PRODUCT CATALOGUE

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Edition X

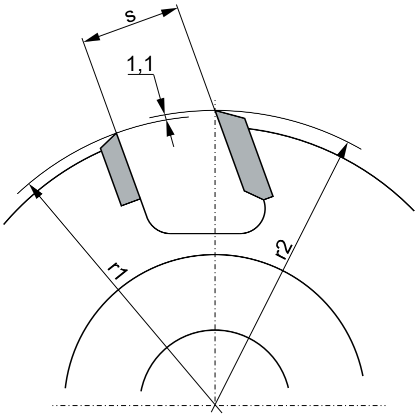
[2026]

Technical Information

08

\\ 1. Classification of tools by milling feed type

VYDONA tools are designed to ensure operator safety during milling. The tool design is based on two types of working feeds during milling, divided into two groups:
– Milling with manual feed MAN
– Milling with mechanical feed MEC



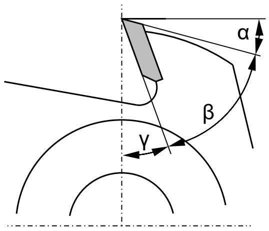
1.1 Tools for Manual Feed

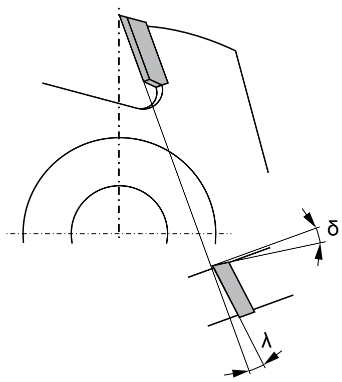
Tools for manual feed are designed to reduce the risk of so-called kickback of the workpiece.
This is ensured by the following design features:
– Limited tooth gullet width “s”
It is defined as the maximum distance between the chip limiter and the cutting tip depending on the tool diameter.
– The difference between the cutting and limiting radius “r2 - r1”, which should be up to 1.1 mm.
Tools for manual feed are marked on the cutter body with the abbreviation MAN (MANUAL FEED).

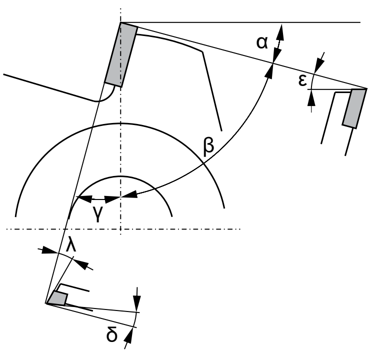
1.2 Tools for Mechanical Feed

Mechanical feed is a term used for tools where the feed of the workpiece is ensured via a machine mechanism (feeding device).
These tools are not limited by the tooth gullet or kickback limiters, yet they comply with all safety regulations for their application. Tools for mechanical feed are marked on the cutter body with the abbreviation MEC (MECHANICAL FEED).

\\ 2. Cutting Part Geometry and Milling Directions







2.1 Cutting Edge Geometry

α = clearance angle

β = wedge angle

γ = rake angle

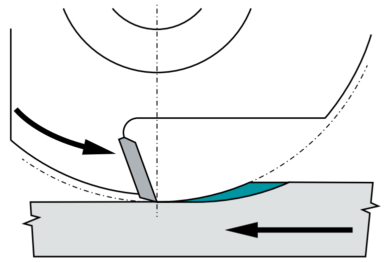
δ = side clearance angle

ε = bevel angle

λ = shear angle (axial angle)

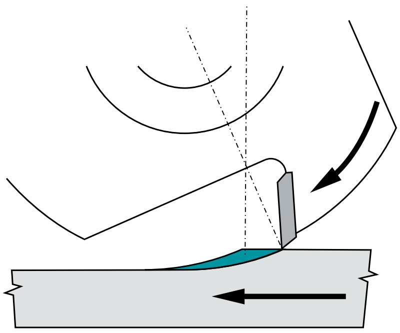
2. Cutting Part Geometry and Milling Directions //

2.2 Milling Relative to Cutter Rotation and Workpiece Feed



a) Conventional milling

The cutter rotates against the feed direction. The chip cross-section gradually increases
from zero to maximum thickness. The disadvantage is that, at the start of the cut, the cutting edge slides along the machined surface, which leads to rubbing, heat build-up, and dulling. It then enters the workpiece, which reduces the machining quality and shortens the overall tool life. The resulting cutting force points out of the workpiece, which is unfavourable when milling against the grain. This type of milling is primarily used for tools with manual feed MAN.

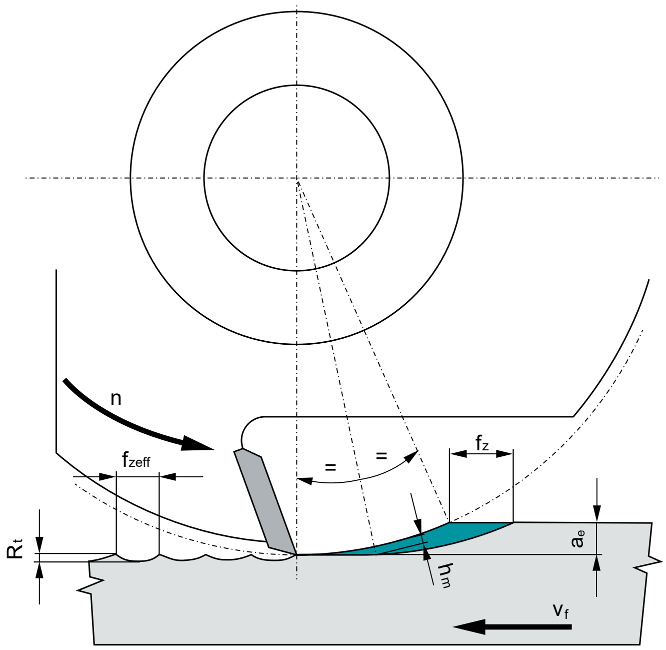


b) Climb milling

The cutter rotates in the feed direction. The cutting edges progressively engage the workpiece, starting at the maximum chip thickness and ending at the machined surface. Surfaces machined this way are smoother and the tool life is longer. The cutting force acts more favourably because it is directed into the workpiece. The disadvantage of climb milling is the shock loads generated as each tooth engages, which requires milling machines and feed units with a rigid construction. This type of milling is used only for tools with mechanical feed MEC.

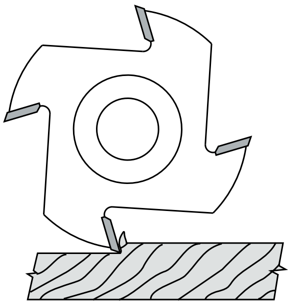
3. Basic Formulas, Standard Tool Parameters //

Basic Formulas, Standard Tool Parameters



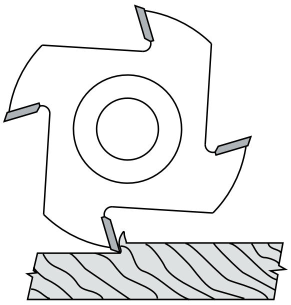
Cutting diameter [mm]	$D = (1000 \cdot v_c) / (n \cdot \pi)$
Speed [RPM]	$n = v_c \cdot 1000 / (\pi \cdot D)$
Cutting speed [m/min]	$v_c = \pi \cdot D \cdot n / 1000$
Feed rate [m/min]	$v_f = f_f \cdot n \cdot z / 1000$
Feed per tooth [mm/tooth]	$f_z = (1000 \cdot v_f) / (n \cdot z)$
Feed per revolution [mm/rev]	$f_n = f_z \cdot z = (1000 \cdot v_f) / n$
...the distance the tool moves during one full revolution	
Theoretical roughness [mm]	$R_t = f_z\ 2 / (4 \cdot D)$
Chip thickness [mm]	$h_m = f_z \cdot \sqrt{(a_e / D)}$
Radial depth of cut [mm]	a_e

\\ 4. Milling in Relation to Wood Grain Direction



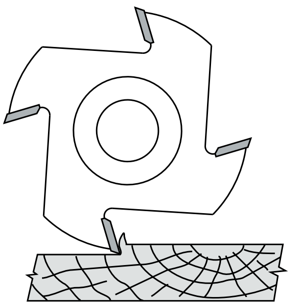
a) Milling with the grain

This method is simple and achieves a very fine surface at high cutting speeds.



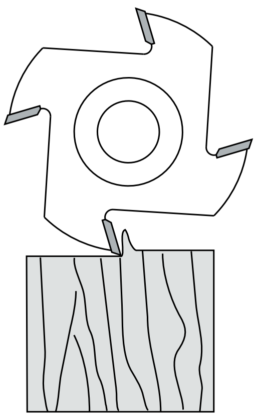
a) Milling against the grain

This milling method is very difficult, as grain lifting occurs. This method should be avoided, e.g., by changing the direction of rotation and the milling method (such as climb or conventional milling).



c) Milling across the grain

Simple milling with a wavy and rough surface.



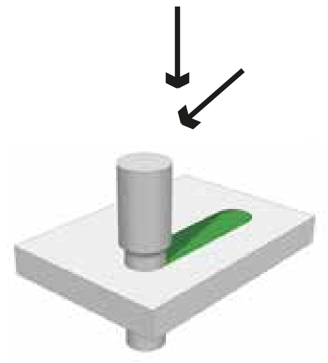
d) End-grain milling

In end-grain milling the fibres are cut vertically, and as the cutter exits the material tear-out occurs. Machine milling is problematic, so only low cutting speeds are used.

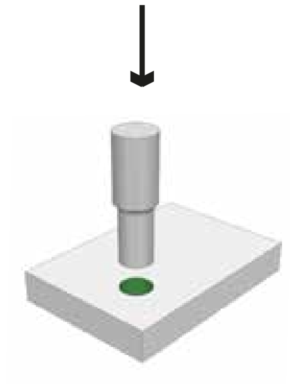
5. Recommended Tool Setup //

Shank tools—entry methods into material

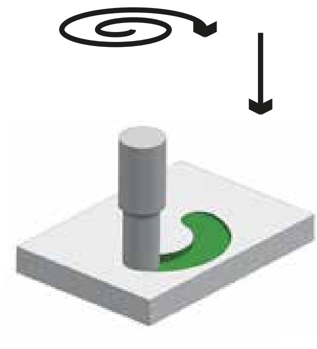
Ramping entry



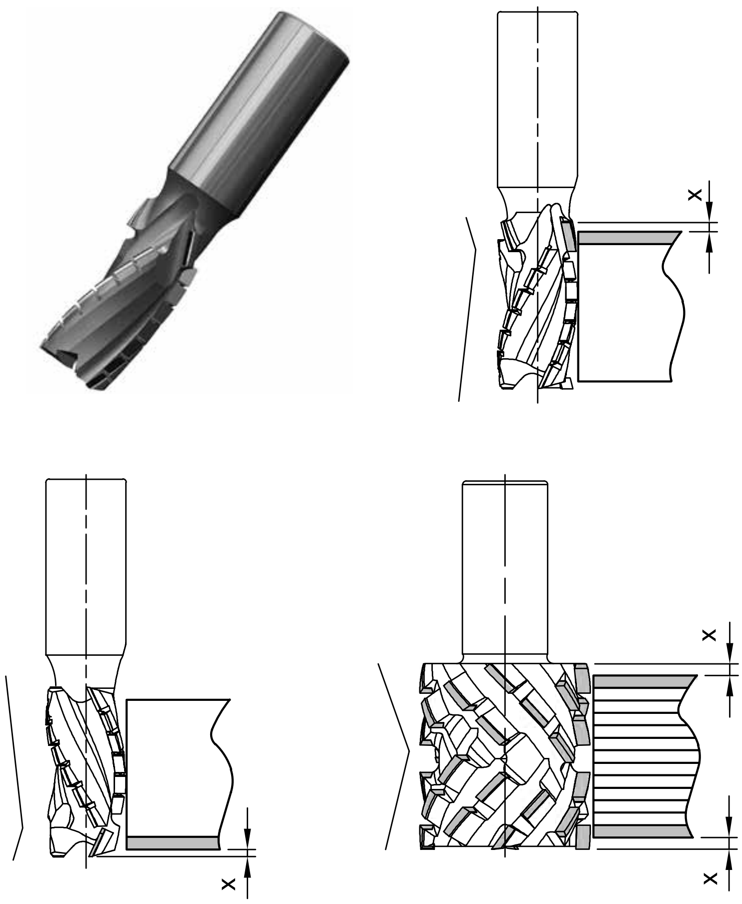
Direct plunging



Helical plunging



Depending on the material reference edge—top – bottom – double-sided,
the minimum recommended setup value beyond the reference edge is x = 1.5 mm



\\ Milling Feed Diagram Depending on the Number of Teeth and Revolutions

Feed mm	Surface quality
0.3–0.8	Smooth surface
0.8–2.5	Medium-smooth surface
2.5–4.0	Rough surface

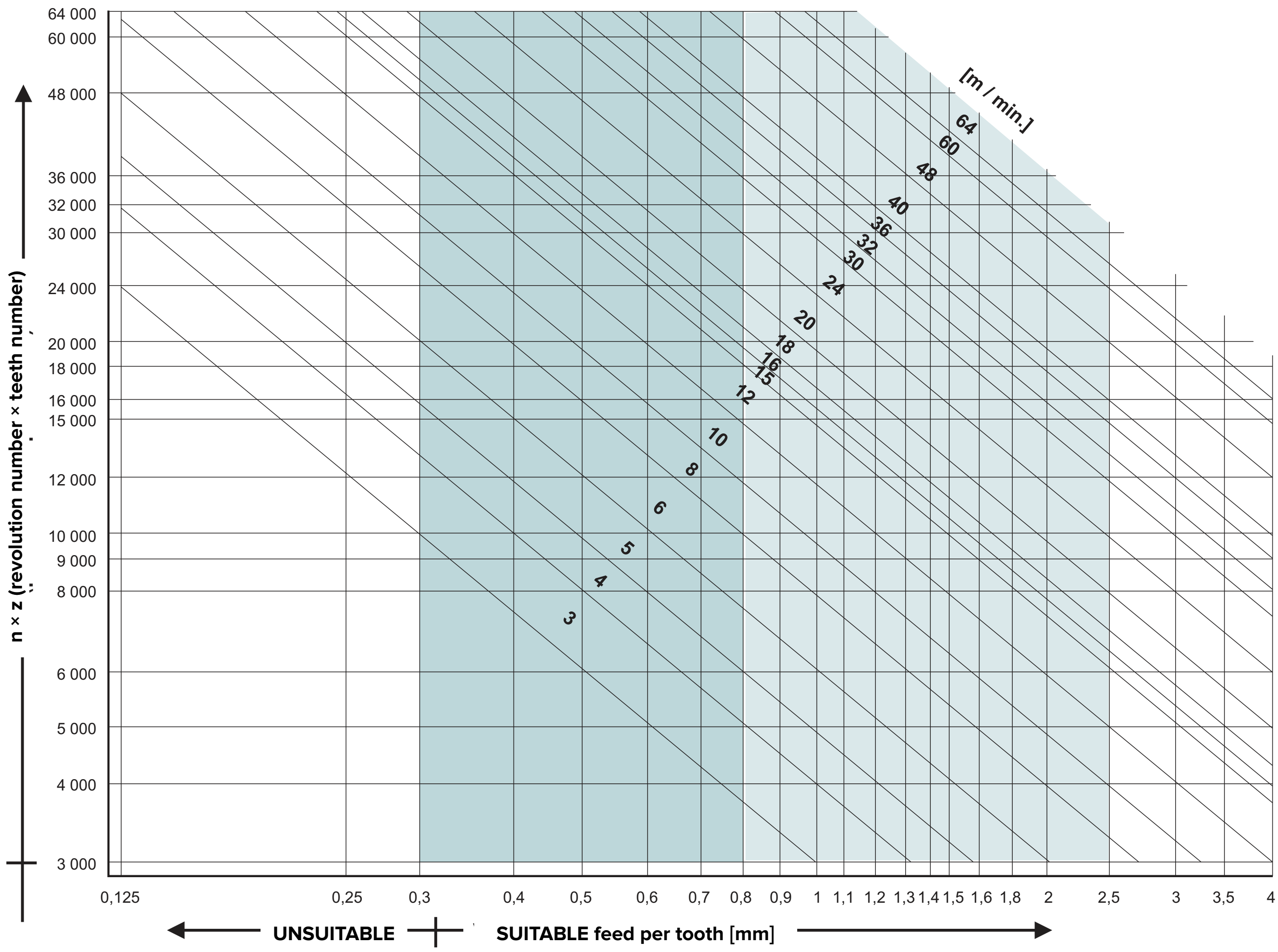


Diagram of Minimum Cutter Diameter for a Given Profile Depth //

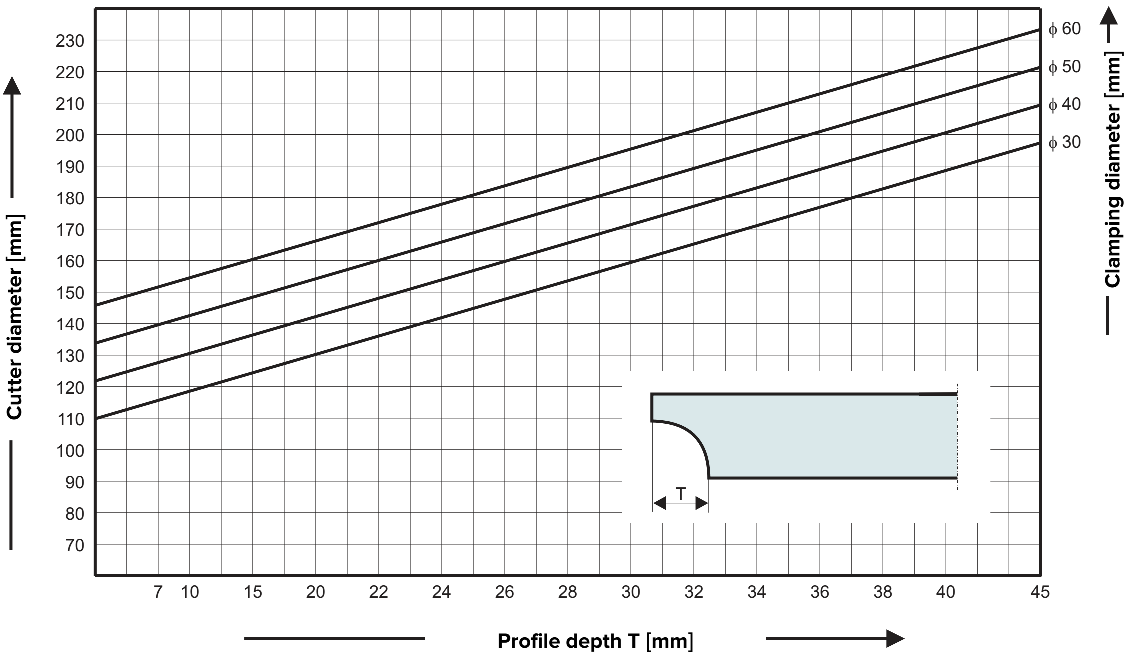
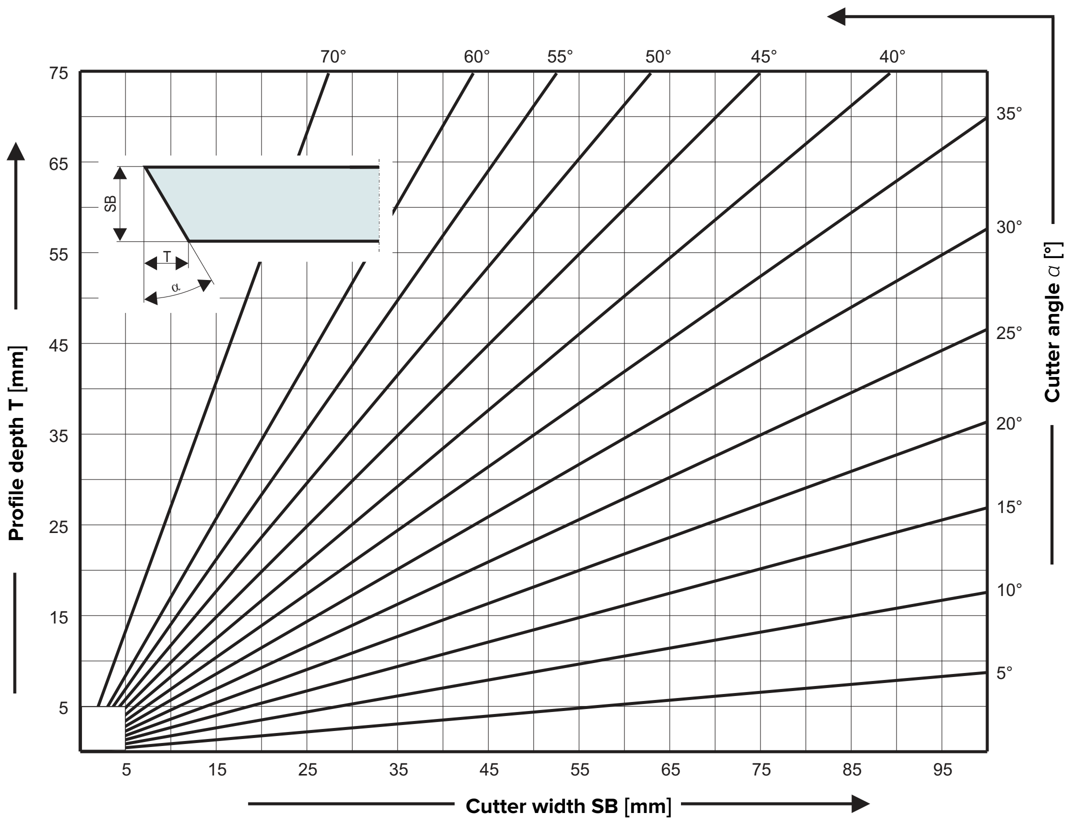
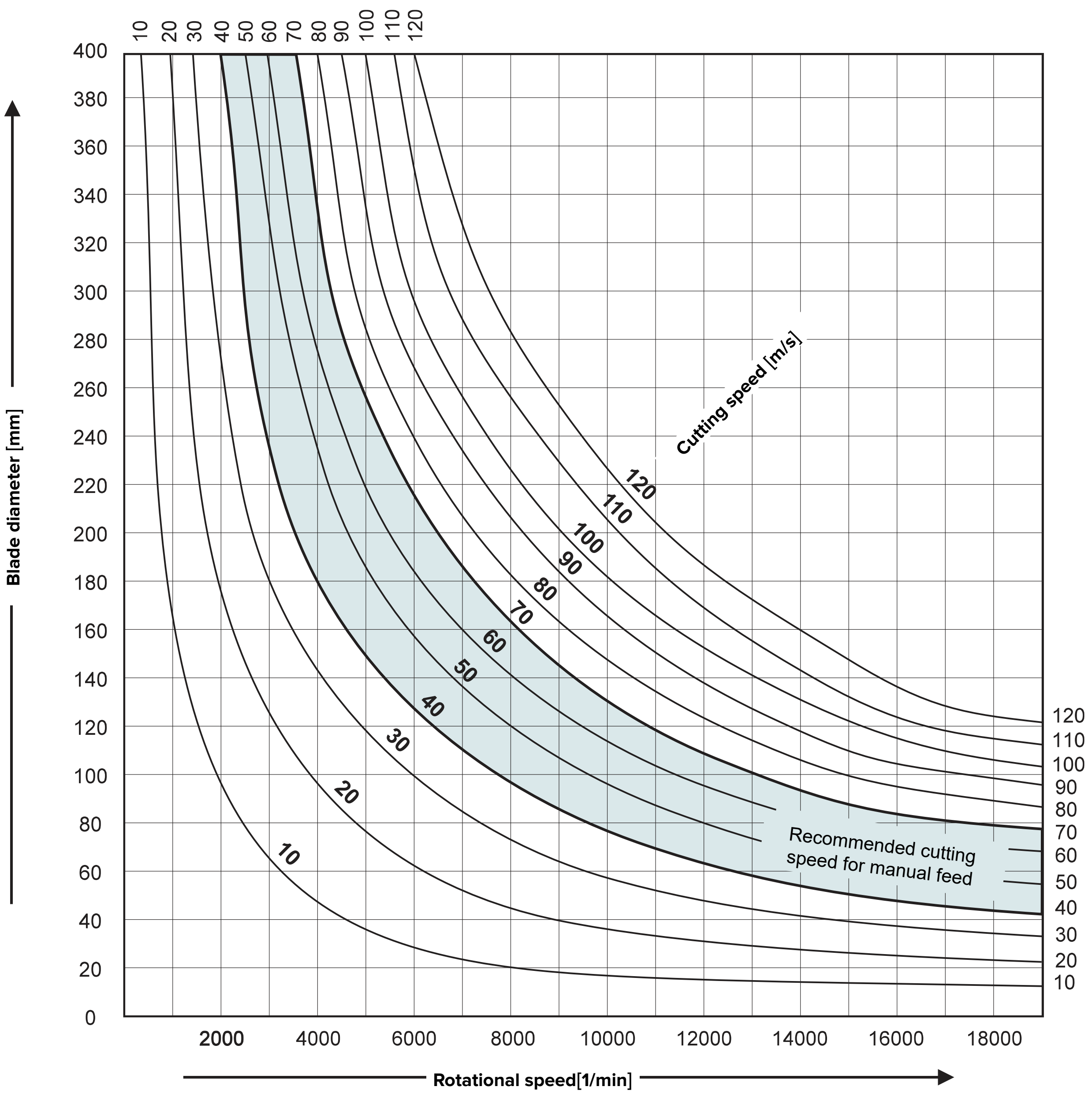


Diagram Determining the Profile Depth for a Given Angle and Cutter Width //



\\ Recommended Cutting Speed Depending on Tool Diameter and Revolution Number

Workpiece material	HS cutter [m/s]	HW cutter [m/s]	HW saw blade [m/s]
Softwood	50–80	60–90	70–100
Hardwood	40–60	50–80	70–90
Chipboard	-	60–80	60–80
Coated chipboard	-	60–80	60–80



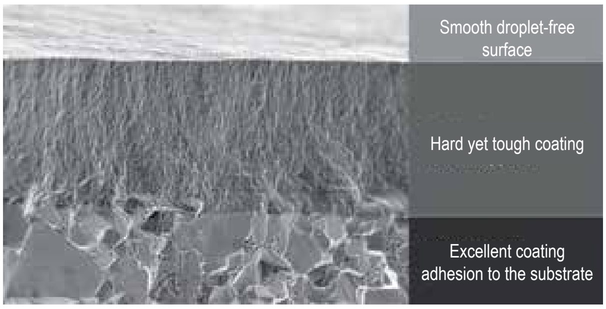
V-maxx cutting coatings for machining

Introducing new, highly efficient coatings for cutting tools used in machining solid wood, chipboard and fibreboard (MDF, chipboard...)
Thanks to their high hardness and wear resistance, coated cutting tools achieve a longer cutting-edge life and, thanks to a significantly lower coefficient of friction, a reduced thermal load on the cutting edge.

V-maxx cutting tool coatings are the result of in-house development and testing carried out in cooperation with leading European coating centres.

Main advantages of V-maxx coatings:

High hardness
High thermal resistance and stability
Extremely smooth surface
Low coefficient of friction



V-maxx S cutting coating

The V-maxx S cutting coating is based on PVD (Physical Vapour Deposition) technology. The respective chemical elements are sputtered from a solid state to a gaseous state by targeted bombarding the source target with these very elements. The result is a light golden colour with a layer thickness of 0.003 mm and a hardness of HV = 2,300 HV. The coating is applicable for solid HW cutters or drills, indexable inserts, as well as HS knives and cutters.

Due to lower friction on the tool cutting surfaces, it finds its application in machining exotic solid wood, particle board
and fibreboard (MDF, chipboard...)

V-maxx H cutting coating

The V-maxx H coating refers to a physical coating produced by PVD (Physical Vapour Deposition) technology. The respective chemical elements are sputtered from a solid state to a gaseous state by targeted bombarding the source target with these very elements. The result is a grey-purple colour with a layer thickness of 0.003–0.004 mm depending on the tool type and a hardness of 3,700 HV.

The coating is applicable for HW indexable inserts and solid shank cutters or drills, as well as HW cutters with brazed tips.

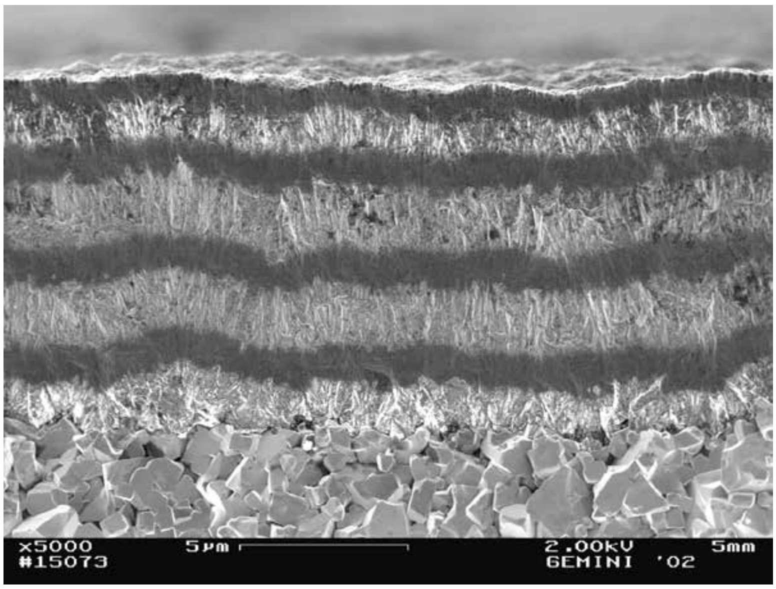
It finds its application in machining exotic solid wood, chipboard and fibreboard (MDF, chipboard...), as well as graphite and glass or carbon fibre boards.

V-maxx D cutting coating

The V-maxx D coating refers to a diamond coating that ensures significantly longer tool life compared to tools with conventional coatings. It is produced by CVD (Chemical Vapour Deposition), in which diamond is synthesized from the vapour phase at elevated temperatures. The result is a dark, graphite colour with a layer thickness of 0.009 mm and a hardness of up to 10,000 HV.

The coating is applicable for selected types of HW indexable inserts and solid shank cutters or drills.

It finds its application in machining exotic solid wood, chipboard and fibreboard (MDF, chipboard...), as well as graphite and glass or carbon fibre boards.



Symbols and Abbreviations //

ø, D – diameter [mm]
< – angle [°]

a_e – radial depth of cut [mm]
ap – axial depth of cut [mm]
AS – asymmetrical tooth arrangement

B – clamping hole length [mm]
BO – clamping hole diameter [mm]

CNC – Computer Numeric Control

DKN – double keyway

f_z – feed per tooth [mm/tooth]
f_n – feed per revolution [mm/rev]

H – knife height, cutting tooth height [mm]
h – workpiece material thickness [mm]
h_m – chip thickness [mm]
h_{max} – maximum workpiece material thickness [mm]

L – total tool length [mm]
L1 – bottom cutting edge length [mm]
LH – counter-clockwise (CCW) rotation

M – metric thread
MAN – manual feed
MEC – mechanical feed
MK – Morse taper

n – rotational speed (RPM)
n_{max} – maximum rotational speed (RPM)
NL – cutting (working) length [mm]

R_t – theoretical roughness [mm]
RH – clockwise (CW) rotation

S – shank diameter [mm]
SB – cutting length [mm]
SY – symmetrical tooth arrangement

T – profile depth [mm]

V_c – cutting speed [m / min]
v_f – feed [m/min]

Z – number of teeth (not identical to the number of cutting edges)

Designations of certain groups of cutting materials (according to EN 847-1)

SP – Alloy tool steel
HL – High-alloy tool steel
HS – High-speed steel
HW – Uncoated tungsten carbide
HC – Coated tungsten carbide
ST – Stellite
DP – Polycrystalline diamond (PCD, DIA)
VBD – indexable insert

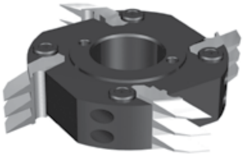
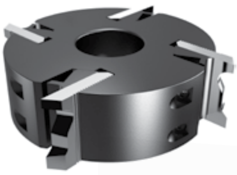
Workpiece material types
Solid dry softwood
Solid dry hardwood
Plywood
MDF
Chipboard
OSB
Chipboard veneered
Chipboard laminated
Chipboard paper coated
MDF veneered
MDF laminated
MDF paper coated
Composite materials, HPL, Trespa
Thermoplastics
Cement-bonded particle board

Servicing Services

09

\\ Tool and Accessory Servicing

Good service, detailed technical consultancy and comprehensive support are part of our philosophy and the quality you expect from us. Thus, we offer not only a high-quality tool but also a complete technological solution and ongoing service throughout the tool’s entire lifespan. VYDONA provides full service for tools produced in-house as well as tools from other manufacturers. We always strive to maintain a high standard in all service work. Tool servicing is provided in the following categories:

Milling tools

with indexable inserts
with HS brazed tips
with profile knives
with planing knives






Milling tools

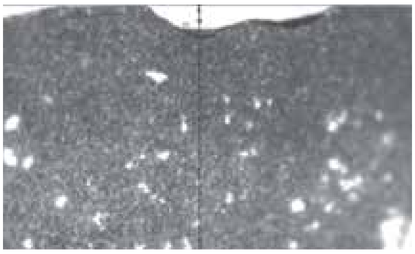
Solid HW shank tools
with HS brazed tips
with HW brazed tips
with DP brazed tips

Service procedures //

Tool condition inspection

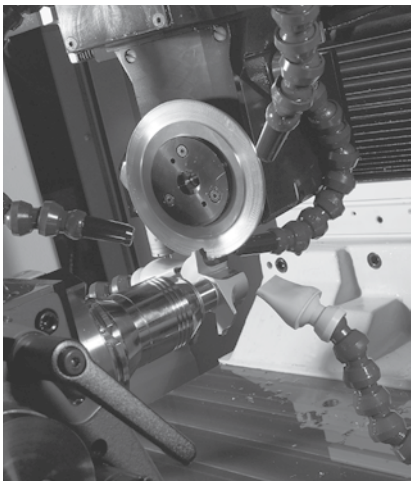
Detection of dullness, mechanical wear and damage

Inspection of cutting edge wear



Sharpening

Sharpening is performed on relevant high-precision CNC machines.



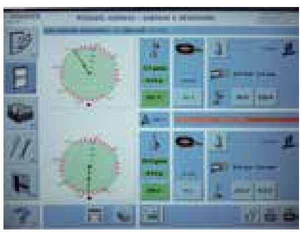
Inspection and setup focused on CNC machines

Each tool is inspected for radial run-out with an accuracy within 0.02 mm; profile tools are inspected for profile accuracy.

Balancing

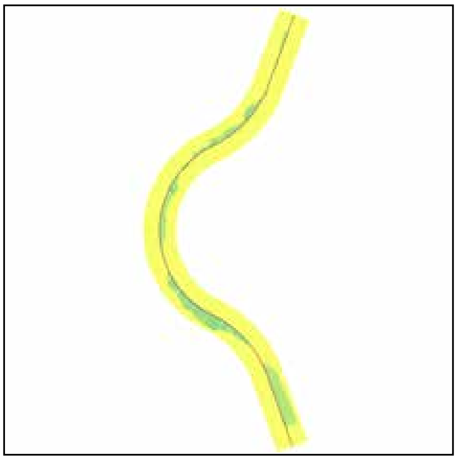
Permissible imbalance is checked for each tool.
Tool imbalance occurs:

– Due to uneven tooth spacing
– As a result of non-standard sharpening
– Due to manufacturing tolerances
– In DP tools, imbalance occurs due to grinding away the body behind the DP tip



LASSO—optical inspection of the grinding profile

Mean deviation (total)	-0,001	Offset X	76,712
Mean deviation (outer)	0,007	Offset Z	-46,347
Mean deviation (inner)	0,007	Offset Phi	-0,25
Mean deviation (X)	0,000	Inner tolerance	-0,020
Mean deviation (Z)	-0,001	Outer tolerance	0,020
Mean deviation (Phi)	0,02		
Maximum deviation (outer)	0,017		
Maximum deviation (inner)	0,018		
Maximum deviation (X)	-0,016		
Maximum deviation (Z)	-0,016		
Used subpixels (%, total)	100,00		
Used subpixels (%, inner)	58,40		
Used subpixels (%, outer)	41,60		
Tolerated subpixels (%, total)	100,00		
Tolerated subpixels (%, inner)	100,00		
Tolerated subpixels (%, outer)	100,00		



Final report

The service includes sharpening accuracy reports and a balancing report according to DIN ISO 1940

Test report 1 / 1

«genius Standard»
User

21.7.2015
11:16:03

VYDONA

ID No. 970201-L.10
Ref. Planing cutterhead DP 60×64×25DKN
Comment

Test technician

Grade	Result	Set value	Upper tol.	Lower tol.	Actual value	Tolerance
1	Lateral value	60,000	0,020	-0,020	60,018	
1	Angle 2				15,48	
1	Run-out	0,000	0,020		0,018	
2	Lateral value	60,000	0,020	-0,020	60,006	
2	Run-out	0,000	0,020		0,008	
3	Lateral value	60,000	0,020	-0,020	60,006	
3	Run-out	0,000	0,020		0,009	
4	Lateral value	60,000	0,020	-0,020	60,000	
4	Run-out	0,000	0,020		0,002	
5	Lateral value	60,000	0,020	-0,020	60,002	
5	Run-out	0,000	0,020		0,005	
6	Lateral value	60,000	0,020	-0,020	60,000	
6	Run-out	0,000	0,020		0,000	
7	Lateral value	60,000	0,020	-0,020	59,992	
7	Run-out	0,000	0,020		0,004	
8	Lateral value	60,000	0,020	-0,020	59,990	
8	Run-out	0,000	0,020		0,005	

All length units in millimetres, all angle units in decimal degrees

VYDONA spol. s r.o., Pravčice 244, 768 24 Hulín
www.vydona.cz

Safe Machining

10

The operating instructions are an indispensable part of the milling tools and are intended for all persons performing work with the given tool. Before use, the instructions must be carefully read and understood, and must always be readily accessible to all personnel.
These instructions conform to ČSN EN 847.

TECHNICAL SPECIFICATIONS

Each tool is indelibly marked with mandatory specifications and, where applicable, the direction of rotation—see figures 1 and 2.
The registered product serial number is included in the mandatory marking.
In the case of a tool set or combined tools, the lowest n MAX value of all the tools is considered the maximum permissible rotational speed.

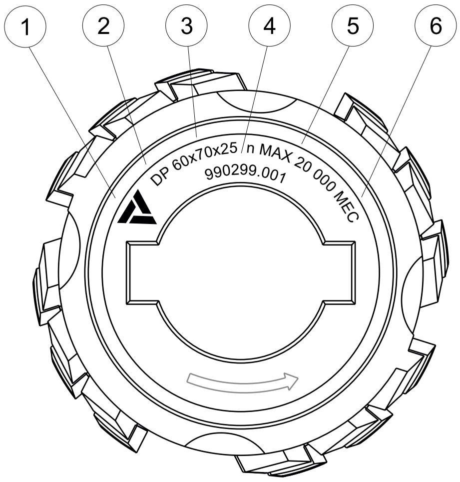


Fig. 1 Marking of a socket tool

TOOL MARKING—socket tools and sets

1. Manufacturer
2. Cutting material
3. Tool dimensions
4. Product ID number
5. Maximum rotational speed
6. Feed type—MEC/MAN

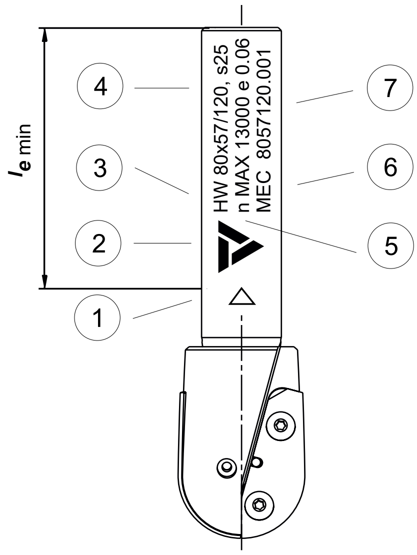


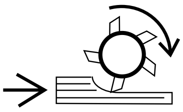
Fig. 2 Marking of a shank tool

TOOL MARKING—shank tools and sets

1. Marking of the maximum free shank length according to ČSN EN 847-2 (l_e min—minimum clamping length)
2. Manufacturer
3. Cutting material
4. Tool dimensions
5. Maximum rotational speed including permissible eccentricity
6. Feed type—MEC/MAN
7. Product ID number

Woodworking machines with manual feed (MAN)

Tools intended for these machines are marked 'MAN' and must always be equipped with a chip thickness limiter.
It is not permitted to use individual tools from a tool set separately.

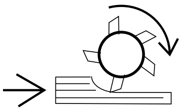


Direction of feed:
- The cutting velocity vector in the **opposite** sense to the workpiece feed vector—CONVENTIONAL MILLING

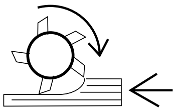
Avoid ejection—*especially kickback!*

Woodworking machines with mechanical feed (MEC)

Tools intended for these machines are marked 'MEC'



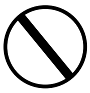
Direction of feed:
- The cutting velocity vector in the opposite sense to the workpiece feed vector—conventional milling



- The cutting velocity vector in the same sense to the workpiece feed vector—climb milling

OPERATING INSTRUCTIONS

Tools are strictly inspected during production and final assembly to ensure they meet specific application requirements.



SAFETY REGULATIONS

- Commissioning instructions: - All applicable regulations must be observed (in Europe, primarily CEN standards), including the safety aspects of the EN 847-1 standard.
- Certain types of applications are prohibited: - Improper use and incorrect application are prohibited. Risk of injury and/or property damage!
- Safety warning: - Failure to follow the operating instructions is dangerous and will void the *manufacturer's* liability.

Please, prioritise your safety!

APPLICATION

- The maximum rotational speed must never be exceeded! Otherwise, there is a risk of damaging the tool and of injury from damaged parts of the tool!
- The recommended feed rate is determined based on the number of teeth, the workpiece material, the amount of stock removal, the spindle speed, and the required surface finish quality.
- The workpiece material specified in the relevant product information must be strictly adhered to.

SAFETY WARNING

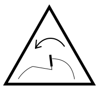
Handling, unpacking/packing

- Handling of tools, including unpacking and packing, must be carried out with care. Always follow safety instructions!

- Risk of personal injury from the cutting part of the tool. Only use protective gloves tested according to EN 388. Tools have very sharp cutting edges!

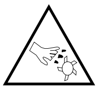
- Protect the cutting edge from contact with hard objects and damage!

- Store and transport tools only in their original protective packaging to prevent tool damage. The packaging is included as part of the tool delivery.

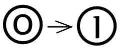


Before use

TOOL: • Check the condition of the cutting edges, including for any fractures!
• Check machine settings, spindle speed, and tool rotation direction.



MACHINE: • Avoid accidental machine start-up during tool change, handling, or cleaning of the tool/machine.



Commissioning

- Mount and secure the tool according to the machine tool manufacturer’s instructions.
- Follow the machine tool manufacturer’s instructions (maximum tool weight, diameter, etc.).
- Avoid collisions and minimise tool vibrations!

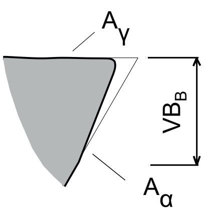
Measurement

- Use only optical measurement methods to avoid damage to the cutting part of the tool.

SHARPENING AND CARE—MAINTENANCE

Operating conditions, safety, and care are guaranteed only if service is performed according to instructions specified by VYDONA s.r.o.

The pristine condition of the machine, cutting edges, and tool bodies, along with correct working conditions, are prerequisites for safe and efficient machining. Regular inspection and cleaning are required. Particular attention must be paid to:



- Regular inspection of the cutting edge condition to detect wear or damage in a timely manner.
- Clamping surfaces must be clean—free from dirt, dust, oil, grease, and water.
- Cleaning must be performed with the utmost care using only suitable tool cleaning agents. Do not clean mechanically!
- When not in use, always protect the tool with a suitable preservative oil to prevent corrosion.
- After re-sharpening, repair, or modification, the tool must still comply with ČSN EN 847 standards.

Sharpening is necessary if:
- The cutting edge is chipped or the workpiece surface no longer meets the required parameters.
- The machine’s power consumption increases significantly.
- The average flank wear VB_B is greater than 0.2 mm (A_α—flank face, A_γ—rake face).

Dust, dirt, etc., accumulated on the tool adversely affect the cut quality. Therefore, the tool requires regular cleaning depending on the operating conditions.

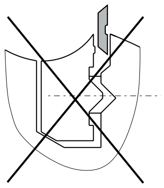


Fig. 3: Incorrect indexable insert position

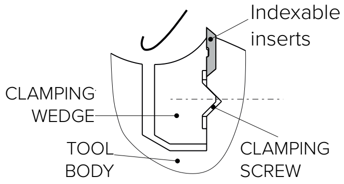


Fig. 4: Correct indexable insert position

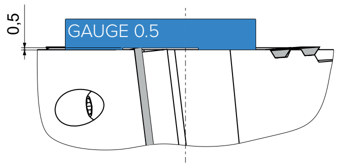


Fig. 5 Magnetic setting gauges for indexable insert positioning

REPLACEMENT OF INDEXABLE INSERTS

The replacement of indexable inserts must be carried out with the utmost care and in compliance with the safety considerations and standards mentioned previously. Use only genuine spare parts from VYDONA s.r.o.

- During assembly, clean all seating and clamping surfaces.

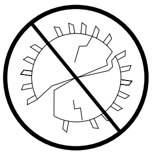
- Install the indexable inserts and all clamping components. Always place the indexable insert into the pocket in the correct position—see figures 3 and 4.

- Do not use damaged tool bodies, knives, or clamping components.

- Clamping screws must be manually tightened using a torque wrench to the required tightening torque. Nominal values for individual clamping systems and screws are provided on page 146. Never tighten screws using a power screwdriver! Screw tightness must be checked before every use.

- After assembly, check the concentricity, insert run-out, and the balancing grade of the entire tool.

- When using rebating indexable inserts, use calibrated magnetic setting gauges with the specified offset to determine the position—see figure 5.



TOOL SERVICING

For re-sharpenable tools, VYDONA s.r.o. records the tool condition and the number of sharpening operations (see the table below). This prevents any misidentification of tools. The manufacturer provides both warranty and post-warranty tool servicing.

In case of tool wear or damage:
- Do not use the tool and
- Contact the technical department of VYDONA s.r.o.

Danger of injury from damaged tool parts!

TOOL SERVICING ID No. ....

Date of sharpening	Tool diameter

V 1.0

StabilHead System

M5, TX20 = 5 Nm

UNI-PROFI System

Knife clamping
M8, ISK 4 = 20 Nm
M10, ISK 5 = 25 Nm
Backing plate clamping
M5, TX25 = 6,5 Nm

StabilHead System

M3,5, TX15 = 4 Nm
M4, TX15 = 4 Nm
M4, TX20 = 4 Nm
M5, TX25 = 6,5 Nm

Indexable profile cutter—pull-wedge

M6. TX25 = 8 Nm
Shim ID No.
710059

Indexable rebating cutter—pull-wedge

M6, TX25 = 8 Nm
Shim ID No.
710059

Indexable insert with push-wedge

M5, ISK 2,5 = 2 Nm
M6, ISK 3 = 6 Nm
M8, ISK 4 = 20 Nm
M10, ISK 5 = 25 Nm

Finger joint cutter

Knife clamping
M10, ISK 5 = 25 Nm

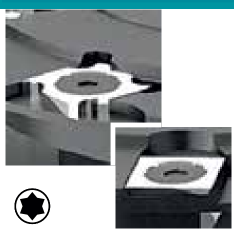
MAN cutterhead with chip limiter

M10, ISK 5 = 25 Nm

Multi-edge indexable inserts

M5, TX20 = 5 Nm
M6, TX20 = 5 Nm

Indexable insert with M4 countersunk nut



M4, TX10 = 3 Nm

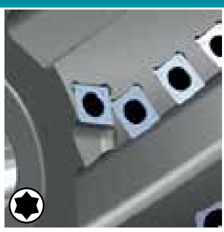
System with 5.5 mm thick inserts

M7, TX30 = 8 Nm

Rounding/chamfering and grooving pins

M6, TX20 = 6,5 Nm
M5, TX25 = 6,5 Nm

Indexable planing head



M5, TX20 = 4 Nm

Planing head

M8, ISK 4
Duralumin = 15 Nm
Steel = 20 Nm
M10, ISK 5
Duralumin = 20 Nm
Steel = 25 Nm

Safety cutterhead

M10, ISK 5 = 25 Nm

Coupling of cutters in a set

M5, ISK 3/4 = 7 Nm
M6, ISK 5 = 10 Nm
M8, ISK 5/6 = 15 Nm
M8, TX 40 = 20 Nm
M10, ISK 6 = 40 Nm

Legend: ⬢ - Hexagonal socket (ISK) ✱ - Torx (TX)

V 1.0

HW	TUNGSTEN CARBIDE (cutting edge material)
DP	POLYCRYSTALLINE DIAMOND (cutting edge material)
HS	HIGH-SPEED STEEL (cutting edge material)
Raptor system	STAGGERED CUTTING EDGES ON SPIRAL CUTTERS ©
Mallard system	HIGH SHEAR ANGLE CUTTING TIPS © (axial angle)
Stabil HEAD	INDEXABLE INSERT WITH DP CUTTING TIP ©
QC QUICK CLAMPING	CENTRIFUGAL CLAMPING SYSTEM (Centrolock—planing knives)
MAN	MANUAL FEED
MEC	MECHANICAL FEED
	INDEXABLE INSERT (form-fit and force-fit clamping of the cutting insert)
	BRAZED TIP (fixed, permanent connection to the cutter body)
FALCON SYSTEM	REBATING INDEXABLE INSERT WITH INTERNAL AND EXTERNAL ROUNDING

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