ASME B1.20.3 conico 1:16 / rosca cónica para tubo norma americana ASME B1.20.3 cónico 1:16

| | mm | | | | |
|---|---|---|---|---|---|
| | P | D3 zyl. | D4 kon. | GT | BT |
| NPTF 1/16" | 27 | 6,10 | 6,41 | 9,70 | 12,10 |
| NPTF 1/8" | 27 | 8,40 | 8,76 | 9,70 | 12,10 |
| NPTF 1/4" | 18 | 11,00 | 11,40 | 14,30 | 17,50 |
| NPTF 3/8" | 18 | 14,30 | 14,84 | 14,60 | 17,70 |
| NPTF 1/2" | 14 | 17,60 | 18,33 | 19,00 | 23,00 |
| NPTF 3/4" | 14 | 23,00 | 23,68 | 19,50 | 23,00 |
| NPTF 1" | 11,5 | 29,00 | 29,73 | 23,40 | 27,40 |
| NPTF 1.1/4" | 11,5 | 37,50 | 38,48 | 23,90 | 28,00 |
| NPTF 1.1/2" | 11,5 | 43,50 | 44,55 | 23,90 | 28,40 |
| NPTF 2" | 11,5 | 56,00 | 56,59 | 24,30 | 28,40 |

# Amerikanische zylindrische Rohrgewinde

American standard straight pipe threads / filetages cylindriques Américains pour tuyauteries / filettature gas cilindriche americane / roscas americanas cilíndricas para tubo




## NPSM

**Gewinde ASME B1.20.1**
American standard straight pipe thread ASME B1.20.1 / filetage pas du gaz cylindrique américain ASME B1.20.1 / filettatura gas cilindrica americana ASME B1.20.1 / rosca de tubo recta americana estándar ASME B1.20.1

| | | D1 mm | | |
|---|---|---|---|---|
| | P | min. | max. | |
| NPSM 1/8" | 27 | 9,093 | 9,246 | 9,10 |
| NPSM 1/4" | 18 | 11,887 | 12,217 | 12,00 |
| NPSM 3/8" | 18 | 15,316 | 15,545 | 15,50 |
| NPSM 1/2" | 14 | 18,974 | 19,279 | 19,00 |
| NPSM 3/4" | 14 | 24,333 | 24,638 | 24,50 |
| NPSM 1" | 11,5 | 30,505 | 30,759 | 30,60 |
| NPSM 1.1/4" | 11,5 | 39,268 | 39,497 | 39,40 |
| NPSM 1.1/2" | 11,5 | 45,339 | 45,568 | 45,50 |
| NPSM 2" | 11,5 | 57,379 | 57,607 | 57,50 |

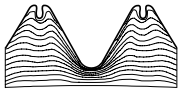
## NPSF

**Gewinde ASME B1.20.3**
American standard straight pipe thread ASME B1.20.3 / filetage pas du gaz cylindrique américain ASME B1.20.3 / filettatura gas cilindrica americana ASME B1.20.3 / rosca ASME B1.20.3

| | | D1 mm | | |
|---|---|---|---|---|
| | P | min. | max. | |
| NPSF 1/8" | 27 | 8,651 | 8,830 | 8,70 |
| NPSF 1/4" | 18 | 11,232 | 11,452 | 11,30 |
| NPSF 3/8" | 18 | 14,671 | 14,889 | 14,75 |
| NPSF 1/2" | 14 | 18,118 | 18,375 | 18,25 |
| NPSF 3/4" | 14 | 23,465 | 23,772 | 23,50 |
| NPSF 1" | 11,5 | 29,464 | 29,758 | 29,50 |

# Gewindefurcher

roll taps / tarauds à refouler / maschi a rullare / laminadores



## M

**Metrisches ISO Regelgewinde DIN 13**
ISO metric coarse thread DIN 13 / filetage métrique ISO DIN 13 / filettatura metrica ISO DIN 13 / rosca métrica ISO DIN 13

| | P | |
|---|---|---|
| M 1 | 0,25 | 0,88 |
| M 1,1 | 0,25 | 0,98 |
| M 1,2 | 0,25 | 1,08 |
| M 1,4 | 0,30 | 1,26 |
| M 1,6 | 0,35 | 1,45 |
| M 1,8 | 0,35 | 1,65 |
| M 2 | 0,40 | 1,82 |
| M 2,2 | 0,45 | 2,00 |
| M 2,5 | 0,45 | 2,30 |
| M 3 | 0,50 | 2,80 |
| M 3,5 | 0,60 | 3,25 |
| M 4 | 0,70 | 3,70 |
| M 4,5 | 0,75 | 4,15 |
| M 5 | 0,80 | 4,65 |
| M 6 | 1,00 | 5,55 |
| M 7 | 1,00 | 6,55 |
| M 8 | 1,25 | 7,45 |
| M 9 | 1,25 | 8,45 |
| M 10 | 1,50 | 9,35 |
| M 11 | 1,50 | 10,35 |
| M 12 | 1,75 | 11,20 |
| M 14 | 2,00 | 13,10 |
| M 16 | 2,00 | 15,10 |
| M 18 | 2,50 | 16,80 |
| M 20 | 2,50 | 18,80 |
| M 22 | 2,50 | 20,80 |
| M 24 | 3,00 | 22,60 |
| M 27 | 3,00 | 25,60 |
| M 30 | 3,50 | 28,30 |
| M 33 | 3,50 | 31,30 |
| M 36 | 4,00 | 34,10 |
| M 39 | 4,00 | 37,10 |
| M 42 | 4,50 | 39,80 |
| M 45 | 4,50 | 42,80 |
| M 48 | 5,00 | 45,60 |

## MF

**Metrisches ISO Feingewinde DIN 13**
ISO metric fine thread DIN 13 / filetage métrique ISO à pas fin DIN 13 / filettatura metrica ISO passo fine DIN 13 / rosca métrica fina ISO DIN 13

| | P | |
|---|---|---|
| M 2 | 0,25 | 1,88 |
| M 2,2 | 0,25 | 2,10 |
| M 2,5 | 0,35 | 2,35 |
| M 3 | 0,35 | 2,85 |
| M 3,5 | 0,35 | 3,35 |
| M 4 | 0,50 | 3,80 |
| M 5 | 0,50 | 4,80 |
| M 6 | 0,50 | 5,80 |
| M 6 | 0,75 | 5,65 |
| M 8 | 0,75 | 7,65 |
| M 8 | 1,00 | 7,55 |
| M 10 | 0,75 | 9,65 |
| M 10 | 1,00 | 9,55 |
| M 10 | 1,25 | 9,45 |
| M 12 | 0,75 | 11,65 |
| M 12 | 1,00 | 11,55 |
| M 12 | 1,25 | 11,45 |
| M 12 | 1,50 | 11,35 |
| M 14 | 1,00 | 13,55 |
| M 14 | 1,25 | 13,45 |
| M 14 | 1,50 | 13,35 |
| M 16 | 1,00 | 15,55 |
| M 16 | 1,50 | 15,35 |
| M 18 | 1,00 | 17,55 |
| M 18 | 1,50 | 17,35 |
| M 18 | 2,00 | 17,10 |
| M 20 | 1,00 | 19,55 |
| M 20 | 1,50 | 19,35 |
| M 20 | 2,00 | 19,10 |
| M 22 | 1,00 | 21,55 |
| M 22 | 1,50 | 21,35 |
| M 22 | 2,00 | 21,10 |
| M 24 | 1,00 | 23,55 |
| M 24 | 1,50 | 23,35 |
| M 24 | 2,00 | 23,10 |

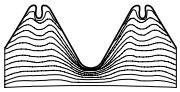
## MF

**Metrisches ISO Feingewinde DIN 13**
ISO metric fine thread DIN 13 / filetage métrique ISO à pas fin DIN 13 / filettatura metrica ISO passo fine DIN 13 / rosca métrica fina ISO DIN 13

| | P | |
|---|---|---|
| M 26 | 1,00 | 25,55 |
| M 26 | 1,50 | 25,35 |
| M 27 | 1,50 | 26,35 |
| M 27 | 2,00 | 26,10 |
| M 28 | 1,00 | 27,55 |
| M 28 | 1,50 | 27,35 |
| M 28 | 2,00 | 27,10 |
| M 30 | 1,00 | 29,55 |
| M 30 | 1,50 | 29,35 |
| M 30 | 2,00 | 29,10 |
| M 30 | 3,00 | 28,60 |
| M 32 | 1,50 | 31,35 |
| M 32 | 2,00 | 31,10 |
| M 33 | 1,50 | 32,35 |
| M 33 | 2,00 | 32,10 |
| M 33 | 3,00 | 31,60 |
| M 36 | 1,50 | 35,35 |
| M 36 | 2,00 | 35,10 |
| M 36 | 3,00 | 34,60 |
| M 38 | 1,50 | 37,35 |
| M 39 | 2,00 | 38,10 |
| M 39 | 3,00 | 37,60 |
| M 40 | 1,50 | 39,35 |
| M 40 | 2,00 | 39,10 |
| M 42 | 1,50 | 41,35 |
| M 42 | 2,00 | 41,10 |
| M 42 | 3,00 | 40,60 |
| M 45 | 1,50 | 44,35 |
| M 45 | 2,00 | 44,10 |
| M 45 | 3,00 | 43,60 |
| M 48 | 1,50 | 47,35 |
| M 48 | 2,00 | 47,10 |
| M 48 | 3,00 | 46,60 |

# Gewindefurcher

roll taps / tarauds à refouler / maschi a rullare / laminadores



## EG M

**Metrisches ISO Regelgewinde DIN 8140**
ISO metric coarse thread EG DIN 8140 / filetage métrique ISO DIN 8140 / filettatura metrica ISO DIN 8140 / rosca métrica ISO DIN 8140

| | P | |
|---|---|---|
| EG M 2 | 0,40 | 2,35 |
| EG M 2,5 | 0,45 | 2,90 |
| EG M 3 | 0,50 | 3,40 |
| EG M 3,5 | 0,60 | 4,00 |
| EG M 4 | 0,70 | 4,60 |
| EG M 5 | 0,80 | 5,70 |
| EG M 6 | 1,00 | 6,80 |
| EG M 7 | 1,00 | 7,80 |
| EG M 8 | 1,25 | 9,10 |
| EG M 9 | 1,25 | 10,10 |
| EG M 10 | 1,50 | 11,30 |
| EG M 11 | 1,50 | 12,30 |
| EG M 12 | 1,75 | 13,50 |
| EG M 14 | 2,00 | 15,70 |
| EG M 16 | 2,00 | 17,70 |
| EG M 18 | 2,50 | 20,00 |
| EG M 20 | 2,50 | 22,00 |

## EG MF

**Metrisches ISO Feingewinde DIN 8140**
ISO metric fine thread EG DIN 8140 / filetage métrique ISO à pas fin DIN 8140 / filettatura metrica ISO passo fine DIN 8140 / rosca métrica fina ISO DIN 8140

| | P | |
|---|---|---|
| EG M 8 | 1,00 | 8,80 |
| EG M 10 | 1,00 | 10,80 |
| EG M 10 | 1,25 | 11,10 |
| EG M 12 | 1,00 | 12,80 |
| EG M 12 | 1,25 | 13,10 |
| EG M 12 | 1,50 | 13,30 |
| EG M 14 | 1,25 | 15,10 |
| EG M 14 | 1,50 | 15,30 |
| EG M 16 | 1,50 | 17,30 |
| EG M 18 | 1,50 | 19,30 |
| EG M 20 | 1,50 | 21,30 |
| EG M 22 | 1,50 | 23,30 |
| EG M 24 | 1,50 | 25,30 |

## UNC

**Gewinde ASME B1.1**
unified coarse thread ASME B1.1 / filetage américain ASME B1.1 / filettatura grossa unificata ASME B1.1 / rosca unificada gruesa ASME B1.1

| | P | |
|---|---|---|
| UNC No1 | 64 | 1,68 |
| UNC No2 | 56 | 1,98 |
| UNC No3 | 48 | 2,26 |
| UNC No4 | 40 | 2,55 |
| UNC No5 | 40 | 2,90 |
| UNC No6 | 32 | 3,15 |
| UNC No8 | 32 | 3,80 |
| UNC No10 | 24 | 4,35 |
| UNC No12 | 24 | 5,00 |
| UNC 1/4" | 20 | 5,80 |
| UNC 5/16" | 18 | 7,30 |
| UNC 3/8" | 16 | 8,80 |
| UNC 7/16" | 14 | 10,30 |
| UNC 1/2" | 13 | 11,80 |
| UNC 9/16" | 12 | 13,35 |
| UNC 5/8" | 11 | 14,85 |
| UNC 3/4" | 10 | 17,80 |
| UNC 7/8" | 9 | 20,90 |
| UNC 1" | 8 | 23,90 |
| UNC 1.1/8" | 7 | 26,80 |
| UNC 1.1/4" | 7 | 30,00 |
| UNC 1.3/8" | 6 | 32,90 |
| UNC 1.1/2" | 6 | 36,10 |

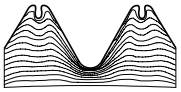
## UNF

**Gewinde ASME B1.1**
unified fine thread ASME B1.1 / filetage américain à pas fin ASME B1.1 / filettatura fine unificata ASME B1.1 / rosca unificada fina ASME B1.1

| | P | |
|---|---|---|
| UNF No0 | 80 | 1,38 |
| UNF No1 | 72 | 1,70 |
| UNF No2 | 64 | 2,00 |
| UNF No3 | 56 | 2,30 |
| UNF No4 | 48 | 2,60 |
| UNF No5 | 44 | 2,90 |
| UNF No6 | 40 | 3,20 |
| UNF No8 | 36 | 3,85 |
| UNF No10 | 32 | 4,45 |
| UNF No12 | 28 | 5,10 |
| UNF 1/4" | 28 | 5,90 |
| UNF 5/16" | 24 | 7,45 |
| UNF 3/8" | 24 | 9,05 |
| UNF 7/16" | 20 | 10,55 |
| UNF 1/2" | 20 | 12,15 |
| UNF 9/16" | 18 | 13,65 |
| UNF 5/8" | 18 | 15,25 |
| UNF 3/4" | 16 | 18,35 |
| UNF 7/8" | 14 | 21,40 |
| UNF 1" | 12 | 24,45 |
| UNF 1.1/8" | 12 | 27,60 |
| UNF 1.1/4" | 12 | 30,80 |
| UNF 1.3/8" | 12 | 33,95 |
| UNF 1.1/2" | 12 | 37,15 |

# Gewindefurcher

roll taps / tarauds à refouler / maschi a rullare / laminadores



## UNEF

**Gewinde ASME B1.1**
unified extra fine thread ASME B1.1 / filetage américain à pas extra fin ASME B1.1 / filettatura extra fine unificata ASME B1.1 / rosca unificada extra-fina ASME B1.1

| | P | |
|---|---|---|
| UNEF No12 | 32 | 5,10 |
| UNEF 1/4" | 32 | 6,00 |
| UNEF 5/16" | 32 | 7,60 |
| UNEF 3/8" | 32 | 9,20 |
| UNEF 7/16" | 28 | 10,70 |
| UNEF 1/2" | 28 | 12,30 |
| UNEF 9/16" | 24 | 13,80 |
| UNEF 5/8" | 24 | 15,40 |
| UNEF 11/16" | 24 | 17,00 |
| UNEF 3/4" | 20 | 18,50 |
| UNEF 13/16" | 20 | 20,10 |
| UNEF 7/8" | 20 | 21,60 |
| UNEF 15/16" | 20 | 23,20 |
| UNEF 1" | 20 | 24,80 |
| UNEF 1.1/16" | 18 | 26,35 |
| UNEF 1.1/8" | 18 | 27,90 |
| UNEF 1.1/4" | 18 | 31,10 |
| UNEF 1.5/16" | 18 | 32,70 |
| UNEF 1.3/8" | 18 | 34,30 |
| UNEF 1.1/2" | 18 | 37,50 |

## G

**Rohrgewinde DIN EN ISO 228**
British standard pipe thread DIN EN ISO 228 / filetage pas du gaz DIN EN ISO 228 / filettatura Whitworth gas DIN EN ISO 228 / rosca para tubo norma británica DIN EN ISO 228

| | P | |
|---|---|---|
| G 1/8" | 28 | 9,25 |
| G 1/4" | 19 | 12,50 |
| G 3/8" | 19 | 16,00 |
| G 1/2" | 14 | 20,00 |
| G 5/8" | 14 | 22,00 |
| G 3/4" | 14 | 25,50 |
| G 7/8" | 14 | 29,25 |
| G 1" | 11 | 32,00 |
| G 1.1/8" | 11 | 36,60 |
| G 1.1/4" | 11 | 40,60 |
| G 1.1/2" | 11 | 46,50 |

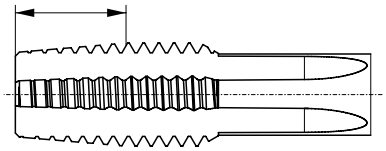
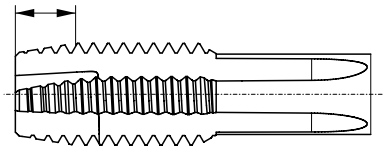
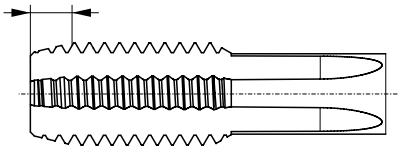
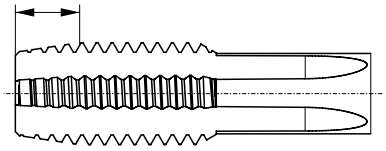
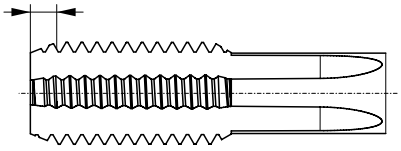
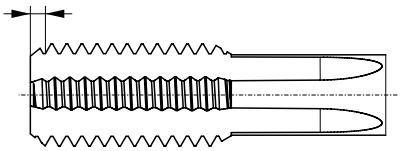
## BSW

**Whitworth Gewinde BS 84**
British standard Whitworth thread BS 84 / filetage British Standard Whitworth BS 84 / filettatura Whitworth standard inglese BS 84 / Rosca norma británica Whitworth BS 84

| | P | |
|---|---|---|
| BSW 1/8" | 40 | 2,85 |
| BSW 3/16" | 24 | 4,20 |
| BSW 1/4" | 20 | 5,70 |
| BSW 5/16" | 18 | 7,20 |
| BSW 3/8" | 16 | 8,70 |
| BSW 7/16" | 14 | 10,20 |
| BSW 1/2" | 12 | 11,60 |
| BSW 5/8" | 11 | 14,70 |
| BSW 3/4" | 10 | 17,70 |
| BSW 7/8" | 9 | 21,00 |
| BSW 1" | 8 | 23,75 |
| BSW 1.1/8" | 7 | 26,70 |
| BSW 1.1/4" | 7 | 29,90 |
| BSW 1.1/2" | 6 | 35,90 |

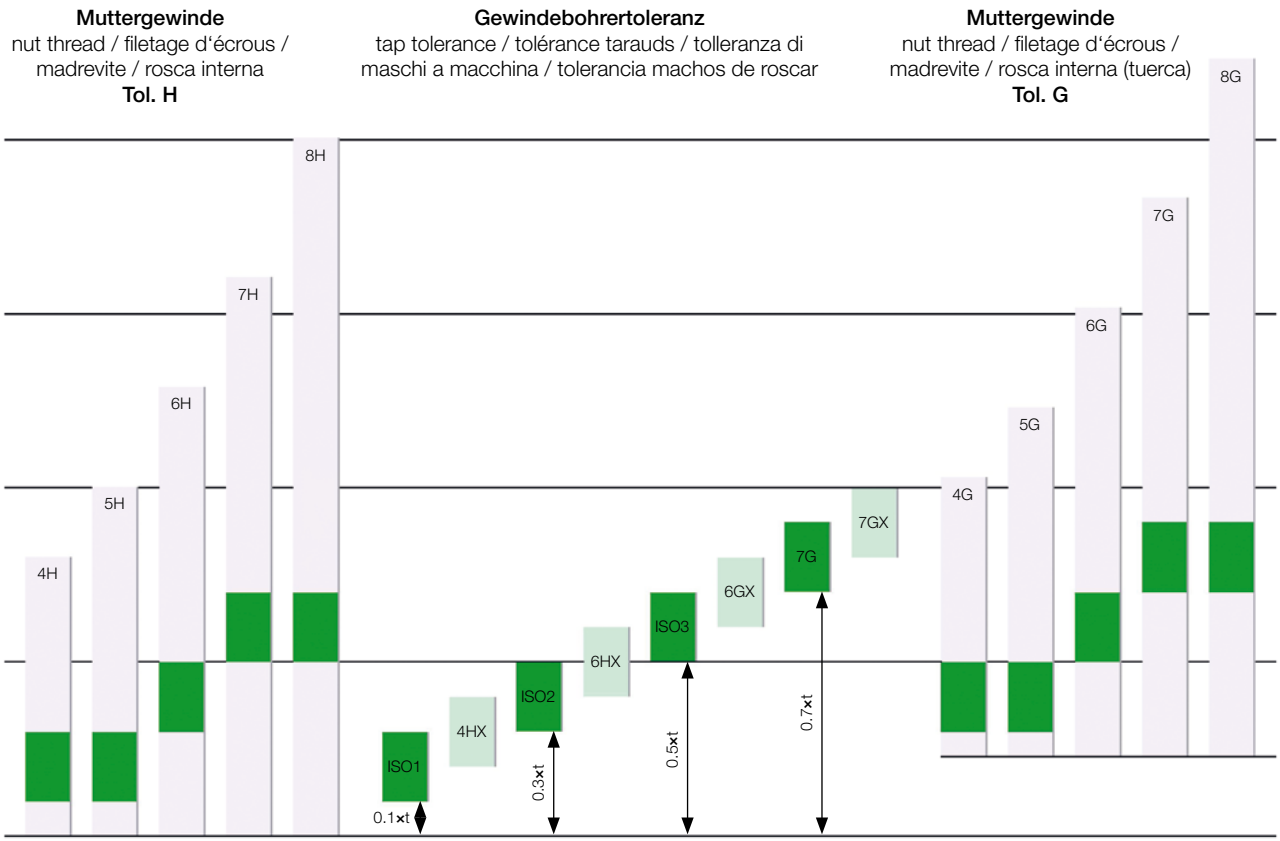
## Gewindebohrer, Gewindefurcher

cutting taps, roll taps / tarauds machine, tarauds à refouler /
maschi a macchina, maschi a rullare / machos de roscado a máquina, laminadores

| **Form**<br>form / forme / forma d‘imbocco / forma | | **Anzahl der Gänge im Anschnitt**<br>no. of chamfer threads / nombre de filets d‘entrée / numero di filetti d‘imbocco / número de hilos de entrada | **Ausführung der Spannuten**<br>flute type / type de goujures / tipo di scanalature / tipo de ranuras | **Bevorzugte Anwendung**<br>preferred application / application recommandée / applicazione preferita / aplicación preferida |
|---|---|---|---|---|
| A |  | 6 - 8 | geradegenutet<br>straight flutes / goujures droites / scanalature diritte / ranuras rectas | kurzes Durchgangsloch<br>short through hole / trou débouchant peu profond / foro passante corto / agujero pasante corto |
| B |  | 3,5 - 5,5 | geradegenutet mit Schälanschnitt<br>straight flutes and spiral point / goujures droites avec coupe GUN / scanalature diritte con imbocco corretto / ranuras rectas con entrada helicoidal | Durchgangsloch in mittel- bzw. langspanenden Werkstoffen<br>through hole in medium- or long-chipping materials / trou débouchant dans matières à copeaux courts ou moyens / foro passante in materiali a truciolo medio e lungo / agujero pasante en materiales de viruta corta o media |
| C |  | 2 - 3 | gerade- oder drallgenutet<br>straight or spiral flutes / goujures droites ou hélicoïdales / scanalature diritte o con elica / ranuras rectas o helicoidales | Sackloch sowie Durchgangsloch in kurzspanenden Werkstoffen<br>blind or through hole in short-chipping materials / trou borgne ou débouchant dans matières à copeaux courts / foro cieco e foro passante in materiali a truciolo corto / agujero ciego o pasante en materiales de viruta corta |
| D |  | 3,5 - 5 | | Sackloch mit langem Gewindeauslauf sowie für Durchgangsloch<br>blind hole with long thread runout or through hole / trou borgne avec réserve longue en fond de trou ou trou débouchant / foro cieco con filettatura lunga e per foro passante / agujero ciego con salida de rosca larga o agujero pasante |
| E |  | 1,5 - 2 | | Sackloch mit sehr kurzem Gewindeauslauf<br>blind hole with very short thread runout / trou borgne avec réserve en fond de trou très courte / foro cieco con filetto molto corto / agujero ciego con salida de rosca muy corta |
| F |  | ≤ 1,5 | | |

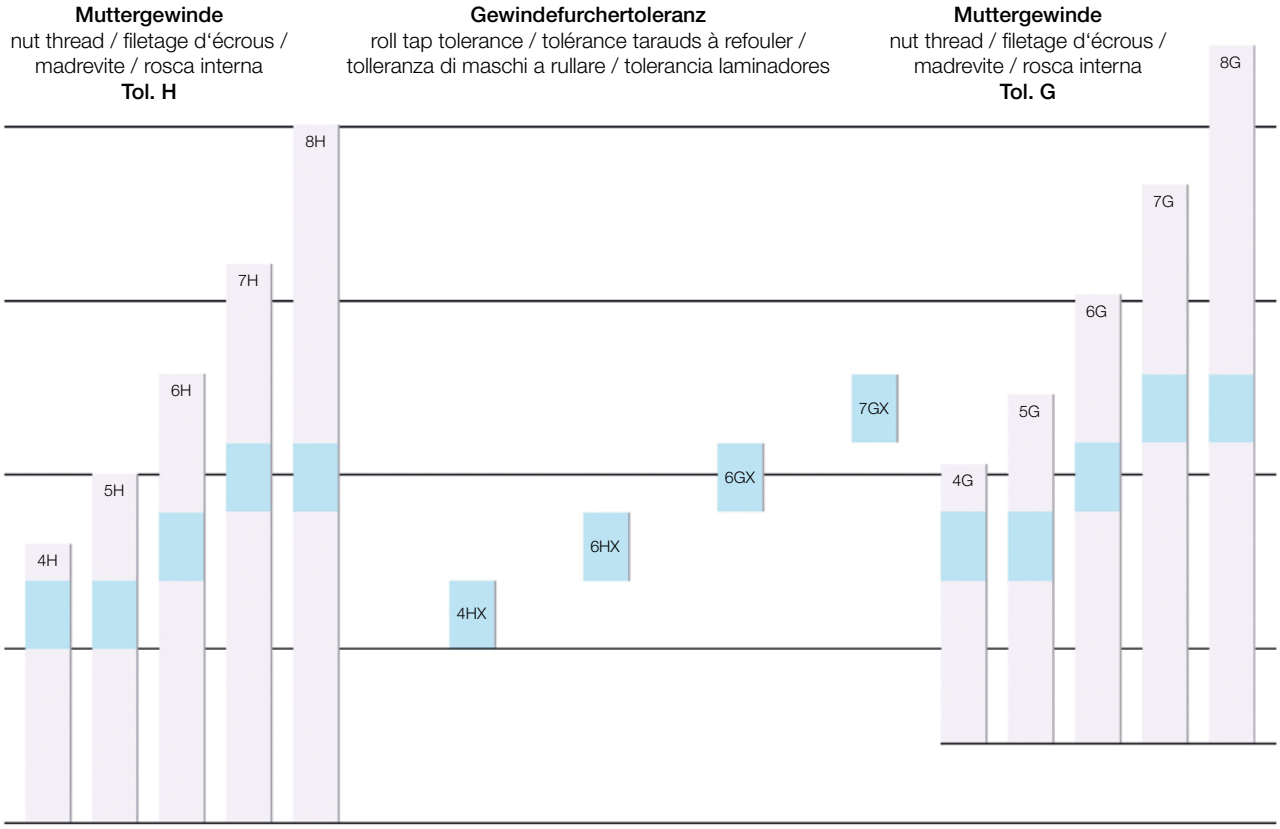
## Lage und Größe der Toleranzfelder am Gewindebohrer / Gewindefurcher und am Muttergewinde

tolerance bands of taps, roll taps and nut threads / limites de tolérances des tarauds et des filetages d'écrous / fascia di tolleranza per maschi e madreviti / campos de tolerancia de machos de roscar y de rosca interna




### Toleranzfelder am Gewindebohrer

tolerance classes of machine taps / classes de tolérance des tarauds coupants / fascia di tolleranza per maschi a macchina / campos de tolerancia de machos de roscar




### Toleranzfelder am Gewindefurcher

tolerance classes of roll taps / classes de tolérance des tarauds à refouler / fascia di tolleranza per maschi a rullare / campos de tolerancia de laminadores

## Herstellungstoleranzen-Abmaß des Flanken-Ø in µm im Vergleich zu ISO2/6H für Gewindebohrer für metrisches ISO-Gewinde; DIN EN 22857; DIN 802-4

limits of fabrication tolerance of the pitch Ø in µm compared to ISO2/6H for machine taps ISO metric thread; DIN EN 22857; DIN 802-4 /
limites des tolérances de fabrication du Ø sur flanc en µm par rapport à ISO2/6H pour tarauds pour filetage métrique ISO; DIN EN 22857; DIN 802-4 /
quote limite di tolleranza di costruzione sul Ø medio in µm in confronto alla ISO2/6H per maschi a macchina metrici; DIN EN 22857; DIN 802-4 /
límites de tolerancias de fabricación del Ø de flancos en µm en comparación con ISO2/6H para machos para rosca métrica ISO; DIN EN 22857; DIN 802-4

| **Nenndurchmesser in mm** nominal diameter in mm / diamètre nominal en mm / Diametro nominale in mm / diámetro nominal en mm | | **Steigung P in mm** pitch P in mm / pas P en mm / passo P in mm / paso P en mm | **Abmaß für Flankendurchmesser** limits of the pitch diameter / limites du Ø sur flanc / quote limite del Ø medio / límites del Ø de flancos | | | |
|---|---|---|---|---|---|---|
| **über** over / au dessus de / più grande di / más de | **bis** until / jusqu'à / fino a / hasta | | **Anwendungsklassen** application classes / classes d'application / classi di applicazioni / clases de aplicación | | | **7G** |
| | | | **1 (ISO1/4H)** | **2 (ISO2/6H)** | **3 (ISO3/6G)** | |
| 1 | 1,4 | 0,2 | 0 | - | - | - |
| | | 0,25 | 0 | - | - | - |
| | | 0,3 | -12 | 0 | - | - |
| 1,4 | 2,8 | 0,35 | -14 | 0 | - | - |
| | | 0,4 | -15 | 0 | - | - |
| | | 0,45 | -15 | 0 | - | - |
| 2,8 | 5,6 | 0,35 | -15 | 0 | - | - |
| | | 0,5 | -16 | 0 | +16 | +32 |
| | | 0,6 | -18 | 0 | +18 | +36 |
| | | 0,7 | -19 | 0 | +19 | +38 |
| | | 0,75 | -19 | 0 | +19 | +38 |
| | | 0,8 | -20 | 0 | +20 | +40 |
| 5,6 | 11,2 | 0,75 | -21 | 0 | +21 | +42 |
| | | 1 | -24 | 0 | +24 | +48 |
| | | 1,25 | -25 | 0 | +25 | +50 |
| | | 1,5 | -28 | 0 | +28 | +56 |
| 11,2 | 22,4 | 1 | -25 | 0 | +25 | +50 |
| | | 1,25 | -28 | 0 | +28 | +56 |
| | | 1,5 | -30 | 0 | +30 | +60 |
| | | 1,75 | -32 | 0 | +32 | +64 |
| | | 2 | -34 | 0 | +34 | +68 |
| | | 2,5 | -36 | 0 | +36 | +72 |
| 22,4 | 45 | 1 | -26 | 0 | +26 | +52 |
| | | 1,5 | -32 | 0 | +32 | +64 |
| | | 2 | -36 | 0 | +36 | +72 |
| | | 3 | -42 | 0 | +42 | +84 |
| | | 3,5 | -45 | 0 | +45 | +90 |
| | | 4 | -47 | 0 | +47 | +94 |
| | | 4,5 | -50 | 0 | +50 | +100 |
| 45 | 90 | 1,5 | -34 | 0 | +34 | +68 |
| | | 2 | -38 | 0 | +38 | +76 |
| | | 3 | -45 | 0 | +45 | +90 |
| | | 4 | -50 | 0 | +50 | +100 |
| | | 5 | -53 | 0 | +53 | +106 |
| | | 5,5 | -56 | 0 | +56 | +112 |
| | | 6 | -60 | 0 | +60 | +120 |

# Umrechnungstabelle

conversion table / tableau de correspondances / tabella di conversione / tabla de conversión

| Gewinde-Bezeichnung<br>thread designation / désignation du filetage / designazione del filetto / designación de la rosca | Nenn-Ø<br>nominal Ø / Ø nominal / Ø nominale / Ø nominal | | Anzahl der Gewindegänge pro Zoll<br>number of threads per inch (TPI) / nombre de filets par pouce / numero di filetti per pollice / número de hilos por pulgada | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | " | mm | UNC | UNF | UNEF | 4-UN | 6-UN | 8-UN | 12-UN | 16-UN | 20-UN | 28-UN | 32-UN | BSW | BSF |
| No0 | 0,0600 | 1,524 | | 80 | | | | | | | | | | 48 | |
| No1 | 0,0730 | 1,854 | 64 | 72 | | | | | | | | | | | |
| No2 | 0,0860 | 2,184 | 56 | 64 | | | | | | | | | | | |
| No3 | 0,0990 | 2,515 | 48 | 56 | | | | | | | | | | | |
| No4 | 0,1120 | 2,845 | 40 | 48 | | | | | | | | | | | |
| No5 | 0,1250 | 3,175 | 40 | 44 | | | | | | | | | | | |
| 1/8" | 0,1250 | 3,175 | | | | | | | | | | | | 40 | |
| No6 | 0,1380 | 3,505 | 32 | 40 | | | | | | | | | UNC | | |
| 5/32" | 0,1563 | 3,969 | | | | | | | | | | | | 32 | |
| No8 | 0,1640 | 4,166 | 32 | 36 | | | | | | | | | UNC | | |
| 3/16" | 0,1875 | 4,763 | | | | | | | | | | | | 24 | 32 |
| No10 | 0,1900 | 4,826 | 24 | 32 | | | | | | | | | UNF | | |
| No12 | 0,2160 | 5,486 | 24 | 28 | 32 | | | | | | | UNF | UNEF | | |
| 7/32" | 0,2185 | 5,550 | | | | | | | | | | | | 24 | 28 |
| 1/4" | 0,2500 | 6,350 | 20 | 28 | 32 | | | | | | UNC | UNF | UNEF | 20 | 26 |
| 9/32" | 0,2811 | 7,140 | | | | | | | | | | | | | 26 |
| 5/16" | 0,3125 | 7,938 | 18 | 24 | 32 | | | | | | 20 | 28 | UNEF | | |
| 3/8" | 0,3750 | 9,525 | 16 | 24 | 32 | | | | | UNC | 20 | 28 | UNEF | 16 | 20 |
| 7/16" | 0,4375 | 11,113 | 14 | 20 | 28 | | | | | 16 | UNF | UNEF | 32 | 14 | 18 |
| 1/2" | 0,5000 | 12,700 | 13 | 20 | 28 | | | | | 16 | UNF | UNEF | 32 | 12 | 16 |
| 9/16" | 0,5625 | 14,288 | 12 | 18 | 24 | | | | UNC | 16 | 20 | 28 | 32 | 12 | 16 |
| 5/8" | 0,6250 | 15,875 | 11 | 18 | 24 | | | | 12 | 16 | 20 | 28 | 32 | 11 | 14 |
| 11/16" | 0,6875 | 17,463 | | | 24 | | | | 12 | 16 | 20 | 28 | 32 | | 14 |
| 3/4" | 0,7500 | 19,050 | 10 | 16 | 20 | | | | 12 | UNF | UNEF | 28 | 32 | 10 | 12 |
| 13/16" | 0,8125 | 20,638 | | | 20 | | | | 12 | 16 | UNEF | 28 | 32 | | 12 |
| 7/8" | 0,8750 | 22,225 | 9 | 14 | 20 | | | | 12 | 16 | UNEF | 28 | 32 | 9 | 11 |
| 15/16" | 0,9375 | 23,813 | | | 20 | | | | 12 | 16 | UNEF | 28 | 32 | | |
| 1" | 1,0000 | 25,400 | 8 | 12 | 20 | | | UNC | UNF | 16 | UNEF | 28 | 32 | 8 | 10 |
| 1.1/16" | 1,0625 | 26,988 | | | 18 | | | 8 | 12 | 16 | 20 | 28 | | | |
| 1.1/8" | 1,1250 | 28,575 | 7 | 12 | 18 | | | 8 | UNF | 16 | 20 | 28 | | 7 | 9 |
| 1.3/16" | 1,1875 | 30,163 | | | 18 | | | 8 | 12 | 16 | 20 | 28 | | | |
| 1.1/4" | 1,2500 | 31,750 | 7 | 12 | 18 | | | 8 | UNF | 16 | 20 | 28 | | 7 | 9 |
| 1.5/16" | 1,3125 | 33,338 | | | 18 | | | 8 | 12 | 16 | 20 | 28 | | | |
| 1.3/8" | 1,3750 | 34,925 | 6 | 12 | 18 | | UNC | 8 | UNF | 16 | 20 | 28 | | 6 | 8 |
| 1.7/16" | 1,4375 | 36,513 | | | 18 | | 6 | 8 | 12 | 16 | 20 | 28 | | | |
| 1.1/2" | 1,5000 | 38,100 | 6 | 12 | 18 | | UNC | 8 | UNF | 16 | 20 | 28 | | 6 | 8 |
| 1.9/16" | 1,5625 | 39,688 | | | 18 | | 6 | 8 | 12 | 16 | 20 | | | | |
| 1.5/8" | 1,6250 | 41,275 | | | 18 | | 6 | 8 | 12 | 16 | 20 | | | 5 | 8 |
| 1.11/16" | 1,6875 | 42,863 | | | 18 | | 6 | 8 | 12 | 16 | 20 | | | | |
| 1.3/4" | 1,7500 | 44,450 | 5 | | | | 6 | 8 | 12 | 16 | 20 | | | 5 | 7 |
| 1.13/16" | 1,8125 | 46,038 | | | | | 6 | 8 | 12 | 16 | 20 | | | | |
| 1.7/8" | 1,8750 | 47,625 | | | | | 6 | 8 | 12 | 16 | 20 | | | 4,5 | |
| 1.15/16" | 1,9375 | 49,213 | | | | | 6 | 8 | 12 | 16 | 20 | | | | |

| Gewinde-Bezeichnung<br>thread designation / désignation du filetage / designazione del filetto / designación de la rosca | Nenn-Ø<br>nominal Ø / Ø nominal / Ø nominale / Ø nominal | | Anzahl der Gewindegänge pro Zoll<br>number of threads per inch (TPI) / nombre de filets par pouce / numero di filetti per pollice / número de hilos por pulgada | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | " | mm | UNC | UNF | UNEF | 4-UN | 6-UN | 8-UN | 12-UN | 16-UN | 20-UN | 28-UN | 32-UN | BSW | BSF |
| 2" | 2,0000 | 50,800 | 4 1/2 | | | | 6 | 8 | 12 | 16 | 20 | | | 4,5 | 7 |
| 2.1/8" | 2,1250 | 53,975 | | | | | 6 | 8 | 12 | 16 | 20 | | | | |
| 2.1/4" | 2,2500 | 57,150 | 4 1/2 | | | | 6 | 8 | 12 | 16 | 20 | | | 4 | 6 |
| 2.3/8" | 2,3750 | 60,325 | | | | | 6 | 8 | 12 | 16 | 20 | | | | |
| 2.1/2" | 2,5000 | 63,500 | 4 | | | UNC | 6 | 8 | 12 | 16 | 20 | | | 4 | 6 |
| 2.5/8" | 2,6250 | 66,675 | | | | 4 | 6 | 8 | 12 | 16 | 20 | | | | |
| 2.3/4" | 2,7500 | 69,850 | 4 | | | UNC | 6 | 8 | 12 | 16 | 20 | | | 3,5 | 6 |
| 2.7/8" | 2,8750 | 73,025 | | | | 4 | 6 | 8 | 12 | 16 | 20 | | | | |
| 3" | 3,0000 | 76,200 | 4 | | | UNC | 6 | 8 | 12 | 16 | 20 | | | 3,5 | 5 |
| 3.1/8" | 3,1250 | 79,375 | | | | 4 | 6 | 8 | 12 | 16 | | | | | |
| 3.1/4" | 3,2500 | 82,550 | 4 | | | UNC | 6 | 8 | 12 | 16 | | | | 3,5 | 5 |
| 3.3/8" | 3,3750 | 85,725 | | | | 4 | 6 | 8 | 12 | 16 | | | | | |
| 3.1/2" | 3,5000 | 88,900 | 4 | | | UNC | 6 | 8 | 12 | 16 | | | | 3,5 | 4,5 |
| 3.5/8" | 3,6250 | 92,075 | | | | 4 | 6 | 8 | 12 | 16 | | | | | |
| 3.3/4" | 3,7500 | 95,250 | 4 | | | UNC | 6 | 8 | 12 | 16 | | | | 3 | 4,5 |
| 3.7/8" | 3,8750 | 98,425 | | | | 4 | 6 | 8 | 12 | 16 | | | | | |
| 4" | 4,0000 | 101,600 | 4 | | | UNC | 6 | 8 | 12 | 16 | | | | 3 | 4,5 |

# Umrechnungstabelle

conversion table / tableau de correspondances / tabella di conversione / tabla de conversión

| Abmessungen in Zoll<br>dimensions in inches / dimensions en pouces / dimensioni in pollici / dimensiones en pulgadas | | Zoll<br>inch / pouce / pollici / pulgada | | | | | |
|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 |
| | | mm | | | | | |
| 0 | 0,000000 | 0,000 | 25,400 | 50,800 | 76,200 | 101,600 | 127,000 |
| 1/64 | 0,015625 | 0,397 | 25,797 | 51,197 | 76,597 | 101,997 | 127,397 |
| 1/32 | 0,031250 | 0,794 | 26,194 | 51,594 | 76,994 | 102,394 | 127,794 |
| 3/64 | 0,046875 | 1,191 | 26,591 | 51,991 | 77,391 | 102,791 | 128,191 |
| 1/16 | 0,062500 | 1,588 | 26,988 | 52,388 | 77,788 | 103,188 | 128,588 |
| 5/64 | 0,078125 | 1,984 | 27,384 | 52,784 | 78,184 | 103,584 | 128,984 |
| 3/32 | 0,093750 | 2,381 | 27,781 | 53,181 | 78,581 | 103,981 | 129,381 |
| 7/64 | 0,109375 | 2,778 | 28,178 | 53,578 | 78,978 | 104,378 | 129,778 |
| 1/8 | 0,125000 | 3,175 | 28,575 | 53,975 | 79,375 | 104,775 | 130,175 |
| 9/64 | 0,140625 | 3,572 | 28,972 | 54,372 | 79,772 | 105,172 | 130,572 |
| 5/32 | 0,156250 | 3,969 | 29,369 | 54,769 | 80,169 | 105,569 | 130,969 |
| 11/64 | 0,171875 | 4,366 | 29,766 | 55,166 | 80,566 | 105,966 | 131,366 |
| 3/16 | 0,187500 | 4,763 | 30,163 | 55,563 | 80,963 | 106,363 | 131,763 |
| 13/64 | 0,203125 | 5,159 | 30,559 | 55,959 | 81,359 | 106,759 | 132,159 |
| 7/32 | 0,218750 | 5,556 | 30,956 | 56,356 | 81,756 | 107,156 | 132,556 |
| 15/64 | 0,234375 | 5,953 | 31,353 | 56,753 | 82,153 | 107,553 | 132,953 |
| 1/4 | 0,250000 | 6,350 | 31,750 | 57,150 | 82,550 | 107,950 | 133,350 |
| 17/64 | 0,265625 | 6,747 | 32,147 | 57,547 | 82,947 | 108,347 | 133,747 |
| 9/32 | 0,281250 | 7,144 | 32,544 | 57,944 | 83,344 | 108,744 | 134,144 |
| 19/64 | 0,296875 | 7,541 | 32,941 | 58,341 | 83,741 | 109,141 | 134,541 |
| 5/16 | 0,312500 | 7,938 | 33,338 | 58,738 | 84,138 | 109,538 | 134,938 |
| 21/64 | 0,323077 | 8,206 | 33,606 | 59,006 | 84,406 | 109,806 | 135,206 |
| 11/32 | 0,343750 | 8,731 | 34,131 | 59,531 | 84,931 | 110,331 | 135,731 |
| 23/64 | 0,359375 | 9,128 | 34,528 | 59,928 | 85,328 | 110,728 | 136,128 |
| 3/8 | 0,375000 | 9,525 | 34,925 | 60,325 | 85,725 | 111,125 | 136,525 |
| 25/64 | 0,390625 | 9,922 | 35,322 | 60,722 | 86,122 | 111,522 | 136,922 |
| 13/32 | 0,406250 | 10,319 | 35,719 | 61,119 | 86,519 | 111,919 | 137,319 |
| 27/64 | 0,421875 | 10,716 | 36,116 | 61,516 | 86,916 | 112,316 | 137,716 |
| 7/16 | 0,437500 | 11,113 | 36,513 | 61,913 | 87,313 | 112,713 | 138,113 |
| 29/64 | 0,453125 | 11,509 | 36,909 | 62,309 | 87,709 | 113,109 | 138,509 |
| 15/32 | 0,468750 | 11,906 | 37,306 | 62,706 | 88,106 | 113,506 | 138,906 |
| 31/64 | 0,484375 | 12,303 | 37,703 | 63,103 | 88,503 | 113,903 | 139,303 |
| 1/2 | 0,500000 | 12,700 | 38,100 | 63,500 | 88,900 | 114,300 | 139,700 |
| 33/64 | 0,515625 | 13,097 | 38,497 | 63,897 | 89,297 | 114,697 | 140,097 |
| 17/32 | 0,531250 | 13,494 | 38,894 | 64,294 | 89,694 | 115,094 | 140,494 |
| 35/64 | 0,546875 | 13,891 | 39,291 | 64,691 | 90,091 | 115,491 | 140,891 |
| 9/16 | 0,562500 | 14,288 | 39,688 | 65,088 | 90,488 | 115,888 | 141,288 |
| 37/64 | 0,578125 | 14,684 | 40,084 | 65,484 | 90,884 | 116,284 | 141,684 |
| 19/32 | 0,593750 | 15,081 | 40,481 | 65,881 | 91,281 | 116,681 | 142,081 |
| 39/64 | 0,609375 | 15,478 | 40,878 | 66,278 | 91,678 | 117,078 | 142,478 |
| 5/8 | 0,625000 | 15,875 | 41,275 | 66,675 | 92,075 | 117,475 | 142,875 |
| 41/64 | 0,640625 | 16,272 | 41,672 | 67,072 | 92,472 | 117,872 | 143,272 |
| 21/32 | 0,656250 | 16,669 | 42,069 | 67,469 | 92,869 | 118,269 | 143,669 |
| 43/64 | 0,671875 | 17,066 | 42,466 | 67,866 | 93,266 | 118,666 | 144,066 |
| 11/16 | 0,687500 | 17,463 | 42,863 | 68,263 | 93,663 | 119,063 | 144,463 |
| 45/64 | 0,703125 | 17,859 | 43,259 | 68,659 | 94,059 | 119,459 | 144,859 |
| 23/32 | 0,718750 | 18,256 | 43,656 | 69,056 | 94,456 | 119,856 | 145,256 |

| **Abmessungen in Zoll** dimensions in inches / dimensions en pouces / dimensioni in pollici / dimensiones en pulgadas | | **Zoll** inch / pouce / pollici / pulgada | | | | | |
|---|---|---|---|---|---|---|---|
| | | **0** | **1** | **2** | **3** | **4** | **5** |
| | | **mm** | | | | | |
| 47/64 | 0,734375 | 18,653 | 44,053 | 69,453 | 94,853 | 120,253 | 145,653 |
| 3/4 | 0,750000 | 19,050 | 44,450 | 69,850 | 95,250 | 120,650 | 146,050 |
| 49/64 | 0,765625 | 19,447 | 44,847 | 70,247 | 95,647 | 121,047 | 146,447 |
| 25/32 | 0,781250 | 19,844 | 45,244 | 70,644 | 96,044 | 121,444 | 146,844 |
| 51/64 | 0,796875 | 20,241 | 45,641 | 71,041 | 96,441 | 121,841 | 147,241 |
| 13/16 | 0,812500 | 20,638 | 46,038 | 71,438 | 96,838 | 122,238 | 147,638 |
| 53/64 | 0,828125 | 21,034 | 46,434 | 71,834 | 97,234 | 122,634 | 148,034 |
| 27/32 | 0,843750 | 21,431 | 46,831 | 72,231 | 97,631 | 123,031 | 148,431 |
| 55/64 | 0,859375 | 21,828 | 47,228 | 72,628 | 98,028 | 123,428 | 148,828 |
| 7/8 | 0,875000 | 22,225 | 47,625 | 73,025 | 98,425 | 123,825 | 149,225 |
| 57/64 | 0,890625 | 22,622 | 48,022 | 73,422 | 98,822 | 124,222 | 149,622 |
| 29/32 | 0,906250 | 23,019 | 48,419 | 73,819 | 99,219 | 124,619 | 150,019 |
| 59/64 | 0,921875 | 23,416 | 48,816 | 74,216 | 99,616 | 125,016 | 150,416 |
| 15/16 | 0,937500 | 23,813 | 49,213 | 74,613 | 100,013 | 125,413 | 150,813 |
| 61/64 | 0,953125 | 24,209 | 49,609 | 75,009 | 100,409 | 125,809 | 151,209 |
| 31/32 | 0,968750 | 24,606 | 50,006 | 75,406 | 100,806 | 126,206 | 151,606 |
| 63/64 | 0,984375 | 25,003 | 50,403 | 75,803 | 101,203 | 126,603 | 152,003 |

## Vergleichstabelle: Zugfestigkeit (N/mm²) - Rockwell - Vickers - Brinell

comparison table: tensile strength - Rockwell - Vickers - Brinell /
tableau comparatif : résistance à la traction - Rockwell - Vickers - Brinell /
tabella di comparazione: resistenza a trazione - Rockwell - Vickers - Brinell /
tabla de comparación: resistencia a la tracción - Rockwell - Vickers - Brinell

| Zugfestigkeit (N/mm² / MPa) tensile strength / résitance à la traction / resistenza a trazione / resistencia a la tracción | Rockwell (HRC) | Vickers (HV 10) | Brinell (HB) |
|---|---|---|---|
| 255 | | 80 | 76 |
| 270 | | 85 | 80,7 |
| 285 | | 90 | 85,5 |
| 305 | | 95 | 90,2 |
| 320 | | 100 | 95 |
| 335 | | 105 | 99,8 |
| 350 | | 110 | 105 |
| 370 | | 115 | 109 |
| 385 | | 120 | 114 |
| 400 | | 125 | 119 |
| 415 | | 130 | 124 |
| 430 | | 135 | 128 |
| 450 | | 140 | 133 |
| 465 | | 145 | 138 |
| 480 | | 150 | 143 |
| 495 | | 155 | 147 |
| 510 | | 160 | 152 |
| 530 | | 165 | 156 |
| 545 | | 170 | 162 |
| 560 | | 175 | 166 |
| 575 | | 180 | 171 |
| 595 | | 185 | 176 |
| 610 | | 190 | 181 |
| 625 | | 195 | 185 |
| 640 | | 200 | 190 |
| 660 | | 205 | 195 |
| 675 | | 210 | 199 |
| 690 | | 215 | 204 |
| 705 | | 220 | 209 |
| 720 | | 225 | 214 |
| 740 | | 230 | 219 |
| 755 | | 235 | 223 |
| 770 | 20,3 | 240 | 228 |
| 785 | 21,3 | 245 | 233 |
| 800 | 22,2 | 250 | 238 |
| 820 | 23,1 | 255 | 242 |
| 835 | 24,0 | 260 | 247 |
| 850 | 24,8 | 265 | 252 |
| 865 | 25,6 | 270 | 257 |
| 880 | 26,4 | 275 | 261 |
| 900 | 27,1 | 280 | 266 |
| 915 | 27,8 | 285 | 271 |
| 930 | 28,5 | 290 | 276 |
| 950 | 29,2 | 295 | 280 |
| 965 | 29,8 | 300 | 285 |
| 995 | 31,0 | 310 | 295 |
| 1030 | 32,2 | 320 | 304 |
| 1060 | 33,3 | 330 | 314 |
| 1095 | 34,4 | 340 | 323 |

| Zugfestigkeit (N/mm² / MPa) tensile strength / résitance à la traction / resistenza a trazione / resistencia a la tracción | Rockwell (HRC) | Vickers (HV 10) | Brinell (HB) |
|---|---|---|---|
| 1125 | 35,5 | 350 | 333 |
| 1155 | 36,6 | 360 | 342 |
| 1190 | 37,7 | 370 | 352 |
| 1220 | 38,8 | 380 | 361 |
| 1255 | 39,8 | 390 | 371 |
| 1290 | 40,8 | 400 | 380 |
| 1320 | 41,8 | 410 | 390 |
| 1350 | 42,7 | 420 | 399 |
| 1385 | 43,6 | 430 | 409 |
| 1420 | 44,5 | 440 | 418 |
| 1455 | 45,3 | 450 | 428 |
| 1485 | 46,1 | 460 | 437 |
| 1520 | 46,9 | 470 | 447 |
| 1555 | 47,7 | 480 | 456 |
| 1595 | 48,4 | 490 | 466 |
| 1630 | 49,1 | 500 | 475 |
| 1665 | 49,8 | 510 | 485 |
| 1700 | 50,5 | 520 | 494 |
| 1740 | 51,1 | 530 | 504 |
| 1775 | 51,7 | 540 | 513 |
| 1810 | 52,3 | 550 | 523 |
| 1845 | 53,0 | 560 | 532 |
| 1880 | 53,6 | 570 | 542 |
| 1920 | 54,1 | 580 | 551 |
| 1955 | 54,7 | 590 | 561 |
| 1995 | 55,2 | 600 | 570 |
| 2030 | 55,7 | 610 | 580 |
| 2070 | 56,3 | 620 | 589 |
| 2105 | 56,8 | 630 | 599 |
| 2145 | 57,3 | 640 | 608 |
| 2180 | 57,8 | 650 | 618 |
| | 58,3 | 660 | |
| | 58,8 | 670 | |
| | 59,2 | 680 | |
| | 59,7 | 690 | |
| | 60,1 | 700 | |
| | 61,0 | 720 | |
| | 61,8 | 740 | |
| | 62,5 | 760 | |
| | 63,3 | 780 | |
| | 64,0 | 800 | |
| | 64,7 | 820 | |
| | 65,3 | 840 | |
| | 65,9 | 860 | |
| | 66,4 | 880 | |
| | 67,0 | 900 | |
| | 67,5 | 920 | |
| | 68,0 | 940 | |
| | | | |

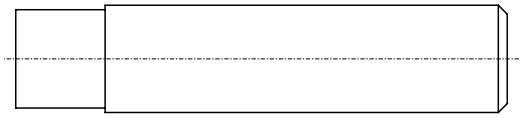
## DIN 1835-1 DIN 6535 Zylinderschäfte

DIN 1835-1 DIN 6535 parallel shanks / DIN 1835-1 DIN 6535 queues cylindriques / DIN 1835-1 DIN 6535 attacchi cilindrici / DIN 1835-1 DIN 6535 mangos cilídricos

### Glatter Zylinderschaft

plain parallel shank / queue cylindrique lisse / attacco cilindrico / mango cilíndrico liso

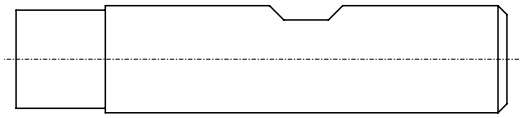
| | |
|---|---|
| DIN 6535 | Form HA<br>form HA / forme HA / forma HA / forma HA |
| DIN 1835-1 | Form A<br>form A / forme A / forma A / forma A |



### Zylinderschaft mit seitlicher Mitnahmefläche

parallel shank with lateral driving surface / queue cylindrique avec méplat Weldon / attacco cilindrico con un grano (attacco Weldon) / mango cilíndrico con plano de arrastre Weldon

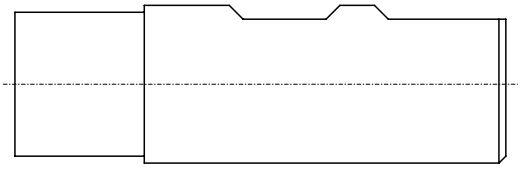
| | |
|---|---|
| DIN 6535 | Form HB für d2 = 6 bis 20 mm<br>form HB for d2 = 6 to 20 mm /<br>forme HB pour d2 = 6 à 20 mm /<br>forma HB per d2 = 6 a 20 mm /<br>forma HB para d2 = 6 a 20 mm |
| DIN 1835-1 | Form B für d2 = 3 bis 20 mm<br>form B for d2 = 3 to 20 mm /<br>forme B pour d2 = 3 à 20 mm /<br>forma B per d2 = 3 a 20 mm /<br>forma B para d2 = 3 a 20 mm |



### Zylinderschaft mit zwei seitlichen Mitnahmeflächen

parallel shank with two lateral driving surfaces / queue cylindrique avec deux méplats Weldon / attacco cilindrico con due grani (attacco Weldon) / mango cilíndrico con dos planos de arrastre Weldon

| | |
|---|---|
| DIN 6535 | Form HB für d2 = 25 und 32 mm<br>form HB for d2 = 25 and 32 mm /<br>forme HB pour d2 = 25 et 32 mm /<br>forma HB per d2 = 25 e 32 mm /<br>forma HB para d2 = 25 y 32 mm |
| DIN 1835-1 | Form B für d2 = 25 bis 63 mm<br>form B for d2 = 25 to 63 mm /<br>forme B pour d2 = 25 à 63 mm /<br>forma B per d2 = 25 a 63 mm /<br>forma B para d2 = 25 a 63 mm |



### Zylinderschaft mit geneigter Spannfläche

parallel shank with inclined clamping surface / queue cylindrique avec méplat Whistle-Notch / attacco cilindrico con piano inclinato (attacco Whistle-Notch) / mango cilíndrico con plano de arrastre inclinado Whistle-Notch

| | |
|---|---|
| DIN 6535 | Form HE für d2 = 6 bis 20 mm<br>form HE for d2 = 6 to 20 mm /<br>forme HE pour d2 = 6 à 20 mm /<br>forma HE per d2 = 6 a 20 mm /<br>forma HE para d2 = 6 a 20 mm |

### Zylinderschaft mit geneigter Spannfläche

parallel shank with inclined clamping surface / queue cylindrique avec méplat Whistle-Notch / attacco cilindrico con piano inclinato (attacco Whistle-Notch) / mango cilíndrico con plano de arrastre inclinado Whistle-Notch

| | |
|---|---|
| DIN 6535 | Form HE für d2 = 25 und 32 mm<br>form HE for d2 = 25 and 32 mm /<br>forme HE pour d2 = 25 et 32 mm /<br>forma HE per d2 = 25 e 32 mm /<br>forma HE para d2 = 25 y 32 mm |
| DIN 1835-1 | Form E für d2 = 6 bis 32 mm<br>form E for d2 = 6 to 32 mm /<br>forme E pour d2 = 6 à 32 mm /<br>forma E per d2 = 6 a 32 mm /<br>forma E para d2 = 6 a 32 mm |

## Kegel-Hohlschaft mit Plananlage (HSK) für Werkzeugmaschinen

hollow taper shank with flange contact surface (HSK) for machine tools / attachement HSK avec centrage sur cone et appui sur collerette / accoppiamento cono rasamento (HSK) / cono hueco poligonal con plano (HSK) para máquinas herramientas

Mitnehmernuten am Kegelende. Zentrale Kühlschmierstoffzufuhr. Einsatz bei Hochgeschwindigkeitszerspanung. Kraftschlüssige Drehmomentübertragung über Kegel und Anlagefläche oder über Mitnehmernuten am Schaftende. Hohe Steifigkeit durch die Abstützung am Bund.

Drive keys at the end of HSK taper. Central coolant supply. Use in high speed cutting. Nonpositive torque transmission through taper and flange contact surface or through the drive keys at the end of the HSK taper. High rigidity due to face contact between flange and spindle. /

Pièces de liaison en bout du cone HSK. Lubrification interne. Utilisation à haute vitesse. Transmission du couple uniquement par serrage sur cone / collerette ou positivement par les pièces de laison en bout du cone. Attachement robuste grâce à l'appui de la collerette sur la broche de la machine. /

Scanalatura di trascinamento. Adduzione del lubrificante. Lavorazione ad alta velocità. Trasmissione momento torcento con cono e trascinatori, o cono e scanalature di trascinamento. Alta rigidità grazie al bloccaggio cono - rasamento. /

Ranuras de arrastre al cono (HSK). Alimentación de refrigerante central. Uso en mecanizado de alta velocidad. Transmisión del par por arrastre de fuerza a través de cono y plano o a través las ranuras de arrastre al cono. Alta rigidez por medio de apoyo del cono.

### DIN 69893-1 Form A

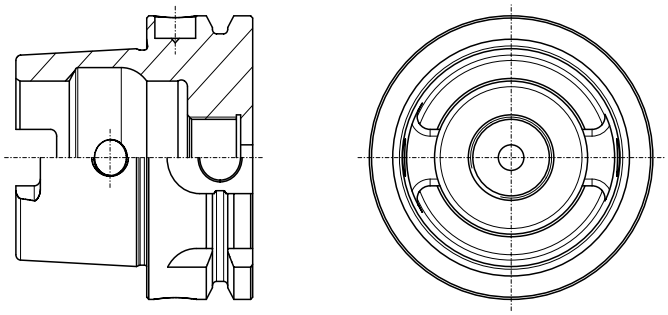
DIN 69893-1 form A / DIN 69893-1 forme A / DIN 69893-1 forma A / DIN 69893-1 forma A

Bund mit Greif- und Indexiernut für automatischen Werkzeugwechsel
flange with gripping groove and indexing notch for automatic tool change / collerette avec rainures d'ablocage et trou d'indexation pour changement automatique / scanalatura di indexaggio per cambio automatico / cono con ranura transversal y ranura de indexación para cambio de herramienta automatico

Werkzeuge sind manuell wechselbar
tools are manually exchangable / outils à changement manuel / cambio degli utensili manuale / cambio de herramienta manual

Bohrung für Datenträger nach DIN 69873
mounting space for data media according to DIN 69873 / avec perçage pour porteur de données selon DIN 69873 / foro per chip memoria secondo DIN 69873 / agujero para soporte de datos según DIN 69873

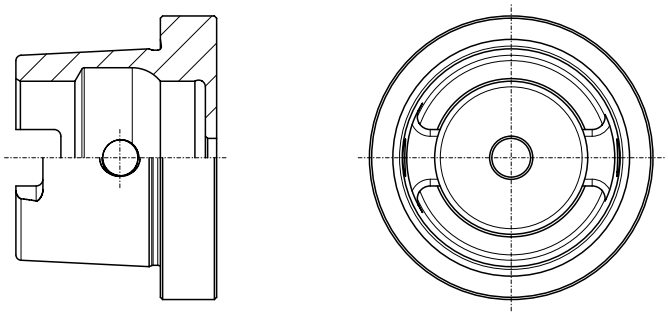
Form A auch als Form C verwendbar
form A can replace form C / forme A peut remplacer forme C / forma A può anche essere usato come forma C / forma A puede sustituir forma C



### DIN 69893-1 Form C

DIN 69893-1 form C / DIN 69893-1 forme C / DIN 69893-1 forma C / DIN 69893-1 forma C

für manuellen Werkzeugwechsel
for manual tool change / pour changement manuel d'outil / cambio mandrino manuale / cambio de herramienta manual



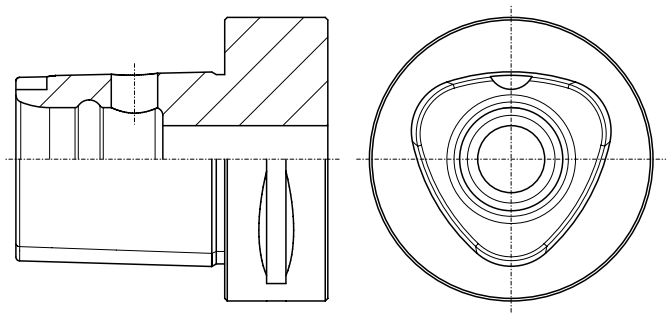
### Polygonaler Kegel-Hohlschaft mit Plananlage Capto™

polygonal hollow taper shank with flange contact surface Capto™ / cone creux avec profil polygon et appui sur collerette selon CAPTO™ / sistema Capto™ con poligoni conici e rasamento / cono hueco poligonal con plano Capto™

universell einsetzbar
universal use / utilisation universelle / uso universale / uso universal

konische Polygonkupplung zur Drehmomentübertragung
tapered polygon coupling for torque transmission / transmission du couple par le profil polygon conique / trasmissione momento torcente a mezzo poligoni conici / acoplamiento cónico para la transmisión del par

hohe Rundlauf- und Wiederholgenauigkeit
high concentricity and repeatability / haute concentricité et répétabilité / alta concentricità ed ripetibilità / alta exactitud de marcha concéntrica y de ajuste



## Steilkegelschaft (SK)

taper shank (SK) / queue conique (SK) / attacco conico (SK) / cono de gran abertura (SK)

Formschlüssige Drehmomentübertragung über Nuten am Kegelrand. Einsatz auf Bearbeitungszentren und CNC Werkzeugmaschinen. Nicht für die Hochgeschwindigkeitsbearbeitung geeignet. Keine Selbsthemmung.

Positive torque transmission through grooves in the flange. Use in machining centres and CNC machine tools. Not suitable for high speed cutting. No self-locking. /

Transmission positive du couple par les rainures de la collerette. Utilisation sur machine ou centre d'usinage CNC. Non recommandé à haute vitesse. Pas autoblocant. /

Trasmissione del momento torcente attraverso le scanalature sulla flangia. Utilizzo su centri di lavoro e CNC. Non utilizzabile sull'alta velocità. Non autobloccante. /

Transmisión del par positiva a través de ranuras en la brida. Uso en centros de mecanizado y en máquinas herramientas CNC. No apropiado para el mecanizado de alta velocidad. Sin autorrentención.

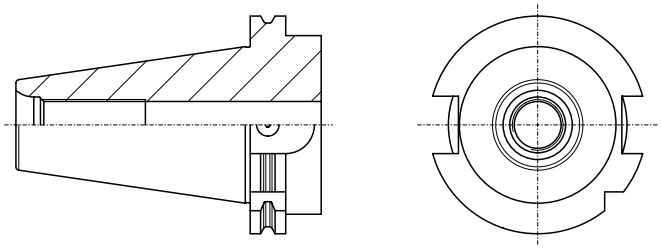
### DIN 69871 A/D Steilkegelschaft

DIN 69871 A/D taper shank / cone suivant DIN 69871 A/D / cono secondo DIN 69871 A/D / cono DIN 69871 A/D

für automatischen Werkzeugwechsel
for automatic tool change / pour changement automatique d'outil / per cambio automatico / para cambio automático

Form AD mit Trapezrille und Durchgangsbohrung für zentrale Kühlschmierstoffzuführung
form AD with trapezoidal groove and through bore for central lubrication supply / forme AD avec rainure trapézoïdale et trou central pour lubrification interne / forma AD per cambio a V con foro passante per lubrificazione attraverso il naso mandrino / forma AD con ranura trapezoidal y agujero pasante para la alimentación de refrigerante central

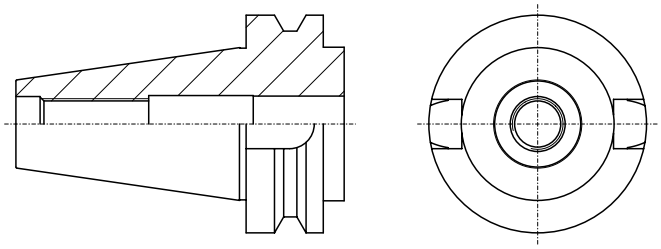
zur Aufnahme von Werkzeugen in NC-Fräs und Bohrmaschinen sowie zur Aufnahme und Einwechslung von Werkzeugen in Bearbeitungszentren
for holding of tools in NC milling and drilling machines as well as for holding and changing of tools in machining centers / pour attachement des outils sur fraiseuses, perceuses à CN et changeurs d'outils des centres d'usinage / per bloccare utensili su macchine di foratura e centri di lavoro / para la recepción de herramientas en fresadoras y taladradoras CNC así como para la recepción y el cambio de herramientas en centros de mecanizado



### MAS-BT

MAS-BT / MAS-BT / MAS-BT / MAS-BT

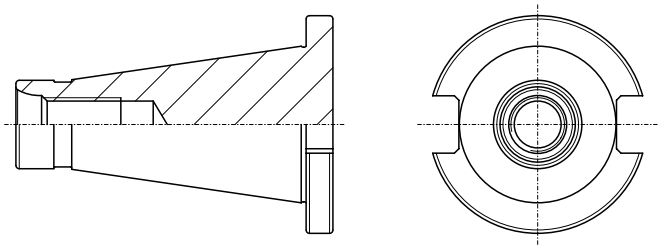
für automatischen Werkzeugwechsel
for automatic tool change / pour changement automatique d'outil / per cambio automatico / para cambio automático



### DIN 2080 Steilkegelschaft für Werkzeuge und Spannzeuge

DIN 2080 taper shank for tools and clamping devices / cône DIN 2080 pour outils et mandrins / attacco conico per utensili e mandrini di serraggio secondo DIN 2080 / cono DIN 2080 para herramientas y mandriles

nicht für automatischen Werkzeugwechsel
not for automatic tool change / incompatible avec changement d'outil automatique / non adatti per cambio automatico / no apropiado para cambio automático



## Allgemein
general / général / generali

| | |
|---|---|
| Formel zur Berechnung der Schnittgeschwindigkeit<br>formula for the computation of the cutting speed /<br>calcul de la vitesse de coupe /<br>formula per il calcolo della velocità di taglio | $v_C = \frac{n * \pi * d_1}{1000}$ |
| Formel zur Berechnung der Drehzahl<br>formula for the computation of the number of revolutions (rpm) /<br>calcul de la vitesse de rotation /<br>formula per il calcolo del numero di giri | $n = \frac{v_C * 1000}{\pi * d_1}$ |

## Gewindeschneiden, Gewindefurchen
tapping, thread roll forming / taraudage coupant, taraudage par refoulement / maschi a tagliare, maschi a rullare

| | |
|---|---|
| Formel zur Berechnung des Vorschubs<br>formula for the computation of the feed /<br>calcul de l'avance /<br>formula per il calcolo dell'avanzamento | $f = n * P * k$ |
| Formel zur Berechnung des Standwegs in m<br>formula for the computation of the tool life in m /<br>calcul de la longueur taraudée en m /<br>formula per il calcolo della durata vita del maschio in m | $\text{Standweg} = \frac{GT * AG}{1000}$ |

## Schnittkraft, Drehmoment und Leistungsberechnung beim Gewindeschneiden
cutting force, torque and power supply computation for thread cutting / effort de coupe, couple et puissance en taraudage / calcolo della forza di taglio, della coppia e della potenza necessaria per la maschiatura

- **Die Berechnung ist gültig für eingängige zylindrische Gewinde mit 60° und 55° Flankenwinkel sowie für scharfe Einschnitt-Gewindebohrer; Tragtiefe des Gewindes 75%.**
  The formulas are applicable for single-start cylindrical threads with a profile angle of 55° or 60 as well as for sharp machine taps; load bearing depth of thread 75 %. /
  Les formules s'appliquent aux filetages triangulaires à simple filet, avec profil à 60° ou 55°, pour une profondeur de filetage utile de 75% obtenu par le passage d' un taraud unique. /
  Le formule sono applicabili per filettature cilindriche con profilo angolo di 55° o 60° come pure per maschi a macchina molto taglienti; altezza utile del filetto della filettatura 75%.

- **Bei Trapez-, ACME-, Rundgewinden ist der Spanungsquerschnitt besonders zu berechnen.**
  For trapezoidal, ACME and round threads, the lateral surface area of chip must be derived by using special formulas. /
  Pour les filetages trapézoïdaux, ACME et ronds, la section du copeau se calcule suivant des formules spécifiques. /
  Per le filettature trapezoidali, ACME e rotonda, l'area (superficie laterale) del truciolo deve essere calcolata usando delle formule speciali.

| | |
|---|---|
| Formel zur Berechnung des Spanungsquerschnittes<br>formula for the computation of the lateral surface area of the chip /<br>calcul de la section du copeau /<br>formula per il calcolo dell'area (superficie laterale) del truciolo | $A = 0{,}25 * P^2$ |
| Formel zur Berechnung der Schnittkraft<br>formula for the computation of the cutting force /<br>calcul de l'effort de coupe /<br>formula per il calcolo dello sforzo di taglio | $F_C = A * k_C$ |
| Formel zur Berechnung des Drehmoments<br>formula for the computation of the torque /<br>calcul du couple de taraudage /<br>formula per il calcolo dello momento torcente | $M = \frac{k_C * P^2 * d_1}{8000}$ |
| Formel zur Leistungsberechnung am Gewindebohrer<br>formula for the computation of the power requirement for the tap /<br>calcul de la puissance absorbée par le taraud /<br>formula per il calcolo della potenza richiesta dal maschio | $P_e = \frac{M * n}{9550}$ |
| Formel zur Berechnung der Maschinenantriebsleitung<br>formula for the computation of the power requirement of the machine /<br>calcul de la puissance absorbée par la machine /<br>formula per il calcolo della potenza richiesta dalla macchina | $P_1 = \frac{P_e}{\eta}$ |

- **Bei Verwendung von Sätzen ist $P_e$ mit folgendem Faktor zu multiplizieren:**
  If tap sets are used, the following factors must be multiplied by $P_e$: / Pour les jeux de tarauds, multiplier $P_e$ par le correcteur suivant: / Se utilizziamo i maschi in serie, applicheremo i seguenti coefficienti al valore $P_e$:

  **Satz à 2 Stück = 0,7**
  set of 2 pieces = 0,7
  jeu de 2 pièces = 0,7
  serie di 2 pezzi = 0,7

  **Satz à 3 Stück = 0,5**
  set of 3 pieces = 0,5
  jeu de 3 pièces = 0,5
  serie di 3 pezzi = 0,5

  **Satz à 4 Stück = 0,4**
  set of 4 pieces = 0,4
  jeu de 4 pièces = 0,4
  serie di 4 pezzi = 0,4

- **Richtwert Wirkungsgrad $\eta$ = 0,8** / guidance value of motor efficiency $\eta$ = 0,8 /
  valeur indicative du rendement de la machine $\eta$ = 0,8 / valore indicativo di rendimento motore $\eta$ = 0,8

- **Bei steigender Abstumpfung muss mit einem Anstieg des Drehmomentes um den 2 - 3-fachen Wert gerechnet werden.**
  With increasing wear of the tool, an increase in required torque by a factor of 2 - 3 is to be expected. /
  Le couple de taraudage augmente au fur et à mesure que le taraud s'use. Le couple de taraudage peut atteindre 2 à 3 fois la valeur du couple initial. / Perdendo l'affilatura, la coppia necessaria deve essere aumentata per un coefficiente di 2 - 3 volte.

## Spezifische Schnittkraft $k_C$

specific cutting force $k_C$ / force spécifique de coupe $k_C$ / specifico sforzo di taglio $k_C$

| Werkstoffbeispiele / examples of materials / exemples de matières / designazione dei materiali / ejemplo de materiales | $k_C$ | Materialgruppe / material group / groupe matière / gruppo materiale / grupo de material |
|---|---|---|
| Stahl / steel / acier / acciaio 600 N/mm² | 2300 N/mm² | 1.1 |
| Stahl / steel / acier / acciaio 600 - 800 N/mm² | 2500 N/mm² | 1.2 |
| Stahl / steel / acier / acciaio 800 - 1000 N/mm² | 2600 N/mm² | 1.3-1.4 |
| Stahl / steel / acier / acciaio 1000 - 1300 N/mm² | 3600 N/mm² | 1.5 |
| rostfreier Stahl / stainless steel / acier inoxydable / acciaio inossidabile | 3200 N/mm² | 2.1-2.2 |
| GJL - Grauguss (170 HB) / GJL - grey cast iron (170 HB) / GJL - fonte grise (170 HB) / GJL - ghisa grigia (170 HB) | 1600 N/mm² | 3.1 |
| GJM - Temperguss hart / GJM hard - malleable cast iron / GJM dur - fonte malléable / GJM duro - ghisa malleabile bianca | 1250 N/mm² | 3.2 |
| GJM - Temperguss weich / GJM soft - malleable cast iron / GJM doux - fonte malléable / GJM morbido - ghisa malleabile bianca | 900 N/mm² | 3.3 |
| Kupfer / copper / cuivre / rame | 1100 N/mm² | 4.1 |
| Kupferlegierung - Ms / copper alloy - brass / alliage de cuivre - laiton / lega di rame - ottone | 720 N/mm² | 4.2-4.3 |
| Kupfer-Sonderlegierung - Gussbronze / special copper alloy - cast bronze / alliage de cuivre spécial - bronze de fonderie / lega di rame speciale - bronzo fuso | 1900 N/mm² | 4.6-4.7 |
| Al-Si-Legierung / Al-Si alloy / alliage Al-Si / leghe Al-Si | 680 N/mm² | 5.1-5.3 |

| **Symbol** symbol / symbole / simbolo / símbolo | **Bezeichnung** explanation / désignation / descrizione / designación / | **Einheit** unit / unité / unità / unidad |
|---|---|---|
| A | Spanungsquerschnitt / lateral surface area of chip / section du copeau / area (superficie laterale) del truciolo | mm² |
| AG | Anzahl der geschnittenen Gewinde / number of threads / nombre de taraudages / numero di filetti maschiati | |
| $d_1$ | Gewinde-Nenndurchmesser / nominal thread diameter / diamètre nominal du filetage / diametro nominale | mm |
| f | Vorschub / feed / avance / avanzamento | mm/min |
| $F_C$ | Schnittkraft / cutting force / effort de coupe / forza di taglio | N |
| GT | Gewindetiefe / thread depth / profondeur taraudée / profondità del filetto | mm |
| k | Korrekturfaktor / correction factor / facteur de correction / fattore di correzione | % |
| $k_C$ | spezifische Schnittkraft / specific cutting force / force spécifique de coupe / lo sforzo di taglio | N/mm² |
| M | Drehmoment / torque / couple de taraudage / momento torcente | Nm |
| n | Drehzahl / rotation speed / vitesse de rotation / numero di giri | 1/min |
| P | Gewindesteigung / thread pitch / pas du filet / passo del filetto | mm |
| $P_e$ | effektive Leistung / effective power consumption / puissance absorbée par le taraud / potenza effettiva maschio | kW |
| $P_1$ | indizierte Leistung / actual power consumption / puissance absorbée par la machine / potenza richiesta dalla M.U. | kW |
| $v_C$ | Schnittgeschwindigkeit / cutting speed / vitesse de coupe / velocità di taglio | m/min |
| $\eta$ | Wirkungsgrad / motor efficiency / rendement de la machine / rendimento motore | % |

## Gewindefräser
thread milling cutter / fraises à fileter/ frese a filettare

## Berechnung der Vorschubwerte
calculation of the feed rates / calcul de l'avance / calcolo velocità di avanzamento

| | |
|---|---|
| Spantiefe radial<br>radial chip thickness /<br>épaisseur du copeau /<br>spessore truciolo | $a_r = \frac{D^2 - D_K^2}{4(D - d_1)}$ |
| Vorschub pro Zahn<br>feed per tooth /<br>avance par dent /<br>avanzamento per dente | $f_Z = h_m \sqrt{\frac{d_1}{a_r}}$ |
| Mittlere Spandicke<br>average chip thickness /<br>épaisseur moyenne du copeau /<br>spessore medio del truciolo | $h_m = f_z \sqrt{\frac{a_r}{d_1}}$ |
| Vorschubgeschwindigkeit an der Außenkontur des Innen- bzw. Außengewindes<br>feed rate at the outer contour of the internal or external thread /<br>avance périphérique de contournement interne / externe du filet /<br>velocità di avanzamento all'esterno del percorso della filettatura interna o esterna | $v_{fA} = v_{fAA} = n * f_Z * z$ |
| Vorschubgeschwindigkeit an der Mittelpunktbahn des Innengewindes<br>feed rate at the center path of the internal thread /<br>avance au centre en taraudage interne /<br>velocità di avanzamento al centro del percorso della filettatura interna | $v_{fM} = \frac{D - d_1}{D} * v_{fA}$ |
| Vorschubgeschwindigkeit an der Außenkontur des Innengewindes<br>feed rate at the outer contour of the internal thread /<br>avance périphérique de contournement interne du filet /<br>velocità di avanzamento all'esterno del percorso della filettatura interna | $v_{fA} = \frac{v_{fM} * D}{D - d_1}$ |
| Vorschub pro Zahn aus der Vorschubgeschwindigkeit an der Mittelpunktbahn des Innengewindes<br>feed per tooth derived from the feed rate at the center path of the internal thread /<br>calcul de l'avance par dent à partir de l'avance au centre en taraudage interne /<br>avanzamento per dente calcolato sulla velocità al centro del percorso della filettatura interna | $f_Z = \frac{v_{fM}}{n * z * \frac{D - d_1}{D}}$ |
| Vorschubgeschwindigkeit an der Außenkontur des Außengewindes<br>feed rate at the outer contour of the external thread /<br>avance périphérique de contournement externe du filet /<br>velocità di avanzamento all'esterno del percorso della filettatura esterna | $v_{fAA} = \frac{v_{fMA} * D}{D + d_1}$ |
| Vorschubgeschwindigkeit an der Mittelpunktbahn des Außengewindes<br>feed rate at the center path of the external thread /<br>avance au centre en filetage externe /<br>velocità di avanzamento al centro del percorso della filettatura esterna | $v_{fMA} = \frac{D + d_1}{D} * v_{fAA}$ |
| Vorschub pro Zahn aus der Vorschubgeschwindigkeit an der Mittelpunktbahn des Außengewindes<br>feed per tooth derived from the feed rate at the center path of the external thread /<br>calcul de l'avance par dent à partir de l'avance au centre en filetage externe /<br>avanzamento per dente calcolato sulla velocità al centro del percorso della filettatura esterna | $f_Z = \frac{v_{fMA}}{n * z * \frac{D + d_1}{D}}$ |
| Zeit für einen Gewindegang<br>machining time for one thread pitch /<br>temps de cycle pour un tour complet de l'outil /<br>tempo di esecuzione di un passo | $t_1 = \frac{D * \pi}{v_{fA}} = \frac{D * \pi}{v_{fAA}}$ |

## Gesamtzeit pro Gewinde

total machining time per thread /
temps de cycle pour la réalisation du filetage complet /
tempo totale per filetto

$$t_{Gew} = \frac{GT}{P} * t_1$$

| **Symbol**<br>symbol /<br>symbole /<br>simbolo /<br>símbolo | **Bezeichnung**<br>explanation /<br>désignation /<br>descrizione /<br>designación / | **Einheit**<br>unit /<br>unité /<br>unità /<br>unidad |
|---|---|---|
| $a_r$ | Spantiefe radial / radial chip thickness /<br>épaisseur du copeau / spessore truciolo | mm |
| $d_1$ | Außendurchmesser Fräser / major Ø milling cutter / Ø extérieur de la fraise / diametro esterno della fresa | mm |
| D | Nenndurchmesser Gewinde / nominal thread Ø / diamètre nominal du filetage / diametro nominale del filetto | mm |
| $D_K$ | Kern- oder Bohrungsdurchmesser / core Ø or bore hole Ø / Ø du noyau ou du perçage /<br>Ø preforo o Ø di foratura | mm |
| $f_Z$ | Vorschub pro Zahn / feed per tooth / avance par dent / avanzamento per dente | mm |
| GT | Gewindetiefe / thread depth / profondeur taraudée / profondità del filetto | mm |
| $h_m$ | mittlere Spandicke / middle chip thickness / épaisseur moyenne du copeau / spessore medio del truciolo | mm |
| n | Spindeldrehzahl / spindle rotation / vitesse de rotation de la broche / velocità di rotazione del mandrino | min-1 |
| P | Gewindesteigung / thread pitch / pas du filet / passo del filetto | mm |
| $t_1$ | Zeit für einen Gewindegang / machining time for one thread pitch / temps de cycle pour un tour complet de l'outil /<br>tempo di esecuzione di un passo | min |
| $t_{Gew.}$ | Gesamtzeit pro Gewinde / total machining time per thread / temps de cycle pour la réalisation du filetage complet /<br>tempo totale per filetto | min |
| $v_C$ | Schnittgeschwindigkeit / cutting speed / vitesse de coupe / velocità di taglio | m/min |
| $v_{fA}$ | Vorschubgeschwindigkeit an der Außenkontur des Innengewindes / feed rate at the outer contour of the internal thread / avance périphérique de contournement interne du filet / velocità di avanzamento all'esterno del percorso della filetta-tura interna | mm/min |
| $v_{fAA}$ | Vorschubgeschwindigkeit an der Außenkontur des Außengewindes / feed rate at the outer contour of the external thread / avance périphérique de contournement externe du filet / velocità di avanzamento all'esterno del percorso della filettatura esterna | mm/min |
| $v_{fM}$ | Vorschubgeschwindigkeit an der Mittelpunktbahn des Innengewindes / feed rate at the center path of the internal thread / avance au centre en taraudage interne / velocità di avanzamento al centro del percorso della filettatura interna | mm/min |
| $v_{fMA}$ | Vorschubgeschwindigkeit an der Mittelpunktbahn des Außengewindes / feed rate at the center path of the external thread / avance au centre en filetage externe / velocità di avanzamento al centro del percorso della filettatura esterna | mm/min |
| z | Zähnezahl des Fräsers / number of teeth of the milling cutter /<br>nombre de dents de la fraise / numero dei denti della fresa | |

## Gewindeschneiden / Tapping

| Fehler / Error | Ursache / Cause | Abhilfe / How to help |
|---|---|---|
| Gewinde wird zu groß<br><br>Internal thread is too big (oversize) | Falscher Gewindebohrer, Schneidengeometrie des Gewindebohrers ist für den Anwendungsfall ungeeignet.<br><br>Wrong type of tap, cutting geometry is not suitable for the application. | Gewindebohrer für die zu zerspanende Werkstoffgruppe / Anwendungsfall einsetzen.<br><br>Use taps that are suitable for the application / material group to be machined. |
| | Zu kleine Gewinde-Kernbohrung.<br><br>Bore hole is too small. | Vorbohr-Ø nach DIN 336 bzw. jeweiliger Norm beachten. Für spanlose Innengewindeherstellung sind besondere Gewinde-Kernbohrungs-Ø erforderlich. Siehe Bohrlochtabelle ab Seite 208.<br><br>Consider bore hole Ø according to DIN 336 or respective standard. Chipless threading requires special bore hole diameters. Table on bore hole Ø see page 208. |
| | Winkel- oder Positionsfehler der Gewinde-Kernbohrung.<br><br>Error in angle or position of the bore hole. | a) Auf korrekte Werkstückspannung achten.<br>b) Gewindeschneidfutter mit achsparalleler Pendelung verwenden.<br><br>a) Pay attention to correct workpiece clamping.<br>b) Use a tap holder with radial parallel floating. |
| | Axial schwergängige Maschinenspindel.<br><br>Axially rough-running machine spindle. | a) Mit maschinellem Vorschub schneiden.<br>b) Gewindeschneidfutter mit Längenausgleich einsetzen.<br><br>a) Cut with automatic feed.<br>b) Use a tap holder with length compensation. |
| | Kaltaufschweißung oder Anklebungen an den Gewindebohrerflanken.<br><br>Cold weldings or material adhesion on the tap flanks. | a) Neues Werkzeug einsetzen.<br>b) Kühlschmierung verbessern (Kühlschmiermittel prüfen).<br>c) Oberflächenbehandelte / beschichtete Gewindebohrer einsetzen.<br><br>a) Use a new tap.<br>b) Improve lubrication (check lubricant).<br>c) Use taps with coating / surface treatment. |
| | Schlechte Führung des Gewindebohrers wegen hohen Freiwinkels.<br><br>Bad lead of the tap due to high clearance angle. | a) Mit Steigungsführung schneiden (Werkzeug wird über Maschinenspindel geführt).<br>b) Gewindebohrer mit verbesserten Führungseigenschaften verwenden.<br><br>a) Cut with pitch control (The tool is guided by the machine spindle).<br>b) Use tap with improved guiding characteristics. |
| | Zu hohe Schnittgeschwindigkeit.<br><br>Cutting speed is too high. | a) Schnittgeschwindigkeit senken.<br>b) Kühlschmierung verbessern.<br><br>a) Lower cutting speed.<br>b) Improve lubrication. |
| | Spanstauungen<br><br>Chip jams | a) Gewindebohrer mit anderer Nutform einsetzen.<br>b) Gewindebohrer mit Oberflächenbehandlung / Beschichtung einsetzen.<br>c) Entspänen.<br><br>a) Use a tap with a different flute form.<br>b) Use a tap with surface treatment / coating.<br>c) Interrupt the cutting operation to remove the chips, then finish the thread. |

## Gewindeschneiden / Tapping

| Fehler / Error | Ursache / Cause | Abhilfe / How to help |
|---|---|---|
| Gewinde wird zu groß<br><br>Internal thread is too big (oversize) | Kühlschmiermittel in Zusammensetzung und / oder Zufuhr ungenügend. Es gibt Kaltaufschweisungen oder Anklebungen.<br><br>Composition and / or supply of lubricant is not sufficient. There is cold welding or material adhesion. | Für geeignete und ausreichende Kühlschmiermittelzufuhr sorgen.<br><br>Make sure that the lubricant supply is suitable and sufficient. |
| | Späne werden nicht optimal abgeführt, Spänestauung.<br><br>The chips evacuation is not optimal, chip jams. | Gewindebohrer mit anderer Nutform einsetzen.<br><br>Use a tap with a different flute form. |
| | Toleranzangabe auf dem GB ist nicht identisch mit Toleranzangabe auf der Zeichnung oder Gewindelehre.<br><br>Tolerance of the tap is not identical with tolerances stated on the drawing or gauge. | Den für die gewünschte Toleranz entsprechenden Gewindebohrer verwenden.<br><br>Use a tap with correct tolerance field. |
| Axial verschnittene Gewinde<br><br>Threads with axial miscut | Hochgedrallte Gewindebohrer (Typ DOMINANT) werden mit zu starkem Anschnittdruck eingesetzt.<br><br>Tap with high helix angle (type DOMINANT) starts cutting with a too high cutting pressure. | Nur leichtes axiales Andrücken beim Anschneiden. Der Gewindebohrer soll sofort in den Zugausgleichsbereich des Gewindeschneidfutters kommen. Vorschubwert reduzieren auf 95 %.<br><br>Reduce initial pressure. The tap has to be kept in the tension area of the tap holder from the beginning. Reduce feed value to 95 %. |
| | Schälschnittgewindebohrer (Typ VARIANT) erhalten zu geringen Anschnittdruck.<br><br>Spiral pointed tap (type VARIANT) starts cutting with a too low cutting pressure. | Bei Schälschnitt- oder linksspiralgenuteten Gewindebohrern stärkeres axiales Andrücken beim Anschneiden. Gewindebohrer im Druckausgleichsbereich des Gewindeschneidfutters halten.<br><br>Increase initial pressure for taps with spiral point or lefthand spiral flute. The tap has to be kept in the compression area of the tap holder. |
| | Gewindeschneidfutter mit Längenausgleich ungeeignet oder im Grenzbereich der Federkraft.<br><br>Tap holder with length compensation is unsuitable or in the limit range of the spring force. | a) Nächst größeres Gewindeschneidfutter verwenden.<br>b) Mit Steigungsführung arbeiten.<br>c) Gewindebohrer mit verbesserten Führungseigenschaften verwenden.<br><br>a) Use the next lager tap holder.<br>b) Work with pitch control.<br>c) Use a machine tap with improved guiding characteristics. |
| Gewinde wird zu eng<br><br>Internal thread is too tight (undersize) | Toleranzangabe auf dem Gewindebohrer ist nicht identisch mit Toleranzangabe auf der Zeichnung oder der Gewindelehre.<br><br>Tolerance of the tap is not identical with tolerances stated on the drawing or gauge. | Den für die gewünschte Toleranz entsprechenden Gewindebohrer verwenden.<br><br>Use a tap with correct tolerance field. |
| | Falscher Gewindebohrer, Schneidengeometrie des Gewindebohrers ist für den Anwendungsfall ungeeignet.<br><br>Wrong type of tap, cutting geometry is not suitable for the application. | Gewindebohrer für die zu zerspanende Werkstoffgruppe einsetzen.<br><br>Use taps that are suitable for the application / material group to be machined. |

## Gewindeschneiden / Tapping

| Fehler / Error | Ursache / Cause | Abhilfe / How to help |
|---|---|---|
| Gewinde wird scheinbar zu eng<br><br>Internal thread seems to be too tight | Der Gewindebohrer schneidet nicht steigungsgenau (Gewinde-Gut-Lehrdorn lässt sich nicht voll einschrauben).<br><br>The tap does not cut within its own pitch (go-gauge cannot be screwed in completely). | a) Siehe Gruppe „Axial verschnittene Gewinde“.<br>b) Zu hohe Axialkräfte während des Schneidvorganges vermeiden.<br>c) Gewindeschneidfutter mit Längenausgleich einsetzen.<br>d) Spanstauung vermeiden.<br><br>a) See „How to help“ “Threads with axial miscut”.<br>b) Avoid high axial forces during tapping.<br>c) Use a tap holder with length compensation.<br>d) Avoid chip jams. |
| Gewinde hat Vorweite<br><br>No-go gauge can be entered deeper than allowed | Es wurde mit falschem Anschnittdruck geschnitten. Axial schwergängige Arbeitsspindel.<br><br>Tap starts cutting with the wrong cutting pressure / axially rough-running machine spindle. | a) Mit Steigungsführung arbeiten.<br>b) Gewindeschneidfutter mit Längenausgleich einsetzen.<br><br>a) Cut with automatic feed.<br>b) Use a tap holder with length compensation. |
| | Winkel- oder Positionsfehler zur Gewindekernbohrung.<br><br>Error in angle or position of the bore hole. | Auf korrekte Werkstückspannung achten. Eventuell Gewindeschneidfutter mit achsparalleler Pendelung verwenden.<br><br>Pay attention to correct workpiece clamping. Possible use of a tap holder with radial parallel floating. |
| Unsaubere Gewindeoberfläche<br><br>Rough thread surface | Schneidengeometrie für den Anwendungsfall ungeeignet.<br><br>Tap geometry does not correspond to the application. | Den geeigneten Gewindebohrer für die zu zerspanende Werkstoffgruppe einsetzen.<br><br>Choose suitable tap for the material group to be machined. |
| | Spanstauungen<br><br>Chip jams | a) Gewindeboher mit anderer Nutform einsetzen.<br>b) Gewindeboher mit Oberflächenbehandlung / Beschichtung einsetzen.<br>c) Entspänen.<br><br>a) Use a tap with a different flute form.<br>b) Use a tap with surface treatment / coating.<br>c) Interrupt the cutting operation to remove the chips, then finish the thread. |
| | Kernloch-Ø zu klein.<br><br>Bore hole diameter is too small. | Kernloch-Ø nach DIN 336 bzw. jeweiligen Norm beachten. Für spanlose Innengewindeherstellung sind besondere Vorbohr-Ø erforderlich. Siehe Bohrlochtabelle auf Seite 198.<br><br>Consider bore hole Ø according to DIN 336 or respective standard. Chipless threading requires special bore hole diameters. Table on bore hole Ø see page 198 to 208. |
| | Kühlschmiermittel in Zusammensetzung und Zufuhr ungenügend.<br><br>Composition and / or supply of lubricant is not sufficient. | Für geeignete und ausreichende Kühlschmiermittelzufuhr sorgen.<br><br>Make sure that the lubricant supply is suitable and sufficient. |

## Gewindeschneiden / Tapping

| Fehler / Error | Ursache / Cause | Abhilfe / How to help |
|---|---|---|
| Unsaubere Gewindeoberfläche<br><br>Rough thread surface | Schnittgeschwindigkeit zu hoch.<br><br>Cutting speed is too high. | a) Schnittgeschwindigkeit senken.<br>b) Kühlschmierung verbessern.<br><br>a) Lower cutting speed.<br>b) Improve lubrication. |
| | Werkzeugüberlastung infolge großer Steigung und / oder Bearbeitung von langspanigen „zähen“ Werkstoffe.<br><br>Overstress of the tool due to big pitch and / or long-chipping material. | Kühlschmierung verbessern, eventuell Einsatz von Schneidöl.<br><br>Improve lubrication, if applicable use of cutting oil. |
| | Kaltaufschweißungen, Aufbauschneidenbildung.<br><br>Tap has cold weldings, built-up edges. | a) Kühlschmiermittelzufuhr verbessern.<br>b) Gewindebohrer mit Oberflächenbehandlung / Beschichtung einsetzen.<br><br>a) Improve lubricant supply.<br>b) Use a tap with surface treatment / coating. |
| Standweg zu gering<br><br>Tool life too low | Alle unter „Unsaubere Gewindeoberfläche“ angeführten Ursachen.<br><br>All causes listed under „Rough thread surface“. | Siehe „Unsaubere Gewindeoberfläche“.<br><br>Please see „Rough thread surface“. |
| | Verfestigte Wandung der Kernlochbohrung durch stumpfe Werkzeuge.<br><br>Compacted wall of the bore hole through used tools. | Bohrwerkzeug rechtzeitig nachschärfen und auswechseln.<br><br>Re-sharpen and change the boring tool in time. |
| | Vergütete oder gehärtete Bauteile.<br><br>Heat-treated or hardened components. | Wenn möglich Vergütung und / oder Oberflächenbehandlung erst nach dem Gewindeschneiden durchführen.<br><br>If possible carry out heat and surface treatment after tapping. |
| | Werkstückwerkstoff hat sich in der Bearbeitung verändert (Zähigkeit, Härte).<br><br>Material characteristics of the workpiece have changed (toughness, hardness). | Werkzeuggeometrie an neue Gegebenheiten anpassen.<br><br>Adjust the geometry of the tap to the new machining conditions. |
| | Gewinde-Kernlochbohrung zu klein vorgebohrt.<br><br>Bore hole is too small. | Kernloch-Ø nach DIN 336 bzw. jeweiliger Norm beachten. Siehe Bohrlochtabelle auf Seite 198.<br><br>Consider bore hole Ø according to DIN 336 or respective standard. Bore hole Ø see page 198. |

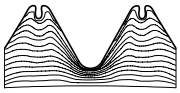
## Gewindeschneiden / Tapping

| Fehler / Error | Ursache / Cause | Abhilfe / How to help |
|---|---|---|
| Werkzeugteilausbrüche oder Werkzeuggewaltbruch im Vor- bzw. Rücklauf<br><br>Tooth breakage or breakage of the tap in forward or reverse motion | Spanstauungen / Späneklemmer<br><br>Chip jams / clamped chips | Andere Gewindebohrer einsetzen.<br><br>Use a different tap. |
| | Überlastung der Anschnittzähne.<br><br>Overstress of the chamfer teeth. | a) Längerer Anschnitt (Bohrungsform beachten, Grund- oder Durchgangsgewinde)<br>b) Anzahl der Anschnittzähne durch höhere Anzahl der Spannuten vergrößern.<br><br>a) Longer chamfer (pay attention to the hole type: blind / through).<br>b) Increase the number of chamfer teeth by increasing the number of flutes. |
| | Winkel- oder Positionsfehler der Gewinde-Kernlochbohrung.<br><br>Error in angle or position of the bore hole. | a) Auf korrekte Werkstückspannung achten.<br>b) Schneidfutter mit achsparalleler Pendelung verwenden.<br><br>a) Pay attention to correct workpiece clamping.<br>b) Use a tap holder with radial parallel floating. |
| | Fehlende oder falsche Ansenkung.<br><br>Missing or wrong countersink. | Ansenken der Gewinde-Kernbohrung in ausreichender Größe (min. 1,05x Nenndurchmesser).<br><br>Countersink the bore hole in the correct size (min. 1.05 x nominal diameter). |
| | Auflaufen des Gewindebohrers auf Kernlochgrund.<br><br>Tap hitting the bottom of the bore hole. | a) Bohrungstiefe prüfen.<br>b) Gewindebohrer mit kürzerem Anschnitt wählen.<br>c) Mit Steigungsführung arbeiten.<br><br>a) Check hole depth.<br>b) Choose a tap with shorter chamfer.<br>c) Cut with pitch control. |
| | Härte des Werkzeugs für das Bearbeitungsproblem nicht optimal. / Schneidengeometrie des Gewindebohrers für den Bearbeitungsfall ungeeignet.<br><br>Hardness of tool is not optimal for the application. / Cutting geometry of the tap is not suitable for the application. | Für den Bearbeitungsfall geeigneten Gewindebohrer verwenden.<br><br>Choose a suitable tool. |

## Gewindefurchen / Thread Roll Forming

| Fehler / Error | Ursache / Cause | Abhilfe / How to help |
|---|---|---|
| Gewinde zu wenig ausgeformt (Kern-Ø ist zu groß)<br><br>Internal thread is not formed completely (core Ø too big) | Vorbohrdurchmesser ist zu groß.<br><br>Bore hole diameter is too big. | Vorbohrdurchmesser verkleinern.<br><br>Reduce the bore hole diameter. |
| | Werkstoffbruchdehnung im Grenzbereich < 8%.<br><br>Material elongation is in the limit range < 8%. | Vorbohrdurchmesser verkleinern, Sonderfurcher mit spezieller Geometrie verwenden.<br><br>Reduce the bore hole diameter, use a special roll tap with specific geometry. |
| Gewinde zu stark ausgeformt (Kern-Ø ist zu klein)<br><br>Thread is "over-formed" (core-Ø is too small) | Vorbohrdurchmesser ist zu klein.<br><br>Bore hole diameter is too small. | Vorbohrdurchmesser vergrößern.<br><br>Increase the bore hole diameter. |
| | Winkel- oder Positionsfehler der Vorbohrung.<br><br>Error in angle or position of the bore hole. | Werkstückspannung optimieren.<br><br>Optimize the workpiece clamping. |
| Unsaubere Gewindeoberfläche / ausgerissene Gewinde<br><br>Rough thread surface / Stripped thread | Schmierung unzureichend.<br><br>Insufficient lubrication. | a) Fettgehalt vom Kühlschmierstoff erhöhen, Schneidöl verwenden.<br>b) Furcher mit Ölnuten einsetzen.<br>c) Furcher mit innerer Kühlmittelzufuhr verwenden.<br><br>a) Increase oil content of the lubricant, use cutting oil.<br>b) Use a roll tap with oil grooves.<br>c) Use a roll tap with internal coolant. |
| | Kaltaufschweißungen oder Werkstoffanklebungen am Furcher.<br><br>Cold welding or material adhesions at the roll tap. | Für den Einsatzfall geeignete Beschichtung wählen.<br><br>Select suitable coating for the application. |
| | Werkzeug hat Verschleiß.<br><br>Tool is worn. | Furcher austauschen.<br><br>Change the roll tap. |

## Gewindefurchen / Thread Roll Forming



| Fehler / Error | Ursache / Cause | Abhilfe / How to help |
|---|---|---|
| Standweg zu gering<br><br>Tool life too low | Fettgehalt des Kühlschmierstoffs unzureichend.<br><br>Oil content of the lubricant is insufficient. | Fettgehalt erhöhen oder Schneidöl verwenden.<br><br>Increase oil content or use cutting oil. |
| | Kühlschmierstoffzuführung nicht optimal.<br><br>Lubrication supply is not optimal. | Furcher mit Ölnuten und / oder mit innerer Kühlmittelzufuhr verwenden.<br><br>Use a roll tap with oil grooves and / or with internal coolant. |
| | Anschnittlänge ist zu kurz.<br><br>Chamfer length is too short. | Werkzeuge mit längerem Anschnitt verwenden.<br><br>Use tools with longer chamfer. |
| | Werkstoff ist abrasiv.<br><br>Material is abrasive. | Furcher mit geeigneter Beschichtung wählen.<br><br>Choose a roll tap with suitable coating. |
| | Werkzeuggeometrie ungeeignet.<br><br>Tap geometry unsuitable. | Werkzeug mit geeigneter Geometrie verwenden.<br><br>Usa a tap with suitable geometry. |
| | Vorbohrungsoberfläche verdichtet.<br><br>Compacted bore hole surface. | a) Bohrwerkzeug rechtzeitig nachschärfen.<br>b) Bohrwerkzeuge nicht zu oft nachschärfen.<br><br>a) Re-sharpen the boring tool in time.<br>b) Do not re-sharpen the boring tool too often. |
| | Vorbohrdurchmesser zu klein.<br><br>Bore hole diameter is too small. | Vorbohrdurchmesser vergrößern.<br><br>Increase the bore hole diametre. |
| | Schnittgeschwindigkeit zu hoch.<br><br>Cutting speed is too high. | Schnittgeschwindigkeit anpassen.<br><br>Adjust the cutting speed. |
| Späne im Gewinde<br><br>Chips in the thread | Fließkralle wird überformt und reißt auf.<br><br>Ridge of the furrow is “over-formed” and breaks open. | Vorbohrdurchmesser vergrößern.<br><br>Increase the bore hole diameter. |
| | Schmiernuten vom Furcher wirken durch Überformung wie eine Schneide.<br><br>“Over-forming” makes the oil grooves of the roll tap work as cutting edges. | a) Vorbohrdurchmesser vergrößern.<br>b) Furcher ohne Schmiernuten verwenden.<br><br>a) Increase the bore hole diameter.<br>b) Use roll taps without oil grooves. |
| | Vorbohrungsoberfläche rau oder mit Überlappung. (Vorbohrung gezogen, gestanzt)<br><br>Bore hole surface rough or with overlap (Bore hole drawn, punched). | Zieh- / Lochstempel austauschen, Ziehspalt optimieren.<br><br>Change drawing punch / punching die, optimize drawing clearance. |
| | Vorbohrung unrund.<br><br>Bore hole non-round. | Zieh- / Lochstempel austauschen, Werkstückspannung / Zuführung optimieren.<br><br>Change drawing punch/punching die, optimize clamping / feeding of workpieces. |

## Taraudage coupant / Maschi a tagliare

| Défaut / Problema | Cause / Causa | Remède / Soluzione |
|---|---|---|
| Taraudage trop grand<br><br>Filetto troppo largo | Mauvais choix de la référence du taraud, la géométrie de coupe ne convient pas pour l'application.<br><br>Maschio sbagliato, la geometria di taglio del maschio non è adatta per l'applicazione. | Choisir un taraud adapté pour l'application / groupe matière.<br><br>Usare un maschio adatto per il gruppo di materiale / per l'applicazione. |
| | Ø avant-trou trop petit.<br><br>Diametro preforo troppo stretto. | Définir le Ø avant-trou selon DIN 336 ou la norme à appliquer. Le taraudage par refoulement nécessite des Ø avant-trou spécifiques. Vous trouverez les tolérances limites des Ø noyaux et avant-trous en page 198 - 208.<br><br>Rispettare la norma DIN 336 del diametro preforo. Per la produzione delle filettature rullate è necessario un diametro di preforo speciale. Vedi la tabella del preforo alla pagina 198 - 208. |
| | Mauvais alignement angulaire ou axial du taraud par rapport à l'avant-trou.<br><br>Problemi di staffaggio o di posizione del preforo. | a) Vérifier le positionnement de la pièce dans le montage.<br>b) Utiliser un porte-taraud avec jeu radial.<br><br>a) Garantire il corretto sistema di tenuta.<br>b) Usare mandrini con oscillazione parallela all'asse. |
| | Avance de la machine incorrecte ou mal programmée.<br><br>Pressione di taglio assiale troppo elevata. | a) Vérifier l'avance de la machine.<br>b) Utiliser un porte-taraud avec une compensation suffisante.<br><br>a) Lavorare con l'avanzamento meccanico.<br>b) Usare un mandrino con compensazione in trazione e compressione. |
| | Métallisations/collages sur les flancs du taraud.<br><br>Il maschio ha subito delle saldature a freddo o incollature sui fianchi o sui taglienti. | a) Utiliser un taraud neuf.<br>b) Vérifier le lubrifiant et les conditions de lubrification.<br>c) Choisir un taraud avec revêtement ou traitement de surface.<br><br>a) Cambiare maschio.<br>b) Migliorare la lubrificazione (controllare la percentuale dell'olio e l'esatta direzione del getto).<br>c) Usare maschi con un trattamento superficiale / rivestimento. |
| | Défaut de guidage du taraud à cause d'une dépouille élevée.<br><br>Guida insufficiente del maschio a causa dell'angolo di spoglia dorsale elevato. | a) Utiliser une avance rigoureusement égale au pas du taraud, pour guider le taraud, sans jeu.<br>b) Choisir un taraud avec de meilleures caractéristiques d'autoguidage.<br><br>a) Usare se possibile maschiatura sincronizzata.<br>b) Scegliere un maschio con una maggiore guida. |
| | Vitesse de coupe trop élevée.<br><br>Velocità di taglio troppo elevata. | a) Réduire la vitesse de coupe.<br>b) Augmenter la lubrification.<br><br>a) Ridurre la velocità di taglio.<br>b) Scegliere un migliore olio da taglio. |
| | Bourrages de copeaux<br><br>Intasamento del truciolo | a) Choisir un taraud avec une forme de goujures différente.<br>b) Choisir un taraud avec revêtement ou traitement de surface.<br>c) Interrompre le taraudage pour évacuer les copeaux, et ensuite reprendre le taraudage.<br><br>a) Usare un maschio con un'altra forma di scanalatura.<br>b) Usare maschi con un trattamento superficiale / rivestimento.<br>c) Togliere eventualmente il truciolo. |

## Taraudage coupant / Maschi a tagliare

| Défaut / Problema | Cause / Causa | Remède / Soluzione |
|---|---|---|
| Taraudage trop grand<br><br>Filetto troppo largo | Lubrification insuffisante ou lubrifiant inadapté. Il y a des métallisations/collages.<br><br>Insufficiente composizione di lubrificazione e (o) adduzione. Ci sono delle saldature a freddo o incollature. | Vérifier si la lubrification est correcte : nature du lubrifiant, débit, position des buses.<br><br>Garantire un'adeguata e sufficiente lubrificazione. |
| | L'évacuation des copeaux n'est pas optimale. Bourrages de copeaux.<br><br>L'evacuazione del truciolo non è ottimale. Intasamento del truciolo. | Choisir un taraud avec une forme de goujures différente.<br><br>Utilizzare un maschio con una diversa forma di scanalature. |
| | Le choix de la classe de tolérance du taraud n'est pas conforme au plan ou au tampon de contrôle.<br><br>L'indicazione della tolleranza sul maschio non è identica all'indicazione sul disegno o calibro. | Choisir un taraud conforme.<br><br>Utilizzare un maschio adeguato alla tolleranza richiesta. |
| Taraudage avec profil déformé<br><br>Doppio taglio assiale | Le taraud à fort angle d'hélice (type DOMINANT) est aspiré à cause d'une pression de coupe trop forte.<br><br>Maschi a forte torsione (tipo DOMINANT) vengono usati con una pressione d'inizio taglio troppo alta. | Réduire la pression à l'attaque du taraudage. Le taraud doit être retenu au démarrage par une traction du porte-taraud. Programmer une avance de 0,95xpas.<br><br>Applicare solo una leggera pressione assiale durante il taglio. Il maschio deve lavorare in trazione con maschiatori compensati. Ridurre l'avanzamento al 95%. |
| | Le taraud à entrée Gun (type VARIANT) est repoussé à cause d'une pression de coupe trop faible.<br><br>Maschi con imbocco corretto (tipo VARIANT) ricevono una pressione d'inizio taglio troppo bassa. | Augmenter la pression à l'attaque du taraudage. Le taraud doit être poussé au démarrage par une compression du porte-taraud.<br><br>Applicare una forte pressione assiale durante il taglio quando si usano maschi con imbocco corretto o con un'elica sinistra. Il maschio deve lavorare in compressione con maschiatori compensati. |
| | Le porte-taraud à compensation est inadapté ou la raideur des ressorts du porte-taraud à compensation n'est pas suffisante.<br><br>Lavorazione eseguita con mandrino a maschiare con compensazione inadatta o al limite della forza elastica. | a) Utiliser un porte-taraud adapté.<br>b) Programmer une avance rigoureusement égale au pas du taraud.<br>c) Utiliser une machine synchrone.<br><br>a) Utilizzare una grandezza superiore di maschiatore.<br>b) Lavorare con corretto passo.<br>c) Usare un maschio con migliori caratteristiche di guida. |
| Le taraudage est trop serré, trop petit<br><br>Filetto troppo stretto | Le choix de la classe de tolérance du taraud n'est pas conforme au plan ou au tampon de contrôle.<br><br>L'indicazione della tolleranza sul maschio non è identica all'indicazione sul disegno o calibro. | Choisir un taraud conforme.<br><br>Utilizzare un maschio adeguato alla tolleranza richiesta. |
| | Mauvais choix de la référence du taraud, la géométrie de coupe ne convient pas pour l'application.<br><br>Maschio sbagliato, la geometria di taglio del maschio non è adatta per l'applicazione. | Choisir un taraud adapté pour l'application / groupe matière.<br><br>Utilizzare un maschio adatto per il gruppo di materiale. |

## Taraudage coupant / Maschi a tagliare

| Défaut / Problema | Cause / Causa | Remède / Soluzione |
|---|---|---|
| Le taraudage est trop serré, trop petit | Le taraud ne coupe pas selon son propre pas. (Le tampon „entre“ ne se visse pas complètement.) | a) Voir les remèdes de la rubrique „Taraudage avec profil déformé“.<br>b) Réduire les efforts axiaux de taraudage.<br>c) Utiliser un porte-taraud à compensation.<br>d) Eviter les bourrages de copeaux. |
| Filetto apparentemente troppo stretto | Il maschio non taglia esattamente il passo corretto. (Il calibro passa non si avvita completamente.) | a) Vedi gruppo „Doppio taglio assiale“.<br>b) Evitare troppa forza assiale durante il processo di taglio.<br>c) Utilizzare un mandrino a maschiare con compensazione.<br>d) Evitare un intasamento di truciolo. |
| Le tampon fileté "n'entre pas" entre sur une profondeur trop importante | La pression à l’attaque du taraudage n’est pas correcte / Avance de la machine incorrecte ou mal programmée. | a) Tarauder avec une avance contrôlée.<br>b) Utiliser un porte-taraud à compensation. |
| | E stato tagliato con una pressione d’inizio taglio. Difficoltà assiale del mandrino di lavoro. | a) Lavorare corretto passo.<br>b) Utilizzare un mandrino a maschiare con compensazione. |
| La parte iniziale del filetto è troppo larga | Mauvais alignement angulaire ou axial du taraud par rapport à l’avant-trou. | Vérifier le positionnement de la pièce dans le montage. Utiliser un porte-taraud avec jeu radial. |
| | Errore dell’angolo o sbaglio di posizione del preforo. | Garantire una tenuta corretta del pezzo. Utilizzare un mandrino con oscillazione parallela all’asse. |
| Mauvais état de surface (rugosités) | La référence du taraud n’est pas adaptée à l’application. | Choisir un taraud adapté pour le groupe matière à tarauder. |
| Superficie filettata rovinata | La geometria del filetto non è conforme. | Scegliere il maschio adatto per il materiale da lavorare. |
| | Bourrages de copeaux | a) Choisir un taraud avec une forme de goujures différente.<br>b) Choisir un taraud avec revêtement ou traitement de surface.<br>c) Interrompre le taraudage pour évacuer les copeaux, et ensuite reprendre le taraudage. |
| | Intasamento del truciolo | a) Utilizzare un maschio con un'altra forma di scanalatura.<br>b) Utilizzare maschi con un trattamento superficiale / rivestimento.<br>c) Togliere eventualmente il truciolo. |
| | Ø avant-trou trop petit | Définir le Ø avant-trou selon DIN 336 ou la norme à appliquer. Le taraudage par refoulement nécessite des Ø avant-trou spécifiques. Vous trouverez les tolérances limites des Ø noyaux et avant-trous en page 198 - 208. |
| | Diametro preforo troppo stretto | Rispettare la norma DIN 336 del diametro preforo. Per la produzione delle filettature rullate è necessario un diametro di preforo speciale. Vedi la tabella del preforo alla pagina 198 - 208. |
| | Lubrification insuffisante ou lubrifiant inadapté. | Vérifier si la lubrification est correcte : nature du lubrifiant, débit, position des buses. |
| | Insufficiente composizione di lubrificazione e (o) adduzione. | Garantire un’adeguata e sufficiente lubrificazione. |

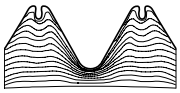
## Taraudage coupant / Maschi a tagliare

| Défaut / Problema | Cause / Causa | Remède / Soluzione |
|---|---|---|
| Mauvais état de surface des filets (rugosités, arrachements)<br><br>Superficie rovinata | Vitesse de coupe trop élevée.<br><br>Velocità di taglio troppo elevata. | a) Réduire la vitesse de coupe.<br>b) Augmenter la lubrification.<br><br>a) Ridurre la velocità di taglio.<br>b) Migliorare la lubrificazione. |
| | Taraud soumis à un effort important à la dent : pas élevé / ou matériau à copeaux longs.<br><br>Sovraccarico del maschio dovuto ad un grande passo e (o) lavorazione di materiali tenaci a truciolo lungo. | Améliorer la lubrification ou si possible utiliser une huile de coupe entière.<br><br>Migliorare la lubrificazione, eventuale uso d'olio da taglio. |
| | Le taraud se métallise, des arêtes rapportées se forment.<br><br>Craterizzazione, tagliente di riporto | a) Vérifier et optimiser les conditions de lubrification.<br>b) Utiliser un taraud revêtu ou avec traitement de surface<br><br>a) Migliorare la lubrificazione.<br>b) Usare maschi con un trattamento superficiale / rivestimento. |
| Durée de vie trop faible<br><br>Durata di vita troppo bassa | Se référer à la liste des causes de la rubrique „Mauvais état de surface des filets".<br><br>Tutte le cause indicate sotto la rubrica "superficie filettata rovinata". | Voir les remèdes de la rubrique „Mauvais état de surface des filets".<br><br>Vedi "superficie filettata rovinata". |
| | Défaut de perçage avant-trou dû à un outil trop usé.<br><br>Uso degli utensili consumati che auto temprano la superficie del foro. | Réaffuter l'outil ou le changer suffisamment tôt.<br><br>Riaffilare e sostituire la punta per tempo. |
| | Matériau dur ou traité thermiquement.<br><br>Pezzi temprati o induriti. | Si possible, exécuter les opérations de traitement thermique et de surface après le taraudage.<br><br>Se possibile bonificare e / o fare la finitura superficiale dopo la filettatura. |
| | Les caractéristiques du matériau ont évolué: dureté, ténacité.<br><br>Il materiale del pezzo da lavorare è cambiato nella lavorazione (resistenza, durezza). | Choisir une géométrie de taraud adaptée.<br><br>Adattarsi alle nuove condizioni di geometria del maschio. |
| | Ø avant-trou trop faible.<br><br>Diametro preforo troppo stretto. | Définir le Ø avant-trou selon DIN 336 ou la norme à appliquer. Le taraudage par refoulement nécessite des Ø avant-trou spécifiques. Vous trouverez les tolérances limites des Ø noyaux et avant-trous en page 198-208.<br><br>Rispettare la norma DIN 336 del diametro preforo. Per la produzione delle filettature rullate è necessario un diametro di preforo speciale. Vedi la tabella del preforo alla pagina 198 - 208. |

## Taraudage coupant / Maschi a tagliare

| Défaut / Problema | Cause / Causa | Remède / Soluzione |
|---|---|---|
| Ecaillage de dents ou casse du taraud en taraudage ou détaraudage.<br><br>Parziali rotture del maschio o rottura forzata in avanzamento o in ritorno | Bourrages des copeaux / difficulté d'évacuation des copeaux.<br><br>Intasamento dei trucioli. | Choisir une référence de taraud mieux adaptée.<br><br>Usare un altro maschio. |
| | Charge sur les dents d'entrée trop importantes.<br><br>Sovraccarico dei denti all'imbocco. | a) Augmenter la longueur de l'entrée, en tenant compte du type de trou : borgne ou débouchant.<br>b) Augmenter le nombre de dents de l'entrée avec plus de goujures.<br><br>a) Imbocco più lungo (notare la forma del foro, foro cieco o foro passante).<br>b) Aumentare la lunghezza dell'imbocco o il numero delle scanalature. |
| | Mauvais alignement angulaire ou axial du taraud par rapport à l'avant-trou.<br><br>Problemi di staffaggio o di posizione del preforo. | a) Vérifier le positionnement de la pièce dans le montage.<br>b) Utiliser un porte-taraud avec jeu radial.<br><br>a) Garantire il corretto sistema di tenuta.<br>b) Usare mandrini con oscillazione parallela all'asse. |
| | Absence de chanfrein à l'entrée de l'avant-trou ou chanfrein insuffisant.<br><br>Svasatura mancante o errate. | Le Ø du chanfrein à l'entrée de l'avant-trou doit être au minimum de 1,05xØ nominal.<br><br>Svasare il foro del filetto in una dimensione sufficiente. (almeno 1,05x il diametro nominale). |
| | Le taraud heurte le fond du trou.<br><br>Il maschio tocca il fondo del foro. | a) Vérifier la profondeur du trou.<br>b) Choisir un taraud avec une entrée plus courte.<br>c) Régler la course ou la butée en fond de taraudage.<br><br>a) Verificare la profondità del foro.<br>b) Usare un maschio con imbocco corto.<br>c) Lavorare con maschiatura sincronizzata. |
| | La dureté du taraud ne convient pas pour l'application. / La géométrie de coupe ne convient pas pour l'application.<br><br>La durezza del maschio non è adatta per la lavorazione. / Geometria di taglio del maschio non adatta per la lavorazione. | Choisir un outil adapté.<br><br>Scegliere il maschio adatto. |

## Taraudage par refoulement / Maschi a rullare



| Défaut / Problema | Cause / Causa | Remède / Soluzione |
|---|---|---|
| Profil de taraudage incomplet (Ø noyau trop fort)<br><br>Profilo filetto ridotto (Ø preforo troppo largo) | Ø avant-trou trop grand.<br><br>Il diametro preforo è troppo largo. | Réduire le Ø avant-trou.<br><br>Ridurre il diametro preforo. |
| | Allongement en % du matériau insuffisant < 8%.<br><br>Materiale con elasticità < 8%. | Diminuer le Ø de l'avant-trou ou utiliser un taraud à refouler avec une géométrie spécifique.<br><br>Ridurre il diametro preforo, usare maschi a rullare con una geometria speciale. |
| Le profil du taraudage est trop rempli (Ø noyau trop petit)<br><br>Profilo filetto troppo completo (Ø preforo troppo stretto) | Ø avant-trou trop faible.<br><br>Il diametro preforo è troppo stretto. | Augmenter le Ø de l'avant-trou.<br><br>Allargare il diametro preforo. |
| | Mauvais alignement angulaire ou axial du taraud par rapport à l'avant-trou.<br><br>Problemi di staffaggio. | Vérifier le bridage de la pièce dans le montage.<br><br>Ottimizzare il sistema di tenuta. |
| Mauvais état de surface des filets ou taraudage arraché<br><br>Filetti strappati / superficie molto rugosa | Lubrification insuffisante.<br><br>Insufficiente quantità del lubrificante. | a) Augmenter le débit du lubrifiant, choisir un lubrifiant plus performant ou de l'huile entière.<br>b) Choisir une référence de taraud avec rainures de lubrification.<br>c) Utiliser un taraud avec arrosage interne.<br><br>a) Aumentare il contenuto di emulsione del lubrificante.<br>b) Utilizzare un maschio a rullare con canalini.<br>c) Utilizzare un maschio a rullare con lubrificazione interna. |
| | Collages à froid ou métallisations du taraud à refouler.<br><br>Saldature a freddo sul maschio a rullare. | Choisir un taraud avec un revêtement adapté.<br><br>Scegliere un rivestimento più idoneo. |
| | L'outil est usé.<br><br>Maschio usurato. | Changer le taraud à refouler.<br><br>Sostituire il maschio a rullare. |

## Taraudage par refoulement / Maschi a rullare

| Défaut / Problema | Cause / Causa | Remède / Soluzione |
|---|---|---|
| Durée de vie trop faible<br><br>Ridotta vita del maschio a rullare | Lubrification insuffisante.<br><br>Insufficiente percentuale d'olio nel lubrificante. | Augmenter le débit du lubrifiant, choisir un lubrifiant plus performant ou de l'huile entière.<br><br>Aumentare la percentuale o passare ad olio intero. |
| | Les conditions de lubrification ne sont pas optimales.<br><br>Quantità del lubrificante al tagliente non ottimale. | Choisir un taraud avec des rainures de lubrification / ou avec arrosage interne.<br><br>Aumentare getto, o usare maschi con canalini di lubrificazione e / o con lubrificazione interna. |
| | Chanfrein d'entrée trop court.<br><br>Lunghezza d'imbocco troppo corta. | Choisir un taraud avec une entrée plus longue.<br><br>Usare maschi con imbocco più lungo. |
| | Le matériau est abrasif.<br><br>Materiale da lavorare molto abrasivo. | Choisir un taraud avec un revêtement adapté.<br><br>Usare un maschio a rullare con rivestimento più resistente. |
| | La géométrie du taraud ne convient pas.<br><br>Geometria del maschio non idonea. | Choisir une référence de taraud adaptée.<br><br>Usare un maschio con la geometria adatta. |
| | L'avant-trou est écroui en surface.<br><br>Superficie preforo troppo dura o auto temprata. | a) Réaffuter l'outil de perçage avant-trou suffisamment tôt.<br>b) Eviter le trop grand nombre de réaffutages.<br><br>a) Riaffilare la punta.<br>b) Non riaffilare troppo spesso. |
| | Ø avant-trou trop faible.<br><br>Diametro preforo piccolo. | Augmenter le Ø de l'outil de perçage de l'avant-trou.<br><br>Aumentare diametro preforo. |
| | Vitesse de coupe trop élevée.<br><br>Velocità di taglio troppo elevata. | Réduire la vitesse de coupe.<br><br>Adeguare la velocità di taglio. |
| Copeaux dans le taraudage<br><br>Trucioli nella filettatura | Le profil du filet est trop rempli et des particules de matière se détachent.<br><br>Lobi d'appoggio rovinati. | Augmenter le Ø avant-trou.<br><br>Aumentare il diametro preforo. |
| | Surépaisseurs suffisamment hautes pour être coupées par les arêtes des rainures de lubrification.<br><br>Le scanalature di lubrificazione tagliano la cresta della maschiatura. | a) Augmenter le Ø avant-trou.<br>b) Choisir un taraud sans rainures de lubrification.<br><br>a) Aumentare il diametro preforo.<br>b) Usare maschi senza canalini di lubrificazione. |
| | Rugosités ou défauts (en relief) sur la surface de l'avant-trou.<br><br>Superficie preforo rugosa (preforo stampato). | Vérifier l'outil de poinçonnage / le bridage de l'outil de poinçonnage.<br><br>Cambiare punzone. |
| | Avant-trou non cylindrique.<br><br>Preforo ovalizzato. | Vérifier l'outil de poinçonnage, améliorer le bridage de la pièce.<br><br>Cambiare punzone, controllare bloccaggio pezzo nei torni, il rumore del pezzo. |

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