ADD engineering

Germany | India | Russia

Energy

Medicine

Machines and Plants

Aerospace

Automotive

Sport and Leisure

TOOLS FOR MODERN LIGHTWEIGHT MATERIALS

Germany | India | Russia

CONTENTS

LIGHTWEIGHT DESIGN COMPETENCE

Lightweight materials are finding more and more applications

Modern lightweight materials offer many different advantages. They make it possible to work in a more energy-efficient manner, save materials and, at the same time, to increase performance and productivity, particularly in mechanical and plant engineering.

Customers

Parts can be made significantly lighter by making use of lightweight materials. They are used by the automobile and aircraft industry, among others, to create more efficient designs for their vehicles. In spite of their lightness and the fact that less materials are required in their production, these modern materials make it possible to manufacture parts that are stable and safe. Therefore, lightweight design meets the demand for increased safety as well as that for reduced fuel-consumption.

In close collaboration with our customers, such as those in the aerospace sector, ADD Engineering has created a comprehensive range of tools for reliably machining modern materials. The range of tools includes both tools for part manufacturing and those for final assembly.

Part manufacturing
In part manufacturing, the machining of parts is stationary, i.e. parts are cut in a machine in several clamping positions. While small to medium cubic parts can be machined on a machining centre, large parts require special gantry machines.

Final assembly
Even today, handheld machines are still used in the final assembly of aircraft, due to their size. For example, in final assembly lines (FAL), rivet holes are made in the outer skin of the aircraft's fuselage. The tools are equipped with special guiding elements.

INNOVATIVE TOOL SOLUTIONS FOR A WIDE RANGE OF SECTORS:

AEROSPACE

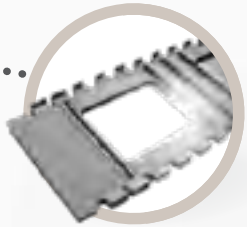
ENERGY

MEDICINE

Innovative and reliable tool solutions require a comprehensive understanding of processes.

Sectors

Requirements for parts and, in turn, the requirements in relation to their machining vary from sector to sector. For example, tools for the aerospace industry must meet "fail safe" requirements



Material

Different materials have different requirements in relation to tool and process parameters. The machining of lightweight materials requires particular machining strategies.

Machine concept

The machine concept has a significant effect on the tool geometry. As a result, tools for handheld machines require additional stabilisers so that they are able to reliably produce constant diameters.

Application

Lightweight materials are machined by milling, drilling or reaming them. Different materials and applications result in different types of wear, which must be taken into account when tools are being designed.

Innovative tool solutions

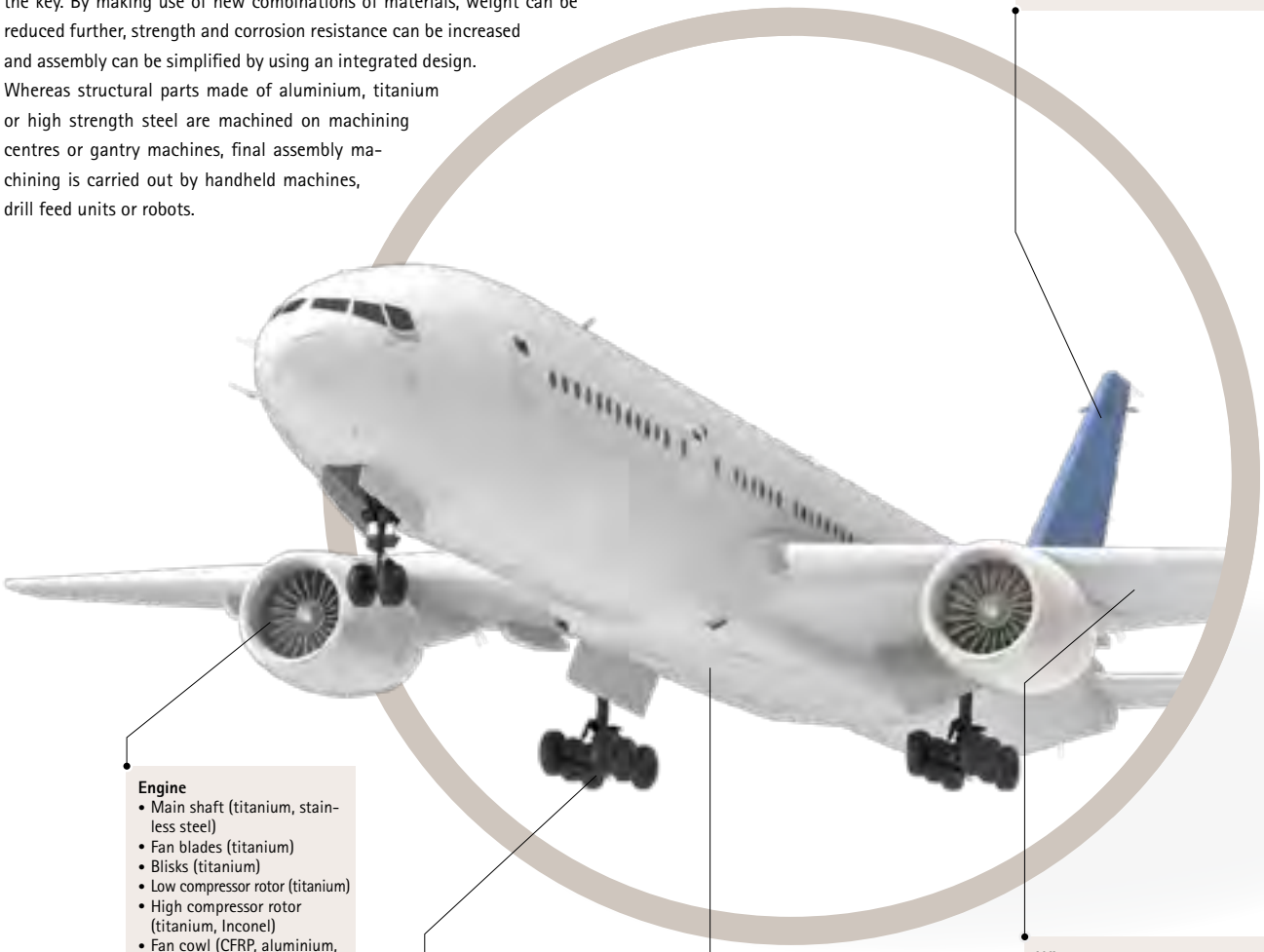
AUTOMOTIVE

MACHINES AND PLANTS

SPORT AND LEISURE

AEROSPACE

In the aerospace industry, materials that are both high-strength and lightweight is the key. By making use of new combinations of materials, weight can be reduced further, strength and corrosion resistance can be increased and assembly can be simplified by using an integrated design. Whereas structural parts made of aluminium, titanium or high strength steel are machined on machining centres or gantry machines, final assembly machining is carried out by handheld machines, drill feed units or robots.



Tail plane
- Vertical tail plane (CFRP, GFRP, titanium)
- Rudder (CFRP, aluminium, titanium)
- Horizontal tail plane (CFRP, aluminium, titanium)
- Elevator (CFRP, aluminium, titanium)

Engine
- Main shaft (titanium, stainless steel)
- Fan blades (titanium)
- Blisks (titanium)
- Low compressor rotor (titanium)
- High compressor rotor (titanium, Inconel)
- Fan cowl (CFRP, aluminium, honeycomb)

Landing gear
- Tube (titanium)
- Cylinder (stainless steel)
- Suspension (stainless steel)

Fuselage
- Cockpit (CFRP, aluminium)
- Fuselage (CFRP, aluminium)
- Doors (CFRP, aluminium, titanium)
- AFT Fuselage (CFRP, aluminium)
- Tail cone (CFRP, aluminium)

Wing
- Centre wingbox (CFRP, aluminium, titanium)
- Leading edge (CFRP, aluminium)
- Trailing edge (CFRP, aluminium, titanium)
- Pylon (CFRP, aluminium, titanium, stainless steel)
- Flap track (CFRP, aluminium, titanium)

Prostheses (CFRP, titanium)
Machining the ends and producing clamping bores.

Wheelchair, rollator (CFRP)
Trimming the outer contour and producing connection bores.

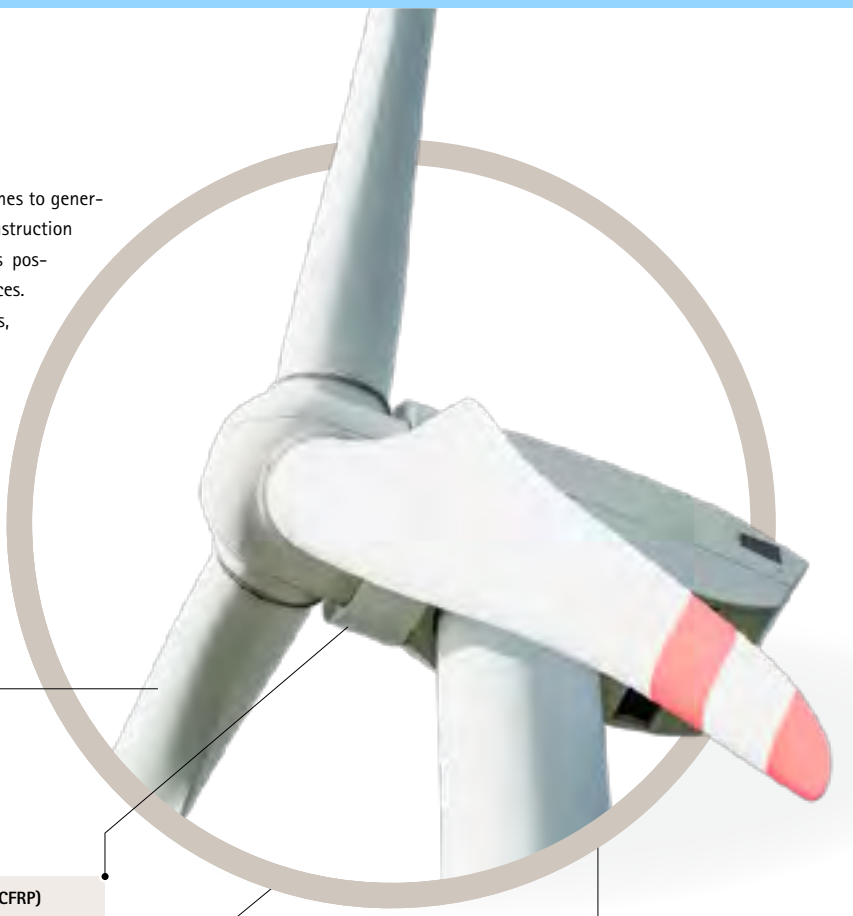
Implants (titanium, stainless steel)

Lenses for glasses (plastic)

Parts in medical devices (CFRP)

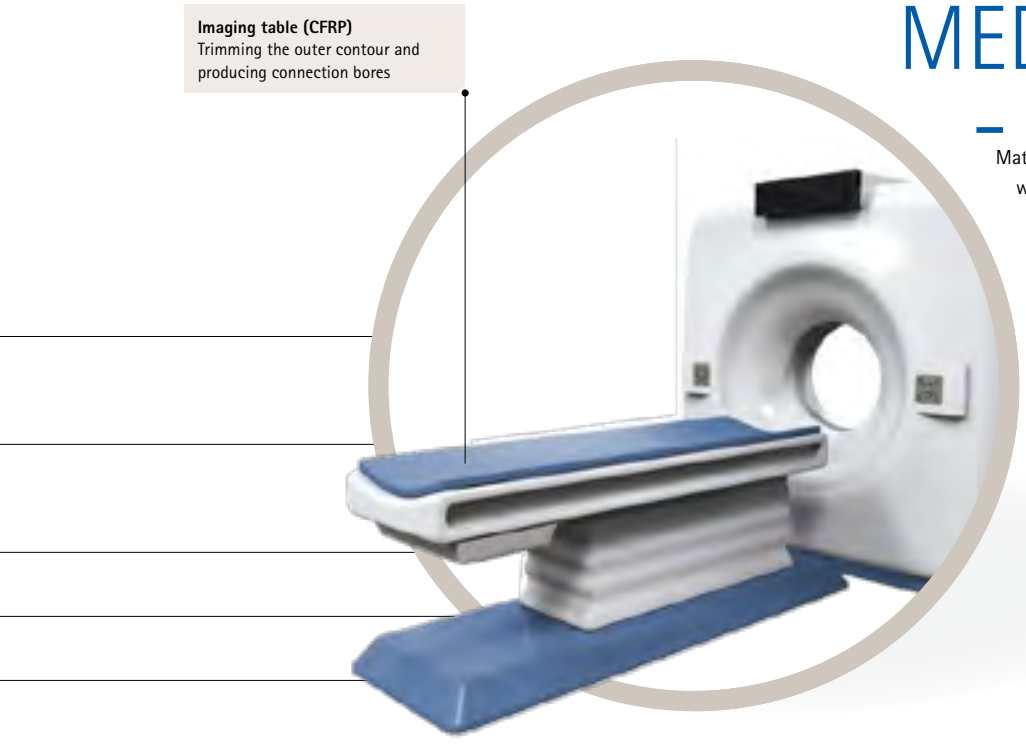
ENERGY

Lightweight materials play a key role when it comes to generating wind power. It is thanks to this that the construction of long-lasting, dynamic, high-strength parts is possible, contributing to an efficient use of resources. So for example, the rotor blades of wind turbines, which are the most exposed to the weather and forces affecting the turbine, are manufactured using fibre-reinforced plastics. In addition, conventional methods of generating electricity (turbines/generators) that make use of lightweight materials in their design have even more advantages.



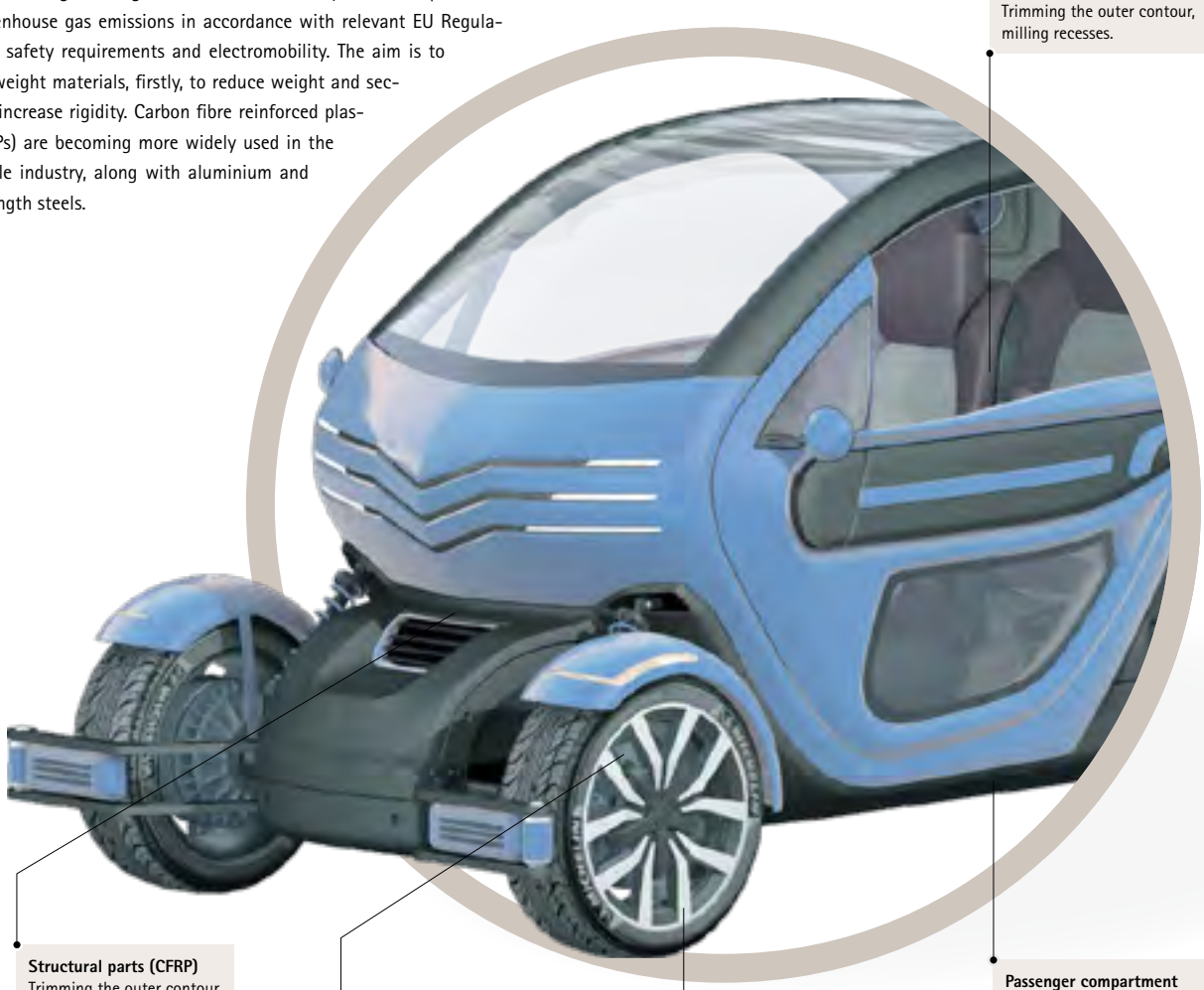
MEDICINE

Materials that are highly resistant to corrosion and wear, such as titanium or stainless steels, are used to manufacture medical devices. In addition to these materials, high-performance composite materials are also used. Self-supporting patient positioning systems for operating tables are one example. These are manufactured using carbon fibre reinforced plastics (CFRP) due to the fact that these materials are very rigid, strong and provide good X-ray transparency.



AUTOMOTIVE

The main challenges facing the automobile industry are the requirements to reduce greenhouse gas emissions in accordance with relevant EU Regulation, new safety requirements and electromobility. The aim is to use lightweight materials, firstly, to reduce weight and secondly, to increase rigidity. Carbon fibre reinforced plastics (CFRPs) are becoming more widely used in the automobile industry, along with aluminium and high-strength steels.



Interior (plastic)
Trimming the outer contour, milling recesses.

Structural parts (CFRP)
Trimming the outer contour, milling pockets, producing connection bores

Brake disks (CFC)
Drilling of ventilation holes and connection bores, flange machining

Rims (aluminium)
Drilling screw holes, manufacturing valve housing, as well as milling hub diameters and rim

Passenger compartment (CFRP)
Trimming of openings and recesses, drilling connection bores

Skis, ski poles, ski boots (CFRP)
Trimming the outer contour

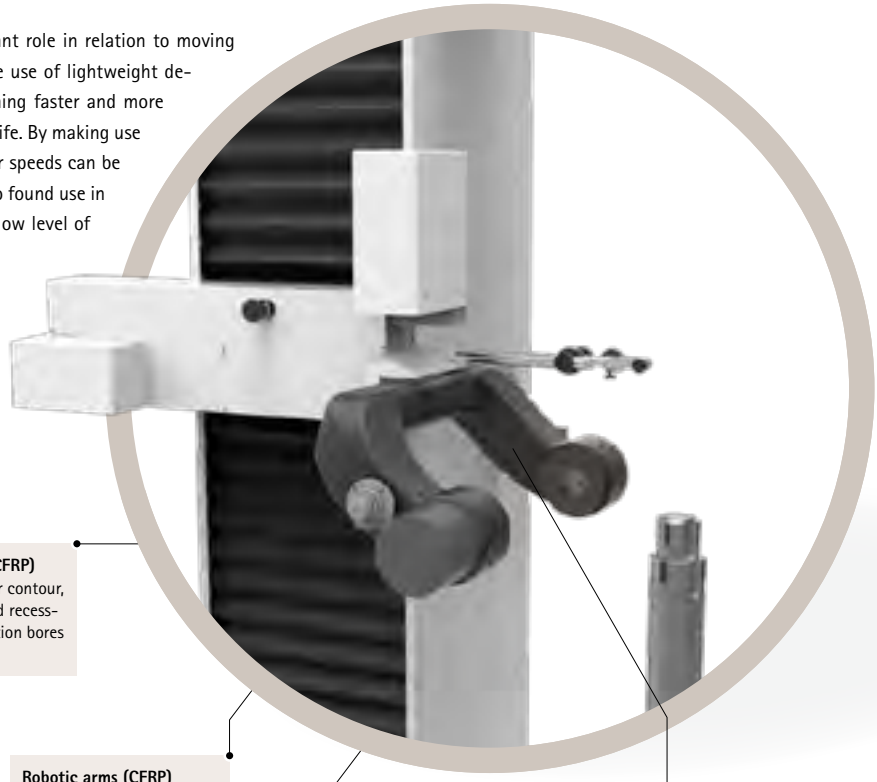
Crossbow; bows (CFRP)
Trimming the outer contour
drilling connection bores

Motorcycle helmet (CFRP)
Trimming the outer contour and cut-out.

Boat hull (GFRP)
Milling the portholes und recesses

MACHINES AND PLANTS

Lightweight design plays an important role in relation to moving parts in mechanical engineering. The use of lightweight design can, for example, make machining faster and more precise, as well as improving service life. By making use of CFRP spindles, considerably higher speeds can be achieved. Lightweight design has also found use in measurement technology due to its low level of thermal expansion.



Cross-members (CFRP)
Trimming the outer contour, milling pockets and recesses, drilling connection bores

Robotic arms (CFRP)
Trimming the outer contour, milling pockets and recesses, drilling connection bores

Machine parts (CFRP)
Drilling connection bores, milling slots and pockets

Measuring arm (CFRP)
Milling of flanges, drilling connection bores

SPORT AND LEISURE

Lightweight materials such as carbon fibre reinforced plastic (CFRP) or titanium are used in performance sport. This is mainly due to their high specific strength. In addition, lightweight materials provide a great deal of design freedom. Common types of machining include the trimming of outer contours, as well as the milling of recesses and cut-outs.

Bicycle frames (CFRP)
Milling bottom brackets and steering head bearings

LIGHTWEIGHT MATERIALS IN DETAIL

C Fibre composite materials

Fibre composite materials are very strong and rigid relative to their light weight. The properties of the materials can be modified as required, by making use of various matrix materials and types of fibres. This allows the optimal fulfilment of the requirements that are made of the part. The parts are manufactured using a near net shape technique. Machining tasks include, among other things, the subsequent machining of the outer contour and the manufacturing of functional surfaces.

C

Carbon fibre reinforced plastic (CFRP)

CFRP is characterised by having high levels of strength and rigidity whilst having a very low density. It is possible to produce CFRP parts that have the same load-bearing capacity as steel but are around 80% lighter.

Properties:
- Very high rigidity
- High tensile strength
- Density: ~1.8 g/cm^3
- Negative coefficient of thermal expansion
- Brittle fracture behaviour

Machinability:
The highly abrasive nature of the fibres results in high levels of tool wear. In addition, machining CFRP with a thermosetting matrix produces fine dust that causes additional wear of both tool and machine. Large CFRP parts tend to vibrate as a result of an unfavourable clamping situation and high levels of rigidity. Sub-optimal process parameters result in damage such as causing individual parts to break off, the delamination of layers of fibre, or leaving fibre protrusions behind.

C

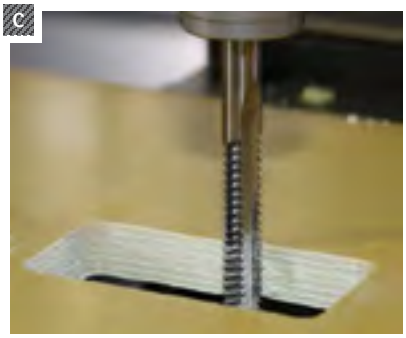
Glass fibre reinforced plastic (GFRP)

GFRP is used whenever normal plastics cannot provide adequate mechanical properties but a high degree of design freedom and durability is needed.

Properties:
- Moderate tensile strength
- Density: ~2.5 g/cm^3
- Isotropic properties
- Brittle fracture behaviour

Machinability:
Glass fibres are highly abrasive and cause rounding of the tool's cutting edge during GFRP machining. The rounding of the cutting edge means that the fibres can no longer be cut cleanly, resulting in increased pressure on the fibres and laminate. This may result in damage to the part, such as chipping or delamination. Suitable tool geometries with sharp cutting edges help to prevent this. Use of diamond coated solid carbide tools or PCD tools substantially increases service life.

C



Aramid fibre reinforced Plastic (AFRP)

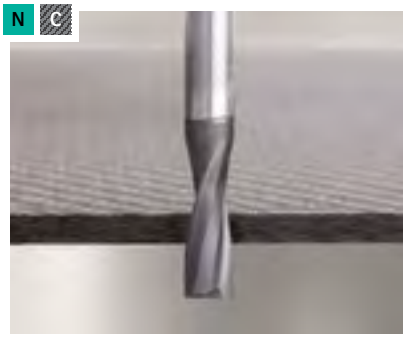
AFRP is used in lightweight parts that are subject to shocks and abrasion.

Properties:
- Very high impact strength
- High tensile strength
- Density: ~1.45 g/cm^3
- Negative coefficient of thermal expansion
- Ductile behaviour

Machinability:
Aramid fibres are able to absorb large amounts of energy. As a result, very sharp tools with special cutting shears are needed in order to cut the fibres cleanly. The protruding circumference cutters ensure that the fibres under pretension are shorn off. If the fibres are not cut cleanly this results in fibre protrusion. The uncut fibres may become wrapped around the tool, impacting negatively on the process.

(1/3)

N C



Graphite and carbon fibre reinforced carbon (CFC)

Graphite and CFC are extremely resistant to corrosion and heat and can be used at temperatures of well over 2,000 °C if shielding gas or a vacuum is used.

Properties:

- Low density (1.3 - 1.8 g/cm^3)
- Effective porosity
- Low thermal expansion
- Low thermal conductivity
- High heat resistance and dimensional stability

Machinability:

The dust produced during machining has a highly abrasive effect on the cutting edges. Therefore, the material of the cutting edges must be relatively resistant to wear. Given that the material is resistant to high temperatures, high cutting speeds and a high feed per tooth can be achieved. Optimal machining results can be achieved using diamond coated or PCD tools. In addition, due to the porous structure of the graphite matrix, CFC is more susceptible to fibre protrusion and delamination.

Factors affecting the machinability of fibre composite materials

1. Starting materials

Fibre

- Glass fibre (GFRP)
- Carbon fibre (CFRP)
  Aramid fibre (AFRP)

Matrix

- Thermosetting matrix
- Thermoplastic matrix

2. Layer structure

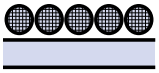
Woven fabric
The fibres are woven together

- Plain
- Twill
- Satin

Wavy grain, higher resin content in the interlaced threads.

Non-woven fabric
The fibres are held together by stitches or an adhesive scrim

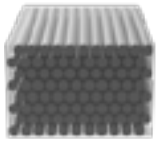
- Multidirectional
- Unidirectional



Fibres lie flat, straight and parallel to one another, less resin required.

3. Laminate structure

Unidirectional
High load-bearing capacity in direction of fibres



Examples:
- 0°
- 45°
- 90°
- 135°

Multidirectional
Can be stressed in multiple directions.

Examples:
- 0°-90°
- 0°-45°-90°
- 0°-45°-90°-135°

1 The reinforced fibre has a significant effect on the mechanical properties of the composite material. The fracture behaviour of each particular fibre is the key to the machining process. The matrix material limits the process temperature and affects chip formation. A thermosetting matrix makes it more likely that particulate matter will be produced, whereas a thermoplastic matrix makes it more likely that chips formation occurs.

2 The fibres are woven together when dry (woven fabric) or held together with sewing threads or an adhesive scrim (non-woven fabric). Whereas the fibres in woven fabric provide mutual support to one another, in non-woven fabric, such effects are minimal or non-existent, leading to an increased risk of fibre protrusion. In addition, the threads that are used can interfere with the machining process (depending on the material). An increased fibre content has a negative effect on clearance surface wear and thereby reduces the service life of the tools.

3 The individual layers are stacked on top of each other. The individual layers are aligned in accordance with the needs of the force requirements for the part. The most important factors when it comes to machining are the structure and surface finish of the top and bottom layer of the laminate. This determines possible types of damage, such as fibre protrusions or delamination. The layer structure, volume of fibres, and manufacturing process have a significant effect on the surface finish.

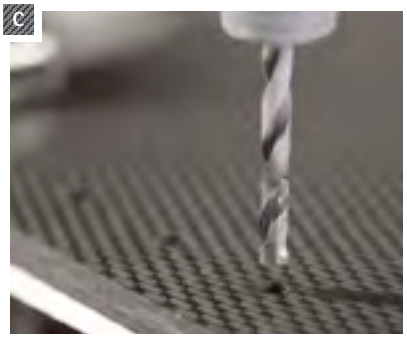
LIGHTWEIGHT MATERIALS IN DETAIL

C Multilayer composite materials (stacks)

In order to reduce weight and corrosion, so-called "stacks" are now being used in modern aircraft programmes, particularly for structural parts that are subject to high levels of stress. Stacks are multilayer composites in which various materials are machined on top of one another. Given that the materials have differing machining requirements, a compromise solution must be found.

For example metal chips can have a negative effect on layers of CFRP. To avoid such problems, bores are drilled in two stages. After drilling from solid, there is a second step that involves boring and countersinking. However, attempts are currently ongoing to turn as much of this as is possible into a single process. Special boring tools with various machining stages make it possible to achieve this so-called "one-shot solution". Diamond-coating and PCD blades are used in milling tools to increase service life, in the same way as with drills.

C



CFRP-aluminium

The development of thin, lightweight CFRP-aluminium composites, which stand out due to their high load bearing-capacity and low susceptibility to corrosion is of great significance, particularly in aircraft and automobile production.

Requirements for machining:
- "One-shot" solution
- Burr-free machining
- Dry machining

Machinability:
The key factors when machining composite materials such as CFRP-aluminium are on the one hand, the positioning of the layers of material and on the other, the layer structure within the CFRP itself. A sharp cutting edge is required to machine the layer of aluminium. However, this cutting edge must also be made resistant to wear, in order to cut through the CFRP beneath. In order to ensure that this composite material is machined in a way that is both cost-effective and "one shot", diamond coated tools are used nowadays.

C

CFRP-titanium

CFRP-titanium multilayer composites are used in aircraft production to manufacture parts that are subject to high levels of stress. As a result, the materials are thick and the bores to be made are subject to tight tolerance. Custom solutions are required to make these bores in a way that maintains process reliability.

Requirements for machining:
- Machining with minimum burr formation
- Machining with MQL
- Constant diameter throughout the entire multilayer composite

Machinability:
Tools for machining CFRP-titanium stacks must have a stable cutting-edge, in order to be able to withstand titanium. At the same time, they must be sharp enough to cut CFRP fibres cleanly. In order to meet the high quality requirements for these bores, it is advisable to follow a process with several machining steps that makes use of multiple tools. This is the only way to ensure such bores are made in a way that ensures process reliability and cost-effectiveness.

C

Aluminium-Aluminium

Aircraft manufacturers often rely on stacks made of various aluminium alloys when constructing fuselages. Bores for riveted joints are made using robots, drill feed units and also hand drills.

Requirements for machining:
- "One-shot" solution
- Burr-free machining
- Dry machining
- Clean parts

Machinability:
When machining the aluminium alloys used in aircraft production, extremely positive cutting edges are needed. In order to minimise the formation of burrs, the heat input into the material must be reduced to a minimum. A special face geometry improves centring capability. This plays an important role when machining the machine concepts mentioned above. A suitable coating helps prevent material build-up on the cutting edge.

Sandwich constructions

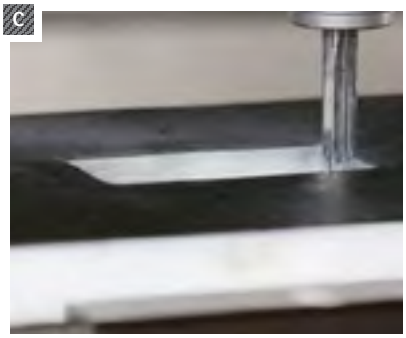
Sandwich constructions combine the best aspects of various materials and therefore allow complex geometric structures with a high load-bearing capacity to be manufactured, while, at the same time, saving a significant amount of weight. They are the preferred option for use in parts in which the normal loads are low, but the bending load and risk of the material warping or buckling requires a specific minimum wall thickness. Sandwich constructions usually consist of two thin, rigid outer layers, which are bound together with a light, supportive core.

Honeycomb core

Sandwich constructions with honeycomb cores have a high level of mechanical rigidity despite their comparatively low weight. They are mainly used in the aerospace and shipbuilding industries.

Properties:
- High bending strength
- Very low specific gravity
- Thin-walled honeycomb structure
- Multi material mix

Machinability:
When working with honeycomb materials, it is crucial that the delicate honeycomb structure remains intact. If part of the honeycomb is destroyed, the bond between the outer panels and the honeycomb core is reduced, compromising the part's stability and rigidity. Sharp, fine-toothed cutting edges ensure the cutting pressure the honeycomb is subjected to is low. In addition to the maximum spindle speed, a high pulse is produced over a small area, so that the honeycomb can be cleanly cut.



Foam core

Sandwich constructions with pressure-resistant foam cores stand out due to their good damping properties, high levels of bending strength and light weight.

Properties:
- Good damping properties
- Good thermal insulation
- Lower strength in comparison to honeycomb core
- Multi material mix

Machinability:
When it comes to machining, the material that the foam core is made from is key. Plastic foams are not very abrasive and can be reliably machined using sharp, uncoated solid carbide tools. Hard foam requires tools with many cutting edges and small chip spaces, whereas large chip flutes are more suitable for soft foam.

LIGHTWEIGHT MATERIALS IN DETAIL

N Aluminium and plastics

The constant urge for reducing weight means particularly light and stable materials must be used. Aluminium boasts a high specific strength and is therefore extremely well-suited for use as a structural material. Plastics are even lighter and stand out due to their mechanical, electrical and thermal properties.

N

Aluminium

Aluminium combines high specific strength with a low dead weight. Aluminium parts are about half as heavy and just as strong as steel parts, but are larger.

Properties:
- High thermal conductivity
- High specific strength
- Its requirements are highly dependent upon the alloy in question

Machinability:
The high thermal conductivity of aluminium allows process heat to quickly dissipate through the chips. The heat input into the tool is low, therefore the stress levels it is subjected to are also low. This makes it possible to achieve high feeds and spindle speeds. The removal of the comparatively high volume of chips requires large chip spaces. Soft aluminium alloys have a tendency to form build-up on the cutting edges, especially when the cutting speed is low. Large rake angles and polished chip spaces help prevent the cutting edges from jamming. As the silicon content increases the chips become less fragile, however, this subjects the tool to more wear.

N

Thermoplastics

Thermoplastics are plastics that deform elastically and plastically when subjected to heat and resolidify when cooled.

Properties:
- Low thermal conductivity
- Can be reshaped when heated (can be melted)
- Amorphous (hard and brittle) or semi-crystalline (hard)
- Largely ductile fracture behaviour

Machinability:
In the case of amorphous structures, machining should take place at a temperature below the specific glass transition temperature (Tg). The material is very susceptible to stress cracking and is prone to brittle fracture behaviour. Partly crystalline thermoplastics should be machined at a temperature lying between Tg and their melting point (Tm). In this phase, the material exhibits a tough and hard quality, which, in almost all cases, results in ductile fracture behaviour. Extremely sharp cutting edges and positive rake angles reduce heat generation to a minimum and, along with large chip flutes, ensure optimal chip removal.

N

Duroplast

Duroplast cannot be reshaped after hardening and remains in a solid state until the time it chemically decomposes.

Properties:
- Low thermal conductivity
- Thermal resistance
- Cannot be melted or moulded
- High strength, low elasticity
- Brittle fracture behaviour

Machinability:
Duroplast remain in a solid state throughout the machining process. Their brittle fracture behaviour causes the formation of particulate matter. To prevent heat build-up, a suitable method of chip removal should be considered. Dust extraction is recommended. Sharp cutting edges and a high chip thickness allow heat produced during machining to dissipate more easily. If the tool overheats, this will impair dimensional accuracy and cause the material to burn. It is for this reason, cutting speeds that are too high should be avoided.

P M S High tensile steels, titanium and highly heat resistant super alloys

High strength materials such as high tensile steels, titanium and highly heat resistant super alloys are difficult to machine. Due to the extraordinary strength of these materials, the cutting edges are subject to very high levels of stress. In particular, the high temperatures cause rapid wear. Alternative machining strategies, such as trochoidal milling, make it possible to increase the material removal rate whilst reducing wear.

P M

High tensile steels

In lightweight design, steels that are both strong and hard are used in areas that require a very high load-bearing capacity and the use a relatively small amount of material. In addition, by adding particular elements to alloys, specific properties, such as corrosion resistance, can be achieved. Precipitation-hardening (PH) steels are particularly suited to use in the aerospace industry, as ultra high-strength, corrosion-resistant parts.

Properties:
- High density (>7.8 kg/dm^3)
- High strength and hardness
- Long-chipping
- Low thermal conductivity

Machinability:
The machinability of steels is highly dependent on alloy contents, heat treatment and the manufacturing process. For example, nickel increases the strength of a material, and, in so doing, reduces its machinability. High levels of hardness generally require the use of particularly sharp cutting edges.

S

Titanium

Titanium is particularly suitable for applications where high levels of resistance to corrosion, strength and a light weight are required.

Properties:
- Low density (4.5 kg/dm^3)
- High specific strength
- Resistant to high temperatures
- Low thermal conductivity
- Ductile

Machinability:
The material's low thermal conductivity, together with its high tensile strength, means that the tools are subject to high levels of thermal and mechanical stress, which results in severe wear. Adhesive effects between the titanium alloy and the tool contribute to the formation of build-up on the cutting edges. Tools that are very hard and highly resistant to heat are particularly well-suited to such machining.

S

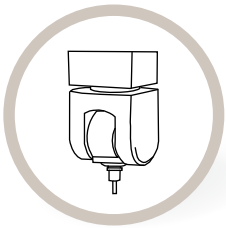
Highly heat-resistant super alloys

Highly heat resistant super alloys are used mainly in situations in which extremely high thermal loads occur and high resistance to corrosion is required.

Properties:
- Resistant to high temperatures
- Very hard
- Poor thermal conductivity
- Highly abrasive

Machinability:
Lamellar chips are produced during machining. These result in high dynamic cutting forces and tend to stick to the tool. These materials are very hard and have poor thermal conductivity. This causes the cutting edges to reach very high temperatures during machining. They have a highly abrasive effect as a result of their great strength. High cutting temperatures require tools with sharp cutting edges. Polished chip flutes ensure that friction is reduced and prevent large increases in temperature when drilling.

THE RIGHT TOOLS FOR EVERY MACHINE CONCEPT

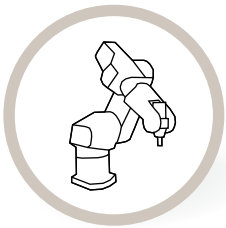


Machining centres / gantry machines with moveable gantry

Properties
- High rigidity, stable machine design
- High spindle speeds, high torque
- Mostly HSK spindles with high radial run-out accuracy
- With internal coolant supply or MQL
- Variable feeds and spindle speeds
- Drilling cycles can be programmed – also with hiccup/pecking feed
- 5 axes
- Machining centre - machining compartment mostly enclosed → working area extraction
- Gantry - mostly open design → extraction mounted separately

Parts
- Machining centre - small to medium cubic parts → clamping fixture compact and stable
- Gantry - large parts → large, often only moderately rigid clamping fixtures

Tools
- Machining centre - shorter tools → Tool lengths are mostly dependent only on the work piece contour
- Gantry – longer tools → The length of the tool is often dependent on the required extraction or the guide bush



Robot with end effector

Properties
- High spindle speeds and feeds possible, depending on the spindle
- Less stable system due to the toothed-belt drive for the axes
- Repetition accuracy max 0.1 - 0.2 mm (makes it more difficult to find a hole that has already been drilled)
- With internal coolant supply or MQL
- Drilling cycles can be programmed – also with hiccup/pecking feed

Parts
- Flexible during the machining of various parts
- Larger parts

Tools
- Drilling tools with a diameter > 8 mm can only be used if there is a piloting stage for stabilisation
- The length of the tools is mostly dependent on the required extraction. or the guide bush

Drill feed units

Properties
- Lightweight machine design
- Only moderate spindle run-out
- With internal coolant supply or MQL
- In the case of pneumatic drill feed units, the spindle speeds and feeds can only be changed by modifying the gearing
- Mostly with hiccup/pecking feed – varies depending on the manufacturer
- Vibrations cannot be fully suppressed
- Only one feed axis
- Significantly increased machining time

Parts
- Large parts– machine goes to the part
- Used with fixtures mounted on parts

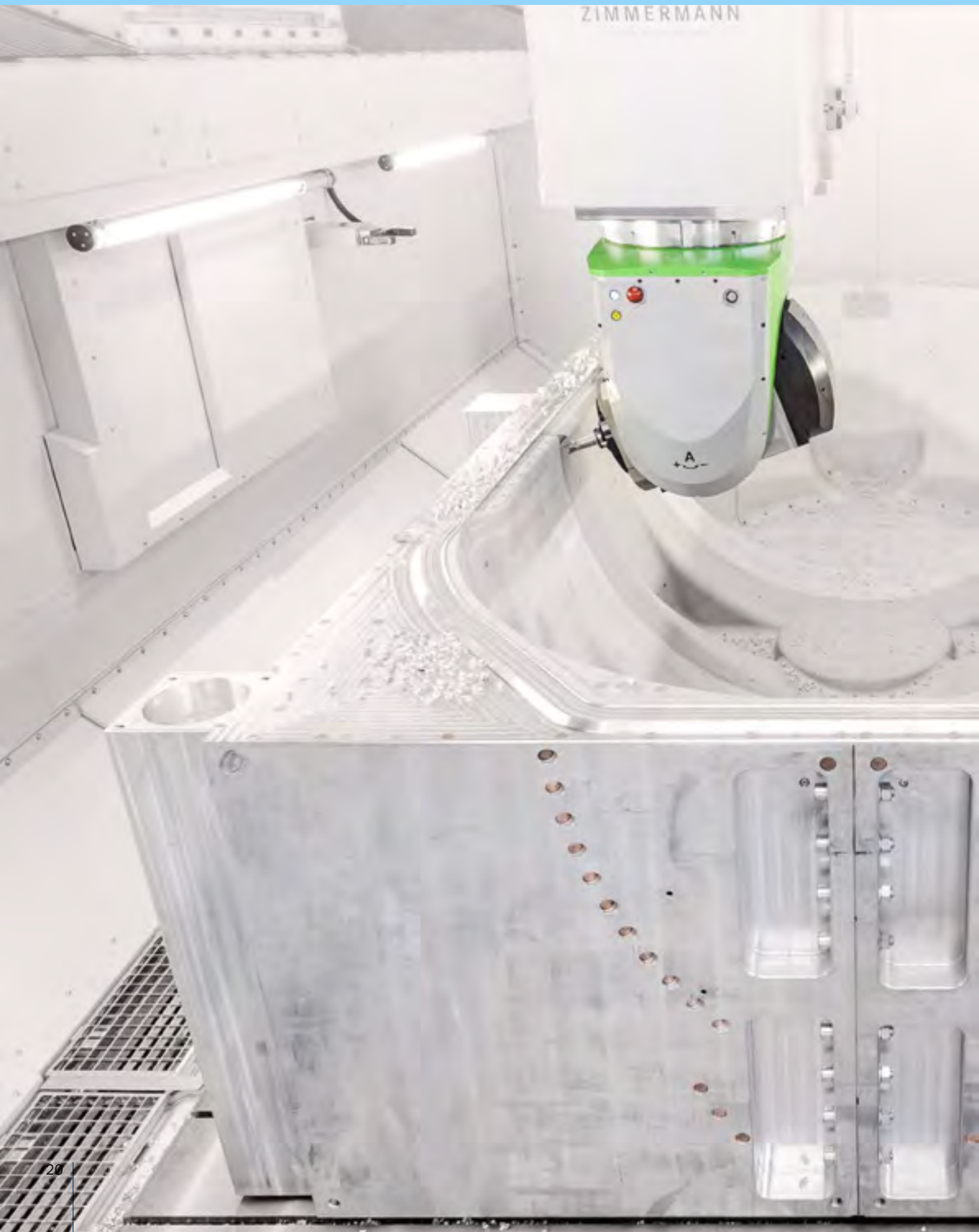
Tools
- Tools partly guided in bushes → precise tool handling extremely important when fitting
- Extraction requires optimised chip formation
- Large tool or chip flute lengths due to bushes and extraction
- Standard tools with special shanks or threaded steel shafts required

Hand drills

Properties
- Mostly pneumatically powered machines
- Machine cost-effective to acquire
- Tool clamping using collet chuck
- Radial run-out cannot be adjusted
- Spindle speed cannot usually be adjusted
- Controlled feeds, using machines with hydraulic brakes
- No cooling – only external
- Feed force set by the operator
- Operator-dependent machining results

Parts
- Large parts– machine goes to the part

Tools
- Tool lengths dependent on the machining point to be reached
- Special geometry to prevent jamming of the tool
- Correct perpendicular drilling only possible with fixture bushes or "tripod"


ZIMMERMANN

PART MANUFACTURING

Tools for the cost-effective machining of modern lightweight materials using machining centres, gantry machines and robots.

PRODUCT OVERVIEW

Tools for part manufacturing

ADD Engineering range of high-performance tools ensures excellent and reliable results in a wide range of machining tasks. During tool design, the focus is on preventing delamination, formation of burrs or fibre protrusions on the component.

Application-oriented
ADD Engineering range of tools includes general purpose mills, as well as milling tools for high-volume and trochoidal milling, in addition to drills and reamers for making bores reliably and accurately.

A perfect match
Regardless of the material that is being machined or its application, the tools have special geometries, high-performance coatings and cost-effective replaceable head systems. In general, the tools can be designed with an internal coolant supply or MQL.

Always the right choice
It makes no difference if machining is carried out using a machining centre, gantry machine or robot - ADD Engineering offers the right tool solution for every machine concept.

Machining centre / gantry machine
Machining centres and gantry machines stand out due to their high rigidity and stable machine design. This allows high spindle speeds to be achieved and high levels of torque to be transmitted.

Robot with end effector:
Machining with robots is a common practice in the manufacturing of CFRP parts. Robots are less stable and require special tools with additional stabilisation in order to achieve high levels of accuracy.

Milling

General purpose mills

General purpose mills. Ideally suited for manufacturing breakthroughs and pockets, trimming the outer contour and milling functional surfaces.

- Contact width a_e up to 1xD
- Optimised cutting geometry helps prevent delamination or other damage to the part
- Optimal chip removal
- Diamond coating for an excellent service life

High-volume milling

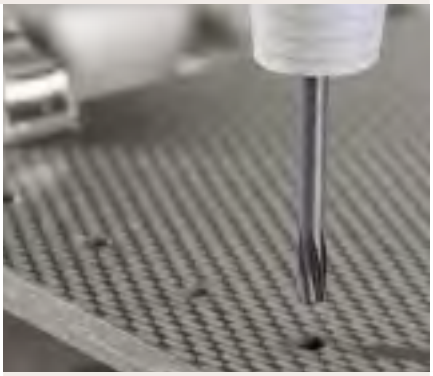
High performance mills for high volume machining of aluminium structural parts.

- High material removal rate: > 8 l/min at a diameter of 32 mm with HSK
- Soft, low vibration cutting
- Very high surface quality with low power consumption
- Polished chip flutes

Trochoidal milling

Maximum material removal rate whilst maintaining a high surface quality. Pre-machining and finish machining with one tool.

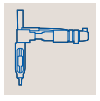
- Cutting depths of up to 3xD
- Diameter range of 4 to 25 mm
- Extra long cutting tool
- Optimised unequal spacing and a finely balanced cutting tool to protect the machine spindle and ensure a long service life.
- Optimal chip removal
- Used with modern CAM system (further information on page 75)

Drilling	Reaming	Special solutions
		
Drilling Reliable and precise drilling of bores in modern lightweight materials. - Innovative geometry to prevent delamination, fibre protrusions or the formation of burrs on bore entries and exits - Diamond coating for an excellent service life - This is particularly cost effective when using the replaceable head drill TTD for bore diameters from 12 mm and drilling depths up to 12xD - Inch measurements available ex stock	**Reaming** High performance reamers for the fine machining of bores to a tolerance of H7 with maximum accuracy. - Special cutting edge geometry produces excellent machining results - Solid carbide with a range of heavy-duty coatings - Monoblock design ensures complete concentricity stability - Ideal for repairing damaged bores - Particularly cost effective within diameter range of 3 to 20 mm	**Special tools, made to measure** Custom solid metal carbide special tools to meet the highest demands. - Producing complex geometries and contours for almost all applications - Effective coatings for all materials - Combining several standard tools to create an effective special tool
Page 76	Page 120	on request

CHOOSING A TOOL

Step by step to the right tool

This selection guide will lead you step by step to the right tool.

1	Application	Choose your main application.	 Milling End mill	 Milling Face mill
2	Product class	Choose your product class.	 Basic Line: Universal tools, broad scope of application, low purchase price	
3	Material suitability	Choose your material in accordance with the MMG (ADD Engineering machining groups, see inside cover).	 Steel	 Stainless Steel
4	Machine concept	Choose your machine concept.	 Machining centre Gantry machine	 Drill feed unit
5	Machining tasks	Consider the demands that the machining task will place on your tool.		
		Milling | End mill	 Trimming thickness of material < 10 mm	 Trimming thickness of material ≥ 10 mm
			 Compression cut	 Straight cut
		Milling | Face mill	 Roughing	Medium machining (machining of residual material)
		Drilling	 Maximum drilling depth	 Drilling into solid
		Reaming	 Through bore	 Interrupted cut
6	Product	Choose your tool.		


Drilling


Reaming

Performance Line:
High-performance tools, broad scope of application, high productivity in series production manufacturing

Expert Line:
Specialist tools for selected applications, maximum precision and productivity

Non-ferrous metals and plastics

Composite materials

Super alloys and titanium


Robot with end effector


Groove milling and milling purpose


Vertical plunging/grooving


Profile milling

Trochoidal milling


Pulling cut


Pushing cut

Finishing

HSC-Application

Stable Process conditions

Unstable Process conditions


Interrupted cut

Maximum bore tolerance

Maximum bore tolerance

Milling | End mills with fixed blades (1/2)

Pro-duct-class	Material suitability															Machine concept		Machining task						
	P	M	N							C						S								
	1-6	1-3	1.1	1.2-1.4	3.1	4.1	4.2	4.3	1.1	1.2	1.3	2.1	4.1	4.2	1-2	3-5			< 10 mm	≥ 10 mm				h_m opt.
Basic LINE						■	■										✔	✔	✔		✔	✔		
						■	■										✔	✔	✔		✔	✔		
					■		■			■							✔	✔	✔		✔			
					■		■			■							✔	✔	✔		✔			
					■		■			■							✔	✔	✔			✔		
					■		■			■							✔	✔	✔			✔		
					■		■			■							✔	✔	✔				✔	
Performance LINE							■			★							✔	✔	✔	✔	✔			
							■			★							✔	✔	✔	✔	✔	✔		
							■			■		★	⬓	⬓			✔	✔	✔	✔	✔			
							■			■		★	⬓	⬓			✔	✔	✔	✔	✔		✔	
							■			■		★	⬓	⬓			✔	✔	✔	✔	✔			
							■			■		★	⬓	⬓			✔	✔	✔	✔	✔		✔	
					★					■							✔	✔	✔	✔	✔	✔		
											★						✔	✔	✔	✔	✔	✔		
									★								✔	✔	✔	✔	✔	✔		
													★	■			✔	✔	✔	✔	✔	✔		
						★	★										✔	✔	✔	✔	✔	✔		
								★									✔	✔	✔	✔	✔	✔		
								■						★			✔	✔	✔	✔	✔	✔		
			⬓	★	⬓	⬓	⬓	⬓									✔	✔	✔	✔	✔	✔		
															■	⬓	✔	✔	✔	✔	✔			

★ 1st choice ■ Highly suitable ⬓ Suitable in some situations

Step 1: Application | Step 2: Product class | Step 3: Material suitability | Step 4: Machine concept | Step 5: Machining task

Machining task				Product						
				Product name	Specification	ø [mm]	Mat.			Page
		✔		OptiMill-Mono-Plastic	SCM33	2 - 12,7	Solid carbide			48
			✔	OptiMill-Mono-Plastic	SCM33	2 - 10	Solid carbide			48
		✔		OptiMill-Composite-MT	SCM40	4 - 20	Solid carbide			34
			✔	OptiMill-Composite-MT	SCM41	4 - 10	Solid carbide			34
		✔		OptiMill-Composite-MT	SCM42	4 - 20	Solid carbide			35
			✔	OptiMill-Composite-MT	SCM43	4 - 10	Solid carbide			35
		✔		OptiMill-Composite-MT-Radius	SCM44	4 - 20	Solid carbide			36
		✔		OptiMill-Composite-Micro	SCM56	1 - 3	Solid carbide			37
	✔			OptiMill-Composite-Speed	SCM45	4 - 20	Solid carbide	✔		38
		✔		OptiMill-Composite-Speed	SCM46	4 - 20	Solid carbide			39
		✔		OptiMill-Composite-Speed	SCM46	4 - 20	Solid carbide			39
			✔	OptiMill-Composite-Speed	SCM47	4 - 20	Solid carbide			40
		✔		OptiMill-Composite-Speed-Radius	SCM87	4 - 20	Solid carbide			41
		✔		OptiMill-Composite-Duo	SCM73	3 - 20	Solid carbide			44
✔				OptiMill-Thermoplastic-FR	SCM61	4 - 20	Solid carbide			45
✔				OptiMill-Composite-TwinCut	SCM49	4 - 20	Solid carbide			46
		✔		OptiMill-Honeycomb	SCM62	4 - 20	Solid carbide			47
✔				OptiMill-Thermoplastic	SCM51	3 - 20	Solid carbide			49
		✔		OptiMill-Softfoam	SCM50	4 - 16	Solid carbide			50
	✔			OptiMill-Hardfoam	SCM64	6 - 20	Solid carbide	✔		51
		✔		OptiMill-Alu-HPC	SCM27	3 - 20	Solid carbide			52
		✔		OptiMill-Titan-HPC	SCM39	6 - 20	Solid carbide	✔		53/54

Continued on next page

Milling | End mills with fixed blades (2/2)

Product-class	Material suitability															Machine concept		Machining task					
	P	M	N						C						S								
	1-6	1-3	1.1	1.2-1.4	3.1	4.1	4.2	4.3	1.1	1.2	1.3	2.1	4.1	4.2	1-2	3-5			< 10 mm	≥ 10 mm				h_m opt.
Expert LINE							⬓			■		■					✔	✔		✔	✔	✔		
							⬓			■		■					✔	✔	✔		✔	✔		
			★	■													✔				✔			
			■	■													✔				✔			
			■	■													✔				✔			
			■	■													✔				✔			
	★	★															✔				✔			✔
															★	⬓	✔				✔			✔
															⬓	★	✔				✔			✔

Milling | Face mills with PCD milling inserts

Product-class	Material suitability															Machine concept		Machining task			
	P	M	N						C						S						
	1-6	1-3	1.1	1.2-1.4	3.1	4.1	4.2	4.3	1.1	1.2	1.3	2.1	4.1	4.2	1-2	3-5			Roughing	Med. machining	Finishing	HSC-Application
			■	■	■	■	■			■	■	■					✔	✔	⬓	■	■	■
			■	■	■	■	■			■	■	■					✔	✔		⬓	■	■

★ 1st choice ■ Highly suitable ⬓ Suitable in some situations

Machining task				Product						
				Product name	Specification	ø (mm)	Mat.			Page
✔				OptiMill-Composite-UD	SCM65	6 - 20	Solid carbide			42
✔				OptiMill-Composite-UD	SCM86	4 - 20	Solid carbide			43
		✔		OptiMill-SPM	SCM68,69	6 - 32	Solid carbide	✔		64
		✔		OPMill-SPM	OPM27	14 - 25	Solid carbide	✔		67
		✔		OptiMill-Diamond-SPM	SHM10,11	6 - 32	PCD	✔		65
		✔		OptiMill-Diamond-SPM	SHM12	32 - 50	PCD	✔		66
		✔		OptiMill-PM-Trochoid	SCM59	4 - 25	Solid carbide			72
		✔		OptiMill-Titan-Trochoid	SCM83	5 - 25	Solid carbide			73
		✔		OptiMill-S-Trochoid	SCM80	5 - 25	Solid carbide			74

Machining task		Product						
Process conditions		Product name	Cutting depth a_p max. [mm]	ø (mm)	Mat.			Page
Stable	Unstable							
■		PowerFeed	5	63 - 400	PCD	✔		56
■	■	FlyCutter	3	63 - 160	PCD	✔		57

Continued on next page

Drilling

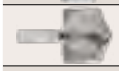
Product-class	Material suitability																	Machine concept			Machining task			
	P	M	N						C								S							
	1-6	1-3	1.1	1.2.-1.4	3.1	4.1	4.2	4.3	1.1	1.2	1.3	2.1	4.1	4.2	5.1	5.2	1-2	3-5				MAX.			
Performance LINE					★					■	★	★	⬓	⬓					✔	✔	✔	5xD	✔	
			⬓	⬓						★	★	■			■				✔	✔	✔	12xD	✔	
						⬓	⬓	★	★				■						✔		✔	3xD	✔	
			★	★															✔	✔	✔	5xD	✔	
			■	★															✔	✔	✔	12xD	✔	
	⬓	★															⬓	⬓	✔	✔	✔	12xD	✔	
																	⬓	★	✔	✔	✔	5xD	✔	✔
Expert LINE					■					★	■	■							✔	✔	✔	5xD	✔	
			⬓	⬓											★				✔	✔	✔	5xD	✔	
																★	■		✔	✔	✔	5xD	✔	
			⬓	⬓											■					✔	✔	5xD	✔	
																■	■			✔	✔	5xD	✔	
			⬓	⬓											★				✔	✔	✔	12xD	✔	
		■														★	■		✔	✔	✔	12xD	✔	
						★	★	■		⬓									✔		✔	5xD	✔	
	■	★															■	■	✔	✔	✔	5xD	✔	
																	★	■	✔	✔	✔	5xD	✔	

Reaming

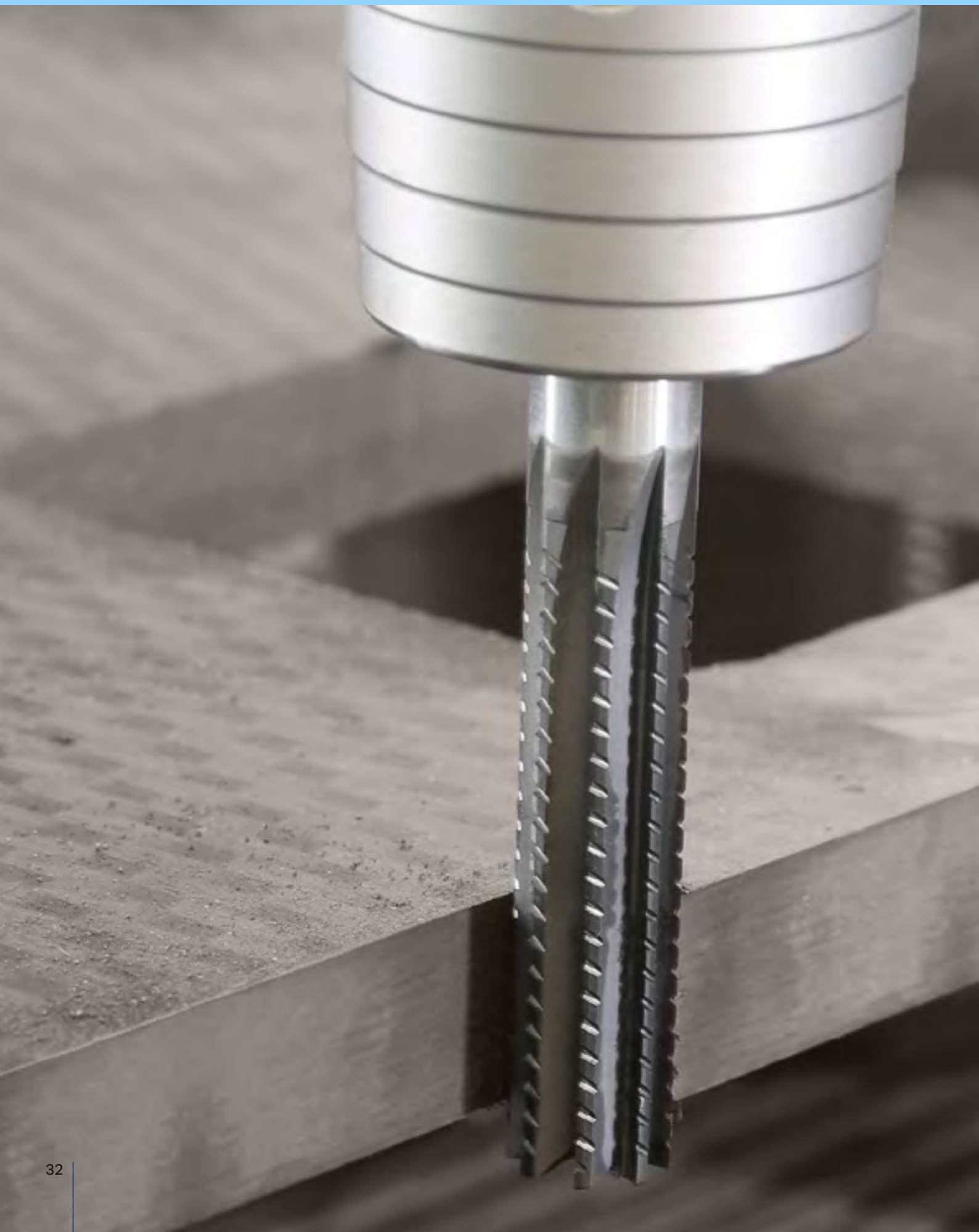
Product-class	Material suitability																	Machine concept		
	P	M	N						C								S			
	1-6	1-3	1.1	1.2-1.4	3.1	4.1	4.2	4.3	1.1	1.2	1.3	2.1	4.1	4.2	5.1	5.2	1-2	3-5			
Performance LINE									■	■	■								✔	✔	✔
			■	■															✔	✔	
	⬓	■																	✔	✔	✔
																	■	■	✔	✔	✔

★ 1st choice ■ Highly suitable ⬓ Suitable in some situations

Step 1: Application | Step 2: Product class | Step 3: Material suitability | Step 4: Machine concept | Step 5: Machining task

Machining task			Product					
IT7	IT8	IT9	Product name	Specification	ø [mm]			Page
		✔	MEGA-Drill-Composite-MD	SCD25	1 - 12			78
		✔	Tête interchangeable TTD, Typ 12 - Composite	Typ 12	12 - 32	✔		81
		✔	MEGA-Drill-Aramid	SCD28	3 - 12			87
		✔	MEGA-Drill-Alu	SCD13	2,8 - 19,05	✔		104
		✔	Tête interchangeable TTD, Typ 03 - Alu	Typ 03	12 - 45	✔		107
		✔	Tête interchangeable TTD, Typ 02 - Inox	Typ 02	12 - 45	✔		112
		✔	MEGA-Drill-Inco	SCD29	3 - 12	✔		114
	✔		MEGA-Drill-Composite-UDX	SCD27	3 - 12	✔		82
		✔	MEGA-Stack-Drill-CA	SCD43	3 - 12	✔		88
		✔	MEGA-Stack-Drill-CT	SCD55	3 - 12	✔		91
		✔	MEGA-Stack-Drill-Robot-CA	SCD45	8 - 20	✔		94
		✔	MEGA-Stack-Drill-Robot-CT	SCD46	8 - 20	✔		97
		✔	Tête interchangeable TTD, Typ 21 - Stack CA	Typ 21	12 - 45	✔		100
		✔	Tête interchangeable TTD, Typ 22 - Stack CT	Typ 22	12 - 45	✔		101
✔			Mono-Drill-Plastic	SCD57	0,97 - 13,03			102
		✔	MEGA-Speed-Drill-Inox	SCD41	3 - 20	✔		109
		✔	MEGA-Speed-Drill-Titan	SCD30	3 - 12	✔		115

Machining task			Product					
		H7	Product name	Cutting lead	ø [mm]			Page
✔	✔	✔	FixReam FXR510	MF1M - HC614	3 - 20	✔		122
✔	✔	✔	FixReam FXR500	MG0A - HP622	4 - 20	✔		123
✔	✔	✔	FixReam FXR510	MF1M - HP145	3 - 20	✔		124
✔	✔	✔	FixReam FXR510	MF1M - HP613	4 - 20	✔		125



GENERAL PURPOSE MILLING CUTTERS

Fibre-reinforced plastics

Sandwich constructions with honeycomb core

Plastics

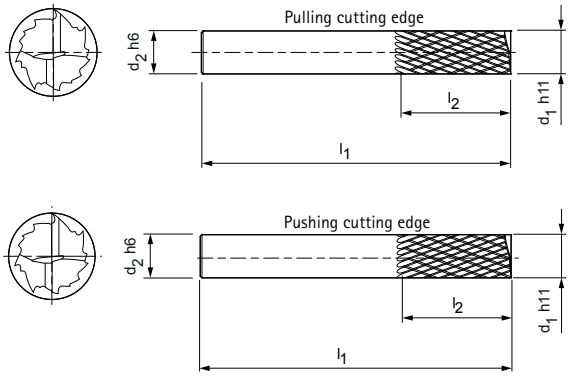
Aluminium

Titanium and super alloys

PCD milling inserts

OptiMill®-Composite-MT

Design with pushing/pulling blade
SCM40/41



Design:

Mill diameter:	4.00-20.00 mm
Cutting material:	HU211
Number of blades:	multi-tooth

Application:
Pulling cutting edges for removing chips/dust more effectively (e.g. when milling pockets and slots). Particularly suitable for cover layers that are difficult to machine (e.g. UD or copper mesh) as it prevents the occurrence of delamination on the lower edge of the part.

Pushing cutting edges push the material onto the bottom edge (this makes them very suitable for tasks using vacuum clamping). Particularly suitable for cover layers that are difficult to machine (e.g. UD or copper mesh) as it prevents the occurrence of delamination on the upper edge of the part.

Pulling cutting edge | SCM40

Dimensions				z	Specification	Order number
d_1 h11	d_2 h6	l_1	l_2			
4,00	4	50	16	Multi-tooth	SCM400-0400ZMVR-S-HA-HU211	30402599
5,00	5	50	16	Multi-tooth	SCM400-0500ZMVR-S-HA-HU211	30402600
5,00	5	75	16	Multi-tooth	SCM400-0500ZMVR-S-HA-HU211	30402601
6,00	6	60	19	Multi-tooth	SCM400-0600ZMVR-S-HA-HU211	30402602
6,00	6	75	30	Multi-tooth	SCM400-0600ZMVR-S-HA-HU211	30402603
8,00	8	63	25	Multi-tooth	SCM400-0800ZMVR-S-HA-HU211	30402604
8,00	8	75	35	Multi-tooth	SCM400-0800ZMVR-S-HA-HU211	30402605
10,00	10	72	25	Multi-tooth	SCM400-1000ZMVR-S-HA-HU211	30402606
12,00	12	83	32	Multi-tooth	SCM400-1200ZMVR-S-HA-HU211	30402607
16,00	16	92	36	Multi-tooth	SCM400-1600ZMVR-S-HA-HU211	30402608
20,00	20	104	45	Multi-tooth	SCM400-2000ZMVR-S-HA-HU211	30402609

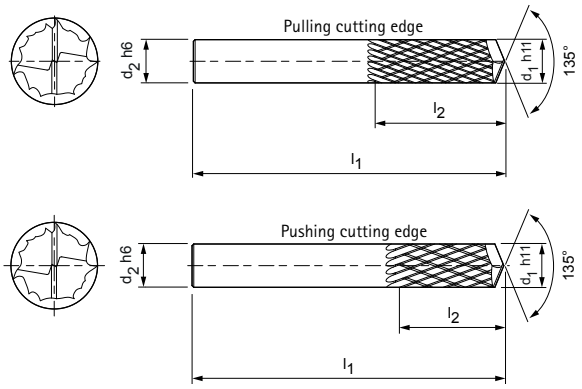
Pushing cutting edge | SCM41

Dimensions				z	Specification	Order number
d_1 h11	d_2 h6	l_1	l_2			
4,00	4	50	16	Multi-tooth	SCM410-0400ZMVR-S-HA-HU211	30402621
5,00	5	50	16	Multi-tooth	SCM410-0500ZMVR-S-HA-HU211	30402622
6,00	6	60	19	Multi-tooth	SCM410-0600ZMVR-S-HA-HU211	30402623
10,00	10	72	25	Multi-tooth	SCM410-1000ZMVR-S-HA-HU211	30402624

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

OptiMill®-Composite-MT

Design with drill bit and pulling/pushing cutting edge
SCM42/43



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
								■		■				■								

Design:

Mill diameter:	4.00-20.00 mm
Cutting material:	HU211
Number of blades:	multi-tooth

Application:

Pulling cutting edge for removing chips/dust more effectively (e.g. when milling pockets and slots). Particularly suitable for cover layers that are difficult to machine (e.g. UD or copper mesh) as it prevents the occurrence of delamination on the lower edge of the part.

Pushing cutting edges push the material onto the bottom edge (this makes them very suitable for tasks using vacuum clamping). Particularly suitable for cover layers that are difficult to machine (e.g. UD or copper mesh) as it prevents the occurrence of delamination on the upper edge of the part.

Pulling blade | SCM42

Dimensions				z	Specification	Order number
d_1 h11	d_2 h6	l_1	l_2			
4,00	4	50	16	Multi-tooth	SCM420-0400ZMVR-HA-HU211	30402629
5,00	5	50	16	Multi-tooth	SCM420-0500ZMVR-HA-HU211	30402630
5,00	5	75	16	Multi-tooth	SCM420-0500ZMVR-HA-HU211	30402631
6,00	6	60	19	Multi-tooth	SCM420-0600ZMVR-HA-HU211	30402632
6,00	6	75	30	Multi-tooth	SCM420-0600ZMVR-HA-HU211	30402633
8,00	8	60	25	Multi-tooth	SCM420-0800ZMVR-HA-HU211	30402634
8,00	8	75	35	Multi-tooth	SCM420-0800ZMVR-HA-HU211	30402635
10,00	10	72	30	Multi-tooth	SCM420-1000ZMVR-HA-HU211	30402636
12,00	12	83	32	Multi-tooth	SCM420-1200ZMVR-HA-HU211	30402637
16,00	16	92	36	Multi-tooth	SCM420-1600ZMVR-HA-HU211	30402638
20,00	20	104	45	Multi-tooth	SCM420-2000ZMVR-HA-HU211	30402639

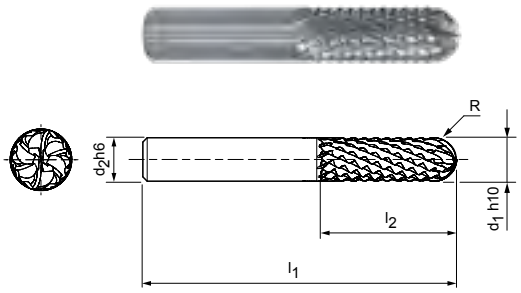
Pushing blade | SCM43

Dimensions				z	Specification	Order number
d_1 h11	d_2 h6	l_1	l_2			
4,00	4	50	16	Multi-tooth	SCM430-0400ZMVR-HA-HU211	30402651
5,00	5	50	16	Multi-tooth	SCM430-0500ZMVR-HA-HU211	30402652
6,00	6	60	19	Multi-tooth	SCM430-0600ZMVR-HA-HU211	30402653
10,00	10	72	25	Multi-tooth	SCM430-1000ZMVR-HA-HU211	30402654

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

OptiMill®-Composite-MT-Radius

Design with full radius
SCM44

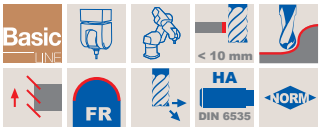


Design:

Mill diameter:	4.00-20.00 mm
Cutting material:	HU211
Number of blades:	multi-tooth

Application:
Pulling cutting edge for removing chips/dust more effectively (e.g. when milling pockets and slots). Particularly suitable for cover layers that are difficult to machine (e.g. UD or copper mesh) as it prevents the occurrence of delamination on the lower edge of the part.

N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
								■		■				■								

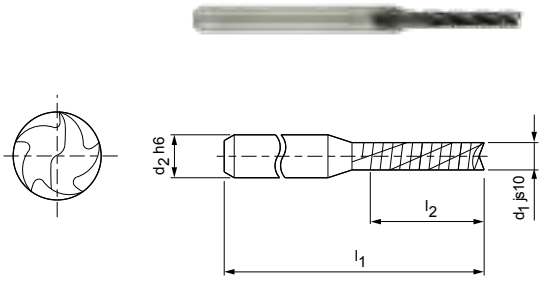


Dimensions					z	Specification	Order number
d_1 h10	d_2 h6	l_1	l_2	R			
4,00	4	50	19	2,00	Multi-tooth	SCM440-0400ZMVR-R0200HA-HU211	30402659
5,00	5	50	19	2,50	Multi-tooth	SCM440-0500ZMVR-R0250HA-HU211	30402660
5,00	5	75	19	2,50	Multi-tooth	SCM440-0500ZMVR-R0250HA-HU211	30402661
6,00	6	60	22	3,00	Multi-tooth	SCM440-0600ZMVR-R0300HA-HU211	30402662
6,00	6	75	33	3,00	Multi-tooth	SCM440-0600ZMVR-R0300HA-HU211	30402663
8,00	8	63	29	4,00	Multi-tooth	SCM440-0800ZMVR-R0400HA-HU211	30402664
8,00	8	75	39	4,00	Multi-tooth	SCM440-0800ZMVR-R0400HA-HU211	30402665
10,00	10	72	30	5,00	Multi-tooth	SCM440-1000ZMVR-R0500HA-HU211	30402666
12,00	12	83	38	6,00	Multi-tooth	SCM440-1200ZMVR-R0600HA-HU211	30402667
16,00	16	92	44	8,00	Multi-tooth	SCM440-1600ZMVR-R0800HA-HU211	30402668
20,00	20	104	55	10,00	Multi-tooth	SCM440-2000ZMVR-R1000HA-HU211	30402669

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

OptiMill®-Composite-Micro

Design with pulling cutting edge
SCM56



Design:

Mill diameter:	1.00-3.00 mm
Cutting material:	HC620
Number of blades:	multi-tooth
Special features:	Diamond coating for a long service life

Application:
Pulling cutting edge for removing chips/dust more effectively (e.g. when milling pockets and slots). Particularly suitable for cover layers that are difficult to machine (e.g. UD or copper mesh) as it prevents the occurrence of delamination on the lower edge of the part.

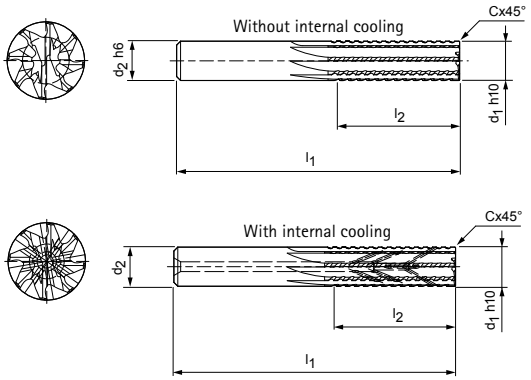
N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
										■				■								

Dimensions				z	Specification	Order number
d_1 js10	d_2 h6	l_1	l_2			
1,00	3	38	5	Multi-tooth	SCM560-0100ZMVR-S-HA-HC620	30504698
2,00	3	38	9	Multi-tooth	SCM560-0200ZMVR-S-HA-HC620	30504700
3,00	3	38	9	Multi-tooth	SCM560-0300ZMVR-S-HA-HC620	30504702

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

OptiMill®-Composite-Speed

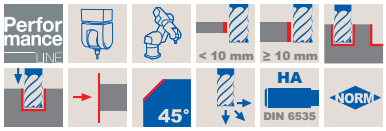
Design with straight blade
SCM45



Design:

Mill diameter:	4.00-20.00 mm
Cutting material:	HC611/HC619
Number of blades:	8
Helix angle:	0°
Special features:	Diamond coating for a long service life

Application:
Roughing and finishing CFRP in one machining step, neutral cut.



Without internal cooling

Dimensions					z	Specification	Order number
d_1 h10	d_2 h6	l_1	l_2	C x 45°			
4,00	6	60	16	0,08	8	SCM450-0400Z08R-F0008HA-HC619	30402670
5,00	6	60	18	0,10	8	SCM450-0500Z08R-F0010HA-HC619	30402671
6,00	6	75	28	0,12	8	SCM450-0600Z08R-F0012HA-HC619	30402672
8,00	8	75	32	0,16	8	SCM450-0800Z08R-F0016HA-HC619	30402673
10,00	10	72	32	0,20	8	SCM450-1000Z08R-F0020HA-HC619	30402674
12,00	12	83	32	0,20	8	SCM450-1200Z08R-F0020HA-HC611	30402675
16,00	16	92	36	0,20	8	SCM450-1600Z08R-F0020HA-HC611	30402676
20,00	20	104	45	0,20	8	SCM450-2000Z08R-F0020HA-HC611	30402677

With internal cooling

Dimensions					z	Specification	Order number
d_1 h10	d_2 h6	l_1	l_2	C x 45°			
6,00	6	75	28	0,12	8	SCM451-0600Z08R-F0012HA-HC619	30402678
8,00	8	75	32	0,16	8	SCM451-0800Z08R-F0016HA-HC619	30402679
10,00	10	72	32	0,20	8	SCM451-1000Z08R-F0020HA-HC619	30402680
12,00	12	83	32	0,20	8	SCM451-1200Z08R-F0020HA-HC611	30402681
16,00	16	92	36	0,20	8	SCM451-1600Z08R-F0020HA-HC611	30402682
20,00	20	104	45	0,20	8	SCM451-2000Z08R-F0020HA-HC611	30402683

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

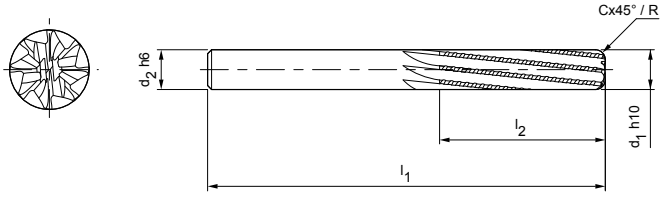
OptiMill®-Composite-Speed

Design with pulling cutting edge
SCM46

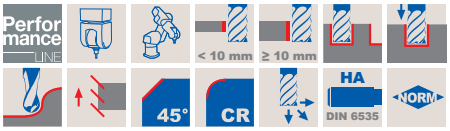
Design:

Mill diameter:	4.00-20.00 mm
Cutting material:	HC611/HC619
Number of blades:	8
Helix angle:	8°
Special features:	Diamond coating for a long service life

Application:
Pulling cutting edge for removing chips/dust more effectively (e.g. when milling pockets and slots). Particularly suitable for cover layers that are difficult to machine (e.g. UD or copper mesh) as it prevents the occurrence of delamination on the lower edge of the part.



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
										■				■		■		⬓	⬓			



Design with chamfer

Dimensions					z	Specification	Order number
d_1 h10	d_2 h6	l_1	l_2	C x 45°			
4,00	6	60	16	0,08	8	SCM460-0400Z08R-F0008HA-HC619	30402684
5,00	6	60	18	0,10	8	SCM460-0500Z08R-F0010HA-HC619	30402685
6,00	6	75	28	0,12	8	SCM460-0600Z08R-F0012HA-HC619	30402686
8,00	8	75	32	0,16	8	SCM460-0800Z08R-F0016HA-HC619	30402687
10,00	10	72	32	0,20	8	SCM460-1000Z08R-F0020HA-HC619	30402688
12,00	12	83	32	0,20	8	SCM460-1200Z08R-F0020HA-HC611	30402689
16,00	16	92	36	0,20	8	SCM460-1600Z08R-F0020HA-HC611	30402690
20,00	20	104	45	0,20	8	SCM460-2000Z08R-F0020HA-HC611	30402691

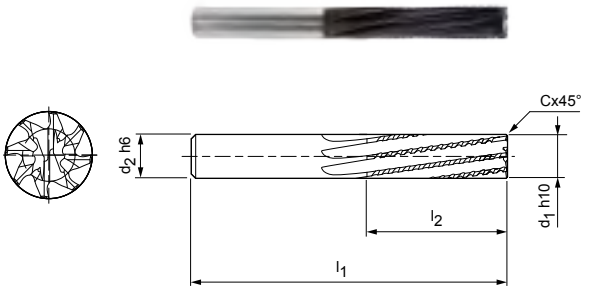
Design with corner radius

Dimensions					z	Specification	Order number
d_1 h10	d_2 h6	l_1	l_2	R			
4,00	6	60	16	1,00	8	SCM460-0400Z08R-R0100HA-HC619	30869171
5,00	6	60	18	1,25	8	SCM460-0500Z08R-R0125HA-HC619	30869172
6,00	6	60	20	1,50	8	SCM460-0600Z08R-R0150HA-HC619	30869173
6,00	6	65	25	1,50	8	SCM460-0600Z08R-R0150HA-HC619	30869174
6,00	6	75	28	1,50	8	SCM460-0600Z08R-R0150HA-HC619	30869175
8,00	8	63	22	2,00	8	SCM460-0800Z08R-R0200HA-HC619	30869176
8,00	8	75	32	2,00	8	SCM460-0800Z08R-R0200HA-HC619	30869177
10,00	10	72	32	2,50	8	SCM460-1000Z08R-R0250HA-HC619	30869178
12,00	12	83	32	3,00	8	SCM460-1200Z08R-R0300HA-HC611	30869179
16,00	16	92	36	4,00	8	SCM460-1600Z08R-R0400HA-HC611	30869180
20,00	20	104	45	5,00	8	SCM460-2000Z08R-R0500HA-HC611	30869181

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

OptiMill®-Composite-Speed

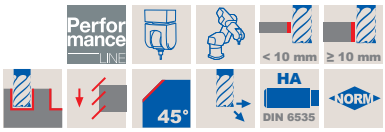
Design with pushing cutting edge
SCM47



Design:

Mill diameter:	4.00-20.00 mm
Cutting material:	HC611/HC619
Number of blades:	8
Helix angle:	-8°
Special features:	Diamond coating for a long service life

Application:
Pushing cutting edges push the material onto the bottom edge (this makes them very suitable for tasks using vacuum clamping). Particularly suitable for cover layers that are difficult to machine (e.g. UD or copper mesh) as it prevents the occurrence of delamination on the upper edge of the part.



Dimensions					z	Specification	Order number
d_1 h10	d_2 h6	l_1	l_2	C x 45°			
4,00	6	60	16	0,08	8	SCM470-0400Z08R-F0008HA-HC619	30402692
5,00	6	60	18	0,10	8	SCM470-0500Z08R-F0010HA-HC619	30402693
6,00	6	75	28	0,12	8	SCM470-0600Z08R-F0012HA-HC619	30402694
8,00	8	75	32	0,16	8	SCM470-0800Z08R-F0016HA-HC619	30402695
10,00	10	72	32	0,20	8	SCM470-1000Z08R-F0020HA-HC619	30402696
12,00	12	83	32	0,20	8	SCM470-1200Z08R-F0020HA-HC611	30402697
16,00	16	92	36	0,20	8	SCM470-1600Z08R-F0020HA-HC611	30402698
20,00	20	104	45	0,20	8	SCM470-2000Z08R-F0020HA-HC611	30402699

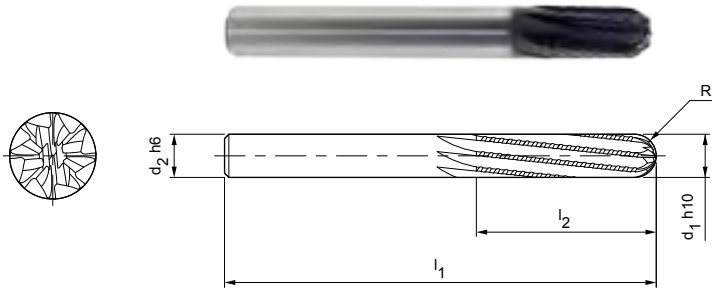
Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

OptiMill®-Composite-Speed-Radius

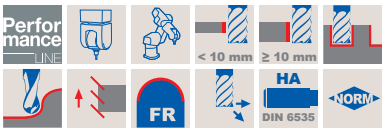
Design with full radius and pulling cutting edge
SCM87

Design:

Mill diameter:	4.00-20.00 mm
Cutting material:	HC611/HC619
Number of blades:	8
Helix angle:	8°
Special features:	Diamond coating for a long service life



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
										■				■		■		⬓	⬓			



Dimensions					z	Specification	Order number
d_1 h10	d_2 h6	l_1	l_2	R			
4,00	6	60	16	2,00	8	SCM870-0400Z08R-R0200HA-HC619	30869182
5,00	6	60	18	2,50	8	SCM870-0500Z08R-R0250HA-HC619	30869183
6,00	6	60	20	3,00	8	SCM870-0600Z08R-R0300HA-HC619	30869184
6,00	6	65	25	3,00	8	SCM870-0600Z08R-R0300HA-HC619	30869185
6,00	6	75	28	3,00	8	SCM870-0600Z08R-R0300HA-HC619	30869186
8,00	8	63	22	4,00	8	SCM870-0800Z08R-R0400HA-HC619	30869187
8,00	8	75	32	4,00	8	SCM870-0800Z08R-R0400HA-HC619	30869188
10,00	10	72	32	5,00	8	SCM870-1000Z08R-R0500HA-HC619	30869189
12,00	12	83	32	6,00	8	SCM870-1200Z08R-R0600HA-HC611	30869190
16,00	16	92	36	8,00	8	SCM870-1600Z08R-R0800HA-HC611	30869191
20,00	20	104	45	10,00	8	SCM870-2000Z08R-R1000HA-HC611	30869192

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

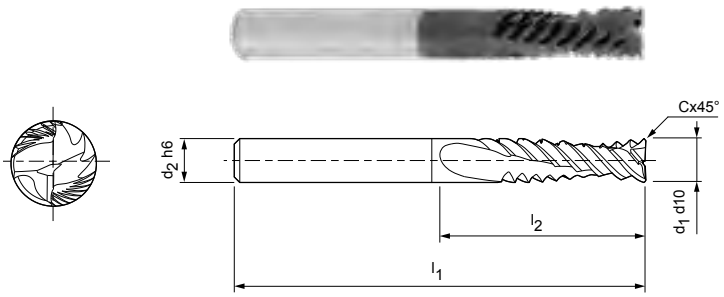
OptiMill®-Composite-UD

Coarse tooth design
SCM65

Design:

Mill diameter:	6.00-20.00 mm
Cutting material:	HC622
Number of blades:	2
Helix angle:	15°
Special features:	Diamond coating for a long service life

Application:
Coarse tooth for CFRP/GFRP > 40 % fibre content. A simultaneous pulling and pushing cut has the effect of compressing the part. This prevents delamination and fibre protrusion.



	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3
N										⬓	

	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
C		■		■						

Dimensions					z	Specification	Order number
d_1 d10	d_2 h6	l_1	l_2	C x 45°			
6,00	6	62	13	0,12	2	SCM650-0600Z02R-F0012HA-HC622	30602374
6,35	8	68	15	0,13	2	SCM650-0635Z02R-F0013HA-HC622	30602375
8,00	8	68	19	0,16	2	SCM650-0800Z02R-F0016HA-HC622	30602376
9,53	10	80	22	0,19	2	SCM650-0953Z02R-F0019HA-HC622	30602377
10,00	10	80	22	0,20	2	SCM650-1000Z02R-F0020HA-HC622	30602378
12,00	12	93	26	0,24	2	SCM650-1200Z02R-F0024HA-HC622	30602379
16,00	16	108	32	0,32	2	SCM650-1600Z02R-F0032HA-HC622	30602380
20,00	20	126	38	0,40	2	SCM650-2000Z02R-F0040HA-HC622	30602381

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

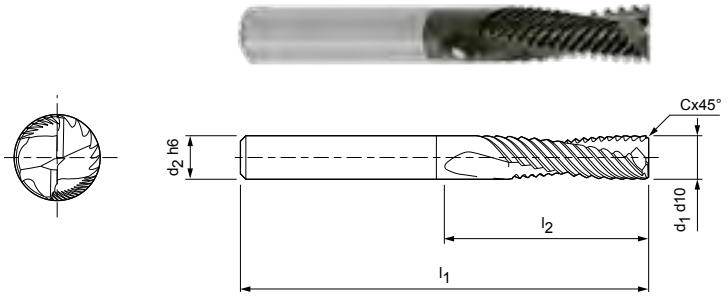
OptiMill®-Composite-UD

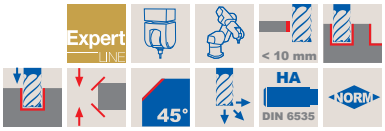
Medium tooth design
SCM66

Design:

Mill diameter:	4.00-20.00 mm
Cutting material:	HC622
Number of blades:	2
Helix angle:	15°
Special features:	Diamond coating for a long service life

Application:
Medium tooth for CFRP/GFRP > 40 % fibre content. A simultaneous pulling and pushing cut has the effect of compressing the part. This prevents delamination and fibre protrusion.





Dimensions					z	Specification	Order number
d_1 d10	d_2 h6	l_1	l_2	C x 45°			
4,00	6	62	11	0,08	2	SCM660-0400Z02R-F0008HA-HC622	30602383
5,00	6	62	13	0,10	2	SCM660-0500Z02R-F0010HA-HC622	30602384
6,00	6	62	13	0,12	2	SCM660-0600Z02R-F0012HA-HC622	30602385
6,35	8	68	15	0,13	2	SCM660-0635Z02R-F0013HA-HC622	30602386
8,00	8	68	19	0,16	2	SCM660-0800Z02R-F0016HA-HC622	30602387
9,53	10	80	22	0,19	2	SCM660-0953Z02R-F0019HA-HC622	30602388
10,00	10	80	22	0,20	2	SCM660-1000Z02R-F0020HA-HC622	30602389
12,00	12	93	26	0,24	2	SCM660-1200Z02R-F0024HA-HC622	30602390
16,00	16	108	32	0,32	2	SCM660-1600Z02R-F0032HA-HC622	30602391
20,00	20	126	38	0,40	2	SCM660-2000Z02R-F0040HA-HC622	30602392

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

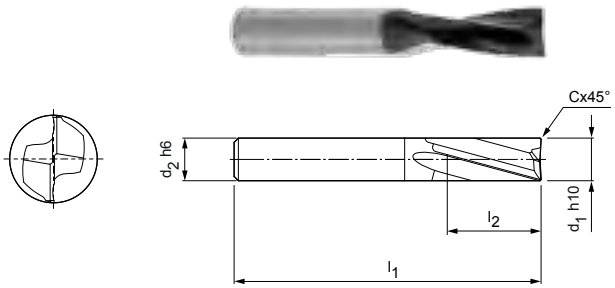
OptiMill®-Composite-Duo

SCM73

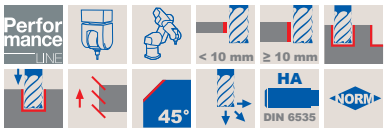
Design:

Mill diameter:	3.00-20.00 mm
Cutting material:	HC619
Number of blades:	2
Helix angle:	15°
Special features:	Diamond coating for a long service life

Application:
For finishing CFRP/GFRP parts with high surface finish requirements.



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
								■						■								

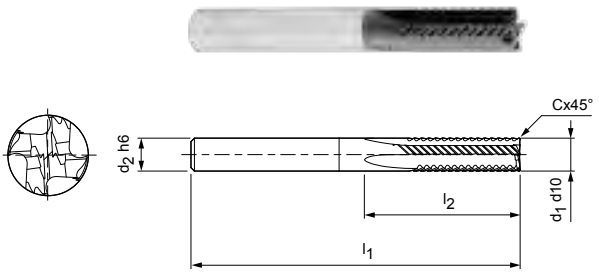


Dimensions					z	Specification	Order number
d_1 h10	d_2 h6	l_1	l_2	C x 45°			
3,00	6	57	8	0,06	2	SCM730-0300Z02R-F0006HA-HC619	30652428
4,00	6	57	11	0,08	2	SCM730-0400Z02R-F0008HA-HC619	30652429
5,00	6	57	13	0,10	2	SCM730-0500Z02R-F0010HA-HC619	30652430
6,00	6	57	13	0,12	2	SCM730-0600Z02R-F0012HA-HC619	30652431
8,00	8	63	19	0,16	2	SCM730-0800Z02R-F0016HA-HC619	30652433
10,00	10	72	22	0,20	2	SCM730-1000Z02R-F0020HA-HC619	30652434
12,00	12	83	26	0,20	2	SCM730-1200Z02R-F0020HA-HC619	30652435
14,00	14	83	26	0,20	2	SCM730-1400Z02R-F0020HA-HC619	30652436
16,00	16	92	32	0,20	2	SCM730-1600Z02R-F0020HA-HC619	30652437
18,00	18	92	32	0,20	2	SCM730-1800Z02R-F0020HA-HC619	30652438
20,00	20	104	38	0,20	2	SCM730-2000Z02R-F0020HA-HC619	30652439

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

OptiMill®-Thermoplastic-FR

SCM61

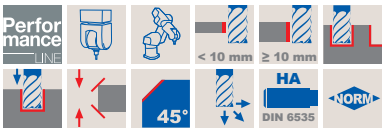


Design:

Mill diameter:	4.00-20.00 mm
Cutting material:	HC614
Number of blades:	4
Helix angle:	0°
Special features:	Diamond coating for a long service life

Application:
For machining fibre–reinforced thermoplastics cost-effectively. Special high performance teeth allow the fibres to be cut cleanly at the cutting edge, without delamination or fibre protrusion.

N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
															■							



Dimensions					z	Specification	Order number
d_1 d10	d_2 h6	l_1	l_2	C x 45°			
4,00	6	62	11	0,08	4	SCM610-0400Z04R-F0008HA-HC614	30602339
5,00	6	62	13	0,10	4	SCM610-0500Z04R-F0010HA-HC614	30602340
6,00	6	62	13	0,12	4	SCM610-0600Z04R-F0012HA-HC614	30602341
6,35	8	68	15	0,13	4	SCM610-0635Z04R-F0013HA-HC614	30602342
8,00	8	68	19	0,16	4	SCM610-0800Z04R-F0016HA-HC614	30602343
9,53	10	80	22	0,19	4	SCM610-0953Z04R-F0019HA-HC614	30602344
10,00	10	80	22	0,20	4	SCM610-1000Z04R-F0020HA-HC614	30602345
12,00	12	93	26	0,24	4	SCM610-1200Z04R-F0024HA-HC614	30602346
16,00	16	108	32	0,32	4	SCM610-1600Z04R-F0032HA-HC614	30602347
20,00	20	126	38	0,40	4	SCM610-2000Z04R-F0040HA-HC614	30602348

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

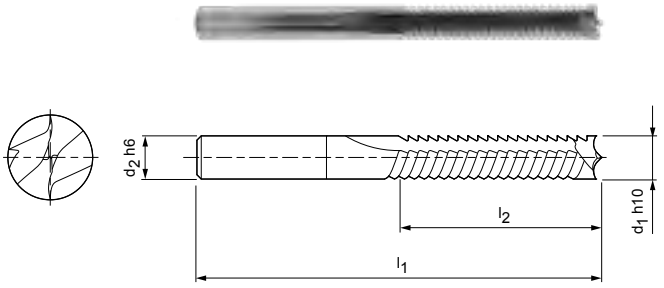
OptiMill®-Composite-TwinCut

SCM49

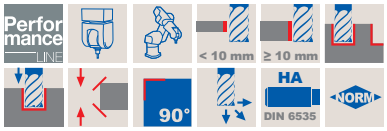
Design:

Mill diameter:	4.00-20.00 mm
Cutting material:	HU610
Number of blades:	2
Helix angle:	0°

Application:
Grooving and milling aramid fibre reinforced plastics. The alternating arrangement of the cutting edges prevents delamination and fibre protrusion at the cutting edge.



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
													■									



Dimensions				z	Specification	Order number
d_1 h10	d_2 h6	l_1	l_2			
4,00	4	75	20	2	SCM490-0400Z02R-S-HA-HU610	30402708
5,00	5	75	25	2	SCM490-0500Z02R-S-HA-HU610	30402709
6,00	6	100	35	2	SCM490-0600Z02R-S-HA-HU610	30402710
8,00	8	100	40	2	SCM490-0800Z02R-S-HA-HU610	30402711
10,00	10	125	50	2	SCM490-1000Z02R-S-HA-HU610	30402712
12,00	12	125	60	2	SCM490-1200Z02R-S-HA-HU610	30402713
16,00	16	150	75	2	SCM490-1600Z02R-S-HA-HU610	30402714
20,00	20	104	45	2	SCM490-2000Z02R-S-HA-HU610	30402715

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

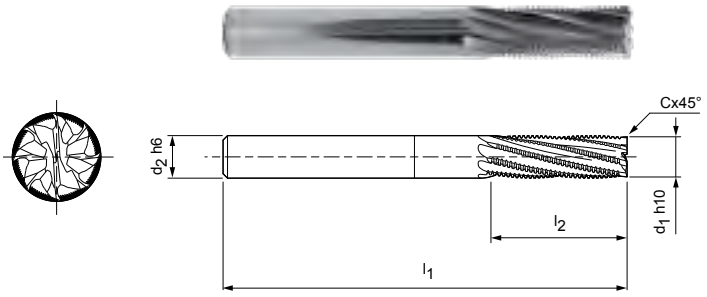
OptiMill®-Honeycomb

SCM62

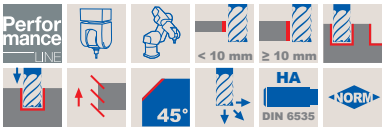
Design:

Mill diameter:	4.00-20.00 mm
Cutting material:	HU607
Number of blades:	6/8
Helix angle:	15°

Application:
For milling honeycomb with a wide variety of different cover layers. Twisted high-performance fine teeth and a sharp-edged face cut make it possible to produce cleanly-cut surfaces without damaging the unstable honeycomb structures.



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
																		■	■			



Dimensions					z	Specification	Order number
d_1 h10	d_2 h6	l_1	l_2	C x 45°			
4,00	6	57	11	0,04	6	SCM620-0400Z06R-F0004HA-HU607	30602350
5,00	6	57	13	0,05	6	SCM620-0500Z06R-F0005HA-HU607	30602351
6,00	6	57	13	0,06	8	SCM620-0600Z08R-F0006HA-HU607	30602352
6,35	8	63	15	0,06	8	SCM620-0635Z08R-F0006HA-HU607	30602353
8,00	8	63	19	0,08	8	SCM620-0800Z08R-F0008HA-HU607	30602354
9,53	10	72	22	0,10	8	SCM620-0953Z08R-F0010HA-HU607	30602355
10,00	10	72	22	0,10	8	SCM620-1000Z08R-F0010HA-HU607	30602356
12,00	12	83	26	0,12	8	SCM620-1200Z08R-F0012HA-HU607	30602357
16,00	16	92	32	0,16	8	SCM620-1600Z08R-F0016HA-HU607	30602358
20,00	20	104	38	0,20	8	SCM620-2000Z08R-F0020HA-HU607	30602359

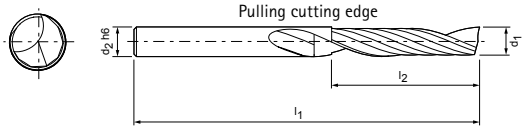
Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

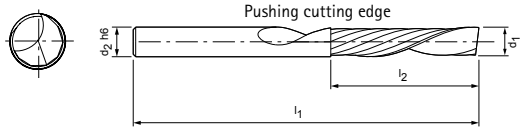
OptiMill®-Mono-Plastic

Design with pushing/pulling cutting edge
SCM33

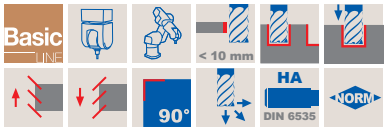
Design:

Mill diameter:	2.00-12.70 mm
Cutting material:	HU211
Number of blades:	1





N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
									■	■												



Dimensions				z	Specification*	Order number	
d_1	d_2 h6	l_1	l_2			pulling	pushing
2,00	3	38	8	1	SCM330-0200Z01[cutting behaviour]-S-HA-HU211	30393650	30393681
2,50	3	38	8	1	SCM330-0250Z01[cutting behaviour]-S-HA-HU211	30393651	30393682
3,00	3	38	10	1	SCM330-0300Z01[cutting behaviour]-S-HA-HU211	30393652	30393683
3,00	4	38	10	1	SCM330-0300Z01[cutting behaviour]-S-HA-HU211	30393653	30393684
3,00	4	50	15	1	SCM330-0300Z01[cutting behaviour]-S-HA-HU211	30393654	30393685
3,00	6	50	10	1	SCM330-0300Z01[cutting behaviour]-S-HA-HU211	30393655	30393686
3,17	6,35	38	13	1	SCM330-0317Z01[cutting behaviour]-S-HA-HU211	30393656	30393687
3,17	4,76	38	13	1	SCM330-0317Z01[cutting behaviour]-S-HA-HU211	30393657	
3,17	3,17	51	13	1	SCM330-0317Z01[cutting behaviour]-S-HA-HU211	30393658	
4,00	4	40	12	1	SCM330-0400Z01[cutting behaviour]-S-HA-HU211	30393659	30393688
4,00	4	60	20	1	SCM330-0400Z01[cutting behaviour]-S-HA-HU211	30393660	30393689
4,00	4	70	30	1	SCM330-0400Z01[cutting behaviour]-S-HA-HU211	30393661	30393690
4,00	6	50	15	1	SCM330-0400Z01[cutting behaviour]-S-HA-HU211	30393662	30393691
4,00	4	50	13	1	SCM330-0400Z01[cutting behaviour]-S-HA-HU211	30393663	30393692
4,76	4,76	51	16	1	SCM330-0476Z01[cutting behaviour]-S-HA-HU211	30393664	30393693
4,76	6,35	51	16	1	SCM330-0476Z01[cutting behaviour]-S-HA-HU211		30393694
5,00	5	50	16	1	SCM330-0500Z01[cutting behaviour]-S-HA-HU211	30393665	30393695
5,00	5	70	30	1	SCM330-0500Z01[cutting behaviour]-S-HA-HU211	30393666	30393696
5,00	5	60	15	1	SCM330-0500Z01[cutting behaviour]-S-HA-HU211	30393667	30393697
5,00	6	50	16	1	SCM330-0500Z01[cutting behaviour]-S-HA-HU211	30393668	
6,00	6	60	20	1	SCM330-0600Z01[cutting behaviour]-S-HA-HU211	30393669	30393698
6,00	6	70	30	1	SCM330-0600Z01[cutting behaviour]-S-HA-HU211	30393670	30393699
6,00	6	80	38	1	SCM330-0600Z01[cutting behaviour]-S-HA-HU211	30393671	30393700
6,35	6,35	51	19	1	SCM330-0635Z01[cutting behaviour]-S-HA-HU211	30393672	30393701
6,35	6,35	77	38	1	SCM330-0635Z01[cutting behaviour]-S-HA-HU211	30393673	
8,00	8	60	25	1	SCM330-0800Z01[cutting behaviour]-S-HA-HU211	30393674	30393702
8,00	8	80	38	1	SCM330-0800Z01[cutting behaviour]-S-HA-HU211	30393675	30393703
9,52	9,52	77	29	1	SCM330-0952Z01[cutting behaviour]-S-HA-HU211	30393676	
10,00	10	75	30	1	SCM330-1000Z01[cutting behaviour]-S-HA-HU211	30393677	30393704
10,00	10	75	20	1	SCM330-1000Z01[cutting behaviour]-S-HA-HU211	30393678	30393705
12,00	12	75	30	1	SCM330-1200Z01[cutting behaviour]-S-HA-HU211	30393679	
12,70	12,7	77	32	1	SCM330-1270Z01[cutting behaviour]-S-HA-HU211	30393680	

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

* Specification plus desired cutting behaviour
R = pulling | L = pushing

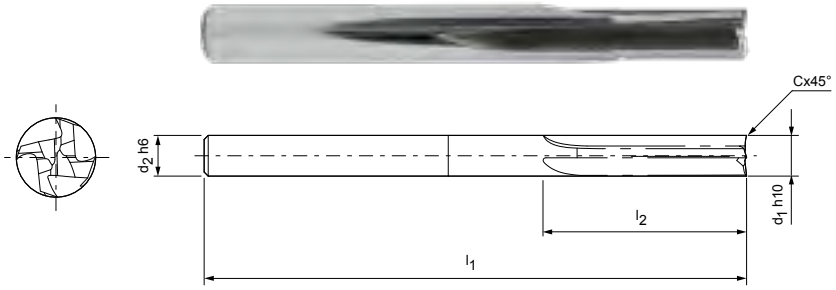
OptiMill®-Thermoplastic

SCM51

Design:

Mill diameter:	3.00-20.00 mm
Cutting material:	HU610
Number of blades:	4
Helix angle:	0 °/±3 °

Application:
For milling thermoplastics. Very sharp cutting edges reduce the heat generated during milling to a minimum, ensuring optimal chip removal.



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
									■	■												

Dimensions					z	Specification	Order number
d_1 h10	d_2 h6	l_1	l_2	C x 45°			
3,00	6	62	8	0,03	4	SCM510-0300Z04R-F0003HA-HU610	30602327
4,00	6	62	11	0,04	4	SCM510-0400Z04R-F0004HA-HU610	30602328
5,00	6	62	13	0,05	4	SCM510-0500Z04R-F0005HA-HU610	30602329
6,00	6	62	13	0,06	4	SCM510-0600Z04R-F0006HA-HU610	30602330
6,35	8	68	15	0,06	4	SCM510-0635Z04R-F0006HA-HU610	30602331
8,00	8	68	19	0,08	4	SCM510-0800Z04R-F0008HA-HU610	30602332
9,53	10	80	22	0,10	4	SCM510-0953Z04R-F0010HA-HU610	30602333
10,00	10	80	22	0,10	4	SCM510-1000Z04R-F0010HA-HU610	30602334
12,00	12	93	26	0,12	4	SCM510-1200Z04R-F0012HA-HU610	30602335
16,00	16	108	32	0,16	4	SCM510-1600Z04R-F0016HA-HU610	30602336
20,00	20	126	38	0,20	4	SCM510-2000Z04R-F0020HA-HU610	30602337

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

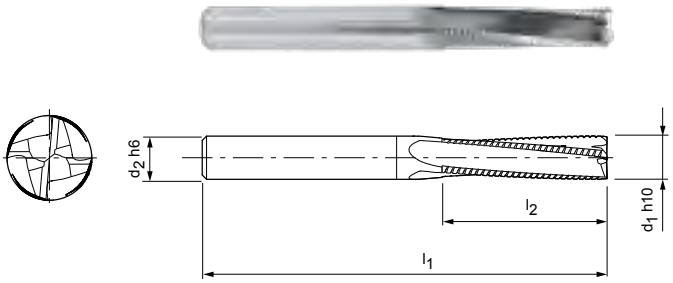
OptiMill®-Softfoam

SCM50

Design:

Mill diameter:	4.00-16.00 mm
Cutting material:	HU210
Number of blades:	4
Helix angle:	6°

Application:
For milling soft foam.



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
											■												

Dimensions				z	Specification	Order number
d_1 h10	d_2 h6	l_1	l_2			
4,00	4	60	25	4	SCM500-0400Z04R-S-HA-HU210	30402716
6,00	6	64,7	30	4	SCM500-0600Z04R-S-HA-HU210	30402717
8,00	8	75	30	4	SCM500-0800Z04R-S-HA-HU210	30402718
12,00	12	83	32	4	SCM500-1200Z04R-S-HA-HU210	30402719
16,00	16	92	36	4	SCM500-1600Z04R-S-HA-HU210	30402720

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

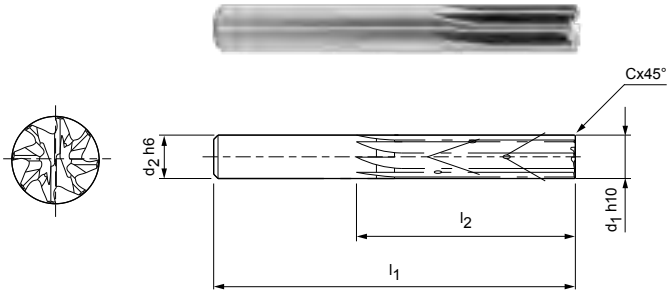
OptiMill®-Hardfoam

Design with internal cooling
SCM64

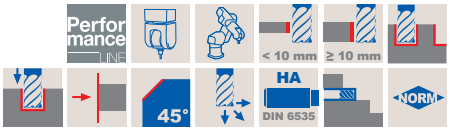
Design:

Mill diameter:	6.00-20.00 mm
Cutting material:	HU610
Number of blades:	8
Helix angle:	0°

Application:
For milling hard foam.



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
											■									■			



Dimensions					z	Specification	Order number
d_1 h10	d_2 h6	l_1	l_2	C x 45°			
6,00	6	75	28	0,12	8	SCM641-0600Z08R-F0012HA-HU610	30602396
6,35	8	75	28	0,13	8	SCM641-0635Z08R-F0013HA-HU610	30602397
8,00	8	75	32	0,16	8	SCM641-0800Z08R-F0016HA-HU610	30602398
9,53	10	72	32	0,19	8	SCM641-0953Z08R-F0019HA-HU610	30602399
10,00	10	72	32	0,20	8	SCM641-1000Z08R-F0020HA-HU610	30602400
12,00	12	83	32	0,24	8	SCM641-1200Z08R-F0024HA-HU610	30602401
16,00	16	92	36	0,32	8	SCM641-1600Z08R-F0032HA-HU610	30602402
20,00	20	104	45	0,40	8	SCM641-2000Z08R-F0040HA-HU610	30602403

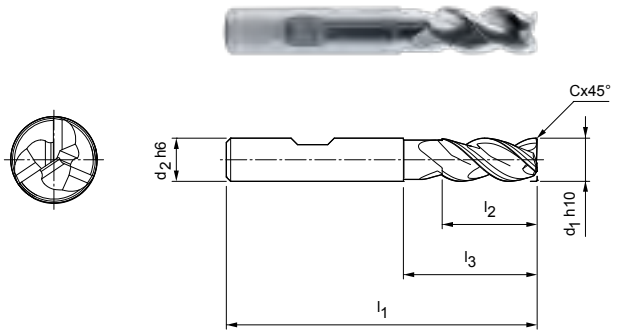
Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

OptiMill®-Alu-HPC

Design with neck
SCM27

Design:

Mill diameter:	3.00-20.00 mm
Cutting material:	HU210
Number of blades:	3
Helix angle	42°-43°
Special features:	Unequal spacing, polished flutes



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
	⬓	■	■	■	■	■	■	⬓	⬓	⬓	⬓											

Dimensions						z	Specification	Order number
d_1 h10	d_2 h6	l_1	l_2	l_3	C x 45°			
*3,00	6	57	8	-	0,06	3	SCM270-0300Z03R-F0006HB-HU210	30393590
*4,00	6	57	11	-	0,08	3	SCM270-0400Z03R-F0008HB-HU210	30393591
*5,00	6	57	13	-	0,10	3	SCM270-0500Z03R-F0010HB-HU210	30393592
6,00	6	57	13	18	0,12	3	SCM270-0600Z03R-F0012HB-HU210	30393593
8,00	8	63	21	25	0,16	3	SCM270-0800Z03R-F0016HB-HU210	30393594
10,00	10	72	22	30	0,20	3	SCM270-1000Z03R-F0020HB-HU210	30393595
12,00	12	83	26	36	0,24	3	SCM270-1200Z03R-F0024HB-HU210	30393596
16,00	16	92	36	42	0,32	3	SCM270-1600Z03R-F0032HB-HU210	30393597
20,00	20	104	41	52	0,40	3	SCM270-2000Z03R-F0040HB-HU210	30393598

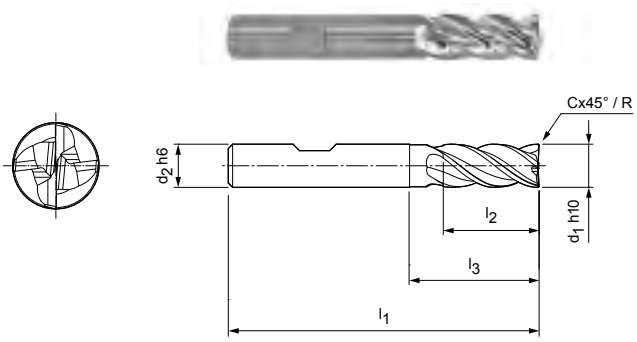
Dimensions in mm.
* Design without neck.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

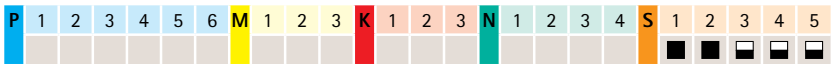
OptiMill®-Titan-HPC

Design with neck
SCM39

Design:

Mill diameter:	6.00-20.00 mm
Cutting material:	HU621
Number of blades:	4
Helix angle:	~ 39°





Dimensions							z	Specification	Order number
d_1 h10	d_2 h6	l_1	l_2	l_3	C x 45°	R			
6,00	6	57	13	20	0,12	-	4	SCM390-0600Z04R-F0012HB-HU621	30395593
6,00	6	57	13	20	-	0,50	4	SCM390-0600Z04R-R0050HB-HU621	30395594
8,00	8	63	19	25	0,16	-	4	SCM390-0800Z04R-F0016HB-HU621	30395595
8,00	8	63	19	25	-	0,50	4	SCM390-0800Z04R-R0050HB-HU621	30395596
10,00	10	72	22	30	0,20	-	4	SCM390-1000Z04R-F0020HB-HU621	30395597
10,00	10	72	22	30	-	0,50	4	SCM390-1000Z04R-R0050HB-HU621	30395598
10,00	10	72	22	30	-	1,00	4	SCM390-1000Z04R-R0100HB-HU621	30395599
12,00	12	83	26	36	0,24	-	4	SCM390-1200Z04R-F0024HB-HU621	30395600
12,00	12	83	26	36	-	0,50	4	SCM390-1200Z04R-R0050HB-HU621	30395601
12,00	12	83	26	36	-	1,00	4	SCM390-1200Z04R-R0100HB-HU621	30395602
12,00	12	83	26	36	-	1,50	4	SCM390-1200Z04R-R0150HB-HU621	30395603
14,00	14	83	26	36	0,28	-	4	SCM390-1400Z04R-F0028HB-HU621	30395604
14,00	14	83	26	36	-	1,00	4	SCM390-1400Z04R-R0100HB-HU621	30395605
16,00	16	92	36	42	0,32	-	4	SCM390-1600Z04R-F0032HB-HU621	30395606
16,00	16	92	36	42	-	1,00	4	SCM390-1600Z04R-R0100HB-HU621	30395607
16,00	16	92	36	42	-	1,50	4	SCM390-1600Z04R-R0150HB-HU621	30395609
16,00	16	92	36	42	-	2,00	4	SCM390-1600Z04R-R0200HB-HU621	30395610
20,00	20	104	41	52	0,40	-	4	SCM390-2000Z04R-F0040HB-HU621	30395611
20,00	20	104	41	52	-	1,50	4	SCM390-2000Z04R-R0150HB-HU621	30395612
20,00	20	104	41	52	-	2,00	4	SCM390-2000Z04R-R0200HB-HU621	30395613
20,00	20	104	41	52	-	2,50	4	SCM390-2000Z04R-R0250HB-HU621	30395614

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

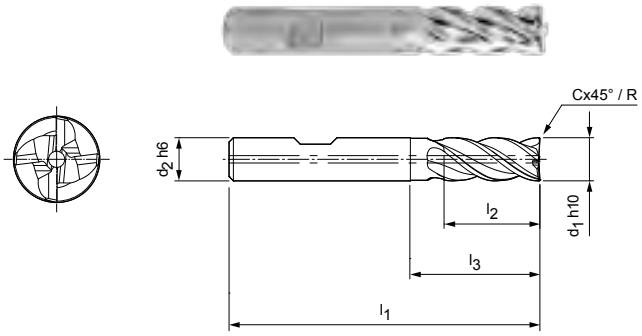
OptiMill®-Titan-HPC

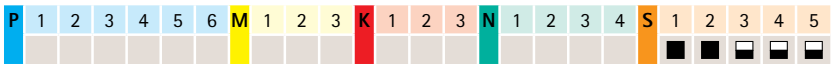
Design with neck and internal cooling
SCM39

Design:

Mill diameter:	6.00-20.00 mm
Cutting material:	HU621
Number of blades:	4
Helix angle:	~ 39°

Application:
Axial plunging not possible - max. 3° ramping.





Dimensions							z	Specification	Order number
d_1 h10	d_2 h6	l_1	l_2	l_3	C x 45°	R			
6,00	6	57	13	20	0,12	-	4	SCM391-0600Z04R-F0012HB-HU621	30395565
6,00	6	57	13	20	-	0,50	4	SCM391-0600Z04R-R0050HB-HU621	30395566
8,00	8	63	19	25	0,16	-	4	SCM391-0800Z04R-F0016HB-HU621	30395568
8,00	8	63	19	25	-	0,50	4	SCM391-0800Z04R-R0050HB-HU621	30395569
10,00	10	72	22	30	0,20	-	4	SCM391-1000Z04R-F0020HB-HU621	30395570
10,00	10	72	22	30	-	0,50	4	SCM391-1000Z04R-R0050HB-HU621	30395571
10,00	10	72	22	30	-	1,00	4	SCM391-1000Z04R-R0100HB-HU621	30395572
12,00	12	83	26	36	0,24	-	4	SCM391-1200Z04R-F0024HB-HU621	30395573
12,00	12	83	26	36	-	0,50	4	SCM391-1200Z04R-R0050HB-HU621	30395574
12,00	12	83	26	36	-	1,00	4	SCM391-1200Z04R-R0100HB-HU621	30395575
12,00	12	83	26	36	-	1,50	4	SCM391-1200Z04R-R0150HB-HU621	30395576
14,00	14	83	26	36	0,28	-	4	SCM391-1400Z04R-F0028HB-HU621	30395577
14,00	14	83	26	36	-	1,00	4	SCM391-1400Z04R-R0100HB-HU621	30395578
16,00	16	92	36	42	0,32	-	4	SCM391-1600Z04R-F0032HB-HU621	30395579
16,00	16	92	36	42	-	1,00	4	SCM391-1600Z04R-R0100HB-HU621	30395580
16,00	16	92	36	42	-	1,50	4	SCM391-1600Z04R-R0150HB-HU621	30395581
16,00	16	92	36	42	-	2,00	4	SCM391-1600Z04R-R0200HB-HU621	30395582
20,00	20	104	41	52	0,40	-	4	SCM391-2000Z04R-F0040HB-HU621	30395583
20,00	20	104	41	52	-	1,50	4	SCM391-2000Z04R-R0150HB-HU621	30395584
20,00	20	104	41	52	-	2,00	4	SCM391-2000Z04R-R0200HB-HU621	30395585
20,00	20	104	41	52	-	2,50	4	SCM391-2000Z04R-R0250HB-HU621	30395586

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

ROUGHING OF TITANIUM ALLOYS

Innovative shell end mill with indexable ISO inserts for roughing integral and structural titanium parts. Its soft cutting, smooth running and process reliability, even with high stock removal, is sure to impress.

▸ Product available on request

ADVANTAGES

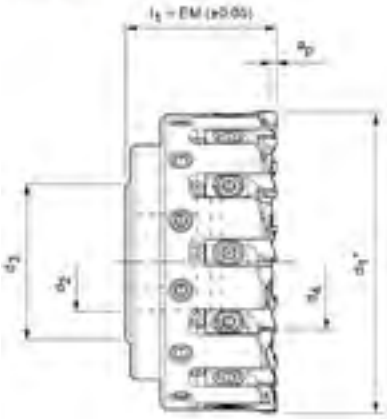
- Soft cutting, reliable process and runs very smoothly
- High performance thanks to a variety of indexable insert sizes

AT A GLANCE

- For roughing integral and structural titanium parts
- Indexable inserts installed radially
- Sealing plug on the modular variant locked directly at the clamping screw
- Each cutting edge is supplied with coolant separately

PowerFeed

PCD face milling head, close pitch
PowerMill



N 1.1 1.2 1.3 1.4 2.1 2.2 2.3 3.1 4.1 4.2 4.3 C 1.1 1.2 1.3 2.1 3.1 S 1 2 3 4 5

Steel tool body

Dimensions					z_{eff}	a_p max.	Weight incl. milling inserts [kg]	max. spindle speed [min⁻¹]	Specification	Order number
d_1*	d_2	d_3	d_4	l_1						
63	22	43	28	48	8	5	0,80	25.000	CFM901-063-CA22-Z08R-PMC-S	30696548

Aluminium tool body

80	27	49	36	50	8	5	0,75	20.000	CFM901-080-CA27-Z08R-PMC-A	30696550
100	32	59	45	50	10	5	1,20	18.000	CFM901-100-CA32-Z10R-PMC-A	30696552
125	40	71	56	63	12	5	2,25	18.550	CFM901-125-CA40-Z12R-PMC-A	30696671
125	40	71	56	63	13	5	2,20	16.000	CFM901-125-CA40-Z13R-PMC-A	30696554
160	40	98	–	63	18	5	2,15	13.000	CFM901-160-CA40-Z18R-PMC-A	30696556
180	40	104	–	63	20	5	2,60	11.500	CFM901-180-CA40-Z20R-PMC-A	30696558
200	60	138	–	63	24	5	4,40	10.000	CFM901-200-CA60-Z24R-PMC-A	30696560
250	60	138	–	63	30	5	7,00	8.000	CFM901-250-CA60-Z30R-PMC-A	30696562
315	60	236	–	80	38	5	14,10	7.000	CFM901-315-CA60-Z38R-PMC-A	30696564
400	60	236	–	80	50	5	22,10	6.100	CFM901-400-CA60-Z50R-PMC-A	30696565

Accessories

	PMC...	Milling insert	Page 58
	MCA...	Milling cutter arbor Shank HSK-A	Page 132
	d_1 160 – 180 200 – 400	Retaining screw for mill arbor ISO 4762 - M12x45-12.9 ISO 4762 - M16x50-12.9	Order number 10006594 10007775

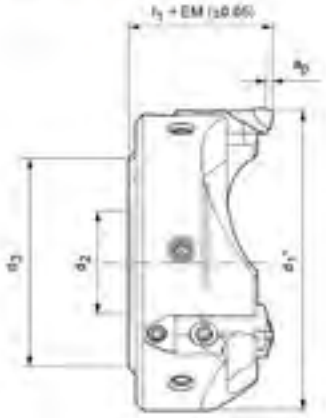
Spare parts**

		Clamping screw for Milling insert M6x13	Order number 30696520
		Adjusting screw M5x8	Order number 30696523
		Swarf protection plate Swarf protection plate (R.H.) Swarf protection plate (L.H.)	Order number 30696535 30696536
		Clamping screw for swarf protection plate M3x7.3	Order number 30696537
	d_1 63 – 125	Coolant screw	Page 129
	d_1 160 – 400	Coolant cover and retaining screw M6x20	Page 129

Dimensions in mm.
LH design available on request.
Special design with greater number of teeth available on request.
* d_1 depends on type of milling insert, see page 58.
** included in delivery.

FlyCutter

PCD-face mill, lightweight design
EcoMill



N 1.1 1.2 1.3 1.4 2.1 2.2 2.3 3.1 4.1 4.2 4.3 C 1.1 1.2 1.3 2.1 3.1 S 1 2 3 4 5

Aluminium tool body

Dimensions				z_{eff}	a_p max.	Weight incl. milling inserts [kg]	max. spindle speed [min^{-1}]	Specification	Order number
d_1*	d_2	d_3	l_1						
63	27	55	42	3	3	0,22	33.000	CFM901-063-CA27-Z03R-FMC-A	30772751
80	27	59	38	3	3	0,299	33.000	CFM901-080-CA27-Z03R-FMC-A	30388951-200
100	27	59	38	3	3	0,418	30.000	CFM901-100-CA27-Z03R-FMC-A	30381973-200
125	27	59	38	3	3	0,627	25.000	CFM901-125-CA27-Z03R-FMC-A	30389952-200
140	27	59	38	4	3	0,800	23.000	CFM901-140-CA27-Z04R-FMC-A	30466716-200
160	27	59	50	4	3	1,469	21.000	CFM901-160-CA27-Z04R-FMC-A	30508209

Accessories

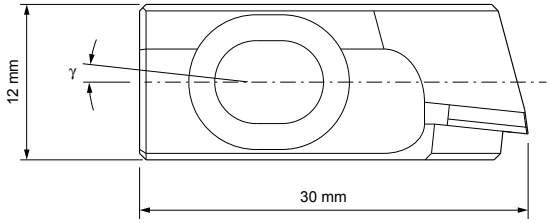
	FMC...	Milling insert	Page 59
	MCA...	Milling cutter arbor Shank BT/BBT	Page 133

Spare parts**

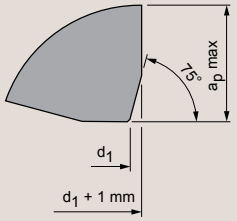
		Clamping screw for milling insert ISO 14580-M5x8-8.8-KL	Order number 30499981
		Threaded spindle M5x0.5LH/RHx17	Order number 30696525
		Adjusting wedge M5X0.5	Order number 30696526
		Locking screw ISO 4028-M4x6-45H-KL	Order number 30367364
	d_1 80 - 160	Coolant screw and washer	Page 130

Dimensions in mm
* d_1 depends on type of milling insert, see page 59
** included in delivery

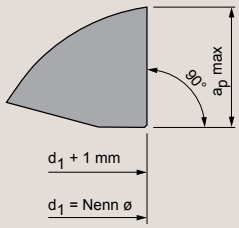
Milling inserts for PowerFeed



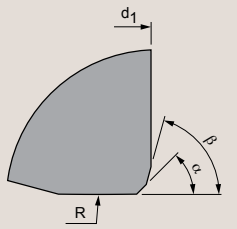
Face blade milling insert

	Rake angle γ [°]	R_z-value [µm]	a_p max.	Cutting material	Cutting direction: to the right		Cutting direction: to the left	
					Specification	Order number	Specification	Order number
	6	≤ 5	5	PU611	PMC-711-0-PU611	30696478	PMC-711-1-PU611	30696480
	6	≤ 10	5	PU611	PMC-712-0-PU611	30696482	PMC-712-1-PU611	30696484
	6	≤ 20	5	PU611	PMC-713-0-PU611	30696485	PMC-713-1-PU611	30696486
	6	> 20	5	PU611	PMC-714-0-PU611	30696488	PMC-714-1-PU611	30696489
	3	≤ 5	5	PU611	PMC-721-0-PU611	30696490	PMC-721-1-PU611	30696491
	3	≤ 10	5	PU611	PMC-722-0-PU611	30696492	PMC-722-1-PU611	30696493
	3	≤ 20	5	PU611	PMC-723-0-PU611	30696494	PMC-723-1-PU611	30696495
	3	> 20	5	PU611	PMC-724-0-PU611	30696496	PMC-724-1-PU611	30696497
	0	≤ 5	5	PU611	PMC-731-0-PU611	30696498	PMC-731-1-PU611	30696503
	0	≤ 10	5	PU611	PMC-732-0-PU611	30696504	PMC-732-1-PU611	30696505
	0	≤ 20	5	PU611	PMC-733-0-PU611	30696508	PMC-733-1-PU611	30696509
	0	> 20	5	PU611	PMC-734-0-PU611	30696511	PMC-734-1-PU611	30696512

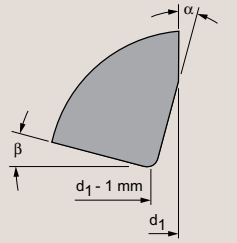
Corner blade milling insert

	6	≤ 5	5	PU611	PMC-611-0-PU611	30696446	PMC-611-1-PU611	30696448
	6	≤ 10	5	PU611	PMC-612-0-PU611	30696450	PMC-612-1-PU611	30696451
	6	≤ 20	5	PU611	PMC-613-0-PU611	30696452	PMC-613-1-PU611	30696453
	6	> 20	5	PU611	PMC-614-0-PU611	30696455	PMC-614-1-PU611	30696456
	3	≤ 5	5	PU611	PMC-621-0-PU611	30696458	PMC-621-1-PU611	30696459
	3	≤ 10	5	PU611	PMC-622-0-PU611	30696460	PMC-622-1-PU611	30696461
	3	≤ 20	5	PU611	PMC-623-0-PU611	30696462	PMC-623-1-PU611	30696463
	3	> 20	5	PU611	PMC-624-0-PU611	30696464	PMC-624-1-PU611	30696465
	0	≤ 5	5	PU611	PMC-631-0-PU611	30696466	PMC-631-1-PU611	30696470
	0	≤ 10	5	PU611	PMC-632-0-PU611	30696472	PMC-632-1-PU611	30696473
	0	≤ 20	5	PU611	PMC-633-0-PU611	30696474	PMC-633-1-PU611	30696475
	0	> 20	5	PU611	PMC-634-0-PU611	30696476	PMC-634-1-PU611	30696477

Wide face milling blade milling insert

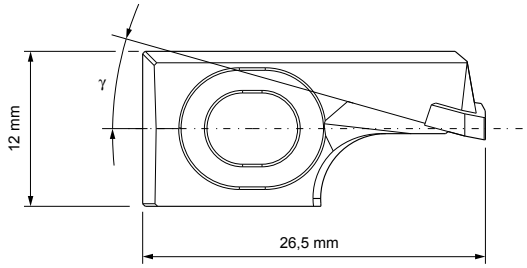
	6	< 5	5	PU611	PMC-811-0-PU611	30696513	PMC-811-1-PU611	30696515
	0	< 3	5	PU611	PMC-831-0-PU611	30696516	PMC-831-1-PU611	30696517

PT blade milling insert

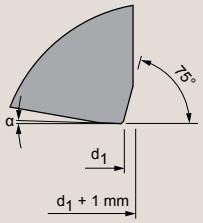
	0	≤ 5	5	PU611	PMC-931-0-PU611	30696518		

Dimensions in mm.

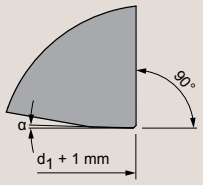
Milling inserts for FlyCutter



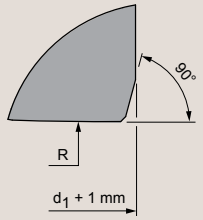
Face blade milling insert

	Rake angle γ [°]	R_z-value [µm]	a_p max.	Running direction	Cutting material	Specification	Order number
	15	≤ 5	3	R.H.	PU611	FMC-751-0-PU611	30410278-300
	15	> 20	3	R.H.	PU611	FMC-754-0-PU611	30410278-302

Corner blade milling insert

	15	≤ 10	3	R.H.	PU611	FMC-652-0-PU611	30410278-303

Wide face milling blade milling insert

	10	≤ 5	3	R.H.	PU611	FMC-841-0-PU611	30410278-301

Dimensions in mm.

HIGH-VOLUME MILLING

High-volume milling

CFS-replaceable head holder

OptiMill® -SPM

High performance mills for the high volume machining of aluminium structural parts

In the aerospace industry, aluminium structural parts, such as wing parts and frame elements are generally milled from solid material. A buy-to-fly ratio of 22 (95 %) is not uncommon here. New machine generations that have sufficient drive power and the necessary spindle speeds make the high-performance machining of aluminium parts cost effective. ADD Engineering has developed a new range of aluminium roughing mills especially for these machines.

The OptiMill-SPM (structural part machining) high performance mill is equipped with a cutting edge that makes up 60%-80% of its diameter. This represents the maximum contact depth for the high-performance milling of aluminium. Thanks to a highly positive cutting edge geometry and optimised chip flutes, the cutting force of PCD mills is reduced by up to 15%. Even when milling on standard machines, this reduction in cutting force results in more efficient machining parameters, and hence in improved performance.

The bottleneck form of the mill prevents the tool from bending during the machining process. Another advantage of this stable design is the clearance that is created between the wall of the part and the mill shank. This prevents chips from scratching the wall of the part, particularly if it has deep pockets.

OptiMill-SPM tools with internal cooling are available in a solid carbide design with a diameter range of 6 to 32 mm or in a PCD design with a diameter range of 6 to 50 mm as part of the standard range. The range of products also includes variants with the well-known CFS replaceable head system.

Tool features in detail

Roughing

OptiMill-SPM

Solid carbide design

1 Uniform point thinning
- Improved plunging capability

2 Optimal cutting edge length
- Optimal ratio between the length of the cutting edge and the diameter.

3 Highly positive rake angle
- Reduced cutting force and high surface quality thanks to a highly positive rake angle

4 Polished chip flutes
- Unhindered chip removal
- No corners or sharp edges in the chip flute

5. Conical neck
- High rigidity thanks to conical design

Finishing

OptiMill-SPM

Solid carbide design with finishing geometry *

6 New cutting edge geometry
- Low vibration cutting
- Strong performance with high wrapping

7 Polished chip flutes
- Perfect chip removal

8 Long cutting edges
- Finishing large depths in one go

MORE DESIGNS FOR ROUGHING

OptiMill-SPM

Solid carbide design with corrugated profile*

- Low vibration roughing
- Uniform material removal rate for each tooth
- Polished chip flutes
- Reduction of cutting power required

OptiMill-Diamond-SPM

PCD design

- High stability during machining thanks to optimally embedded PCD blades
- No notching effects or protrusions
- Increased axis angle

CPMill-SPM

Solid carbide design with replaceable head system

- Cost effective thanks to CFS -replaceable head system

* On request

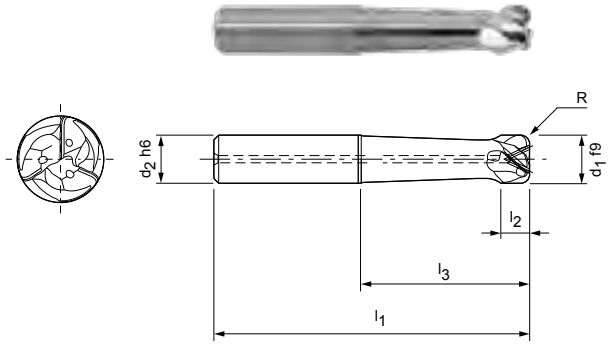
OptiMill®-SPM

Solid carbide design with internal cooling
SCM68/69

Design:

Mill diameter:	6.00-32.00 mm
Cutting material:	HU610
Number of blades:	3
Helix angle:	43°

Application:
High-volume machining of aluminium structural parts.



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
	■	■	■	■																		

Short design | SCM68

Dimensions						z	Specification	Order number
d_1 f9	d_2 h6	l_1	l_2	l_3	R			
14,00	16	77	11,2	24,5	3,00	3	SCM681-1400Z03R-R0300HA-HU610	30551337
15,00	16	78	12	26,25	3,00	3	SCM681-1500Z03R-R0300HA-HU610	30551339
16,00	16	81	12,8	28	3,00	3	SCM681-1600Z03R-R0300HA-HU610	30551341
18,00	20	87	14,4	31,5	3,00	3	SCM681-1800Z03R-R0300HA-HU610	30551342
20,00	20	90	16	35	3,00	3	SCM681-2000Z03R-R0300HA-HU610	30551344
25,00	25	107	20	43,75	4,00	3	SCM681-2500Z03R-R0400HA-HU610	30551345
32,00	32	125	25,6	56	4,00	3	SCM681-3200Z03R-R0400HA-HU610	30551346

Long design | SCM69

Dimensions						z	Specification	Order number
d_1 f9	d_2 h6	l_1	l_2	l_3	R			
6,00	6	60	4,8	19,5	1,00	3	SCM691-0600Z03R-R0100HA-HU610	30551334
8,00	8	70	6,4	26	1,00	3	SCM691-0800Z03R-R0100HA-HU610	30551333
10,00	10	80	8	32,5	2,00	3	SCM691-1000Z03R-R0200HA-HU610	30551331
12,00	12	90	9,6	39	2,00	3	SCM691-1200Z03R-R0200HA-HU610	30551330
14,00	16	99	11,2	45,5	3,00	3	SCM691-1400Z03R-R0300HA-HU610	30551348
15,00	16	100	12	48,75	3,00	3	SCM691-1500Z03R-R0300HA-HU610	30551349
16,00	16	105	12,8	52	3,00	3	SCM691-1600Z03R-R0300HA-HU610	30551350
18,00	20	114	14,4	58,5	3,00	3	SCM691-1800Z03R-R0300HA-HU610	30551351
20,00	20	120	16	65	3,00	3	SCM691-2000Z03R-R0300HA-HU610	30551352
25,00	25	145	20	81,25	4,00	3	SCM691-2500Z03R-R0400HA-HU610	30551353
32,00	32	173	25,6	104	4,00	3	SCM691-3200Z03R-R0400HA-HU610	30551354

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

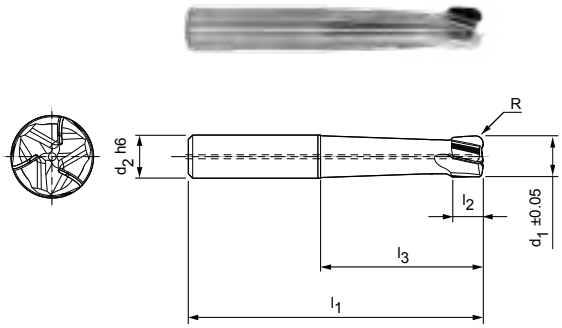
OptiMill®-Diamond-SPM

Design with PCD blades and internal cooling*
SHM10/11

Design:

Mill diameter:	6.00-32.00 mm
Cutting material:	PU622
Number of blades:	3
Axis angle:	9/12 °
Special features:	PCD blades for a long service life

Application:
High-volume machining of aluminium structural parts.



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
	■	■	■	■																		

Short design | SHM10

Dimensions						z	Specification	Order number
d_1 (±0.05)	d_2 h6	l_1	l_2	l_3	R			
14,00	16	77	10	28	3,00	3	SHM101-1400BZ03R-R0300HA-PU622	30552836
15,00	16	78	10,6	29	3,00	3	SHM101-1500CZ03R-R0300HA-PU622	30552839
16,00	16	81	11,4	32	3,00	3	SHM101-1600CZ03R-R0300HA-PU622	30552842
18,00	20	87	12,8	36	3,00	3	SHM101-1800CZ03R-R0300HA-PU622	30552844
20,00	20	90	14,2	39	3,00	3	SHM101-2000CZ03R-R0300HA-PU622	30552846
25,00	25	107	17,8	50	4,00	3	SHM101-2500DZ03R-R0400HA-PU622	30552849
32,00	32	125	20	64	4,00	3	SHM101-3200DZ03R-R0400HA-PU622	30552851

Long design | SHM11

Dimensions						z	Specification	Order number
d_1 (±0.05)	d_2 h6	l_1	l_2	l_3	R			
6,00	6	60	6	23	1,00	3	SHM110-0600BZ03R-R0100HA-PU622	30552830
8,00	8	70	7	33	1,00	3	SHM110-0800BZ03R-R0100HA-PU622	30552832
10,00	10	80	7,5	39	2,00	3	SHM111-1000BZ03R-R0200HA-PU622	30552833
12,00	12	90	8,5	44	2,00	3	SHM111-1200BZ03R-R0200HA-PU622	30552834
14,00	16	99	10	50	3,00	3	SHM111-1400BZ03R-R0300HA-PU622	30552837
15,00	16	100	10,6	51	3,00	3	SHM111-1500CZ03R-R0300HA-PU622	30552841
16,00	16	105	11,4	56	3,00	3	SHM111-1600CZ03R-R0300HA-PU622	30552843
18,00	20	114	12,8	63	3,00	3	SHM111-1800CZ03R-R0300HA-PU622	30552845
20,00	20	120	14,2	69	3,00	3	SHM111-2000CZ03R-R0300HA-PU622	30552847
25,00	25	145	17,8	88	4,00	3	SHM111-2500DZ03R-R0400HA-PU622	30552850
32,00	32	173	20	112	4,00	3	SHM111-3200DZ03R-R0400HA-PU622	30552852

Dimensions in mm.
* Internal cooling from ø 10 mm.
Cutting data recommendation from page 234.
Special designs available on request.

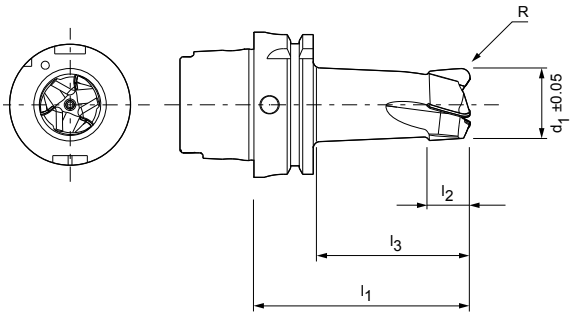
OptiMill®-Diamond-SPM

Design with HSK-A connection and internal cooling
SHM12

Design:

Mill diameter:	32.00-50.00 mm
Cutting material:	PU622
Number of blades:	3/4
Helix angle:	12°
Special features:	PCD blades for a long service life

Application:
High-volume machining of aluminium structural parts.



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
	■	■	■	■																		

With HSK-A63 connection

Dimensions					z	Specification	Order number
d_1 (±0.05)	l_1	l_2	l_3	R			
32,00	86	17	57	4,00	3	SHM121-3200Z03R-R0400A6-PU622	30583603
40,00	98	17	70	4,00	4	SHM121-4000Z04R-R0400A6-PU622	30597953
50,00	109	20	80	4,00	4	SHM121-5000Z04R-R0400A6-PU622	30590483

With HSK-A63 with enlarged face connection 80

Dimensions					z	Specification	Order number
d_1 (±0.05)	l_1	l_2	l_3	R			
32,00	86	17	57	4,00	3	SHM121-3200Z03R-R0400A6-PU622	30625821
50,00	109	20	80	4,00	4	SHM121-5000Z04R-R0400A6-PU622	30625820

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

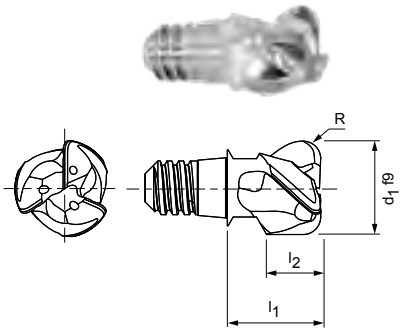
CPMill®-SPM

Design with CFS connection and internal cooling
CPM27

Design:

Mill diameter:	14.00-25.00 mm
Cutting material:	HU610
Number of blades:	3
Helix angle:	43°

Application:
High-volume machining of aluminium structural parts.



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
	■	■	■	■																		

Dimensions					z	a_p max.	Wrench size (SW)	Specification	Order number
d_1 f9	CFS-size	l_1	l_2	R					
14,00	10	17,5	11,2	3,00	3	11,2	SW 11	CPM271-1400Z03-R0300-10-HU610	30551355
15,00	10	18,75	12	3,00	3	12	SW 11	CPM271-1500Z03-R0300-10-HU610	30551356
16,00	10	20	12,8	3,00	3	12,8	SW 11	CPM271-1600Z03-R0300-10-HU610	30551357
18,00	12	22,5	14,4	3,00	3	14,4	SW 13	CPM271-1800Z03-R0300-12-HU610	30551358
20,00	14	25	16	3,00	3	16	SW 15	CPM271-2000Z03-R0300-14-HU610	30551359
25,00	16	31,25	20	4,00	3	20	SW 18	CPM271-2500Z03-R0400-16-HU610	30551360

Accessories

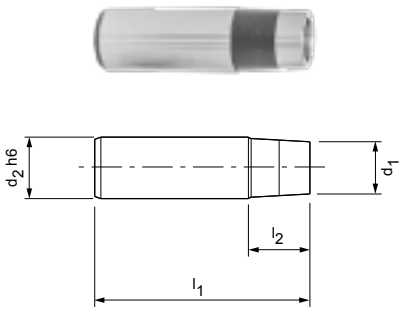
	CFS-replaceable head holder CFS401	Page 68

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

CFS-replaceable head holder

Conical design with internal cooling, optimised for replaceable head mill SPM CFS401

Application:
For use with replaceable head mill SPM CPM27.



HA DIN 6535

Short steel design

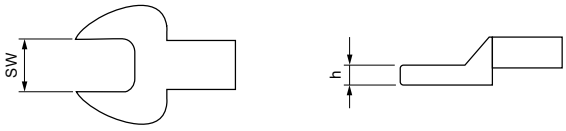
Dimensions					Specification	Order number
CFS size	d_1	d_2 h6	l_1	l_2		
10*	12	16	63	14	CFS401N-10-014-ZYL-HA16-S	30550452
10**	13	16	65	16	CFS401N-10-016-ZYL-HA16-S	30557517
12	15	20	69	18	CFS401N-12-018-ZYL-HA20-S	30550444
14	17	20	70	19	CFS401N-14-019-ZYL-HA20-S	30557520
16	22	25	82	25	CFS401N-16-025-ZYL-HA25-S	30550443

Long solid carbide design with steel connection

Dimensions					Specification	Order number
CFS size	d_1	d_2 h6	l_1	l_2		
10*	12	16	85	36	CFS401N-10-036-ZYL-HA16-H	30550450
10**	13	16	89	40	CFS401N-10-040-ZYL-HA16-H	30557519
12	15	20	96	45	CFS401N-12-045-ZYL-HA20-H	30550916
14	17	20	100	49	CFS401N-14-049-ZYL-HA20-H	30557521
16	22	25	120	63	CFS401N-16-063-ZYL-HA25-H	30550441

Dimensions in mm.
* Suitable for replaceable head mill with d_1 = 14 mm and 15 mm.
** Suitable for replaceable head mill with d_1 = 16 mm.

Accessories - assembly aid



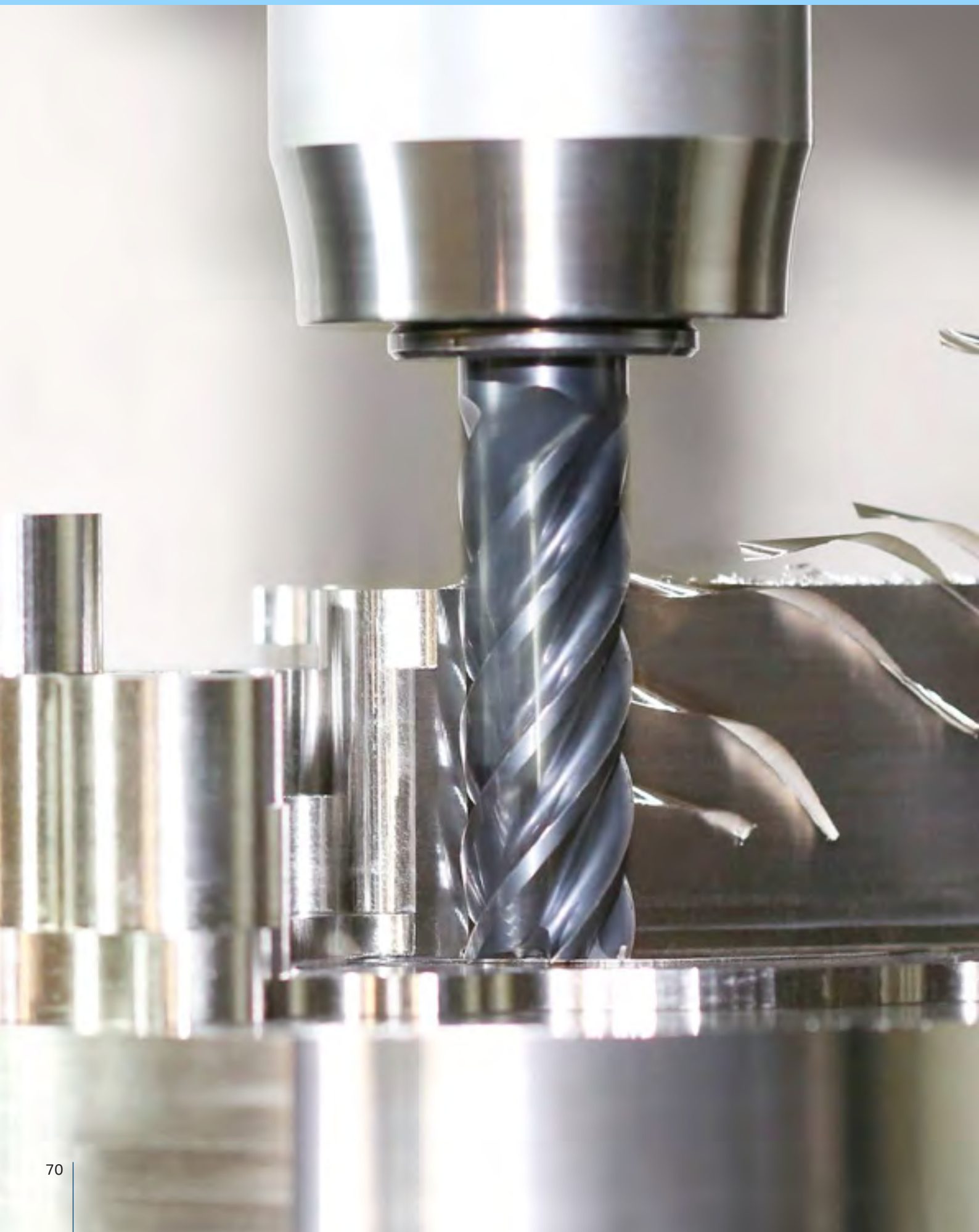
Open-ended wrench attachments

Dimensions			Order number
Spanner size (SW)	h	Attachment shank	
SW 11	3,8	9 x 12	30672376
SW 13	3,8	9 x 12	30376392
SW 15	3,8	9 x 12	30376393
SW 18	4,8	9 x 12	30673296

Torque wrench

Attachment shank	Tighten torque [Nm]	Total length l_1	Order number
9x12	2 - 25	274	30386735
14x18	20 - 200	470,5	30386736

Dimensions in mm.

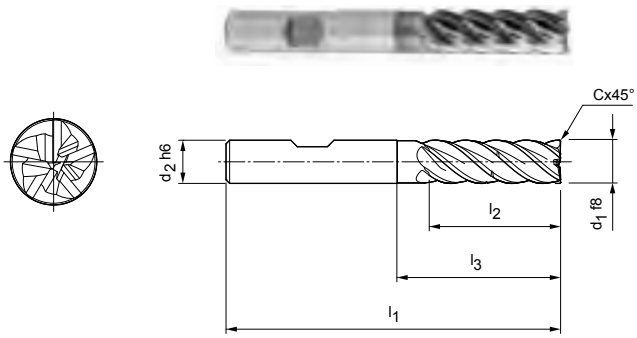


TROCHOIDAL MILLING

Trochoidal milling

OptiMill®-PM-Trochoid

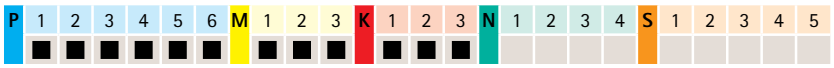
3xD design with neck
SCM59



Design:

Mill diameter:	4.00-25.00 mm
Cutting material:	HP723
Number of blades:	5
Helix angle:	41°-42°
Balancing quality:	Insert section balanced to G2.5 in accordance with DIN ISO 1940-G2.5
Special features:	Unequal spacing

Application:
Specifically for trochoidal milling - part-contact cutting/trimming. For cutting depths of up to 3xD with a special chip breaker for optimum chip control.

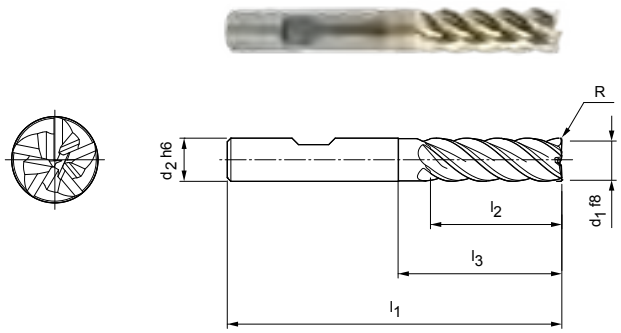


Dimensions						z	Specification	Order number
d_1 f8	d_2 h6	l_1	l_2	l_3	C x 45°			
4,00	6	62	16	23	0,08	5	SCM590-0400Z05R-F0008HB-HP723	30563364
5,00	6	62	17	24	0,10	5	SCM590-0500Z05R-F0010HB-HP723	30563365
6,00	6	62	18	25	0,12	5	SCM590-0600Z05R-F0012HB-HP723	30563366
8,00	8	68	24	30	0,16	5	SCM590-0800Z05R-F0016HB-HP723	30563367
10,00	10	80	30	35	0,20	5	SCM590-1000Z05R-F0020HB-HP723	30563368
12,00	12	93	36	45	0,24	5	SCM590-1200Z05R-F0024HB-HP723	30563369
14,00	14	99	42	50	0,28	5	SCM590-1400Z05R-F0028HB-HP723	30563370
16,00	16	108	48	55	0,32	5	SCM590-1600Z05R-F0032HB-HP723	30563371
18,00	18	117	54	67	0,36	5	SCM590-1800Z05R-F0036HB-HP723	30615879
20,00	20	126	60	70	0,40	5	SCM590-2000Z05R-F0040HB-HP723	30563372
25,00	25	150	75	92	0,50	5	SCM590-2500Z05R-F0050HB-HP723	30615113

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

OptiMill®-Titan-Trochoid

3xD design with neck
SCM63



Design:

Mill diameter:	5.00-25.00 mm
Cutting material:	HP620
Number of blades:	5
Helix angle:	41°-42°
Balancing quality:	Insert section balanced to G2.5 in accordance with DIN ISO 1940-G2.5
Special features:	Unequal spacing

Application:
Specifically for trochoidal milling - part-contact cutting/trimming. For cutting depths of up to 3xD.

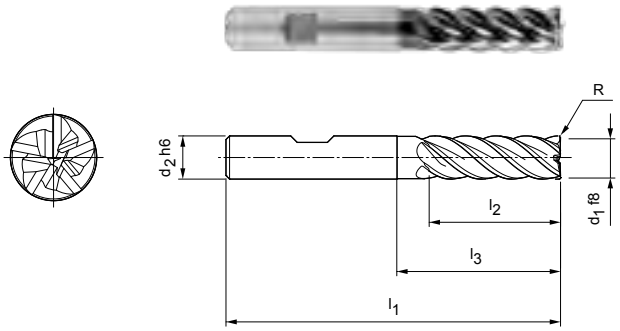
P	1	2	3	4	5	6	M	1	2	3	K	1	2	3	N	1	2	3	4	S	1	2	3	4	5

Dimensions						z	Specification	Order number
d_1 f8	d_2 h6	l_1	l_2	l_3	R			
5,00	6	62	17	24	0,10	5	SCM630-0500Z05R-R0010HB-HP620	30651031
6,00	6	62	18	25	0,10	5	SCM630-0600Z05R-R0010HB-HP620	30651032
8,00	8	68	24	30	0,20	5	SCM630-0800Z05R-R0020HB-HP620	30651033
10,00	10	80	30	35	0,20	5	SCM630-1000Z05R-R0020HB-HP620	30651034
12,00	12	93	36	45	0,30	5	SCM630-1200Z05R-R0030HB-HP620	30651035
14,00	14	99	42	50	0,30	5	SCM630-1400Z05R-R0030HB-HP620	30651036
16,00	16	108	48	55	0,30	5	SCM630-1600Z05R-R0030HB-HP620	30651037
18,00	18	117	54	67	0,30	5	SCM630-1800Z05R-R0030HB-HP620	30651038
20,00	20	126	60	70	0,30	5	SCM630-2000Z05R-R0030HB-HP620	30651039
25,00	25	150	75	92	0,40	5	SCM630-2500Z05R-R0040HB-HP620	30651040

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

OptiMill®-S-Trochoid

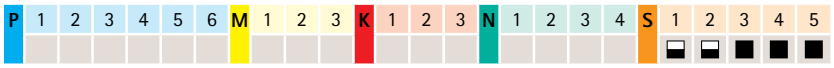
3xD design with neck
SCM60



Design:

Mill diameter:	5.00-25.00 mm
Cutting material:	HP219
Number of blades:	5
Helix angle:	41°-42°
Balancing quality:	Insert section balanced to G2.5 in accordance with DIN ISO 1940-G2.5
Special features:	Unequal spacing

Application:
Specifically for trochoidal milling - part-contact cutting/trimming. For cutting depths of up to 3xD.



Dimensions						z	Specification	Order number
d_1 f8	d_2 h6	l_1	l_2	l_3	R			
5,00	6	62	17	24	0,10	5	SCM600-0500Z05R-R0010HB-HP219	30564633
6,00	6	62	18	25	0,10	5	SCM600-0600Z05R-R0010HB-HP219	30564634
8,00	8	68	24	30	0,20	5	SCM600-0800Z05R-R0020HB-HP219	30564635
10,00	10	80	30	35	0,20	5	SCM600-1000Z05R-R0020HB-HP219	30564636
12,00	12	93	36	45	0,30	5	SCM600-1200Z05R-R0030HB-HP219	30564637
14,00	14	99	42	50	0,30	5	SCM600-1400Z05R-R0030HB-HP219	30564638
16,00	16	108	48	55	0,30	5	SCM600-1600Z05R-R0030HB-HP219	30564639
18,00	18	117	54	67	0,30	5	SCM600-1800Z05R-R0030HB-HP219	30605011
20,00	20	126	60	70	0,30	5	SCM600-2000Z05R-R0030HB-HP219	30564640
25,00	25	150	75	92	0,40	5	SCM600-2500Z05R-R0040HB-HP219	30605016

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

NOTE:

- In addition to a modern CAM system or a modern machine control system, trochoidal milling also requires a machining centre that is as dynamic as possible
- Total efficiency can be achieved by using OptiMill mills from the trochoidal range

▸ You can find further information regarding trochoidal milling on page 226

DRILLING

Fibre-reinforced plastics

Multilayer composite materials - stacks

Plastics and aluminium

Inox, titanium and super alloys

Replaceable head holder TTS

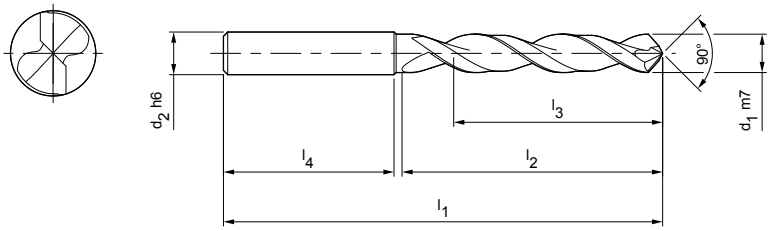
MEGA-Drill-Composite-MD

Solid carbide twist drill
SCD25 (5xD), external coolant supply

Design:

Drill diameter:	1.00-12.00 mm
Cutting material:	HC611/614/619
Number of blades:	2
Number of guide chamfers:	2
Tip angle:	90°
Helix angle:	35°

Application:
CFRP with multidirectional fibre structure.



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
								■						■	■	■		⬓	⬓			

Dimensions							Specification	Order number
d_1 m7 [mm]	d_1 m7 [inch]	d_2 h6	l_1	l_2	l_3	l_4		
1,00		4	45	7	6	31	SCD250-0100-2-2-090HA05-HC614	30894662
1,10		4	45	7,5	6	30,5	SCD250-0110-2-2-090HA05-HC614	30894663
1,20		4	45	8,5	7	30	SCD250-0120-2-2-090HA05-HC614	30894664
1,30		4	45	9	7	29,5	SCD250-0130-2-2-090HA05-HC614	30894665
1,40		4	45	10	8	29	SCD250-0140-2-2-090HA05-HC614	30894666
1,50		4	50	10,5	8	33,5	SCD250-0150-2-2-090HA05-HC619	30894667
1,60		4	50	11	9	33	SCD250-0160-2-2-090HA05-HC619	30894668
1,70		4	50	12	9	32,5	SCD250-0170-2-2-090HA05-HC619	30894669
1,80		4	50	12,5	10	32	SCD250-0180-2-2-090HA05-HC619	30894670
1,90		4	50	13,5	10	31,5	SCD250-0190-2-2-090HA05-HC619	30894671
2,00		4	50	14	11	31	SCD250-0200-2-2-090HA05-HC619	30894672
2,10		4	55	14,5	12	35,5	SCD250-0210-2-2-090HA05-HC619	30894673
2,20		4	55	15,5	12	34,5	SCD250-0220-2-2-090HA05-HC619	30894674
2,30		4	55	16	13	34	SCD250-0230-2-2-090HA05-HC619	30894675
2,40		4	55	17	13	33,5	SCD250-0240-2-2-090HA05-HC619	30894676
2,50		6	66	24	19	36	SCD250-0250-2-2-090HA05-HC619	30401897
2,60		6	66	24	19	36	SCD250-0260-2-2-090HA05-HC619	30401898
2,70		6	66	24	19	36	SCD250-0270-2-2-090HA05-HC619	30401899
2,80		6	66	24	19	36	SCD250-0280-2-2-090HA05-HC619	30401900
2,90		6	66	24	19	36	SCD250-0290-2-2-090HA05-HC619	30401901
3,00		6	66	28	23	36	SCD250-0300-2-2-090HA05-HC619	30401902
3,10		6	66	28	23	36	SCD250-0310-2-2-090HA05-HC619	30401903
3,175	1/8	6	66	28	23	36	SCD250-03175-2-2-090HA05-HC619	30401904
3,20		6	66	28	23	36	SCD250-0320-2-2-090HA05-HC619	30401905
3,30		6	66	28	23	36	SCD250-0330-2-2-090HA05-HC619	30401906
3,40		6	66	28	23	36	SCD250-0340-2-2-090HA05-HC619	30401907
3,50		6	66	28	23	36	SCD250-0350-2-2-090HA05-HC619	30401908
3,60		6	66	28	23	36	SCD250-0360-2-2-090HA05-HC619	30401909
3,70		6	66	28	23	36	SCD250-0370-2-2-090HA05-HC619	30401910
3,80		6	66	28	23	36	SCD250-0380-2-2-090HA05-HC619	30401911
3,90		6	66	28	23	36	SCD250-0390-2-2-090HA05-HC619	30401912
4,00		6	74	36	29	36	SCD250-0400-2-2-090HA05-HC619	30401913
4,10		6	74	36	29	36	SCD250-0410-2-2-090HA05-HC619	30401914
4,20		6	74	36	29	36	SCD250-0420-2-2-090HA05-HC619	30401915
4,30		6	74	36	29	36	SCD250-0430-2-2-090HA05-HC619	30401916

Mono-Drill-Composite-MD | Solid carbide twist drill SCD25 (5xD), external coolant supply

Dimensions							Specification	Order number
d_1 m7 [mm]	d_1 m7 [inch]	d_2 h6	l_1	l_2	l_3	l_4		
4,40		6	74	36	29	36	SCD250-0440-2-2-090HA05-HC619	30401917
4,50		6	74	36	29	36	SCD250-0450-2-2-090HA05-HC619	30401918
4,60		6	74	36	29	36	SCD250-0460-2-2-090HA05-HC619	30401919
4,70		6	74	36	29	36	SCD250-0470-2-2-090HA05-HC619	30401920
4,763	3/16	6	74	36	29	36	SCD250-04763-2-2-090HA05-HC619	30401921
4,80		6	74	36	29	36	SCD250-0480-2-2-090HA05-HC619	30401922
4,90		6	74	36	29	36	SCD250-0490-2-2-090HA05-HC619	30401923
5,00		6	82	44	35	36	SCD250-0500-2-2-090HA05-HC619	30401924
5,10		6	82	44	35	36	SCD250-0510-2-2-090HA05-HC619	30401925
5,20		6	82	44	35	36	SCD250-0520-2-2-090HA05-HC619	30401926
5,30		6	82	44	35	36	SCD250-0530-2-2-090HA05-HC619	30401927
5,40		6	82	44	35	36	SCD250-0540-2-2-090HA05-HC619	30401928
5,50		6	82	44	35	36	SCD250-0550-2-2-090HA05-HC619	30401929
5,60		6	82	44	35	36	SCD250-0560-2-2-090HA05-HC619	30401930
5,70		6	82	44	35	36	SCD250-0570-2-2-090HA05-HC619	30401931
5,80		6	82	44	35	36	SCD250-0580-2-2-090HA05-HC619	30401932
5,90		6	82	44	35	36	SCD250-0590-2-2-090HA05-HC619	30401933
6,00		6	82	44	35	36	SCD250-0600-2-2-090HA05-HC619	30401934
6,10		8	91	53	43	36	SCD250-0610-2-2-090HA05-HC619	30401935
6,20		8	91	53	43	36	SCD250-0620-2-2-090HA05-HC619	30401936
6,30		8	91	53	43	36	SCD250-0630-2-2-090HA05-HC619	30401937
6,35	1/4	8	91	53	43	36	SCD250-06350-2-2-090HA05-HC619	30401938
6,40		8	91	53	43	36	SCD250-0640-2-2-090HA05-HC619	30401939
6,50		8	91	53	43	36	SCD250-0650-2-2-090HA05-HC619	30401940
6,60		8	91	53	43	36	SCD250-0660-2-2-090HA05-HC619	30401941
6,70		8	91	53	43	36	SCD250-0670-2-2-090HA05-HC619	30401942
6,80		8	91	53	43	36	SCD250-0680-2-2-090HA05-HC619	30401943
6,90		8	91	53	43	36	SCD250-0690-2-2-090HA05-HC619	30401944
7,00		8	91	53	43	36	SCD250-0700-2-2-090HA05-HC619	30401945
7,10		8	91	53	43	36	SCD250-0710-2-2-090HA05-HC619	30401946
7,20		8	91	53	43	36	SCD250-0720-2-2-090HA05-HC619	30401947
7,30		8	91	53	43	36	SCD250-0730-2-2-090HA05-HC619	30401948
7,40		8	91	53	43	36	SCD250-0740-2-2-090HA05-HC619	30401949
7,50		8	91	53	43	36	SCD250-0750-2-2-090HA05-HC619	30401950
7,60		8	91	53	43	36	SCD250-0760-2-2-090HA05-HC619	30401951
7,70		8	91	53	43	36	SCD250-0770-2-2-090HA05-HC619	30401952
7,80		8	91	53	43	36	SCD250-0780-2-2-090HA05-HC619	30401953
7,90		8	91	53	43	36	SCD250-0790-2-2-090HA05-HC619	30401954
7,938	5/16	8	91	53	43	36	SCD250-07938-2-2-090HA05-HC619	30401955
8,00		8	91	53	43	36	SCD250-0800-2-2-090HA05-HC619	30401956
8,10		10	103	61	49	40	SCD250-0810-2-2-090HA05-HC611	30401957
8,20		10	103	61	49	40	SCD250-0820-2-2-090HA05-HC611	30401958
8,30		10	103	61	49	40	SCD250-0830-2-2-090HA05-HC611	30401959
8,40		10	103	61	49	40	SCD250-0840-2-2-090HA05-HC611	30401960
8,50		10	103	61	49	40	SCD250-0850-2-2-090HA05-HC611	30401961
8,60		10	103	61	49	40	SCD250-0860-2-2-090HA05-HC611	30401962
8,70		10	103	61	49	40	SCD250-0870-2-2-090HA05-HC611	30401963
8,80		10	103	61	49	40	SCD250-0880-2-2-090HA05-HC611	30401964
8,90		10	103	61	49	40	SCD250-0890-2-2-090HA05-HC611	30401965
9,00		10	103	61	49	40	SCD250-0900-2-2-090HA05-HC611	30401966
9,10		10	103	61	49	40	SCD250-0910-2-2-090HA05-HC611	30401967
9,20		10	103	61	49	40	SCD250-0920-2-2-090HA05-HC611	30401968
9,30		10	103	61	49	40	SCD250-0930-2-2-090HA05-HC611	30401969
9,40		10	103	61	49	40	SCD250-0940-2-2-090HA05-HC611	30401970
9,50		10	103	61	49	40	SCD250-0950-2-2-090HA05-HC611	30401971
9,525	3/8	10	103	61	49	40	SCD250-09525-2-2-090HA05-HC611	30401972
9,60		10	103	61	49	40	SCD250-0960-2-2-090HA05-HC611	30401973

Continued on next page

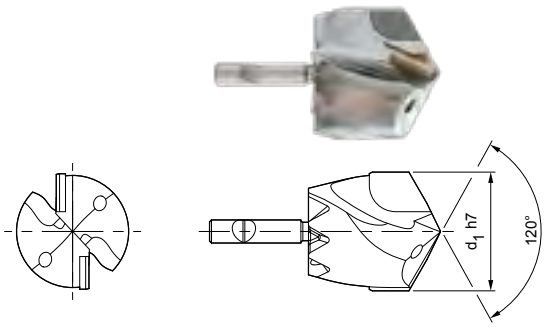
Mono-Drill-Composite-MD | Solid carbide twist drill SCD25 (5xD), external coolant supply

Dimensions							Specification	Order number
d_1 m7 [mm]	d_1 m7 [inch]	d_2 h6	l_1	l_2	l_3	l_4		
9,70		10	103	61	49	40	SCD250-0970-2-2-090HA05-HC611	30401974
9,80		10	103	61	49	40	SCD250-0980-2-2-090HA05-HC611	30401975
9,90		10	103	61	49	40	SCD250-0990-2-2-090HA05-HC611	30401976
10,00		10	103	61	49	40	SCD250-1000-2-2-090HA05-HC611	30401977
10,10		12	118	71	56	45	SCD250-1010-2-2-090HA05-HC611	30401978
10,20		12	118	71	56	45	SCD250-1020-2-2-090HA05-HC611	30401979
10,30		12	118	71	56	45	SCD250-1030-2-2-090HA05-HC611	30401980
10,40		12	118	71	56	45	SCD250-1040-2-2-090HA05-HC611	30401981
10,50		12	118	71	56	45	SCD250-1050-2-2-090HA05-HC611	30401982
10,60		12	118	71	56	45	SCD250-1060-2-2-090HA05-HC611	30401983
10,70		12	118	71	56	45	SCD250-1070-2-2-090HA05-HC611	30401984
10,80		12	118	71	56	45	SCD250-1080-2-2-090HA05-HC611	30401985
10,90		12	118	71	56	45	SCD250-1090-2-2-090HA05-HC611	30401986
11,00		12	118	71	56	45	SCD250-1100-2-2-090HA05-HC611	30401987
11,10		12	118	71	56	45	SCD250-1110-2-2-090HA05-HC611	30401988
11,111	7/16	12	118	71	56	45	SCD250-11111-2-2-090HA05-HC611	30401989
11,20		12	118	71	56	45	SCD250-1120-2-2-090HA05-HC611	30401990
11,30		12	118	71	56	45	SCD250-1130-2-2-090HA05-HC611	30401991
11,40		12	118	71	56	45	SCD250-1140-2-2-090HA05-HC611	30401992
11,50		12	118	71	56	45	SCD250-1150-2-2-090HA05-HC611	30401993
11,60		12	118	71	56	45	SCD250-1160-2-2-090HA05-HC611	30401994
11,70		12	118	71	56	45	SCD250-1170-2-2-090HA05-HC611	30401995
11,80		12	118	71	56	45	SCD250-1180-2-2-090HA05-HC611	30401996
11,90		12	118	71	56	45	SCD250-1190-2-2-090HA05-HC611	30401997
12,00		12	118	71	56	45	SCD250-1200-2-2-090HA05-HC611	30401998

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

Replaceable drill head TTD

Made from solid carbide, with PCD tips and an internal coolant supply
Type 12 - composite



Design:

Drill diameter:	12.00-32.00 mm
Cutting material:	PU611
Number of blades:	2
Number of guide chamfers:	2
Tip angle:	120°
Helix angle:	30°

Application:
CFRP/GFRP with multidirectional fibre structure.

	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3
N	▬	▬	▬	▬	▬						

	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
C		■	■	■				■		

Performance LINE

IT9

d_1 from 12.00 to 18.70			
d_1h7	Connection	Specification	Order number
12,00	TTS12-A	TTD-2F12-1200-PU611	30620877
12,50	TTS12-A	TTD-2F12-1250-PU611	30620878
12,70	TTS12-A	TTD-2F12-1270-PU611	30620879
13,00	TTS12-A	TTD-2F12-1300-PU611	30620880
13,50	TTS12-A	TTD-2F12-1350-PU611	30620881
13,70	TTS12-A	TTD-2F12-1370-PU611	30620882
14,00	TTS12-A	TTD-2F12-1400-PU611	30620883
14,23	TTS12-A	TTD-2F12-1423-PU611	30620884
14,50	TTS12-A	TTD-2F12-1450-PU611	30620885
14,70	TTS12-A	TTD-2F12-1470-PU611	30620886
15,00	TTS12-A	TTD-2F12-1500-PU611	30620887
15,30	TTS12-A	TTD-2F12-1530-PU611	30620888
15,50	TTS12-A	TTD-2F12-1550-PU611	30620889
15,70	TTS12-A	TTD-2F12-1570-PU611	30620890
15,88	TTS12-A	TTD-2F12-1588-PU611	30620891
16,00	TTS12-A	TTD-2F12-1600-PU611	30620892
16,50	TTS12-A	TTD-2F12-1650-PU611	30620893
16,70	TTS12-A	TTD-2F12-1670-PU611	30620894
17,00	TTS12-A	TTD-2F12-1700-PU611	30620895
17,50	TTS12-A	TTD-2F12-1750-PU611	30620896
17,70	TTS12-A	TTD-2F12-1770-PU611	30620897
18,00	TTS12-A	TTD-2F12-1800-PU611	30620898
18,50	TTS12-A	TTD-2F12-1850-PU611	30620899
18,70	TTS12-A	TTD-2F12-1870-PU611	30620900

d_1 from 19.00 to 25.70			
d_1h7	Connection	Specification	Order number
19,00	TTS12-A	TTD-2F12-1900-PU611	30620901
19,05	TTS12-A	TTD-2F12-1905-PU611	30620902
19,50	TTS12-A	TTD-2F12-1950-PU611	30620903
19,70	TTS12-A	TTD-2F12-1970-PU611	30620904
20,00	TTS12-A	TTD-2F12-2000-PU611	30620905
20,50	TTS12-A	TTD-2F12-2050-PU611	30620906
20,70	TTS12-A	TTD-2F12-2070-PU611	30620907
21,00	TTS12-A	TTD-2F12-2100-PU611	30620908
21,50	TTS12-A	TTD-2F12-2150-PU611	30620909
21,70	TTS12-A	TTD-2F12-2170-PU611	30620910
22,00	TTS12-A	TTD-2F12-2200-PU611	30620911
22,22	TTS12-A	TTD-2F12-2222-PU611	30620912
22,50	TTS12-A	TTD-2F12-2250-PU611	30620913
22,70	TTS12-A	TTD-2F12-2270-PU611	30620914
23,00	TTS12-A	TTD-2F12-2300-PU611	30620915
23,50	TTS12-A	TTD-2F12-2350-PU611	30620916
23,70	TTS12-A	TTD-2F12-2370-PU611	30620917
24,00	TTS12-A	TTD-2F12-2400-PU611	30620918
24,50	TTS12-A	TTD-2F12-2450-PU611	30620919
24,70	TTS18-A	TTD-2F12-2470-PU611	30620920
25,00	TTS18-A	TTD-2F12-2500-PU611	30620921
25,40	TTS18-A	TTD-2F12-2540-PU611	30620922
25,50	TTS18-A	TTD-2F12-2550-PU611	30620923
25,70	TTS18-A	TTD-2F12-2570-PU611	30620924

d_1 from 26.00 to 32.00			
d_1h7	Connection	Specification	Order number
26,00	TTS18-A	TTD-2F12-2600-PU611	30620925
26,50	TTS18-A	TTD-2F12-2650-PU611	30620926
26,70	TTS18-A	TTD-2F12-2670-PU611	30620927
27,00	TTS18-A	TTD-2F12-2700-PU611	30620928
27,50	TTS18-A	TTD-2F12-2750-PU611	30620929
27,70	TTS18-A	TTD-2F12-2770-PU611	30620930
28,00	TTS18-A	TTD-2F12-2800-PU611	30620931
28,50	TTS18-A	TTD-2F12-2850-PU611	30620932
28,60	TTS18-A	TTD-2F12-2860-PU611	30620933
28,70	TTS18-A	TTD-2F12-2870-PU611	30620934
29,00	TTS18-A	TTD-2F12-2900-PU611	30620935
29,50	TTS18-A	TTD-2F12-2950-PU611	30620936
29,70	TTS18-A	TTD-2F12-2970-PU611	30620937
30,00	TTS18-A	TTD-2F12-3000-PU611	30620938
30,20	TTS18-A	TTD-2F12-3020-PU611	30620939
30,50	TTS18-A	TTD-2F12-3050-PU611	30620940
30,70	TTS18-A	TTD-2F12-3070-PU611	30620941
31,00	TTS18-A	TTD-2F12-3100-PU611	30620942
31,50	TTS18-A	TTD-2F12-3150-PU611	30620943
31,70	TTS18-A	TTD-2F12-3170-PU611	30620944
31,80	TTS18-A	TTD-2F12-3180-PU611	30620945
32,00	TTS18-A	TTD-2F12-3200-PU611	30620946

Accessories

	Replaceable head holder TTS TTS100, 3xD TTS100, 5xD TTS100, 8xD TTS100, 12xD	 Page 116 Page 117 Page 118 Page 119

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

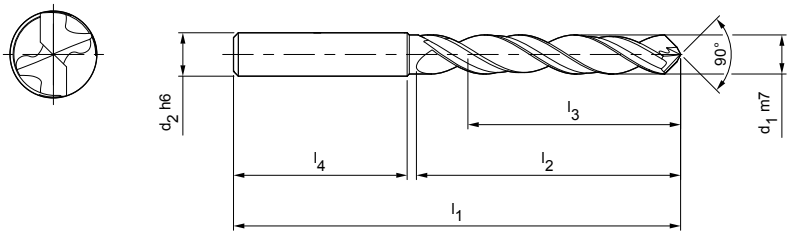
MEGA-Drill-Composite-UDX

Solid carbide twist drill
SCD27 (5xD), external coolant supply

Design:

Drill diameter:	3.00-12.00 mm
Cutting material:	HC611/619
Tip angle:	90°
Number of blades:	2
Number of guide chamfers:	2
Helix angle:	35°

Application:
For all CFRP materials / for solving problems in unstable clamping situations or thin-walled parts.



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
								■						■	■	■						

Dimensions							Specification	Order number
d_1 m7 [mm]	d_1 m7 [inch]	d_2 h6	l_1	l_2	l_3	l_4		
3,00		6	66	26	20	36	SCD270-0300-2-2-090HA05-HC619	30402101
3,10		6	66	26	20	36	SCD270-0310-2-2-090HA05-HC619	30402102
3,175	1/8	6	66	26	20	36	SCD270-03175-2-2-090HA05-HC619	30402103
3,20		6	66	26	20	36	SCD270-0320-2-2-090HA05-HC619	30402104
3,30		6	66	26	20	36	SCD270-0330-2-2-090HA05-HC619	30402105
3,40		6	66	26	20	36	SCD270-0340-2-2-090HA05-HC619	30402106
3,50		6	66	26	20	36	SCD270-0350-2-2-090HA05-HC619	30402107
3,60		6	66	26	20	36	SCD270-0360-2-2-090HA05-HC619	30402108
3,70		6	66	26	20	36	SCD270-0370-2-2-090HA05-HC619	30402109
3,80		6	66	26	20	36	SCD270-0380-2-2-090HA05-HC619	30402110
3,90		6	66	26	20	36	SCD270-0390-2-2-090HA05-HC619	30402111
4,00		6	74	35	27	36	SCD270-0400-2-2-090HA05-HC619	30402112
4,10		6	74	35	27	36	SCD270-0410-2-2-090HA05-HC619	30402113
4,20		6	74	35	27	36	SCD270-0420-2-2-090HA05-HC619	30402114
4,30		6	74	35	27	36	SCD270-0430-2-2-090HA05-HC619	30402115
4,40		6	74	35	27	36	SCD270-0440-2-2-090HA05-HC619	30402116
4,50		6	74	35	27	36	SCD270-0450-2-2-090HA05-HC619	30402117
4,60		6	74	35	27	36	SCD270-0460-2-2-090HA05-HC619	30402118
4,70		6	74	35	27	36	SCD270-0470-2-2-090HA05-HC619	30402119
4,763	3/16	6	74	35	27	36	SCD270-04763-2-2-090HA05-HC619	30402120
4,80		6	74	35	27	36	SCD270-0480-2-2-090HA05-HC619	30402121
4,90		6	74	35	27	36	SCD270-0490-2-2-090HA05-HC619	30402122
5,00		6	82	44	35	36	SCD270-0500-2-2-090HA05-HC619	30402123
5,10		6	82	44	35	36	SCD270-0510-2-2-090HA05-HC619	30402124
5,20		6	82	44	35	36	SCD270-0520-2-2-090HA05-HC619	30402125
5,30		6	82	44	35	36	SCD270-0530-2-2-090HA05-HC619	30402126
5,40		6	82	44	35	36	SCD270-0540-2-2-090HA05-HC619	30402127
5,50		6	82	44	35	36	SCD270-0550-2-2-090HA05-HC619	30402128
5,60		6	82	44	35	36	SCD270-0560-2-2-090HA05-HC619	30402129
5,70		6	82	44	35	36	SCD270-0570-2-2-090HA05-HC619	30402130
5,80		6	82	44	35	36	SCD270-0580-2-2-090HA05-HC619	30402131
5,90		6	82	44	35	36	SCD270-0590-2-2-090HA05-HC619	30402132
6,00		6	82	44	35	36	SCD270-0600-2-2-090HA05-HC619	30650496
6,10		8	91	52	40	36	SCD270-0610-2-2-090HA05-HC619	30650497
6,20		8	91	52	40	36	SCD270-0620-2-2-090HA05-HC619	30650498

MEGA-Drill-Composite-UDX | Solid carbide twist drill SCD27 (5xD), external coolant supply

Dimensions							Specification	Order number
d_1 m7 [mm]	d_1 m7 [inch]	d_2 h6	l_1	l_2	l_3	l_4		
6,30		8	91	52	40	36	SCD270-0630-2-2-090HA05-HC619	30650499
6,35	1/4	8	91	52	40	36	SCD270-0635-2-2-090HA05-HC619	30650500
6,40		8	91	52	40	36	SCD270-0640-2-2-090HA05-HC619	30650501
6,50		8	91	52	40	36	SCD270-0650-2-2-090HA05-HC619	30650502
6,60		8	91	52	40	36	SCD270-0660-2-2-090HA05-HC619	30650503
6,70		8	91	52	40	36	SCD270-0670-2-2-090HA05-HC619	30650504
6,80		8	91	52	40	36	SCD270-0680-2-2-090HA05-HC619	30650505
6,90		8	91	52	40	36	SCD270-0690-2-2-090HA05-HC619	30650506
7,00		8	91	52	40	36	SCD270-0700-2-2-090HA05-HC619	30650507
7,10		8	91	52	40	36	SCD270-0710-2-2-090HA05-HC619	30650508
7,20		8	91	52	40	36	SCD270-0720-2-2-090HA05-HC619	30650509
7,30		8	91	52	40	36	SCD270-0730-2-2-090HA05-HC619	30650510
7,40		8	91	52	40	36	SCD270-0740-2-2-090HA05-HC619	30650511
7,50		8	91	52	40	36	SCD270-0750-2-2-090HA05-HC619	30650512
7,60		8	91	52	40	36	SCD270-0760-2-2-090HA05-HC619	30650513
7,70		8	91	52	40	36	SCD270-0770-2-2-090HA05-HC619	30650514
7,80		8	91	52	40	36	SCD270-0780-2-2-090HA05-HC619	30650515
7,90		8	91	52	40	36	SCD270-0790-2-2-090HA05-HC619	30650516
7,938	5/16	8	91	52	40	36	SCD270-07938-2-2-090HA05-HC619	30650517
8,00		8	91	52	40	36	SCD270-0800-2-2-090HA05-HC619	30650518
8,10		10	103	60	45	40	SCD270-0810-2-2-090HA05-HC611	30650519
8,20		10	103	60	45	40	SCD270-0820-2-2-090HA05-HC611	30650520
8,30		10	103	60	45	40	SCD270-0830-2-2-090HA05-HC611	30650521
8,40		10	103	60	45	40	SCD270-0840-2-2-090HA05-HC611	30650522
8,50		10	103	60	45	40	SCD270-0850-2-2-090HA05-HC611	30650523
8,60		10	103	60	45	40	SCD270-0860-2-2-090HA05-HC611	30650524
8,70		10	103	60	45	40	SCD270-0870-2-2-090HA05-HC611	30650525
8,80		10	103	60	45	40	SCD270-0880-2-2-090HA05-HC611	30650526
8,90		10	103	60	45	40	SCD270-0890-2-2-090HA05-HC611	30650527
9,00		10	103	60	45	40	SCD270-0900-2-2-090HA05-HC611	30650528
9,10		10	103	60	45	40	SCD270-0910-2-2-090HA05-HC611	30650529
9,20		10	103	60	45	40	SCD270-0920-2-2-090HA05-HC611	30650530
9,30		10	103	60	45	40	SCD270-0930-2-2-090HA05-HC611	30650531
9,40		10	103	60	45	40	SCD270-0940-2-2-090HA05-HC611	30650532
9,50		10	103	60	45	40	SCD270-0950-2-2-090HA05-HC611	30650533
9,525	3/8	10	103	60	45	40	SCD270-09525-2-2-090HA05-HC611	30650534
9,60		10	103	60	45	40	SCD270-0960-2-2-090HA05-HC611	30650535
9,70		10	103	60	45	40	SCD270-0970-2-2-090HA05-HC611	30650536
9,80		10	103	60	45	40	SCD270-0980-2-2-090HA05-HC611	30650537
9,90		10	103	60	45	40	SCD270-0990-2-2-090HA05-HC611	30650538
10,00		10	103	60	45	40	SCD270-1000-2-2-090HA05-HC611	30650539
10,10		12	118	70	52	45	SCD270-1010-2-2-090HA05-HC611	30650540
10,20		12	118	70	52	45	SCD270-1020-2-2-090HA05-HC611	30650541
10,30		12	118	70	52	45	SCD270-1030-2-2-090HA05-HC611	30650542
10,40		12	118	70	52	45	SCD270-1040-2-2-090HA05-HC611	30650543
10,50		12	118	70	52	45	SCD270-1050-2-2-090HA05-HC611	30650544
10,60		12	118	70	52	45	SCD270-1060-2-2-090HA05-HC611	30650545
10,70		12	118	70	52	45	SCD270-1070-2-2-090HA05-HC611	30650546
10,80		12	118	70	52	45	SCD270-1080-2-2-090HA05-HC611	30650547
10,90		12	118	70	52	45	SCD270-1090-2-2-090HA05-HC611	30650548
11,00		12	118	70	52	45	SCD270-1100-2-2-090HA05-HC611	30650549
11,10		12	118	70	52	45	SCD270-1110-2-2-090HA05-HC611	30650550
11,111	7/16	12	118	70	52	45	SCD270-11111-2-2-090HA05-HC611	30650551
11,20		12	118	70	52	45	SCD270-1120-2-2-090HA05-HC611	30650552
11,30		12	118	70	52	45	SCD270-1130-2-2-090HA05-HC611	30650553
11,40		12	118	70	52	45	SCD270-1140-2-2-090HA05-HC611	30650554
11,50		12	118	70	52	45	SCD270-1150-2-2-090HA05-HC611	30650555

Continued on next page

MEGA-Drill-Composite-UDX | Solid carbide twist drill SCD27 (5xD), external coolant supply

Dimensions							Specification	Order number
d_1 m7 [mm]	d_1 m7 [inch]	d_2 h6	l_1	l_2	l_3	l_4		
11,60		12	118	70	52	45	SCD270-1160-2-2-090HA05-HC611	30650556
11,70		12	118	70	52	45	SCD270-1170-2-2-090HA05-HC611	30650557
11,80		12	118	70	52	45	SCD270-1180-2-2-090HA05-HC611	30650558
11,90		12	118	70	52	45	SCD270-1190-2-2-090HA05-HC611	30650559
12,00		12	118	70	52	45	SCD270-1200-2-2-090HA05-HC611	30650560

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

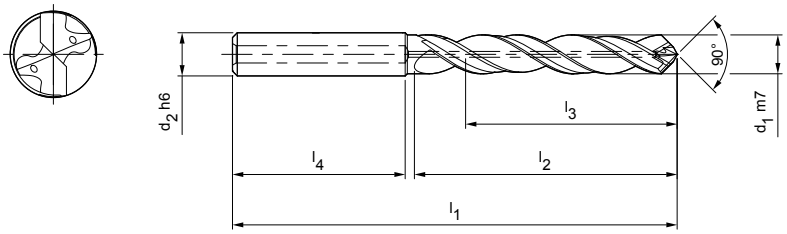
MEGA-Drill-Composite-UDX

Solid carbide twist drill
SCD271 (5xD), internal coolant supply

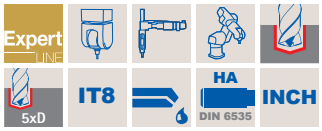
Design:

Drill diameter:	6.00-12.00 mm
Cutting material:	HC611/619
Number of blades:	2
Number of guide chamfers:	2
Tip angle:	90°
Helix angle:	35°

Application:
For all CFRP materials / for solving problems in unstable clamping situations or thin-walled parts.



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
								■						■	■	■						



Dimensions							Specification	Order number
d_1 m7 [mm]	d_1 m7 [inch]	d_2 h6	l_1	l_2	l_3	l_4		
6,00		6	82	44	35	36	SCD271-0600-2-2-090HA05-HC619	30402197
6,10		8	91	52	40	36	SCD271-0610-2-2-090HA05-HC619	30402198
6,20		8	91	52	40	36	SCD271-0620-2-2-090HA05-HC619	30402199
6,30		8	91	52	40	36	SCD271-0630-2-2-090HA05-HC619	30402200
6,35	1/4	8	91	52	40	36	SCD271-0635-2-2-090HA05-HC619	30402201
6,40		8	91	52	40	36	SCD271-0640-2-2-090HA05-HC619	30402202
6,50		8	91	52	40	36	SCD271-0650-2-2-090HA05-HC619	30402203
6,60		8	91	52	40	36	SCD271-0660-2-2-090HA05-HC619	30402204
6,70		8	91	52	40	36	SCD271-0670-2-2-090HA05-HC619	30402205
6,80		8	91	52	40	36	SCD271-0680-2-2-090HA05-HC619	30402206
6,90		8	91	52	40	36	SCD271-0690-2-2-090HA05-HC619	30402207
7,00		8	91	52	40	36	SCD271-0700-2-2-090HA05-HC619	30402208
7,10		8	91	52	40	36	SCD271-0710-2-2-090HA05-HC619	30402209
7,20		8	91	52	40	36	SCD271-0720-2-2-090HA05-HC619	30402210
7,30		8	91	52	40	36	SCD271-0730-2-2-090HA05-HC619	30402211
7,40		8	91	52	40	36	SCD271-0740-2-2-090HA05-HC619	30402212
7,50		8	91	52	40	36	SCD271-0750-2-2-090HA05-HC619	30402213
7,60		8	91	52	40	36	SCD271-0760-2-2-090HA05-HC619	30402214
7,70		8	91	52	40	36	SCD271-0770-2-2-090HA05-HC619	30402215
7,80		8	91	52	40	36	SCD271-0780-2-2-090HA05-HC619	30402216
7,90		8	91	52	40	36	SCD271-0790-2-2-090HA05-HC619	30402217
7,938	5/16	8	91	52	40	36	SCD271-07938-2-2-090HA05-HC619	30402218
8,00		8	91	52	40	36	SCD271-0800-2-2-090HA05-HC619	30402219
8,10		10	103	60	45	40	SCD271-0810-2-2-090HA05-HC611	30402220
8,20		10	103	60	45	40	SCD271-0820-2-2-090HA05-HC611	30402221
8,30		10	103	60	45	40	SCD271-0830-2-2-090HA05-HC611	30402222
8,40		10	103	60	45	40	SCD271-0840-2-2-090HA05-HC611	30402223
8,50		10	103	60	45	40	SCD271-0850-2-2-090HA05-HC611	30402224
8,60		10	103	60	45	40	SCD271-0860-2-2-090HA05-HC611	30402225
8,70		10	103	60	45	40	SCD271-0870-2-2-090HA05-HC611	30402226
8,80		10	103	60	45	40	SCD271-0880-2-2-090HA05-HC611	30402227
8,90		10	103	60	45	40	SCD271-0890-2-2-090HA05-HC611	30402228
9,00		10	103	60	45	40	SCD271-0900-2-2-090HA05-HC611	30402229
9,10		10	103	60	45	40	SCD271-0910-2-2-090HA05-HC611	30402230
9,20		10	103	60	45	40	SCD271-0920-2-2-090HA05-HC611	30402231

Continued on next page

MEGA-Stack-Composite-UDX | Solid carbide twist drill SCD271 (5xD), internal coolant supply

Dimensions							Specification	Order number
d_1 m7 [mm]	d_1 m7 [inch]	d_2 h6	l_1	l_2	l_3	l_4		
9,30		10	103	60	45	40	SCD271-0930-2-2-090HA05-HC611	30402232
9,40		10	103	60	45	40	SCD271-0940-2-2-090HA05-HC611	30402233
9,50		10	103	60	45	40	SCD271-0950-2-2-090HA05-HC611	30402234
9,525	3/8	10	103	60	45	40	SCD271-09525-2-2-090HA05-HC611	30402235
9,60		10	103	60	45	40	SCD271-0960-2-2-090HA05-HC611	30402236
9,70		10	103	60	45	40	SCD271-0970-2-2-090HA05-HC611	30402237
9,80		10	103	60	45	40	SCD271-0980-2-2-090HA05-HC611	30402238
9,90		10	103	60	45	40	SCD271-0990-2-2-090HA05-HC611	30402239
10,00		10	103	60	45	40	SCD271-1000-2-2-090HA05-HC611	30402240
10,10		12	118	70	52	45	SCD271-1010-2-2-090HA05-HC611	30402241
10,20		12	118	70	52	45	SCD271-1020-2-2-090HA05-HC611	30402242
10,30		12	118	70	52	45	SCD271-1030-2-2-090HA05-HC611	30402243
10,40		12	118	70	52	45	SCD271-1040-2-2-090HA05-HC611	30402244
10,50		12	118	70	52	45	SCD271-1050-2-2-090HA05-HC611	30402245
10,60		12	118	70	52	45	SCD271-1060-2-2-090HA05-HC611	30402246
10,70		12	118	70	52	45	SCD271-1070-2-2-090HA05-HC611	30402247
10,80		12	118	70	52	45	SCD271-1080-2-2-090HA05-HC611	30402248
10,90		12	118	70	52	45	SCD271-1090-2-2-090HA05-HC611	30402249
11,00		12	118	70	52	45	SCD271-1100-2-2-090HA05-HC611	30402250
11,10		12	118	70	52	45	SCD271-1110-2-2-090HA05-HC611	30402251
11,111	7/16	12	118	70	52	45	SCD271-11111-2-2-090HA05-HC611	30402252
11,20		12	118	70	52	45	SCD271-1120-2-2-090HA05-HC611	30402253
11,30		12	118	70	52	45	SCD271-1130-2-2-090HA05-HC611	30402254
11,40		12	118	70	52	45	SCD271-1140-2-2-090HA05-HC611	30402255
11,50		12	118	70	52	45	SCD271-1150-2-2-090HA05-HC611	30402256
11,60		12	118	70	52	45	SCD271-1160-2-2-090HA05-HC611	30402257
11,70		12	118	70	52	45	SCD271-1170-2-2-090HA05-HC611	30402258
11,80		12	118	70	52	45	SCD271-1180-2-2-090HA05-HC611	30402259
11,90		12	118	70	52	45	SCD271-1190-2-2-090HA05-HC611	30402260
12,00		12	118	70	52	45	SCD271-1200-2-2-090HA05-HC611	30402261

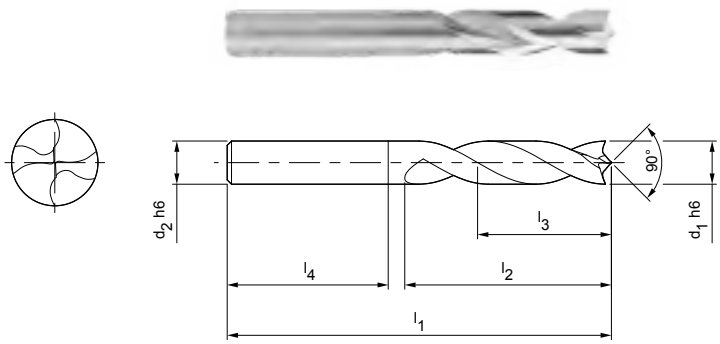
Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

MEGA-Drill-Aramid

Solid carbide twist drill
SCD28 (3xD), external coolant supply

Design:

Drill diameter:	3.00-12.00 mm
Cutting material:	HU610
Number of blades:	2
Tip angle:	90°
Helix angle:	30°



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
									⬓	⬓	■		■					■				

Performance LINE | 3xD | IT9 | HA DIN 6535

Dimensions						Specification	Order number
d_1 h6	d_2 h6	l_1	l_2	l_3	l_4		
3,00	3	40	12	7	28	SCD280-0300-2-0-090HA03-HU610	30402323
4,00	4	55	18	12	28	SCD280-0400-2-0-090HA03-HU610	30402324
5,00	5	62	26	18	28	SCD280-0500-2-0-090HA03-HU610	30402325
6,00	6	66	28	19	36	SCD280-0600-2-0-090HA03-HU610	30402326
6,50	6,5	70	31	21	36	SCD280-0650-2-0-090HA03-HU610	30402327
7,00	7	74	34	23	36	SCD280-0700-2-0-090HA03-HU610	30402328
8,00	8	79	37	25	36	SCD280-0800-2-0-090HA03-HU610	30402329
8,50	8,5	79	37	25	40	SCD280-0850-2-0-090HA03-HU610	30402330
9,00	9	84	40	27	40	SCD280-0900-2-0-090HA03-HU610	30402331
10,00	10	89	48	31	40	SCD280-1000-2-0-090HA03-HU610	30402332
12,00	12	102	50	32	45	SCD280-1200-2-0-090HA03-HU610	30402333

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

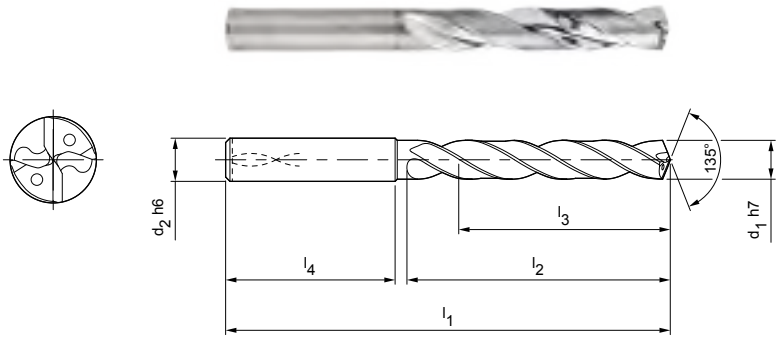
MEGA-Stack-Drill-CA

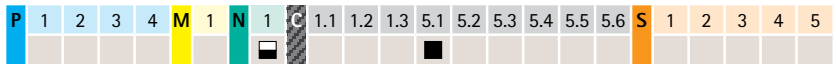
Solid carbide twist drill
SCD43 (5xD), internal coolant supply

Design:

Drill diameter:	3.00-12.00 mm
Cutting material:	HU717
Number of blades:	2
Number of guide chamfers:	4
Tip angle:	135°
Helix angle:	34°

Application:
CFRP-aluminium multilayer composites.





Dimensions						Specification	Order number
d_1 h7	d_2 h6	l_1	l_2	l_3	l_4		
3,00	6	66	28	23	36	SCD431-0300-2-4-135HA05-HU717	30514052
3,10	6	66	28	23	36	SCD431-0310-2-4-135HA05-HU717	30514053
3,20	6	66	28	23	36	SCD431-0320-2-4-135HA05-HU717	30514054
3,30	6	66	28	23	36	SCD431-0330-2-4-135HA05-HU717	30514055
3,40	6	66	28	23	36	SCD431-0340-2-4-135HA05-HU717	30514056
3,50	6	66	28	23	36	SCD431-0350-2-4-135HA05-HU717	30514057
3,60	6	66	28	23	36	SCD431-0360-2-4-135HA05-HU717	30514058
3,70	6	66	28	23	36	SCD431-0370-2-4-135HA05-HU717	30514059
3,80	6	74	36	29	36	SCD431-0380-2-4-135HA05-HU717	30514060
3,90	6	74	36	29	36	SCD431-0390-2-4-135HA05-HU717	30514062
4,00	6	74	36	29	36	SCD431-0400-2-4-135HA05-HU717	30514063
4,10	6	74	36	29	36	SCD431-0410-2-4-135HA05-HU717	30514064
4,176	6	74	36	29	36	SCD431-04176-2-4-135HA05-HU717	30514065
4,20	6	74	36	29	36	SCD431-0420-2-4-135HA05-HU717	30514066
4,30	6	74	36	29	36	SCD431-0430-2-4-135HA05-HU717	30514067
4,40	6	74	36	29	36	SCD431-0440-2-4-135HA05-HU717	30514068
4,50	6	74	36	29	36	SCD431-0450-2-4-135HA05-HU717	30514070
4,60	6	74	36	29	36	SCD431-0460-2-4-135HA05-HU717	30514071
4,70	6	74	36	29	36	SCD431-0470-2-4-135HA05-HU717	30514072
4,80	6	74	36	29	36	SCD431-0480-2-4-135HA05-HU717	30514073
4,837	6	74	36	29	36	SCD431-04837-2-4-135HA05-HU717	30514074
4,90	6	82	44	35	36	SCD431-0490-2-4-135HA05-HU717	30514075
5,00	6	82	44	35	36	SCD431-0500-2-4-135HA05-HU717	30514076
5,10	6	82	44	35	36	SCD431-0510-2-4-135HA05-HU717	30514077
5,20	6	82	44	35	36	SCD431-0520-2-4-135HA05-HU717	30514078
5,30	6	82	44	35	36	SCD431-0530-2-4-135HA05-HU717	30514079
5,40	6	82	44	35	36	SCD431-0540-2-4-135HA05-HU717	30514080
5,50	6	82	44	35	36	SCD431-0550-2-4-135HA05-HU717	30514081
5,55	6	82	44	35	36	SCD431-0555-2-4-135HA05-HU717	30514082
5,565	6	82	44	35	36	SCD431-05565-2-4-135HA05-HU717	30514083
5,60	6	82	44	35	36	SCD431-0560-2-4-135HA05-HU717	30514084
5,70	6	82	44	35	36	SCD431-0570-2-4-135HA05-HU717	30514085
5,80	6	82	44	35	36	SCD431-0580-2-4-135HA05-HU717	30514086
5,90	6	82	44	35	36	SCD431-0590-2-4-135HA05-HU717	30514087
6,00	6	82	44	35	36	SCD431-0600-2-4-135HA05-HU717	30514088

MEGA-Stack-Drill-CA | Solid carbide twist drill SCD43 (5xD), internal coolant supply

Dimensions						Specification	Order number
d_1 h7	d_2 h6	l_1	l_2	l_3	l_4		
6,10	8	91	53	43	36	SCD431-0610-2-4-135HA05-HU717	30514089
6,20	8	91	53	43	36	SCD431-0620-2-4-135HA05-HU717	30514090
6,30	8	91	53	43	36	SCD431-0630-2-4-135HA05-HU717	30514091
6,365	8	91	53	43	36	SCD431-06365-2-4-135HA05-HU717	30514092
6,4	8	91	53	43	36	SCD431-0640-2-4-135HA05-HU717	30514093
6,5	8	91	53	43	36	SCD431-0650-2-4-135HA05-HU717	30514094
6,6	8	91	53	43	36	SCD431-0660-2-4-135HA05-HU717	30514095
6,7	8	91	53	43	36	SCD431-0670-2-4-135HA05-HU717	30514096
6,8	8	91	53	43	36	SCD431-0680-2-4-135HA05-HU717	30514097
6,90	8	91	53	43	36	SCD431-0690-2-4-135HA05-HU717	30514098
7,00	8	91	53	43	36	SCD431-0700-2-4-135HA05-HU717	30514099
7,10	8	91	53	43	36	SCD431-0710-2-4-135HA05-HU717	30514100
7,20	8	91	53	43	36	SCD431-0720-2-4-135HA05-HU717	30514101
7,30	8	91	53	43	36	SCD431-0730-2-4-135HA05-HU717	30514102
7,40	8	91	53	43	36	SCD431-0740-2-4-135HA05-HU717	30514103
7,50	8	91	53	43	36	SCD431-0750-2-4-135HA05-HU717	30514104
7,60	8	91	53	43	36	SCD431-0760-2-4-135HA05-HU717	30514105
7,70	8	91	53	43	36	SCD431-0770-2-4-135HA05-HU717	30514106
7,80	8	91	53	43	36	SCD431-0780-2-4-135HA05-HU717	30514107
7,90	8	91	53	43	36	SCD431-0790-2-4-135HA05-HU717	30514108
7,953	8	91	53	43	36	SCD431-07953-2-4-135HA05-HU717	30514109
8,00	8	91	53	43	36	SCD431-0800-2-4-135HA05-HU717	30514110
8,10	10	103	61	49	40	SCD431-0810-2-4-135HA05-HU717	30514111
8,20	10	103	61	49	40	SCD431-0820-2-4-135HA05-HU717	30514112
8,30	10	103	61	49	40	SCD431-0830-2-4-135HA05-HU717	30514113
8,40	10	103	61	49	40	SCD431-0840-2-4-135HA05-HU717	30514114
8,50	10	103	61	49	40	SCD431-0850-2-4-135HA05-HU717	30514115
8,60	10	103	61	49	40	SCD431-0860-2-4-135HA05-HU717	30514116
8,70	10	103	61	49	40	SCD431-0870-2-4-135HA05-HU717	30514117
8,80	10	103	61	49	40	SCD431-0880-2-4-135HA05-HU717	30514118
8,90	10	103	61	49	40	SCD431-0890-2-4-135HA05-HU717	30514119
9,00	10	103	61	49	40	SCD431-0900-2-4-135HA05-HU717	30514120
9,10	10	103	61	49	40	SCD431-0910-2-4-135HA05-HU717	30514121
9,20	10	103	61	49	40	SCD431-0920-2-4-135HA05-HU717	30514122
9,30	10	103	61	49	40	SCD431-0930-2-4-135HA05-HU717	30514123
9,40	10	103	61	49	40	SCD431-0940-2-4-135HA05-HU717	30514124
9,50	10	103	61	49	40	SCD431-0950-2-4-135HA05-HU717	30514125
9,54	10	103	61	49	40	SCD431-09540-2-4-135HA05-HU717	30514126
9,60	10	103	61	49	40	SCD431-0960-2-4-135HA05-HU717	30514127
9,70	10	103	61	49	40	SCD431-0970-2-4-135HA05-HU717	30514128
9,80	10	103	61	49	40	SCD431-0980-2-4-135HA05-HU717	30514129
9,90	10	103	61	49	40	SCD431-0990-2-4-135HA05-HU717	30514130
10,00	10	103	61	49	40	SCD431-1000-2-4-135HA05-HU717	30514131
10,10	12	118	71	56	45	SCD431-1010-2-4-135HA05-HU717	30514132
10,20	12	118	71	56	45	SCD431-1020-2-4-135HA05-HU717	30514133
10,30	12	118	71	56	45	SCD431-1030-2-4-135HA05-HU717	30514134
10,40	12	118	71	56	45	SCD431-1040-2-4-135HA05-HU717	30514135
10,50	12	118	71	56	45	SCD431-1050-2-4-135HA05-HU717	30514136
10,60	12	118	71	56	45	SCD431-1060-2-4-135HA05-HU717	30514137
10,70	12	118	71	56	45	SCD431-1070-2-4-135HA05-HU717	30514138
10,80	12	118	71	56	45	SCD431-1080-2-4-135HA05-HU717	30514139
10,90	12	118	71	56	45	SCD431-1090-2-4-135HA05-HU717	30514140
11,00	12	118	71	56	45	SCD431-1100-2-4-135HA05-HU717	30514141
11,10	12	118	71	56	45	SCD431-1110-2-4-135HA05-HU717	30514142
11,133	12	118	71	56	45	SCD431-11133-2-4-135HA05-HU717	30514143
11,20	12	118	71	56	45	SCD431-1120-2-4-135HA05-HU717	30514144
11,30	12	118	71	56	45	SCD431-1130-2-4-135HA05-HU717	30514145

Continued on next page

MEGA-Stack-Drill-CA | Solid carbide twist drill SCD43 (5xD), internal coolant supply

Dimensions						Specification	Order number
d_1 h7	d_2 h6	l_1	l_2	l_3	l_4		
11,40	12	118	71	56	45	SCD431-1140-2-4-135HA05-HU717	30514146
11,50	12	118	71	56	45	SCD431-1150-2-4-135HA05-HU717	30514147
11,60	12	118	71	56	45	SCD431-1160-2-4-135HA05-HU717	30514148
11,70	12	118	71	56	45	SCD431-1170-2-4-135HA05-HU717	30514149
11,80	12	118	71	56	45	SCD431-1180-2-4-135HA05-HU717	30514150
11,90	12	118	71	56	45	SCD431-1190-2-4-135HA05-HU717	30514151
12,00	12	118	71	56	45	SCD431-1200-2-4-135HA05-HU717	30514152

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

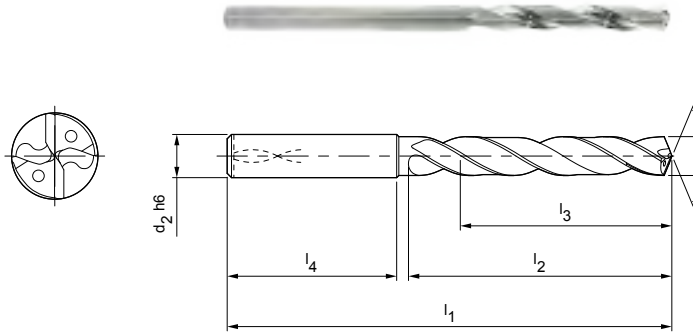
MEGA-Stack-Drill-CT

Solid carbide twist drill
SCD55 (5xD), internal coolant supply

Design:

Drill diameter:	3.00-12.00 mm
Cutting material:	HU621
Number of blades:	2
Number of guide chamfers:	3
Tip angle:	135°
Helix angle:	34°

Application:
Multilayer composites made out of CFRP-titanium.



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
														■						■	■			

Dimensions						Specification	Order number
d_1 h7	d_2 h6	l_1	l_2	l_3	l_4		
3,00	6	66	28	23	36	SCD551-0300-2-3-135HA05-HU621	30514153
3,10	6	66	28	23	36	SCD551-0310-2-3-135HA05-HU621	30514154
3,20	6	66	28	23	36	SCD551-0320-2-3-135HA05-HU621	30514155
3,30	6	66	28	23	36	SCD551-0330-2-3-135HA05-HU621	30514156
3,40	6	66	28	23	36	SCD551-0340-2-3-135HA05-HU621	30514157
3,50	6	66	28	23	36	SCD551-0350-2-3-135HA05-HU621	30514158
3,60	6	66	28	23	36	SCD551-0360-2-3-135HA05-HU621	30514159
3,70	6	66	28	23	36	SCD551-0370-2-3-135HA05-HU621	30514160
3,80	6	74	36	29	36	SCD551-0380-2-3-135HA05-HU621	30514161
3,90	6	74	36	29	36	SCD551-0390-2-3-135HA05-HU621	30514162
4,00	6	74	36	29	36	SCD551-0400-2-3-135HA05-HU621	30514163
4,10	6	74	36	29	36	SCD551-0410-2-3-135HA05-HU621	30514164
4,176	6	74	36	29	36	SCD551-04176-2-3-135HA05-HU621	30514165
4,20	6	74	36	29	36	SCD551-0420-2-3-135HA05-HU621	30514166
4,30	6	74	36	29	36	SCD551-0430-2-3-135HA05-HU621	30514167
4,40	6	74	36	29	36	SCD551-0440-2-3-135HA05-HU621	30514168
4,50	6	74	36	29	36	SCD551-0450-2-3-135HA05-HU621	30514169
4,60	6	74	36	29	36	SCD551-0460-2-3-135HA05-HU621	30514170
4,70	6	74	36	29	36	SCD551-0470-2-3-135HA05-HU621	30514171
4,80	6	74	36	29	36	SCD551-0480-2-3-135HA05-HU621	30514172
4,837	6	74	36	29	36	SCD551-04837-2-3-135HA05-HU621	30514173
4,90	6	82	44	35	36	SCD551-0490-2-3-135HA05-HU621	30514174
5,00	6	82	44	35	36	SCD551-0500-2-3-135HA05-HU621	30514175
5,10	6	82	44	35	36	SCD551-0510-2-3-135HA05-HU621	30514176
5,20	6	82	44	35	36	SCD551-0520-2-3-135HA05-HU621	30514177
5,30	6	82	44	35	36	SCD551-0530-2-3-135HA05-HU621	30514178
5,40	6	82	44	35	36	SCD551-0540-2-3-135HA05-HU621	30514179
5,50	6	82	44	35	36	SCD551-0550-2-3-135HA05-HU621	30514180
5,55	6	82	44	35	36	SCD551-0555-2-3-135HA05-HU621	30514181
5,565	6	82	44	35	36	SCD551-05565-2-3-135HA05-HU621	30514182
5,60	6	82	44	35	36	SCD551-0560-2-3-135HA05-HU621	30514183
5,70	6	82	44	35	36	SCD551-0570-2-3-135HA05-HU621	30514184
5,80	6	82	44	35	36	SCD551-0580-2-3-135HA05-HU621	30514185
5,90	6	82	44	35	36	SCD551-0590-2-3-135HA05-HU621	30514186
6,00	6	82	44	35	36	SCD551-0600-2-3-135HA05-HU621	30514187

Continued on next page

MEGA-Stack-Drill-CT | Solid carbide twist drill SCD55 (5xD), internal coolant supply

Dimensions						Specification	Order number
d_1 h7	d_2 h6	l_1	l_2	l_3	l_4		
6,10	8	91	53	43	36	SCD551-0610-2-3-135HA05-HU621	30514188
6,20	8	91	53	43	36	SCD551-0620-2-3-135HA05-HU621	30514189
6,30	8	91	53	43	36	SCD551-0630-2-3-135HA05-HU621	30514190
6,365	8	91	53	43	36	SCD551-06365-2-3-135HA05-HU621	30514191
6,40	8	91	53	43	36	SCD551-0640-2-3-135HA05-HU621	30514192
6,50	8	91	53	43	36	SCD551-0650-2-3-135HA05-HU621	30514193
6,60	8	91	53	43	36	SCD551-0660-2-3-135HA05-HU621	30514194
6,70	8	91	53	43	36	SCD551-0670-2-3-135HA05-HU621	30514195
6,80	8	91	53	43	36	SCD551-0680-2-3-135HA05-HU621	30514196
6,90	8	91	53	43	36	SCD551-0690-2-3-135HA05-HU621	30514197
7,00	8	91	53	43	36	SCD551-0700-2-3-135HA05-HU621	30514198
7,10	8	91	53	43	36	SCD551-0710-2-3-135HA05-HU621	30514199
7,20	8	91	53	43	36	SCD551-0720-2-3-135HA05-HU621	30514200
7,30	8	91	53	43	36	SCD551-0730-2-3-135HA05-HU621	30514201
7,40	8	91	53	43	36	SCD551-0740-2-3-135HA05-HU621	30514202
7,50	8	91	53	43	36	SCD551-0750-2-3-135HA05-HU621	30514203
7,60	8	91	53	43	36	SCD551-0760-2-3-135HA05-HU621	30514204
7,70	8	91	53	43	36	SCD551-0770-2-3-135HA05-HU621	30514205
7,80	8	91	53	43	36	SCD551-0780-2-3-135HA05-HU621	30514206
7,90	8	91	53	43	36	SCD551-0790-2-3-135HA05-HU621	30514207
7,953	8	91	53	43	36	SCD551-07953-2-3-135HA05-HU621	30514208
8,00	8	91	53	43	36	SCD551-0800-2-3-135HA05-HU621	30514209
8,10	10	103	61	49	40	SCD551-0810-2-3-135HA05-HU621	30514210
8,20	10	103	61	49	40	SCD551-0820-2-3-135HA05-HU621	30514211
8,30	10	103	61	49	40	SCD551-0830-2-3-135HA05-HU621	30514212
8,40	10	103	61	49	40	SCD551-0840-2-3-135HA05-HU621	30514213
8,50	10	103	61	49	40	SCD551-0850-2-3-135HA05-HU621	30514214
8,60	10	103	61	49	40	SCD551-0860-2-3-135HA05-HU621	30514215
8,70	10	103	61	49	40	SCD551-0870-2-3-135HA05-HU621	30514216
8,80	10	103	61	49	40	SCD551-0880-2-3-135HA05-HU621	30514217
8,90	10	103	61	49	40	SCD551-0890-2-3-135HA05-HU621	30514218
9,00	10	103	61	49	40	SCD551-0900-2-3-135HA05-HU621	30514219
9,10	10	103	61	49	40	SCD551-0910-2-3-135HA05-HU621	30514220
9,20	10	103	61	49	40	SCD551-0920-2-3-135HA05-HU621	30514221
9,30	10	103	61	49	40	SCD551-0930-2-3-135HA05-HU621	30514222
9,40	10	103	61	49	40	SCD551-0940-2-3-135HA05-HU621	30514223
9,50	10	103	61	49	40	SCD551-0950-2-3-135HA05-HU621	30514224
9,54	10	103	61	49	40	SCD551-09540-2-3-135HA05-HU621	30514225
9,60	10	103	61	49	40	SCD551-0960-2-3-135HA05-HU621	30514226
9,70	10	103	61	49	40	SCD551-0970-2-3-135HA05-HU621	30514227
9,80	10	103	61	49	40	SCD551-0980-2-3-135HA05-HU621	30514228
9,90	10	103	61	49	40	SCD551-0990-2-3-135HA05-HU621	30514229
10,00	10	103	61	49	40	SCD551-1000-2-3-135HA05-HU621	30514230
10,10	12	118	71	56	45	SCD551-1010-2-3-135HA05-HU621	30514231
10,20	12	118	71	56	45	SCD551-1020-2-3-135HA05-HU621	30514232
10,30	12	118	71	56	45	SCD551-1030-2-3-135HA05-HU621	30514233
10,40	12	118	71	56	45	SCD551-1040-2-3-135HA05-HU621	30514234
10,50	12	118	71	56	45	SCD551-1050-2-3-135HA05-HU621	30514235
10,60	12	118	71	56	45	SCD551-1060-2-3-135HA05-HU621	30514236
10,70	12	118	71	56	45	SCD551-1070-2-3-135HA05-HU621	30514237
10,80	12	118	71	56	45	SCD551-1080-2-3-135HA05-HU621	30514238
10,90	12	118	71	56	45	SCD551-1090-2-3-135HA05-HU621	30514239
11,00	12	118	71	56	45	SCD551-1100-2-3-135HA05-HU621	30514240
11,10	12	118	71	56	45	SCD551-1110-2-3-135HA05-HU621	30514241
11,133	12	118	71	56	45	SCD551-11133-2-3-135HA05-HU621	30514242
11,20	12	118	71	56	45	SCD551-1120-2-3-135HA05-HU621	30514243
11,30	12	118	71	56	45	SCD551-1130-2-3-135HA05-HU621	30514244

MEGA-Stack-Drill-CT | Solid carbide twist drill SCD55 (5xD), internal coolant supply

Dimensions						Specification	Order number
d_1 h7	d_2 h6	l_1	l_2	l_3	l_4		
11,40	12	118	71	56	45	SCD551-1140-2-3-135HA05-HU621	30514245
11,50	12	118	71	56	45	SCD551-1150-2-3-135HA05-HU621	30514246
11,60	12	118	71	56	45	SCD551-1160-2-3-135HA05-HU621	30514247
11,70	12	118	71	56	45	SCD551-1170-2-3-135HA05-HU621	30514248
11,80	12	118	71	56	45	SCD551-1180-2-3-135HA05-HU621	30514249
11,90	12	118	71	56	45	SCD551-1190-2-3-135HA05-HU621	30514250
12,00	12	118	71	56	45	SCD551-1200-2-3-135HA05-HU621	30514251

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

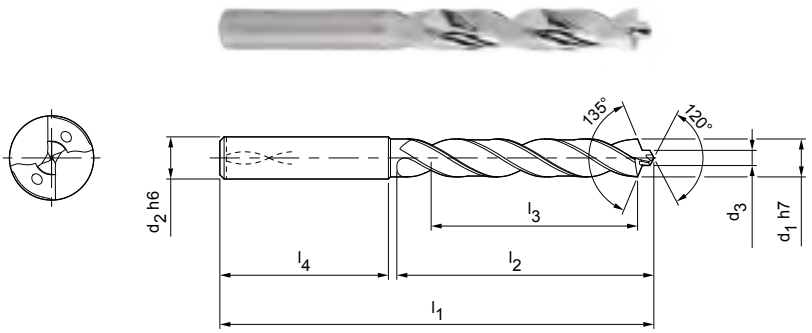
MEGA-Stack-Drill-Robot-CA

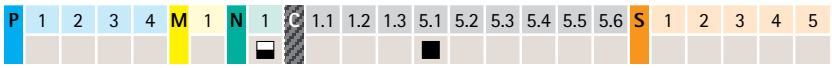
Solid carbide twist drill
SCD45 (5xD), internal coolant supply

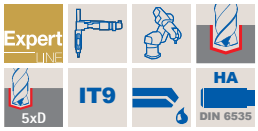
Design:

Drill diameter:	8.00-20.00 mm
Cutting material:	HU717
Number of blades:	2
Number of guide chamfers:	4
Tip angle:	120°
Helix angle:	34°

Application:
CFRP-aluminium multilayer composite for robotic use (end effector).







Dimensions							Specification	Order number
d_1 h7	d_2 h6	d_3	l_1	l_2	l_3	l_4		
8,00	8	3,20	91	53	43	36	SCD451-0800-2-4-120HA05-HU717	30514252
8,10	10	3,24	103	61	49	40	SCD451-0810-2-4-120HA05-HU717	30514253
8,20	10	3,28	103	61	49	40	SCD451-0820-2-4-120HA05-HU717	30514254
8,30	10	3,32	103	61	49	40	SCD451-0830-2-4-120HA05-HU717	30514255
8,40	10	3,36	103	61	49	40	SCD451-0840-2-4-120HA05-HU717	30514256
8,50	10	3,40	103	61	49	40	SCD451-0850-2-4-120HA05-HU717	30514257
8,60	10	3,44	103	61	49	40	SCD451-0860-2-4-120HA05-HU717	30514258
8,70	10	3,48	103	61	49	40	SCD451-0870-2-4-120HA05-HU717	30514259
8,80	10	3,52	103	61	49	40	SCD451-0880-2-4-120HA05-HU717	30514260
8,90	10	3,56	103	61	49	40	SCD451-0890-2-4-120HA05-HU717	30514261
9,00	10	3,60	103	61	49	40	SCD451-0900-2-4-120HA05-HU717	30514262
9,10	10	3,64	103	61	49	40	SCD451-0910-2-4-120HA05-HU717	30514263
9,20	10	3,68	103	61	49	40	SCD451-0920-2-4-120HA05-HU717	30514264
9,30	10	3,72	103	61	49	40	SCD451-0930-2-4-120HA05-HU717	30514265
9,40	10	3,76	103	61	49	40	SCD451-0940-2-4-120HA05-HU717	30514266
9,50	10	3,80	103	61	49	40	SCD451-0950-2-4-120HA05-HU717	30514267
9,54	10	3,82	103	61	49	40	SCD451-09540-2-4-120HA05-HU717	30514268
9,60	10	3,84	103	61	49	40	SCD451-0960-2-4-120HA05-HU717	30514269
9,70	10	3,88	103	61	49	40	SCD451-0970-2-4-120HA05-HU717	30514270
9,80	10	3,92	103	61	49	40	SCD451-0980-2-4-120HA05-HU717	30514271
9,90	10	3,96	103	61	49	40	SCD451-0990-2-4-120HA05-HU717	30514272
10,00	10	4,00	103	61	49	40	SCD451-1000-2-4-120HA05-HU717	30514273
10,10	12	4,04	118	71	56	45	SCD451-1010-2-4-120HA05-HU717	30514275
10,20	12	4,08	118	71	56	45	SCD451-1020-2-4-120HA05-HU717	30514276
10,30	12	4,12	118	71	56	45	SCD451-1030-2-4-120HA05-HU717	30514277
10,40	12	4,16	118	71	56	45	SCD451-1040-2-4-120HA05-HU717	30514278
10,50	12	4,20	118	71	56	45	SCD451-1050-2-4-120HA05-HU717	30514279
10,60	12	4,24	118	71	56	45	SCD451-1060-2-4-120HA05-HU717	30514280
10,70	12	4,28	118	71	56	45	SCD451-1070-2-4-120HA05-HU717	30514281
10,80	12	4,32	118	71	56	45	SCD451-1080-2-4-120HA05-HU717	30514282
10,90	12	4,36	118	71	56	45	SCD451-1090-2-4-120HA05-HU717	30514283
11,00	12	4,40	118	71	56	45	SCD451-1100-2-4-120HA05-HU717	30514284
11,10	12	4,44	118	71	56	45	SCD451-1110-2-4-120HA05-HU717	30514285
11,133	12	4,45	118	71	56	45	SCD451-11133-2-4-120HA05-HU717	30514286
11,20	12	4,48	118	71	56	45	SCD451-1120-2-4-120HA05-HU717	30514287

MEGA-Stack-Drill-Robot-CA | Solid carbide twist drill SCD45 (5xD), internal coolant supply

Dimensions							Specification	Order number
d_1 h7	d_2 h6	d_3	l_1	l_2	l_3	l_4		
11,30	12	4,52	118	71	56	45	SCD451-1130-2-4-120HA05-HU717	30514288
11,40	12	4,56	118	71	56	45	SCD451-1140-2-4-120HA05-HU717	30514289
11,50	12	4,60	118	71	56	45	SCD451-1150-2-4-120HA05-HU717	30514290
11,60	12	4,64	118	71	56	45	SCD451-1160-2-4-120HA05-HU717	30514291
11,70	12	4,68	118	71	56	45	SCD451-1170-2-4-120HA05-HU717	30514292
11,80	12	4,72	118	71	56	45	SCD451-1180-2-4-120HA05-HU717	30514293
11,90	12	4,76	118	71	56	45	SCD451-1190-2-4-120HA05-HU717	30514294
12,00	12	4,80	118	71	56	45	SCD451-1200-2-4-120HA05-HU717	30514295
12,10	14	4,84	124	77	60	45	SCD451-1210-2-4-120HA05-HU717	30514296
12,20	14	4,88	124	77	60	45	SCD451-1220-2-4-120HA05-HU717	30514297
12,30	14	4,92	124	77	60	45	SCD451-1230-2-4-120HA05-HU717	30514299
12,40	14	4,96	124	77	60	45	SCD451-1240-2-4-120HA05-HU717	30514300
12,50	14	5,00	124	77	60	45	SCD451-1250-2-4-120HA05-HU717	30514301
12,60	14	5,04	124	77	60	45	SCD451-1260-2-4-120HA05-HU717	30514302
12,70	14	5,08	124	77	60	45	SCD451-1270-2-4-120HA05-HU717	30514303
12,72	14	5,09	124	77	60	45	SCD451-12720-2-4-120HA05-HU717	30514304
12,80	14	5,12	124	77	60	45	SCD451-1280-2-4-120HA05-HU717	30514305
12,90	14	5,16	124	77	60	45	SCD451-1290-2-4-120HA05-HU717	30514306
13,00	14	5,20	124	77	60	45	SCD451-1300-2-4-120HA05-HU717	30514307
13,10	14	5,24	124	77	60	45	SCD451-1310-2-4-120HA05-HU717	30514308
13,20	14	5,28	124	77	60	45	SCD451-1320-2-4-120HA05-HU717	30514309
13,30	14	5,32	124	77	60	45	SCD451-1330-2-4-120HA05-HU717	30514310
13,40	14	5,36	124	77	60	45	SCD451-1340-2-4-120HA05-HU717	30514311
13,50	14	5,40	124	77	60	45	SCD451-1350-2-4-120HA05-HU717	30514312
13,60	14	5,44	124	77	60	45	SCD451-1360-2-4-120HA05-HU717	30514313
13,70	14	5,48	124	77	60	45	SCD451-1370-2-4-120HA05-HU717	30514314
13,80	14	5,52	124	77	60	45	SCD451-1380-2-4-120HA05-HU717	30514315
13,90	14	5,56	124	77	60	45	SCD451-1390-2-4-120HA05-HU717	30514316
14,00	14	5,60	124	77	60	45	SCD451-1400-2-4-120HA05-HU717	30514317
14,10	16	5,64	133	83	63	48	SCD451-1410-2-4-120HA05-HU717	30514318
14,20	16	5,68	133	83	63	48	SCD451-1420-2-4-120HA05-HU717	30514319
14,295	16	5,72	133	83	63	48	SCD451-14295-2-4-120HA05-HU717	30514320
14,30	16	5,72	133	83	63	48	SCD451-1430-2-4-120HA05-HU717	30514321
14,40	16	5,76	133	83	63	48	SCD451-1440-2-4-120HA05-HU717	30514322
14,50	16	5,80	133	83	63	48	SCD451-1450-2-4-120HA05-HU717	30514323
14,60	16	5,84	133	83	63	48	SCD451-1460-2-4-120HA05-HU717	30514324
14,70	16	5,88	133	83	63	48	SCD451-1470-2-4-120HA05-HU717	30514325
14,80	16	5,92	133	83	63	48	SCD451-1480-2-4-120HA05-HU717	30514326
14,90	16	5,96	133	83	63	48	SCD451-1490-2-4-120HA05-HU717	30514327
15,00	16	6,00	133	83	63	48	SCD451-1500-2-4-120HA05-HU717	30514328
15,10	16	6,04	133	83	63	48	SCD451-1510-2-4-120HA05-HU717	30514329
15,20	16	6,08	133	83	63	48	SCD451-1520-2-4-120HA05-HU717	30514330
15,30	16	6,12	133	83	63	48	SCD451-1530-2-4-120HA05-HU717	30514331
15,40	16	6,16	133	83	63	48	SCD451-1540-2-4-120HA05-HU717	30514332
15,50	16	6,20	133	83	63	48	SCD451-1550-2-4-120HA05-HU717	30514333
15,60	16	6,24	133	83	63	48	SCD451-1560-2-4-120HA05-HU717	30514334
15,70	16	6,28	133	83	63	48	SCD451-1570-2-4-120HA05-HU717	30514335
15,80	16	6,32	133	83	63	48	SCD451-1580-2-4-120HA05-HU717	30514336
15,882	16	6,35	133	83	63	48	SCD451-15882-2-4-120HA05-HU717	30514337
15,90	16	6,36	133	83	63	48	SCD451-1590-2-4-120HA05-HU717	30514338
16,00	16	6,40	133	83	63	48	SCD451-1600-2-4-120HA05-HU717	30514339
16,10	18	6,44	143	93	71	48	SCD451-1610-2-4-120HA05-HU717	30514340
16,20	18	6,48	143	93	71	48	SCD451-1620-2-4-120HA05-HU717	30514341
16,30	18	6,52	143	93	71	48	SCD451-1630-2-4-120HA05-HU717	30514342
16,40	18	6,56	143	93	71	48	SCD451-1640-2-4-120HA05-HU717	30514343
16,50	18	6,60	143	93	71	48	SCD451-1650-2-4-120HA05-HU717	30514344
16,60	18	6,64	143	93	71	48	SCD451-1660-2-4-120HA05-HU717	30514345

Continued on next page

MEGA-Stack-Drill-Robot-CA | Solid carbide twist drill SCD45 (5xD), internal coolant supply

Dimensions							Specification	Order number
d_1 h7	d_2 h6	d_3	l_1	l_2	l_3	l_4		
16,70	18	6,68	143	93	71	48	SCD451-1670-2-4-120HA05-HU717	30514346
16,80	18	6,72	143	93	71	48	SCD451-1680-2-4-120HA05-HU717	30514347
16,90	18	6,76	143	93	71	48	SCD451-1690-2-4-120HA05-HU717	30514348
17,00	18	6,80	143	93	71	48	SCD451-1700-2-4-120HA05-HU717	30514349
17,10	18	6,84	143	93	71	48	SCD451-1710-2-4-120HA05-HU717	30514350
17,20	18	6,88	143	93	71	48	SCD451-1720-2-4-120HA05-HU717	30514351
17,30	18	6,92	143	93	71	48	SCD451-1730-2-4-120HA05-HU717	30514352
17,40	18	6,96	143	93	71	48	SCD451-1740-2-4-120HA05-HU717	30514353
17,50	18	7,00	143	93	71	48	SCD451-1750-2-4-120HA05-HU717	30514354
17,60	18	7,04	143	93	71	48	SCD451-1760-2-4-120HA05-HU717	30514355
17,70	18	7,08	143	93	71	48	SCD451-1770-2-4-120HA05-HU717	30514356
17,80	18	7,12	143	93	71	48	SCD451-1780-2-4-120HA05-HU717	30514357
17,90	18	7,16	143	93	71	48	SCD451-1790-2-4-120HA05-HU717	30514358
18,00	18	7,20	143	93	71	48	SCD451-1800-2-4-120HA05-HU717	30514359
18,10	20	7,24	153	101	77	50	SCD451-1810-2-4-120HA05-HU717	30514360
18,20	20	7,28	153	101	77	50	SCD451-1820-2-4-120HA05-HU717	30514361
18,30	20	7,32	153	101	77	50	SCD451-1830-2-4-120HA05-HU717	30514362
18,40	20	7,36	153	101	77	50	SCD451-1840-2-4-120HA05-HU717	30514363
18,50	20	7,40	153	101	77	50	SCD451-1850-2-4-120HA05-HU717	30514364
18,60	20	7,44	153	101	77	50	SCD451-1860-2-4-120HA05-HU717	30514365
18,70	20	7,48	153	101	77	50	SCD451-1870-2-4-120HA05-HU717	30514366
18,80	20	7,52	153	101	77	50	SCD451-1880-2-4-120HA05-HU717	30514367
18,90	20	7,56	153	101	77	50	SCD451-1890-2-4-120HA05-HU717	30514368
19,00	20	7,60	153	101	77	50	SCD451-1900-2-4-120HA05-HU717	30514369
19,065	20	7,63	153	101	77	50	SCD451-19065-2-4-120HA05-HU717	30514370
19,10	20	7,64	153	101	77	50	SCD451-1910-2-4-120HA05-HU717	30514371
19,20	20	7,68	153	101	77	50	SCD451-1920-2-4-120HA05-HU717	30514372
19,30	20	7,72	153	101	77	50	SCD451-1930-2-4-120HA05-HU717	30514373
19,40	20	7,76	153	101	77	50	SCD451-1940-2-4-120HA05-HU717	30514374
19,50	20	7,80	153	101	77	50	SCD451-1950-2-4-120HA05-HU717	30514375
19,60	20	7,84	153	101	77	50	SCD451-1960-2-4-120HA05-HU717	30514376
19,70	20	7,88	153	101	77	50	SCD451-1970-2-4-120HA05-HU717	30514377
19,80	20	7,92	153	101	77	50	SCD451-1980-2-4-120HA05-HU717	30514378
19,90	20	7,96	153	101	77	50	SCD451-1990-2-4-120HA05-HU717	30514379
20,00	20	8,00	153	101	77	50	SCD451-2000-2-4-120HA05-HU717	30514380

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

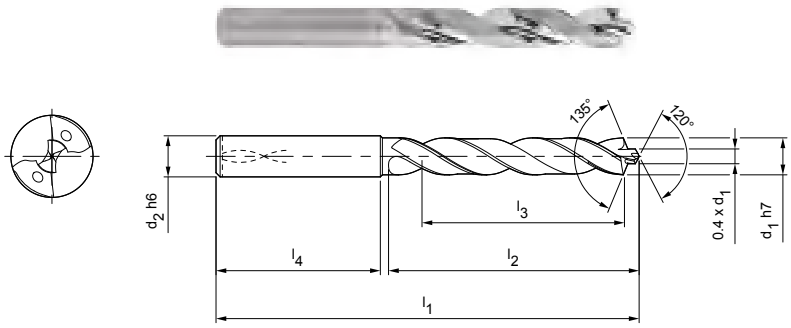
MEGA-Stack-Drill-Robot-CT

Solid carbide twist drill
SCD46 (5xD), internal coolant supply

Design:

Drill diameter:	8.00-20.00 mm
Cutting material:	HU621
Number of blades:	2
Number of guide chamfers:	3
Tip angle:	120°
Helix angle:	34°

Application:
CFRP-titanium multilayer composite for robotic use (end effector).



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
														■						■	■			

Dimensions						Specification	Order number
d_1 h7	d_2 h6	l_1	l_2	l_3	l_4		
8,00	8	91	53	43	36	SCD461-0800-2-3-120HA05-HU621	30514381
8,10	10	103	61	49	40	SCD461-0810-2-3-120HA05-HU621	30514382
8,20	10	103	61	49	40	SCD461-0820-2-3-120HA05-HU621	30514383
8,30	10	103	61	49	40	SCD461-0830-2-3-120HA05-HU621	30514384
8,40	10	103	61	49	40	SCD461-0840-2-3-120HA05-HU621	30514385
8,50	10	103	61	49	40	SCD461-0850-2-3-120HA05-HU621	30514386
8,60	10	103	61	49	40	SCD461-0860-2-3-120HA05-HU621	30514387
8,70	10	103	61	49	40	SCD461-0870-2-3-120HA05-HU621	30514388
8,80	10	103	61	49	40	SCD461-0880-2-3-120HA05-HU621	30514389
8,90	10	103	61	49	40	SCD461-0890-2-3-120HA05-HU621	30514390
9,00	10	103	61	49	40	SCD461-0900-2-3-120HA05-HU621	30514391
9,10	10	103	61	49	40	SCD461-0910-2-3-120HA05-HU621	30514392
9,20	10	103	61	49	40	SCD461-0920-2-3-120HA05-HU621	30514393
9,30	10	103	61	49	40	SCD461-0930-2-3-120HA05-HU621	30514394
9,40	10	103	61	49	40	SCD461-0940-2-3-120HA05-HU621	30514395
9,50	10	103	61	49	40	SCD461-0950-2-3-120HA05-HU621	30514396
9,54	10	103	61	49	40	SCD461-09540-2-3-120HA05-HU621	30514397
9,60	10	103	61	49	40	SCD461-0960-2-3-120HA05-HU621	30514398
9,70	10	103	61	49	40	SCD461-0970-2-3-120HA05-HU621	30514399
9,80	10	103	61	49	40	SCD461-0980-2-3-120HA05-HU621	30514400
9,90	10	103	61	49	40	SCD461-0990-2-3-120HA05-HU621	30514401
10,00	10	103	61	49	40	SCD461-1000-2-3-120HA05-HU621	30514402
10,10	12	118	71	56	45	SCD461-1010-2-3-120HA05-HU621	30514403
10,20	12	118	71	56	45	SCD461-1020-2-3-120HA05-HU621	30514404
10,30	12	118	71	56	45	SCD461-1030-2-3-120HA05-HU621	30514405
10,40	12	118	71	56	45	SCD461-1040-2-3-120HA05-HU621	30514406
10,50	12	118	71	56	45	SCD461-1050-2-3-120HA05-HU621	30514407
10,60	12	118	71	56	45	SCD461-1060-2-3-120HA05-HU621	30514408
10,70	12	118	71	56	45	SCD461-1070-2-3-120HA05-HU621	30514409
10,80	12	118	71	56	45	SCD461-1080-2-3-120HA05-HU621	30514410
10,90	12	118	71	56	45	SCD461-1090-2-3-120HA05-HU621	30514411
11,00	12	118	71	56	45	SCD461-1100-2-3-120HA05-HU621	30514412
11,10	12	118	71	56	45	SCD461-1110-2-3-120HA05-HU621	30514413
11,133	12	118	71	56	45	SCD461-11133-2-3-120HA05-HU621	30514414
11,20	12	118	71	56	45	SCD461-1120-2-3-120HA05-HU621	30514415

Continued on next page

MEGA-Stack-Drill-Robot-CT | Solid carbide twist drill SCD46 (5xD), internal coolant supply

Dimensions						Specification	Order number
d_1 h7	d_2 h6	l_1	l_2	l_3	l_4		
11,30	12	118	71	56	45	SCD461-1130-2-3-120HA05-HU621	30514416
11,40	12	118	71	56	45	SCD461-1140-2-3-120HA05-HU621	30514417
11,50	12	118	71	56	45	SCD461-1150-2-3-120HA05-HU621	30514418
11,60	12	118	71	56	45	SCD461-1160-2-3-120HA05-HU621	30514419
11,70	12	118	71	56	45	SCD461-1170-2-3-120HA05-HU621	30514420
11,80	12	118	71	56	45	SCD461-1180-2-3-120HA05-HU621	30514421
11,90	12	118	71	56	45	SCD461-1190-2-3-120HA05-HU621	30514422
12,00	12	118	71	56	45	SCD461-1200-2-3-120HA05-HU621	30514423
12,10	14	124	77	60	45	SCD461-1210-2-3-120HA05-HU621	30514424
12,20	14	124	77	60	45	SCD461-1220-2-3-120HA05-HU621	30514425
12,30	14	124	77	60	45	SCD461-1230-2-3-120HA05-HU621	30514426
12,40	14	124	77	60	45	SCD461-1240-2-3-120HA05-HU621	30514427
12,50	14	124	77	60	45	SCD461-1250-2-3-120HA05-HU621	30514428
12,60	14	124	77	60	45	SCD461-1260-2-3-120HA05-HU621	30514429
12,70	14	124	77	60	45	SCD461-1270-2-3-120HA05-HU621	30514430
12,72	14	124	77	60	45	SCD461-12720-2-3-120HA05-HU621	30514431
12,80	14	124	77	60	45	SCD461-1280-2-3-120HA05-HU621	30514432
12,90	14	124	77	60	45	SCD461-1290-2-3-120HA05-HU621	30514433
13,00	14	124	77	60	45	SCD461-1300-2-3-120HA05-HU621	30514434
13,10	14	124	77	60	45	SCD461-1310-2-3-120HA05-HU621	30514435
13,20	14	124	77	60	45	SCD461-1320-2-3-120HA05-HU621	30514436
13,30	14	124	77	60	45	SCD461-1330-2-3-120HA05-HU621	30514437
13,40	14	124	77	60	45	SCD461-1340-2-3-120HA05-HU621	30514438
13,50	14	124	77	60	45	SCD461-1350-2-3-120HA05-HU621	30514439
13,60	14	124	77	60	45	SCD461-1360-2-3-120HA05-HU621	30514440
13,70	14	124	77	60	45	SCD461-1370-2-3-120HA05-HU621	30514441
13,80	14	124	77	60	45	SCD461-1380-2-3-120HA05-HU621	30514442
13,90	14	124	77	60	45	SCD461-1390-2-3-120HA05-HU621	30514444
14,00	14	124	77	60	45	SCD461-1400-2-3-120HA05-HU621	30514445
14,10	16	133	83	63	48	SCD461-1410-2-3-120HA05-HU621	30514446
14,20	16	133	83	63	48	SCD461-1420-2-3-120HA05-HU621	30514447
14,295	16	133	83	63	48	SCD461-14295-2-3-120HA05-HU621	30514448
14,30	16	133	83	63	48	SCD461-1430-2-3-120HA05-HU621	30514449
14,40	16	133	83	63	48	SCD461-1440-2-3-120HA05-HU621	30514450
14,50	16	133	83	63	48	SCD461-1450-2-3-120HA05-HU621	30514451
14,60	16	133	83	63	48	SCD461-1460-2-3-120HA05-HU621	30514452
14,70	16	133	83	63	48	SCD461-1470-2-3-120HA05-HU621	30514453
14,80	16	133	83	63	48	SCD461-1480-2-3-120HA05-HU621	30514454
14,90	16	133	83	63	48	SCD461-1490-2-3-120HA05-HU621	30514455
15,00	16	133	83	63	48	SCD461-1500-2-3-120HA05-HU621	30514456
15,10	16	133	83	63	48	SCD461-1510-2-3-120HA05-HU621	30514457
15,20	16	133	83	63	48	SCD461-1520-2-3-120HA05-HU621	30514458
15,30	16	133	83	63	48	SCD461-1530-2-3-120HA05-HU621	30514459
15,40	16	133	83	63	48	SCD461-1540-2-3-120HA05-HU621	30514460
15,50	16	133	83	63	48	SCD461-1550-2-3-120HA05-HU621	30514461
15,60	16	133	83	63	48	SCD461-1560-2-3-120HA05-HU621	30514462
15,70	16	133	83	63	48	SCD461-1570-2-3-120HA05-HU621	30514463
15,80	16	133	83	63	48	SCD461-1580-2-3-120HA05-HU621	30514464
15,882	16	133	83	63	48	SCD461-15882-2-3-120HA05-HU621	30514465
15,90	16	133	83	63	48	SCD461-1590-2-3-120HA05-HU621	30514466
16,00	16	133	83	63	48	SCD461-1600-2-3-120HA05-HU621	30514467
16,10	18	143	93	71	48	SCD461-1610-2-3-120HA05-HU621	30514468
16,20	18	143	93	71	48	SCD461-1620-2-3-120HA05-HU621	30514469
16,30	18	143	93	71	48	SCD461-1630-2-3-120HA05-HU621	30514470
16,40	18	143	93	71	48	SCD461-1640-2-3-120HA05-HU621	30514471
16,50	18	143	93	71	48	SCD461-1650-2-3-120HA05-HU621	30514472
16,60	18	143	93	71	48	SCD461-1660-2-3-120HA05-HU621	30514473

MEGA-Stack-Drill-Robot-CT | Solid carbide twist drill SCD46 (5xD), internal coolant supply

Dimensions						Specification	Order number
d_1 h7	d_2 h6	l_1	l_2	l_3	l_4		
16,70	18	143	93	71	48	SCD461-1670-2-3-120HA05-HU621	30514474
16,80	18	143	93	71	48	SCD461-1680-2-3-120HA05-HU621	30514475
16,90	18	143	93	71	48	SCD461-1690-2-3-120HA05-HU621	30514476
17,00	18	143	93	71	48	SCD461-1700-2-3-120HA05-HU621	30514477
17,10	18	143	93	71	48	SCD461-1710-2-3-120HA05-HU621	30514478
17,20	18	143	93	71	48	SCD461-1720-2-3-120HA05-HU621	30514479
17,30	18	143	93	71	48	SCD461-1730-2-3-120HA05-HU621	30514480
17,40	18	143	93	71	48	SCD461-1740-2-3-120HA05-HU621	30514481
17,50	18	143	93	71	48	SCD461-1750-2-3-120HA05-HU621	30514482
17,60	18	143	93	71	48	SCD461-1760-2-3-120HA05-HU621	30514483
17,70	18	143	93	71	48	SCD461-1770-2-3-120HA05-HU621	30514484
17,80	18	143	93	71	48	SCD461-1780-2-3-120HA05-HU621	30514485
17,90	18	143	93	71	48	SCD461-1790-2-3-120HA05-HU621	30514486
18,00	18	143	93	71	48	SCD461-1800-2-3-120HA05-HU621	30514487
18,10	20	153	101	77	50	SCD461-1810-2-3-120HA05-HU621	30514488
18,20	20	153	101	77	50	SCD461-1820-2-3-120HA05-HU621	30514489
18,30	20	153	101	77	50	SCD461-1830-2-3-120HA05-HU621	30514490
18,40	20	153	101	77	50	SCD461-1840-2-3-120HA05-HU621	30514491
18,50	20	153	101	77	50	SCD461-1850-2-3-120HA05-HU621	30514492
18,60	20	153	101	77	50	SCD461-1860-2-3-120HA05-HU621	30514493
18,70	20	153	101	77	50	SCD461-1870-2-3-120HA05-HU621	30514494
18,80	20	153	101	77	50	SCD461-1880-2-3-120HA05-HU621	30514495
18,90	20	153	101	77	50	SCD461-1890-2-3-120HA05-HU621	30514496
19,00	20	153	101	77	50	SCD461-1900-2-3-120HA05-HU621	30514497
19,065	20	153	101	77	50	SCD461-19065-2-3-120HA05-HU621	30514498
19,10	20	153	101	77	50	SCD461-1910-2-3-120HA05-HU621	30514499
19,20	20	153	101	77	50	SCD461-1920-2-3-120HA05-HU621	30514500
19,30	20	153	101	77	50	SCD461-1930-2-3-120HA05-HU621	30514501
19,40	20	153	101	77	50	SCD461-1940-2-3-120HA05-HU621	30514502
19,50	20	153	101	77	50	SCD461-1950-2-3-120HA05-HU621	30514503
19,60	20	153	101	77	50	SCD461-1960-2-3-120HA05-HU621	30514504
19,70	20	153	101	77	50	SCD461-1970-2-3-120HA05-HU621	30514505
19,80	20	153	101	77	50	SCD461-1980-2-3-120HA05-HU621	30514506
19,90	20	153	101	77	50	SCD461-1990-2-3-120HA05-HU621	30514507
20,00	20	153	101	77	50	SCD461-2000-2-3-120HA05-HU621	30514508

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

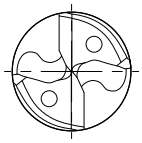
Replaceable drill head TTD

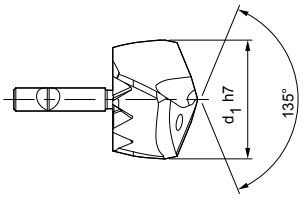
Made from solid carbide, internal coolant supply
Type 21 - stack CA

Design:

Drill diameter:	12.00-45.00 mm
Cutting material:	HU318
Number of blades:	2
Number of guide chamfers:	4
Tip angle:	135°
Helix angle:	30°

Application:
CFRP-aluminium multilayer composites.





P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
								■					■											

d_1 from 12.00 to 22.70			
d_1h7	Connection	Specification	Order number
12,00	TTS12-A	TTD-4F21-1200-HU318	30872938
12,30	TTS12-A	TTD-4F21-1230-HU318	30401828
12,50	TTS12-A	TTD-4F21-1250-HU318	30872939
12,70	TTS12-A	TTD-4F21-1270-HU318	30872940
13,00	TTS12-A	TTD-4F21-1300-HU318	30872941
13,50	TTS12-A	TTD-4F21-1350-HU318	30872942
13,70	TTS12-A	TTD-4F21-1370-HU318	30872943
13,90	TTS12-A	TTD-4F21-1390-HU318	30401829
14,00	TTS12-A	TTD-4F21-1400-HU318	30872944
14,50	TTS12-A	TTD-4F21-1450-HU318	30872945
14,70	TTS12-A	TTD-4F21-1470-HU318	30872946
15,00	TTS12-A	TTD-4F21-1500-HU318	30872947
15,50	TTS12-A	TTD-4F21-1550-HU318	30401830
15,70	TTS12-A	TTD-4F21-1570-HU318	30872948
16,00	TTS12-A	TTD-4F21-1600-HU318	30872949
16,50	TTS12-A	TTD-4F21-1650-HU318	30872950
16,70	TTS12-A	TTD-4F21-1670-HU318	30872951
17,00	TTS12-A	TTD-4F21-1700-HU318	30872952
17,50	TTS12-A	TTD-4F21-1750-HU318	30872953
17,70	TTS12-A	TTD-4F21-1770-HU318	30872954
18,00	TTS12-A	TTD-4F21-1800-HU318	30872955
18,50	TTS12-A	TTD-4F21-1850-HU318	30872956
18,70	TTS12-A	TTD-4F21-1870-HU318	30401831
19,00	TTS12-A	TTD-4F21-1900-HU318	30872957
19,50	TTS12-A	TTD-4F21-1950-HU318	30872958
19,70	TTS12-A	TTD-4F21-1970-HU318	30872959
20,00	TTS12-A	TTD-4F21-2000-HU318	30872960
20,50	TTS12-A	TTD-4F21-2050-HU318	30872961
20,70	TTS12-A	TTD-4F21-2070-HU318	30872962
21,00	TTS12-A	TTD-4F21-2100-HU318	30872963
21,50	TTS12-A	TTD-4F21-2150-HU318	30872964
21,70	TTS12-A	TTD-4F21-2170-HU318	30872965
21,80	TTS12-A	TTD-4F21-2180-HU318	30401832
22,00	TTS12-A	TTD-4F21-2200-HU318	30872966
22,50	TTS12-A	TTD-4F21-2250-HU318	30872967
22,70	TTS12-A	TTD-4F21-2270-HU318	30872968

d_1 from 23.00 to 33.70			
d_1h7	Connection	Specification	Order number
23,00	TTS12-A	TTD-4F21-2300-HU318	30872969
23,50	TTS12-A	TTD-4F21-2350-HU318	30872970
23,70	TTS12-A	TTD-4F21-2370-HU318	30872971
24,00	TTS12-A	TTD-4F21-2400-HU318	30872973
24,50	TTS18-A	TTD-4F21-2450-HU318	30872974
24,70	TTS18-A	TTD-4F21-2470-HU318	30872975
25,00	TTS18-A	TTD-4F21-2500-HU318	30401833
25,50	TTS18-A	TTD-4F21-2550-HU318	30872976
25,70	TTS18-A	TTD-4F21-2570-HU318	30872977
26,00	TTS18-A	TTD-4F21-2600-HU318	30872978
26,50	TTS18-A	TTD-4F21-2650-HU318	30872979
26,70	TTS18-A	TTD-4F21-2670-HU318	30872980
27,00	TTS18-A	TTD-4F21-2700-HU318	30872981
27,50	TTS18-A	TTD-4F21-2750-HU318	30872983
27,70	TTS18-A	TTD-4F21-2770-HU318	30872984
28,00	TTS18-A	TTD-4F21-2800-HU318	30872985
28,20	TTS18-A	TTD-4F21-2820-HU318	30401834
28,50	TTS18-A	TTD-4F21-2850-HU318	30872986
28,70	TTS18-A	TTD-4F21-2870-HU318	30872987
29,00	TTS18-A	TTD-4F21-2900-HU318	30872988
29,50	TTS18-A	TTD-4F21-2950-HU318	30872989
29,70	TTS18-A	TTD-4F21-2970-HU318	30872990
29,80	TTS18-A	TTD-4F21-2980-HU318	30401835
30,00	TTS18-A	TTD-4F21-3000-HU318	30872991
30,50	TTS18-A	TTD-4F21-3050-HU318	30872992
30,70	TTS18-A	TTD-4F21-3070-HU318	30872993
31,00	TTS18-A	TTD-4F21-3100-HU318	30872994
31,40	TTS18-A	TTD-4F21-3140-HU318	30401836
31,50	TTS18-A	TTD-4F21-3150-HU318	30872995
31,70	TTS18-A	TTD-4F21-3170-HU318	30872996
32,00	TTS18-A	TTD-4F21-3200-HU318	30872997
32,50	TTS18-A	TTD-4F21-3250-HU318	30872998
32,70	TTS18-A	TTD-4F21-3270-HU318	30872999
33,00	TTS18-A	TTD-4F21-3300-HU318	30873000
33,50	TTS18-A	TTD-4F21-3350-HU318	30873001
33,70	TTS18-A	TTD-4F21-3370-HU318	30873002

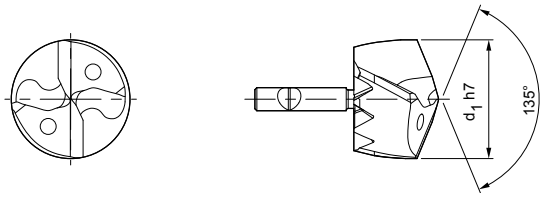
d_1 from 34.00 to 45.00			
d_1h7	Connection	Specification	Order number
34,00	TTS18-A	TTD-4F21-3400-HU318	30873003
34,50	TTS18-A	TTD-4F21-3450-HU318	30873004
34,70	TTS18-A	TTD-4F21-3470-HU318	30873005
35,00	TTS18-A	TTD-4F21-3500-HU318	30873006
35,50	TTS18-A	TTD-4F21-3550-HU318	30873007
35,70	TTS18-A	TTD-4F21-3570-HU318	30873008
36,00	TTS18-A	TTD-4F21-3600-HU318	30873010
36,50	TTS18-A	TTD-4F21-3650-HU318	30873011
36,70	TTS18-A	TTD-4F21-3670-HU318	30873012
37,00	TTS18-A	TTD-4F21-3700-HU318	30873013
37,50	TTS18-A	TTD-4F21-3750-HU318	30873014
37,70	TTS18-A	TTD-4F21-3770-HU318	30873015
38,00	TTS18-A	TTD-4F21-3800-HU318	30873016
38,50	TTS18-A	TTD-4F21-3850-HU318	30873017
38,70	TTS18-A	TTD-4F21-3870-HU318	30873018
39,00	TTS18-A	TTD-4F21-3900-HU318	30873019
39,50	TTS18-A	TTD-4F21-3950-HU318	30873020
39,70	TTS18-A	TTD-4F21-3970-HU318	30873021
40,00	TTS18-A	TTD-4F21-4000-HU318	30873022
40,50	TTS18-A	TTD-4F21-4050-HU318	30873023
40,70	TTS18-A	TTD-4F21-4070-HU318	30873024
41,00	TTS18-A	TTD-4F21-4100-HU318	30873025
41,50	TTS18-A	TTD-4F21-4150-HU318	30873026
41,70	TTS18-A	TTD-4F21-4170-HU318	30873027
42,00	TTS18-A	TTD-4F21-4200-HU318	30873028
42,50	TTS18-A	TTD-4F21-4250-HU318	30873029
42,70	TTS18-A	TTD-4F21-4270-HU318	30873030
43,00	TTS18-A	TTD-4F21-4300-HU318	30873031
43,50	TTS18-A	TTD-4F21-4350-HU318	30873032
43,70	TTS18-A	TTD-4F21-4370-HU318	30873033
44,00	TTS18-A	TTD-4F21-4400-HU318	30873034
44,50	TTS18-A	TTD-4F21-4450-HU318	30873035
44,70	TTS18-A	TTD-4F21-4470-HU318	30873036
45,00	TTS18-A	TTD-4F21-4500-HU318	30873037

Dimensions in mm.
For suitable replaceable head holder TTS, see page 116 onwards

Cutting data recommendation from page 234.
Special designs and other coatings available on request.

Replaceable drill head TTD

Made from solid carbide, internal coolant supply
Type 22 - stack CT



Design:

Drill diameter:	12.00-45.00 mm
Cutting material:	HU318
Number of blades:	2
Number of guide chamfers:	3
Tip angle:	135°
Helix angle:	30°

Application:
CFRP-titanium multilayer composites.

P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
						■								■						■	■				

d1 from 12.00 to 22.00			
d1h7	Connection	Specification	Order number
12,00	TTS12-A	TTD-3F22-1200-HU318	30872845
12,30	TTS12-A	TTD-3F22-1230-HU318	30401878
12,50	TTS12-A	TTD-3F22-1250-HU318	30731144
12,70	TTS12-A	TTD-3F22-1270-HU318	30872846
13,00	TTS12-A	TTD-3F22-1300-HU318	30872847
13,50	TTS12-A	TTD-3F22-1350-HU318	30731123
13,70	TTS12-A	TTD-3F22-1370-HU318	30872848
13,90	TTS12-A	TTD-3F22-1390-HU318	30401879
14,00	TTS12-A	TTD-3F22-1400-HU318	30872849
14,20	TTS12-A	TTD-3F22-1420-HU318	30731157
14,50	TTS12-A	TTD-3F22-1450-HU318	30872850
14,70	TTS12-A	TTD-3F22-1470-HU318	30872851
15,00	TTS12-A	TTD-3F22-1500-HU318	30872852
15,50	TTS12-A	TTD-3F22-1550-HU318	30401880
15,70	TTS12-A	TTD-3F22-1570-HU318	30860906
16,00	TTS12-A	TTD-3F22-1600-HU318	30872853
16,50	TTS12-A	TTD-3F22-1650-HU318	30872854
16,70	TTS12-A	TTD-3F22-1670-HU318	30872855
17,00	TTS12-A	TTD-3F22-1700-HU318	30872856
17,50	TTS12-A	TTD-3F22-1750-HU318	30731149
17,70	TTS12-A	TTD-3F22-1770-HU318	30872857
18,00	TTS12-A	TTD-3F22-1800-HU318	30872858
18,50	TTS12-A	TTD-3F22-1850-HU318	30872859
18,70	TTS12-A	TTD-3F22-1870-HU318	30401881
19,00	TTS12-A	TTD-3F22-1900-HU318	30872860
19,50	TTS12-A	TTD-3F22-1950-HU318	30872861
19,70	TTS12-A	TTD-3F22-1970-HU318	30872862
19,80	TTS12-A	TTD-3F22-1980-HU318	30872863
20,00	TTS12-A	TTD-3F22-2000-HU318	30858392
20,50	TTS12-A	TTD-3F22-2050-HU318	30872864
20,70	TTS12-A	TTD-3F22-2070-HU318	30872865
21,00	TTS12-A	TTD-3F22-2100-HU318	30872866
21,50	TTS12-A	TTD-3F22-2150-HU318	30872867
21,70	TTS12-A	TTD-3F22-2170-HU318	30872868
21,80	TTS12-A	TTD-3F22-2180-HU318	30401882
22,00	TTS12-A	TTD-3F22-2200-HU318	30872869

d1 from 22.50 to 33.00			
d1h7	Connection	Specification	Order number
22,50	TTS12-A	TTD-3F22-2250-HU318	30872870
22,70	TTS12-A	TTD-3F22-2270-HU318	30872871
23,00	TTS12-A	TTD-3F22-2300-HU318	30872872
23,50	TTS12-A	TTD-3F22-2350-HU318	30872873
23,70	TTS12-A	TTD-3F22-2370-HU318	30872874
24,00	TTS12-A	TTD-3F22-2400-HU318	30872875
24,50	TTS18-A	TTD-3F22-2450-HU318	30872876
24,70	TTS18-A	TTD-3F22-2470-HU318	30872877
25,00	TTS18-A	TTD-3F22-2500-HU318	30401883
25,50	TTS18-A	TTD-3F22-2550-HU318	30872878
25,70	TTS18-A	TTD-3F22-2570-HU318	30872879
26,00	TTS18-A	TTD-3F22-2600-HU318	30872880
26,50	TTS18-A	TTD-3F22-2650-HU318	30872881
26,70	TTS18-A	TTD-3F22-2670-HU318	30872882
27,00	TTS18-A	TTD-3F22-2700-HU318	30872883
27,50	TTS18-A	TTD-3F22-2750-HU318	30872884
27,70	TTS18-A	TTD-3F22-2770-HU318	30872885
28,00	TTS18-A	TTD-3F22-2800-HU318	30872886
28,20	TTS18-A	TTD-3F22-2820-HU318	30401884
28,50	TTS18-A	TTD-3F22-2850-HU318	30872887
28,70	TTS18-A	TTD-3F22-2870-HU318	30872888
29,00	TTS18-A	TTD-3F22-2900-HU318	30872889
29,50	TTS18-A	TTD-3F22-2950-HU318	30872890
29,70	TTS18-A	TTD-3F22-2970-HU318	30872891
29,80	TTS18-A	TTD-3F22-2980-HU318	30401885
30,00	TTS18-A	TTD-3F22-3000-HU318	30872892
30,50	TTS18-A	TTD-3F22-3050-HU318	30872893
30,70	TTS18-A	TTD-3F22-3070-HU318	30872894
31,00	TTS18-A	TTD-3F22-3100-HU318	30872895
31,40	TTS18-A	TTD-3F22-3140-HU318	30401886
31,50	TTS18-A	TTD-3F22-3150-HU318	30872896
31,70	TTS18-A	TTD-3F22-3170-HU318	30872897
32,00	TTS18-A	TTD-3F22-3200-HU318	30872898
32,50	TTS18-A	TTD-3F22-3250-HU318	30872899
32,70	TTS18-A	TTD-3F22-3270-HU318	30872900
33,00	TTS18-A	TTD-3F22-3300-HU318	30872901

d1 from 33.50 to 45.00			
d1h7	Connection	Specification	Order number
33,50	TTS18-A	TTD-3F22-3350-HU318	30872902
33,70	TTS18-A	TTD-3F22-3370-HU318	30872903
34,00	TTS18-A	TTD-3F22-3400-HU318	30872904
34,50	TTS18-A	TTD-3F22-3450-HU318	30872905
34,70	TTS18-A	TTD-3F22-3470-HU318	30872906
35,00	TTS18-A	TTD-3F22-3500-HU318	30872907
35,50	TTS18-A	TTD-3F22-3550-HU318	30872908
35,70	TTS18-A	TTD-3F22-3570-HU318	30872909
36,00	TTS18-A	TTD-3F22-3600-HU318	30872910
36,50	TTS18-A	TTD-3F22-3650-HU318	30872911
36,70	TTS18-A	TTD-3F22-3670-HU318	30872912
37,00	TTS18-A	TTD-3F22-3700-HU318	30872913
37,50	TTS18-A	TTD-3F22-3750-HU318	30872914
37,70	TTS18-A	TTD-3F22-3770-HU318	30872915
38,00	TTS18-A	TTD-3F22-3800-HU318	30872916
38,50	TTS18-A	TTD-3F22-3850-HU318	30872917
38,70	TTS18-A	TTD-3F22-3870-HU318	30872918
39,00	TTS18-A	TTD-3F22-3900-HU318	30872919
39,50	TTS18-A	TTD-3F22-3950-HU318	30872920
39,70	TTS18-A	TTD-3F22-3970-HU318	30872921
40,00	TTS18-A	TTD-3F22-4000-HU318	30872922
40,50	TTS18-A	TTD-3F22-4050-HU318	30872923
40,70	TTS18-A	TTD-3F22-4070-HU318	30872924
41,00	TTS18-A	TTD-3F22-4100-HU318	30872925
41,50	TTS18-A	TTD-3F22-4150-HU318	30872926
41,70	TTS18-A	TTD-3F22-4170-HU318	30872927
42,00	TTS18-A	TTD-3F22-4200-HU318	30872928
42,50	TTS18-A	TTD-3F22-4250-HU318	30872929
42,70	TTS18-A	TTD-3F22-4270-HU318	30872930
43,00	TTS18-A	TTD-3F22-4300-HU318	30872931
43,50	TTS18-A	TTD-3F22-4350-HU318	30872932
43,70	TTS18-A	TTD-3F22-4370-HU318	30872933
44,00	TTS18-A	TTD-3F22-4400-HU318	30872934
44,50	TTS18-A	TTD-3F22-4450-HU318	30872935
44,70	TTS18-A	TTD-3F22-4470-HU318	30872936
45,00	TTS18-A	TTD-3F22-4500-HU318	30872937

Dimensions in mm.
For suitable replaceable head holder TTS, see page 116 onwards

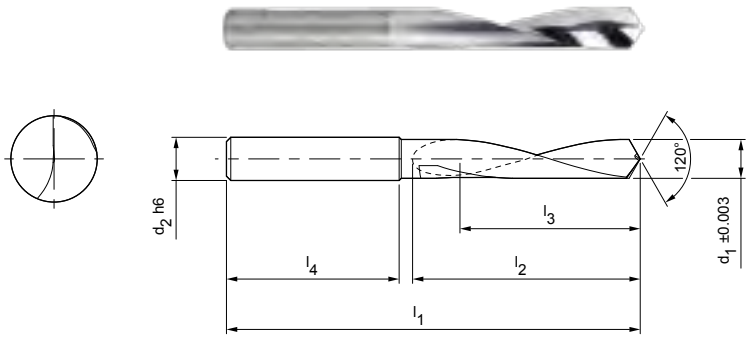
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

Mono-Drill-Plastic

Solid carbide twist drill
SCD57 (5xD), external coolant supply

Design:

Drill diameter:	0.97-13.03 mm
Cutting material:	HU607
Number of blades:	1
Number of guide chamfers:	1
Point geometry:	Specific lead geometry
Tip angle:	120°



N 1.1 1.2 1.3 1.4 2.1 2.2 2.3 3.1 4.1 4.2 4.3 C 1.1 1.2 1.3 2.1 3.1 4.1 4.2 5.1 5.2 5.3

Expert LINE | 5xD | IT7 | HA DIN 6535

Dimensions						Specification	Order number
d_1 (±0.003)	d_2 h6	l_1	l_2	l_3	l_4		
0,97	3	45	7	6	31	SCD570-0097-1-1-120HA06-HU607	30658388
0,98	3	45	7	6	31	SCD570-0098-1-1-120HA06-HU607	30658389
0,99	3	45	7	6	31	SCD570-0099-1-1-120HA06-HU607	30658390
1,00	3	45	7	6	31	SCD570-0100-1-1-120HA06-HU607	30658391
1,01	3	45	7	6	31	SCD570-0101-1-1-120HA06-HU607	30658392
1,02	3	45	7	6	31	SCD570-0102-1-1-120HA06-HU607	30658393
1,03	3	45	7	6	31	SCD570-0103-1-1-120HA06-HU607	30658394
1,97	3	50	14	11	31	SCD570-0197-1-1-120HA06-HU607	30658395
1,98	3	50	14	11	31	SCD570-0198-1-1-120HA06-HU607	30658396
1,99	3	50	14	11	31	SCD570-0199-1-1-120HA06-HU607	30658397
2,00	3	50	14	11	31	SCD570-0200-1-1-120HA06-HU607	30658398
2,01	3	50	14	11	31	SCD570-0201-1-1-120HA06-HU607	30658399
2,02	3	50	14	11	31	SCD570-0202-1-1-120HA06-HU607	30658400
2,03	3	50	14	11	31	SCD570-0203-1-1-120HA06-HU607	30658401
2,97	4	66	28	23	36	SCD570-0297-1-1-120HA06-HU607	30658402
2,98	4	66	28	23	36	SCD570-0298-1-1-120HA06-HU607	30658403
2,99	4	66	28	23	36	SCD570-0299-1-1-120HA06-HU607	30658404
3,00	4	66	28	23	36	SCD570-0300-1-1-120HA06-HU607	30658405
3,01	4	66	28	23	36	SCD570-0301-1-1-120HA06-HU607	30658406
3,02	4	66	28	23	36	SCD570-0302-1-1-120HA06-HU607	30658407
3,03	4	66	28	23	36	SCD570-0303-1-1-120HA06-HU607	30658408
3,97	4	74	36	29	36	SCD570-0397-1-1-120HA06-HU607	30658409
3,98	4	74	36	29	36	SCD570-0398-1-1-120HA06-HU607	30658410
3,99	4	74	36	29	36	SCD570-0399-1-1-120HA06-HU607	30658411
4,00	4	74	36	29	36	SCD570-0400-1-1-120HA06-HU607	30658412
4,01	4	74	36	29	36	SCD570-0401-1-1-120HA06-HU607	30658413
4,02	4	74	36	29	36	SCD570-0402-1-1-120HA06-HU607	30658414
4,03	4	74	36	29	36	SCD570-0403-1-1-120HA06-HU607	30658415
4,97	6	82	44	35	36	SCD570-0497-1-1-120HA06-HU607	30658416
4,98	6	82	44	35	36	SCD570-0498-1-1-120HA06-HU607	30658417
4,99	6	82	44	35	36	SCD570-0499-1-1-120HA06-HU607	30658418
5,00	6	82	44	35	36	SCD570-0500-1-1-120HA06-HU607	30658419
5,01	6	82	44	35	36	SCD570-0501-1-1-120HA06-HU607	30658420
5,02	6	82	44	35	36	SCD570-0502-1-1-120HA06-HU607	30658421
5,03	6	82	44	35	36	SCD570-0503-1-1-120HA06-HU607	30658422

Mono-Drill-Plastic | Solid carbide twist drill SCD57 (5xD), external coolant supply

Dimensions						Specification	Order number
d_1 (±0.003)	d_2 h6	l_1	l_2	l_3	l_4		
5,97	6	82	44	35	36	SCD570-0597-1-1-120HA06-HU607	30658423
5,98	6	82	44	35	36	SCD570-0598-1-1-120HA06-HU607	30658424
5,99	6	82	44	35	36	SCD570-0599-1-1-120HA06-HU607	30658425
6,00	6	82	44	35	36	SCD570-0600-1-1-120HA06-HU607	30658426
6,01	6	82	44	35	36	SCD570-0601-1-1-120HA06-HU607	30658427
6,02	6	82	44	35	36	SCD570-0602-1-1-120HA06-HU607	30658428
6,03	6	82	44	35	36	SCD570-0603-1-1-120HA06-HU607	30658429
6,97	8	91	53	43	36	SCD570-0697-1-1-120HA06-HU607	30658430
6,98	8	91	53	43	36	SCD570-0698-1-1-120HA06-HU607	30658431
6,99	8	91	53	43	36	SCD570-0699-1-1-120HA06-HU607	30658432
7,00	8	91	53	43	36	SCD570-0700-1-1-120HA06-HU607	30658433
7,01	8	91	53	43	36	SCD570-0701-1-1-120HA06-HU607	30658434
7,02	8	91	53	43	36	SCD570-0702-1-1-120HA06-HU607	30658435
7,03	8	91	53	43	36	SCD570-0703-1-1-120HA06-HU607	30658436
7,97	8	91	53	43	36	SCD570-0797-1-1-120HA06-HU607	30658437
7,98	8	91	53	43	36	SCD570-0798-1-1-120HA06-HU607	30658438
7,99	8	91	53	43	36	SCD570-0799-1-1-120HA06-HU607	30658439
8,00	8	91	53	43	36	SCD570-0800-1-1-120HA06-HU607	30658440
8,01	8	91	53	43	36	SCD570-0801-1-1-120HA06-HU607	30658441
8,02	8	91	53	43	36	SCD570-0802-1-1-120HA06-HU607	30658442
8,03	8	91	53	43	36	SCD570-0803-1-1-120HA06-HU607	30658443
8,97	10	103	61	49	40	SCD570-0897-1-1-120HA06-HU607	30658444
8,98	10	103	61	49	40	SCD570-0898-1-1-120HA06-HU607	30658445
8,99	10	103	61	49	40	SCD570-0899-1-1-120HA06-HU607	30658446
9,00	10	103	61	49	40	SCD570-0900-1-1-120HA06-HU607	30658447
9,01	10	103	61	49	40	SCD570-0901-1-1-120HA06-HU607	30658448
9,02	10	103	61	49	40	SCD570-0902-1-1-120HA06-HU607	30658449
9,03	10	103	61	49	40	SCD570-0903-1-1-120HA06-HU607	30658450
9,97	10	103	61	49	40	SCD570-0997-1-1-120HA06-HU607	30658451
9,98	10	103	61	49	40	SCD570-0998-1-1-120HA06-HU607	30658452
9,99	10	103	61	49	40	SCD570-0999-1-1-120HA06-HU607	30658453
10,00	10	103	61	49	40	SCD570-1000-1-1-120HA06-HU607	30658454
10,01	10	103	61	49	40	SCD570-1001-1-1-120HA06-HU607	30658455
10,02	10	103	61	49	40	SCD570-1002-1-1-120HA06-HU607	30658456
10,03	10	103	61	49	40	SCD570-1003-1-1-120HA06-HU607	30658457
10,97	12	118	71	56	45	SCD570-1097-1-1-120HA06-HU607	30658458
10,98	12	118	71	56	45	SCD570-1098-1-1-120HA06-HU607	30658459
10,99	12	118	71	56	45	SCD570-1099-1-1-120HA06-HU607	30658460
11,00	12	118	71	56	45	SCD570-1100-1-1-120HA06-HU607	30658461
11,01	12	118	71	56	45	SCD570-1101-1-1-120HA06-HU607	30658462
11,02	12	118	71	56	45	SCD570-1102-1-1-120HA06-HU607	30658463
11,03	12	118	71	56	45	SCD570-1103-1-1-120HA06-HU607	30658464
11,97	12	118	71	56	45	SCD570-1197-1-1-120HA06-HU607	30658465
11,98	12	118	71	56	45	SCD570-1198-1-1-120HA06-HU607	30658466
11,99	12	118	71	56	45	SCD570-1199-1-1-120HA06-HU607	30658467
12,00	12	118	71	56	45	SCD570-1200-1-1-120HA06-HU607	30658468
12,01	12	118	71	56	45	SCD570-1201-1-1-120HA06-HU607	30658469
12,02	12	118	71	56	45	SCD570-1202-1-1-120HA06-HU607	30658470
12,03	12	118	71	56	45	SCD570-1203-1-1-120HA06-HU607	30658471
12,97	14	124	77	60	45	SCD570-1297-1-1-120HA06-HU607	30658472
12,98	14	124	77	60	45	SCD570-1298-1-1-120HA06-HU607	30658473
12,99	14	124	77	60	45	SCD570-1299-1-1-120HA06-HU607	30658474
13,00	14	124	77	60	45	SCD570-1300-1-1-120HA06-HU607	30658475
13,01	14	124	77	60	45	SCD570-1301-1-1-120HA06-HU607	30658476
13,02	14	124	77	60	45	SCD570-1302-1-1-120HA06-HU607	30658477
13,03	14	124	77	60	45	SCD570-1303-1-1-120HA06-HU607	30658478

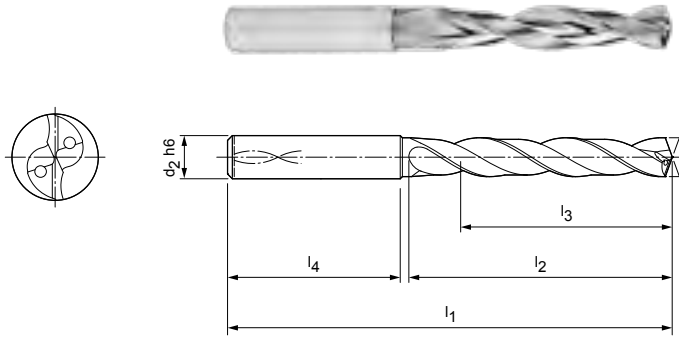
Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

MEGA-Drill-Alu

Solid carbide twist drill
SCD13 (5xD), internal coolant supply

Design:

Drill diameter:	2.80-19.05 mm
Cutting material:	HU630
Number of blades:	2
Number of guide chamfers:	2
Point geometry:	Specific lead geometry
Tip angle:	140°
Helix angle:	30°



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
	■	■	■	■	■	■	■															

Dimensions							Specification	Order number
d_1 m7 [mm]	d_1 m7 [inch]	d_2 h6	l_1	l_2	l_3	l_4		
*2,80		6	66	28	23	36	SCD131-0280-2-2-140HA05-HU630	30427727
3,00		6	66	28	23	36	SCD131-0300-2-2-140HA05-HU630	30391326
3,10		6	66	28	23	36	SCD131-0310-2-2-140HA05-HU630	30391327
3,18	1/8	6	66	28	23	36	SCD131-0318-2-2-140HA05-HU630	30451145
3,20		6	66	28	23	36	SCD131-0320-2-2-140HA05-HU630	30391328
3,30		6	66	28	23	36	SCD131-0330-2-2-140HA05-HU630	30391329
3,40		6	66	28	23	36	SCD131-0340-2-2-140HA05-HU630	30391330
3,50		6	66	28	23	36	SCD131-0350-2-2-140HA05-HU630	30391331
3,57	9/64	6	66	28	23	36	SCD131-0357-2-2-140HA05-HU630	30451147
3,60		6	66	28	23	36	SCD131-0360-2-2-140HA05-HU630	30391332
*3,70		6	66	28	23	36	SCD131-0370-2-2-140HA05-HU630	30391333
3,80		6	74	36	29	36	SCD131-0380-2-2-140HA05-HU630	30391334
3,90		6	74	36	29	36	SCD131-0390-2-2-140HA05-HU630	30391335
3,97	5/32	6	74	36	29	36	SCD131-0397-2-2-140HA05-HU630	30451149
4,00		6	74	36	29	36	SCD131-0400-2-2-140HA05-HU630	30391336
4,10		6	74	36	29	36	SCD131-0410-2-2-140HA05-HU630	30391337
4,20		6	74	36	29	36	SCD131-0420-2-2-140HA05-HU630	30391338
4,30		6	74	36	29	36	SCD131-0430-2-2-140HA05-HU630	30391339
4,37	11/64	6	74	36	29	36	SCD131-0437-2-2-140HA05-HU630	30451151
4,40		6	74	36	29	36	SCD131-0440-2-2-140HA05-HU630	30391340
4,50		6	74	36	29	36	SCD131-0450-2-2-140HA05-HU630	30391341
4,60		6	74	36	29	36	SCD131-0460-2-2-140HA05-HU630	30391342
*4,65		6	74	36	29	36	SCD131-0465-2-2-140HA05-HU630	30453500
4,70		6	74	36	29	36	SCD131-0470-2-2-140HA05-HU630	30391343
4,76	3/16	6	82	44	35	36	SCD131-0476-2-2-140HA05-HU630	30451153
4,80		6	82	44	35	36	SCD131-0480-2-2-140HA05-HU630	30391344
4,90		6	82	44	35	36	SCD131-0490-2-2-140HA05-HU630	30391345
5,00		6	82	44	35	36	SCD131-0500-2-2-140HA05-HU630	30391346
5,10		6	82	44	35	36	SCD131-0510-2-2-140HA05-HU630	30391347
5,16	13/64	6	82	44	35	36	SCD131-0516-2-2-140HA05-HU630	30451154
5,20		6	82	44	35	36	SCD131-0520-2-2-140HA05-HU630	30391348
5,30		6	82	44	35	36	SCD131-0530-2-2-140HA05-HU630	30391349
5,40		6	82	44	35	36	SCD131-0540-2-2-140HA05-HU630	30391350
5,50		6	82	44	35	36	SCD131-0550-2-2-140HA05-HU630	30391351
*5,55		6	82	44	35	36	SCD131-0555-2-2-140HA05-HU630	on demand

MEGA-Drill-Alu | Solid carbide twist drill SCD13 (5xD), internal coolant supply

Dimensions							Specification	Order number
d_1 m7 [mm]	d_1 m7 [inch]	d_2 h6	l_1	l_2	l_3	l_4		
5,56	7/32	6	82	44	35	36	SCD131-0556-2-2-140HA05-HU630	30451155
5,60		6	82	44	35	36	SCD131-0560-2-2-140HA05-HU630	30391352
5,70		6	82	44	35	36	SCD131-0570-2-2-140HA05-HU630	30391353
5,80		6	82	44	35	36	SCD131-0580-2-2-140HA05-HU630	30391354
5,90		6	82	44	35	36	SCD131-0590-2-2-140HA05-HU630	30391355
5,95	15/64	6	82	44	35	36	SCD131-0595-2-2-140HA05-HU630	30451156
6,00		6	82	44	35	36	SCD131-0600-2-2-140HA05-HU630	30391356
6,10		8	91	53	43	36	SCD131-0610-2-2-140HA05-HU630	30391357
6,20		8	91	53	43	36	SCD131-0620-2-2-140HA05-HU630	30391358
6,30		8	91	53	43	36	SCD131-0630-2-2-140HA05-HU630	30391359
6,35	1/4	8	91	53	43	36	SCD131-0635-2-2-140HA05-HU630	30451158
6,40		8	91	53	43	36	SCD131-0640-2-2-140HA05-HU630	30391360
6,50		8	91	53	43	36	SCD131-0650-2-2-140HA05-HU630	30391361
6,60		8	91	53	43	36	SCD131-0660-2-2-140HA05-HU630	30391362
6,70		8	91	53	43	36	SCD131-0670-2-2-140HA05-HU630	30391363
6,75	17/64	8	91	53	43	36	SCD131-0675-2-2-140HA05-HU630	30451161
6,80		8	91	53	43	36	SCD131-0680-2-2-140HA05-HU630	30391364
6,90		8	91	53	43	36	SCD131-0690-2-2-140HA05-HU630	30391365
7,00		8	91	53	43	36	SCD131-0700-2-2-140HA05-HU630	30391366
7,10		8	91	53	43	36	SCD131-0710-2-2-140HA05-HU630	30391367
7,14	9/32	8	91	53	43	36	SCD131-0714-2-2-140HA05-HU630	30451162
7,20		8	91	53	43	36	SCD131-0720-2-2-140HA05-HU630	30391368
7,30		8	91	53	43	36	SCD131-0730-2-2-140HA05-HU630	30391369
7,40		8	91	53	43	36	SCD131-0740-2-2-140HA05-HU630	30391370
*7,45		8	91	53	43	36	SCD131-0745-2-2-140HA05-HU630	30453910
7,50		8	91	53	43	36	SCD131-0750-2-2-140HA05-HU630	30391371
7,54	19/64	8	91	53	43	36	SCD131-0754-2-2-140HA05-HU630	30451163
7,60		8	91	53	43	36	SCD131-0760-2-2-140HA05-HU630	30391372
7,70		8	91	53	43	36	SCD131-0770-2-2-140HA05-HU630	30391373
7,80		8	91	53	43	36	SCD131-0780-2-2-140HA05-HU630	30391374
7,90		8	91	53	43	36	SCD131-0790-2-2-140HA05-HU630	30391375
7,94	5/16	8	91	53	43	36	SCD131-0794-2-2-140HA05-HU630	30451164
8,00		8	91	53	43	36	SCD131-0800-2-2-140HA05-HU630	30391376
8,10		10	103	61	49	40	SCD131-0810-2-2-140HA05-HU630	30391377
8,20		10	103	61	49	40	SCD131-0820-2-2-140HA05-HU630	30391378
8,30		10	103	61	49	40	SCD131-0830-2-2-140HA05-HU630	30391379
8,33	21/64	10	103	61	49	40	SCD131-0833-2-2-140HA05-HU630	30451165
8,40		10	103	61	49	40	SCD131-0840-2-2-140HA05-HU630	30391380
8,50		10	103	61	49	40	SCD131-0850-2-2-140HA05-HU630	30391381
8,60		10	103	61	49	40	SCD131-0860-2-2-140HA05-HU630	30391382
8,70		10	103	61	49	40	SCD131-0870-2-2-140HA05-HU630	30391383
8,73	11/32	10	103	61	49	40	SCD131-0873-2-2-140HA05-HU630	30451167
8,80		10	103	61	49	40	SCD131-0880-2-2-140HA05-HU630	30391384
8,90		10	103	61	49	40	SCD131-0890-2-2-140HA05-HU630	30391385
9,00		10	103	61	49	40	SCD131-0900-2-2-140HA05-HU630	30391386
9,10		10	103	61	49	40	SCD131-0910-2-2-140HA05-HU630	30391387
9,13	23/64	10	103	61	49	40	SCD131-0913-2-2-140HA05-HU630	30451168
9,20		10	103	61	49	40	SCD131-0920-2-2-140HA05-HU630	30391388
*9,30		10	103	61	49	40	SCD131-0930-2-2-140HA05-HU630	30391389
9,40		10	103	61	49	40	SCD131-0940-2-2-140HA05-HU630	30391390
9,50		10	103	61	49	40	SCD131-0950-2-2-140HA05-HU630	30391391
9,53	3/8	10	103	61	49	40	SCD131-0953-2-2-140HA05-HU630	30451170
9,60		10	103	61	49	40	SCD131-0960-2-2-140HA05-HU630	30391392
9,70		10	103	61	49	40	SCD131-0970-2-2-140HA05-HU630	30391393
9,80		10	103	61	49	40	SCD131-0980-2-2-140HA05-HU630	30391394
9,90		10	103	61	49	40	SCD131-0990-2-2-140HA05-HU630	30391395
9,92	25/64	10	103	61	49	40	SCD131-0992-2-2-140HA05-HU630	30451171

Continued on next page

MEGA-Drill-Alu | Solid carbide twist drill SCD13 (5xD), internal coolant supply

Dimensions							Specification	Order number
d_1 m7 [mm]	d_1 m7 [inch]	d_2 h6	l_1	l_2	l_3	l_4		
10,00		10	103	61	49	40	SCD131-1000-2-2-140HA05-HU630	30391396
10,10		12	118	71	56	45	SCD131-1010-2-2-140HA05-HU630	30391397
10,20		12	118	71	56	45	SCD131-1020-2-2-140HA05-HU630	30391398
10,30		12	118	71	56	45	SCD131-1030-2-2-140HA05-HU630	30391399
10,32	13/32	12	118	71	56	45	SCD131-1032-2-2-140HA05-HU630	30451173
10,40		12	118	71	56	45	SCD131-1040-2-2-140HA05-HU630	30391400
10,50		12	118	71	56	45	SCD131-1050-2-2-140HA05-HU630	30391401
10,60		12	118	71	56	45	SCD131-1060-2-2-140HA05-HU630	30391402
10,70		12	118	71	56	45	SCD131-1070-2-2-140HA05-HU630	30391403
10,72	27/64	12	118	71	56	45	SCD131-1072-2-2-140HA05-HU630	30451174
10,80		12	118	71	56	45	SCD131-1080-2-2-140HA05-HU630	30391404
10,90		12	118	71	56	45	SCD131-1090-2-2-140HA05-HU630	30391405
11,00		12	118	71	56	45	SCD131-1100-2-2-140HA05-HU630	30391406
11,11	7/16	12	118	71	56	45	SCD131-1111-2-2-140HA05-HU630	30451175
11,50		12	118	71	56	45	SCD131-1150-2-2-140HA05-HU630	30391407
12,00		12	118	71	56	45	SCD131-1200-2-2-140HA05-HU630	30391408
12,50		14	124	77	60	45	SCD131-1250-2-2-140HA05-HU630	30391409
13,00		14	124	77	60	45	SCD131-1300-2-2-140HA05-HU630	30391410
13,50		14	124	77	60	45	SCD131-1350-2-2-140HA05-HU630	30391411
14,00		14	124	77	60	45	SCD131-1400-2-2-140HA05-HU630	30391412
14,50		16	133	83	63	48	SCD131-1450-2-2-140HA05-HU630	30391413
14,68	37/64	16	133	83	63	48	SCD131-1468-2-2-140HA05-HU630	30451181
14,80		16	133	83	63	48	SCD131-1480-2-2-140HA05-HU630	30391414
15,00		16	133	83	63	48	SCD131-1500-2-2-140HA05-HU630	30391415
15,08	19/32	16	133	83	63	48	SCD131-1508-2-2-140HA05-HU630	30451182
15,50		16	133	83	63	48	SCD131-1550-2-2-140HA05-HU630	30391416
15,80		16	133	83	63	48	SCD131-1580-2-2-140HA05-HU630	30391417
15,88	5/8	16	133	83	63	48	SCD131-1588-2-2-140HA05-HU630	30451183
16,00		16	133	83	63	48	SCD131-1600-2-2-140HA05-HU630	30391418
16,67	21/32	18	143	93	71	48	SCD131-1667-2-2-140HA05-HU630	30451184
17,46	11/16	18	143	93	71	48	SCD131-1746-2-2-140HA05-HU630	30451185
17,86	45/54	18	143	93	71	48	SCD131-1786-2-2-140HA05-HU630	30451186
18,26	23/32	20	153	101	77	50	SCD131-1826-2-2-140HA05-HU630	30451187
19,05	3/4	20	153	101	77	50	SCD131-1905-2-2-140HA05-HU630	30451188

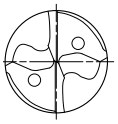
Dimensions in mm.
* Specifically suited to prefabricating core holes for thread formers.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

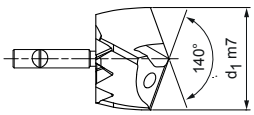
Replaceable drill head TTD

Made from solid carbide, internal coolant supply
Type 03 - alu

Design:

Drill diameter:	12.00-45.00 mm
Cutting material:	HP619
Number of blades:	2
Number of guide chamfers:	4
Tip angle:	140 °





N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3
	■	■	■	■	■	■	■				

C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3

d_1 from 12.00 to 15.40			
d_1m7	Connection	Specification	Order number
12,00	TTS12-A	TTD-4F03-1200-HP619	30231807
12,10	TTS12-A	TTD-4F03-1210-HP619	30249057
12,20	TTS12-A	TTD-4F03-1220-HP619	30249058
12,30	TTS12-A	TTD-4F03-1230-HP619	30249059
12,40	TTS12-A	TTD-4F03-1240-HP619	30249060
12,50	TTS12-A	TTD-4F03-1250-HP619	30231808
12,60	TTS12-A	TTD-4F03-1260-HP619	30249061
12,70	TTS12-A	TTD-4F03-1270-HP619	30231810
12,80	TTS12-A	TTD-4F03-1280-HP619	30249062
12,90	TTS12-A	TTD-4F03-1290-HP619	30249063
13,00	TTS12-A	TTD-4F03-1300-HP619	30231812
13,10	TTS12-A	TTD-4F03-1310-HP619	30249064
13,20	TTS12-A	TTD-4F03-1320-HP619	30249065
13,30	TTS12-A	TTD-4F03-1330-HP619	30249066
13,40	TTS12-A	TTD-4F03-1340-HP619	30249067
13,50	TTS12-A	TTD-4F03-1350-HP619	30231815
13,60	TTS12-A	TTD-4F03-1360-HP619	30249068
13,70	TTS12-A	TTD-4F03-1370-HP619	30231816
13,80	TTS12-A	TTD-4F03-1380-HP619	30249069
13,90	TTS12-A	TTD-4F03-1390-HP619	30249070
14,00	TTS12-A	TTD-4F03-1400-HP619	30231817
14,10	TTS12-A	TTD-4F03-1410-HP619	30249071
14,20	TTS12-A	TTD-4F03-1420-HP619	30249072
14,30	TTS12-A	TTD-4F03-1430-HP619	30249073
14,40	TTS12-A	TTD-4F03-1440-HP619	30249074
14,50	TTS12-A	TTD-4F03-1450-HP619	30231818
14,60	TTS12-A	TTD-4F03-1460-HP619	30249075
14,70	TTS12-A	TTD-4F03-1470-HP619	30231819
14,80	TTS12-A	TTD-4F03-1480-HP619	30249076
14,90	TTS12-A	TTD-4F03-1490-HP619	30249077
15,00	TTS12-A	TTD-4F03-1500-HP619	30231820
15,10	TTS12-A	TTD-4F03-1510-HP619	30249078
15,20	TTS12-A	TTD-4F03-1520-HP619	30249079
15,30	TTS12-A	TTD-4F03-1530-HP619	30249080
15,40	TTS12-A	TTD-4F03-1540-HP619	30249081

d_1 from 15.50 to 18.90			
d_1m7	Connection	Specification	Order number
15,50	TTS12-A	TTD-4F03-1550-HP619	30231821
15,60	TTS12-A	TTD-4F03-1560-HP619	30249082
15,70	TTS12-A	TTD-4F03-1570-HP619	30219138
15,80	TTS12-A	TTD-4F03-1580-HP619	30249083
15,90	TTS12-A	TTD-4F03-1590-HP619	30249084
16,00	TTS12-A	TTD-4F03-1600-HP619	30191460
16,10	TTS12-A	TTD-4F03-1610-HP619	30249085
16,20	TTS12-A	TTD-4F03-1620-HP619	30249086
16,30	TTS12-A	TTD-4F03-1630-HP619	30249087
16,40	TTS12-A	TTD-4F03-1640-HP619	30249088
16,50	TTS12-A	TTD-4F03-1650-HP619	30191461
16,60	TTS12-A	TTD-4F03-1660-HP619	30249089
16,70	TTS12-A	TTD-4F03-1670-HP619	30219139
16,80	TTS12-A	TTD-4F03-1680-HP619	30249090
16,90	TTS12-A	TTD-4F03-1690-HP619	30249091
17,00	TTS12-A	TTD-4F03-1700-HP619	30191462
17,10	TTS12-A	TTD-4F03-1710-HP619	30249092
17,20	TTS12-A	TTD-4F03-1720-HP619	30249093
17,30	TTS12-A	TTD-4F03-1730-HP619	30249094
17,40	TTS12-A	TTD-4F03-1740-HP619	30249095
17,50	TTS12-A	TTD-4F03-1750-HP619	30191463
17,60	TTS12-A	TTD-4F03-1760-HP619	30249096
17,70	TTS12-A	TTD-4F03-1770-HP619	30219140
17,80	TTS12-A	TTD-4F03-1780-HP619	30249097
17,90	TTS12-A	TTD-4F03-1790-HP619	30249098
18,00	TTS12-A	TTD-4F03-1800-HP619	30191464
18,10	TTS12-A	TTD-4F03-1810-HP619	30234210
18,20	TTS12-A	TTD-4F03-1820-HP619	30249099
18,30	TTS12-A	TTD-4F03-1830-HP619	30249100
18,40	TTS12-A	TTD-4F03-1840-HP619	30249101
18,50	TTS12-A	TTD-4F03-1850-HP619	30191465
18,60	TTS12-A	TTD-4F03-1860-HP619	30249102
18,70	TTS12-A	TTD-4F03-1870-HP619	30219141
18,80	TTS12-A	TTD-4F03-1880-HP619	30249103
18,90	TTS12-A	TTD-4F03-1890-HP619	30249104

d_1 from 19.00 to 22.40			
d_1m7	Connection	Specification	Order number
19,00	TTS12-A	TTD-4F03-1900-HP619	30191466
19,10	TTS12-A	TTD-4F03-1910-HP619	30249105
19,20	TTS12-A	TTD-4F03-1920-HP619	30249106
19,30	TTS12-A	TTD-4F03-1930-HP619	30249107
19,40	TTS12-A	TTD-4F03-1940-HP619	30249108
19,50	TTS12-A	TTD-4F03-1950-HP619	30191467
19,60	TTS12-A	TTD-4F03-1960-HP619	30249109
19,70	TTS12-A	TTD-4F03-1970-HP619	30219142
19,80	TTS12-A	TTD-4F03-1980-HP619	30249110
19,90	TTS12-A	TTD-4F03-1990-HP619	30249111
20,00	TTS12-A	TTD-4F03-2000-HP619	30191468
20,10	TTS12-A	TTD-4F03-2010-HP619	30249112
20,20	TTS12-A	TTD-4F03-2020-HP619	30249113
20,30	TTS12-A	TTD-4F03-2030-HP619	30216431
20,40	TTS12-A	TTD-4F03-2040-HP619	30249114
20,50	TTS12-A	TTD-4F03-2050-HP619	30191469
20,60	TTS12-A	TTD-4F03-2060-HP619	30249115
20,70	TTS12-A	TTD-4F03-2070-HP619	30219143
20,80	TTS12-A	TTD-4F03-2080-HP619	30249116
20,90	TTS12-A	TTD-4F03-2090-HP619	30249117
21,00	TTS12-A	TTD-4F03-2100-HP619	30191470
21,10	TTS12-A	TTD-4F03-2110-HP619	30249118
21,20	TTS12-A	TTD-4F03-2120-HP619	30249119
21,30	TTS12-A	TTD-4F03-2130-HP619	30249120
21,40	TTS12-A	TTD-4F03-2140-HP619	30249121
21,50	TTS12-A	TTD-4F03-2150-HP619	30191471
21,60	TTS12-A	TTD-4F03-2160-HP619	30249122
21,70	TTS12-A	TTD-4F03-2170-HP619	30219144
21,80	TTS12-A	TTD-4F03-2180-HP619	30249123
21,90	TTS12-A	TTD-4F03-2190-HP619	30249124
22,00	TTS12-A	TTD-4F03-2200-HP619	30191472
22,10	TTS12-A	TTD-4F03-2210-HP619	30249125
22,20	TTS12-A	TTD-4F03-2220-HP619	30249126
22,30	TTS12-A	TTD-4F03-2230-HP619	30249127
22,40	TTS12-A	TTD-4F03-2240-HP619	30249128

Continued on next page

Solid carbide replaceable drill head TTD, internal cooling – type 03

d_1 from 22.50 to 26.50			
d_1m7	Connection	Specification	Order number
22,50	TTS12-A	TTD-4F03-2250-HP619	30191473
22,60	TTS12-A	TTD-4F03-2260-HP619	30249129
22,70	TTS12-A	TTD-4F03-2270-HP619	30219145
22,80	TTS12-A	TTD-4F03-2280-HP619	30249130
22,90	TTS12-A	TTD-4F03-2290-HP619	30249131
23,00	TTS12-A	TTD-4F03-2300-HP619	30191474
23,10	TTS12-A	TTD-4F03-2310-HP619	30249132
23,20	TTS12-A	TTD-4F03-2320-HP619	30249133
23,30	TTS12-A	TTD-4F03-2330-HP619	30249134
23,40	TTS12-A	TTD-4F03-2340-HP619	30249135
23,50	TTS12-A	TTD-4F03-2350-HP619	30191475
23,60	TTS12-A	TTD-4F03-2360-HP619	30249136
23,70	TTS12-A	TTD-4F03-2370-HP619	30219146
23,80	TTS12-A	TTD-4F03-2380-HP619	30249137
23,90	TTS12-A	TTD-4F03-2390-HP619	30249138
24,00	TTS12-A	TTD-4F03-2400-HP619	30191476
24,10	TTS12-A	TTD-4F03-2410-HP619	30249139
24,20	TTS12-A	TTD-4F03-2420-HP619	30249140
24,30	TTS12-A	TTD-4F03-2430-HP619	30249141
24,40	TTS12-A	TTD-4F03-2440-HP619	30249142
24,50	TTS18-A	TTD-4F03-2450-HP619	30191477
24,60	TTS18-A	TTD-4F03-2460-HP619	30249143
24,70	TTS18-A	TTD-4F03-2470-HP619	30219147
24,80	TTS18-A	TTD-4F03-2480-HP619	30249144
24,90	TTS18-A	TTD-4F03-2490-HP619	30249145
25,00	TTS18-A	TTD-4F03-2500-HP619	30191478
25,10	TTS18-A	TTD-4F03-2510-HP619	30249146
25,20	TTS18-A	TTD-4F03-2520-HP619	30249147
25,30	TTS18-A	TTD-4F03-2530-HP619	30249148
25,40	TTS18-A	TTD-4F03-2540-HP619	30249149
25,50	TTS18-A	TTD-4F03-2550-HP619	30191479
25,60	TTS18-A	TTD-4F03-2560-HP619	30249150
25,70	TTS18-A	TTD-4F03-2570-HP619	30219148
25,80	TTS18-A	TTD-4F03-2580-HP619	30249151
25,90	TTS18-A	TTD-4F03-2590-HP619	30249152
26,00	TTS18-A	TTD-4F03-2600-HP619	30191480
26,10	TTS18-A	TTD-4F03-2610-HP619	30249153
26,20	TTS18-A	TTD-4F03-2620-HP619	30249154
26,30	TTS18-A	TTD-4F03-2630-HP619	30249155
26,40	TTS18-A	TTD-4F03-2640-HP619	30249156
26,50	TTS18-A	TTD-4F03-2650-HP619	30191481

d_1 from 26.60 to 30.60			
d_1m7	Connection	Specification	Order number
26,60	TTS18-A	TTD-4F03-2660-HP619	30249157
26,70	TTS18-A	TTD-4F03-2670-HP619	30219149
26,80	TTS18-A	TTD-4F03-2680-HP619	30249158
26,90	TTS18-A	TTD-4F03-2690-HP619	30249159
27,00	TTS18-A	TTD-4F03-2700-HP619	30191482
27,10	TTS18-A	TTD-4F03-2710-HP619	30249160
27,20	TTS18-A	TTD-4F03-2720-HP619	30249161
27,30	TTS18-A	TTD-4F03-2730-HP619	30249162
27,40	TTS18-A	TTD-4F03-2740-HP619	30249163
27,50	TTS18-A	TTD-4F03-2750-HP619	30191483
27,60	TTS18-A	TTD-4F03-2760-HP619	30249164
27,70	TTS18-A	TTD-4F03-2770-HP619	30219150
27,80	TTS18-A	TTD-4F03-2780-HP619	30249165
27,90	TTS18-A	TTD-4F03-2790-HP619	30249166
28,00	TTS18-A	TTD-4F03-2800-HP619	30191484
28,10	TTS18-A	TTD-4F03-2810-HP619	30249167
28,20	TTS18-A	TTD-4F03-2820-HP619	30249168
28,30	TTS18-A	TTD-4F03-2830-HP619	30249169
28,40	TTS18-A	TTD-4F03-2840-HP619	30249170
28,50	TTS18-A	TTD-4F03-2850-HP619	30191485
28,60	TTS18-A	TTD-4F03-2860-HP619	30249171
28,70	TTS18-A	TTD-4F03-2870-HP619	30219151
28,80	TTS18-A	TTD-4F03-2880-HP619	30249172
28,90	TTS18-A	TTD-4F03-2890-HP619	30249173
29,00	TTS18-A	TTD-4F03-2900-HP619	30191486
29,10	TTS18-A	TTD-4F03-2910-HP619	30249174
29,20	TTS18-A	TTD-4F03-2920-HP619	30249175
29,30	TTS18-A	TTD-4F03-2930-HP619	30249176
29,40	TTS18-A	TTD-4F03-2940-HP619	30249177
29,50	TTS18-A	TTD-4F03-2950-HP619	30191487
29,60	TTS18-A	TTD-4F03-2960-HP619	30249178
29,70	TTS18-A	TTD-4F03-2970-HP619	30219152
29,80	TTS18-A	TTD-4F03-2980-HP619	30249179
29,90	TTS18-A	TTD-4F03-2990-HP619	30249180
30,00	TTS18-A	TTD-4F03-3000-HP619	30191488
30,10	TTS18-A	TTD-4F03-3010-HP619	30249181
30,20	TTS18-A	TTD-4F03-3020-HP619	30249182
30,30	TTS18-A	TTD-4F03-3030-HP619	30249183
30,40	TTS18-A	TTD-4F03-3040-HP619	30249184
30,50	TTS18-A	TTD-4F03-3050-HP619	30191489
30,60	TTS18-A	TTD-4F03-3060-HP619	30249185

d_1 from 30.70 to 45.00			
d_1m7	Connection	Specification	Order number
30,70	TTS18-A	TTD-4F03-3070-HP619	30219153
30,80	TTS18-A	TTD-4F03-3080-HP619	30249186
30,90	TTS18-A	TTD-4F03-3090-HP619	30249187
31,00	TTS18-A	TTD-4F03-3100-HP619	30191490
31,10	TTS18-A	TTD-4F03-3110-HP619	30249188
31,20	TTS18-A	TTD-4F03-3120-HP619	30249189
31,30	TTS18-A	TTD-4F03-3130-HP619	30249190
31,40	TTS18-A	TTD-4F03-3140-HP619	30249191
31,50	TTS18-A	TTD-4F03-3150-HP619	30191491
31,60	TTS18-A	TTD-4F03-3160-HP619	30249192
31,70	TTS18-A	TTD-4F03-3170-HP619	30219154
31,80	TTS18-A	TTD-4F03-3180-HP619	30249193
31,90	TTS18-A	TTD-4F03-3190-HP619	30249194
32,00	TTS18-A	TTD-4F03-3200-HP619	30191492
32,50	TTS18-A	TTD-4F03-3250-HP619	30322399
33,00	TTS18-A	TTD-4F03-3300-HP619	30322401
33,50	TTS18-A	TTD-4F03-3350-HP619	30322402
34,00	TTS18-A	TTD-4F03-3400-HP619	30322403
34,50	TTS18-A	TTD-4F03-3450-HP619	30322404
35,00	TTS18-A	TTD-4F03-3500-HP619	30322405
35,50	TTS18-A	TTD-4F03-3550-HP619	30322406
36,00	TTS18-A	TTD-4F03-3600-HP619	30322407
36,50	TTS18-A	TTD-4F03-3650-HP619	30322408
37,00	TTS18-A	TTD-4F03-3700-HP619	30322409
37,50	TTS18-A	TTD-4F03-3750-HP619	30322410
38,00	TTS18-A	TTD-4F03-3800-HP619	30322412
38,50	TTS18-A	TTD-4F03-3850-HP619	30322413
39,00	TTS18-A	TTD-4F03-3900-HP619	30322434
39,50	TTS18-A	TTD-4F03-3950-HP619	30322414
40,00	TTS18-A	TTD-4F03-4000-HP619	30322416
40,50	TTS18-A	TTD-4F03-4050-HP619	30322417
41,00	TTS18-A	TTD-4F03-4100-HP619	30322418
41,50	TTS18-A	TTD-4F03-4150-HP619	30322419
42,00	TTS18-A	TTD-4F03-4200-HP619	30322421
42,50	TTS18-A	TTD-4F03-4250-HP619	30322422
43,00	TTS18-A	TTD-4F03-4300-HP619	30322423
43,50	TTS18-A	TTD-4F03-4350-HP619	30322424
44,00	TTS18-A	TTD-4F03-4400-HP619	30322425
44,50	TTS18-A	TTD-4F03-4450-HP619	30322426
45,00	TTS18-A	TTD-4F03-4500-HP619	30322427

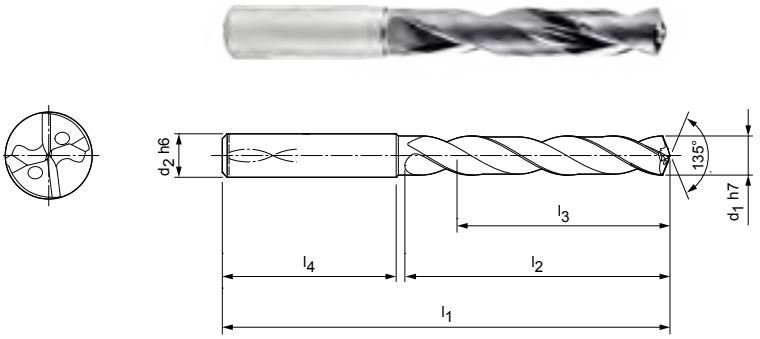
Accessories

	Replaceable head holder TTS TTS100, 3xD TTS100, 5xD TTS100, 8xD TTS100, 12xD	 Page 116 Page 117 Page 118 Page 119

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

MEGA-Speed-Drill-Inox

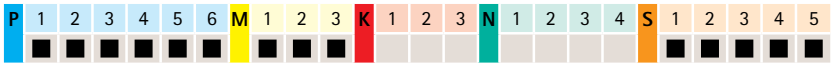
Solid carbide twist drill
SCD41 (5xD), internal coolant supply

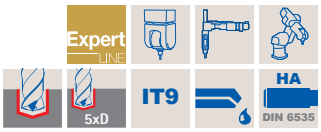


Design:

Drill diameter:	3.00-20.00 mm
Cutting material:	HP374
Number of blades:	2
Number of guide chamfers:	3
Point geometry:	Specific lead geometry
Tip angle:	135 °
Helix angle:	30 °

Application:
For high speed machining.





Dimensions						Specification	Order number
d_1 h7	d_2 h6	l_1	l_2	l_3	l_4		
3,00	6	66	28	23	36	SCD411-0300-2-3-135HA05-HP374	30488182
3,10	6	66	28	23	36	SCD411-0310-2-3-135HA05-HP374	30488183
3,20	6	66	28	23	36	SCD411-0320-2-3-135HA05-HP374	30488184
3,30	6	66	28	23	36	SCD411-0330-2-3-135HA05-HP374	30488185
3,40	6	66	28	23	36	SCD411-0340-2-3-135HA05-HP374	30488186
3,50	6	66	28	23	36	SCD411-0350-2-3-135HA05-HP374	30488187
3,60	6	66	28	23	36	SCD411-0360-2-3-135HA05-HP374	30488188
3,70	6	66	28	23	36	SCD411-0370-2-3-135HA05-HP374	30488189
3,80	6	74	36	29	36	SCD411-0380-2-3-135HA05-HP374	30488190
3,90	6	74	36	29	36	SCD411-0390-2-3-135HA05-HP374	30488191
4,00	6	74	36	29	36	SCD411-0400-2-3-135HA05-HP374	30488192
4,10	6	74	36	29	36	SCD411-0410-2-3-135HA05-HP374	30488193
4,20	6	74	36	29	36	SCD411-0420-2-3-135HA05-HP374	30488194
4,30	6	74	36	29	36	SCD411-0430-2-3-135HA05-HP374	30488195
4,40	6	74	36	29	36	SCD411-0440-2-3-135HA05-HP374	30488196
4,50	6	74	36	29	36	SCD411-0450-2-3-135HA05-HP374	30488197
4,60	6	74	36	29	36	SCD411-0460-2-3-135HA05-HP374	30488198
4,65	6	74	36	29	36	SCD411-0465-2-3-135HA05-HP374	30488199
4,70	6	74	36	29	36	SCD411-0470-2-3-135HA05-HP374	30488200
4,80	6	82	44	35	36	SCD411-0480-2-3-135HA05-HP374	30488201
4,90	6	82	44	35	36	SCD411-0490-2-3-135HA05-HP374	30488202
5,00	6	82	44	35	36	SCD411-0500-2-3-135HA05-HP374	30488203
5,10	6	82	44	35	36	SCD411-0510-2-3-135HA05-HP374	30488204
5,20	6	82	44	35	36	SCD411-0520-2-3-135HA05-HP374	30488205
5,30	6	82	44	35	36	SCD411-0530-2-3-135HA05-HP374	30488206
5,40	6	82	44	35	36	SCD411-0540-2-3-135HA05-HP374	30488207
5,50	6	82	44	35	36	SCD411-0550-2-3-135HA05-HP374	30488208
5,55	6	82	44	35	36	SCD411-0555-2-3-135HA05-HP374	30488209
5,60	6	82	44	35	36	SCD411-0560-2-3-135HA05-HP374	30488210
5,70	6	82	44	35	36	SCD411-0570-2-3-135HA05-HP374	30488211
5,80	6	82	44	35	36	SCD411-0580-2-3-135HA05-HP374	30488212
5,90	6	82	44	35	36	SCD411-0590-2-3-135HA05-HP374	30488213
6,00	6	82	44	35	36	SCD411-0600-2-3-135HA05-HP374	30488214
6,10	8	91	53	43	36	SCD411-0610-2-3-135HA05-HP374	30488215
6,20	8	91	53	43	36	SCD411-0620-2-3-135HA05-HP374	30488216

Continued on next page

MEGA-Speed-Drill-Inox | Solid carbide twist drill SCD41 (5xD), internal coolant supply

Dimensions						Specification	Order number
d_1 h7	d_2 h6	l_1	l_2	l_3	l_4		
6,30	8	91	53	43	36	SCD411-0630-2-3-135HA05-HP374	30488217
6,40	8	91	53	43	36	SCD411-0640-2-3-135HA05-HP374	30488218
6,50	8	91	53	43	36	SCD411-0650-2-3-135HA05-HP374	30488219
6,60	8	91	53	43	36	SCD411-0660-2-3-135HA05-HP374	30488220
6,70	8	91	53	43	36	SCD411-0670-2-3-135HA05-HP374	30488221
6,80	8	91	53	43	36	SCD411-0680-2-3-135HA05-HP374	30488222
6,90	8	91	53	43	36	SCD411-0690-2-3-135HA05-HP374	30488223
7,00	8	91	53	43	36	SCD411-0700-2-3-135HA05-HP374	30488224
7,10	8	91	53	43	36	SCD411-0710-2-3-135HA05-HP374	30488225
7,20	8	91	53	43	36	SCD411-0720-2-3-135HA05-HP374	30488226
7,30	8	91	53	43	36	SCD411-0730-2-3-135HA05-HP374	30488227
7,40	8	91	53	43	36	SCD411-0740-2-3-135HA05-HP374	30488228
7,50	8	91	53	43	36	SCD411-0750-2-3-135HA05-HP374	30488229
7,60	8	91	53	43	36	SCD411-0760-2-3-135HA05-HP374	30488230
7,70	8	91	53	43	36	SCD411-0770-2-3-135HA05-HP374	30488231
7,80	8	91	53	43	36	SCD411-0780-2-3-135HA05-HP374	30488232
7,90	8	91	53	43	36	SCD411-0790-2-3-135HA05-HP374	30488233
8,00	8	91	53	43	36	SCD411-0800-2-3-135HA05-HP374	30488234
8,10	10	103	61	49	40	SCD411-0810-2-3-135HA05-HP374	30488235
8,20	10	103	61	49	40	SCD411-0820-2-3-135HA05-HP374	30488236
8,30	10	103	61	49	40	SCD411-0830-2-3-135HA05-HP374	30488237
8,40	10	103	61	49	40	SCD411-0840-2-3-135HA05-HP374	30488238
8,50	10	103	61	49	40	SCD411-0850-2-3-135HA05-HP374	30488239
8,60	10	103	61	49	40	SCD411-0860-2-3-135HA05-HP374	30488240
8,70	10	103	61	49	40	SCD411-0870-2-3-135HA05-HP374	30488241
8,80	10	103	61	49	40	SCD411-0880-2-3-135HA05-HP374	30488242
8,90	10	103	61	49	40	SCD411-0890-2-3-135HA05-HP374	30488243
9,00	10	103	61	49	40	SCD411-0900-2-3-135HA05-HP374	30488244
9,10	10	103	61	49	40	SCD411-0910-2-3-135HA05-HP374	30488245
9,20	10	103	61	49	40	SCD411-0920-2-3-135HA05-HP374	30488246
9,30	10	103	61	49	40	SCD411-0930-2-3-135HA05-HP374	30488247
9,40	10	103	61	49	40	SCD411-0940-2-3-135HA05-HP374	30488248
9,50	10	103	61	49	40	SCD411-0950-2-3-135HA05-HP374	30488249
9,60	10	103	61	49	40	SCD411-0960-2-3-135HA05-HP374	30488250
9,70	10	103	61	49	40	SCD411-0970-2-3-135HA05-HP374	30488251
9,80	10	103	61	49	40	SCD411-0980-2-3-135HA05-HP374	30488252
9,90	10	103	61	49	40	SCD411-0990-2-3-135HA05-HP374	30488253
10,00	10	103	61	49	40	SCD411-1000-2-3-135HA05-HP374	30488254
10,10	12	118	71	56	45	SCD411-1010-2-3-135HA05-HP374	30488255
10,20	12	118	71	56	45	SCD411-1020-2-3-135HA05-HP374	30488256
10,30	12	118	71	56	45	SCD411-1030-2-3-135HA05-HP374	30488257
10,40	12	118	71	56	45	SCD411-1040-2-3-135HA05-HP374	30488258
10,50	12	118	71	56	45	SCD411-1050-2-3-135HA05-HP374	30488259
10,60	12	118	71	56	45	SCD411-1060-2-3-135HA05-HP374	30488260
10,70	12	118	71	56	45	SCD411-1070-2-3-135HA05-HP374	30488261
10,80	12	118	71	56	45	SCD411-1080-2-3-135HA05-HP374	30488262
10,90	12	118	71	56	45	SCD411-1090-2-3-135HA05-HP374	30488263
11,00	12	118	71	56	45	SCD411-1100-2-3-135HA05-HP374	30488264
11,10	12	118	71	56	45	SCD411-1110-2-3-135HA05-HP374	30488265
11,20	12	118	71	56	45	SCD411-1120-2-3-135HA05-HP374	30488266
11,30	12	118	71	56	45	SCD411-1130-2-3-135HA05-HP374	30488267
11,40	12	118	71	56	45	SCD411-1140-2-3-135HA05-HP374	30488268
11,50	12	118	71	56	45	SCD411-1150-2-3-135HA05-HP374	30488269
11,60	12	118	71	56	45	SCD411-1160-2-3-135HA05-HP374	30488270
11,70	12	118	71	56	45	SCD411-1170-2-3-135HA05-HP374	30488271
11,80	12	118	71	56	45	SCD411-1180-2-3-135HA05-HP374	30488272
11,90	12	118	71	56	45	SCD411-1190-2-3-135HA05-HP374	30488273

MEGA-Speed-Drill-Inox | Solid carbide twist drill SCD41 (5xD), internal coolant supply

Dimensions						Specification	Order number
d_1 h7	d_2 h6	l_1	l_2	l_3	l_4		
12,00	12	118	71	56	45	SCD411-1200-2-3-135HA05-HP374	30488274
12,50	14	124	77	60	45	SCD411-1250-2-3-135HA05-HP374	30488275
12,80	14	124	77	60	45	SCD411-1280-2-3-135HA05-HP374	30488276
13,00	14	124	77	60	45	SCD411-1300-2-3-135HA05-HP374	30488277
13,50	14	124	77	60	45	SCD411-1350-2-3-135HA05-HP374	30488278
13,80	14	124	77	60	45	SCD411-1380-2-3-135HA05-HP374	30488279
14,00	14	124	77	60	45	SCD411-1400-2-3-135HA05-HP374	30488280
14,50	16	133	83	63	48	SCD411-1450-2-3-135HA05-HP374	30488281
14,80	16	133	83	63	48	SCD411-1480-2-3-135HA05-HP374	30488282
15,00	16	133	83	63	48	SCD411-1500-2-3-135HA05-HP374	30488283
15,50	16	133	83	63	48	SCD411-1550-2-3-135HA05-HP374	30488284
15,80	16	133	83	63	48	SCD411-1580-2-3-135HA05-HP374	30488285
16,00	16	133	83	63	48	SCD411-1600-2-3-135HA05-HP374	30488286
16,50	18	143	93	71	48	SCD411-1650-2-3-135HA05-HP374	30488287
16,80	18	143	93	71	48	SCD411-1680-2-3-135HA05-HP374	30488288
17,00	18	143	93	71	48	SCD411-1700-2-3-135HA05-HP374	30488289
17,50	18	143	93	71	48	SCD411-1750-2-3-135HA05-HP374	30488290
17,80	18	143	93	71	48	SCD411-1780-2-3-135HA05-HP374	30488291
18,00	18	143	93	71	48	SCD411-1800-2-3-135HA05-HP374	30488292
18,50	20	153	101	77	50	SCD411-1850-2-3-135HA05-HP374	30488293
18,80	20	153	101	77	50	SCD411-1880-2-3-135HA05-HP374	30488294
19,00	20	153	101	77	50	SCD411-1900-2-3-135HA05-HP374	30488295
19,50	20	153	101	77	50	SCD411-1950-2-3-135HA05-HP374	30488296
19,80	20	153	101	77	50	SCD411-1980-2-3-135HA05-HP374	30488297
20,00	20	153	101	77	50	SCD411-2000-2-3-135HA05-HP374	30488298

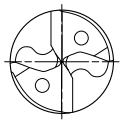
Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

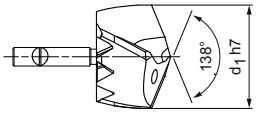
Replaceable drill head TTD

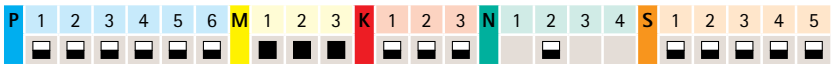
Made from solid carbide, internal coolant supply
Type 02 - inox

Design:

Drill diameter:	12.00-45.00 mm
Cutting material:	HP385
Number of blades:	2
Number of guide chamfers:	3
Tip angle:	138 °







d_1 from 12.00 to 15.40			
d_1h7	Connec-tion	Specification	Order number
12,00	TTS12-A	TTD-3F02-1200-HP385	30231780
12,10	TTS12-A	TTD-3F02-1210-HP385	30248920
12,20	TTS12-A	TTD-3F02-1220-HP385	30248921
12,30	TTS12-A	TTD-3F02-1230-HP385	30248922
12,40	TTS12-A	TTD-3F02-1240-HP385	30248923
12,50	TTS12-A	TTD-3F02-1250-HP385	30231784
12,60	TTS12-A	TTD-3F02-1260-HP385	30248924
12,70	TTS12-A	TTD-3F02-1270-HP385	30231787
12,80	TTS12-A	TTD-3F02-1280-HP385	30248925
12,90	TTS12-A	TTD-3F02-1290-HP385	30248926
13,00	TTS12-A	TTD-3F02-1300-HP385	30231791
13,10	TTS12-A	TTD-3F02-1310-HP385	30248927
13,20	TTS12-A	TTD-3F02-1320-HP385	30248928
13,30	TTS12-A	TTD-3F02-1330-HP385	30248929
13,40	TTS12-A	TTD-3F02-1340-HP385	30248930
13,50	TTS12-A	TTD-3F02-1350-HP385	30231792
13,60	TTS12-A	TTD-3F02-1360-HP385	30248931
13,70	TTS12-A	TTD-3F02-1370-HP385	30231793
13,80	TTS12-A	TTD-3F02-1380-HP385	30248932
13,90	TTS12-A	TTD-3F02-1390-HP385	30248933
14,00	TTS12-A	TTD-3F02-1400-HP385	30231795
14,10	TTS12-A	TTD-3F02-1410-HP385	30239446
14,20	TTS12-A	TTD-3F02-1420-HP385	30248934
14,30	TTS12-A	TTD-3F02-1430-HP385	30248935
14,40	TTS12-A	TTD-3F02-1440-HP385	30248936
14,50	TTS12-A	TTD-3F02-1450-HP385	30231802
14,60	TTS12-A	TTD-3F02-1460-HP385	30248937
14,70	TTS12-A	TTD-3F02-1470-HP385	30231804
14,80	TTS12-A	TTD-3F02-1480-HP385	30248938
14,90	TTS12-A	TTD-3F02-1490-HP385	30248939
15,00	TTS12-A	TTD-3F02-1500-HP385	30231805
15,10	TTS12-A	TTD-3F02-1510-HP385	30248940
15,20	TTS12-A	TTD-3F02-1520-HP385	30248941
15,30	TTS12-A	TTD-3F02-1530-HP385	30248942
15,40	TTS12-A	TTD-3F02-1540-HP385	30248943

d_1 from 15.50 to 18.90			
d_1h7	Connec-tion	Specification	Order number
15,50	TTS12-A	TTD-3F02-1550-HP385	30231806
15,60	TTS12-A	TTD-3F02-1560-HP385	30248944
15,70	TTS12-A	TTD-3F02-1570-HP385	30219115
15,80	TTS12-A	TTD-3F02-1580-HP385	30248945
15,90	TTS12-A	TTD-3F02-1590-HP385	30248946
16,00	TTS12-A	TTD-3F02-1600-HP385	30191427
16,10	TTS12-A	TTD-3F02-1610-HP385	30248947
16,20	TTS12-A	TTD-3F02-1620-HP385	30248948
16,30	TTS12-A	TTD-3F02-1630-HP385	30248949
16,40	TTS12-A	TTD-3F02-1640-HP385	30248950
16,50	TTS12-A	TTD-3F02-1650-HP385	30191428
16,60	TTS12-A	TTD-3F02-1660-HP385	30248951
16,70	TTS12-A	TTD-3F02-1670-HP385	30219122
16,80	TTS12-A	TTD-3F02-1680-HP385	30248952
16,90	TTS12-A	TTD-3F02-1690-HP385	30248953
17,00	TTS12-A	TTD-3F02-1700-HP385	30191429
17,10	TTS12-A	TTD-3F02-1710-HP385	30248954
17,20	TTS12-A	TTD-3F02-1720-HP385	30248955
17,30	TTS12-A	TTD-3F02-1730-HP385	30248956
17,40	TTS12-A	TTD-3F02-1740-HP385	30248957
17,50	TTS12-A	TTD-3F02-1750-HP385	30191430
17,60	TTS12-A	TTD-3F02-1760-HP385	30248958
17,70	TTS12-A	TTD-3F02-1770-HP385	30219123
17,80	TTS12-A	TTD-3F02-1780-HP385	30248959
17,90	TTS12-A	TTD-3F02-1790-HP385	30248960
18,00	TTS12-A	TTD-3F02-1800-HP385	30191431
18,10	TTS12-A	TTD-3F02-1810-HP385	30248961
18,20	TTS12-A	TTD-3F02-1820-HP385	30248962
18,30	TTS12-A	TTD-3F02-1830-HP385	30248963
18,40	TTS12-A	TTD-3F02-1840-HP385	30248964
18,50	TTS12-A	TTD-3F02-1850-HP385	30191432
18,60	TTS12-A	TTD-3F02-1860-HP385	30248965
18,70	TTS12-A	TTD-3F02-1870-HP385	30219124
18,80	TTS12-A	TTD-3F02-1880-HP385	30248966
18,90	TTS12-A	TTD-3F02-1890-HP385	30248967

d_1 from 19.00 to 22.40			
d_1h7	Connec-tion	Specification	Order number
19,00	TTS12-A	TTD-3F02-1900-HP385	30191433
19,10	TTS12-A	TTD-3F02-1910-HP385	30248968
19,20	TTS12-A	TTD-3F02-1920-HP385	30248969
19,30	TTS12-A	TTD-3F02-1930-HP385	30248970
19,40	TTS12-A	TTD-3F02-1940-HP385	30248971
19,50	TTS12-A	TTD-3F02-1950-HP385	30191434
19,60	TTS12-A	TTD-3F02-1960-HP385	30248972
19,70	TTS12-A	TTD-3F02-1970-HP385	30219125
19,80	TTS12-A	TTD-3F02-1980-HP385	30248973
19,90	TTS12-A	TTD-3F02-1990-HP385	30248974
20,00	TTS12-A	TTD-3F02-2000-HP385	30191435
20,10	TTS12-A	TTD-3F02-2010-HP385	30248975
20,20	TTS12-A	TTD-3F02-2020-HP385	30248976
20,30	TTS12-A	TTD-3F02-2030-HP385	30248977
20,40	TTS12-A	TTD-3F02-2040-HP385	30248978
20,50	TTS12-A	TTD-3F02-2050-HP385	30191436
20,60	TTS12-A	TTD-3F02-2060-HP385	30221253
20,70	TTS12-A	TTD-3F02-2070-HP385	30219126
20,80	TTS12-A	TTD-3F02-2080-HP385	30248979
20,90	TTS12-A	TTD-3F02-2090-HP385	30248980
21,00	TTS12-A	TTD-3F02-2100-HP385	30191437
21,10	TTS12-A	TTD-3F02-2110-HP385	30248981
21,20	TTS12-A	TTD-3F02-2120-HP385	30248982
21,30	TTS12-A	TTD-3F02-2130-HP385	30248983
21,40	TTS12-A	TTD-3F02-2140-HP385	30248984
21,50	TTS12-A	TTD-3F02-2150-HP385	30191438
21,60	TTS12-A	TTD-3F02-2160-HP385	30248985
21,70	TTS12-A	TTD-3F02-2170-HP385	30219127
21,80	TTS12-A	TTD-3F02-2180-HP385	30248986
21,90	TTS12-A	TTD-3F02-2190-HP385	30248987
22,00	TTS12-A	TTD-3F02-2200-HP385	30191439
22,10	TTS12-A	TTD-3F02-2210-HP385	30248988
22,20	TTS12-A	TTD-3F02-2220-HP385	30221256
22,30	TTS12-A	TTD-3F02-2230-HP385	30248989
22,40	TTS12-A	TTD-3F02-2240-HP385	30248990

Solid carbide replaceable drill head TTD, internal cooling – type 02

d_1 from 22.50 to 26.50			
d_1h7	Connection	Specification	Order number
22,50	TTS12-A	TTD-3F02-2250-HP385	30191440
22,60	TTS12-A	TTD-3F02-2260-HP385	30248991
22,70	TTS12-A	TTD-3F02-2270-HP385	30219128
22,80	TTS12-A	TTD-3F02-2280-HP385	30248992
22,90	TTS12-A	TTD-3F02-2290-HP385	30248993
23,00	TTS12-A	TTD-3F02-2300-HP385	30191441
23,10	TTS12-A	TTD-3F02-2310-HP385	30248994
23,20	TTS12-A	TTD-3F02-2320-HP385	30248995
23,30	TTS12-A	TTD-3F02-2330-HP385	30248996
23,40	TTS12-A	TTD-3F02-2340-HP385	30248997
23,50	TTS12-A	TTD-3F02-2350-HP385	30191442
23,60	TTS12-A	TTD-3F02-2360-HP385	30248998
23,70	TTS12-A	TTD-3F02-2370-HP385	30219129
23,80	TTS12-A	TTD-3F02-2380-HP385	30248999
23,90	TTS12-A	TTD-3F02-2390-HP385	30249000
24,00	TTS12-A	TTD-3F02-2400-HP385	30191443
24,10	TTS12-A	TTD-3F02-2410-HP385	30249001
24,20	TTS12-A	TTD-3F02-2420-HP385	30249002
24,30	TTS12-A	TTD-3F02-2430-HP385	30237401
24,40	TTS12-A	TTD-3F02-2440-HP385	30249004
24,50	TTS18-A	TTD-3F02-2450-HP385	30191444
24,60	TTS18-A	TTD-3F02-2460-HP385	30249005
24,70	TTS18-A	TTD-3F02-2470-HP385	30219130
24,80	TTS18-A	TTD-3F02-2480-HP385	30249006
24,90	TTS18-A	TTD-3F02-2490-HP385	30249007
25,00	TTS18-A	TTD-3F02-2500-HP385	30191445
25,10	TTS18-A	TTD-3F02-2510-HP385	30249008
25,20	TTS18-A	TTD-3F02-2520-HP385	30249009
25,30	TTS18-A	TTD-3F02-2530-HP385	30249010
25,40	TTS18-A	TTD-3F02-2540-HP385	30249011
25,50	TTS18-A	TTD-3F02-2550-HP385	30191446
25,60	TTS18-A	TTD-3F02-2560-HP385	30249012
25,70	TTS18-A	TTD-3F02-2570-HP385	30219131
25,80	TTS18-A	TTD-3F02-2580-HP385	30249013
25,90	TTS18-A	TTD-3F02-2590-HP385	30249014
26,00	TTS18-A	TTD-3F02-2600-HP385	30191447
26,10	TTS18-A	TTD-3F02-2610-HP385	30249015
26,20	TTS18-A	TTD-3F02-2620-HP385	30249016
26,30	TTS18-A	TTD-3F02-2630-HP385	30249017
26,40	TTS18-A	TTD-3F02-2640-HP385	30249018
26,50	TTS18-A	TTD-3F02-2650-HP385	30191448

d_1 from 26.60 to 30.60			
d_1h7	Connection	Specification	Order number
26,60	TTS18-A	TTD-3F02-2660-HP385	30249019
26,70	TTS18-A	TTD-3F02-2670-HP385	30219132
26,80	TTS18-A	TTD-3F02-2680-HP385	30249020
26,90	TTS18-A	TTD-3F02-2690-HP385	30249021
27,00	TTS18-A	TTD-3F02-2700-HP385	30191449
27,10	TTS18-A	TTD-3F02-2710-HP385	30249022
27,20	TTS18-A	TTD-3F02-2720-HP385	30249023
27,30	TTS18-A	TTD-3F02-2730-HP385	30249024
27,40	TTS18-A	TTD-3F02-2740-HP385	30249025
27,50	TTS18-A	TTD-3F02-2750-HP385	30191450
27,60	TTS18-A	TTD-3F02-2760-HP385	30249026
27,70	TTS18-A	TTD-3F02-2770-HP385	30219133
27,80	TTS18-A	TTD-3F02-2780-HP385	30249027
27,90	TTS18-A	TTD-3F02-2790-HP385	30249028
28,00	TTS18-A	TTD-3F02-2800-HP385	30191451
28,10	TTS18-A	TTD-3F02-2810-HP385	30249029
28,20	TTS18-A	TTD-3F02-2820-HP385	30249030
28,30	TTS18-A	TTD-3F02-2830-HP385	30249031
28,40	TTS18-A	TTD-3F02-2840-HP385	30249032
28,50	TTS18-A	TTD-3F02-2850-HP385	30191452
28,60	TTS18-A	TTD-3F02-2860-HP385	30249033
28,70	TTS18-A	TTD-3F02-2870-HP385	30219134
28,80	TTS18-A	TTD-3F02-2880-HP385	30249034
28,90	TTS18-A	TTD-3F02-2890-HP385	30249035
29,00	TTS18-A	TTD-3F02-2900-HP385	30191453
29,10	TTS18-A	TTD-3F02-2910-HP385	30249036
29,20	TTS18-A	TTD-3F02-2920-HP385	30249037
29,30	TTS18-A	TTD-3F02-2930-HP385	30249038
29,40	TTS18-A	TTD-3F02-2940-HP385	30249039
29,50	TTS18-A	TTD-3F02-2950-HP385	30191454
29,60	TTS18-A	TTD-3F02-2960-HP385	30249040
29,70	TTS18-A	TTD-3F02-2970-HP385	30219135
29,80	TTS18-A	TTD-3F02-2980-HP385	30249041
29,90	TTS18-A	TTD-3F02-2990-HP385	30249042
30,00	TTS18-A	TTD-3F02-3000-HP385	30191455
30,10	TTS18-A	TTD-3F02-3010-HP385	30249043
30,20	TTS18-A	TTD-3F02-3020-HP385	30249044
30,30	TTS18-A	TTD-3F02-3030-HP385	30249045
30,40	TTS18-A	TTD-3F02-3040-HP385	30249046
30,50	TTS18-A	TTD-3F02-3050-HP385	30191456
30,60	TTS18-A	TTD-3F02-3060-HP385	30249047

d_1 from 30.70 to 45.00			
d_1h7	Connection	Specification	Order number
30,70	TTS18-A	TTD-3F02-3070-HP385	30219136
30,80	TTS18-A	TTD-3F02-3080-HP385	30249048
30,90	TTS18-A	TTD-3F02-3090-HP385	30249049
31,00	TTS18-A	TTD-3F02-3100-HP385	30191457
31,10	TTS18-A	TTD-3F02-3110-HP385	30249050
31,20	TTS18-A	TTD-3F02-3120-HP385	30249051
31,30	TTS18-A	TTD-3F02-3130-HP385	30249052
31,40	TTS18-A	TTD-3F02-3140-HP385	30249053
31,50	TTS18-A	TTD-3F02-3150-HP385	30191458
31,60	TTS18-A	TTD-3F02-3160-HP385	30249054
31,70	TTS18-A	TTD-3F02-3170-HP385	30219137
31,80	TTS18-A	TTD-3F02-3180-HP385	30249055
31,90	TTS18-A	TTD-3F02-3190-HP385	30249056
32,00	TTS18-A	TTD-3F02-3200-HP385	30191459
32,50	TTS18-A	TTD-3F02-3250-HP385	30322371
33,00	TTS18-A	TTD-3F02-3300-HP385	30322372
33,50	TTS18-A	TTD-3F02-3350-HP385	30322373
34,00	TTS18-A	TTD-3F02-3400-HP385	30322375
34,50	TTS18-A	TTD-3F02-3450-HP385	30322376
35,00	TTS18-A	TTD-3F02-3500-HP385	30322377
35,50	TTS18-A	TTD-3F02-3550-HP385	30322378
36,00	TTS18-A	TTD-3F02-3600-HP385	30322379
36,50	TTS18-A	TTD-3F02-3650-HP385	30322380
37,00	TTS18-A	TTD-3F02-3700-HP385	30322381
37,50	TTS18-A	TTD-3F02-3750-HP385	30322382
38,00	TTS18-A	TTD-3F02-3800-HP385	30322383
38,50	TTS18-A	TTD-3F02-3850-HP385	30322384
39,00	TTS18-A	TTD-3F02-3900-HP385	30322385
39,50	TTS18-A	TTD-3F02-3950-HP385	30322386
40,00	TTS18-A	TTD-3F02-4000-HP385	30322387
40,50	TTS18-A	TTD-3F02-4050-HP385	30322432
41,00	TTS18-A	TTD-3F02-4100-HP385	30322389
41,50	TTS18-A	TTD-3F02-4150-HP385	30322390
42,00	TTS18-A	TTD-3F02-4200-HP385	30322391
42,50	TTS18-A	TTD-3F02-4250-HP385	30322392
43,00	TTS18-A	TTD-3F02-4300-HP385	30322393
43,50	TTS18-A	TTD-3F02-4350-HP385	30322394
44,00	TTS18-A	TTD-3F02-4400-HP385	30322395
44,50	TTS18-A	TTD-3F02-4450-HP385	30322396
45,00	TTS18-A	TTD-3F02-4500-HP385	30322397

Accessories

	Replaceable head holder TTS TTS100, 3xD TTS100, 5xD TTS100, 8xD TTS100, 12xD	 Page 116 Page 117 Page 118 Page 119

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

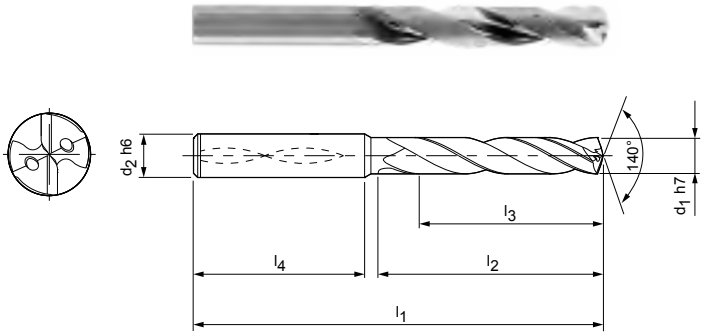
MEGA-Drill-Inco

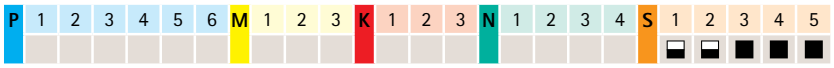
Solid carbide twist drill
SCD29 (5xD), internal coolant supply

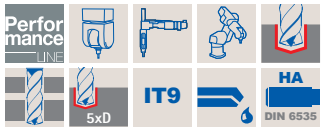
Design:

Drill diameter:	3.00-12.00 mm
Cutting material:	HU621
Number of blades:	2
Number of guide chamfers:	4
Tip angle:	140°
Helix angle:	30°

Application:
Nickel-based alloys







Dimensions						Specification	Order number
d_1 h7	d_2 h6	l_1	l_2	l_3	l_4		
3,00	6	66	28	23	36	SCD291-0300-2-4-140HA05-HU621	30393829
4,00	6	74	36	29	36	SCD291-0400-2-4-140HA05-HU621	30393830
5,00	6	82	44	35	36	SCD291-0500-2-4-140HA05-HU621	30393831
6,00	6	82	44	35	36	SCD291-0600-2-4-140HA05-HU621	30393832
7,00	8	91	53	43	36	SCD291-0700-2-4-140HA05-HU621	30393833
8,00	8	91	53	43	40	SCD291-0800-2-4-140HA05-HU621	30393834
9,00	10	103	61	49	40	SCD291-0900-2-4-140HA05-HU621	30393835
10,00	10	103	61	49	40	SCD291-1000-2-4-140HA05-HU621	30393836
11,00	12	118	71	56	45	SCD291-1100-2-4-140HA05-HU621	30393837
12,00	12	118	71	56	45	SCD291-1200-2-4-140HA05-HU621	30393838

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

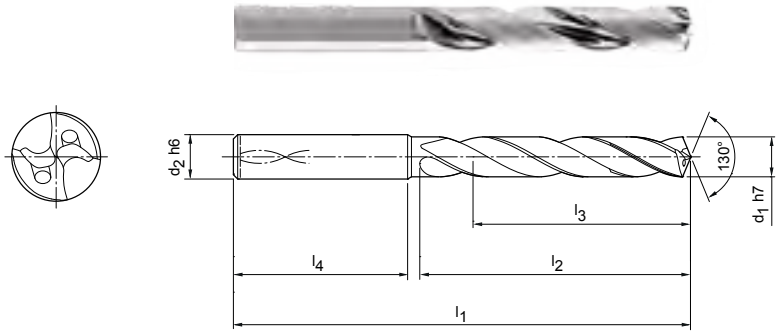
MEGA-Speed-Drill-Titan

Solid carbide twist drill
SCD30 (5xD), internal coolant supply

Design:

Drill diameter:	3.00-12.00 mm
Cutting material:	HU621
Number of blades:	2
Number of guide chamfers:	3
Tip angle:	130°
Helix angle:	30°

Application:
For high speed machining.



P 1 2 3 4 5 6 M 1 2 3 K 1 2 3 N 1 2 3 4 S 1 2 3 4 5

Expert LINE 5xD IT9 HA DIN 6535

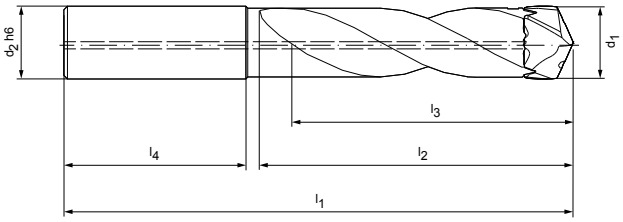
Dimensions						Specification	Order number
d_1 h7	d_2 h6	l_1	l_2	l_3	l_4		
3,00	6	66	28	23	36	SCD301-0300-2-3-130HA05-HU621	30393819
4,00	6	74	36	29	36	SCD301-0400-2-3-130HA05-HU621	30393820
5,00	6	82	44	35	36	SCD301-0500-2-3-130HA05-HU621	30393821
6,00	6	82	44	35	36	SCD301-0600-2-3-130HA05-HU621	30393822
7,00	8	91	53	43	36	SCD301-0700-2-3-130HA05-HU621	30393823
8,00	8	91	53	43	40	SCD301-0800-2-3-130HA05-HU621	30393824
9,00	10	103	61	49	40	SCD301-0900-2-3-130HA05-HU621	30393825
10,00	10	103	61	49	40	SCD301-1000-2-3-130HA05-HU621	30393826
11,00	12	118	71	56	45	SCD301-1100-2-3-130HA05-HU621	30393827
12,00	12	118	71	56	45	SCD301-1200-2-3-130HA05-HU621	30393828

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

Replaceable head holder TTS

TTS100 with front clamping system for replaceable head drill TTD (3xD), internal coolant supply

Design:
For a drill diameter of: 12.00-45.49 mm
Change mechanism: Front clamping system
Possible to replace the head in the machine



Dimensions							Specification	Shank HA	Shank HB	Shank HE
d_1	Connection	d_2 h6	l_1	l_2	l_3	l_4		Order number	Order number	Order number
12,00-12,49	TTS12-S	14	100	53	38	45	TTS100-12-DR3-1200-14	30231822	30232785	30232818
12,50-12,99	TTS12-S	14	105	55	39	45	TTS100-12-DR3-1250-14	30231823	30232787	30232820
13,00-13,49	TTS12-S	14	105	57	41	45	TTS100-12-DR3-1300-14	30231824	30232789	30232821
13,50-13,99	TTS12-S	16	110	59	42	48	TTS100-12-DR3-1350-16	30231825	30232790	30232827
14,00-14,49	TTS12-S	16	115	61	44	48	TTS100-12-DR3-1400-16	30231831	30232792	30232828
14,50-14,99	TTS12-S	16	115	63	45	48	TTS100-12-DR3-1450-16	30231832	30232793	30232829
15,00-15,49	TTS12-S	16	115	65	47	48	TTS100-12-DR3-1500-16	30231833	30232794	30232830
15,50-16,49	TTS12-S	18	120	70	50	48	TTS100-12-DR3-1550-18	30191550	30191496	30198891
16,50-17,49	TTS12-S	18	125	74	53	48	TTS100-12-DR3-1650-18	30191551	30191497	30198895
17,50-18,49	TTS12-S	18	130	78	56	48	TTS100-12-DR3-1750-18	30191552	30191498	30198932
18,50-19,49	TTS12-S	20	135	82	59	50	TTS100-12-DR3-1850-20	30191553	30191499	30198933
19,50-20,49	TTS12-S	20	140	87	62	50	TTS100-12-DR3-1950-20	30191554	30191500	30198934
20,50-21,49	TTS12-S	25	150	91	65	56	TTS100-12-DR3-2050-25	30191555	30191501	30198935
21,50-22,49	TTS12-S	25	155	95	68	56	TTS100-12-DR3-2150-25	30191556	30191502	30198936
22,50-23,49	TTS12-S	25	160	99	71	56	TTS100-12-DR3-2250-25	30191557	30191503	30198937
23,50-24,49	TTS12-S	25	165	103	74	56	TTS100-12-DR3-2350-25	30191558	30191504	30198938
24,50-25,49	TTS18-S	25	165	108	77	56	TTS100-18-DR3-2450-25	30191559	30191505	30198939
25,50-26,49	TTS18-S	25	175	112	80	56	TTS100-18-DR3-2550-25	30191561	30191507	30198940
26,50-27,49	TTS18-S	25	175	116	83	56	TTS100-18-DR3-2650-25	30191562	30191508	30198941
27,50-28,49	TTS18-S	25	180	120	86	56	TTS100-18-DR3-2750-25	30191563	30191509	30198942
28,50-29,49	TTS18-S	32	190	124	89	60	TTS100-18-DR3-2850-32	30191564	30191510	30198943
29,50-30,49	TTS18-S	32	195	129	92	60	TTS100-18-DR3-2950-32	30191565	30191511	30198945
30,50-31,49	TTS18-S	32	195	133	95	60	TTS100-18-DR3-3050-32	30191566	30191512	30198946
31,50-32,49	TTS18-S	32	200	137	98	60	TTS100-18-DR3-3150-32	30191567	30191513	30198948
32,50-33,49	TTS18-S	32	210	144	101	60	TTS100-18-DR3-3250-32	30322281	30322289	30322297
33,50-34,49	TTS18-S	32	215	148	104	60	TTS100-18-DR3-3350-32	30322282	30322290	30322298
34,50-35,49	TTS18-S	32	220	153	107	60	TTS100-18-DR3-3450-32	30322283	30322291	30322299
*35,50-37,49	TTS18-S	40	237	161	113	70	TTS100-18-DR3-3550-40	-	30535313	30322300
*37,50-39,49	TTS18-S	40	247	170	119	70	TTS100-18-DR3-3750-40	-	30535316	30322301
*39,50-41,49	TTS18-S	40	257	178	125	70	TTS100-18-DR3-3950-40	-	30535318	30322302
*41,50-43,49	TTS18-S	40	265	187	131	70	TTS100-18-DR3-4150-40	-	30535320	30322303
*43,50-45,49	TTS18-S	40	275	196	137	70	TTS100-18-DR3-4350-40	-	30535321	30322304

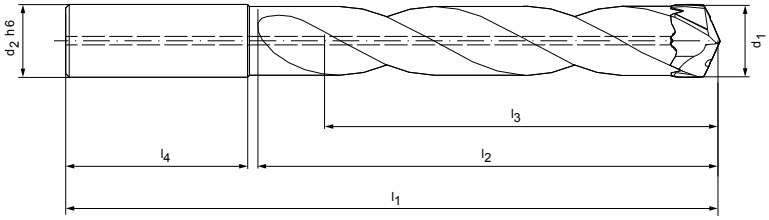
Dimensions in mm.
* similar to HE (DIN 6535)
Special designs available on request.

Replaceable head holder TTS

TTS100 with front clamping system for replaceable head drill TTD (5xD), internal coolant supply

Design:

For a drill diameter of:	12.00-45.49 mm
Change mechanism:	Front clamping system Possible to replace the head in the machine



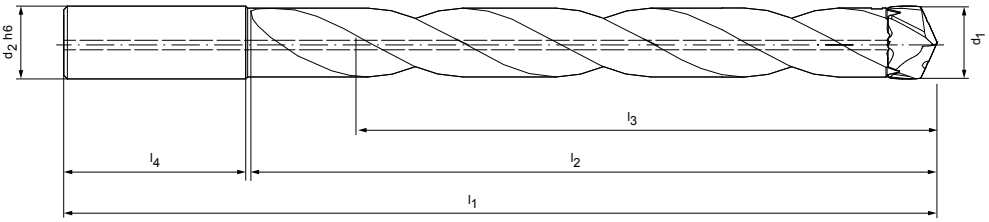
Dimensions							Specification	Shank HA	Shank HB	Shank HE
d_1	Connection	d_2 h6	l_1	l_2	l_3	l_4		Order number	Order number	Order number
12,00-12,49	TTS12-S	14	125	78	63	45	TTS100-12-DR5-1200-14	30231835	30232796	30232832
12,50-12,99	TTS12-S	14	130	81	65	45	TTS100-12-DR5-1250-14	30231836	30232798	30232833
13,00-13,49	TTS12-S	14	130	84	68	45	TTS100-12-DR5-1300-14	30231837	30232799	30232834
13,50-13,99	TTS12-S	16	140	88	70	48	TTS100-12-DR5-1350-16	30231838	30232800	30232835
14,00-14,49	TTS12-S	16	140	90	73	48	TTS100-12-DR5-1400-16	30231839	30232801	30232836
14,50-14,99	TTS12-S	16	145	94	75	48	TTS100-12-DR5-1450-16	30231840	30232802	30232837
15,00-15,49	TTS12-S	16	145	96	78	48	TTS100-12-DR5-1500-16	30231841	30232803	30232838
15,50-16,49	TTS12-S	18	155	103	83	48	TTS100-12-DR5-1550-18	30191568	30191514	30198949
16,50-17,49	TTS12-S	18	160	109	88	48	TTS100-12-DR5-1650-18	30191569	30191515	30198950
17,50-18,49	TTS12-S	18	165	115	93	48	TTS100-12-DR5-1750-18	30191570	30191516	30198951
18,50-19,49	TTS12-S	20	175	121	98	50	TTS100-12-DR5-1850-20	30191571	30191517	30198952
19,50-20,49	TTS12-S	20	180	128	103	50	TTS100-12-DR5-1950-20	30191572	30191518	30198953
20,50-21,49	TTS12-S	25	195	134	108	56	TTS100-12-DR5-2050-25	30191573	30191519	30198954
21,50-22,49	TTS12-S	25	200	140	113	56	TTS100-12-DR5-2150-25	30191574	30191520	30198955
22,50-23,49	TTS12-S	25	205	146	118	56	TTS100-12-DR5-2250-25	30191575	30191521	30198956
23,50-24,49	TTS12-S	25	210	152	123	56	TTS100-12-DR5-2350-25	30191576	30191522	30198957
24,50-25,49	TTS18-S	25	220	159	128	56	TTS100-18-DR5-2450-25	30191577	30191523	30198958
25,50-26,49	TTS18-S	25	225	165	133	56	TTS100-18-DR5-2550-25	30191579	30191525	30198959
26,50-27,49	TTS18-S	25	230	171	138	56	TTS100-18-DR5-2650-25	30191580	30191526	30198960
27,50-28,49	TTS18-S	25	240	177	143	56	TTS100-18-DR5-2750-25	30191581	30191527	30198961
28,50-29,49	TTS18-S	32	250	183	148	60	TTS100-18-DR5-2850-32	30191582	30191528	30198962
29,50-30,49	TTS18-S	32	255	190	153	60	TTS100-18-DR5-2950-32	30191583	30191529	30198963
30,50-31,49	TTS18-S	32	260	196	158	60	TTS100-18-DR5-3050-32	30191584	30191530	30198964
31,50-32,49	TTS18-S	32	265	202	163	60	TTS100-18-DR5-3150-32	30191585	30191531	30198965
32,50-33,49	TTS18-S	32	275	210	168	60	TTS100-18-DR5-3250-32	30322305	30322313	30322322
33,50-34,49	TTS18-S	32	285	217	173	60	TTS100-18-DR5-3350-32	30322306	30322314	30322323
34,50-35,49	TTS18-S	32	290	224	178	60	TTS100-18-DR5-3450-32	30322307	30322315	30322324
*35,50-37,49	TTS18-S	40	312	236	188	70	TTS100-18-DR5-3550-40	-	30535324	30322326
*37,50-39,49	TTS18-S	40	327	249	198	70	TTS100-18-DR5-3750-40	-	30534860	30322327
*39,50-41,49	TTS18-S	40	337	261	208	70	TTS100-18-DR5-3950-40	-	30535326	30322328
*41,50-43,49	TTS18-S	40	350	274	218	70	TTS100-18-DR5-4150-40	-	30535327	30322329
*43,50-45,49	TTS18-S	40	365	287	228	70	TTS100-18-DR5-4350-40	-	30535328	30322331

Dimensions in mm.
* similar to HE (DIN 6535)
Special designs available on request.

Replaceable head holder TTS

TTS100 with front clamping system for replaceable head drill TTD (8xD), internal coolant supply

Design:
For a drill diameter of: 12.00-32.49 mm
Change mechanism: Front clamping system
Possible to replace the head in the machine



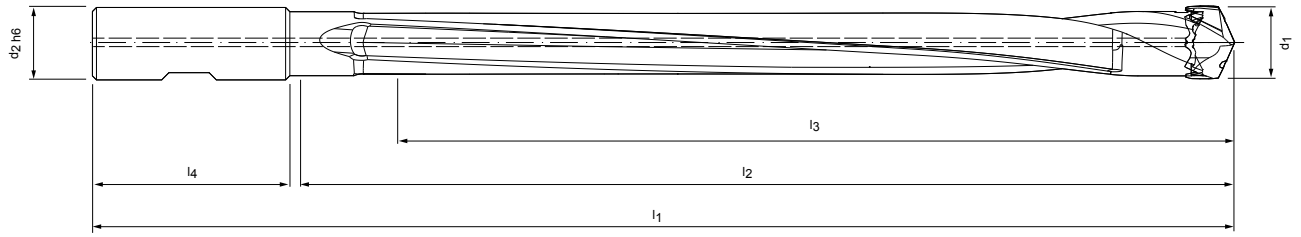
Dimensions							Specification	Shank HA	Shank HB	Shank HE
d_1	Connection	d_2 h6	l_1	l_2	l_3	l_4		Order number	Order number	Order number
12,00-12,49	TTS12-S	14	165	116	100	45	TTS100-12-DR8-1200-14	30231843	30232805	30232840
12,50-12,99	TTS12-S	14	170	121	104	45	TTS100-12-DR8-1250-14	30231844	30232806	30232841
13,00-13,49	TTS12-S	14	175	126	108	45	TTS100-12-DR8-1300-14	30231845	30232807	30232842
13,50-13,99	TTS12-S	16	180	129	112	48	TTS100-12-DR8-1350-16	30231846	30232808	30232843
14,00-14,49	TTS12-S	16	185	134	116	48	TTS100-12-DR8-1400-16	30231847	30232809	30232845
14,50-14,99	TTS12-S	16	190	139	120	48	TTS100-12-DR8-1450-16	30231848	30232810	30232846
15,00-15,49	TTS12-S	16	195	144	124	48	TTS100-12-DR8-1500-16	30231849	30232811	30232847
15,50-16,49	TTS12-S	18	205	152	132	48	TTS100-12-DR8-1550-18	30191586	30191532	30198966
16,50-17,49	TTS12-S	18	215	161	140	48	TTS100-12-DR8-1650-18	30191587	30191533	30198967
17,50-18,49	TTS12-S	18	220	171	148	48	TTS100-12-DR8-1750-18	30191588	30191534	30198968
18,50-19,49	TTS12-S	20	235	180	156	50	TTS100-12-DR8-1850-20	30191589	30191535	30198969
19,50-20,49	TTS12-S	20	240	189	164	50	TTS100-12-DR8-1950-20	30191590	30191536	30198971
20,50-21,49	TTS12-S	25	260	198	172	56	TTS100-12-DR8-2050-25	30191591	30191537	30198972
21,50-22,49	TTS12-S	25	270	207	180	56	TTS100-12-DR8-2150-25	30191592	30191538	30198973
22,50-23,49	TTS12-S	25	275	217	188	56	TTS100-12-DR8-2250-25	30191593	30191539	30198974
23,50-24,49	TTS12-S	25	285	226	196	56	TTS100-12-DR8-2350-25	30191594	30191540	30198975
24,50-25,49	TTS18-S	25	295	235	204	56	TTS100-18-DR8-2450-25	30191595	30191541	30198976
25,50-26,49	TTS18-S	25	305	244	212	56	TTS100-18-DR8-2550-25	30191597	30191543	30198977
26,50-27,49	TTS18-S	25	315	253	220	56	TTS100-18-DR8-2650-25	30191598	30191544	30198978
27,50-28,49	TTS18-S	25	325	263	228	56	TTS100-18-DR8-2750-25	30191599	30191545	30198979
28,50-29,49	TTS18-S	32	340	272	236	60	TTS100-18-DR8-2850-32	30191600	30191546	30198980
29,50-30,49	TTS18-S	32	345	281	244	60	TTS100-18-DR8-2950-32	30191601	30191547	30198981
30,50-31,49	TTS18-S	32	355	290	252	60	TTS100-18-DR8-3050-32	30191602	30191548	30198982
31,50-32,49	TTS18-S	32	360	299	260	60	TTS100-18-DR8-3150-32	30191603	30191549	30198983

Dimensions in mm.
Special designs available on request.

Replaceable head holder TTS

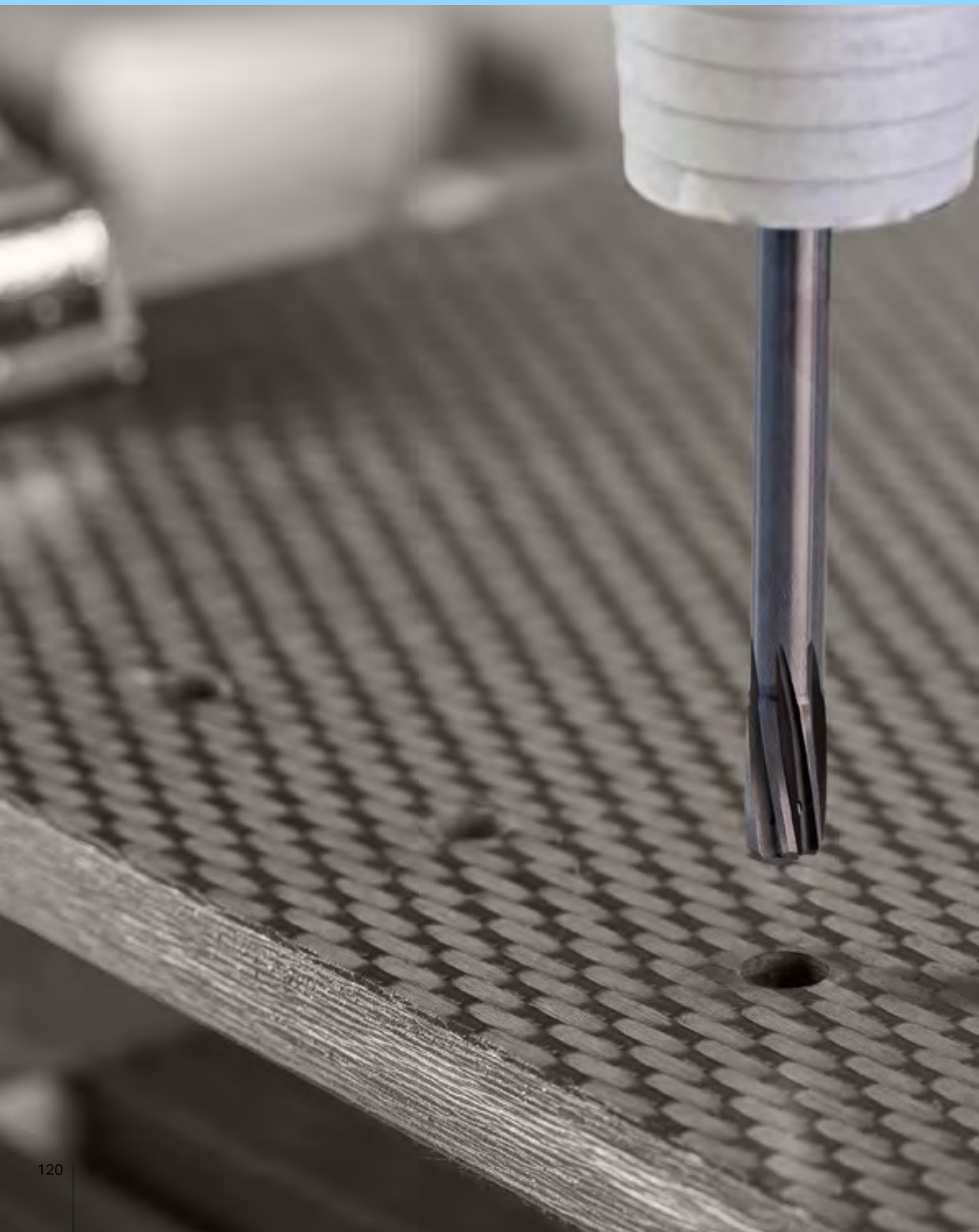
TTS100 with front clamping system for replaceable head drill TTD (12xD), internal coolant supply

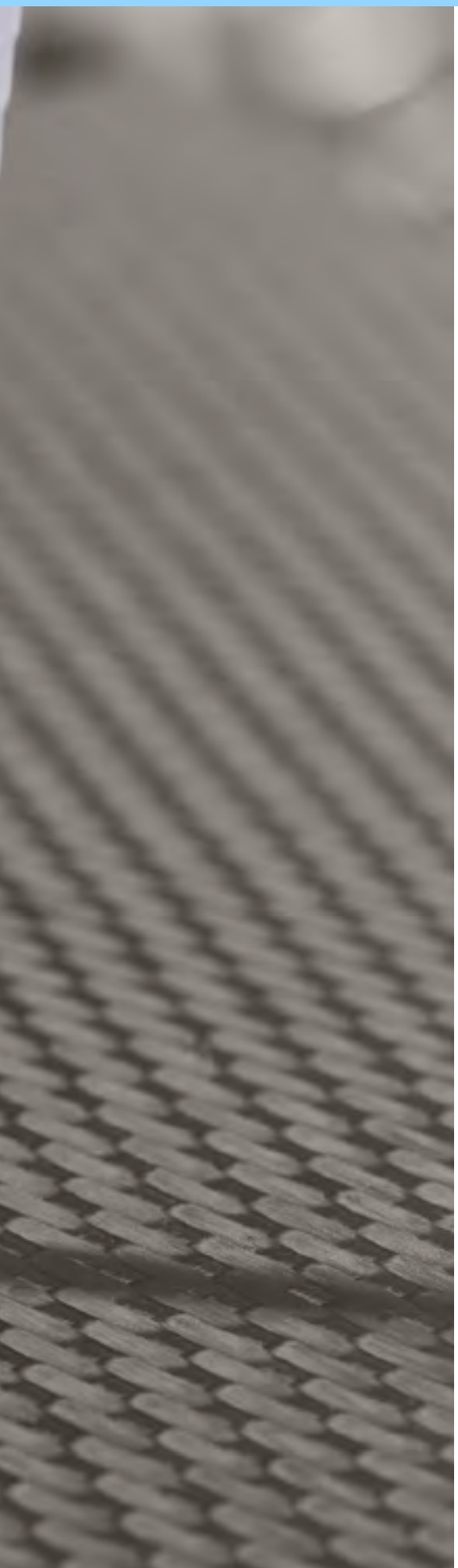
Design:
For a drill diameter of: 12.00 - 32.49 mm
Change mechanism: Front clamping system
Possible to replace the head in the machine



Dimensions							Specification	Shank HA	Shank HB	Shank HE
d_1	Connection	d_2 h6	l_1	l_2	l_3	l_4		Order number	Order number	Order number
12,00-12,49	TTS12-S	14	210	162	150	45	TTS100-12-DR12-1200-14	30327797	30327798	30327800
12,50-12,99	TTS12-S	14	216	168	156	45	TTS100-12-DR12-1250-14	30327801	30327802	30327803
13,00-13,49	TTS12-S	14	223	175	162	45	TTS100-12-DR12-1300-14	30327804	30327805	30327806
13,50-13,99	TTS12-S	16	235	182	168	48	TTS100-12-DR12-1350-16	30327807	30327808	30327809
14,00-14,49	TTS12-S	16	242	189	174	48	TTS100-12-DR12-1400-16	30327810	30327811	30327812
14,50-14,99	TTS12-S	16	248	195	180	48	TTS100-12-DR12-1450-16	30327813	30327814	30327815
15,00-15,49	TTS12-S	16	255	202	186	48	TTS100-12-DR12-1500-16	30327816	30327817	30327818
15,50-16,49	TTS12-S	18	262	209	198	48	TTS100-12-DR12-1550-18	30327819	30327820	30327822
16,50-17,49	TTS12-S	18	275	222	210	48	TTS100-12-DR12-1650-18	30327823	30327824	30327826
17,50-18,49	TTS12-S	18	289	236	222	48	TTS100-12-DR12-1750-18	30327827	30327828	30327830
18,50-19,49	TTS12-S	20	304	249	234	50	TTS100-12-DR12-1850-20	30327832	30327833	30327834
19,50-20,49	TTS12-S	20	318	263	246	50	TTS100-12-DR12-1950-20	30327835	30255588	30327842
20,50-21,49	TTS12-S	25	337	276	258	56	TTS100-12-DR12-2050-25	30327843	30327844	30327845
21,50-22,49	TTS12-S	25	351	290	270	56	TTS100-12-DR12-2150-25	30327846	30327847	30327849
22,50-23,49	TTS12-S	25	364	303	282	56	TTS100-12-DR12-2250-25	30327850	30327851	30327852
23,50-24,49	TTS12-S	25	378	317	294	56	TTS100-12-DR12-2350-25	30327853	30327854	30327855
24,50-25,49	TTS18-S	25	391	330	306	56	TTS100-18-DR12-2450-25	30327858	30327859	30327860
25,50-26,49	TTS18-S	25	405	344	318	56	TTS100-18-DR12-2550-25	30327861	30327863	30327864
26,50-27,49	TTS18-S	25	418	357	330	56	TTS100-18-DR12-2650-25	30327865	30327866	30327867
27,50-28,49	TTS18-S	25	432	371	342	56	TTS100-18-DR12-2750-25	30327869	30327870	30327871
28,50-29,49	TTS18-S	32	449	384	354	60	TTS100-18-DR12-2850-32	30327872	30327873	30327874
29,50-30,49	TTS18-S	32	463	398	366	60	TTS100-18-DR12-2950-32	30327875	30327876	30327877
30,50-31,49	TTS18-S	32	476	411	378	60	TTS100-18-DR12-3050-32	30327878	30327879	30327880
31,50-32,49	TTS18-S	32	490	425	390	60	TTS100-18-DR12-3150-32	30327881	30327883	30327885

Dimensions in mm.
Special designs available on request.





REAMING

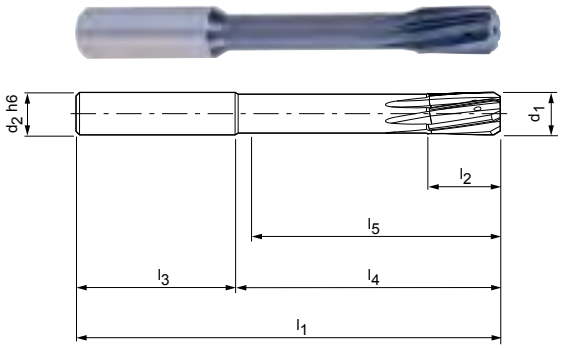
Reaming

FixReam FXR510

Solid carbide design with internal cooling
FXR510 - Composite

Design:

Reamer diameter:	3.00-20.00 mm
Number of blades	4/6/8
Cutting lead:	MF1M
Cutting material:	HC614



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
													■	■	■							

Dimensions							z	Specification	Order number
d_1	d_2 h6	l_1	l_2	l_3	l_4	l_5			
3,00	4	65	12	28	37	34	4	FXR510Ø3H7MF1M-HC614	30601253
3,20	4	65	12	28	37	34	4	FXR510Ø3.2H7MF1M-HC614	30601254
3,50	4	65	12	28	37	34	4	FXR510Ø3.5H7MF1M-HC614	30601255
4,00	6	75	12	36	39	34	4	FXR510Ø4H7MF1M-HC614	30570922
4,50	6	75	12	36	39	34	4	FXR510Ø4.5H7MF1M-HC614	30570923
5,00	6	75	12	36	39	35	4	FXR510Ø5H7MF1M-HC614	30570924
5,50	6	75	12	36	39	35	4	FXR510Ø5.5H7MF1M-HC614	30570925
6,00	6	75	12	36	39	35	4	FXR510Ø6H7MF1M-HC614	30570926
6,50	8	100	16	36	64	59	6	FXR510Ø6.5H7MF1M-HC614	30570927
7,00	8	100	16	36	64	59	6	FXR510Ø7H7MF1M-HC614	30570928
7,50	8	100	16	36	64	60	6	FXR510Ø7.5H7MF1M-HC614	30570929
8,00	8	100	16	36	64	60	6	FXR510Ø8H7MF1M-HC614	30570930
8,50	10	100	20	40	60	55	6	FXR510Ø8.5H7MF1M-HC614	30570931
9,00	10	100	20	40	60	55	6	FXR510Ø9H7MF1M-HC614	30570932
9,50	10	120	20	40	80	76	6	FXR510Ø9.5H7MF1M-HC614	30570933
10,00	10	120	20	40	80	76	6	FXR510Ø10H7MF1M-HC614	30570934
10,50	12	120	20	45	75	70	6	FXR510Ø10.5H7MF1M-HC614	30570935
11,00	12	120	20	45	75	70	6	FXR510Ø11H7MF1M-HC614	30570936
11,50	12	120	20	45	75	71	6	FXR510Ø11.5H7MF1M-HC614	30570937
12,00	12	120	20	45	75	71	6	FXR510Ø12H7MF1M-HC614	30570938
13,00	14	130	22	45	85	80	6	FXR510Ø13H7MF1M-HC614	30570939
14,00	14	130	22	45	85	80	6	FXR510Ø14H7MF1M-HC614	30570940
15,00	16	130	22	48	82	77	6	FXR510Ø15H7MF1M-HC614	30570941
16,00	16	150	25	48	102	97	6	FXR510Ø16H7MF1M-HC614	30570942
17,00	18	150	25	48	102	97	8	FXR510Ø17H7MF1M-HC614	30570943
18,00	18	150	25	48	102	97	8	FXR510Ø18H7MF1M-HC614	30570944
19,00	20	150	25	50	100	95	8	FXR510Ø19H7MF1M-HC614	30570945
20,00	20	150	25	50	100	95	8	FXR510Ø20H7MF1M-HC614	30570946

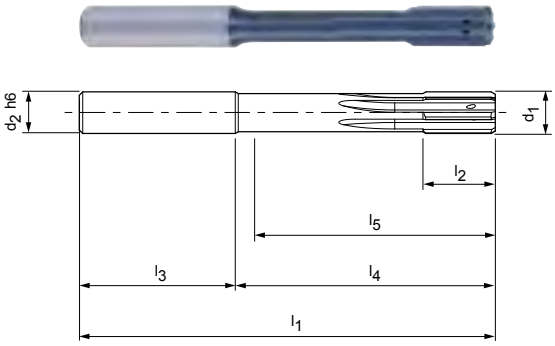
Dimensions in mm.
Cutting data recommendation from page 234.
Intermediate sizes and tolerances other than H7 are available on request.

FixReam FXR500

Solid carbide design with internal cooling
FXR500 - Alu

Design:

Reamer diameter:	4.00-20.00 mm
Number of blades	4/6/8
Cutting lead:	MG0A
Cutting material:	HP622



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
	■	■	■	■																		

Dimensions							z	Specification	Order number
d_1	d_2 h6	l_1	l_2	l_3	l_4	l_5			
4,00	6	75	12	36	39	34	4	FXR500Ø4H7MG0A-HP622	30570872
4,50	6	75	12	36	39	34	4	FXR500Ø4.5H7MG0A-HP622	30570873
5,00	6	75	12	36	39	35	4	FXR500Ø5H7MG0A-HP622	30570874
5,50	6	75	12	36	39	35	4	FXR500Ø5.5H7MG0A-HP622	30570875
6,00	6	75	12	36	39	35	4	FXR500Ø6H7MG0A-HP622	30570876
6,50	8	100	16	36	64	59	6	FXR500Ø6.5H7MG0A-HP622	30570877
7,00	8	100	16	36	64	59	6	FXR500Ø7H7MG0A-HP622	30570878
7,50	8	100	16	36	64	60	6	FXR500Ø7.5H7MG0A-HP622	30570879
8,00	8	100	16	36	64	60	6	FXR500Ø8H7MG0A-HP622	30570880
8,50	10	100	20	40	60	55	6	FXR500Ø8.5H7MG0A-HP622	30570881
9,00	10	100	20	40	60	55	6	FXR500Ø9H7MG0A-HP622	30570882
9,50	10	120	20	40	80	76	6	FXR500Ø9.5H7MG0A-HP622	30570883
10,00	10	120	20	40	80	76	6	FXR500Ø10H7MG0A-HP622	30570884
10,50	12	120	20	45	75	70	6	FXR500Ø10.5H7MG0A-HP622	30570885
11,00	12	120	20	45	75	70	6	FXR500Ø11H7MG0A-HP622	30570886
11,50	12	120	20	45	75	71	6	FXR500Ø11.5H7MG0A-HP622	30570887
12,00	12	120	20	45	75	71	6	FXR500Ø12H7MG0A-HP622	30570888
13,00	14	130	22	45	85	80	6	FXR500Ø13H7MG0A-HP622	30570889
14,00	14	130	22	45	85	80	6	FXR500Ø14H7MG0A-HP622	30570890
15,00	16	130	22	48	82	77	6	FXR500Ø15H7MG0A-HP622	30570891
16,00	16	150	25	48	102	97	6	FXR500Ø16H7MG0A-HP622	30570892
17,00	18	150	25	48	102	97	6	FXR500Ø17H7MG0A-HP622	30570893
18,00	18	150	25	48	102	97	6	FXR500Ø18H7MG0A-HP622	30570894
19,00	20	150	25	50	100	95	6	FXR500Ø19H7MG0A-HP622	30570895
20,00	20	150	25	50	100	95	6	FXR500Ø20H7MG0A-HP622	30570896

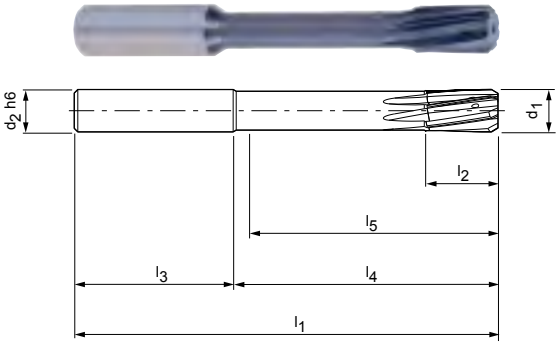
Dimensions in mm.
Cutting data recommendation from page 234.
Intermediate sizes and tolerances other than H7 are available on request.

FixReam FXR510

Solid carbide design with internal cooling
FXR510 - Inox

Design:

Reamer diameter:	3.00-20.00 mm
Number of blades	4/6/8
Cutting lead:	MF1M
Cutting material:	HP145



P	1	2	3	4	5	6	M	1	2	3	K	1	2	3	N	1	2	3	4	S	1	2	3	4	5
				■		■		■	■	■															

Dimensions							z	Specification	Order number
d_1	d_2 h6	l_1	l_2	l_3	l_4	l_5			
3,00	4	65	12	28	37	34	4	FXR510Ø3H7MF1M-HP145	30601250
3,20	4	65	12	28	37	34	4	FXR510Ø3.2H7MF1M-HP145	30601251
3,50	4	65	12	28	37	34	4	FXR510Ø3.5H7MF1M-HP145	30601252
4,00	6	75	12	36	39	34	4	FXR510Ø4H7MF1M-HP145	30570772
4,50	6	75	12	36	39	34	4	FXR510Ø4.5H7MF1M-HP145	30570773
5,00	6	75	12	36	39	35	4	FXR510Ø5H7MF1M-HP145	30570774
5,50	6	75	12	36	39	35	4	FXR510Ø5.5H7MF1M-HP145	30570775
6,00	6	75	12	36	39	35	4	FXR510Ø6H7MF1M-HP145	30570776
6,50	8	100	16	36	64	59	6	FXR510Ø6.5H7MF1M-HP145	30570777
7,00	8	100	16	36	64	59	6	FXR510Ø7H7MF1M-HP145	30570778
7,50	8	100	16	36	64	60	6	FXR510Ø7.5H7MF1M-HP145	30570779
8,00	8	100	16	36	64	60	6	FXR510Ø8H7MF1M-HP145	30570780
8,50	10	100	20	40	60	55	6	FXR510Ø8.5H7MF1M-HP145	30570781
9,00	10	100	20	40	60	55	6	FXR510Ø9H7MF1M-HP145	30570782
9,50	10	120	20	40	80	76	6	FXR510Ø9.5H7MF1M-HP145	30570783
10,00	10	120	20	40	80	76	6	FXR510Ø10H7MF1M-HP145	30570784
10,50	12	120	20	45	75	70	6	FXR510Ø10.5H7MF1M-HP145	30570785
11,00	12	120	20	45	75	70	6	FXR510Ø11H7MF1M-HP145	30570786
11,50	12	120	20	45	75	71	6	FXR510Ø11.5H7MF1M-HP145	30570787
12,00	12	120	20	45	75	71	6	FXR510Ø12H7MF1M-HP145	30570788
13,00	14	130	22	45	85	80	6	FXR510Ø13H7MF1M-HP145	30570789
14,00	14	130	22	45	85	80	6	FXR510Ø14H7MF1M-HP145	30570790
15,00	16	130	22	48	82	77	6	FXR510Ø15H7MF1M-HP145	30570791
16,00	16	150	25	48	102	97	6	FXR510Ø16H7MF1M-HP145	30570792
17,00	18	150	25	48	102	97	8	FXR510Ø17H7MF1M-HP145	30570793
18,00	18	150	25	48	102	97	8	FXR510Ø18H7MF1M-HP145	30570794
19,00	20	150	25	50	100	95	8	FXR510Ø19H7MF1M-HP145	30570795
20,00	20	150	25	50	100	95	8	FXR510Ø20H7MF1M-HP145	30570796

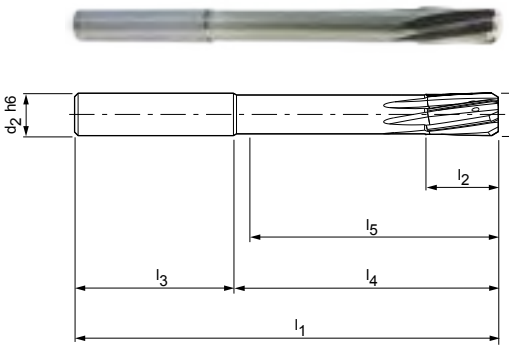
Dimensions in mm.
Cutting data recommendation from page 234.
Intermediate sizes and tolerances other than H7 are available on request.

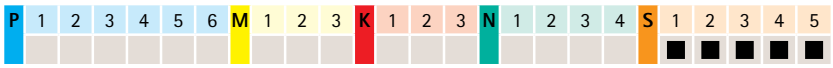
FixReam FXR510

Solid carbide design with internal cooling
FXR510 - Titan

Design:

Reamer diameter:	4.00-20.00 mm
Number of blades	4/6/8
Cutting lead:	MF1M
Cutting material:	HP613





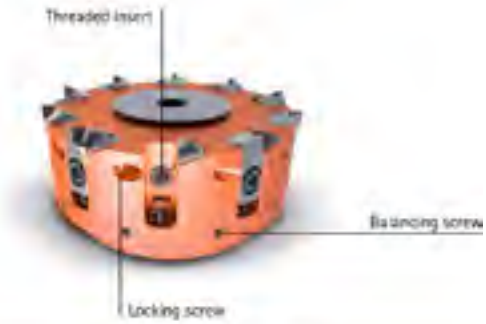
Dimensions							z	Specification	Order number
d_1	d_2 h6	l_1	l_2	l_3	l_4	l_5			
4,00	6	75	12	36	39	34	4	FXR510Ø4H7MF1M-HP613	30584871
4,50	6	75	12	36	39	34	4	FXR510Ø4.5H7MF1M-HP613	30584872
5,00	6	75	12	36	39	35	4	FXR510Ø5H7MF1M-HP613	30584873
5,50	6	75	12	36	39	35	4	FXR510Ø5.5H7MF1M-HP613	30584874
6,00	6	75	12	36	39	35	4	FXR510Ø6H7MF1M-HP613	30584875
6,50	8	100	16	36	64	59	6	FXR510Ø6.5H7MF1M-HP613	30584876
7,00	8	100	16	36	64	59	6	FXR510Ø7H7MF1M-HP613	30584877
7,50	8	100	16	36	64	60	6	FXR510Ø7.5H7MF1M-HP613	30584878
8,00	8	100	16	36	64	60	6	FXR510Ø8H7MF1M-HP613	30584879
8,50	10	100	20	40	60	55	6	FXR510Ø8.5H7MF1M-HP613	30584880
9,00	10	100	20	40	60	55	6	FXR510Ø9H7MF1M-HP613	30584881
9,50	10	120	20	40	80	76	6	FXR510Ø9.5H7MF1M-HP613	30584882
10,00	10	120	20	40	80	76	6	FXR510Ø10H7MF1M-HP613	30584883
10,50	12	120	20	45	75	70	6	FXR510Ø10.5H7MF1M-HP613	30584884
11,00	12	120	20	45	75	70	6	FXR510Ø11H7MF1M-HP613	30584885
11,50	12	120	20	45	75	71	6	FXR510Ø11.5H7MF1M-HP613	30584886
12,00	12	120	20	45	75	71	6	FXR510Ø12H7MF1M-HP613	30584887
13,00	14	130	22	45	85	80	6	FXR510Ø13H7MF1M-HP613	30584888
14,00	14	130	22	45	85	80	6	FXR510Ø14H7MF1M-HP613	30584889
15,00	16	130	22	48	82	77	6	FXR510Ø15H7MF1M-HP613	30584890
16,00	16	150	25	48	102	97	6	FXR510Ø16H7MF1M-HP613	30584891
17,00	18	150	25	48	102	97	8	FXR510Ø17H7MF1M-HP613	30584892
18,00	18	150	25	48	102	97	8	FXR510Ø18H7MF1M-HP613	30584893
19,00	20	150	25	50	100	95	8	FXR510Ø19H7MF1M-HP613	30584894
20,00	20	150	25	50	100	95	8	FXR510Ø20H7MF1M-HP613	30584895

Dimensions in mm.
Cutting data recommendation from page 234.
Intermediate sizes and tolerances other than H7 are available on request.

ACCESSORIES AND SPARE PARTS

Milling cutters with PCD milling inserts

Accessories and spare parts for mills with PCD milling inserts - System Power



	d*	Dimensions	Model	Wrench size (SW) / Torx size	Tightening torque [Nm]	Weight [g]	Order number
Clamping screw for milling insert							
	63 – 400	M6x13	Cylinder head screw	SW 5	14	5	30696520**
Adjusting screw for milling insert							
	63 – 400	M5x8				2.5	30696523
Swarf protection plate							
	63 – 400		Swarf protection plate (R.H.)			1.4	30696535
	63 – 400		Swarf protection plate (L.H.)			1.4	30696536
Clamping screw for swarf protection plate							
	63 – 400	M3x7.3	Torx screw	TX8		0.3	30696537
Locking screw							
	50 – 400	M6x12		SW 3		1.6	30696529
Balancing screws							
	80 – 160	M6x10				1.4	10040022
	200 – 400	M10x10				2.7	10012542
	***	M8x10				2.2	10040023
Threaded insert							
	up to 80	M6x8	Threaded insert			2.3	30696545
	from 100	M6x12	Threaded insert			3.6	30696546

* Face mill diameter
** Only suitable for single use.
*** Only suitable for special mills.

PMC series

PMC series

	d*	Dimensions	Model	Wrench size (SW) / Torx size	Tightening torque [Nm]	Weight [g]	Order number
Coolant screw							
	63	M10	Coolant screw	SW 10	50	82.3	30326178
	80	M12	Coolant screw	SW 12	80	176.2	30326179
	100	M16	Coolant screw	SW 14	100	263	30326180
	125 – 140	M20	Coolant screw	SW 14	200	595	30326181
Coolant cover							
	160 – 180		Coolant cover			200	30696538
	200		Coolant cover			500	30696539
	250		Coolant cover			700	30696540
	315		Coolant cover			1300	30696541
	400		Coolant cover			2300	30696542
Retaining screw for coolant cover							
	160 – 400	M6x18	Countersunk head screw	SW 4		4.3	30670137

Accessories

Retaining screws for mill arbors							
	160 – 180	M12x45	Cylinder head screw in accordance with ISO 4762	SW 10	70	84	10006594
	200 – 400	M16x50	Cylinder head screw in accordance with ISO 4762	SW 14	70	140	10007775
Backing plate**							
	63 – 400	0.25 mm	Backing plate t=0.25			0.5	30696530
	63 – 400	0.5 mm	Backing plate t=0.50			0.9	30696531
	63 – 400	1 mm	Backing plate t=1.00			2	30696532
	63 – 400	1.5 mm	Backing plate t=1.50			3	30696533
	63 – 400	2 mm	Backing plate t=2.00			4	30696534

* Face mill diameter
** Adapted to the feed per tooth.

Accessories and spare parts for mills with PCD milling inserts - System Eco

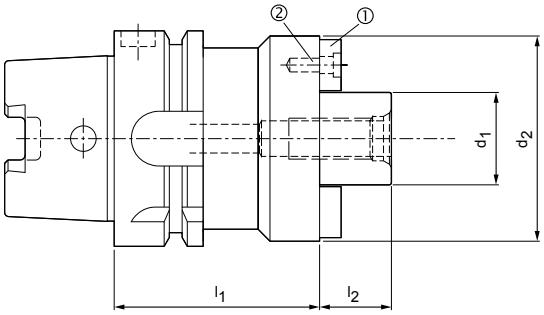
FMC series

	d*	Dimensions	Model	Wrench size (SW) / Torx size	Tightening torque [Nm]	Weight [g]	Order number
Clamping screw for milling insert							
	63 – 160	M5x8	Torx screw	TX25	8	2.3	30499981
Adjusting wedge							
	63 – 160		Adjusting wedge			1.6	30696526
Threaded spindle							
	63 – 160	M5x0.5LH/ RHx17	Threaded spindle	SW 2.5		1.2	30696525
Locking screw							
	63 – 160	M4x6	Locking screw	SW 2	2	0.3	30367384
Balancing screws							
	63 – 160	M6x10	Threaded pin			1.4	10040022
Coolant screw							
	63		Coolant screw	SW 24	70	40	30772751-600
	80 – 160	M12x20	Coolant screw	SW 24	80	47	30381973-601
	80 – 160	ø 36 mm	Washer			24	30381973-600

*Face mill diameter

Milling cutter arbors

Mechanical tool clamping
with enlarged contact surface diameter in accordance with DIN 69882-3
Shank HSK-A in accordance with DIN 69893-1



Nominal size HSK-A	Dimensions				Weight [kg]	Specification	Order number without mill clamping screw	Order number Chip version
	d_1	d_2	l_1	l_2				
63	22	48	50	19	1,0	MCA-HSK-A063-22-050-1-0-W	10066802	10071567
63	27	60	60	21	1,4	MCA-HSK-A063-27-060-1-0-W	10066803	10078580
63	32	78	60	24	1,7	MCA-HSK-A063-32-060-1-0-W	10066804	10072205
63*	40	89	60	27	1,9	MCA-HSK-A063-40-060-1-0-W	10066805	10076023
63*	60**	140	70	40	4,5	MCA-HSK-A063-40-070-1-0-W	10067153	10093651
80	22	48	50	19	1,5	MCA-HSK-A080-22-050-1-0-W	10066806	on request
80	27	60	50	21	1,7	MCA-HSK-A080-27-050-1-0-W	10066808	on request
80	32	78	60	24	2,3	MCA-HSK-A080-32-060-1-0-W	10066810	on request
80*	40	89	60	27	2,5	MCA-HSK-A080-40-060-1-0-W	10066811	on request
100	22	48	50	19	2,3	MCA-HSK-A100-22-050-1-0-W	10066812	30201364
100	27	60	50	21	2,5	MCA-HSK-A100-27-050-1-0-W	10066813	10079983
100	32	78	50	24	2,9	MCA-HSK-A100-32-050-1-0-W	10066814	30192516
100*	40	89	60	27	3,5	MCA-HSK-A100-40-060-1-0-W	10066815	30192520
100*	60	140	70	40	6,2	MCA-HSK-A100-60-070-1-0-W	10066817	10071573

The sizes marked with an asterisk (*) have four additional threaded bores for cutting heads with tool connections in accordance with DIN 2079.
**d_1 = 60 mm at a nominal size of HSK-A 63: maximum milling head diameter 250 mm. No balancing bores on the periphery.

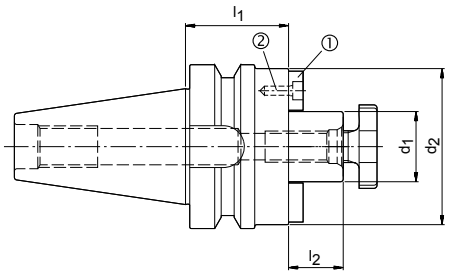
Spare parts

Cutting arbor d	① Key block (2x)		② Retaining screw ISO 4762 for key block (2x)	
	Specification	Order number	Size	Order number
22	MT1013-01	10005640	M4x10 - 12,9	10003583
27	MT1215-01	10005165	M4x16 - 12,9	10003586
32	MT1422-01	10004063	M5x16 - 12,9	10003601
40	MT1623-01	10004064	M5x16 - 12,9	10003601
60	MT2625-01	10010103	M12x25 - 12,9	10003675

Dimensions in mm.
Supplied as follows: With key blocks screwed on. Without coolant tube
Design: Permissible run-out variation of the hollow taper shank in relation to the arbor$_1$ ≤ 8 µm. Six balancing bores on the periphery.
Balancing quality: G 2.5 at 16,000 min^{-1} as delivered

Milling cutter arbors

Mechanical tool clamping
BT shank in accordance with ISO 7388-2 form JD (JIS B 6339)

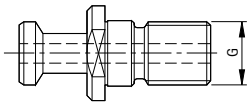


Design with BT connection

Nominal size BT	Dimensions				Weight [kg]	Specification	Order number
	d_1	d_2	l_1	l_2			
30	27	46	35	21	0,7	MCA-BT030-27-035-0-0-W	50016666
40	27	60	35	21	1,3	MCA-BT040-27-035-0-0-W	10073630

Design with BBT connection

Nominal size BBT	Dimensions				Weight [kg]	Specification	Order number
	d_1	d_2	l_1	l_2			
30	27	70	45	20	1,0	MCA-BT030-27-045-0-0-W	30487186
40	27	70	60	20	2,0	MCA-BT040-27-060-0-0-W	30475457



Pull studs for SK adapter
in accordance with ISO7388-3 form JD 30°/45°

BT	Form	G	Order number
30	30°	M12	10017954
30	45°	M12	10066211
40	30°	M16	10022405
40	45°	M16	10018129

Spare parts

For arbor diameter	① Key block	② Retaining screw for key block in accordance with ISO 4762	
d_1	Order number	Size	Order number
27	10005165	M4x16 - 12.9	10003586

Dimensions in mm.
Supplied as follows: With key blocks and mill clamping screw in accordance with DIN 6367 screwed on. Without pull studs
Design: Permissible run-out variation of the taper in relation to the arbor diameter $d_1 \leq 8$ µm.
Balancing quality: G 2.5 at 16,000 min^{-1} as delivered

FINAL ASSEMBLY

Tools for the reliable machining of multilayer composite materials with drill feed units and hand drills.

PRODUCT OVERVIEW

Tools for final assembly

Handheld machines are used in the final assembly of aircraft, due to the size of these items. ADD Engineering has developed a range of high-performance tools specifically for machining with handheld machines and drill feed units.

Application-oriented

The range includes tools for the drilling from solid, boring, reaming and countersinking of multimaterial multilayer composites. Specific guiding elements ensure the reliable production of precise bores with high surface quality and accurate concentricity.

Process reliability in focus

ADD Engineering offers innovative geometries for the various combinations of materials in order to prevent delamination, fibre protrusions or the formation of burrs on bore entries and exits. Optional accessories such as guide pins and drill brushes also improve machining quality.

Always the right choice

ADD Engineering offers the right tool for every application and provides support for optimising the respective machining task. All tools can be manufactured with the specific thread adapters required.

Drill feed unit:

In contrast to handheld machines, drill feed units allow the tool to be guided mechanically However, the spindle run-out is moderate. The insert with drill brushes is recommended for additional guiding.

Handheld machines

Handheld machines offer a high degree of flexibility but lack the qualities required for stable tool guidance. As a result, additional stabilisers are needed to produce a constant diameter.

Tools for final assembly

Drilling from solid (first hole)

Tools for drilling from solid in multilayer composite materials (stacks) made out of CFRP, aluminium, high-alloy steels or titanium with a hand drill.

- Innovative geometries to prevent delamination, fibre protrusions and the formation of burrs on bore entries and exits
- Extremely sharp cutting edges ensure a smooth cut and low cutting force
- Ideal for multilayer stacks in which the top stack has already been mechanically pre-drilled
- Countersink drill for producing bores with a countersink in one machining step Also suitable for use with drill feed units

Boring and reaming (final hole)

Boring and reaming of through bores tools with special cutting leads and guiding elements for the reliable production of precise bores with high surface quality and accurate concentricity.

- Tools with guide spigots for boring pre-drilled bores
- Tools for reaming bores in multilayer composites, ensuring process reliability and consistently high quality - also when hand drills are used
- Tools with an enlarged contact surface and extra long blade (type Paris) for reaming damaged bores.

Countersinking

Producing precise, circular countersinks and spot faces on bores that have already been pre-drilled.

- Spot facers for producing contact surfaces for rivet heads
- 100° countersink cutter for producing rivet head seats
- Cost-effective chanfering using a 90°countersink cutter
- Cross-hole countersink cutters for reduced cutting force and controlled chip removal
- Precision countersink cutters with extremely unequal spacing for precise, circular 90° countersinks
- Design with fixed or replaceable guide pin for machining pilot bores of different diameters with only one counter sink cutter
- Reverse countersink with drawbars make the machining of hard-to-reach areas possible

Accessories and spare parts

Guide spigots, drawbars and drill brushes

Optional accessories for increasing process reliability and improving machining quality.

- Guide spigots guide the tool into the pre-drilled hole
- Drawbars make backward machining possible with one countersink and guide the tool safely into the bore
- Drill brushes guide the drill during machining and make it possible to produce a custom drilling pattern, without letting the drill deviate. This makes the drilling process significantly easier and leads to a much cleaner result

Page 200

Hand drill

The hand drills have been specially designed for machining modern materials.

- Low weight of approx. 1kg and an ergonomically shaped, rubberised handle for exceptional handling
- Collet chuck of up to ø10 mm
- 450 Watt pneumatic drive for machining CFRP, aluminium and titanium
- Available with a range of spindle speeds to achieve the best machining results
- Available with a hydraulic brake for a controlled feed
- Tripod for producing bores perpendicular to the surface

Page 206

Thread adapter for drill feed units

All tools can be manufactured with the specific thread adapters required.

- Changing the tool is quick and straightforward
- Brazed design for restrictive space requirements
- Shrunk design for multiple use

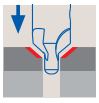
Page 208

CHOOSING A TOOL

Step by step to the right tool

This selection guide will lead you step by step to the right tool.

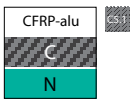
1 Application — Choose your main application.

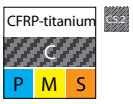
Drilling from solid (first hole)	 Drilling from solid  Drilling from solid - with countersink
Boring and reaming (final hole)	 Boring  Reaming  Repair - reaming
Countersinking	 Chamfering - 180 °  Counter-sinking - 100 °  Chamfering - 90 °

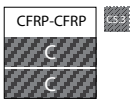
2 Material suitability — Select the material for the individual layers in accordance with the MMG (ADD Engineering machining group, see inside cover).

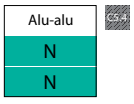
 Steel
 Stainless steel
 Non-ferrous metals and plastics
 Composite materials
 Super alloys and titanium

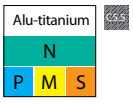
Choose the structure of your multilayer composite.

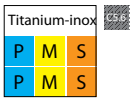












3 Properties of the part — Consider the demands that the properties of the bore will make on your tool.

Maximum tolerance

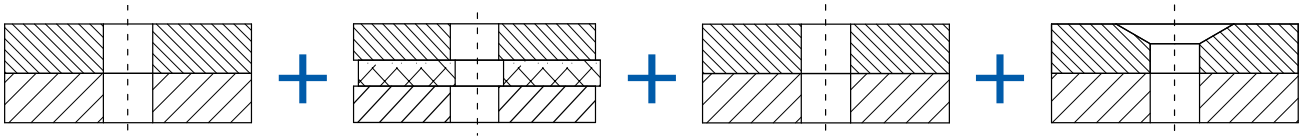
4 Product — Choose your tool.

Types of bores used in aircraft production

Overview of selected machining situations occurring in aircraft production and recommended tool combinations

Example 1: Rivet hole with 100° countersink

Producing bores on the fuselage, torsion box and wing in various multilayer composites.
Boring is optional and is used to reduce cutting force or to correct any mismatch between bores in the individual layers and align them with one another.



Drilling from solid

MEGA-Stack-Drill-Hand-CC

MEGA-Stack-Drill-Hand-CTA

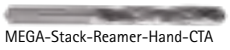
FAL-Drill-Uni

FAL-Drill-Composite

Optional: Boring

MEGA-Stack-CoreDrill-Hand-CTA

Reaming



MEGA-Stack-Reamer-Hand-CTA

FAL-Handreamer-America

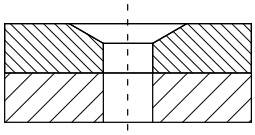
Optional: Countersinking

FAL-Countersink-100°-Pilot

FAL-Countersink-100°-Plugin-Pilot

Example 2: Rivet hole with 100° countersink

Production of bores with countersinks in one machining step

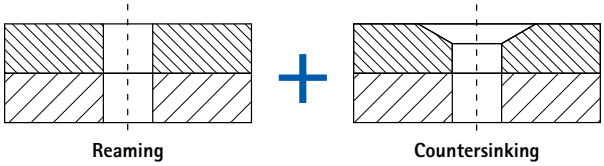


Drilling from solid and countersinking (in one machining step)

FAL-Countersink-Drill

Example 3: Repair of existing bores

Reaming bores in multilayer metal composites up to the next size.
This method is used if normal bores have flaws or have been damaged.



Reaming

FAL-Handreamer-Paris

FAL-Handreamer-Pilot

Countersinking

FAL-Countersink-100°-Pilot

FAL-Countersink-100°-Plugin-Pilot

Drilling from solid (first hole)

Step 1: Application

Step 2: Material suitability

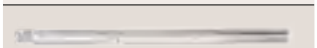
MAT

Step 3: Properties of the part

IT8

Application		Material suitability													Tolerance			Product		
		P		M	N	C							S							
		1	4	1	1	1	5.1	5.2	5.3	5.4	5.5	5.6	1-2	4	IT8	IT9	IT10	Product name	Mat.	
	Drilling from the solid - with countersink	■			■						■						✔	FAL-Countersink-Drill	HSS	
			■	■	■	■	■	■									✔	FAL-Countersink-Drill	Solid carbide	
	Drilling from the solid without countersink	■			■						■						✔	FAL-Drill-Uni	HSS	
			■	■	■	■	■	■					■				✔	MEGA-Stack-Drill-Hand-CTA	Solid carbide	
						■			■							✔		MEGA-Stack-Drill-Hand-CC	Solid carbide	
						■			■							✔		FAL-Drill-Composite	Solid carbide	

Boring and reaming (final hole)

Application		Material suitability													Tolerance			Product		
		P		M	N	C							S							
		1	4	1	1	1	5.1	5.2	5.3	5.4	5.5	5.6	1-2	4	IT8	IT9	IT10	Product name	Mat.	
	Boring		■	■	■	■	■	■					■			✔		MEGA-Stack-CoreDrill-Hand-CTA	Solid carbide	
	Reaming		■	■	■	■	■	■					■			✔		MEGA-Stack-Reamer-Hand-CTA	Solid carbide	
		■			■						■				✔			FAL-Handreamer-America	HSS	
			■	■	■	■	■	■	■				■		✔			FAL-Handreamer-America	Solid carbide	
	Repair - reaming	■			■						■				✔			FAL-Handreamer-Pilot	HSS	
		■			■						■				✔			FAL-Handreamer-Paris	HSS	
			■	■	■	■	■	■	■				■		✔			FAL-Handreamer-Paris	Solid carbide	

★ 1st choice ■ Highly suitable ⬓ Suitable in some situations

Wing parts (assembly)							Fuselage parts (assembly)										Tail plane (assembly)			
Torsion box	Slats	Landing flaps	Wing tips	Trailing edge	Engine mount	Other wing parts	Cockpit	Forward fuselage	Centre fuselage	Rear fuselage	Tail	Tail cone	Wing-/fuselage covering	Doors and covers	Interior fittings	Cabin flooring	Other components of the fuselage	Elevator unit	Rudder unit	Other Tail plane parts	Page
	✔	✔	✔				✔	✔	✔	✔	✔	✔	✔	✔			✔	✔	✔	✔	146
	✔	✔	✔				✔	✔	✔	✔	✔	✔	✔	✔			✔	✔	✔	✔	147
✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	148
✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	149
✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	152
	✔	✔	✔	✔			✔				✔	✔	✔	✔	✔						155

Wing parts (assembly)							Fuselage parts (assembly)										Tail plane (assembly)			
Torsion box	Slats	Landing flaps	Wing tips	Trailing edge	Engine mount	Other wing parts	Cockpit	Forward fuselage	Centre fuselage	Rear fuselage	Tail	Tail cone	Wing-/fuselage covering	Doors and covers	Interior fittings	Cabin flooring	Other components of the fuselage	Elevator unit	Rudder unit	Other Tail plane parts	Page
✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	158
✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	159
	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔				162
✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	165
	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔				168
	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔				170
✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	173

Countersinking

Step 1: Application

Step 2: Material suitability

MAT

Step 3: Properties of the part

IT8

Application		Material suitability													Toler-ance	Product			
		P		M	N	C							S			Product name	z	Mat.	
		1	4	1	1	1	5.1	5.2	5.3	5.4	5.5	5.6	1-2	4					
	Chamfering - 180°	■			■						■				± 0,05	FAL-Countersink-180°-Reverse	4/5/6	HSS	
			■	■								■	■		± 0,05	FAL-Countersink-180°-Reverse	4/5	Solid carbide	
		■			■						■				± 0,05	FAL-Spotfacer-180°-Plugin-Pilot	4	HSS	
	Counter-sinking - 100 °	■			■						■					FAL-Countersink-100°-Reverse	4	HSS	
		■			■						■					FAL-Countersink-100°-Plugin-Pilot	2	HSS	
		■			■						■					FAL-Countersink-100°-Pilot	3	HSS	
		■			■						■					FAL-Countersink-100°-Plugin-Pilot	3	HSS	
			■	■	■		■	■	■				■	■		FAL-Countersink-100°-Pilot	3	Solid carbide	
			■	■	■		■	■	■				■	■		FAL-Countersink-100°-Plugin-Pilot	3	Solid carbide	
					■	■	■		■							FAL-Countersink-100°-Pilot	2	PCD	
					■	■	■		■							FAL-Countersink-100°-Plugin-Pilot	2	PCD	
	Chamfer-ing - 90 °	■			■						■					FAL-Countersink-90°	1	HSS	
			■	■		■	■	■	■				■	■		FAL-Countersink-90°	1	Solid carbide	
		■			■						■					FAL-Deburring-90°	1	HSS	
		■			■						■					Präzisions-Kegelsenker	3	HSS	
		■	■	■	■		■	■	■				■	■		Präzisions-Kegelsenker	3	Solid carbide	

★ 1st choice ■ Highly suitable ⬓ Suitable in some situations

Wing parts (assembly)							Fuselage parts (assembly)										Tail plane (assembly)			
Torsion box	Slats	Landing flaps	Wing tips	Trailing edge	Engine mount	Other wing parts	Cockpit	Forward fuselage	Centre fuselage	Rear fuselage	Tail	Tail cone	Wing-/fuselage covering	Doors and covers	Interior fittings	Cabin flooring	Other components of the fuselage	Elevator unit	Rudder unit	Other Tail plane parts	Page
✔				✔	✔	✔								✔							178
✔				✔	✔	✔								✔							181
✔				✔	✔	✔								✔							182
✔				✔	✔	✔								✔							184
	✔	✔	✔				✔	✔	✔	✔	✔	✔	✔	✔			✔	✔	✔	✔	185
	✔	✔	✔				✔	✔	✔	✔	✔	✔	✔	✔			✔	✔	✔	✔	186
	✔	✔	✔				✔	✔	✔	✔	✔	✔	✔	✔			✔	✔	✔	✔	187
	✔	✔	✔				✔	✔	✔	✔	✔	✔	✔	✔			✔	✔	✔	✔	188
	✔	✔	✔				✔	✔	✔	✔	✔	✔	✔	✔			✔	✔	✔	✔	189
	✔	✔	✔				✔	✔	✔	✔	✔	✔	✔	✔			✔	✔	✔	✔	190
	✔	✔	✔				✔	✔	✔	✔	✔	✔	✔	✔			✔	✔	✔	✔	191
✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	192
✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	193
✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	194
✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	196
✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	197

DRILLING FROM SOLID (FIRST HOLE)

Drilling into solid - with countersink

Drilling into solid - without countersink

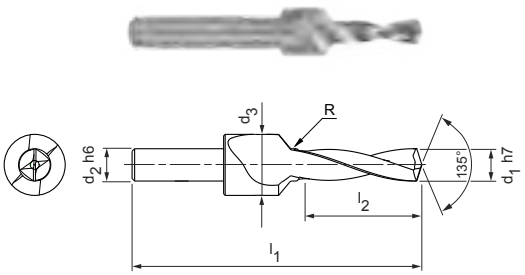
FAL-Countersink-Drill

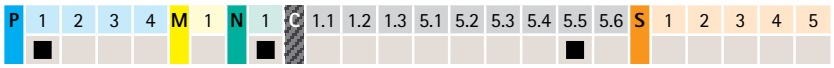
HSS design
FAD20

Design:

Drill diameter:	2.40-6.35 mm
Cutting material:	SU344
Number of blades:	2
Tip angle:	135°
Helix angle:	25°

Application:
Multilayer composites made out of aluminium and steel.



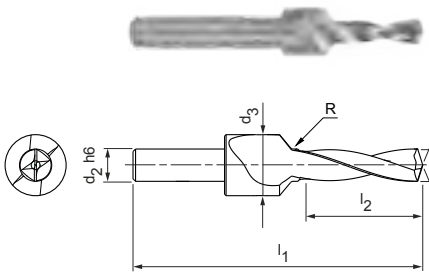


Dimensions						z	Specification	Order number
d_1 h7	d_2 h6	d_3	l_1	l_2	R			
2,40	6,35	10	44	7	0,3	2	FAD200-0240-2-2-135HA-SU344	30582981
2,40	6,35	10	44	7	0,3	2	FAD200-0240-2-2-135HA-SU344	30582982
2,50	6,35	10	44	7	0,3	2	FAD200-0250-2-2-135HA-SU344	30582983
3,30	6,35	10	44	7	0,3	2	FAD200-0330-2-2-135HA-SU344	30582984
3,60	6,35	10	44	7	0,3	2	FAD200-0360-2-2-135HA-SU344	30582985
3,20	6,35	10	44	12	0,3	2	FAD200-0320-2-2-135HA-SU344	30582986
3,30	6,35	10	44	12	0,3	2	FAD200-0330-2-2-135HA-SU344	30582987
3,60	6,35	10	44	12	0,3	2	FAD200-0360-2-2-135HA-SU344	30582988
4,00	6,35	10	44	12	0,3	2	FAD200-0400-2-2-135HA-SU344	30582989
4,02	6,35	10	44	12	0,3	2	FAD200-0402-2-2-135HA-SU344	30582990
4,12	6,35	10	44	12	0,3	2	FAD200-0412-2-2-135HA-SU344	30582991
4,12	6,35	10	44	12	0,3	2	FAD200-0412-2-2-135HA-SU344	30582992
4,78	6,35	10	44	12	0,3	2	FAD200-0478-2-2-135HA-SU344	30582993
4,95	6,35	10	44	16	0,3	2	FAD200-0495-2-2-135HA-SU344	30582994
4,78	6,35	10	44	16	0,6	2	FAD200-0478-2-2-135HA-SU344	30582995
4,95	6,35	10	44	16	0,6	2	FAD200-0495-2-2-135HA-SU344	30582996
4,78	6,35	10	44	19	0,6	2	FAD200-0478-2-2-135HA-SU344	30582997
4,95	6,35	10	44	19	0,6	2	FAD200-0495-2-2-135HA-SU344	30582998
4,78	6,35	12	44	12	0,6	2	FAD200-0478-2-2-135HA-SU344	30582999
4,95	6,35	12	44	16	0,6	2	FAD200-0495-2-2-135HA-SU344	30583000
4,78	6,35	12	44	16	0,6	2	FAD200-0478-2-2-135HA-SU344	30583001
4,95	6,35	12	48	19	0,6	2	FAD200-0495-2-2-135HA-SU344	30583002
4,78	6,35	12	48	19	0,6	2	FAD200-0478-2-2-135HA-SU344	30583003
4,95	6,35	12	48	16	0,6	2	FAD200-0495-2-2-135HA-SU344	30583004
5,02	6,35	12	48	16	0,6	2	FAD200-0502-2-2-135HA-SU344	30583005
5,60	6,35	12	48	19	0,6	2	FAD200-0560-2-2-135HA-SU344	30583006
5,02	6,35	12	48	19	0,6	2	FAD200-0502-2-2-135HA-SU344	30583007
5,60	6,35	12	48	19	0,6	2	FAD200-0560-2-2-135HA-SU344	30583008
6,31	6,35	12	52	19	0,6	2	FAD200-0631-2-2-135HA-SU344	30583009
6,35	6,35	12	52	12	0,6	2	FAD200-0635-2-2-135HA-SU344	30583010
6,31	6,35	12	57	26	0,6	2	FAD200-0631-2-2-135HA-SU344	30583011
6,35	6,35	12	57	26	0,6	2	FAD200-0635-2-2-135HA-SU344	30583012

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FAL-Countersink-Drill

Solid carbide design
FAD21



Design:

Drill diameter:	2.40-6.35 mm
Cutting material:	HU318
Number of blades:	2
Tip angle:	135°
Helix angle:	25°

Application:
Multilayer composites made out of CFRP, aluminium, titanium and stainless steel.

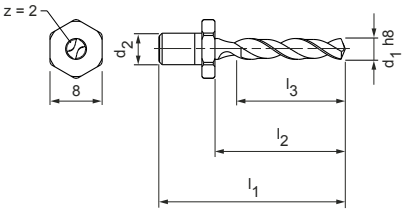
P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
				■		■		■			■	■	■	■										

Dimensions						z	Specification	Order number
d_1 h7	d_2 h6	d_3	l_1	l_2	R			
2,40	6,35	10	44	7	0,3	2	FAD210-0240-2-2-135HA-HU318	30583013
2,40	6,35	10	44	7	0,3	2	FAD210-0240-2-2-135HA-HU318	30583014
2,50	6,35	10	44	7	0,3	2	FAD210-0250-2-2-135HA-HU318	30583015
3,30	6,35	10	44	7	0,3	2	FAD210-0330-2-2-135HA-HU318	30583016
3,60	6,35	10	44	7	0,3	2	FAD210-0360-2-2-135HA-HU318	30583017
3,20	6,35	10	44	12	0,3	2	FAD210-0320-2-2-135HA-HU318	30583018
3,30	6,35	10	44	12	0,3	2	FAD210-0330-2-2-135HA-HU318	30583019
3,60	6,35	10	44	12	0,3	2	FAD210-0360-2-2-135HA-HU318	30583020
4,00	6,35	10	44	12	0,3	2	FAD210-0400-2-2-135HA-HU318	30583021
4,02	6,35	10	44	12	0,3	2	FAD210-0402-2-2-135HA-HU318	30583022
4,12	6,35	10	44	12	0,3	2	FAD210-0412-2-2-135HA-HU318	30583023
4,12	6,35	10	44	12	0,3	2	FAD210-0412-2-2-135HA-HU318	30583024
4,78	6,35	10	44	12	0,3	2	FAD210-0478-2-2-135HA-HU318	30583025
4,95	6,35	10	44	16	0,3	2	FAD210-0495-2-2-135HA-HU318	30583026
4,78	6,35	10	44	16	0,6	2	FAD210-0478-2-2-135HA-HU318	30583027
4,95	6,35	10	44	16	0,6	2	FAD210-0495-2-2-135HA-HU318	30583028
4,78	6,35	10	44	19	0,6	2	FAD210-0478-2-2-135HA-HU318	30583029
4,95	6,35	10	44	19	0,6	2	FAD210-0495-2-2-135HA-HU318	30583030
4,78	6,35	12	44	12	0,6	2	FAD210-0478-2-2-135HA-HU318	30583031
4,95	6,35	12	44	16	0,6	2	FAD210-0495-2-2-135HA-HU318	30583032
4,78	6,35	12	44	16	0,6	2	FAD210-0478-2-2-135HA-HU318	30583033
4,95	6,35	12	48	19	0,6	2	FAD210-0495-2-2-135HA-HU318	30583034
4,78	6,35	12	48	19	0,6	2	FAD210-0478-2-2-135HA-HU318	30583035
4,95	6,35	12	48	16	0,6	2	FAD210-0495-2-2-135HA-HU318	30583036
5,02	6,35	12	48	16	0,6	2	FAD210-0502-2-2-135HA-HU318	30583037
5,60	6,35	12	48	19	0,6	2	FAD210-0560-2-2-135HA-HU318	30583038
5,02	6,35	12	48	19	0,6	2	FAD210-0502-2-2-135HA-HU318	30583039
5,60	6,35	12	48	19	0,6	2	FAD210-0560-2-2-135HA-HU318	30583040
6,31	6,35	12	52	19	0,6	2	FAD210-0631-2-2-135HA-HU318	30583041
6,35	6,35	12	52	12	0,6	2	FAD210-0635-2-2-135HA-HU318	30583042
6,31	6,35	12	57	26	0,6	2	FAD210-0631-2-2-135HA-HU318	30583043
6,35	6,35	12	57	26	0,6	2	FAD210-0635-2-2-135HA-HU318	30583044

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FAL-Drill-Uni

HSS design
FAD10



Design:

Drill diameter:	2.50-6.35 mm
Cutting material:	SU344
Number of blades:	2
Tip angle:	135°
Helix angle:	35°

Application:
Multilayer composites made out of aluminium and steel.

P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
	■							■									■							

Dimensions							z	Specification	Order number
d_1 h8 [mm]	d_1 h8 [inch]	d_2	l_1	l_2 [mm]	l_2 [inch]	l_3			
2,50	0,098	10-32 UNF	20,6	12	0,472	8	2	FAD100-0250-2-2-135TS-SU344	30606613
2,50	0,098	10-32 UNF	28,6	20	0,787	16	2	FAD100-0250-2-2-135TS-SU344	30606614
3,00	0,118	10-32 UNF		12	0,472		2	FAD100-0300-2-2-135TS-SU344	30606615
3,20	0,126	10-32 UNF	16,6	8	0,315		2	FAD100-0320-2-2-135TS-SU344	30606616
3,20	0,126	10-32 UNF	20,6	12	0,472	8	2	FAD100-0320-2-2-135TS-SU344	30606617
3,20	0,126	10-32 UNF	28,6	20	0,787	16	2	FAD100-0320-2-2-135TS-SU344	30606618
4,00	0,157	10-32 UNF	20,6	12	0,472	7	2	FAD100-0400-2-2-135TS-SU344	30606619
4,00	0,157	10-32 UNF	23,6	15	0,591	8	2	FAD100-0400-2-2-135TS-SU344	30606620
4,80	0,189	10-32 UNF	23,6	15	0,591	9	2	FAD100-0480-2-2-135TS-SU344	30606621
4,92	0,194	10-32 UNF		9,52	0,375		2	FAD100-0492-2-2-135TS-SU344	30606622
6,35	1/4"	10-32 UNF		31,75	1,25		2	FAD100-0635-2-2-135TS-SU344	30606623

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

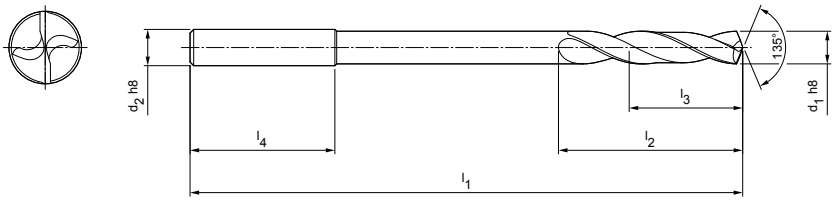
MEGA-Stack-Drill-Hand-CTA

Solid carbide drills
SCD48, 5xD

Design:

Drill diameter:	3.00-13.00 mm
Cutting material:	HU318
Number of blades:	2
Tip angle:	135°
Helix angle:	15°

Application:
Multilayer composites made out of CFRP-aluminium or CFRP-titanium.



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
				■		■		■			■	■	■	■							■	■			

Dimensions						z	Specification	Order number
d_1 h8	d_2 h8	l_1	l_2	l_3	l_4			
3,00	6,00	130	50,8	31,3	36	2	SCD480-0300-2-2-135HA05-HU318	30621178
3,10	6,00	130	50,8	31,3	36	2	SCD480-0310-2-2-135HA05-HU318	30621179
3,20	6,00	130	50,8	31,3	36	2	SCD480-0320-2-2-135HA05-HU318	30621180
3,30	6,00	130	50,8	31,3	36	2	SCD480-0330-2-2-135HA05-HU318	30621181
3,40	6,00	130	50,8	31,3	36	2	SCD480-0340-2-2-135HA05-HU318	30621182
3,50	6,00	130	50,8	31,3	36	2	SCD480-0350-2-2-135HA05-HU318	30621183
3,60	6,00	130	50,8	31,3	36	2	SCD480-0360-2-2-135HA05-HU318	30621184
3,70	6,00	130	50,8	31,3	36	2	SCD480-0370-2-2-135HA05-HU318	30621185
3,80	6,00	130	50,8	31,3	36	2	SCD480-0380-2-2-135HA05-HU318	30621186
3,90	6,00	130	50,8	31,3	36	2	SCD480-0390-2-2-135HA05-HU318	30621187
4,00	6,00	130	50,8	31,3	36	2	SCD480-0400-2-2-135HA05-HU318	30621188
4,10	6,00	130	50,8	31,3	36	2	SCD480-0410-2-2-135HA05-HU318	30621190
4,20	6,00	130	50,8	31,3	36	2	SCD480-0420-2-2-135HA05-HU318	30621195
4,30	6,00	130	50,8	31,3	36	2	SCD480-0430-2-2-135HA05-HU318	30621196
4,40	6,00	130	50,8	31,3	36	2	SCD480-0440-2-2-135HA05-HU318	30621197
4,50	6,00	130	50,8	31,3	36	2	SCD480-0450-2-2-135HA05-HU318	30621198
4,60	6,00	130	50,8	31,3	36	2	SCD480-0460-2-2-135HA05-HU318	30621199
4,70	6,00	130	50,8	31,3	36	2	SCD480-0470-2-2-135HA05-HU318	30621200
4,80	6,00	130	50,8	31,3	36	2	SCD480-0480-2-2-135HA05-HU318	30621203
4,90	6,00	130	50,8	31,3	36	2	SCD480-0490-2-2-135HA05-HU318	30621207
5,00	6,00	130	50,8	31,3	36	2	SCD480-0500-2-2-135HA05-HU318	30621208
5,10	6,00	130	50,8	31,3	36	2	SCD480-0510-2-2-135HA05-HU318	30621209
5,20	6,00	130	50,8	31,3	36	2	SCD480-0520-2-2-135HA05-HU318	30621211
5,30	6,00	130	50,8	31,3	36	2	SCD480-0530-2-2-135HA05-HU318	30621212
5,40	6,00	130	50,8	31,3	36	2	SCD480-0540-2-2-135HA05-HU318	30621213
5,50	6,00	130	50,8	31,3	36	2	SCD480-0550-2-2-135HA05-HU318	30621216
5,60	6,00	130	50,8	31,3	36	2	SCD480-0560-2-2-135HA05-HU318	30621221
5,70	6,00	130	50,8	31,3	36	2	SCD480-0570-2-2-135HA05-HU318	30621222
5,80	6,00	130	50,8	31,3	36	2	SCD480-0580-2-2-135HA05-HU318	30621223
5,90	6,00	130	50,8	31,3	36	2	SCD480-0590-2-2-135HA05-HU318	30621224
6,00	6,00	130	50,8	31,3	36	2	SCD480-0600-2-2-135HA05-HU318	30621225
6,10	8,00	130	50,8	31,3	36	2	SCD480-0610-2-2-135HA05-HU318	30621226
6,20	8,00	130	50,8	31,3	36	2	SCD480-0620-2-2-135HA05-HU318	30621227
6,30	8,00	130	50,8	31,3	36	2	SCD480-0630-2-2-135HA05-HU318	30621230
6,40	8,00	130	50,8	31,3	36	2	SCD480-0640-2-2-135HA05-HU318	30621237

Continued on next page

MEGA-Stack-Drill-Hand-CTA | Solid carbide drill, SCD48 (5xD)

Dimensions						z	Specification	Order number
d_1 h8	d_2 h8	l_1	l_2	l_3	l_4			
6,50	8,00	130	50,8	31,3	36	2	SCD480-0650-2-2-135HA05-HU318	30621238
6,60	8,00	130	50,8	31,3	36	2	SCD480-0660-2-2-135HA05-HU318	30621239
6,70	8,00	130	50,8	31,3	36	2	SCD480-0670-2-2-135HA05-HU318	30621241
6,80	8,00	130	50,8	31,3	36	2	SCD480-0680-2-2-135HA05-HU318	30621242
6,90	8,00	130	50,8	31,3	36	2	SCD480-0690-2-2-135HA05-HU318	30621243
7,00	8,00	130	50,8	31,3	36	2	SCD480-0700-2-2-135HA05-HU318	30621244
7,10	8,00	130	50,8	31,3	36	2	SCD480-0710-2-2-135HA05-HU318	30621245
7,20	8,00	130	50,8	31,3	36	2	SCD480-0720-2-2-135HA05-HU318	30621246
7,30	8,00	130	50,8	31,3	36	2	SCD480-0730-2-2-135HA05-HU318	30621247
7,40	8,00	130	50,8	31,3	36	2	SCD480-0740-2-2-135HA05-HU318	30621248
7,50	8,00	130	50,8	31,3	36	2	SCD480-0750-2-2-135HA05-HU318	30621249
7,60	8,00	130	50,8	31,3	36	2	SCD480-0760-2-2-135HA05-HU318	30621250
7,70	8,00	130	50,8	31,3	36	2	SCD480-0770-2-2-135HA05-HU318	30621251
7,80	8,00	130	50,8	31,3	36	2	SCD480-0780-2-2-135HA05-HU318	30621252
7,90	8,00	130	50,8	31,3	36	2	SCD480-0790-2-2-135HA05-HU318	30621254
8,00	8,00	130	50,8	31,3	36	2	SCD480-0800-2-2-135HA05-HU318	30621261
8,10	10,00	130	50,8	31,3	40	2	SCD480-0810-2-2-135HA05-HU318	30621262
8,20	10,00	130	50,8	31,3	40	2	SCD480-0820-2-2-135HA05-HU318	30621263
8,30	10,00	130	50,8	31,3	40	2	SCD480-0830-2-2-135HA05-HU318	30621265
8,40	10,00	130	50,8	31,3	40	2	SCD480-0840-2-2-135HA05-HU318	30621266
8,50	10,00	130	50,8	31,3	40	2	SCD480-0850-2-2-135HA05-HU318	30621267
8,60	10,00	130	50,8	31,3	40	2	SCD480-0860-2-2-135HA05-HU318	30621268
8,70	10,00	130	50,8	31,3	40	2	SCD480-0870-2-2-135HA05-HU318	30621269
8,80	10,00	130	50,8	31,3	40	2	SCD480-0880-2-2-135HA05-HU318	30621270
8,90	10,00	130	50,8	31,3	40	2	SCD480-0890-2-2-135HA05-HU318	30621271
9,00	10,00	130	50,8	31,3	40	2	SCD480-0900-2-2-135HA05-HU318	30621272
9,10	10,00	130	50,8	31,3	40	2	SCD480-0910-2-2-135HA05-HU318	30621273
9,20	10,00	130	50,8	31,3	40	2	SCD480-0920-2-2-135HA05-HU318	30621274
9,30	10,00	130	50,8	31,3	40	2	SCD480-0930-2-2-135HA05-HU318	30621275
9,40	10,00	130	50,8	31,3	40	2	SCD480-0940-2-2-135HA05-HU318	30621276
9,50	10,00	130	50,8	31,3	40	2	SCD480-0950-2-2-135HA05-HU318	30621278
9,60	10,00	130	50,8	31,3	40	2	SCD480-0960-2-2-135HA05-HU318	30621284
9,70	10,00	130	50,8	31,3	40	2	SCD480-0970-2-2-135HA05-HU318	30621285
9,80	10,00	130	50,8	31,3	40	2	SCD480-0980-2-2-135HA05-HU318	30621286
9,90	10,00	130	50,8	31,3	40	2	SCD480-0990-2-2-135HA05-HU318	30621288
10,00	10,00	130	50,8	31,3	40	2	SCD480-1000-2-2-135HA05-HU318	30621289
10,10	12,00	130	50,8	31,3	45	2	SCD480-1010-2-2-135HA05-HU318	30621290
10,20	12,00	130	50,8	31,3	45	2	SCD480-1020-2-2-135HA05-HU318	30621291
10,30	12,00	130	50,8	31,3	45	2	SCD480-1030-2-2-135HA05-HU318	30621292
10,40	12,00	130	50,8	31,3	45	2	SCD480-1040-2-2-135HA05-HU318	30621293
10,50	12,00	130	50,8	31,3	45	2	SCD480-1050-2-2-135HA05-HU318	30621294
10,60	12,00	130	50,8	31,3	45	2	SCD480-1060-2-2-135HA05-HU318	30621295
10,70	12,00	130	50,8	31,3	45	2	SCD480-1070-2-2-135HA05-HU318	30621296
10,80	12,00	130	50,8	31,3	45	2	SCD480-1080-2-2-135HA05-HU318	30621297
10,90	12,00	130	50,8	31,3	45	2	SCD480-1090-2-2-135HA05-HU318	30621298
11,00	12,00	130	50,8	31,3	45	2	SCD480-1100-2-2-135HA05-HU318	30621300
11,10	12,00	130	50,8	31,3	45	2	SCD480-1110-2-2-135HA05-HU318	30621302
11,20	12,00	130	50,8	31,3	45	2	SCD480-1135-2-2-135HA05-HU318	30621307
11,30	12,00	130	50,8	31,3	45	2	SCD480-1130-2-2-135HA05-HU318	30621308
11,40	12,00	130	50,8	31,3	45	2	SCD480-1140-2-2-135HA05-HU318	30621309
11,50	12,00	130	50,8	31,3	45	2	SCD480-1150-2-2-135HA05-HU318	30621311
11,60	12,00	130	50,8	31,3	45	2	SCD480-1160-2-2-135HA05-HU318	30621312
11,70	12,00	130	50,8	31,3	45	2	SCD480-1170-2-2-135HA05-HU318	30621313
11,80	12,00	130	50,8	31,3	45	2	SCD480-1180-2-2-135HA05-HU318	30621314
11,90	12,00	130	50,8	31,3	45	2	SCD480-1190-2-2-135HA05-HU318	30621315
12,00	12,00	130	50,8	31,3	45	2	SCD480-1350-2-2-135HA05-HU318	30621316
12,10	14,00	130	50,8	31,3	45	2	SCD480-1210-2-2-135HA05-HU318	30621317

MEGA-Stack-Drill-Hand-CTA | Solid carbide drill, SCD48 (5xD)

Dimensions						z	Specification	Order number
d_1 h8	d_2 h8	l_1	l_2	l_3	l_4			
12,20	14,00	130	50,8	31,3	45	2	SCD480-1220-2-2-135HA05-HU318	30621318
12,30	14,00	130	50,8	31,3	45	2	SCD480-1230-2-2-135HA05-HU318	30621319
12,40	14,00	130	50,8	31,3	45	2	SCD480-1240-2-2-135HA05-HU318	30621320
12,50	14,00	130	50,8	31,3	45	2	SCD480-1250-2-2-135HA05-HU318	30621321
12,60	14,00	130	50,8	31,3	45	2	SCD480-1260-2-2-135HA05-HU318	30621323
12,70	14,00	130	50,8	31,3	45	2	SCD480-1270-2-2-135HA05-HU318	30621326
12,80	14,00	130	50,8	31,3	45	2	SCD480-1280-2-2-135HA05-HU318	30621330
12,90	14,00	130	50,8	31,3	45	2	SCD480-1290-2-2-135HA05-HU318	30621331
13,00	14,00	130	50,8	31,3	45	2	SCD480-1300-2-2-135HA05-HU318	30621332

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

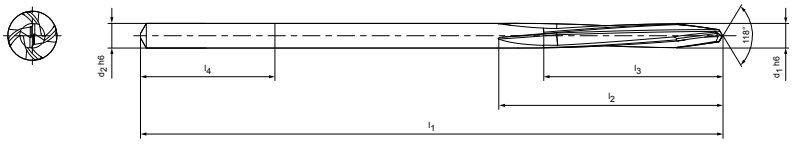
MEGA-Stack-Drill-Hand-CC

Solid carbide drills
SCD50 (5xD)

Design:

Drill diameter:	4.00-13.00 mm
Cutting material:	HU318
Number of blades:	4
Tip angle:	118°
Helix angle:	5°

Application:
CFRP with multidirectional fibre structure.



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
											■	■			■									

Dimensions						z	Specification	Order number
d_1 h6	d_2 h6	l_1	l_2	l_3	l_4			
4,00	4,00	130	50	40	30	4	SCD500-0400-4-4-118HA05-HU318	30622011
4,10	4,10	130	50	40	30	4	SCD500-0410-4-4-118HA05-HU318	30622013
4,20	4,20	130	50	40	30	4	SCD500-0420-4-4-118HA05-HU318	30622018
4,30	4,30	130	50	40	30	4	SCD500-0430-4-4-118HA05-HU318	30622019
4,40	4,40	130	50	40	30	4	SCD500-0440-4-4-118HA05-HU318	30622020
4,50	4,50	130	50	40	30	4	SCD500-0450-4-4-118HA05-HU318	30622021
4,60	4,60	130	50	40	30	4	SCD500-0460-4-4-118HA05-HU318	30622022
4,70	4,70	130	50	40	30	4	SCD500-0470-4-4-118HA05-HU318	30622023
4,80	4,80	130	50	40	30	4	SCD500-0480-4-4-118HA05-HU318	30622026
4,90	4,90	130	50	40	30	4	SCD500-0490-4-4-118HA05-HU318	30622030
5,00	5,00	130	50	40	30	4	SCD500-0500-4-4-118HA05-HU318	30622031
5,10	5,10	130	50	40	30	4	SCD500-0510-4-4-118HA05-HU318	30622032
5,20	5,20	130	50	40	30	4	SCD500-0520-4-4-118HA05-HU318	30622034
5,30	5,30	130	50	40	30	4	SCD500-0530-4-4-118HA05-HU318	30622035
5,40	5,40	130	50	40	30	4	SCD500-0540-4-4-118HA05-HU318	30622036
5,50	5,50	130	50	40	30	4	SCD500-0550-4-4-118HA05-HU318	30622039
5,60	5,60	130	50	40	30	4	SCD500-0560-4-4-118HA05-HU318	30622044
5,70	5,70	130	50	40	30	4	SCD500-0570-4-4-118HA05-HU318	30622045
5,80	5,80	130	50	40	30	4	SCD500-0580-4-4-118HA05-HU318	30622046
5,90	5,90	130	50	40	30	4	SCD500-0590-4-4-118HA05-HU318	30622047
6,00	6,00	130	50	40	30	4	SCD500-0600-4-4-118HA05-HU318	30622048
6,10	6,10	130	50	40	30	4	SCD500-0610-4-4-118HA05-HU318	30622049
6,20	6,20	130	50	40	30	4	SCD500-0620-4-4-118HA05-HU318	30622050
6,30	6,30	130	50	40	30	4	SCD500-0630-4-4-118HA05-HU318	30622053
6,40	6,40	130	50	40	30	4	SCD500-0640-4-4-118HA05-HU318	30622060
6,50	6,50	130	50	40	30	4	SCD500-0650-4-4-118HA05-HU318	30622061
6,60	6,60	130	50	40	30	4	SCD500-0660-4-4-118HA05-HU318	30622062
6,70	6,70	130	50	40	30	4	SCD500-0670-4-4-118HA05-HU318	30622064
6,80	6,80	130	50	40	30	4	SCD500-0680-4-4-118HA05-HU318	30622065
6,90	6,90	130	50	40	30	4	SCD500-0690-4-4-118HA05-HU318	30622066
7,00	7,00	130	50	40	30	4	SCD500-0700-4-4-118HA05-HU318	30622067
7,10	7,10	130	50	40	30	4	SCD500-0710-4-4-118HA05-HU318	30622068
7,20	7,20	130	50	40	30	4	SCD500-0720-4-4-118HA05-HU318	30622069

MEGA-Stack-Drill-Hand-CC | Solid carbide drill, SCD50 (5xD)

Dimensions						z	Specification	Order number
d_1 h6	d_2 h6	l_1	l_2	l_3	l_4			
7,30	7,30	130	50	40	30	4	SCD500-0730-4-4-118HA05-HU318	30622070
7,40	7,40	130	50	40	30	4	SCD500-0740-4-4-118HA05-HU318	30622071
7,50	7,50	130	50	40	30	4	SCD500-0750-4-4-118HA05-HU318	30622072
7,60	7,60	130	50	40	30	4	SCD500-0760-4-4-118HA05-HU318	30622073
7,70	7,70	130	50	40	30	4	SCD500-0770-4-4-118HA05-HU318	30622074
7,80	7,80	130	50	40	30	4	SCD500-0780-4-4-118HA05-HU318	30622075
7,90	7,90	130	50	40	30	4	SCD500-0790-4-4-118HA05-HU318	30622077
8,00	8,00	130	50	40	30	4	SCD500-0800-4-4-118HA05-HU318	30622084
8,10	8,10	130	50	40	30	4	SCD500-0810-4-4-118HA05-HU318	30622085
8,20	8,20	130	50	40	30	4	SCD500-0820-4-4-118HA05-HU318	30622086
8,30	8,30	130	50	40	30	4	SCD500-0830-4-4-118HA05-HU318	30622088
8,40	8,40	130	50	40	30	4	SCD500-0840-4-4-118HA05-HU318	30622089
8,50	8,50	130	50	40	30	4	SCD500-0850-4-4-118HA05-HU318	30622090
8,60	8,60	130	50	40	30	4	SCD500-0860-4-4-118HA05-HU318	30622091
8,70	8,70	130	50	40	30	4	SCD500-0870-4-4-118HA05-HU318	30622092
8,80	8,80	130	50	40	30	4	SCD500-0880-4-4-118HA05-HU318	30622093
8,90	8,90	130	50	40	30	4	SCD500-0890-4-4-118HA05-HU318	30622094
9,00	9,00	130	50	40	30	4	SCD500-0900-4-4-118HA05-HU318	30622095
9,10	9,10	130	50	40	30	4	SCD500-0910-4-4-118HA05-HU318	30622096
9,20	9,20	130	50	40	30	4	SCD500-0920-4-4-118HA05-HU318	30622097
9,30	9,30	130	50	40	30	4	SCD500-0930-4-4-118HA05-HU318	30622098
9,40	9,40	130	50	40	30	4	SCD500-0940-4-4-118HA05-HU318	30622099
9,50	9,50	130	50	40	30	4	SCD500-0950-4-4-118HA05-HU318	30622101
9,60	9,60	130	50	40	30	4	SCD500-0960-4-4-118HA05-HU318	30622107
9,70	9,70	130	50	40	30	4	SCD500-0970-4-4-118HA05-HU318	30622108
9,80	9,80	130	50	40	30	4	SCD500-0980-4-4-118HA05-HU318	30622109
9,90	9,90	130	50	40	30	4	SCD500-0990-4-4-118HA05-HU318	30622111
10,00	10,00	130	50	40	30	4	SCD500-1000-4-4-118HA05-HU318	30622112
10,10	10,10	130	50	40	30	4	SCD500-1010-4-4-118HA05-HU318	30622113
10,20	10,20	130	50	40	30	4	SCD500-1020-4-4-118HA05-HU318	30622114
10,30	10,30	130	50	40	30	4	SCD500-1030-4-4-118HA05-HU318	30622115
10,40	10,40	130	50	40	30	4	SCD500-1040-4-4-118HA05-HU318	30622116
10,50	10,50	130	50	40	30	4	SCD500-1050-4-4-118HA05-HU318	30622117
10,60	10,60	130	50	40	30	4	SCD500-1060-4-4-118HA05-HU318	30622118
10,70	10,70	130	50	40	30	4	SCD500-1070-4-4-118HA05-HU318	30622119
10,80	10,80	130	50	40	30	4	SCD500-1080-4-4-118HA05-HU318	30622120
10,90	10,90	130	50	40	30	4	SCD500-1090-4-4-118HA05-HU318	30622121
11,00	11,00	130	50	40	30	4	SCD500-1100-4-4-118HA05-HU318	30622123
11,10	11,10	130	50	40	30	4	SCD500-1110-4-4-118HA05-HU318	30622125
11,20	11,20	130	50	40	30	4	SCD500-1120-4-4-118HA05-HU318	30622130
11,30	11,30	130	50	40	30	4	SCD500-1130-4-4-118HA05-HU318	30622131
11,40	11,40	130	50	40	30	4	SCD500-1140-4-4-118HA05-HU318	30622132
11,50	11,50	130	50	40	30	4	SCD500-1150-4-4-118HA05-HU318	30622134
11,60	11,60	130	50	40	30	4	SCD500-1160-4-4-118HA05-HU318	30622135
11,70	11,70	130	50	40	30	4	SCD500-1170-4-4-118HA05-HU318	30622136
11,80	11,80	130	50	40	30	4	SCD500-1180-4-4-118HA05-HU318	30622137
11,90	11,90	130	50	40	30	4	SCD500-1190-4-4-118HA05-HU318	30622138
12,00	12,00	130	50	40	30	4	SCD500-1200-4-4-118HA05-HU318	30622139
12,10	12,10	130	50	40	30	4	SCD500-1210-4-4-118HA05-HU318	30622140
12,20	12,20	130	50	40	30	4	SCD500-1220-4-4-118HA05-HU318	30622141
12,30	12,30	130	50	40	30	4	SCD500-1230-4-4-118HA05-HU318	30622142
12,40	12,40	130	50	40	30	4	SCD500-1240-4-4-118HA05-HU318	30622143
12,50	12,50	130	50	40	30	4	SCD500-1250-4-4-118HA05-HU318	30622144
12,60	12,60	130	50	40	30	4	SCD500-1260-4-4-118HA05-HU318	30622146
12,70	12,70	130	50	40	30	4	SCD500-1270-4-4-118HA05-HU318	30622149

Continued on next page

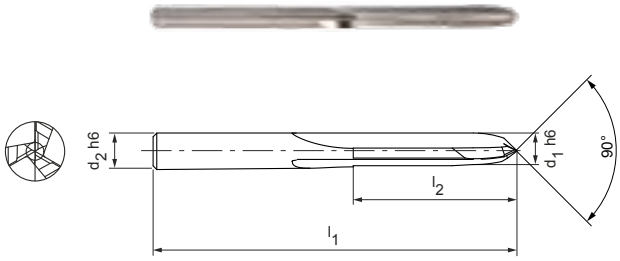
MEGA-Stack-Drill-Hand-CC | Solid carbide drill, SCD50 (5xD)

Dimensions						z	Specification	Order number
d_1 h6	d_2 h6	l_1	l_2	l_3	l_4			
12,80	12,80	130	50	40	30	4	SCD500-1280-4-4-118HA05-HU318	30622153
12,90	12,90	130	50	40	30	4	SCD500-1290-4-4-118HA05-HU318	30622154
13,00	13,00	130	50	40	30	4	SCD500-1300-4-4-118HA05-HU318	30622155

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FAL-Drill-Composite

Solid carbide design
FAD11



Design:

Drill diameter:	3.00-10.00 mm
Cutting material:	HU318
Number of blades:	3
Tip angle:	90°
Helix angle:	0°

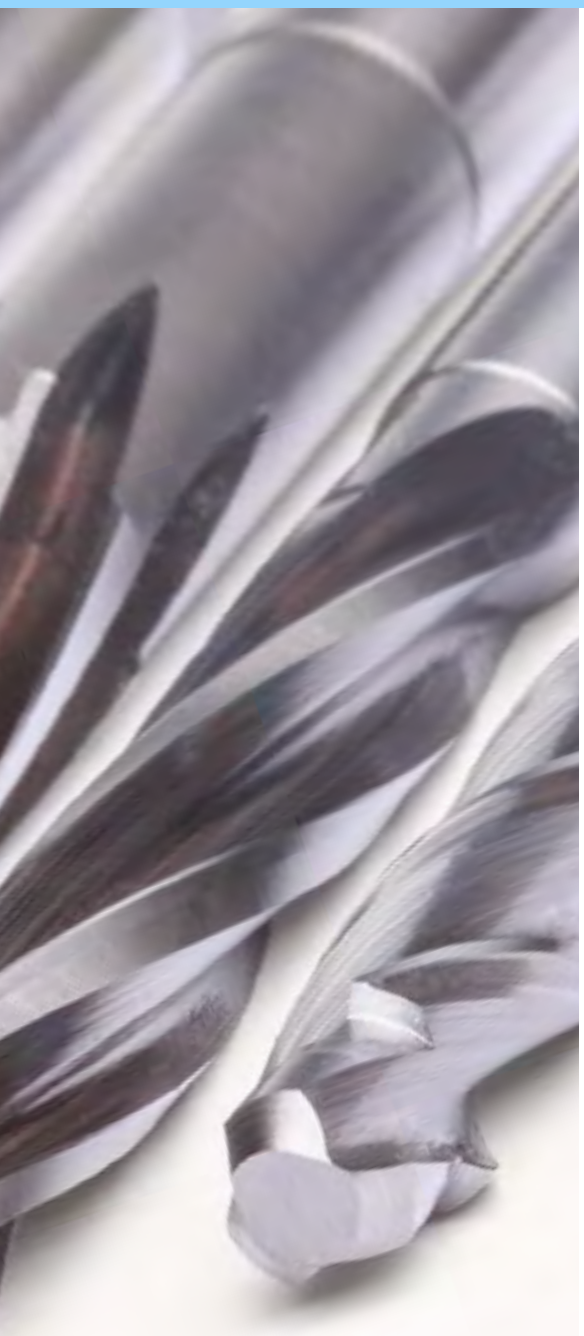
Application:
CFRP multilayer composites.

P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
											■	■			■									

IT9 | HA DIN 6535 | INCH

Dimensions					z	Specification	Order number
d_1 h6 [mm]	d_1 h6 [inch]	d_2 h6	l_1	l_2			
3,00	0,12	3	100	45	3	FAD110-0300-3-3-090HA-HU318	30582224
3,20	0,13	3,2	100	45	3	FAD110-0320-3-3-090HA-HU318	30582225
3,30	0,13	3,3	100	45	3	FAD110-0330-3-3-090HA-HU318	30582226
3,50	0,14	3,5	100	45	3	FAD110-0350-3-3-090HA-HU318	30582227
3,70	0,15	3,7	100	45	3	FAD110-0370-3-3-090HA-HU318	30582228
4,00	0,16	4	100	45	3	FAD110-0400-3-3-090HA-HU318	30582229
4,10	0,16	4,1	100	45	3	FAD110-0410-3-3-090HA-HU318	30582230
4,16	0,16	4,16	100	45	3	FAD110-0416-3-3-090HA-HU318	30582231
4,20	0,17	4,2	100	45	3	FAD110-0420-3-3-090HA-HU318	30582232
4,30	0,17	4,3	100	45	3	FAD110-0430-3-3-090HA-HU318	30582233
4,50	0,18	4,5	100	45	3	FAD110-0450-3-3-090HA-HU318	30582234
4,70	0,19	4,7	100	45	3	FAD110-0470-3-3-090HA-HU318	30582235
4,80	0,19	4,8	100	45	3	FAD110-0480-3-3-090HA-HU318	30582236
5,00	0,20	5	100	45	3	FAD110-0500-3-3-090HA-HU318	30582237
5,10	0,20	5,1	100	45	3	FAD110-0510-3-3-090HA-HU318	30582238
5,20	0,21	5,2	100	45	3	FAD110-0520-3-3-090HA-HU318	30582239
5,30	0,21	5,3	100	45	3	FAD110-0530-3-3-090HA-HU318	30582240
5,40	0,21	5,4	100	45	3	FAD110-0540-3-3-090HA-HU318	30582241
5,50	0,22	5,5	100	45	3	FAD110-0550-3-3-090HA-HU318	30582242
5,80	0,23	5,8	100	45	3	FAD110-0580-3-3-090HA-HU318	30582243
6,00	0,24	6	100	45	3	FAD110-0600-3-3-090HA-HU318	30582244
6,10	0,24	6,1	100	45	3	FAD110-0610-3-3-090HA-HU318	30582245
6,20	0,24	6,2	100	45	3	FAD110-0620-3-3-090HA-HU318	30582246
6,30	0,25	6,3	100	45	3	FAD110-0630-3-3-090HA-HU318	30582247
6,40	0,25	6,4	100	45	3	FAD110-0640-3-3-090HA-HU318	30582248
6,50	0,26	6,5	100	45	3	FAD110-0650-3-3-090HA-HU318	30582249
7,00	0,28	7	100	45	3	FAD110-0700-3-3-090HA-HU318	30582250
7,10	0,28	7,1	100	45	3	FAD110-0710-3-3-090HA-HU318	30582251
7,30	0,29	7,3	100	45	3	FAD110-0730-3-3-090HA-HU318	30582252
8,00	0,32	8	100	45	3	FAD110-0800-3-3-090HA-HU318	30582253
10,00	0,39	10	100	45	3	FAD110-1000-3-3-090HA-HU318	30582254

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.



BORING AND REAMING (FINAL HOLE)

Boring

Reaming

Repair - reaming

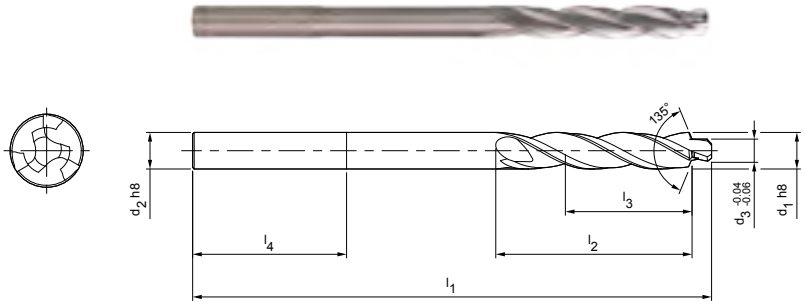
MEGA-Stack-CoreDrill-Hand-CTA

Solid carbide boring tool
SCD52 (5xD)

Design:

Drill diameter:	4.00-12.00 mm
Cutting material:	HU318
Number of blades:	3
Tip angle:	135°
Helix angle:	30°

Application:
Multilayer composites made out of CFRP-aluminium or CFRP-titanium.



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
				■		■		■			■	■	■	■						■	■				

Dimensions							z	Specification	Order number
d_1 h8	d_2 h8	d_3 -0.04 -0.06	l_1	l_2	l_3	l_4			
4,00	4,00	3,20	130	50,8	32,8	28	3	SCD520-0400-3-3-135HA05-HU318	30621394
4,50	4,50	3,20	130	50,8	32,8	28	3	SCD520-0450-3-3-135HA05-HU318	30621395
5,00	5,00	3,20	130	50,8	32,8	28	3	SCD520-0500-3-3-135HA05-HU318	30621396
5,50	5,50	3,20	130	50,8	32,8	36	3	SCD520-0550-3-3-135HA05-HU318	30621397
6,00	6,00	3,20	130	50,8	32,8	36	3	SCD520-0600-3-3-135HA05-HU318	30621398
6,50	6,50	3,20	130	50,8	32,8	36	3	SCD520-0650-3-3-135HA05-HU318	30621399
7,00	7,00	6,00	130	50,8	32,8	36	3	SCD520-0700-3-3-135HA05-HU318	30621400
7,50	7,50	6,00	130	50,8	32,8	36	3	SCD520-0750-3-3-135HA05-HU318	30621401
8,00	8,00	6,00	130	50,8	32,8	36	3	SCD520-0800-3-3-135HA05-HU318	30621402
8,50	8,50	6,00	130	50,8	32,8	40	3	SCD520-0850-3-3-135HA05-HU318	30621403
9,00	9,00	6,00	130	50,8	32,8	40	3	SCD520-0900-3-3-135HA05-HU318	30621404
9,50	9,50	6,00	130	50,8	32,8	40	3	SCD520-0950-3-3-135HA05-HU318	30621405
10,00	10,00	9,00	130	50,8	32,8	40	3	SCD520-1000-3-3-135HA05-HU318	30621406
10,50	10,00	9,00	130	50,8	32,8	40	3	SCD520-1050-3-3-135HA05-HU318	30621407
11,00	10,00	9,00	130	50,8	32,8	40	3	SCD520-1100-3-3-135HA05-HU318	30621408
11,50	10,00	9,00	130	50,8	32,8	40	3	SCD520-1150-3-3-135HA05-HU318	30621409
12,00	10,00	9,00	130	50,8	32,8	40	3	SCD520-1200-3-3-135HA05-HU318	30621410

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

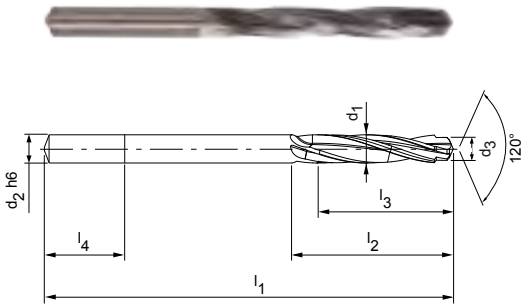
MEGA-Stack-Reamer-Hand-CTA

Solid carbide reamers
SCD54 (5xD)

Design:

Drill diameter:	4.00-13.00 mm
Cutting material:	HU318
Number of blades:	4
Tip angle:	120°
Helix angle:	15°

Application:
Multilayer composites made out of CFRP-aluminium or CFRP-titanium.



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
				■		■		■			■	■	■	■							■	■			

Dimensions							z	Specification	Order number
d_1	d_2 h6	d_3	l_1	l_2	l_3	l_4			
4,00	4,00	3,50	130	60,8	50,8	30	4	SCD540-0400-4-4-120HA05-HU318	30621571
4,10	4,10	3,50	130	60,8	50,8	30	4	SCD540-0410-4-4-120HA05-HU318	30621573
4,20	4,20	3,50	130	60,8	50,8	30	4	SCD540-0420-4-4-120HA05-HU318	30621578
4,30	4,30	3,50	130	60,8	50,8	30	4	SCD540-0430-4-4-120HA05-HU318	30621579
4,40	4,40	3,50	130	60,8	50,8	30	4	SCD540-0440-4-4-120HA05-HU318	30621580
4,50	4,50	4,00	130	60,8	50,8	30	4	SCD540-0450-4-4-120HA05-HU318	30621581
4,60	4,60	4,00	130	60,8	50,8	30	4	SCD540-0460-4-4-120HA05-HU318	30621582
4,70	4,70	4,00	130	60,8	50,8	30	4	SCD540-0470-4-4-120HA05-HU318	30621583
4,80	4,80	4,00	130	60,8	50,8	30	4	SCD540-0480-4-4-120HA05-HU318	30621586
4,90	4,90	4,00	130	60,8	50,8	30	4	SCD540-0490-4-4-120HA05-HU318	30621590
5,00	5,00	4,50	130	60,8	50,8	30	4	SCD540-0500-4-4-120HA05-HU318	30621591
5,10	5,10	4,50	130	60,8	50,8	30	4	SCD540-0510-4-4-120HA05-HU318	30621592
5,20	5,20	4,50	130	60,8	50,8	30	4	SCD540-0520-4-4-120HA05-HU318	30621594
5,30	5,30	4,50	130	60,8	50,8	30	4	SCD540-0530-4-4-120HA05-HU318	30621595
5,40	5,40	4,50	130	60,8	50,8	30	4	SCD540-0540-4-4-120HA05-HU318	30621596
5,50	5,50	5,00	130	60,8	50,8	30	4	SCD540-0550-4-4-120HA05-HU318	30621599
5,60	5,60	5,00	130	60,8	50,8	30	4	SCD540-0560-4-4-120HA05-HU318	30621604
5,70	5,70	5,00	130	60,8	50,8	30	4	SCD540-0570-4-4-120HA05-HU318	30621605
5,80	5,80	5,00	130	60,8	50,8	30	4	SCD540-0580-4-4-120HA05-HU318	30621606
5,90	5,90	5,00	130	60,8	50,8	30	4	SCD540-0590-4-4-120HA05-HU318	30621607
6,00	6,00	5,50	130	60,8	50,8	30	4	SCD540-0600-4-4-120HA05-HU318	30621608
6,10	6,10	5,50	130	60,8	50,8	30	4	SCD540-0610-4-4-120HA05-HU318	30621609
6,20	6,20	5,50	130	60,8	50,8	30	4	SCD540-0620-4-4-120HA05-HU318	30621610
6,30	6,30	5,50	130	60,8	50,8	30	4	SCD540-0630-4-4-120HA05-HU318	30621613
6,40	6,40	5,50	130	60,8	50,8	30	4	SCD540-0640-4-4-120HA05-HU318	30621620
6,50	6,50	6,00	130	60,8	50,8	30	4	SCD540-0650-4-4-120HA05-HU318	30621621
6,60	6,60	6,00	130	60,8	50,8	30	4	SCD540-0660-4-4-120HA05-HU318	30621622
6,70	6,70	6,00	130	60,8	50,8	30	4	SCD540-0670-4-4-120HA05-HU318	30621624
6,80	6,80	6,00	130	60,8	50,8	30	4	SCD540-0680-4-4-120HA05-HU318	30621625
6,90	6,90	6,00	130	60,8	50,8	30	4	SCD540-0690-4-4-120HA05-HU318	30621626
7,00	7,00	6,50	130	60,8	50,8	30	4	SCD540-0700-4-4-120HA05-HU318	30621627
7,10	7,10	6,50	130	60,8	50,8	30	4	SCD540-0710-4-4-120HA05-HU318	30621628
7,20	7,20	6,50	130	60,8	50,8	30	4	SCD540-0720-4-4-120HA05-HU318	30621629
7,30	7,30	6,50	130	60,8	50,8	30	4	SCD540-0730-4-4-120HA05-HU318	30621630
7,40	7,40	6,50	130	60,8	50,8	30	4	SCD540-0740-4-4-120HA05-HU318	30621631

Continued on next page

MEGA-Stack-Reamer-Hand-CTA | Solid carbide reamers, SCD54 (5xD)

Dimensions							z	Specification	Order number
d_1	d_2 h6	d_3	l_1	l_2	l_3	l_4			
7,50	7,50	7,00	130	60,8	50,8	30	4	SCD540-0750-4-4-120HA05-HU318	30621632
7,60	7,60	7,00	130	60,8	50,8	30	4	SCD540-0760-4-4-120HA05-HU318	30621633
7,70	7,70	7,00	130	60,8	50,8	30	4	SCD540-0770-4-4-120HA05-HU318	30621634
7,80	7,80	7,00	130	60,8	50,8	30	4	SCD540-0780-4-4-120HA05-HU318	30621635
7,90	7,90	7,00	130	60,8	50,8	30	4	SCD540-0790-4-4-120HA05-HU318	30621637
8,00	8,00	7,50	130	60,8	50,8	30	4	SCD540-0800-4-4-120HA05-HU318	30621644
8,10	8,10	7,50	130	60,8	50,8	30	4	SCD540-0810-4-4-120HA05-HU318	30621645
8,20	8,20	7,50	130	60,8	50,8	30	4	SCD540-0820-4-4-120HA05-HU318	30621646
8,30	8,30	7,50	130	60,8	50,8	30	4	SCD540-0830-4-4-120HA05-HU318	30621648
8,40	8,40	7,50	130	60,8	50,8	30	4	SCD540-0840-4-4-120HA05-HU318	30621649
8,50	8,50	8,00	130	60,8	50,8	30	4	SCD540-0850-4-4-120HA05-HU318	30621650
8,60	8,60	8,00	130	60,8	50,8	30	4	SCD540-0860-4-4-120HA05-HU318	30621651
8,70	8,70	8,00	130	60,8	50,8	30	4	SCD540-0870-4-4-120HA05-HU318	30621652
8,80	8,80	8,00	130	60,8	50,8	30	4	SCD540-0880-4-4-120HA05-HU318	30621653
8,90	8,90	8,00	130	60,8	50,8	30	4	SCD540-0890-4-4-120HA05-HU318	30621654
9,00	9,00	8,50	130	60,8	50,8	30	4	SCD540-0900-4-4-120HA05-HU318	30621655
9,10	9,10	8,50	130	60,8	50,8	30	4	SCD540-0910-4-4-120HA05-HU318	30621656
9,20	9,20	8,50	130	60,8	50,8	30	4	SCD540-0920-4-4-120HA05-HU318	30621657
9,30	9,30	8,50	130	60,8	50,8	30	4	SCD540-0930-4-4-120HA05-HU318	30621658
9,40	9,40	8,50	130	60,8	50,8	30	4	SCD540-0940-4-4-120HA05-HU318	30621659
9,50	9,50	9,00	130	60,8	50,8	30	4	SCD540-0950-4-4-120HA05-HU318	30621661
9,60	9,60	9,00	130	60,8	50,8	30	4	SCD540-0960-4-4-120HA05-HU318	30621667
9,70	9,70	9,00	130	60,8	50,8	30	4	SCD540-0970-4-4-120HA05-HU318	30621668
9,80	9,80	9,00	130	60,8	50,8	30	4	SCD540-0980-4-4-120HA05-HU318	30621669
9,90	9,90	9,00	130	60,8	50,8	30	4	SCD540-0990-4-4-120HA05-HU318	30621671
10,00	10,00	9,50	130	60,8	50,8	30	4	SCD540-1000-4-4-120HA05-HU318	30621672
10,10	10,10	9,50	130	60,8	50,8	30	4	SCD540-1010-4-4-120HA05-HU318	30621673
10,20	10,20	9,50	130	60,8	50,8	30	4	SCD540-1020-4-4-120HA05-HU318	30621674
10,30	10,30	9,50	130	60,8	50,8	30	4	SCD540-1030-4-4-120HA05-HU318	30621675
10,40	10,40	9,50	130	60,8	50,8	30	4	SCD540-1040-4-4-120HA05-HU318	30621676
10,50	10,50	10,00	130	60,8	50,8	30	4	SCD540-1050-4-4-120HA05-HU318	30621677
10,60	10,60	10,00	130	60,8	50,8	30	4	SCD540-1060-4-4-120HA05-HU318	30621678
10,70	10,70	10,00	130	60,8	50,8	30	4	SCD540-1070-4-4-120HA05-HU318	30621679
10,80	10,80	10,00	130	60,8	50,8	30	4	SCD540-1080-4-4-120HA05-HU318	30621680
10,90	10,90	10,00	130	60,8	50,8	30	4	SCD540-1090-4-4-120HA05-HU318	30621681
11,00	11,00	10,50	130	60,8	50,8	30	4	SCD540-1100-4-4-120HA05-HU318	30621683
11,10	11,10	10,50	130	60,8	50,8	30	4	SCD540-1110-4-4-120HA05-HU318	30621685
11,20	11,20	10,50	130	60,8	50,8	30	4	SCD540-1120-4-4-120HA05-HU318	30621690
11,30	11,30	10,50	130	60,8	50,8	30	4	SCD540-1130-4-4-120HA05-HU318	30621691
11,40	11,40	10,50	130	60,8	50,8	30	4	SCD540-1140-4-4-120HA05-HU318	30621692
11,50	11,50	11,00	130	60,8	50,8	30	4	SCD540-1150-4-4-120HA05-HU318	30621694
11,60	11,60	11,00	130	60,8	50,8	30	4	SCD540-1160-4-4-120HA05-HU318	30621695
11,70	11,70	11,00	130	60,8	50,8	30	4	SCD540-1170-4-4-120HA05-HU318	30621696
11,80	11,80	11,00	130	60,8	50,8	30	4	SCD540-1180-4-4-120HA05-HU318	30621697
11,90	11,90	11,00	130	60,8	50,8	30	4	SCD540-1190-4-4-120HA05-HU318	30621698
12,00	12,00	11,50	130	60,8	50,8	30	4	SCD540-1200-4-4-120HA05-HU318	30621699
12,10	12,10	11,50	130	60,8	50,8	30	4	SCD540-1210-4-4-120HA05-HU318	30621700
12,20	12,20	11,50	130	60,8	50,8	30	4	SCD540-1220-4-4-120HA05-HU318	30621701
12,30	12,30	11,50	130	60,8	50,8	30	4	SCD540-1230-4-4-120HA05-HU318	30621702
12,40	12,40	11,50	130	60,8	50,8	30	4	SCD540-1240-4-4-120HA05-HU318	30621703
12,50	12,50	12,00	130	60,8	50,8	30	4	SCD540-1250-4-4-120HA05-HU318	30621704
12,60	12,60	12,00	130	60,8	50,8	30	4	SCD540-1260-4-4-120HA05-HU318	30621706

MEGA-Stack-Reamer-Hand-CTA | Solid carbide reamers, SCD54 (5xD)

Dimensions							z	Specification	Order number
d_1	d_2 h6	d_3	l_1	l_2	l_3	l_4			
12,70	12,70	12,00	130	60,8	50,8	30	4	SCD540-1270-4-4-120HA05-HU318	30621709
12,80	12,80	12,00	130	60,8	50,8	30	4	SCD540-1280-4-4-120HA05-HU318	30621713
12,90	12,90	12,00	130	60,8	50,8	30	4	SCD540-1290-4-4-120HA05-HU318	30621714
13,00	13,00	12,00	130	60,8	50,8	30	4	SCD540-1300-4-4-120HA05-HU318	30621715

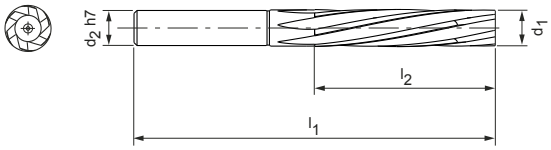
Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FAL-Handreamer-America

HSS design
FAR110

Design:
Reamer diameter: 4.063-25.384 mm
Cutting material: SU344
Number of blades 5/6/8
Helix angle: 12°

Application:
Multilayer composites made out of aluminium and steel.



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
	■							■									■							

IT8 HA DIN 6535 INCH

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2 h7	l_1	l_2			
4,063	0,160	4	80	45	5	FAR110Ø4.063H7AM-SU344	30581833
4,083	0,161	4	80	45	5	FAR110Ø4.083H7AM-SU344	30581834
4,125	0,162	4	80	45	5	FAR110Ø4.125H7AM-SU344	30581835
4,155	0,164	4	80	45	5	FAR110Ø4.155H7AM-SU344	30581836
4,163	0,164	4	80	45	5	FAR110Ø4.163H7AM-SU344	30581837
4,718	0,186	4	80	45	6	FAR110Ø4.718H7AM-SU344	30581838
4,738	0,187	4	80	45	6	FAR110Ø4.738H7AM-SU344	30581839
4,780	0,188	4	80	45	6	FAR110Ø4.78H7AM-SU344	30581840
4,79	0,189	4	80	45	6	FAR110Ø4.79H7AM-SU344	30581841
4,797	0,189	4	80	45	6	FAR110Ø4.797H7AM-SU344	30581842
4,815	0,190	4	80	45	6	FAR110Ø4.815H7AM-SU344	30581843
4,823	0,190	4	80	45	6	FAR110Ø4.823H7AM-SU344	30581844
4,870	0,192	4	80	45	6	FAR110Ø4.87H7AM-SU344	30581845
5,012	0,197	4	80	45	6	FAR110Ø5.012H7AM-SU344	30581846
5,442	0,214	4	80	45	6	FAR110Ø5.442H7AM-SU344	30581847
5,467	0,215	4	80	45	6	FAR110Ø5.467H7AM-SU344	30581848
5,512	0,217	5	80	45	6	FAR110Ø5.512H7AM-SU344	30581849
5,520	0,217	5	80	45	6	FAR110Ø5.52H7AM-SU344	30581850
5,526	0,218	5	80	45	6	FAR110Ø5.526H7AM-SU344	30581851
5,544	0,218	5	80	45	6	FAR110Ø5.544H7AM-SU344	30581852
5,552	0,219	5	80	45	6	FAR110Ø5.552H7AM-SU344	30581853
6,222	0,245	5	90	50	6	FAR110Ø6.222H7AM-SU344	30581854
6,257	0,246	5	90	50	6	FAR110Ø6.257H7AM-SU344	30581855
6,310	0,248	5	90	50	6	FAR110Ø6.31H7AM-SU344	30581856
6,319	0,249	5	90	50	6	FAR110Ø6.319H7AM-SU344	30581857
6,32	0,249	5	90	50	6	FAR110Ø6.32H7AM-SU344	30581858
6,339	0,250	5	90	50	6	FAR110Ø6.339H7AM-SU344	30581859
6,347	1/4"	5	90	50	6	FAR110Ø6.347H7AM-SU344	30581860
6,396	0,252	5	90	50	6	FAR110Ø6.396H7AM-SU344	30581861
6,536	0,257	5	90	50	6	FAR110Ø6.536H7AM-SU344	30581862
7,809	0,307	6	100	50	6	FAR110Ø7.809H7AM-SU344	30581863
7,844	0,309	6	100	50	6	FAR110Ø7.844H7AM-SU344	30581864
7,900	0,311	6	100	50	6	FAR110Ø7.9H7AM-SU344	30581865
7,907	0,311	6	100	50	6	FAR110Ø7.907H7AM-SU344	30581866
7,927	0,312	6	100	50	6	FAR110Ø7.927H7AM-SU344	30581867

FAL-Handreamer-America | HSS design, FAR110

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2 h7	l_1	l_2			
7,935	0,312	6	100	50	6	FAR110Ø7.935H7AM-SU344	30581868
7,986	0,314	6	100	50	6	FAR110Ø7.986H7AM-SU344	30581869
8,125	0,320	6	100	50	6	FAR110Ø8.125H7AM-SU344	30581870
9,387	0,370	8	100	50	6	FAR110Ø9.387H7AM-SU344	30581871
9,427	0,371	8	100	50	6	FAR110Ø9.427H7AM-SU344	30581872
9,490	0,374	8	100	50	6	FAR110Ø9.49H7AM-SU344	30581873
9,494	0,374	8	100	50	6	FAR110Ø9.494H7AM-SU344	30581874
9,514	0,375	8	100	50	6	FAR110Ø9.514H7AM-SU344	30581875
9,522	3/8"	8	100	50	6	FAR110Ø9.522H7AM-SU344	30581876
9,576	0,377	8	100	50	6	FAR110Ø9.576H7AM-SU344	30581877
9,711	0,382	8	100	50	6	FAR110Ø9.711H7AM-SU344	30581878
10,964	0,432	10	110	55	6	FAR110Ø10.964H7AM-SU344	30581879
11,007	0,433	10	110	55	6	FAR110Ø11.007H7AM-SU344	30581880
11,078	0,436	10	110	55	6	FAR110Ø11.078H7AM-SU344	30581881
11,080	0,436	10	110	55	6	FAR110Ø11.08H7AM-SU344	30581882
11,105	0,437	10	110	55	6	FAR110Ø11.105H7AM-SU344	30581883
11,109	0,437	10	110	55	6	FAR110Ø11.109H7AM-SU344	30581884
11,161	0,439	10	110	55	6	FAR110Ø11.161H7AM-SU344	30581885
11,300	0,445	10	110	55	6	FAR110Ø11.3H7AM-SU344	30581886
12,542	0,494	12	120	60	6	FAR110Ø12.542H7AM-SU344	30581887
12,594	0,496	12	120	60	6	FAR110Ø12.594H7AM-SU344	30581888
12,665	0,499	12	120	60	6	FAR110Ø12.665H7AM-SU344	30581889
12,670	0,499	12	120	60	6	FAR110Ø12.67H7AM-SU344	30581890
12,692	1/2"	12	120	60	6	FAR110Ø12.692H7AM-SU344	30581891
12,697	1/2"	12	120	60	6	FAR110Ø12.697H7AM-SU344	30581892
12,748	0,502	12	120	60	8	FAR110Ø12.748H7AM-SU344	30581893
12,887	0,507	12	120	60	8	FAR110Ø12.887H7AM-SU344	30581894
14,107	0,555	12	130	70	8	FAR110Ø14.107H7AM-SU344	30581895
14,164	0,558	12	130	70	8	FAR110Ø14.164H7AM-SU344	30581896
14,24	0,561	12	130	70	8	FAR110Ø14.24H7AM-SU344	30581897
14,247	0,561	12	130	70	8	FAR110Ø14.247H7AM-SU344	30581898
14,267	0,562	12	130	70	8	FAR110Ø14.267H7AM-SU344	30581899
14,272	0,562	12	130	70	8	FAR110Ø14.272H7AM-SU344	30581900
14,461	0,569	12	130	70	8	FAR110Ø14.461H7AM-SU344	30581901
15,694	0,618	12	140	80	8	FAR110Ø15.694H7AM-SU344	30581902
15,752	0,620	12	140	80	8	FAR110Ø15.752H7AM-SU344	30581903
15,827	0,623	12	140	80	8	FAR110Ø15.827H7AM-SU344	30581904
15,836	0,623	12	140	80	8	FAR110Ø15.836H7AM-SU344	30581905
15,854	0,624	12	140	80	8	FAR110Ø15.854H7AM-SU344	30581906
15,859	0,624	12	140	80	8	FAR110Ø15.859H7AM-SU344	30581907
16,049	0,632	12	160	90	8	FAR110Ø16.049H7AM-SU344	30581908
18,852	0,742	12	160	90	8	FAR110Ø18.852H7AM-SU344	30581909
18,912	0,745	12	160	90	8	FAR110Ø18.912H7AM-SU344	30581910
18,999	0,748	12	160	90	8	FAR110Ø18.999H7AM-SU344	30581911
19,013	0,749	12	160	90	8	FAR110Ø19.013H7AM-SU344	30581912
19,032	0,749	12	160	90	8	FAR110Ø19.032H7AM-SU344	30581913
19,034	0,749	12	160	90	8	FAR110Ø19.034H7AM-SU344	30581914
19,224	0,757	12	160	90	8	FAR110Ø19.224H7AM-SU344	30581915
22,011	0,867	12	190	115	8	FAR110Ø22.011H7AM-SU344	30581916
22,083	0,869	12	190	115	8	FAR110Ø22.083H7AM-SU344	30581917
22,174	0,873	12	190	115	8	FAR110Ø22.174H7AM-SU344	30581918
22,189	0,874	12	190	115	8	FAR110Ø22.189H7AM-SU344	30581919
22,207	0,874	12	190	115	8	FAR110Ø22.207H7AM-SU344	30581920
22,209	0,874	12	190	115	8	FAR110Ø22.209H7AM-SU344	30581921
22,399	0,882	12	190	115	8	FAR110Ø22.399H7AM-SU344	30581922
25,170	0,991	12	200	130	8	FAR110Ø25.17H7AM-SU344	30581923
25,253	0,994	12	200	130	8	FAR110Ø25.253H7AM-SU344	30581924

Continued on next page

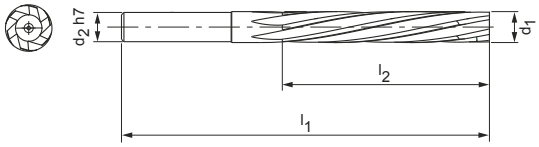
FAL-Handreamer-America | HSS design, FAR110

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2 h7	l_1	l_2			
25,350	0,998	12	200	130	8	FAR110Ø25.35H7AM-SU344	30581925
25,364	0,999	12	200	130	8	FAR110Ø25.364H7AM-SU344	30581926
25,382	0,9993	12	200	130	8	FAR110Ø25.382H7AM-SU344	30581927
25,384	0,9994	12	200	130	8	FAR110Ø25.384H7AM-SU344	30581928

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FAL-Handreamer-America

Solid carbide design
FAR110



Design:

Reamer diameter:	4.063-25.384 mm
Cutting material:	HU318
Number of blades	5/6/8
Helix angle:	12°

Application:
Multilayer composites made out of CFRP, aluminium, titanium and stainless steel.

P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
				■		■		■			■	■	■	■	■					■	■				

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2 h7	l_1	l_2			
4,063	0,160	4	80	40	5	FAR110Ø4.063H7AM-HU318	30581732
4,083	0,161	4	80	40	5	FAR110Ø4.083H7AM-HU318	30581733
4,125	0,162	4	80	40	5	FAR110Ø4.125H7AM-HU318	30581734
4,155	0,164	4	80	40	5	FAR110Ø4.155H7AM-HU318	30581735
4,163	0,164	4	80	40	5	FAR110Ø4.163H7AM-HU318	30581736
4,718	0,186	4	86	45	6	FAR110Ø4.718H7AM-HU318	30581737
4,738	0,187	4	86	45	6	FAR110Ø4.738H7AM-HU318	30581738
4,780	0,188	4	86	45	6	FAR110Ø4.78H7AM-HU318	30581739
4,790	0,189	4	86	45	6	FAR110Ø4.79H7AM-HU318	30581740
4,797	0,189	4	86	45	6	FAR110Ø4.797H7AM-HU318	30581741
4,815	0,190	4	86	45	6	FAR110Ø4.815H7AM-HU318	30581742
4,823	0,190	4	86	45	6	FAR110Ø4.823H7AM-HU318	30581743
4,870	0,192	4	86	45	6	FAR110Ø4.87H7AM-HU318	30581744
5,012	0,197	4	93	50	6	FAR110Ø5.012H7AM-HU318	30581745
5,442	0,214	4	93	50	6	FAR110Ø5.442H7AM-HU318	30581746
5,467	0,215	4	93	50	6	FAR110Ø5.467H7AM-HU318	30581747
5,512	0,217	5	93	50	6	FAR110Ø5.512H7AM-HU318	30581748
5,520	0,217	5	93	50	6	FAR110Ø5.52H7AM-HU318	30581749
5,526	0,218	5	93	50	6	FAR110Ø5.526H7AM-HU318	30581750
5,544	0,218	5	93	50	6	FAR110Ø5.544H7AM-HU318	30581751
5,552	0,219	5	93	50	6	FAR110Ø5.552H7AM-HU318	30581752
6,222	0,245	5	101	55	6	FAR110Ø6.222H7AM-HU318	30581753
6,257	0,246	5	101	55	6	FAR110Ø6.257H7AM-HU318	30581754
6,310	0,248	5	101	55	6	FAR110Ø6.31H7AM-HU318	30581755
6,319	0,249	5	101	55	6	FAR110Ø6.319H7AM-HU318	30581756
6,320	0,249	5	101	55	6	FAR110Ø6.32H7AM-HU318	30581757
6,339	0,250	5	101	55	6	FAR110Ø6.339H7AM-HU318	30581758
6,347	1/4"	5	101	55	6	FAR110Ø6.347H7AM-HU318	30581759
6,396	0,252	5	101	55	6	FAR110Ø6.396H7AM-HU318	30581760
6,536	0,257	5	109	65	6	FAR110Ø6.536H7AM-HU318	30581761
7,809	0,307	6	117	65	6	FAR110Ø7.809H7AM-HU318	30581762
7,844	0,309	6	117	65	6	FAR110Ø7.844H7AM-HU318	30581763
7,900	0,311	6	117	65	6	FAR110Ø7.9H7AM-HU318	30581764
7,907	0,311	6	117	65	6	FAR110Ø7.907H7AM-HU318	30581765
7,927	0,312	6	117	65	6	FAR110Ø7.927H7AM-HU318	30581766

Continued on next page

FAL-Handreamer-America | Solid carbide design, FAR110

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2 h7	l_1	l_2			
7,935	0,312	6	117	65	6	FAR110Ø7.935H7AM-HU318	30581767
7,986	0,314	6	117	65	6	FAR110Ø7.986H7AM-HU318	30581768
8,125	0,320	6	117	65	6	FAR110Ø8.125H7AM-HU318	30581769
9,387	0,370	8	125	70	6	FAR110Ø9.387H7AM-HU318	30581770
9,427	0,371	8	125	70	6	FAR110Ø9.427H7AM-HU318	30581771
9,490	0,374	8	133	75	6	FAR110Ø9.49H7AM-HU318	30581772
9,494	0,374	8	133	75	6	FAR110Ø9.494H7AM-HU318	30581773
9,514	0,375	8	133	75	6	FAR110Ø9.514H7AM-HU318	30581774
9,522	3/8"	8	133	75	6	FAR110Ø9.522H7AM-HU318	30581775
9,576	0,377	8	133	75	6	FAR110Ø9.576H7AM-HU318	30581776
9,711	0,382	8	133	75	6	FAR110Ø9.711H7AM-HU318	30581777
10,964	0,432	10	142	80	6	FAR110Ø10.964H7AM-HU318	30581778
11,007	0,433	10	142	80	6	FAR110Ø11.007H7AM-HU318	30581779
11,078	0,436	10	142	80	6	FAR110Ø11.078H7AM-HU318	30581780
11,080	0,436	10	142	80	6	FAR110Ø11.08H7AM-HU318	30581781
11,105	0,437	10	142	80	6	FAR110Ø11.105H7AM-HU318	30581782
11,109	0,437	10	142	80	6	FAR110Ø11.109H7AM-HU318	30581783
11,161	0,439	10	142	80	6	FAR110Ø11.161H7AM-HU318	30581784
11,300	0,445	10	142	80	6	FAR110Ø11.3H7AM-HU318	30581785
12,542	0,494	12	151	85	6	FAR110Ø12.542H7AM-HU318	30581786
12,594	0,496	12	151	85	6	FAR110Ø12.594H7AM-HU318	30581787
12,665	0,499	12	151	85	6	FAR110Ø12.665H7AM-HU318	30581788
12,670	0,499	12	151	85	6	FAR110Ø12.67H7AM-HU318	30581789
12,692	1/2"	12	151	85	6	FAR110Ø12.692H7AM-HU318	30581790
12,697	1/2"	12	151	85	6	FAR110Ø12.697H7AM-HU318	30581791
12,748	0,502	12	151	85	8	FAR110Ø12.748H7AM-HU318	30581792
12,887	0,507	12	151	85	8	FAR110Ø12.887H7AM-HU318	30581793
14,107	0,555	12	169	95	8	FAR110Ø14.107H7AM-HU318	30581794
14,164	0,558	12	169	95	8	FAR110Ø14.164H7AM-HU318	30581795
14,24	0,561	12	169	95	8	FAR110Ø14.24H7AM-HU318	30581796
14,247	0,561	12	169	95	8	FAR110Ø14.247H7AM-HU318	30581797
14,267	0,562	12	169	95	8	FAR110Ø14.267H7AM-HU318	30581798
14,272	0,562	12	169	95	8	FAR110Ø14.272H7AM-HU318	30581799
14,461	0,569	12	169	95	8	FAR110Ø14.461H7AM-HU318	30581800
15,694	0,618	12	178	105	8	FAR110Ø15.694H7AM-HU318	30581801
15,752	0,62	12	178	105	8	FAR110Ø15.752H7AM-HU318	30581802
15,827	0,623	12	178	105	8	FAR110Ø15.827H7AM-HU318	30581803
15,836	0,623	12	178	105	8	FAR110Ø15.836H7AM-HU318	30581804
15,854	0,624	12	178	105	8	FAR110Ø15.854H7AM-HU318	30581805
15,859	0,624	12	178	105	8	FAR110Ø15.859H7AM-HU318	30581806
16,049	0,632	12	178	105	8	FAR110Ø16.049H7AM-HU318	30581807
18,852	0,742	12	178	105	8	FAR110Ø18.852H7AM-HU318	30581808
18,912	0,745	12	178	105	8	FAR110Ø18.912H7AM-HU318	30581809
18,999	0,748	12	178	105	8	FAR110Ø18.999H7AM-HU318	30581810
19,013	0,749	12	178	105	8	FAR110Ø19.013H7AM-HU318	30581811
19,032	0,749	12	178	105	8	FAR110Ø19.032H7AM-HU318	30581812
19,034	0,749	12	178	105	8	FAR110Ø19.034H7AM-HU318	30581813
19,224	0,757	12	178	105	8	FAR110Ø19.224H7AM-HU318	30581814
22,011	0,867	12	190	115	8	FAR110Ø22.011H7AM-HU318	30581815
22,083	0,869	12	190	115	8	FAR110Ø22.083H7AM-HU318	30581816
22,174	0,873	12	190	115	8	FAR110Ø22.174H7AM-HU318	30581817
22,189	0,874	12	190	115	8	FAR110Ø22.189H7AM-HU318	30581818
22,207	0,874	12	190	115	8	FAR110Ø22.207H7AM-HU318	30581819
22,209	0,874	12	190	115	8	FAR110Ø22.209H7AM-HU318	30581820
22,399	0,882	12	190	115	8	FAR110Ø22.399H7AM-HU318	30581821
25,170	0,991	12	200	130	8	FAR110Ø25.17H7AM-HU318	30581822
25,253	0,994	12	200	130	8	FAR110Ø25.253H7AM-HU318	30581823

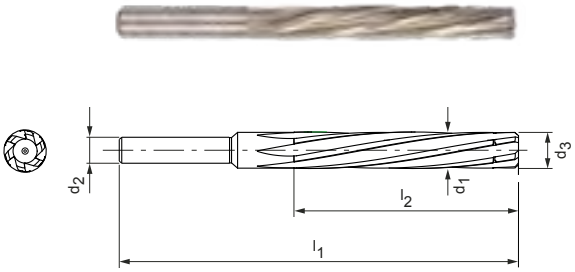
FAL-Handreamer-America | Solid carbide design, FAR110

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2 h7	l_1	l_2			
25,350	0,998	12	200	130	8	FAR110Ø25.35H7AM-HU318	30581824
25,364	0,999	12	200	130	8	FAR110Ø25.364H7AM-HU318	30581825
25,382	0,9993	12	200	130	8	FAR110Ø25.382H7AM-HU318	30581826
25,384	0,9994	12	200	130	8	FAR110Ø25.384H7AM-HU318	30581827

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FAL-Handreamer-Pilot

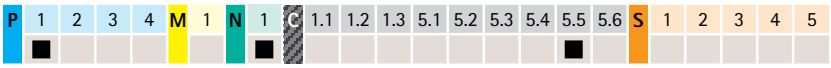
HSS design
FAR310



Design:

Reamer diameter:	6.706-16.842 mm
Cutting material:	SU344
Number of blades	6
Helix angle:	12°

Application:
Multilayer composites made out of aluminium and steel.



Dimensions						z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	d_3	l_1	l_2			
6,706	0,264	6	6,31	90	45	6	FAR310Ø6.706H7MC1F-SU344	30581934
7,102	0,28	6	6,706	90	45	6	FAR310Ø7.102H7MC1F-SU344	30581935
8,211	0,323	8	7,815	100	55	6	FAR310Ø8.211H7MC1F-SU344	30581936
8,296	0,327	8	7,9	100	55	6	FAR310Ø8.296H7MC1F-SU344	30581937
8,607	0,339	8	8,211	100	55	6	FAR310Ø8.607H7MC1F-SU344	30581938
8,692	0,342	8	8,296	100	55	6	FAR310Ø8.692H7MC1F-SU344	30581939
9,782	0,385	8	9,387	100	55	6	FAR310Ø9.782H7MC1F-SU344	30581940
9,886	0,389	8	9,49	100	55	6	FAR310Ø9.886H7MC1F-SU344	30581941
10,109	0,398	10	9,711	110	55	6	FAR310Ø10.109H7MC1F-SU344	30581942
10,179	0,401	10	9,782	110	55	6	FAR310Ø10.179H7MC1F-SU344	30581943
10,282	0,405	10	9,886	110	55	6	FAR310Ø10.282H7MC1F-SU344	30581944
10,505	0,414	10	10,109	110	55	6	FAR310Ø10.505H7MC1F-SU344	30581945
11,368	0,448	10	10,972	110	55	6	FAR310Ø11.368H7MC1F-SU344	30581946
11,476	0,452	10	11,08	110	55	6	FAR310Ø11.476H7MC1F-SU344	30581947
11,27	0,444	10	11,199	110	55	6	FAR310Ø11.27H7MC1F-SU344	30581948
11,696	0,46	10	11,3	120	60	6	FAR310Ø11.696H7MC1F-SU344	30581949
11,764	0,463	10	11,368	120	60	6	FAR310Ø11.764H7MC1F-SU344	30581950
11,872	0,467	10	11,476	120	60	6	FAR310Ø11.872H7MC1F-SU344	30581951
12,092	0,476	12	11,696	120	60	6	FAR310Ø12.092H7MC1F-SU344	30581952
12,954	0,51	12	12,559	120	60	6	FAR310Ø12.954H7MC1F-SU344	30581953
12,856	0,506	12	12,787	120	60	6	FAR310Ø12.856H7MC1F-SU344	30581955
13,066	0,514	12	12,67	120	60	6	FAR310Ø13.066H7MC1F-SU344	30581954
13,253	0,522	12	12,858	120	60	6	FAR310Ø13.253H7MC1F-SU344	30581956
13,283	0,523	12	12,887	120	60	6	FAR310Ø13.283H7MC1F-SU344	30581957
13,351	0,526	12	12,954	120	60	6	FAR310Ø13.351H7MC1F-SU344	30581958
13,462	0,53	12	13,066	120	60	6	FAR310Ø13.462H7MC1F-SU344	30581959
13,68	0,539	12	13,283	120	60	6	FAR310Ø13.68H7MC1F-SU344	30581960
14,859	0,585	12	14,461	130	70	6	FAR310Ø14.859H7MC1F-SU344	30581961
15,255	0,601	12	14,859	130	70	6	FAR310Ø15.255H7MC1F-SU344	30581962
16,145	0,636	12	15,712	140	75	6	FAR310Ø16.145H7MC1F-SU344	30581963
16,195	0,638	12	15,724	140	75	6	FAR310Ø16.195H7MC1F-SU344	30581964
16,232	0,639	12	15,836	140	75	6	FAR310Ø16.232H7MC1F-SU344	30581965
16,446	0,647	12	16,049	160	95	6	FAR310Ø16.446H7MC1F-SU344	30581966

FAL-Handreamer-Pilot | HSS design, FAR310

Dimensions						z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	d_3	l_1	l_2			
16,542	0,651	12	16,145	160	95	6	FAR310Ø16.542H7MC1F-SU344	30581967
16,516	0,65	12	16,195	160	95	6	FAR310Ø16.516H7MC1F-SU344	30581968
16,842	0,663	12	16,446	160	95	6	FAR310Ø16.842H7MC1F-SU344	30581969

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

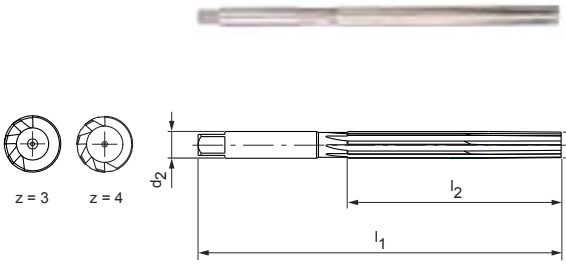
FAL-Handreamer-Paris

HSS design
FAR200

Design:

Reamer diameter:	2.00-25.40 mm
Shank form:	DIN10 / 2009-12
Cutting material:	SU344
Number of blades:	3/4
Helix angle:	0°

Application:
Part made out of aluminium, bronze and steel.



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
	■							■									■							

IT8 INCH

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	l_1	l_2			
2,00	0,079	2	65	35	3	FAR200Ø2H7PA-SU344	30581970
2,50	0,098	2,5	65	35	3	FAR200Ø2.5H7PA-SU344	30581971
3,00	0,118	3	85	50	3	FAR200Ø3H7PA-SU344	30581972
3,50	0,138	3,5	95	56	3	FAR200Ø3.5H7PA-SU344	30581973
3,70	0,146	3,5	95	56	3	FAR200Ø3.7H7PA-SU344	30581974
4,00	0,157	4	100	60	3	FAR200Ø4H7PA-SU344	30581975
4,10	0,161	4	100	60	3	FAR200Ø4.1H7PA-SU344	30581976
4,20	0,165	4	100	60	3	FAR200Ø4.2H7PA-SU344	30581977
4,40	0,173	4	100	60	3	FAR200Ø4.4H7PA-SU344	30581978
4,50	0,177	4,5	106	63	3	FAR200Ø4.5H7PA-SU344	30581979
4,60	0,181	4,5	106	63	3	FAR200Ø4.6H7PA-SU344	30581980
4,80	0,189	4,5	106	63	3	FAR200Ø4.8H7PA-SU344	30581981
5,00	0,197	5	112	67	3	FAR200Ø5H7PA-SU344	30581982
5,10	0,201	5	112	67	3	FAR200Ø5.1H7PA-SU344	30581983
5,20	0,205	5	112	67	3	FAR200Ø5.2H7PA-SU344	30581984
5,30	0,209	5	112	67	3	FAR200Ø5.3H7PA-SU344	30581985
5,40	0,213	5	112	67	3	FAR200Ø5.4H7PA-SU344	30581986
5,50	0,217	5,5	118	71	3	FAR200Ø5.5H7PA-SU344	30581987
5,60	0,22	5,5	118	71	3	FAR200Ø5.6H7PA-SU344	30581988
5,80	0,228	5,5	118	71	3	FAR200Ø5.8H7PA-SU344	30581989
5,90	0,232	5,5	118	71	3	FAR200Ø5.9H7PA-SU344	30581990
6,00	0,236	6	118	71	3	FAR200Ø6H7PA-SU344	30581991
6,10	0,24	6	118	71	3	FAR200Ø6.1H7PA-SU344	30581992
6,20	0,244	6	118	71	3	FAR200Ø6.2H7PA-SU344	30581993
6,30	0,248	6	118	71	3	FAR200Ø6.3H7PA-SU344	30581994
6,35	1/4"	6	125	75	3	FAR200Ø6.35H7PA-SU344	30581995
6,40	0,252	6	125	75	3	FAR200Ø6.4H7PA-SU344	30581997
6,50	0,256	6	125	75	3	FAR200Ø6.5H7PA-SU344	30581998
6,60	0,26	6	125	75	3	FAR200Ø6.6H7PA-SU344	30581999
6,70	0,264	6	125	75	3	FAR200Ø6.7H7PA-SU344	30582000
6,80	0,268	6	125	75	3	FAR200Ø6.8H7PA-SU344	30582001
7,00	0,276	7	132	80	3	FAR200Ø7H7PA-SU344	30582002
7,20	0,283	7	132	80	3	FAR200Ø7.2H7PA-SU344	30582003
7,40	0,291	7	132	80	3	FAR200Ø7.4H7PA-SU344	30582004
7,50	0,295	7	132	80	3	FAR200Ø7.5H7PA-SU344	30582005

FAL-Handreamer-Paris | HSS design, FAR200

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	l_1	l_2			
7,60	0,299	7	132	80	3	FAR200Ø7.6H7PA-SU344	30582006
7,70	0,303	7	132	80	3	FAR200Ø7.7H7PA-SU344	30582007
7,80	0,307	7	132	80	3	FAR200Ø7.8H7PA-SU344	30582008
8,00	0,315	8	140	85	3	FAR200Ø8H7PA-SU344	30582009
8,20	0,323	8	140	85	3	FAR200Ø8.2H7PA-SU344	30582010
8,40	0,331	8	140	85	3	FAR200Ø8.4H7PA-SU344	30582011
8,50	0,335	8	140	85	3	FAR200Ø8.5H7PA-SU344	30582012
8,60	0,339	8	140	85	3	FAR200Ø8.6H7PA-SU344	30582013
8,80	0,346	8	140	85	3	FAR200Ø8.8H7PA-SU344	30582014
9,00	0,354	9	150	90	3	FAR200Ø9H7PA-SU344	30582015
9,20	0,362	9	150	90	3	FAR200Ø9.2H7PA-SU344	30582016
9,40	0,370	9	150	90	3	FAR200Ø9.4H7PA-SU344	30582017
9,50	0,374	9	150	90	3	FAR200Ø9.5H7PA-SU344	30582018
9,52	0,375	9	160	95	3	FAR200Ø9.52H7PA-SU344	30582019
9,60	0,378	9	160	95	3	FAR200Ø9.6H7PA-SU344	30582020
9,80	0,386	9	160	95	3	FAR200Ø9.8H7PA-SU344	30582021
10,00	0,394	10	160	95	3	FAR200Ø10H7PA-SU344	30582022
10,20	0,402	10	160	95	3	FAR200Ø10.2H7PA-SU344	30582023
10,40	0,409	10	160	95	3	FAR200Ø10.4H7PA-SU344	30582024
10,50	0,413	10	160	95	3	FAR200Ø10.5H7PA-SU344	30582025
10,60	0,417	10	160	95	3	FAR200Ø10.6H7PA-SU344	30582026
10,80	0,425	10	160	95	3	FAR200Ø10.8H7PA-SU344	30582027
11,00	0,433	11	170	100	3	FAR200Ø11H7PA-SU344	30582028
11,20	0,441	11	170	100	3	FAR200Ø11.2H7PA-SU344	30582029
11,30	0,445	11	170	100	3	FAR200Ø11.3H7PA-SU344	30582030
11,40	0,449	11	170	100	3	FAR200Ø11.4H7PA-SU344	30582031
11,50	0,453	11	170	100	3	FAR200Ø11.5H7PA-SU344	30582032
11,60	0,457	11	170	100	3	FAR200Ø11.6H7PA-SU344	30582033
11,80	0,465	11	170	100	3	FAR200Ø11.8H7PA-SU344	30582034
12,00	0,472	12	180	106	3	FAR200Ø12H7PA-SU344	30582035
12,10	0,476	12	180	106	3	FAR200Ø12.1H7PA-SU344	30582036
12,20	0,480	12	180	106	3	FAR200Ø12.2H7PA-SU344	30582037
12,50	0,492	12	180	106	3	FAR200Ø12.5H7PA-SU344	30582038
12,70	1/2"	12	180	106	3	FAR200Ø12.7H7PA-SU344	30582039
13,00	0,512	12	180	106	3	FAR200Ø13H7PA-SU344	30582040
13,50	0,531	12	180	106	3	FAR200Ø13.5H7PA-SU344	30582041
14,00	0,551	14	190	112	3	FAR200Ø14H7PA-SU344	30582042
14,50	0,571	14	190	112	4	FAR200Ø14.5H7PA-SU344	30582043
15,00	0,591	14	190	112	4	FAR200Ø15H7PA-SU344	30582044
15,50	0,610	14	190	112	4	FAR200Ø15.5H7PA-SU344	30582045
16,00	0,630	16	200	118	4	FAR200Ø16H7PA-SU344	30582046
16,50	0,650	16	200	118	4	FAR200Ø16.5H7PA-SU344	30582047
17,00	0,669	16	200	118	4	FAR200Ø17H7PA-SU344	30582048
17,50	0,689	16	200	118	4	FAR200Ø17.5H7PA-SU344	30582049
18,00	0,709	18	212	125	4	FAR200Ø18H7PA-SU344	30582050
18,50	0,728	18	212	125	4	FAR200Ø18.5H7PA-SU344	30582051
19,00	0,748	18	212	125	4	FAR200Ø19H7PA-SU344	30582052
19,50	0,768	18	212	125	4	FAR200Ø19.5H7PA-SU344	30582053
20,00	0,787	20	224	132	4	FAR200Ø20H7PA-SU344	30582054
20,50	0,807	20	224	132	4	FAR200Ø20.5H7PA-SU344	30582055
21,00	0,827	20	224	132	4	FAR200Ø21H7PA-SU344	30582056
21,50	0,846	20	224	132	4	FAR200Ø21.5H7PA-SU344	30582057
22,00	0,866	22	236	140	4	FAR200Ø22H7PA-SU344	30582058
22,50	0,886	22	236	140	4	FAR200Ø22.5H7PA-SU344	30582059
23,00	0,906	22	236	140	4	FAR200Ø23H7PA-SU344	30582060
23,50	0,925	22	236	140	4	FAR200Ø23.5H7PA-SU344	30582061
24,00	0,945	22	250	150	4	FAR200Ø24H7PA-SU344	30582062

Continued on next page

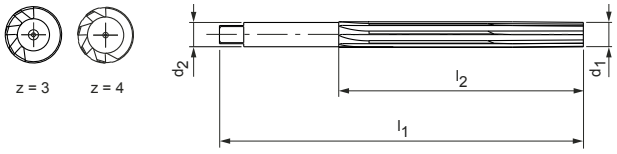
FAL-Handreamer-Paris | HSS design, FAR200

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	l_1	l_2			
24,50	0,965	22	250	150	4	FAR200Ø24.5H7PA-SU344	30582063
25,00	0,984	25	250	150	4	FAR200Ø25H7PA-SU344	30582064
25,40	1"	25	250	150	4	FAR200Ø25.4H7PA-SU344	30582065

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FAL-Handreamer-Paris

Solid carbide design
FAR200



Design:

Reamer diameter:	2.00-25.40 mm
Shank form:	DIN10 / 2009-12
Cutting material:	HU318
Number of blades:	3/4
Helix angle:	0°

Application:
Part made out of CFRP, aluminium, titanium and stainless steel.

P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
				■		■		■			■	■	■	■	■					■	■				

IT8 INCH

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	l_1	l_2			
2,00	0,079	2	65	35	3	FAR200Ø2H7PA-HU318	30582098
2,50	0,098	2,5	65	35	3	FAR200Ø2.5H7PA-HU318	30582099
3,00	0,118	3	85	50	3	FAR200Ø3H7PA-HU318	30582100
3,50	0,138	3,5	95	56	3	FAR200Ø3.5H7PA-HU318	30582101
3,70	0,146	3,5	95	56	3	FAR200Ø3.7H7PA-HU318	30582102
4,00	0,157	4	100	60	3	FAR200Ø4H7PA-HU318	30582103
4,10	0,161	4	100	60	3	FAR200Ø4.1H7PA-HU318	30582104
4,20	0,165	4	100	60	3	FAR200Ø4.2H7PA-HU318	30582105
4,40	0,173	4	100	60	3	FAR200Ø4.4H7PA-HU318	30582106
4,50	0,177	4,5	106	63	3	FAR200Ø4.5H7PA-HU318	30582107
4,60	0,181	4,5	106	63	3	FAR200Ø4.6H7PA-HU318	30582108
4,80	0,189	4,5	106	63	3	FAR200Ø4.8H7PA-HU318	30582109
5,00	0,197	5	112	67	3	FAR200Ø5H7PA-HU318	30582110
5,10	0,201	5	112	67	3	FAR200Ø5.1H7PA-HU318	30582111
5,20	0,205	5	112	67	3	FAR200Ø5.2H7PA-HU318	30582112
5,30	0,209	5	112	67	3	FAR200Ø5.3H7PA-HU318	30582113
5,40	0,213	5	112	67	3	FAR200Ø5.4H7PA-HU318	30582114
5,50	0,217	5,5	118	71	3	FAR200Ø5.5H7PA-HU318	30582115
5,60	0,220	5,5	118	71	3	FAR200Ø5.6H7PA-HU318	30582116
5,80	0,228	5,5	118	71	3	FAR200Ø5.8H7PA-HU318	30582117
5,90	0,232	5,5	118	71	3	FAR200Ø5.9H7PA-HU318	30582118
6,00	0,236	6	118	71	3	FAR200Ø6H7PA-HU318	30582119
6,10	0,240	6	118	71	3	FAR200Ø6.1H7PA-HU318	30582120
6,20	0,244	6	118	71	3	FAR200Ø6.2H7PA-HU318	30582121
6,30	0,248	6	118	71	3	FAR200Ø6.3H7PA-HU318	30582122
6,35	1/4"	6	125	75	3	FAR200Ø6.35H7PA-HU318	30582123
6,40	0,252	6	125	75	3	FAR200Ø6.4H7PA-HU318	30582124
6,50	0,256	6	125	75	3	FAR200Ø6.5H7PA-HU318	30582125
6,60	0,260	6	125	75	3	FAR200Ø6.6H7PA-HU318	30582126
6,70	0,264	6	125	75	3	FAR200Ø6.7H7PA-HU318	30582127
6,80	0,268	6	125	75	3	FAR200Ø6.8H7PA-HU318	30582128
7,00	0,276	7	132	80	3	FAR200Ø7H7PA-HU318	30582129
7,20	0,283	7	132	80	3	FAR200Ø7.2H7PA-HU318	30582130
7,40	0,291	7	132	80	3	FAR200Ø7.4H7PA-HU318	30582131
7,50	0,295	7	132	80	3	FAR200Ø7.5H7PA-HU318	30582132

Continued on next page

FAL-Handreamer-Paris | Solid carbide design, FAR200

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	l_1	l_2			
7,60	0,299	7	132	80	3	FAR200Ø7.6H7PA-HU318	30582133
7,70	0,303	7	132	80	3	FAR200Ø7.7H7PA-HU318	30582134
7,80	0,307	7	132	80	3	FAR200Ø7.8H7PA-HU318	30582135
8,00	0,315	8	140	85	3	FAR200Ø8H7PA-HU318	30582136
8,20	0,323	8	140	85	3	FAR200Ø8.2H7PA-HU318	30582137
8,40	0,331	8	140	85	3	FAR200Ø8.4H7PA-HU318	30582138
8,50	0,335	8	140	85	3	FAR200Ø8.5H7PA-HU318	30582139
8,60	0,339	8	140	85	3	FAR200Ø8.6H7PA-HU318	30582140
8,80	0,346	8	140	85	3	FAR200Ø8.8H7PA-HU318	30582141
9,00	0,354	9	150	90	3	FAR200Ø9H7PA-HU318	30582142
9,20	0,362	9	150	90	3	FAR200Ø9.2H7PA-HU318	30582143
9,40	0,37	9	150	90	3	FAR200Ø9.4H7PA-HU318	30582144
9,50	0,374	9	150	90	3	FAR200Ø9.5H7PA-HU318	30582145
9,52	0,375	9	160	95	3	FAR200Ø9.52H7PA-HU318	30582146
9,60	0,378	9	160	95	3	FAR200Ø9.6H7PA-HU318	30582147
9,80	0,386	9	160	95	3	FAR200Ø9.8H7PA-HU318	30582148
10,00	0,394	10	160	95	3	FAR200Ø10H7PA-HU318	30582149
10,20	0,402	10	160	95	3	FAR200Ø10.2H7PA-HU318	30582150
10,40	0,409	10	160	95	3	FAR200Ø10.4H7PA-HU318	30582151
10,50	0,413	10	160	95	3	FAR200Ø10.5H7PA-HU318	30582152
10,60	0,417	10	160	95	3	FAR200Ø10.6H7PA-HU318	30582153
10,80	0,425	10	160	95	3	FAR200Ø10.8H7PA-HU318	30582154
11,00	0,433	11	170	100	3	FAR200Ø11H7PA-HU318	30582155
11,20	0,441	11	170	100	3	FAR200Ø11.2H7PA-HU318	30582156
11,30	0,445	11	170	100	3	FAR200Ø11.3H7PA-HU318	30582157
11,40	0,449	11	170	100	3	FAR200Ø11.4H7PA-HU318	30582158
11,50	0,453	11	170	100	3	FAR200Ø11.5H7PA-HU318	30582159
11,60	0,457	11	170	100	3	FAR200Ø11.6H7PA-HU318	30582160
11,80	0,465	11	170	100	3	FAR200Ø11.8H7PA-HU318	30582161
12,00	0,472	12	180	106	3	FAR200Ø12H7PA-HU318	30582162
12,10	0,476	12	180	106	3	FAR200Ø12.1H7PA-HU318	30582163
12,20	0,480	12	180	106	3	FAR200Ø12.2H7PA-HU318	30582164
12,50	0,492	12	180	106	3	FAR200Ø12.5H7PA-HU318	30582165
12,70	1/2"	12	180	106	3	FAR200Ø12.7H7PA-HU318	30582166
13,00	0,512	12	180	106	3	FAR200Ø13H7PA-HU318	30582167
13,50	0,531	12	180	106	3	FAR200Ø13.5H7PA-HU318	30582168
14,00	0,551	14	190	112	3	FAR200Ø14H7PA-HU318	30582169
14,50	0,571	14	190	112	4	FAR200Ø14.5H7PA-HU318	30582170
15,00	0,591	14	190	112	4	FAR200Ø15H7PA-HU318	30582171
15,50	0,610	14	190	112	4	FAR200Ø15.5H7PA-HU318	30582172
16,00	0,630	16	200	118	4	FAR200Ø16H7PA-HU318	30582173
16,50	0,650	16	200	118	4	FAR200Ø16.5H7PA-HU318	30582174
17,00	0,669	16	200	118	4	FAR200Ø17H7PA-HU318	30582175
17,50	0,689	16	200	118	4	FAR200Ø17.5H7PA-HU318	30582176
18,00	0,709	18	212	125	4	FAR200Ø18H7PA-HU318	30582177
18,50	0,728	18	212	125	4	FAR200Ø18.5H7PA-HU318	30582178
19,00	0,748	18	212	125	4	FAR200Ø19H7PA-HU318	30582179
19,50	0,768	18	212	125	4	FAR200Ø19.5H7PA-HU318	30582180
20,00	0,787	20	224	132	4	FAR200Ø20H7PA-HU318	30582181
20,50	0,807	20	224	132	4	FAR200Ø20.5H7PA-HU318	30582182
21,00	0,827	20	224	132	4	FAR200Ø21H7PA-HU318	30582183
21,50	0,846	20	224	132	4	FAR200Ø21.5H7PA-HU318	30582184
22,00	0,866	22	236	140	4	FAR200Ø22H7PA-HU318	30582185
22,50	0,886	22	236	140	4	FAR200Ø22.5H7PA-HU318	30582186
23,00	0,906	22	236	140	4	FAR200Ø23H7PA-HU318	30582187
23,50	0,925	22	236	140	4	FAR200Ø23.5H7PA-HU318	30582188
24,00	0,945	22	250	150	4	FAR200Ø24H7PA-HU318	30582189

FAL-Handreamer-Paris | Solid carbide design, FAR200

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	l_1	l_2			
24,50	0,965	22	250	150	4	FAR200Ø24.5H7PA-HU318	30582190
25,00	0,984	25	250	150	4	FAR200Ø25H7PA-HU318	30582191
25,40	1"	25	250	150	4	FAR200Ø25.4H7PA-HU318	30582192

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FOAM CUT

ADD engineering

COUNTERSINKING

Spot facing / countersinking - 180°

Countersinking - 100°

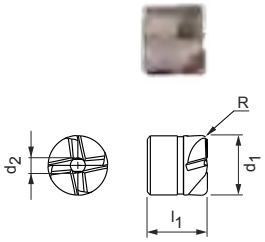
Deburring / countersinking - 90°

FAL-Countersink-180°-Reverse

HSS design
FAC10

Design:
Outside diameter: 10.00-54.00 mm
Cutting material: SU344
Number of blades: 4/5/6
Helix angle: 15°

Application:
Multilayer composites made out of aluminium and steel.



P 1 2 3 4 M 1 N 1 C 1.1 1.2 1.3 5.1 5.2 5.3 5.4 5.5 5.6 S 1 2 3 4 5

± 0,05 INCH

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	l_1	R			
10,00		2,5	10	1	4	FAC100-1000-4-180PR-SU344	30582255
10,00		2,5	10	2	4	FAC100-1000-4-180PR-SU344	30582257
12,00		2,5	10	1	4	FAC100-1200-4-180PR-SU344	30582259
12,00		2,5	10	2	4	FAC100-1200-4-180PR-SU344	30582262
12,70	1/2"	2,5	10	1	4	FAC100-1270-4-180PR-SU344	30606767
12,70	1/2"	2,5	10	2	4	FAC100-1270-4-180PR-SU344	30606770
14,00		2,5	10	1	4	FAC100-1400-4-180PR-SU344	30582265
14,00		2,5	10	2	4	FAC100-1400-4-180PR-SU344	30582269
15,00		2,5	10	2	4	FAC100-1500-4-180PR-SU344	30582273
15,875	5/8"	2,5	10	1	4	FAC100-15875-4-180PR-SU344	30606773
15,875	5/8"	2,5	10	2	4	FAC100-15875-4-180PR-SU344	30606776
16,00		2,5	10	0	4	FAC100-1600-4-180PR-SU344	30582277
16,00		2,5	10	1	4	FAC100-1600-4-180PR-SU344	30582281
16,00		2,5	10	2	4	FAC100-1600-4-180PR-SU344	30582285
10,00		3	10	1	4	FAC100-1000-4-180PR-SU344	30582256
10,00		3	10	2	4	FAC100-1000-4-180PR-SU344	30582258
12,00		3	10	1	4	FAC100-1200-4-180PR-SU344	30582260
12,00		3	10	2	4	FAC100-1200-4-180PR-SU344	30582263
12,70	1/2"	3	10	1	4	FAC100-1270-4-180PR-SU344	30606768
12,70	1/2"	3	10	2	4	FAC100-1270-4-180PR-SU344	30606771
14,00		3	10	1	4	FAC100-1400-4-180PR-SU344	30582266
14,00		3	10	2	4	FAC100-1400-4-180PR-SU344	30582270
15,00		3	10	2	4	FAC100-1500-4-180PR-SU344	30582274
15,875	5/8"	3	10	1	4	FAC100-15875-4-180PR-SU344	30606774
15,875	5/8"	3	10	2	4	FAC100-15875-4-180PR-SU344	30606777
16,00		3	10	0	4	FAC100-1600-4-180PR-SU344	30582278
16,00		3	10	1	4	FAC100-1600-4-180PR-SU344	30582282
16,00		3	10	2	4	FAC100-1600-4-180PR-SU344	30582286
17,00		3	10	0	4	FAC100-1700-4-180PR-SU344	30582289
17,00		3	10	2	4	FAC100-1700-4-180PR-SU344	30582293
18,00		3	10	1	4	FAC100-1800-4-180PR-SU344	30582297
18,00		3	10	2	4	FAC100-1800-4-180PR-SU344	30582301
15,00		4	16	2	4	FAC100-1500-4-180PR-SU344	30582275
15,875	5/8"	4	16	1	4	FAC100-15875-4-180PR-SU344	30606775
15,875	5/8"	4	16	2	4	FAC100-15875-4-180PR-SU344	30606778

FAL-Countersink-180°-Reverse | HSS design, FAC10

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	l_1	R			
16,00		4	16	0	4	FAC100-1600-4-180PR-SU344	30582279
16,00		4	16	1	4	FAC100-1600-4-180PR-SU344	30582283
16,00		4	16	2	4	FAC100-1600-4-180PR-SU344	30582287
17,00		4	16	0	4	FAC100-1700-4-180PR-SU344	30582290
17,00		4	16	2	4	FAC100-1700-4-180PR-SU344	30582294
18,00		4	16	1	4	FAC100-1800-4-180PR-SU344	30582298
18,00		4	16	2	4	FAC100-1800-4-180PR-SU344	30582302
19,00		4	16	2	4	FAC100-1900-4-180PR-SU344	30582305
19,05	3/4"	4	16	1	4	FAC100-1905-4-180PR-SU344	30606782
19,05	3/4"	4	16	2	4	FAC100-1905-4-180PR-SU344	30606779
20,00		4	16	1	4	FAC100-2000-4-180PR-SU344	30582308
20,00		4	16	2	4	FAC100-2000-4-180PR-SU344	30582311
14,00		5	18	1	4	FAC100-1400-4-180PR-SU344	30582268
14,00		5	18	2	4	FAC100-1400-4-180PR-SU344	30582272
15,00		5	18	2	4	FAC100-1500-4-180PR-SU344	30582276
16,00		5	18	0	4	FAC100-1600-4-180PR-SU344	30582280
16,00		5	18	1	4	FAC100-1600-4-180PR-SU344	30582284
16,00		5	18	2	4	FAC100-1600-4-180PR-SU344	30582288
17,00		5	18	0	4	FAC100-1700-4-180PR-SU344	30582291
17,00		5	18	2	4	FAC100-1700-4-180PR-SU344	30582295
18,00		5	18	1	4	FAC100-1800-4-180PR-SU344	30582299
18,00		5	18	2	4	FAC100-1800-4-180PR-SU344	30582303
19,00		5	18	2	4	FAC100-1900-4-180PR-SU344	30582306
19,05	3/4"	5	18	1	4	FAC100-1905-4-180PR-SU344	30606783
19,05	3/4"	5	18	2	4	FAC100-1905-4-180PR-SU344	30606780
20,00		5	18	1	4	FAC100-2000-4-180PR-SU344	30582309
20,00		5	18	2	4	FAC100-2000-4-180PR-SU344	30582312
22,00		5	18	2	4	FAC100-2200-4-180PR-SU344	30582314
24,00		5	18	1	4	FAC100-2400-4-180PR-SU344	30582316
24,00		5	18	2	4	FAC100-2400-4-180PR-SU344	30582319
25,4	1"	5	18	1	4	FAC100-2540-4-180PR-SU344	30606785
27,00		5	18	2	4	FAC100-2700-4-180PR-SU344	30582322
17,00		6	20	0	4	FAC100-1700-4-180PR-SU344	30582292
17,00		6	20	2	4	FAC100-1700-4-180PR-SU344	30582296
18,00		6	20	1	4	FAC100-1800-4-180PR-SU344	30582300
18,00		6	20	2	4	FAC100-1800-4-180PR-SU344	30582304
19,00		6	20	2	4	FAC100-1900-4-180PR-SU344	30582307
19,05	3/4"	6	20	1	4	FAC100-1905-4-180PR-SU344	30606784
19,05	3/4"	6	20	2	4	FAC100-1905-4-180PR-SU344	30606781
20,00		6	20	1	4	FAC100-2000-4-180PR-SU344	30582310
20,00		6	20	2	4	FAC100-2000-4-180PR-SU344	30582313
22,00		6	20	2	4	FAC100-2200-4-180PR-SU344	30582315
24,00		6	20	1	4	FAC100-2400-4-180PR-SU344	30582317
24,00		6	20	2	4	FAC100-2400-4-180PR-SU344	30582320
25,40	1"	6	20	1	4	FAC100-2540-4-180PR-SU344	30606786
27,00		6	20	2	4	FAC100-2700-4-180PR-SU344	30582323
29,00		6	20	2	4	FAC100-2900-4-180PR-SU344	30582325
31,00		6	20	2	4	FAC100-3100-4-180PR-SU344	30582327
33,00		6	20	2	4	FAC100-3300-4-180PR-SU344	30582330
35,00		6	20	2	5	FAC100-3500-5-180PR-SU344	30582333
36,00		6	20	2	5	FAC100-3600-5-180PR-SU344	30582336
38,00		6	20	2	5	FAC100-3800-5-180PR-SU344	30582339
40,00		6	20	2	5	FAC100-4000-5-180PR-SU344	30582342
42,00		6	20	2	5	FAC100-4200-5-180PR-SU344	30582345
46,00		6	20	2	5	FAC100-4600-5-180PR-SU344	30582348
47,00		6	20	2	6	FAC100-4700-6-180PR-SU344	30582351
52,00		6	20	2	6	FAC100-5200-6-180PR-SU344	30582354

Continued on next page

FAL-Countersink-180°-Reverse | HSS design, FAC10

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	l_1	R			
24,00		8	20	1	4	FAC100-2400-4-180PR-SU344	30582318
24,00		8	20	2	4	FAC100-2400-4-180PR-SU344	30582321
25,00	1"	8	20	2	4	FAC100-2500-4-180PR-SU344	30606787
27,00		8	20	2	4	FAC100-2700-4-180PR-SU344	30582324
29,00		8	20	2	4	FAC100-2900-4-180PR-SU344	30582326
31,00		8	20	2	4	FAC100-3100-4-180PR-SU344	30582328
33,00		8	20	2	4	FAC100-3300-4-180PR-SU344	30582331
35,00		8	20	2	5	FAC100-3500-5-180PR-SU344	30582334
36,00		8	20	2	5	FAC100-3600-5-180PR-SU344	30582337
38,00		8	20	2	5	FAC100-3800-5-180PR-SU344	30582340
40,00		8	20	2	5	FAC100-4000-5-180PR-SU344	30582343
42,00		8	20	2	5	FAC100-4200-5-180PR-SU344	30582346
46,00		8	20	2	5	FAC100-4600-5-180PR-SU344	30582349
47,00		8	20	2	6	FAC100-4700-6-180PR-SU344	30582352
52,00		8	20	2	6	FAC100-5200-6-180PR-SU344	30582355
54,00		8	20	2	6	FAC100-5400-6-180PR-SU344	30582357
31,00		12	20	2	4	FAC100-3100-4-180PR-SU344	30582329
33,00		12	20	2	4	FAC100-3300-4-180PR-SU344	30582332
35,00		12	20	2	5	FAC100-3500-5-180PR-SU344	30582335
36,00		12	20	2	5	FAC100-3600-5-180PR-SU344	30582338
38,00		12	20	2	5	FAC100-3800-5-180PR-SU344	30582341
40,00		12	20	2	5	FAC100-4000-5-180PR-SU344	30582344
42,00		12	20	2	5	FAC100-4200-5-180PR-SU344	30582347
46,00		12	20	2	5	FAC100-4600-5-180PR-SU344	30582350
47,00		12	20	2	6	FAC100-4700-6-180PR-SU344	30582353
52,00		12	20	2	6	FAC100-5200-6-180PR-SU344	30582356
54,00		12	20	2	6	FAC100-5400-6-180PR-SU344	30582358

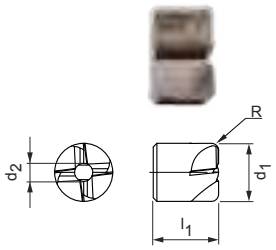
Accessories

	Drawbar (one-sided)	Page 202

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FAL-Countersink-180°-Reverse

Solid carbide design
FAC11



Design:

Outside diameter:	16.00-31.00 mm
Cutting material:	HU318
Number of blades:	4/5
Helix angle:	8°

Application:
Multilayer composites made out of titanium and stainless steel.

P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
				■		■												■		■	■				

± 0,05 INCH

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	l_1	R			
16,00		5	18	2	4	FAC110-1600-4-180PR-HU318	30606788
17,00		5	18	2	4	FAC110-1700-4-180PR-HU318	30606789
18,00		6	20	2	4	FAC110-1800-4-180PR-HU318	30606790
19,05	3/4"	6	20	2	4	FAC110-1905-4-180PR-HU318	30606791
20,00		6	20	2	4	FAC110-2000-4-180PR-HU318	30606792
25,40	1"	6	20	2	5	FAC110-2540-5-180PR-HU318	30606793
27,00		6	20	2	5	FAC110-2700-5-180PR-HU318	30606794
31,00		6	20	2	5	FAC110-3100-5-180PR-HU318	30606795

Accessories

	Drawbar (with thread)	Page 203

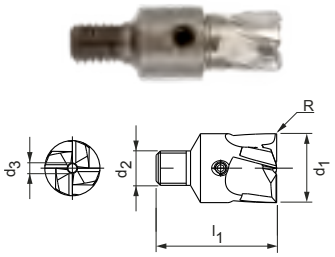
Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FAL-Spotfacer-180°-Plugin-Pilot

HSS design with bore on the face side for mounting various guide pins
FAC12

Design:
Outside diameter: 8.00-30.00 mm
Cutting material: SU344
Number of blades: 4
Helix angle: 15°

Application:
Multilayer composites made out of aluminium and steel.



P 1 2 3 4 M 1 N 1 C 1.1 1.2 1.3 5.1 5.2 5.3 5.4 5.5 5.6 S 1 2 3 4 5

± 0,05 INCH

Dimensions						z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	d_3	l_1	R			
8,00		6	3	28	1	4	FAC120-0800-4-180TS-SU344	30582359
10,00		6	3	28	1	4	FAC120-1000-4-180TS-SU344	30582360
12,00		8	3	28	1	4	FAC120-1200-4-180TS-SU344	30582361
12,70	1/2"	8	3	28	1	4	FAC120-1270-4-180TS-SU344	30605112
13,00		8	3	28	1	4	FAC120-1300-4-180TS-SU344	30582362
14,00		8	3	28	1	4	FAC120-1400-4-180TS-SU344	30582363
15,00		8	3	28	1	4	FAC120-1500-4-180TS-SU344	30582364
16,00		8	4	28	1	4	FAC120-1600-4-180TS-SU344	30582365
17,00		8	4	28	1	4	FAC120-1700-4-180TS-SU344	30582366
18,00		8	4	28	1	4	FAC120-1800-4-180TS-SU344	30582367
19,00		8	4	28	1	4	FAC120-1900-4-180TS-SU344	30582368
19,05	3/4"	8	4	28	1	4	FAC120-1905-4-180TS-SU344	30605115
20,00		8	4	28	2	4	FAC120-2000-4-180TS-SU344	30582369
21,00		8	4	28	2	4	FAC120-2100-4-180TS-SU344	30582370
22,00		8	4	28	2	4	FAC120-2200-4-180TS-SU344	30582371
23,00		10	4	42	2	4	FAC120-2300-4-180TS-SU344	30582372
24,00		10	4	42	2	4	FAC120-2400-4-180TS-SU344	30582373
26,00		10	4	42	2	4	FAC120-2600-4-180TS-SU344	30582374
27,00		10	4	42	2	4	FAC120-2700-4-180TS-SU344	30582375
28,00		10	4	42	2	4	FAC120-2800-4-180TS-SU344	30582376
20,00		8	5	28	2	4	FAC120-2000-4-180TS-SU344	30582377
21,00		8	5	28	2	4	FAC120-2100-4-180TS-SU344	30582378
22,00		8	5	28	2	4	FAC120-2200-4-180TS-SU344	30582379
23,00		10	5	42	2	4	FAC120-2300-4-180TS-SU344	30582380
24,00		10	5	42	2	4	FAC120-2400-4-180TS-SU344	30582381
26,00		10	5	42	2	4	FAC120-2600-4-180TS-SU344	30582382
27,00		10	5	42	2	4	FAC120-2700-4-180TS-SU344	30582383
28,00		10	5	42	2	4	FAC120-2800-4-180TS-SU344	30582384
29,00		10	5	42	2	4	FAC120-2900-4-180TS-SU344	30582385
30,00		10	5	42	2	4	FAC120-3000-4-180TS-SU344	30582386
22,00		8	6	28	2	4	FAC120-2200-4-180TS-SU344	30582387
23,00		10	6	42	2	4	FAC120-2300-4-180TS-SU344	30582388
24,00		10	6	42	2	4	FAC120-2400-4-180TS-SU344	30582389
26,00		10	6	42	2	4	FAC120-2600-4-180TS-SU344	30582390
27,00		10	6	42	2	4	FAC120-2700-4-180TS-SU344	30582391

FAL-Spotfacer-180°-Plugin-Pilot | HSS design, FAC12

Dimensions						z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	d_3	l_1	R			
28,00		10	6	42	2	4	FAC120-2800-4-180TS-SU344	30582392
29,00		10	6	42	2	4	FAC120-2900-4-180TS-SU344	30582393
30,00		10	6	42	2	4	FAC120-3000-4-180TS-SU344	30582394

Accessories

	Guide pins	Page 200

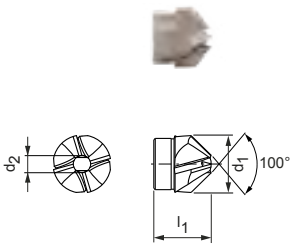
Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FAL-Countersink-100°-Reverse

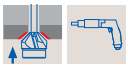
HSS design
FAC13

Design:
Outside diameter: 10.00-20.00 mm
Cutting material: SU344
Number of blades: 4
Taper angle: 100°

Application:
Multilayer composites made out of aluminium and steel.



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
	■							■									■							



Dimensions			z	Specification	Order number
d_1	d_2	l_1			
10,00	2,50	10	4	FAC130-1000-4-100PR-SU344	30606760
12,00	2,50	10	4	FAC130-1200-4-100PR-SU344	30606762
10,00	3,00	10	4	FAC130-1000-4-100PR-SU344	30606761
12,00	3,00	10	4	FAC130-1200-4-100PR-SU344	30606763
16,00	4,00	16	4	FAC130-1600-4-100PR-SU344	30606765
20,00	6,00	20	4	FAC130-2000-4-100PR-SU344	30606766

Accessories

	Drawbar (one-sided)	Page 202

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

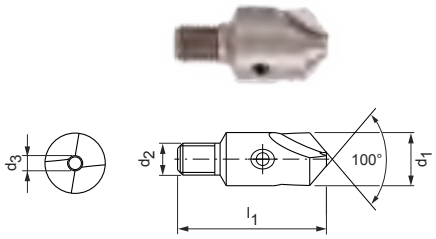
FAL-Countersink-100°-Plugin-Pilot

HSS design with bore on the face side for mounting various guide pins
FAC14

Design:

Outside diameter:	8.00-22.00 mm
Cutting material:	SU344
Number of blades:	2
Taper angle:	100°

Application:
Multilayer composites made out of aluminium and steel.



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
■							■										■							

INCH

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	d_3	l_1			
8,00		6	2	28	2	FAC140-0800-2-100TS-SU344	30606796
8,00		6	2,5	28	2	FAC140-0800-2-100TS-SU344	30606797
8,00		6	3	28	2	FAC140-0800-2-100TS-SU344	30606798
10,00		6	2	28	2	FAC140-1000-2-100TS-SU344	30606799
10,00		6	2,5	28	2	FAC140-1000-2-100TS-SU344	30606800
10,00		6	3	28	2	FAC140-1000-2-100TS-SU344	30606801
12,00		8	3	28	2	FAC140-1200-2-100TS-SU344	30606802
12,00		8	4	28	2	FAC140-1200-2-100TS-SU344	30606803
12,70	1/2"	8	3	28	2	FAC140-1270-2-100TS-SU344	30606804
12,70	1/2"	8	4	28	2	FAC140-1270-2-100TS-SU344	30606805
14,00		8	3	28	2	FAC140-1400-2-100TS-SU344	30606806
14,00		8	4	28	2	FAC140-1400-2-100TS-SU344	30606807
14,00		8	5	28	2	FAC140-1400-2-100TS-SU344	30606808
17,00		8	4	28	2	FAC140-1700-2-100TS-SU344	30606809
17,00		8	5	28	2	FAC140-1700-2-100TS-SU344	30606810
21,00		8	4	28	2	FAC140-2100-2-100TS-SU344	30606811
21,00		8	5	28	2	FAC140-2100-2-100TS-SU344	30606812
22,00		10	5	42	2	FAC140-2200-2-100TS-SU344	30606813

Accessories

	Guide pins	Page 200

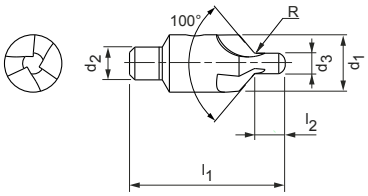
Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FAL-Countersink-100°-Pilot

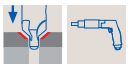
HSS design
FAC15

Design:
Outside diameter: 10.00-21.00 mm
Cutting material: SU344
Number of blades: 3
Taper angle: 100°

Application:
Multilayer composites made out of aluminium and steel.



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
	■							■									■							



Dimensions						z	Specification	Order number
d_1	d_2	d_3	l_1	l_2	R			
10,00	6	2,38	32,5	4,5	0,3	3	FAC150-1000-3-100TS-SU344	30582410
10,00	6	2,4	32,5	4,5	0,3	3	FAC150-1000-3-100TS-SU344	30582411
10,00	6	3,17	33,5	5,5	0,3	3	FAC150-1000-3-100TS-SU344	30582412
10,00	6	3,5	33,5	5,5	0,3	3	FAC150-1000-3-100TS-SU344	30582413
10,00	6	3,6	33,5	5,5	0,3	3	FAC150-1000-3-100TS-SU344	30582414
10,00	6	3,7	33,5	5,5	0,3	3	FAC150-1000-3-100TS-SU344	30582415
10,00	6	4	33,5	5,5	0,3	3	FAC150-1000-3-100TS-SU344	30582416
10,00	6	4,15	33,5	5,5	0,3	3	FAC150-1000-3-100TS-SU344	30582417
10,00	6	4,8	34,5	6,5	0,6	3	FAC150-1000-3-100TS-SU344	30582418
10,00	6	4,83	34,5	6,5	0,6	3	FAC150-1000-3-100TS-SU344	30582419
14,00	8	4,8	37	6,5	0,6	3	FAC150-1400-3-100TS-SU344	30582420
14,00	8	4,83	37	6,5	0,6	3	FAC150-1400-3-100TS-SU344	30582421
14,00	8	5,6	38	7,5	0,6	3	FAC150-1400-3-100TS-SU344	30582422
14,00	8	6,35	38	7,5	0,6	3	FAC150-1400-3-100TS-SU344	30582423
17,00	8	7,9	38,5	8	1	3	FAC150-1700-3-100TS-SU344	30582424
17,00	8	8	38,5	8	1	3	FAC150-1700-3-100TS-SU344	30582425
21,00	8	9,52	38,5	8	1	3	FAC150-2100-3-100TS-SU344	30582426

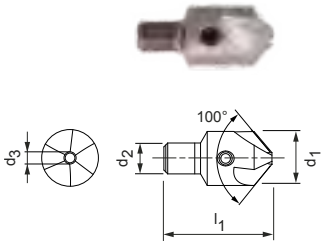
Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FAL-Countersink-100°-Plugin-Pilot

HSS design with bore on the face side for mounting various guide pins
FAC16

Design:
Outside diameter: 8.00-22.00 mm
Cutting material: SU344
Number of blades: 3
Taper angle: 100°

Application:
Multilayer composites made out of aluminium and steel.



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
■							■										■							

INCH

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	d_3	l_1			
8,00		6	2	28	3	FAC160-0800-3-100TS-SU344	30582461
8,00		6	2,5	28	3	FAC160-0800-3-100TS-SU344	30582462
8,00		6	3	28	3	FAC160-0800-3-100TS-SU344	30582463
10,00		6	2	28	3	FAC160-1000-3-100TS-SU344	30582464
10,00		6	2,5	28	3	FAC160-1000-3-100TS-SU344	30582465
10,00		6	3	28	3	FAC160-1000-3-100TS-SU344	30582466
12,00		8	3	28	3	FAC160-1200-3-100TS-SU344	30582467
12,00		8	4	28	3	FAC160-1200-3-100TS-SU344	30582468
12,70	1/2"	8	3	28	3	FAC160-1270-3-100TS-SU344	30582469
12,70	1/2"	8	4	28	3	FAC160-1270-3-100TS-SU344	30582470
14,00		8	3	28	3	FAC160-1400-3-100TS-SU344	30582471
14,00		8	4	28	3	FAC160-1400-3-100TS-SU344	30582472
14,00		8	5	28	3	FAC160-1400-3-100TS-SU344	30582473
17,00		8	4	28	3	FAC160-1700-3-100TS-SU344	30582474
17,00		8	5	28	3	FAC160-1700-3-100TS-SU344	30582475
21,00		8	4	28	3	FAC160-2100-3-100TS-SU344	30582476
21,00		8	5	28	3	FAC160-2100-3-100TS-SU344	30582477
22,00		10	5	42	3	FAC160-2200-3-100TS-SU344	30582478

Accessories

	Guide pins	Page 200

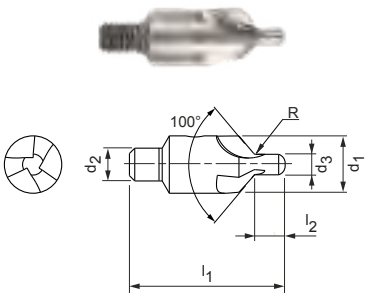
Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FAL-Countersink-100°-Pilot

Solid carbide design
FAC17

Design:
Outside diameter: 10.00-21.00 mm
Cutting material: HU318
Number of blades: 3
Taper angle: 100°

Application:
Multilayer composites made out of CFRP, aluminium, titanium and stainless steel.



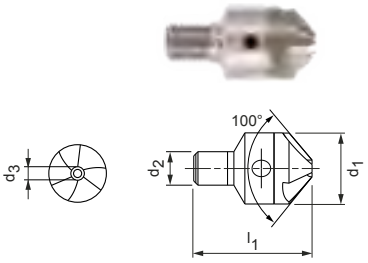
P	1	2	3	4	M	1	N	1	K	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
				■		■		■			■	■	■	■	■					■	■			■	

Dimensions						z	Specification	Order number
d_1	d_2	d_3	l_1	l_2	R			
10,00	6	2,38	32,5	4,5	0,3	3	FAC170-1000-3-100TS-HU318	30582427
10,00	6	2,4	32,5	4,5	0,3	3	FAC170-1000-3-100TS-HU318	30582428
10,00	6	3,17	33,5	5,5	0,3	3	FAC170-1000-3-100TS-HU318	30582429
10,00	6	3,5	33,5	5,5	0,3	3	FAC170-1000-3-100TS-HU318	30582430
10,00	6	3,6	33,5	5,5	0,3	3	FAC170-1000-3-100TS-HU318	30582431
10,00	6	3,7	33,5	5,5	0,3	3	FAC170-1000-3-100TS-HU318	30582432
10,00	6	4	33,5	5,5	0,3	3	FAC170-1000-3-100TS-HU318	30582433
10,00	6	4,15	33,5	5,5	0,3	3	FAC170-1000-3-100TS-HU318	30582434
14,00	6	4,8	34,5	6,5	0,6	3	FAC170-1400-3-100TS-HU318	30582435
14,00	6	4,83	34,5	6,5	0,6	3	FAC170-1400-3-100TS-HU318	30582436
14,00	8	4,8	37	6,5	0,6	3	FAC170-1400-3-100TS-HU318	30582437
14,00	8	4,83	37	6,5	0,6	3	FAC170-1400-3-100TS-HU318	30582438
14,00	8	5,6	38	7,5	0,6	3	FAC170-1400-3-100TS-HU318	30582439
14,00	8	6,35	38	7,5	0,6	3	FAC170-1400-3-100TS-HU318	30582440
17,00	8	7,9	38,5	8	1	3	FAC170-1700-3-100TS-HU318	30582441
17,00	8	8	38,5	8	1	3	FAC170-1700-3-100TS-HU318	30582442
21,00	8	9,52	40	8	1	3	FAC170-2100-3-100TS-HU318	30582443

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FAL-Countersink-100°-Plugin-Pilot

Solid carbide design with bore on the face side for mounting various guide pins various guide pins.
FAC18



Design:

Outside diameter:	10.00-22.00 mm
Cutting material:	HU318
Number of blades:	3
Taper angle:	100°

Application:
Multilayer composites made out of CFRP, aluminium, titanium and stainless steel.

P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
				■		■					■	■	■	■	■					■	■		■	

INCH

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	d_3	l_1			
10,00		6	2,5	28	3	FAC180-1000-3-100TS-HU318	30582483
10,00		6	3	28	3	FAC180-1000-3-100TS-HU318	30582484
10,00		8	4	28	3	FAC180-1000-3-100TS-HU318	30582486
12,70	1/2"	8	4	28	3	FAC180-1270-3-100TS-HU318	30582488
14,00		8	4	28	3	FAC180-1400-3-100TS-HU318	30582490
14,00		8	5	28	3	FAC180-1400-3-100TS-HU318	30582491
17,00		8	4	28	3	FAC180-1700-3-100TS-HU318	30582492
17,00		8	5	28	3	FAC180-1700-3-100TS-HU318	30582493
21,00		8	4	28	3	FAC180-2100-3-100TS-HU318	30582494
21,00		8	5	28	3	FAC180-2100-3-100TS-HU318	30582495
22,00		10	5	42	3	FAC180-2200-3-100TS-HU318	30582496

Accessories

	Guide pins	Page 200

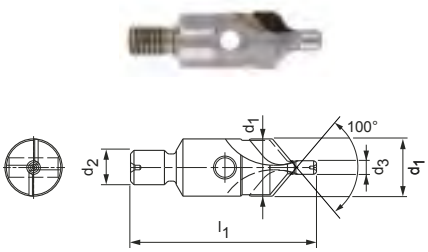
Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FAL-Countersink-100°-Pilot

Design with PCD blades
FAC19

Design:
Outside diameter: 10.00-21.00 mm
Cutting material: PU611
Number of blades: 2
Taper angle: 100°

Application:
Multi-layer composites made out of CFRP and aluminium.



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
								■			■	■	■		■									

Dimensions					z	Specification	Order number
d_1	d_2	d_3	l_1	R			
10,00	6	2,38	32,5	0,2 - 0,4	2	FAC190-1000-2-100TS-PU611	30582444
10,00	6	2,4	32,5	0,2 - 0,4	2	FAC190-1000-2-100TS-PU611	30582445
10,00	6	3,17	33,5	0,2 - 0,4	2	FAC190-1000-2-100TS-PU611	30582446
10,00	6	3,5	33,5	0,2 - 0,4	2	FAC190-1000-2-100TS-PU611	30582447
10,00	6	3,6	33,5	0,2 - 0,4	2	FAC190-1000-2-100TS-PU611	30582448
10,00	6	3,7	33,5	0,2 - 0,4	2	FAC190-1000-2-100TS-PU611	30582449
10,00	6	4	33,5	0,2 - 0,4	2	FAC190-1000-2-100TS-PU611	30582450
10,00	6	4,15	33,5	0,2 - 0,4	2	FAC190-1000-2-100TS-PU611	30582451
10,00	6	4,8	34,5	0,4 - 0,75	2	FAC190-1000-2-100TS-PU611	30582452
10,00	6	4,83	34,5	0,4 - 0,75	2	FAC190-1000-2-100TS-PU611	30582453
14,00	8	4,8	37	0,4 - 0,75	2	FAC190-1400-2-100TS-PU611	30582454
14,00	8	4,83	37	0,4 - 0,75	2	FAC190-1400-2-100TS-PU611	30582455
14,00	8	5,6	38	0,4 - 0,75	2	FAC190-1400-2-100TS-PU611	30582456
14,00	8	6,35	38	0,4 - 0,75	2	FAC190-1400-2-100TS-PU611	30582457
17,00	8	7,9	38,5	0,75 - 1,25	2	FAC190-1700-2-100TS-PU611	30582458
17,00	8	8	38,5	0,75 - 1,25	2	FAC190-1700-2-100TS-PU611	30582459
21,00	8	9,52	38,5	0,75 - 1,25	2	FAC190-2100-2-100TS-PU611	30582460

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

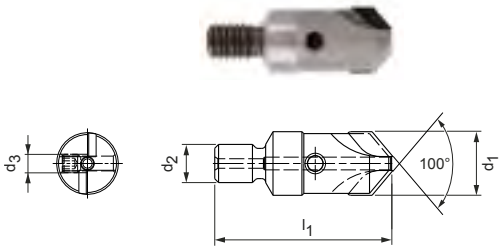
FAL-Countersink-100°-Plugin-Pilot

Design with PCD blades with bore on the face side for mounting various guide pins FAC20

Design:

Outside diameter:	10.00-22.00 mm
Cutting material:	PU611
Number of blades:	2
Taper angle:	100°

Application:
Multilayer composites made out of CFRP and aluminium.



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
								■			■	■	■		■									

INCH

Dimensions					z	Specification	Order number
d_1 [mm]	d_1 [inch]	d_2	d_3	l_1			
10,00		6	2	28	2	FAC200-1000-2-100TS-PU611	30582630
10,00		6	2,5	28	2	FAC200-1000-2-100TS-PU611	30582631
10,00		8	3	28	2	FAC200-1000-2-100TS-PU611	30582632
12,00		8	3	28	2	FAC200-1200-2-100TS-PU611	30582633
12,00		8	4	28	2	FAC200-1200-2-100TS-PU611	30582634
12,70	1/2"	8	3	28	2	FAC200-1270-2-100TS-PU611	30582635
12,70	1/2"	8	4	28	2	FAC200-1270-2-100TS-PU611	30582636
14,00		8	3	28	2	FAC200-1400-2-100TS-PU611	30582637
14,00		8	4	28	2	FAC200-1400-2-100TS-PU611	30582638
14,00		8	5	28	2	FAC200-1400-2-100TS-PU611	30582639
17,00		8	4	28	2	FAC200-1700-2-100TS-PU611	30582640
17,00		8	5	28	2	FAC200-1700-2-100TS-PU611	30582641
21,00		8	4	28	2	FAC200-2100-2-100TS-PU611	30582642
21,00		8	5	28	2	FAC200-2100-2-100TS-PU611	30582643
22,00		10	5	42	2	FAC200-2200-2-100TS-PU611	30582644

Accessories

	Guide pins	Page 200

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

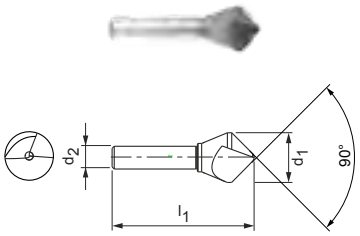
FAL-Countersink-90°

HSS design
FAC22

Design:

Outside diameter:	6.00-35.00 mm
Cutting material:	SU344
Number of blades:	1
Taper angle:	90°

Application:
Multilayer composites made out of aluminium and steel.



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
	■							■									■							

Dimensions				z	Specification	Order number
d_1	d_2	Diameter range	l_1			
6,00	5	1 - 6	40	1	FAC220-0600-1-090HA-SU344	30582645
10,00	6	2 - 10	45	1	FAC220-1000-1-090HA-SU344	30582646
12,00	8	2 - 12	50	1	FAC220-1200-1-090HA-SU344	30582647
15,00	8	3 - 15	55	1	FAC220-1500-1-090HA-SU344	30582648
20,00	10	3 - 20	64	1	FAC220-2000-1-090HA-SU344	30582649
25,00	12	4 - 25	71	1	FAC220-2500-1-090HA-SU344	30582650
30,00	12	4 - 30	75	1	FAC220-3000-1-090HA-SU344	30582651
35,00	16	5 - 35	100	1	FAC220-3500-1-090HA-SU344	30582652

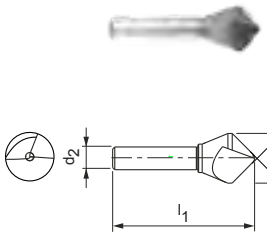
Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FAL-Countersink-90°

Solid carbide design
FAC23

Design:

Outside diameter:	6.00-35.00 mm
Cutting material:	HU318
Number of blades:	1
Taper angle:	90°



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
				■		■					■	■	■	■	■					■	■		■	

Dimensions				z	Specification	Order number
d_1	d_2	Diameter range	l_1			
6,00	5	1 - 6	40	1	FAC230-0600-1-090HA-HU318	30582653
10,00	6	2 - 10	45	1	FAC230-1000-1-090HA-HU318	30582654
12,00	8	2 - 12	50	1	FAC230-1200-1-090HA-HU318	30582655
15,00	8	3 - 15	55	1	FAC230-1500-1-090HA-HU318	30582656
20,00	10	3 - 20	64	1	FAC230-2000-1-090HA-HU318	30582657
25,00	12	4 - 25	71	1	FAC230-2500-1-090HA-HU318	30582658
30,00	12	4 - 30	75	1	FAC230-3000-1-090HA-HU318	30582659
35,00	16	5 - 35	100	1	FAC230-3500-1-090HA-HU318	30582660

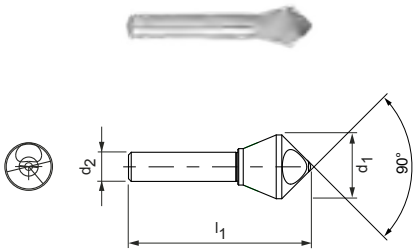
Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

FAL-Deburring-90°

HSS design
FAC21

Design:
Outside diameter: 10.00-35.00 mm
Cutting material: SU344
Number of blades: 1
Taper angle: 90°

Application:
Multilayer composites made out of aluminium and steel.



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
	■							■									■							

Dimensions				z	Specification	Order number
d_1	d_2	Diameter range	l_1			
10,00	6	4 - 9	45	1	FAC210-1000-1-090HA-SU344	30582677
15,00	8	6 - 14	55	1	FAC210-1500-1-090HA-SU344	30582678
20,00	10	8 - 18	64	1	FAC210-2000-1-090HA-SU344	30582679
25,00	12	10 - 23	67	1	FAC210-2500-1-090HA-SU344	30582680
30,00	12	12 - 28	78	1	FAC210-3000-1-090HA-SU344	30582681
35,00	16	14 - 33	100	1	FAC210-3500-1-090HA-SU344	30582682

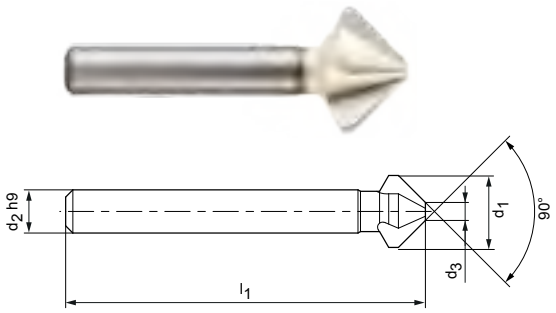
Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

Precision countersink cutter

Precision HSS design, extremely unequal spacing
COS11

Design:
Outside diameter: 4.30-31.00 mm
Cutting material: SP345
Number of blades: 3
Taper angle: 90°

Application:
Multilayer composites made out of aluminium and steel.



P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
	■							■									■							

Dimensions				z	Specification	Order number
d_1	d_2 h9	d_3	l_2			
4,30	4	1,3	40	3	COS110-0430-335C-SP345	30662991
6,00	5	1,5	45	3	COS110-0600-335C-SP345	30662992
6,30	5	1,5	45	3	COS110-0630-335C-SP345	30633783
8,00	6	2,0	50	3	COS110-0800-335C-SP345	30662993
8,30	6	2,0	50	3	COS110-0830-335C-SP345	30662994
10,00	6	2,5	50	3	COS110-1000-335C-SP345	30662996
10,40	6	2,5	50	3	COS110-1040-335C-SP345	30633784
11,50	8	2,8	56	3	COS110-1150-335C-SP345	30662997
12,40	8	2,8	56	3	COS110-1240-335C-SP345	30662998
15,00	10	3,2	60	3	COS110-1500-335C-SP345	30662999
16,50	10	3,2	60	3	COS110-1650-335C-SP345	30633786
19,00	10	3,5	63	3	COS110-1900-335C-SP345	30663000
20,50	10	3,5	63	3	COS110-2050-335C-SP345	30633787
23,00	10	3,8	67	3	COS110-2300-335C-SP345	30663001
25,00	10	3,8	67	3	COS110-2500-335C-SP345	30633788
31,00	12	4,2	71	3	COS110-3100-335C-SP345	30663003

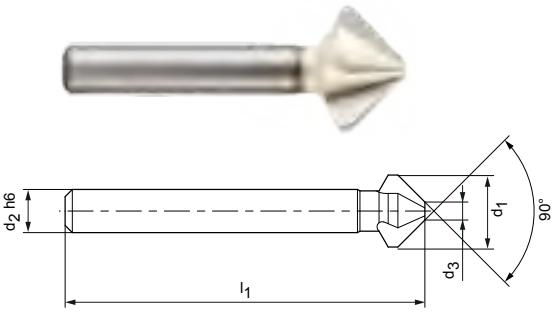
Countersink cutter set, HSS design

Set	Diameter	Order number
5-piece	6.30 / 10.40 / 16.50 / 20.50 / 25.00	30634356

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

Precision countersink cutter

Precision solid carbide design, extremely unequal spacing
COS11



Design:

Outside diameter:	6.30-31.00 mm
Cutting material:	HP437
Number of blades:	3
Taper angle:	90°

Application:
Multilayer composites made out of CFRP, aluminium, titanium and stainless steel.

P	1	2	3	4	M	1	N	1	C	1.1	1.2	1.3	5.1	5.2	5.3	5.4	5.5	5.6	S	1	2	3	4	5
■				■		■		■					■	■	■					■	■			■	

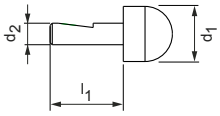
Dimensions				z	Specification	Order number
d_1	d_2 h6	d_3	l_2			
6,30	5	1,5	45	3	COS110-0630-335C-HP437	30799189
8,30	6	2,0	50	3	COS110-0830-335C-HP437	30799191
10,40	6	2,5	50	3	COS110-1040-335C-HP437	30799192
12,40	8	2,8	56	3	COS110-1240-335C-HP437	30799195
16,50	10	3,2	60	3	COS110-1650-335C-HP437	30799198
20,50	10	3,5	63	3	COS110-2050-335C-HP437	30799199
25,00	10	3,8	67	3	COS110-2500-335C-HP437	30799201
31,00	12	4,2	71	3	COS110-3100-335C-HP437	30799203

Dimensions in mm.
Cutting data recommendation from page 234.
Special designs and other coatings available on request.

ACCESSORIES AND SPARE PARTS

Accessories and spare parts

Guide spigots



FAL-Plugin Pilot

Dimensions				Order number
d_1 [mm]	d_1 [inch]	d_2	l_1	
2,00		2	17	30582689
2,38		2	17	30582690
2,50		2	17	30582691
3,00		2	17	30582693
3,10		2	17	30582696
3,17	1/8"	2	17	30582699
3,20		2	17	30582702
3,50		2	17	30582705
3,60		2	17	30582708
3,80		2	17	30582711
3,97		2	17	30582715
4,00		2	17	30582719
4,10		2	17	30582723
4,50		2	17	30582727
4,76	3/16"	2	17	30582731
4,80		2	17	30582735
4,83		2	17	30582739
5,00		2	17	30582743
2,50		2,5	17	30582692
3,00		2,5	17	30582694
3,10		2,5	17	30582697
3,17	1/8"	2,5	17	30582700
3,20		2,5	17	30582703
3,50		2,5	17	30582706
3,60		2,5	17	30582709
3,80		2,5	17	30582712
3,97		2,5	17	30582716
4,00		2,5	17	30582720
4,10		2,5	17	30582724
4,50		2,5	17	30582728
4,76	3/16"	2,5	17	30582732
4,80		2,5	17	30582736
4,83		2,5	17	30582740
5,00		2,5	17	30582744
5,20		2,5	17	30582748
5,50		2,5	17	30582752
5,80		2,5	17	30582755
6,00		2,5	17	30582759
6,35	1/4"	2,5	17	30582763

Dimensions				Order number
d_1 [mm]	d_1 [inch]	d_2	l_1	
6,50		2,5	17	30582767
3,00		3	17	30582695
3,10		3	17	30582698
3,17		3	17	30582701
3,20		3	17	30582704
3,50		3	17	30582707
3,60		3	17	30582710
3,80		3	17	30582713
3,97		3	17	30582717
4,00		3	17	30582721
4,10		3	17	30582725
4,50		3	17	30582729
4,76		3	17	30582733
4,80		3	17	30582737
4,83		3	17	30582741
5,00		3	17	30582745
5,20		3	17	30582749
5,50		3	17	30583045
5,80		3	17	30582756
6,00		3	17	30582760
6,35	1/4"	3	17	30582764
6,50		3	17	30582768
6,80		3	17	30582772
7,00		3	17	30582776
7,50		3	17	30582780
7,90		3	17	30582784
8,00		3	17	30582788
8,20		3	17	30582792
8,50		3	17	30582796
8,90		3	17	30582800
9,00		3	17	30582804
9,10		3	17	30582808
9,20		3	17	30582812
9,30		3	17	30582816
9,50		3	17	30582820
9,80		3	17	30582824
10,00		3	17	30582828
10,60		3	17	30582832
3,80		3,5	17	30582714

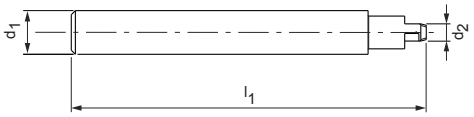
FAL-Plugin Pilot

Dimensions				Order number
d_1 [mm]	d_1 [inch]	d_2	l_1	
3,97		3,5	17	30582718
4,00		3,5	17	30582722
4,10		3,5	17	30582726
4,50		3,5	17	30582730
4,76		3,5	17	30582734
4,80		3,5	17	30582738
4,83		3,5	17	30582742
5,00		3,5	17	30582746
5,20		3,5	17	30582750
5,50		3,5	17	30582753
5,80		3,5	17	30582757
6,00		3,5	17	30582761
6,35	1/4"	3,5	17	30582765
6,50		3,5	17	30582769
6,80		3,5	17	30582773
7,00		3,5	17	30582777
7,50		3,5	17	30582781
7,90		3,5	17	30582785
8,00		3,5	17	30582789
8,20		3,5	17	30582793
8,50		3,5	17	30582797
8,90		3,5	17	30582801
9,00		3,5	17	30582805
9,10		3,5	17	30582809
9,20		3,5	17	30582813
9,30		3,5	17	30582817
9,50		3,5	17	30582821
9,80		3,5	17	30582825
10,00		3,5	17	30582829
10,60		3,5	17	30582833
10,80		3,5	17	30582836
11,00		3,5	17	30582839
5,00		4	17	30582747
5,20		4	17	30582751
5,50		4	17	30582754
5,80		4	17	30582758
6,00		4	17	30582762
6,35	1/4"	4	17	30582766
6,50		4	17	30582770
6,80		4	17	30582774
7,00		4	17	30582778
7,50		4	17	30582782
7,90		4	17	30582786
8,00		4	17	30582790
8,20		4	17	30582794
8,50		4	17	30582798
8,90		4	17	30582802
9,00		4	17	30582806
9,10		4	17	30582810
9,20		4	17	30582814
9,30		4	17	30582818
9,50		4	17	30582822
9,80		4	17	30582826

Dimensions				Order number
d_1 [mm]	d_1 [inch]	d_2	l_1	
10,00		4	17	30582830
10,60		4	17	30582834
10,80		4	17	30582837
11,00		4	17	30582840
11,10		4	17	30582842
11,20		4	17	30582844
6,50		5	17	30582771
6,80		5	17	30582775
7,00		5	17	30582779
7,50		5	17	30582783
7,90		5	17	30582787
8,00		5	17	30582791
8,20		5	17	30582795
8,50		5	17	30582799
8,90		5	17	30582803
9,00		5	17	30582807
9,10		5	17	30582811
9,20		5	17	30582815
9,30		5	17	30582819
9,50		5	17	30582823
9,80		5	17	30582827
10,00		5	17	30582831
10,60		5	17	30582835
10,80		5	17	30582838
11,00		5	17	30582841
11,10		5	17	30582843
11,20		5	17	30582845
11,70		5	17	30582846
12,00		5	17	30582847
12,30		5	17	30582848
12,60		5	17	30582849
12,70	1/2"	5	17	30582850
12,80		5	17	30582851

Dimensions in mm.

Drawbar



Drawbar | One-sided

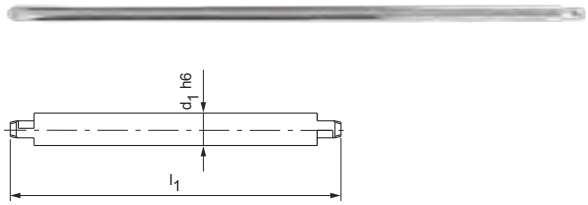
Dimensions				Order number
d_1 h6 [mm]	d_1 [inch]	d_2	l_1	
2,50		2,5	110	30582852
3,00		3	110	30582853
3,20		3	110	30582854
4,00		3	110	30582855
4,80		3	110	30582857
5,00		3	110	30582859
5,10		3	110	30582862
5,30		3	110	30582865
5,50		3	110	30582868
5,60		3	110	30582871
4,00		4	110	30582856
4,80		4	110	30582858
5,00		4	110	30582860
5,10		4	110	30582863
5,30		4	110	30582866
5,50		4	110	30582869
5,60		4	110	30582872
5,80		4	110	30582874
6,00		4	110	30582876
6,10		4	110	30582879
6,20		4	110	30582882
6,32		4	110	30582885
6,35	1/4"	4	110	30582888
6,50		4	110	30582891
6,70		4	110	30582894
7,10		4	110	30582897
7,50		4	110	30582900
7,70		4	110	30582903
7,80		4	110	30582906
5,00		5	110	30582861
5,10		5	110	30582864
5,30		5	110	30582867
5,50		5	110	30582870
5,60		5	110	30582873
5,80		5	110	30582875
6,00		5	110	30582877
6,10		5	110	30582880
6,20		5	110	30582883
6,32		5	110	30582886

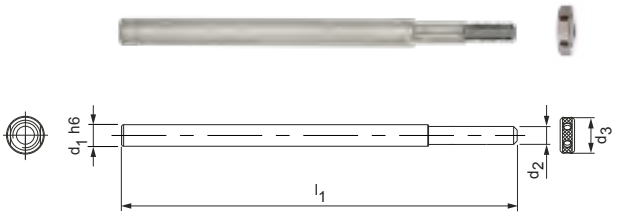
Dimensions				Order number
d_1 h6 [mm]	d_1 [inch]	d_2	l_1	
6,35	1/4"	5	110	30582889
6,50		5	110	30582892
6,70		5	110	30582895
7,10		5	110	30582898
7,50		5	110	30582901
7,70		5	110	30582904
7,80		5	110	30582907
7,90		5	110	30582909
8,00		5	110	30582911
8,10		5	110	30582913
6,00		6	110	30582878
6,10		6	110	30582881
6,20		6	110	30582884
6,32		6	110	30582887
6,35	1/4"	6	110	30582890
6,50		6	110	30582893
6,70		6	110	30582896
7,10		6	110	30582899
7,50		6	110	30582902
7,70		6	110	30582905
7,80		6	110	30582908
7,90		6	110	30582910
8,00		6	110	30582912
8,10		6	110	30582914
8,20		6	110	30582916
8,90		6	110	30582918
9,10		6	110	30582920
9,30		6	110	30582922
10,10		6	110	30582924
10,40		6	110	30582926
10,50		6	110	30582928
10,70		6	110	30582930
11,10		6	110	30582932
11,20		6	110	30582934
12,00		6	110	30582936
12,20		6	110	30582939
12,50		6	110	30582942
13,10		6	110	30582945
14,10		6	110	30582948

Drawbar | One-sided

Dimensions				Order number
d_1 h6 [mm]	d_1 [inch]	d_2	l_1	
8,10		8	110	30582915
8,20		8	110	30582917
8,90		8	110	30582919
9,10		8	110	30582921
9,30		8	110	30582923
10,10		8	110	30582925
10,40		8	110	30582927
10,50		8	110	30582929
10,70		8	110	30582931
11,10		8	110	30582933
11,20		8	110	30582935
12,00		8	110	30582937
12,20		8	110	30582940
12,50		8	110	30582943

Dimensions				Order number
d_1 h6 [mm]	d_1 [inch]	d_2	l_1	
13,10		8	130	30582946
14,10		8	130	30582949
14,20		8	130	30582951
15,00		8	130	30582953
12,00		12	110	30582938
12,20		12	110	30582941
12,50		12	110	30582944
13,10		12	130	30582947
14,10		12	130	30582950
14,20		12	130	30582952
15,00		12	130	30582954
15,50		12	130	30582955
15,60		12	130	30582956





Drawbar | Double-sided

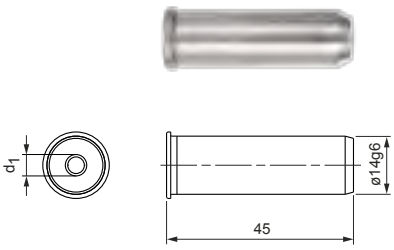
Dimensions			Order number
d_1 h6 [mm]	d_1 [inch]	l_1	
2,50	-	110	30582957
3,00	-	110	30582958
4,00	-	110	30582959
5,00	-	110	30582960
6,00	-	110	30582961
8,00	-	110	30582962
12,00	-	110	30582963

Drawbar | With thread

Dimensions				Order number
d_1 h6 [mm]	d_2	d_3	l_1	
6,00	5	16	110	30606826
8,00	6	18	110	30606827
10,00	6	24	110	30606828
12,00	6	26	110	30606829

Dimensions in mm.

Drill brush



Dimensions		Order number
d_1	Tolerance	
2,50	H7	30362987
3,30	H7	30362988
3,70	H7	30362989
4,00	U9	30362998
4,00	X7	30362999
4,13	H8	30491530
4,16	G9	30362991
4,16	H9	30362992
4,20	U8	30513844
4,20	X7	30524551
4,40	U8	30513847
4,50	H8	30491533
4,70	F7	30362993
4,78	H8	30491531
4,80	F7	30501057
4,80	E8	30362995
4,80	H8	30362996
5,00	G9	30363003
5,00	H6	30363004
5,00	H8	30363005
5,00	U8	30363002
5,00	U9	30363006
5,00	X7	30363007
5,06	G9	30501061
5,05	H9	30363000
5,20	U8	30459253

Dimensions		Order number
d_1	Tolerance	
5,40	U8	30459257
5,70	F7	30363001
6,00	G9	30363011
6,00	H8	30363012
6,00	U6	30363013
6,00	U8	30363010
6,00	U9	30363014
6,20	U8	30513855
6,35	F7	30520233
6,35	H8	30491529
6,40	U8	30363008
6,60	H9	30363009
7,50	X7	30511851
7,92	H9	30363015
7,94	F7	30520235
8,00	N6	30363016
8,00	P7	30501027
8,00	R6	30363017
8,00	S6	30363018
8,50	X7	30511829
8,60	N6	30513843
9,00	X7	30511838
9,50	X7	30511826
9,53	F7	30520236
10,00	X7	30511823

Dimensions in mm.

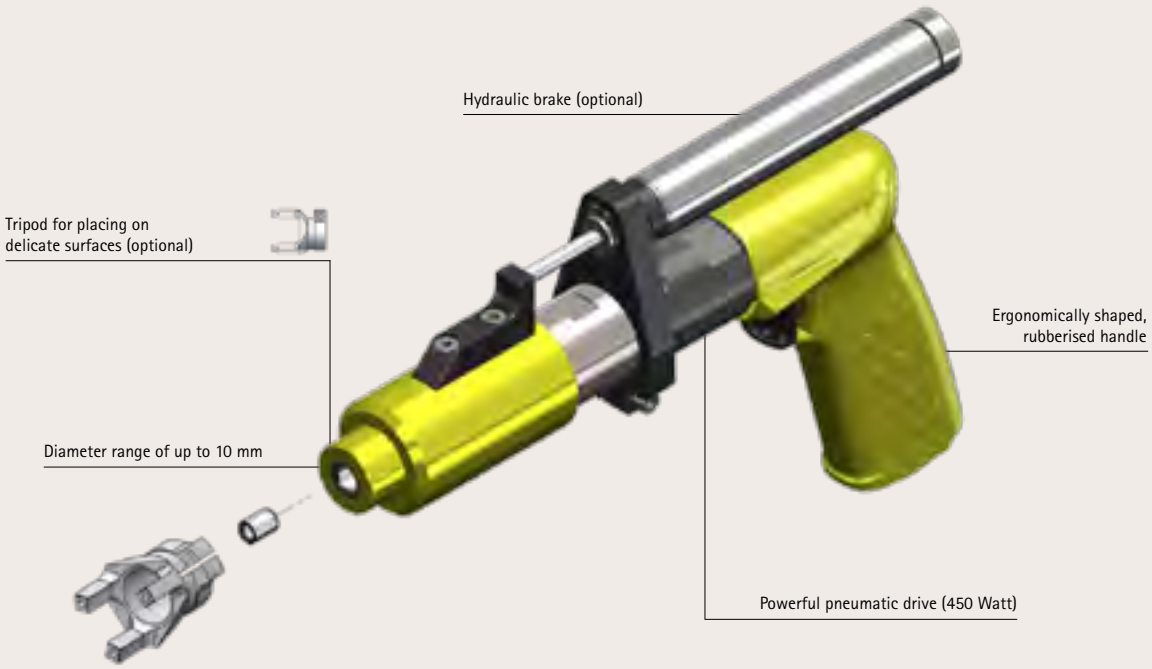

4141 0670 92

Hand drills

The hand drills have been specially designed for machining modern materials. Due to their low weight of approx. 1 kg and their ergonomically shaped, rubberised handles, hand drills have excellent handling properties. The machines are equipped with a collet chuck of up to ø 10 mm. The 450 Watt pneumatic drives are specially designed for machining CFRP, aluminium and titanium. To be able to achieve the best machining results, the drills are available with a variety of spindle speeds, depending on the material and the bore diameter.

Optionally these machines can be equipped with a hydraulic brake for a controlled feed, as well as a tripod for drilling bores perpendicular to the surface.

Overview of performance features



Hand drill

Pneumatically powered, without coolant supply

Manual feed

With integrated hydraulic brake for controlled feed

Manual feed

Selection guide	Spindle speed [1/min]	Output [Watt]	Air pressure [bar]	Air connection	Max. stroke [mm]	Tool length [mm]	Tool adapter	Order number
CFRP-titanium	500	450	6,3	1/4"	-	150	Collet	30379206
CFRP-alu und CFRP-CFRP	3.200	450	6,3	1/4"	-	150	Collet	30379205
CFRP-alu und CFRP-CFRP	5.200	450	6,3	1/4"	-	150	Collet	30379203

With integrated hydraulic brake for controlled feed

Selection guide	Spindle speed [1/min]	Output [Watt]	Air pressure [bar]	Air connection	Max. stroke [mm]	Tool length [mm]	Tool adapter	Order number
CFRP-titanium	500	450	6,3	1/4"	25	120	Collet	30372743
CFRP-alu und CFRP-CFRP	3.200	450	6,3	1/4"	25	120	Collet	30372746
CFRP-alu und CFRP-CFRP	5.200	450	6,3	1/4"	25	120	Collet	30372745

Accessories

Tripod stop holder

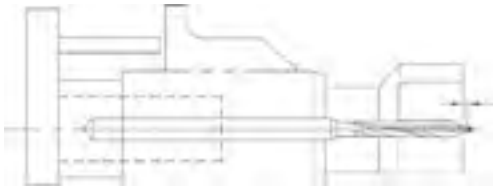
Stop holder / tripod location bore	Order number
ø 40	30372762

Collet

Collet ø [mm]	Order number
5	30372754
6	30372755
7	30372757
8	30372758
10	30372759

Installation instructions

For tools with an integrated hydraulic brake and tripod

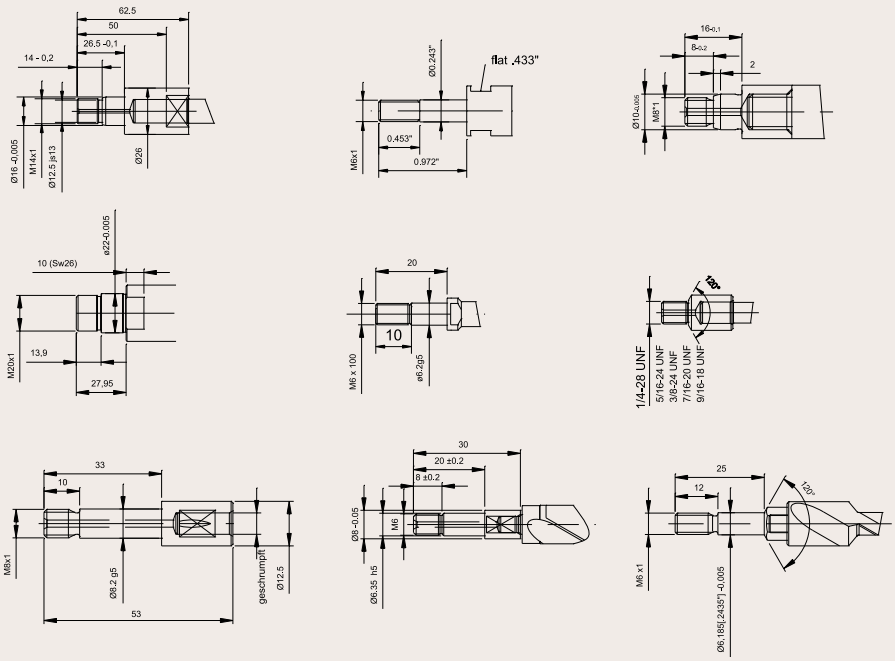


overhang of approx. 1.5 mm in relation to the positioning in the pre-drilled hole

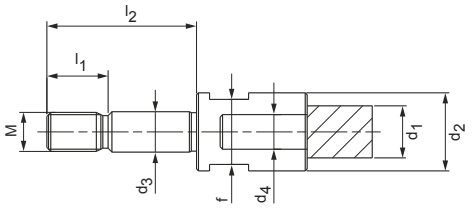
Thread adapters for drill feed units

The spindles on drill feed units are equipped with manufacturer-specific thread connections so that tools can be changed quickly and easily. The connection between the adapter and cutting tool is available either in a brazed or shrunk version. Both types of connections offer advantages, the brazed version requires significantly less space whereas the shrunk version can be re-used multiple times. ADD Engineering manufactures all tools with the specific thread adapters required.

Design samples

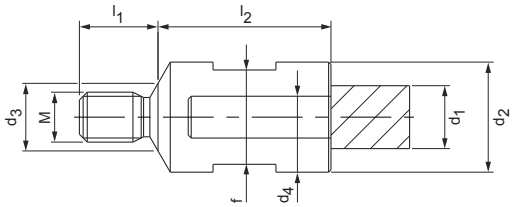


Thread adapter



Threaded shank (metric)

Dimensions								
d_1	d_4	M	d_2	d_3	l_1 (± 0.2 mm)	l_2 (± 0.2 mm)	f	Order number
4,20	4	M6 x 100	12	6,20	10	23	10	30589093
4,80	4	M6 x 100	12	6,20	10	23	10	30589093
5,60	5	M6 x 100	12	6,20	10	23	10	30589094
6,40	6	M6 x 100	12	6,20	10	23	10	30589095
7,90	7	M8 x 100	12	8,20	10	23	10	30556097
9,50	9	M8 x 100	12	8,20	10	23	10	30556098
11,10	10	M10 x 100	14	10,20	10	23	12	30589134
12,70	12	M10 x 100	16	10,20	10	23	14	30589135



Threaded shank UNF

Dimensions								
d_1	d_4	M	d_2	d_3	l_1	l_2	f	Order number
< 10	4	1/4 - 28 UNF	14,00	8,593	10	22	12	30589121
	5	1/4 - 28 UNF	14,00	8,593	10	22	12	30589122
	6	1/4 - 28 UNF	14,00	8,593	10	22	12	30589123
	7	1/4 - 28 UNF	14,00	8,593	10	22	12	30589124
	8	1/4 - 28 UNF	14,00	8,593	10	22	12	30589125
	9	1/4 - 28 UNF	14,00	8,593	10	22	13	30589126
	10	1/4 - 28 UNF	14,00	8,593	10	22	13	30589127
10 < D < 13,2	9	5/16 - 24 UNF	14,00	9,938	10	22	12	30564599
10 < D < 13,2	10	5/16 - 24 UNF	14,00	9,938	10	22	12	30564597
13,2 < D < 17	10	3/8 - 24 UNF	18,00	12,193	12	23	16	30589113
17 < D < 30	10	7/16 - 20 UNF	14,00	11,796	12	20	12	30564556

Dimensions in mm.

SOLUTIONS

Solutions for your part with high process reliability, based on the newest machining strategies and production methods.

SOLUTIONS FOR THE PRACTICE

Automotive

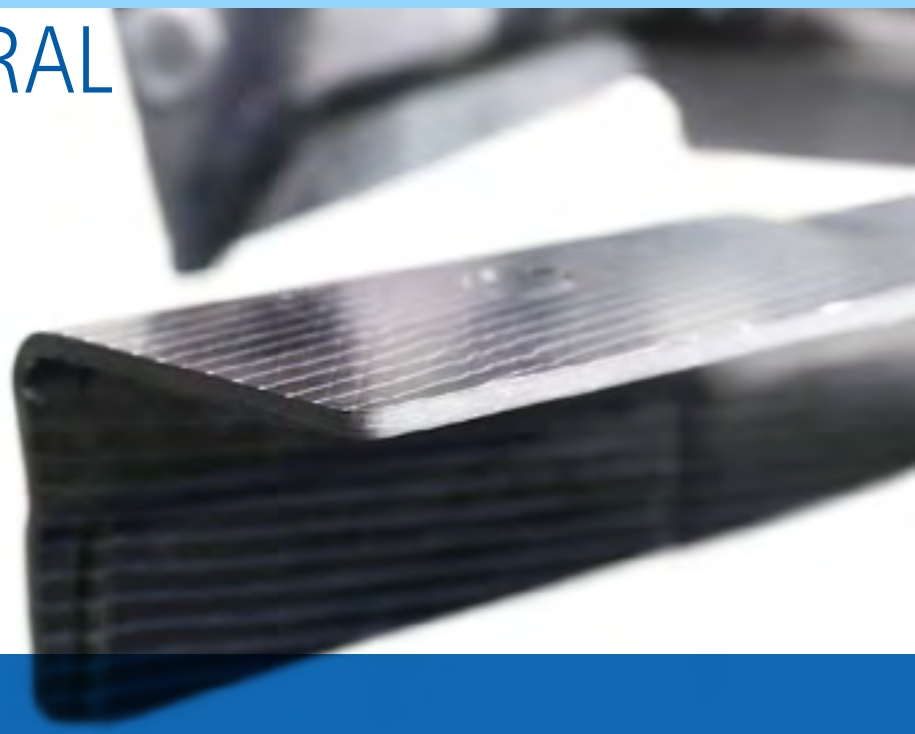
Energy

Aerospace

CFRP STRUCTURAL PARTS

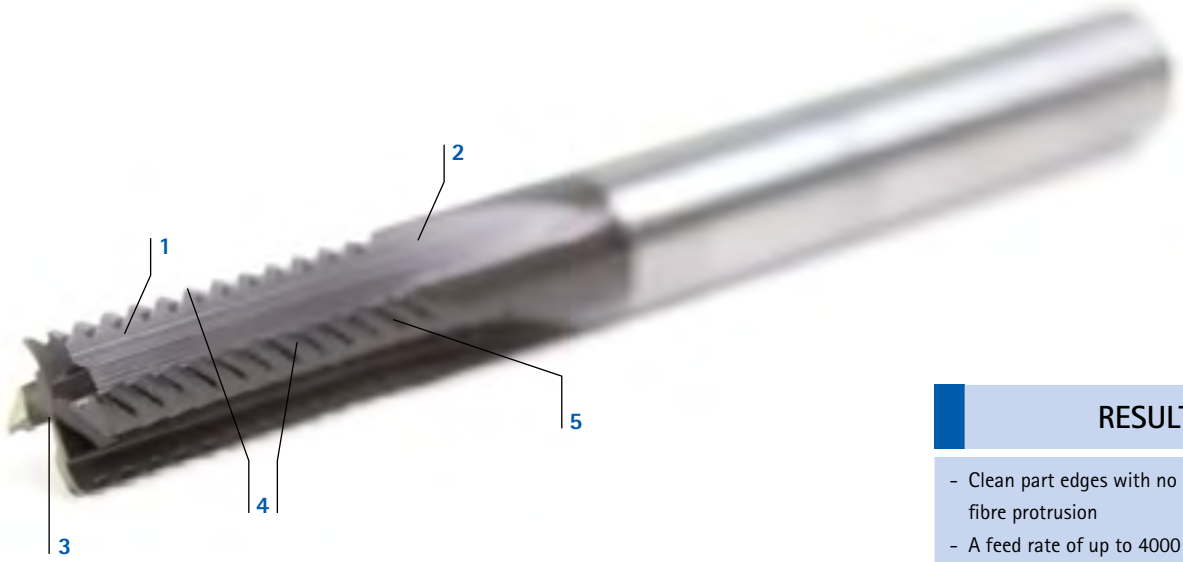
C Fibre composite materials

Machining of thin-walled CFRP parts in accordance with the special requirements of the automotive industry.



Challenges/tasks:

In contrast to the aerospace industry, machining CFRP under the conditions present in the mass production automobile industry, and its emphasis on cost, requires tools that reliably achieve high feeds and long tool life in order to meet requirements in relation to cycle time and to keep the costs per tool as low as possible. Furthermore, most thin walled parts tend to vibrate. The manufacturing methods used to produce CFRP structures for mass production, as well as the use of various types of mills with differing mechanical properties on one part makes the formation of fibre protrusions more likely.



Solid carbide mill with diamond coating

Trimming the outer contour as well as producing breakthroughs and pockets

1. High-performance diamond coating

High abrasion resistance for a very long service life

2. Large chip flutes

Dust and process heat is removed quickly and safely, even when machining volumes are extremely high.

3. Optimised face geometry

Delamination-free plunging

4. Compression cut – combination of pushing and pulling blades

Cutting the fibres cleanly prevents delamination and fibre protrusion.

5. High-performance geometry with multiple teeth

Extremely high machining volumes in one machining step.

RESULTS

- Clean part edges with no delamination or fibre protrusion
- A feed rate of up to 4000 mm/min
- Tool life of up to 1,200 m in a full cut

ADVANTAGES

- Low costs per part during mass production thanks to high cutting speeds and large feeds
- No fibre protrusion
- Delamination-free machining
- Very long service life
- Increased process reliability

ADD engineering

WIND TURBINE-ROTOR BLADES

Fibre composite materials

Designing the joint between the rotor blade and rotor hub is one of the most demanding tasks involved in the development of blades for wind turbines.

Challenges/tasks:

The bolted joint connecting the rotor blade to the rotor hub via the blade bearing is subjected to extreme dynamic loads. Manufacturers usually use a so-called "cross-pin joint" to reduce manufacturing costs and the weight of the rotor blade. In order to cost-effectively carry out the drilling, milling and cutting operations necessary for this connection on the GFRP blade joint, ADD Engineering has developed innovative tool systems, which have been optimised to reduce the amount of dust and chips formed.

1. PCD core drill

Machining the longitudinal and cross bores for the retaining pins

PCD-tipped core drills have long tool lives as well as preventing delamination at the bore exit. Due to the low volume of chips produced, even at large machining diameters, a significantly smaller volume of dust and chips is produced relative to conventional drills.

2. Replaceable head drill TTD (special design)

Machining the locking bores for blade alignment in the machine tool

The geometry of the replaceable head drill has been specially optimised to meet the requirements of GFRP machining. The replaceable head design makes machining a diameter of 32 mm particularly cost effective.

3. PCD disc-type mill (cutting)

Cutting off the protruding resin on the edge of the rotor blade root

The disk-type mill ø = 400 mm, tipped with 20 PCD blades, ensures short machining times. The polished tool body reduces the build-up of heat that occurs during machining. No wandering of the saw cut occurs, such as with conventional machining, with diamond saw blades.

4. PCD face mill (EcoSpeed)

Finishing the cut edge

After cutting off protruding resin using the disc-type cutter, the surface of the joint to the rotor hub is finished using a PCD-tipped face mill from the EcoMill series, in order to achieve the required flatness.

ADVANTAGES

- Innovative core drill reduces the formation of dust and chips
- Short machining times during milling due to the tool body containing the highest possible number of inserts
- No delamination, fibre protrusion or formation of burrs on the part
- Long tool life due to PCD-tipped inserts or special diamond coating

WING MANUFACTU-RING/-ASSEMBLY

C Aluminium, CFRP and titanium multilayer composites

Reliable production of bores during manufacturing and assembly of aerofoils and wing parts.

Challenges/tasks:

The geometric requirements for the bores in these highly loaded aluminium/CFRP/titanium structural components are very tight and must be met with high process reliability (Cpk 1.6). Over many years, ADD Engineering has obtained an understanding of the process involved in mechanically machining each material. Process reliability is key to the production and assembly of wings, therefore these precise bores are first dri lled and then reamed.

1. Replaceable head drill TTD-Stack Drill

Drilling aluminium, CFRP, titanium stacks

These optimally designed tools operate with low process heat in titanium, prevents aluminium from sticking, produce short chips and therefore prevent damage to the adjoining fibre material.

2. HPR replaceable head reamer "Stack-Reamer"

Reaming aluminium, CFRP, titanium stacks

ADD Engineering multi-bladed reamers (HPR) equipped with PCD blades operate with absolute process reliability and a long tool life in all materi-als. The required tolerances are achieved in all the different materials,whether it be CFRP, aluminium or titanium.

RESULTS

- Dimensionally stable bores of IT7 quality in all situations
- Minimal burr formation on bore outlets

ADVANTAGES

- Custom tool solutions for the best results in all types of stacks
- Drilling and reaming tools suitable for a wi-de range of different multilayer composites
- Replaceable head systems for high cost-efficiency
- CFRP-CFRP: Drilling without delamination or fibre protrusion
- CFRP-aluminium drilling with minimal burr formation and without delamination
- CFRP-titanium Low levels of process heat at high process speeds

AIRCRAFT FUSELAGE

C **Aluminium–aluminium multilayer composite**

Dry machining alu-alu stacks in the aircraft fuselage using drill feed units for riveted joints.

Challenges/tasks:
Until now, minimum quantity lubrication (MQL) has been used for cooling drilling and countersinking tools. However, when the drill emerged through the outlet, the coolant got into the aircraft, where further assembly steps were being carried out at the same time. This posed a health risk for the workers in the fuselage, and it was necessary to carry out extensive cleaning. Dry machining wasn't the only challenge for the tool, the differing properties of the two different aluminium alloys also posed problems. Burrs must not be produced during machining, whether they form on the bore exit or between the two layers.

1. Drill with countersink step

Dry machining the riveted joints of an aircraft fuselage

Extremely positive cutting edges as well as a double angle ensure that few bores are formed and centring is improved The coating prevents material from sticking to the cutting edge. A leading stage ensures optimal bore quality. Specially formed chip flutes ensure optimal chip removal.

RESULTS

- Tool life: 1,600 bores

ADVANTAGES

- Minimal burr formation and improved centring
- Optimal bore quality and a long tool life
- Clean parts. No cleaning/disassembly necessary
- Low emissions when machining

WING RIB

N Aluminium

Aluminium structural parts are usually milled from solid material. Here, machining that is flawless with regard to dimensional accuracy, the parallel alignment of the walls, as well as the surface roughness and finish is key.

Challenges/tasks:

During machining, the structure of the part becomes increasingly delicate the more material is removed. As a result, reducing the cutting force that arises has a decisive effect on the quality of the part. Here, dimensional accuracy is just one of many factors. A lot more attention is paid to the parallel alignment of the walls. Cutting edge geometry is even important in roughing, particularly with regard to walls and bases as well as free-standing webs that could be pushed back by cutting forces that are too high.

1. OptiMill-SPM with roughing teeth (customer-specific design with internal cooling)

Roughing contours and pockets

A specially developed cutting edge profile with significantly reduced cutting force for high-performance machining. The exceptional plunging properties of the tool significantly reduce the heat input into the part. This helps improve surface finish (conductivity measurement)

2. Finishing end mill (special design)

Finishing contours and walls of pockets

The new finishing geometry, which is specially designed for finishing deep pockets and finishing delicate structural parts, also operates without a "pull effect" when there are high levels of wrapping (use of the tool where there is high wrapping, e.g. at the corners of pockets).

ADVANTAGES WHEN ROUGHING

- Machining volume is doubled
- Spindle load is reduced by more than 20%
- Tool life is increased from 500 min to 800 min
- Tool with internal cooling
- Stable corrugated profile for high-performance finishing

ADVANTAGES WHEN FINISHING

- Perfect chip removal thanks to a polished chip flutes
- Strong performance with high levels of wrapping
- Saves time due to the fact it can reach deep cutting depths in one go when finishing
- Low vibration cutting thanks to an optimised cutting edge geometry

TURBINE WHEEL DISK - TROCHOIDAL MILLING

M High-alloy steel

By changing their milling strategy, Siemens achieved a substantial improvement in process reliability during the machining of a large gas turbine wheel disk made of high-alloy steel.

Challenges/tasks:

The 66 impeller pockets form an integral part of a turbine wheel disk weighing over four tonnes, which is part of one of the world's most powerful gas turbines (SGT5-8000H). Manufacturing a turbine wheel disk with a diameter of two metres presents a particular challenge due to the fact that very large machining volumes have to be handled. Every one of the 66 impeller pockets had to be machined out of solid material (X12CrMoWVNbN1011). In addition, each pocket measures roughly 140x70 mm, with a radius of 30 mm at the bottom of the pocket. ADD Engineering took on the challenge, not only supplying new tools but also carrying out the NC programming.

1. Replaceable head drill special design

Finishing the impeller pockets

The Ø 42 mm special radius mill with ADD Enin-geering HFS-High Torque connections is curre-ntly being used at Siemens to rough impeller pockets. It has reduced the time needed for finishing from 30 to 7.7 minutes.

2. OptiMill-Trochoid - special design

Roughing the impeller pockets

The optimally designed tool, which is based on the process by means of trochoidal milling. made available by ADD Engineering via iMachining (SolidCAM), functions with an extremely high level of process reliability. It is currently being used in Siemens' gas turbine plant to carry out the finishing process by means of trochoidal milling.

RESULTS

- Tool life when roughing is ten times higher (increased from 2 to 22 pockets)
- Tool life when finishing is tripled (from 22 to 66 pockets)
- Machining time per impeller pocket is more than halved
- Machining costs are reduced by more than 62%
- Total machining time is reduced from 5,000 to 1,600 minutes.

ADVANTAGES

- A substantial improvement in process reli ability thanks to a change in strategy put in place by ADD Engineering
- Custom-made tools for specific tasks
- Improved surface quality of the impeller pockets
- Strategy optimised for limited machine dynamics

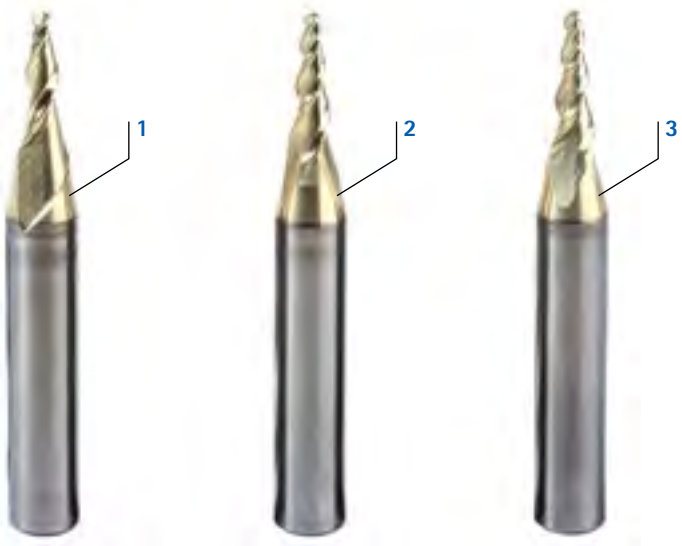
IMPELLERS TURBOCHARGERS

N S **Aluminium, titanium and highly heat resistant super alloys**

Impellers for turbochargers are mass produced for the automotive industry. Due to the wide variety of different turbochargers, the geometry of the impellers used also varies greatly.

Challenges/tasks:

The machining processes for impellers have been subject to continuous development over the last few years. This is no surprise when you take into account the production figures, which show that several hundreds of thousands of impellers are produced each week. The blade geometries of the impeller is milled from solid material using a three-step process, involving roughing, semi-finishing and finishing. This process is used both for titanium designs and versions made out of high-strength forged aluminium.



1. Roughing

The roughing mill performs the first full cut of the gap between every impeller. The first contours of the wing are then produced using part-contact cutting.

2. Semi-finish

The semi-finish tool roughs the contours of the wing again, whilst simultaneously finishing the floor of the impeller as well as the boss.

3. Finishing

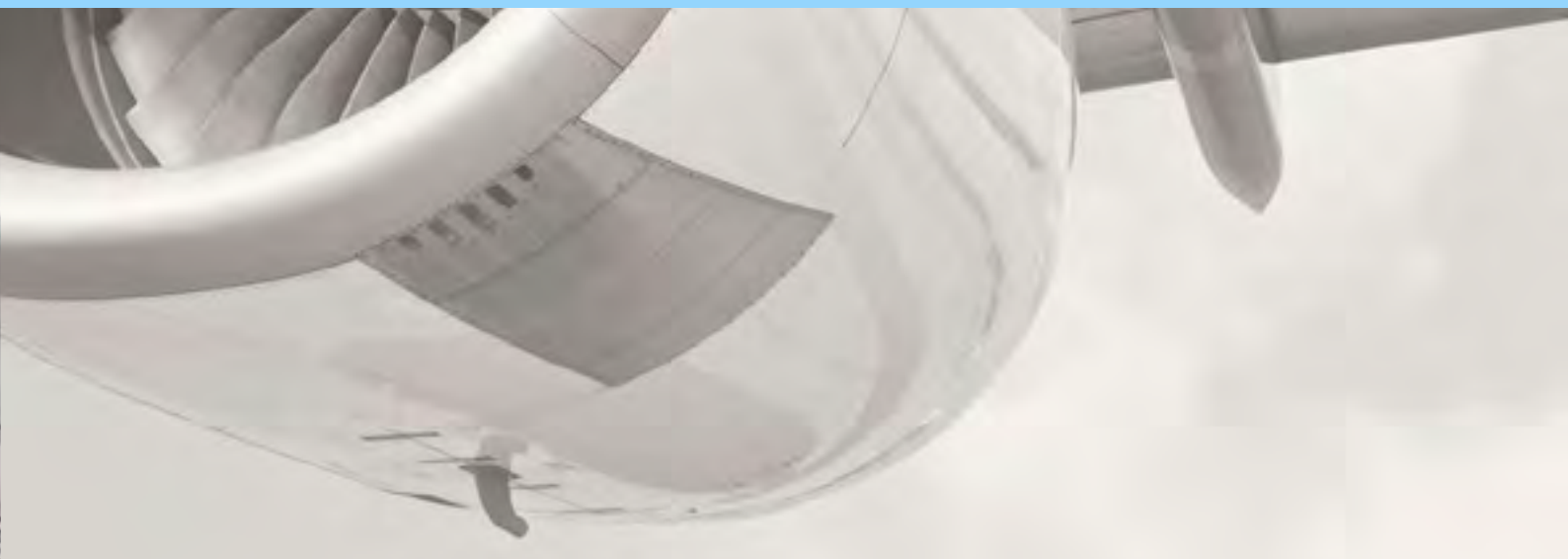
The finishing milling tool is only used on the surface of the wings. As far as is possible, it does not produce burrs.

RESULTS

- Angular mill, custom made in accordance with the size of the impellers and the material being machined
- Runs smoother during the roughing process, which doubles tool life

ADVANTAGES

- High rigidity thanks to conical design of the transition to the tool shank
- Polished chip flutes
- Optimised face geometry ensures the surface of the boss is perfect
- Quiet, low vibration cutting
- A polished tool circumference ensures minimal chipping of the cutting edge
- Chip breaker geometry when roughing



MACHINING TURBINE PARTS

Innovative customer-focused tools for roughing and finishing turbine parts made of difficult to machine materials. ADD Engineering also supplies products suitable for these purposes on request

1. Form cutters
Machining blade roots

2. Conical CFS replaceable head mill
Machining shovel blades

3. Profile milling
Machining blade root grooves

TECHNICAL APPENDIX

Notes on application, handling as well as cutting data

TECHNICAL SPECIFICATIONS

ADD engineering

TECHNICAL APPENDIX

General technical information

Cutting data recommendation

Trochoidal milling - the basics

Definition

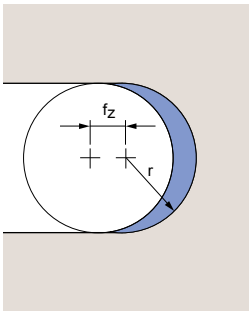
Trochoidal milling is a milling strategy that aims to reduce process power whilst simultaneously increasing material removal rate. The overlap of the feed movement with a circular movement of the tool can have a positive effect on contact conditions. Material is removed cyclically with changing contact conditions that can be matched to the tool usage as well as variable machining breadths along the circular path of the tool.

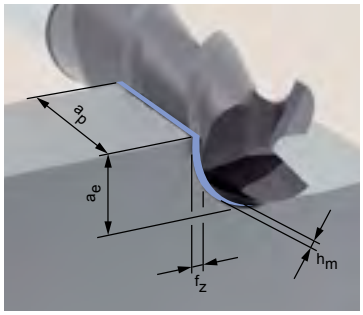
Example: flute milling

Conventional milling

When carrying out roughing as a full cut, the contact conditions of the mill are determined at a wrap angle of 180°.

As well as producing long chips, this subjects the tool to relatively high levels of thermal stress due to the long tooth engagement. In turn, the large chip thickness that results causes high machining forces, limiting process-stabilised peck depths, feeds and cutting speeds.



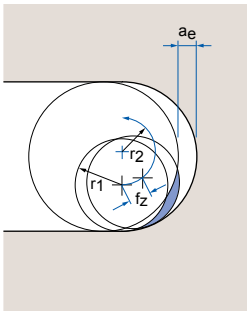


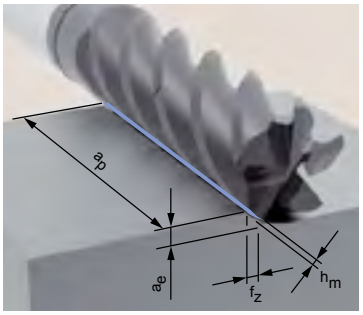
a_p: small (cutting depth~1xD)
a_e: large (1xD)
f_z: small
v_c: low

Trochoidal milling

The specific kinematics of trochoidal milling make it possible to improve the contact conditions thanks to the overlap of the feed movement with the circular movement of the tool. The contact angle is correspondingly small.

The consequence of this technological approach is a substantially reduced cutting force due to reduced machining width and length. In turn, it is easier to achieve greater cutting depths.

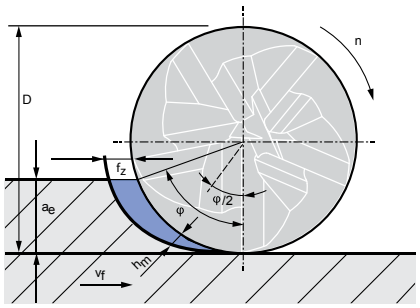




a_p: large (use of the full length of the cutting edge possible)
a_e: small
f_z: large
v_c: high

Average chip thickness h_m and contact angle φ

Contact angle	φ = [°]	$\cos\varphi = 1 - \frac{2 \cdot a_e}{D}$	Is dependent on the contact ratio a_e/D and is limited depending on the material.
Average chip thickness	h_m = [mm]	$h_m = f_z \cdot \sqrt{\frac{a_e}{D}}$	Is maintained at an almost constant level during trochoidal milling by means of dynamic feeds. The average chip thickness is measured at φ/2.
Feed per tooth	$f_z = [\frac{mm}{Tooth}]$		Limited variable, is adjusted by the CAM system during machining.
Contact width	a_e = [mm]		Is continuously recalculated by the CAM software and limits the contact angle φ.
Tool diameter	D = [mm]		



Handling notes for the replaceable milling heads CPMill

CPMill series universal replaceable milling heads have a long tool life while maintaining a high machining quality. The CFS connection ensures the easy and quick changing of milling heads with a high repetition accuracy. A perfect hold is achieved with the highest degree of stability and rigidity.

The replaceable milling head is tightened with a pre-specified tightening torque and requires an interlocking and force-fitting connection. The key features of this system are a high radial run-out accuracy in conjunction with a very good level of rigidity.

Assembling the replaceable milling heads CPMill

Note:
Wearing gloves is recommended in order to minimise the risk of injury.

Comment:
Only for trained personnel.

1. Clean the taper, thread and face surface of the replaceable milling head using compressed air and a towel.

2. Clean the taper, thread and face surface of the replaceable head holder using compressed air and a towel.

3. Screw the replaceable milling head into the replaceable head holder, turning it tightly by hand. Then, screw the replaceable head holder, along with the tool, into the machine holder.

4. As far as is possible, keep the torque wrench horizontal when placing it on the replaceable drill head, thus ensuring the spanner is not tilted relative to the surface.

5. Note:
Place your free hand on the replaceable milling head so that you are able to carry out delicate tuning.
In this way, more precise adjustments can be made to the tightening torque.

Use the torque wrench and the appropriate open-ended spanner to tighten the replaceable milling head to the stated tightening torque (see table "tightening torque of the replaceable milling heads").

Results
The gap between the replaceable milling head and the replaceable head holder has been closed and there is an interlocking and force-fitting connection. The replaceable milling head CPMill is now operational.

Tightening torque of the replaceable mill heads

Connection size CFS	Tightening torque [Nm]
6	5
8	12,5
10	15
12	20
16	25
20	30

Handling notes for replaceable-head drill TTD

Piloting

- A pilot bore is to be recommended for drilling depths of greater than 8xD
- When using replaceable drill head type 02, a pilot bore is to be recommended for drilling depths of greater than 5xD
- When making a pilot bore using the replaceable drill head type 02 reducing the stated feed by 50% is recommended.
- When making a pilot bore with replaceable drill heads type 01 or 03, the recommended machining values may be used
- When entering the pilot bore, use the same drill head geometry and reduced machining values (recommendation v_c = 50 % and circa f = 50 %) up until 1 mm above the bottom of the bore
- Then, the drilling that takes place after piloting is carried out in accordance with the recommended machining values (see section in technical appendix chapter Cutting data recommendation for replaceable-head drill TTD)

Notes for drilling with a 12xD holder

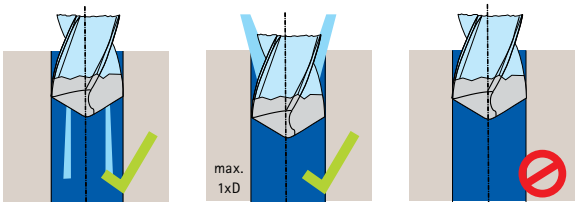
- A pilot bore is necessary for a drilling depth of 12xD
- Coolant pressure must be at least 40 bar
- When machining steel material it may be necessary to remove chips.
- When using a power tool, it is possible to make use of a turning machine
- It is recommended to increase the cutting speed by 30% relative to the standard value

Stationary tools

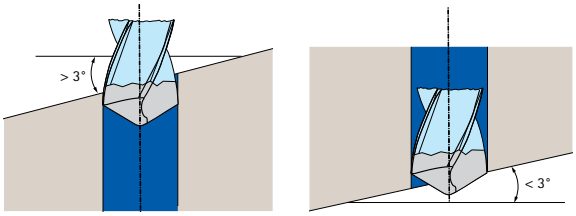
If the tool is stationary, position the chip flute runout horizontally to prevent chip congestion.

Situation regarding coolant

The coolant pressure is dependent on the drilling depth:
1xD: 8 bar | 3xD: 8 bar | 5xD: 12 bar | 8xD: 25 bar | 12xD: 40 bar

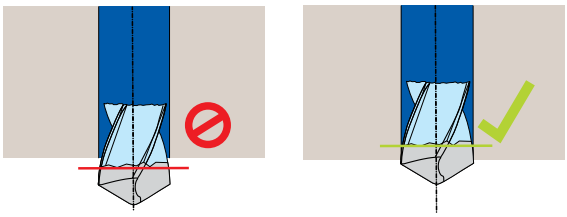


Max. entry and exit angle

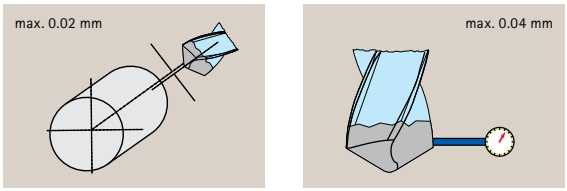


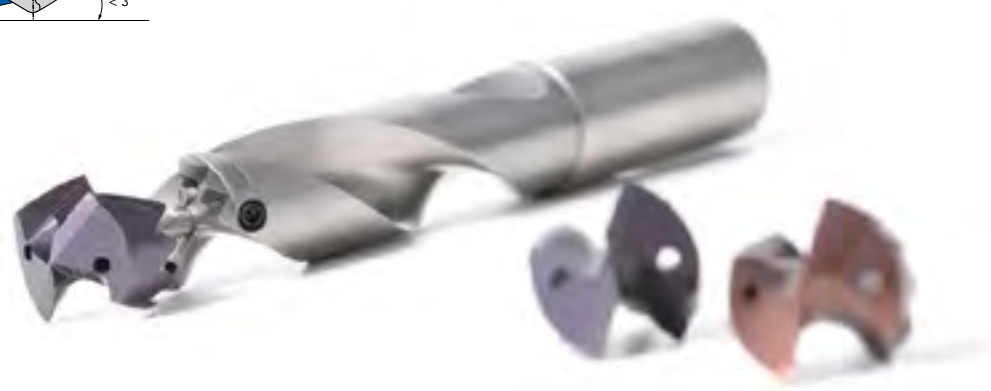
Through bores

It is not recommended to reduce the cutting value at the bore outlet.



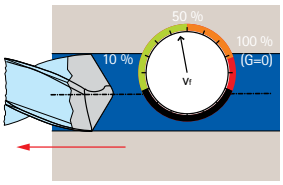
Radial run-out accuracy



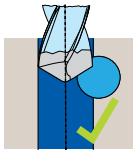


No rapid traverse on withdrawal

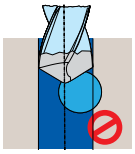
It is recommended that the speed of withdrawal is 5 times the feed rate.



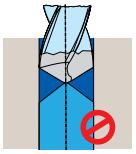
Machining situations



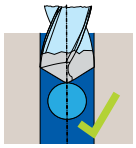
Bore off-centre
Chisel edge
in contact



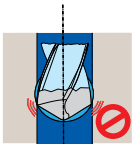
Bore off-centre
Chisel edge not in
contact



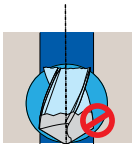
Breakthrough to
bore in opposite
direction



Bore centred
and << D



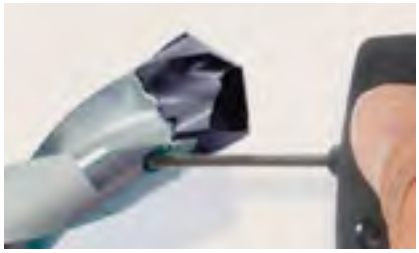
Bore centred
and ≡D



Bore centred
and >> D

Assembly

Unscrewing the drill head



1. Each time you change the drill head, check that the clamping screw is tight. If the clamping screw can be easily loosened, it must be replaced. Only use the original clamping screws!

2. Unscrew the clamping screw using the hexagon key supplied.

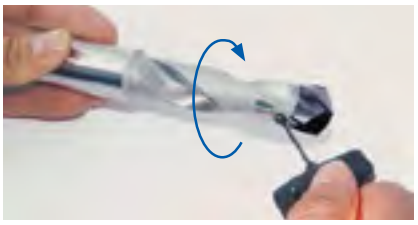
3. Pull the drill head out of the serration.

Note:
At a minimum, the clamping screw must be replaced every 8 times the drill head is replaced.

Clamping the drill head

1. Clean the TTS connection of the holder with a brush.

2. Fit the new drill head to the holder.



3. Tighten the clamping screw by turning it clockwise tight by hand.

Note:
Make sure that the positioning aid on the drill head is engaged in the positioning aid on the tool holder and that the chip flute and serration on the drill head and holder are aligned.

Handling notes for PCD-face mill - System Power

To achieve a perfect surface quality and high removal rates when face milling, it is essential that all blades are securely fitted to the tool body and run perfectly in the axial plane. ADD Engineering uses a simple setting system for the face milling head systems from the PowerMill series.

The blades can be adjusted precisely using the adjusting screw. When this is used in conjunction with the additional locking screw, it guarantees the milling insert will be perfectly fitted to the tool body. Use under HSC conditions is therefore possible without any issues.

Replacing and setting the PCD milling inserts

Requirements:
The mill has been screwed onto the setting device and the mill clamping screw/coolant screw has been tightened (see table "tightening torque for mill clamping screw/coolant screw" on page 231).

Comment:
Only for trained personnel.

1. Loosen and remove the clamping screw of the milling insert. After this, turn the locking screw back several turns.

2. Move the milling insert upwards, removing it from its seat. Afterwards, clean the seat of the milling insert with compressed air.

3. Check whether the flat side of the locking screw (2) is pointing in the direction of the milling insert seat. If a spherical shape can be seen (1), use your finger to turn it so that it is in the flat position.

4. If the adjusting screw has not yet been inserted, insert it and screw it in all the way with an internal hexagon key. Then, insert the new milling insert from above.

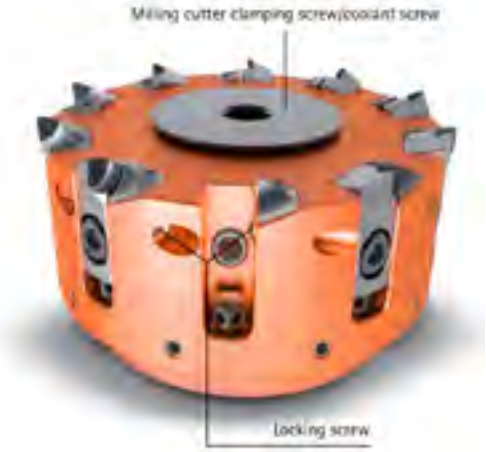
5. Insert the clamping screw of the milling insert and screw it in gently with an internal hexagon key. Then, carefully push the milling insert down with your finger whilst at the same time tightening the clamping screw with torque wrench 4 Nm.

6. Screw the locking screw all the way in with an internal hexagon key by turning it anticlockwise. Afterwards, screw it back by a half turn.

Note:
Clean all the blades of the milling inserts with cleaning compound to avoid inaccurate measurements.

Note:
The adjusting dimensions are specified on the appropriate product pages. The adjusting dimension EM refers exclusively to tool body of the mill incl. milling inserts. When adjusting a mill with a receptacle, the height of the receptacle must always be taken into account. In this case, the adjusting dimension is l_A+EM.

* When using the clamping screw please pay attention to the note on page 251.



7. Setting with a setting device (optical)
Using the setting device, optically set a milling insert to -0.01mm before the adjusting dimension EM:
To do this, measure the cutting edge with the optical measuring device, and turn the adjusting screw anticlockwise with an internal hexagon key until EM = -0.01 mm is reached. For purely optical adjustment, repeat this procedure for the rest of the milling inserts (then proceed with step 9).

8. Setting with dial gauge
Note:
Do not leave the measuring sensor resting on the milling insert when turning the mill. Aluminium measuring sensors are recommended.

When setting the dial gauge, use a gauge block to set the EM. Then set the milling insert to 0.01 under EM.

For this purpose, press the milling insert at the highest point, in order to take the most up to date measurement. Then, using the adjusting screw, turn the milling insert up until EM = 0.01 is reached. Repeat for all milling inserts.

9. Note:
The measuring sensor must not be left sitting on the milling insert during the handling stage.

Use a torque wrench to screw in the clamping screw of the milling insert with torque spanner 14 Nm. Afterwards, use a torque wrench to screw in the locking screws with torque wrench approx. 2 Nm.

10. Determine the milling insert with the highest cutting edge, either optically, using the setting device or in a tactile manner, using the dial gauge, then set it to zero. Then, adjust all the milling inserts to the highest cutting edge, using either an optical approach or the dial gauge.
To do this, turn the adjusting screw clockwise with an internal hexagon key until the zero dimension is reached (tolerance ± 2µm).

Tightening torque for clamping screws

Clamping screw Order number	Dimensions	Spanner size	Tightening torque [Nm]
30696520	M6x13	SW 5	14

Tightening torque for mill clamping screw/coolant screw

Clamping screw Order number	Milling head diameter [mm]	Dimensions	Wrench size	Tightening torque [Nm]
30326178	63	M10	SW 10	50
30326179	80	M12	SW 12	60
30326180	100	M16	SW 14	100
30326181	125 - 140	M20	SW 14	100
10006594	160	M12	SW 10	70
10007775	200 - 400	M16	SW 14	70

Handling notes for PCD-face mill - System Eco

To achieve optimal surface quality when face milling it is essential that all blades run perfectly in the axial plane. ADD Engineering uses a special adjusting system for its various series of face milling heads (EcoMill, EcoMill-Blue, RapidMill-Blue and FlyCutter). Using a high-precision wedge adjusting element, the axial run-out can be effortlessly adjusted in the µ-range. This system stands out due to the accuracy it can achieve, combined with its easily handling.

To make adjustments easily, conveniently, quickly and precisely, use of a ADD Engineering setting device is recommended. For example with the new UNISET-P with measuring sensor* the axial run-out can be easily adjusted in record time and with µ-precision.

Replacing and setting the PCD milling inserts

Requirements:
The mill has been screwed onto the setting device and the mill clamping screw/coolant screw has been tightened (see table "tightening torque for mill clamping screw/coolant screw" on page 233).

Comment:
Only for trained personnel.

1. Turn the threaded spindle one turn anticlockwise with an internal hexagon key with a wrench size of 2.5.

2. Unscrew the clamping screw of the milling insert and move it upwards, removing it from the dovetail guide.

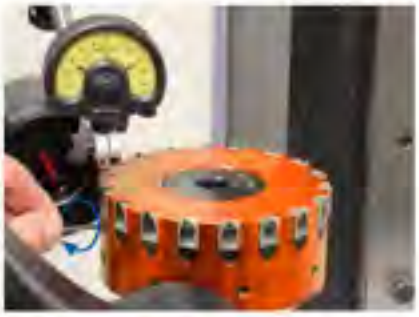
3. Clean the seat of the milling insert with compressed air and then insert the new milling insert into the dovetail guide from above.

4. Note:
While tightening the milling insert, press on it lightly so that the adjusting wedge is engaged.

Insert the clamping screw of the milling insert and tighten it with 1-2 Nm, turning it clockwise.

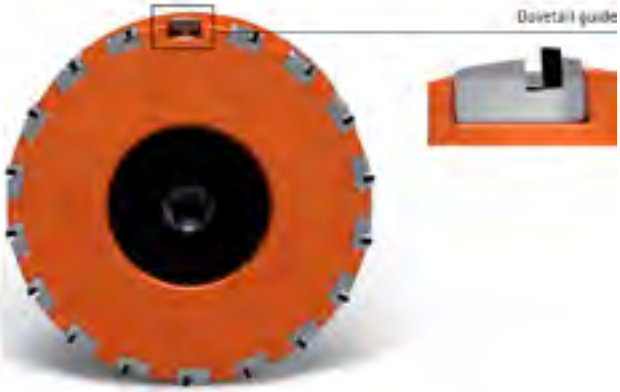
Note:
Clean all the blades of the milling inserts with cleaning compound to avoid inaccurate measurements.

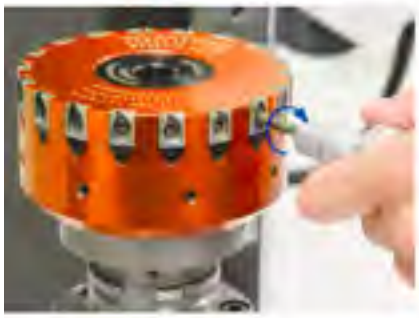
5. Using the setting device, optically set a milling insert to -0.01 mm before the adjusting dimension EM:
To do this, measure the cutting edge with the optical measuring device, and turn the threaded spindle clockwise with an internal hexagon key until EM = -0.01 mm is reached. For purely optical adjustment, repeat this procedure for the rest of the milling inserts (then proceed with step 7).



6. Position the dial gauge on the adjusted milling insert and set it to zero. Using the dial gauge, set the milling insert to -0.01 before EM. To do this, turn the threaded spindle clockwise with the internal hexagon key until the zero dimension is reached.

* While optical systems reach their limits at µ-precise adjusting, high-precision adjusting of the axial run-out can be easily realised with the aid of the tactile measuring sensor.
**When using the clamping screw please pay attention to the note on page 233



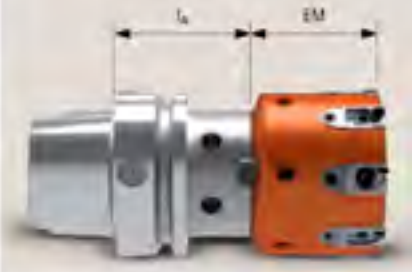


7. **Note:**
The measuring sensor must not be left sitting on the milling insert during the handling stage.

Turn the clamping screw of the milling insert clockwise using a torque wrench (for torque, see table "tightening torque for clamping screws").

8. Using the setting device, determine the milling insert with the highest cutting edge optically, then set the dial gauge to zero. Adjust all the milling inserts to the highest cutting edge using the dial gauge: to do this, turn the threaded spindle clockwise with the internal hexagon key until the zero dimension is reached (tolerance ± 2 µm).

Note:
The adjusting dimensions are specified on the appropriate product pages. The adjusting dimension EM refers exclusively to tool body of the mill incl. milling inserts. When adjusting a mill with a receptacle, the height of the receptacle l_A must always be taken into account. In this case, the adjusting dimension is l_A+EM.



Tightening torque for clamping screws

Clamping screw Order number	Dimensions	TORX®-/TORX PLUS®-Actuator size	Tightening torque [Nm]
30499981	M5x8	TX25	8

Tightening torque for coolant screw

Clamping screw Order number	Milling head diameter [mm]	Dimensions	Wrench size	Tightening torque [Nm]
30772751-600	63		SW 24	70
30381973-601	80 - 160	M12x20	SW 24	80

Cutting data recommendation

Part manufacturing

Milling | End mills with fixed blades

General purpose mills

Product name	Specification	Page
OptiMill-Composite-MT	SCM40,41,42,43	236
OptiMill-Composite-MT-Radius	SCM44	236
OptiMill-Composite-Micro	SCM56	236
OptiMill-Composite-Speed	SCM45,46,47	236
OptiMill-Composite-Speed-Radius	SCM87	236
OptiMill-Composite-UD	SCM65,66	236
OptiMill-Composite-Duo	SCM73	236
OptiMill-Thermoplastic-FR	SCM61	236
OptiMill-Composite-TwinCut	SCM49	236
OptiMill-Honeycomb	SCM62	236
OptiMill-Mono-Plastic	SCM33	236
OptiMill-Thermoplastic	SCM51	238
OptiMill-Softfoam	SCM50	238
OptiMill-Hardfoam	SCM64	238
OptiMill-Alu-HPC	SCM27	238
OptiMill-Titan-HPC	SCM39	238

High volume mills

Product name	Specification	Page
OptiMill-SPM	SCM68,69	242
CPMill-SPM	CPM26,27	242
OptiMill-Diamond-SPM	SHM10,11,12	242

Trochoidal mills

Product name	Specification	Page
OptiMill-PM-Trochoid	SCM59	244
OptiMill-S-Trochoid	SCM60	244
OptiMill-Titan-Trochoid	SCM63	244

Milling | Face mills with PCD milling inserts

Product name	Specification	Page
PowerMill	CFM901	240
FlyCutter	CFM901	240

Drilling

Solid carbide drills

Product name	Specification	Page
MEGA-Drill-Composite-MD	SCD25	246
MEGA-Drill-Composite-UDX	SCD27	246
MEGA-Drill-Aramid	SCD28	246
MEGA-Stack-Drill-CA	SCD43	246
MEGA-Stack-Drill-CT	SCD55	248
MEGA-Stack-Drill-Robot-CA	SCD45	248
MEGA-Stack-Drill-Robot-CT	SCD46	248
Mono-Drill-Plastic	SCD57	250
MEGA-Drill-Alu	SCD13	250
MEGA-Speed-Drill-Inox	SCD41	250
MEGA-Drill-Inco	SCD29	252
MEGA-Speed-Drill-Titan	SCD30	252

Replaceable head drills

Product name	Specification	Page
TTD - type 12 - composite	Type 12	254
TTD - type 21 - stack CA	Type 21	254
TTD - type 22 - stack CT	Type 22	254
TTD - type 03- alu	Type 03	256
TTD - type 02- inox	Type 02	256

Reaming

Product name	Cutting lead	Cutting material	Page
FXR510 - Composite	MF1M	HC614	258
FXR500 - Alu	MG0A	HP622	258
FXR510 - Inox	MF1M	HP145	258
FXR510 - Titan	MF1M	HP613	258

Final assembly

Drilling from solid (first hole)

Product name	Specification	Page
FAL-Countersink-Drill, HSS	FAD20	260
FAL-Countersink-Drill, solid carbide	FAD21	260
MEGA-Stack-Drill-Hand-CC	SCD50	260
FAL-Drill-Composite	FAD11	260
FAL-Drill-Uni	FAD10	261
MEGA-Stack-Drill-Hand-CTA	SCD48	261

Boring and reaming (final hole)

Product name	Specification	Page
MEGA-Stack-CoreDrill-Hand-CTA	SCD52	262
MEGA-Stack-Reamer-Hand-CTA	SCD54	262
FAL-Handreamer-America, HSS	FAR110	263
FAL-Handreamer-America, solid carbide	FAR110	263
FAL-Handreamer-Pilot	FAR310	264
FAL-Handreamer-Paris, HSS	FAR200	264
FAL-Handreamer-Paris, solid carbide	FAR200	264

Countersinking

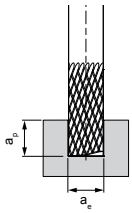
Product name	Specification	Page
FAL-Countersink-180°-Reverse, HSS	FAC10	265
FAL-Countersink-180°-Reverse, solid carbide	FAC11	265
FAL-Spotfacer-180°-Plugin-Pilot	FAC12	265
FAL-Countersink-100°-Plugin-Pilot (z=2), HSS	FAC14	266
FAL-Countersink-100°-Pilot, HSS	FAC15	266
FAL-Countersink-100°-Plugin-Pilot (z=3), HSS	FAC16	266
FAL-Countersink-100°-Pilot, solid carbide	FAC17	267
FAL-Countersink-100°-Plugin-Pilot, solid carbide	FAC18	267
FAL-Countersink-100°-Pilot, PCD	FAC19	268
FAL-Countersink-100°-Plugin-Pilot, PCD	FAC20	268
FAL-Countersink-100°-Reverse	FAC13	268
FAL-Deburring-90°	FAC21	269
FAL-Countersink-90°, HSS	FAC22	269
FAL-Countersink-90°, solid carbide	FAC23	269
Precision countersink cutter, HSS	COS11	270
Precision countersink cutter, solid carbide	COS11	272

Note:
The cutting values stated on the following pages are guideline values.
The optimal data for each specific machining application should be determined in trials or during machining.

Cutting data recommendation for shoulder mills

Feed and cutting speed

Groove milling



OptiMill-Composite-MT | SCM40, 41, 42, 43
OptiMill-Composite-Speed-Radius | SCM44

MMG*			Material	Strength/ hardness [N/mm²] [HRC]	Cooling			v_c [m/ min]	f_z [mm/tooth]							
									Mill diameter [mm]							
					MQL/air	Dry	Wet		2	4	6	8	10	12	16	20
N	N3	N3.1	Graphite		✓	✓	✓	340	0.012	0.022	0.031	0.039	0.048	0.056	0.070	0.081
N	N4	N4.2	Plastic, Duroplast		✓	✓	✓	120	0.009	0.015	0.022	0.028	0.034	0.040	0.050	0.058
C	C1	C1.2	Plastic matrix (thermosetting), CFRP/GFRP		✓	✓	✓	120	0.009	0.015	0.022	0.028	0.034	0.040	0.050	0.058

OptiMill-Composite-Micro | SCM56

									1	2	3					
N	N4	N4.2	Plastic, Duroplast		✓	✓	✓	105	0.005	0.008	0.011					
C	C1	C1.2	Plastic matrix (thermosetting), CFRP/GFRP		✓	✓	✓	105	0.005	0.008	0.011					

OptiMill-Composite-Micro | SCM45,46,47
OptiMill-Composite-Speed-Radius | SCM87

N	N4	N4.2	Plastic, Duroplast		✓	✓	✓	150	0.011	0.019	0.027	0.035	0.043	0.050	0.062	0.072
C	C1	C1.2	Plastic matrix (thermosetting), CFRP/GFRP		✓	✓	✓	150	0.011	0.019	0.027	0.035	0.043	0.050	0.062	0.072
C	C2	C2.1	Carbon matrix, carbon fibre reinforced (CFC)		✓	✓	✓	150	0.010	0.017	0.025	0.032	0.038	0.045	0.056	0.065
C	C4	C4.1	Sandwich construction, honeycomb core		✓	✓		200	0.006	0.011	0.015	0.020	0.024	0.028	0.035	0.040
C	C4	C4.2	Sandwich construction, foam core		✓	✓		150	0.007	0.012	0.016	0.021	0.026	0.030	0.037	0.043

OptiMill-Composite-UD | SCM65,66

N	N4	N4.2	Plastic, Duroplast		✓	✓	✓	150	0.011	0.019	0.027	0.035	0.043	0.050	0.062	0.072
C	C1	C1.2	Plastic matrix (thermosetting), CFRP/GFRP					150	0.011	0.019	0.027	0.035	0.043	0.050	0.062	0.072
C	C2	C2.1	Carbon matrix, carbon fibre reinforced (CFC)					110	0.010	0.017	0.025	0.032	0.038	0.045	0.056	0.065

OptiMill-Composite-Duo | SCM73

N	N3	N3.1	Graphite					340	0.012	0.022	0.031	0.039	0.048	0.056	0.070	0.081
C	C1	C1.2	Plastic matrix (thermosetting), CFRP/GFRP		✓	✓	✓	105	0.008	0.013	0.019	0.025	0.030	0.035	0.044	0.051

OptiMill-Thermoplastic-FR | SCM61

C	C1	C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		✓	✓	✓	100	0.011	0.019	0.027	0.035	0.043	0.050	0.062	0.072

OptiMill-Composite-TwinCut | SCM49

C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)		✓	✓	✓	110	0.015	0.027	0.038	0.049	0.060	0.070	0.087	0.101

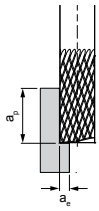
OptiMill-Honeycomb| SCM62

C	C4	C4.1	Sandwich construction, honeycomb core		✓	✓		200	0.006	0.011	0.015	0.020	0.024	0.028	0.035	0.040
		C4.2	Sandwich construction, foam core		✓	✓		150	0.007	0.012	0.016	0.021	0.026	0.030	0.037	0.043

OptiMill-Mono-Plastic | SCM33

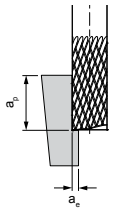
									2	3	4	5	6	8	10	12
N	N4	N4.1	Plastic, thermoplastic		✓	✓	✓	100	0.022	0.030	0.038	0.047	0.055	0.070	0.085	0.100
		N4.2	Plastic, Duroplast		✓	✓	✓	150	0.022	0.030	0.038	0.047	0.055	0.070	0.085	0.100

Roughing



a_p = 1.5 x D
a_p = 0.25 x D

Finishing



a_p = 1.5 x D
a_e = 0.1 x D

v_c [m/min]	f_z [mm/tooth] Mill diameter [mm]								v_c [m/min]	f_z [mm/tooth] Mill diameter [mm]							
	2	4	6	8	10	12	16	20		2	4	6	8	10	12	16	20
510	0.021	0.037	0.052	0.067	0.081	0.095	0.118	0.137	**680**	0.033	0.058	0.082	0.106	0.128	0.149	0.187	0.217
180	0.015	0.026	0.037	0.048	0.058	0.068	0.085	0.098	**240**	0.023	0.041	0.059	0.076	0.092	0.107	0.134	0.155
180	0.015	0.026	0.037	0.048	0.058	0.068	0.085	0.098	**240**	0.023	0.041	0.059	0.076	0.092	0.107	0.134	0.155

	1	2	3							1	2	3					
210	0.008	0.013	0.018						**210**	0.008	0.013	0.018					
210	0.008	0.013	0.018						**210**	0.008	0.013	0.018					

150	0.011	0.019	0.027	0.035	0.043	0.050	0.062	0.072	**445**	0.029	0.052	0.073	0.094	0.115	0.133	0.167	0.194
150	0.011	0.019	0.027	0.035	0.043	0.050	0.062	0.072	**445**	0.029	0.052	0.073	0.094	0.115	0.133	0.167	0.194
150	0.010	0.017	0.025	0.032	0.038	0.045	0.056	0.065	**445**	0.026	0.046	0.066	0.085	0.103	0.120	0.150	0.174
200	0.006	0.011	0.015	0.020	0.024	0.028	0.035	0.040	**400**	0.016	0.029	0.041	0.053	0.064	0.075	0.094	0.108
150	0.007	0.012	0.016	0.021	0.026	0.030	0.037	0.043	**445**	0.017	0.031	0.044	0.057	0.069	0.080	0.100	0.116

300	0.018	0.033	0.046	0.060	0.072	0.084	0.106	0.122	**445**	0.029	0.052	0.073	0.094	0.115	0.133	0.167	0.194
300	0.018	0.033	0.046	0.060	0.072	0.084	0.106	0.122	**445**	0.029	0.052	0.073	0.094	0.115	0.133	0.167	0.194
169	0.017	0.029	0.042	0.054	0.065	0.076	0.095	0.110	**220**	0.026	0.046	0.066	0.085	0.103	0.120	0.150	0.174

510	0.021	0.037	0.052	0.067	0.081	0.095	0.118	0.137	**680**	0.033	0.058	0.082	0.106	0.128	0.149	0.187	0.217
210	0.013	0.023	0.033	0.042	0.051	0.059	0.074	0.086	**310**	0.020	0.036	0.051	0.066	0.080	0.093	0.117	0.135

200	0.018	0.033	0.046	0.060	0.072	0.084	0.106	0.122	**295**	0.029	0.052	0.073	0.094	0.115	0.133	0.167	0.194

220	0.026	0.046	0.065	0.084	0.101	0.118	0.148	0.171	**325**	0.041	0.072	0.103	0.132	0.160	0.187	0.234	0.271

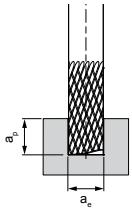
300	0.010	0.018	0.026	0.033	0.041	0.047	0.059	0.069	**400**	0.016	0.029	0.041	0.053	0.064	0.075	0.094	0.108
300	0.011	0.020	0.028	0.036	0.043	0.051	0.063	0.073	**445**	0.017	0.031	0.044	0.057	0.069	0.080	0.100	0.116

	2	3	4	5	6	8	10	12		2	3	4	5	6	8	10	12
200	0.037	0.051	0.065	0.079	0.093	0.119	0.145	0.169	**200**	0.037	0.051	0.065	0.079	0.093	0.119	0.145	0.169
300	0.037	0.051	0.065	0.079	0.093	0.119	0.145	0.169	**300**	0.037	0.051	0.065	0.079	0.093	0.119	0.145	0.169

Cutting data recommendation for shoulder mills

Feed and cutting speed

Groove milling



a_p = 1 x D
a_e = 1 x D

OptiMill-Thermoplastic-FR | SCM51

MMG*			Material	Strength/ hardness [N/mm²] [HRC]	Cooling			v_c [m/ min]	f_z [mm/tooth]							
					MQL/air	Dry	Wet		Mill diameter [mm]							
									2	4	6	8	10	12	16	20
N	N4	N4.1	Plastic, thermoplastic		✓	✓	✓	100	0.011	0.019	0.027	0.035	0.043	0.050	0.062	0.072
		N4.2	Plastic, Duroplast		✓	✓	✓	150	0.011	0.019	0.027	0.035	0.043	0.050	0.062	0.072

OptiMill-Softfoam | SCM50

N	N4	N4.3	Plastic, foam					260	0.007	0.012	0.016	0.021	0.026	0.030	0.037	0.043

OptiMill-Hardfoam | SCM64

N	N4	N4.3	Plastic, foam		✓	✓		260	0.007	0.012	0.016	0.021	0.026	0.030	0.037	0.043
C	C4	C4.2	Sandwich construction, foam core					150	0.007	0.012	0.016	0.021	0.026	0.030	0.037	0.043

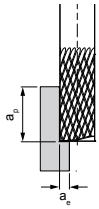
OptiMill-Alu-HPC | SCM27

N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		✓	✓	✓	755	0.022	0.038	0.055	0.07	0.085	0.1	0.125	0.144
		N1.2	Aluminium, alloyed ≤ 7% Si		✓	✓	✓	500	0.023	0.04	0.057	0.074	0.09	0.105	0.131	0.152
		N1.3	Aluminium, alloyed > 7 -12 % Si		✓	✓	✓	400	0.024	0.042	0.06	0.077	0.094	0.109	0.137	0.159
		N1.4	Aluminium, alloyed > 12 % Si		✓	✓	✓	290	0.026	0.046	0.066	0.085	0.103	0.119	0.149	0.173
	N2	N2.1	Copper, non-alloyed and low alloyed	< 300	✓	✓	✓	290	0.017	0.031	0.044	0.056	0.068	0.08	0.1	0.115
		N2.2	Copper, alloyed	> 300	✓	✓	✓	215	0.017	0.031	0.044	0.056	0.068	0.08	0.1	0.115
		N2.3	Brass, bronze, gunmetal	< 1200	✓	✓	✓	360	0.011	0.019	0.027	0.035	0.043	0.05	0.062	0.072
	N4	N4.1	Plastic, thermoplastic		✓	✓	✓	100	0.011	0.019	0.027	0.035	0.043	0.05	0.062	0.072
		N4.2	Plastic, Duroplast		✓	✓	✓	150	0.011	0.019	0.027	0.035	0.043	0.05	0.062	0.072
		N4.3	Plastic, foam		✓	✓		450	0.007	0.012	0.016	0.021	0.026	0.03	0.037	0.043

OptiMill-Titan-HPC | SCM39

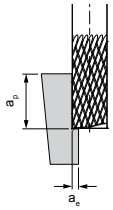
S	S1	S1.1	Titanium, titanium alloys	< 400			✓	70	0.012	0.021	0.030	0.039	0.047	0.055	0.068	0.079
	S2	S2.1	Titanium, titanium alloys	< 1200			✓	65	0.010	0.017	0.025	0.032	0.038	0.045	0.056	0.065
		S2.2	Titanium, titanium alloys	> 1200			✓	60	0.009	0.015	0.022	0.028	0.034	0.040	0.050	0.058
	S3	S3.1	Nickel, non-alloyed and alloyed	< 900			✓	45	0.011	0.019	0.027	0.035	0.043	0.050	0.062	0.072
		S3.2	Nickel, non-alloyed and alloyed	> 900			✓	35	0.007	0.012	0.016	0.021	0.026	0.030	0.037	0.043
	S4	S4.1	Highly heat-resistant super alloys, Ni-, Co-, and Fe- based				✓	25	0.005	0.010	0.014	0.018	0.021	0.025	0.031	0.036
	S5	S5.1	Tungsten-based and molybdenum-based alloys				✓	25	0.009	0.015	0.022	0.028	0.034	0.040	0.050	0.058

Roughing



a_p = 1.5 x D
a_p = 0.25 x D

Finishing



a_p = 1.5 x D
a_e = 0.1 x D

v_c [m/min]	f_z [mm/tooth] Mill diameter [mm]								v_c [m/min]	f_z [mm/tooth] Mill diameter [mm]							
	2	4	6	8	10	12	16	20		2	4	6	8	10	12	16	20
200	0.018	0.033	0.046	0.060	0.072	0.084	0.106	0.122	**295**	0.029	0.052	0.073	0.094	0.115	0.133	0.167	0.194
300	0.018	0.033	0.046	0.060	0.072	0.084	0.106	0.122	**445**	0.029	0.052	0.073	0.094	0.115	0.133	0.167	0.194
390	0.011	0.020	0.028	0.036	0.043	0.051	0.063	0.073	**520**	0.017	0.031	0.044	0.057	0.069	0.080	0.100	0.116
390	0.011	0.020	0.028	0.036	0.043	0.051	0.063	0.073	**520**	0.017	0.031	0.044	0.057	0.069	0.080	0.100	0.116
300	0.011	0.020	0.028	0.036	0.043	0.051	0.063	0.073	**445**	0.017	0.031	0.044	0.057	0.069	0.080	0.100	0.116
1540	0.037	0.065	0.093	0.119	0.145	0.169	0.211	0.245	**2255**	0.058	0.103	0.147	0.189	0.229	0.267	0.334	0.387
1025	0.039	0.069	0.098	0.125	0.152	0.177	0.222	0.257	**1500**	0.061	0.108	0.154	0.198	0.241	0.28	0.351	0.406
815	0.041	0.072	0.102	0.131	0.159	0.186	0.232	0.269	**1200**	0.064	0.113	0.162	0.208	0.252	0.294	0.367	0.426
590	0.044	0.078	0.111	0.143	0.174	0.203	0.254	0.294	**865**	0.07	0.124	0.176	0.227	0.275	0.32	0.401	0.464
590	0.03	0.052	0.074	0.096	0.116	0.135	0.169	0.196	**865**	0.047	0.083	0.117	0.151	0.183	0.214	0.267	0.31
440	0.03	0.052	0.074	0.096	0.116	0.135	0.169	0.196	**650**	0.047	0.083	0.117	0.151	0.183	0.214	0.267	0.31
735	0.018	0.033	0.046	0.06	0.072	0.084	0.106	0.122	**1080**	0.029	0.052	0.073	0.094	0.115	0.133	0.167	0.194
200	0.018	0.033	0.046	0.06	0.072	0.084	0.106	0.122	**295**	0.029	0.052	0.073	0.094	0.115	0.133	0.167	0.194
300	0.018	0.033	0.046	0.06	0.072	0.084	0.106	0.122	**445**	0.029	0.052	0.073	0.094	0.115	0.133	0.167	0.194
920	0.011	0.02	0.028	0.036	0.043	0.051	0.063	0.073	**1350**	0.017	0.031	0.044	0.057	0.069	0.08	0.1	0.116
90	0.020	0.036	0.051	0.066	0.080	0.093	0.116	0.135	**130**	0.030	0.051	0.071	0.086	0.105	0.118	0.146	0.165
80	0.017	0.029	0.042	0.054	0.065	0.076	0.095	0.110	**115**	0.027	0.044	0.062	0.074	0.090	0.101	0.125	0.140
70	0.015	0.026	0.037	0.048	0.058	0.068	0.085	0.098	**100**	0.025	0.041	0.057	0.068	0.080	0.093	0.115	0.128
50	0.018	0.033	0.046	0.060	0.072	0.084	0.106	0.122	**70**	0.028	0.048	0.066	0.080	0.097	1.109	0.136	0.152
40	0.011	0.020	0.028	0.036	0.043	0.051	0.063	0.073	**60**	0.021	0.035	0.048	0.056	0.068	0.076	0.093	0.103
30	0.009	0.016	0.023	0.030	0.036	0.042	0.053	0.061	**50**	0.019	0.031	0.043	0.050	0.041	0.067	0.053	0.091
30	0.015	0.026	0.037	0.048	0.058	0.068	0.085	0.098	**50**	0.025	0.041	0.057	0.068	0.063	0.093	1.115	0.128

Cutting data recommendation for face mills with PCD-milling inserts

Cutting speed and feed per tooth

MMG*			Material	Strength/hardness [N/mm² - HRC]	Cooling			
					MQL/air	Dry	Wet	
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		✓	✓	✓	
		N1.2	Aluminium, alloyed ≤ 7% Si		✓	✓	✓	
		N1.3	Aluminium, alloyed > 7 -12 % Si		✓	✓	✓	
		N1.4	Aluminium, alloyed > 12 % Si		✓	✓	✓	
	N2	N2.1	Copper, non-alloyed and low alloyed	< 300 N/mm²	✓	✓	✓	
		N2.2	Copper, alloyed	> 300 N/mm²	✓	✓	✓	
		N2.3	Brass, bronze, gunmetal	< 1200 N/mm²	✓	✓	✓	
	N3	N3.1	Graphite		✓	✓	✓	
	N4	N4.1	Plastic, thermoplastic		✓	✓	✓	
		N4.2	Plastic, Duroplast		✓	✓	✓	
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)		✓	✓		
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		✓	✓		
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		✓	✓		
	C2	C2.1	Carbon matrix, carbon fibre reinforced (CFC)		✓	✓		

PowerMill			FlyCutter	
v_c [m/min]	f_z [mm/tooth]		v_c [m/min]	f_z [mm/tooth]
	Cutting depth a_p max. 3 mm	Cutting depth a_p max. 5 mm		Cutting depth a_p max. 3 mm
max.6000	up to 0.2	0.1	max.6000	up to 0.2
max.6000			max.6000	
max.6000			max.6000	
max.2000			max.2000	
max.6000			max.6000	
max.2000			max.2000	
max.2000			max.2000	
max.2000			max.2000	
max.2000			max.2000	
max.2000			max.2000	
max.2000	up to 0.2	0.1	max.2000	up to 0.2
max.2000			max.2000	
max.2000			max.2000	

Cutting data recommendation for high volume mills

Feed and cutting speed

5° ramping possible
f_z ramping = f_z max * 0.6

OptiMill-SPM

Product	MMG*			Material	Strength/hardness [N/mm²] [HRC]	Cooling			
						MQL/air	Dry	Wet	
SCM69, long 	N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si				✓	
			N1.2	Aluminium, alloyed<= 7% Si				✓	
			N1.3	Aluminium, alloyed > 7-12 % Si				✓	
			N1.4	Aluminium, alloyed > 12 % Si				✓	
SCM68, short 	N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si				✓	
			N1.2	Aluminium, alloyed<= 7% Si				✓	
			N1.3	Aluminium, alloyed > 7-12 % Si				✓	
			N1.4	Aluminium, alloyed > 12 % Si				✓	

CPMill-SPM

CPM27, long 	N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si					
			N1.2	Aluminium, alloyed<= 7% Si					
			N1.3	Aluminium, alloyed > 7-12 % Si					
			N1.4	Aluminium, alloyed > 12 % Si					
CPM27, short 	N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si					
			N1.2	Aluminium, alloyed<= 7% Si					
			N1.3	Aluminium, alloyed > 7-12 % Si					
			N1.4	Aluminium, alloyed > 12 % Si					

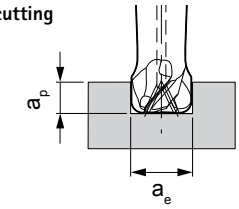
OptiMill-Diamond-SPM

SHM11, long 	N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		✓		✓	
			N1.2	Aluminium, alloyed<= 7% Si		✓		✓	
			N1.3	Aluminium, alloyed > 7-12 % Si		✓		✓	
			N1.4	Aluminium, alloyed > 12 % Si		✓		✓	
SHM10, short 	N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		✓		✓	
			N1.2	Aluminium, alloyed<= 7% Si		✓		✓	
			N1.3	Aluminium, alloyed > 7-12 % Si		✓		✓	
			N1.4	Aluminium, alloyed > 12 % Si		✓		✓	

OptiMill-Diamond-SPM

SHM12, HSK-A 	N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		✓		✓	
			N1.2	Aluminium, alloyed<= 7% Si		✓		✓	
			N1.3	Aluminium, alloyed > 7-12 % Si		✓		✓	
			N1.4	Aluminium, alloyed > 12 % Si		✓		✓	

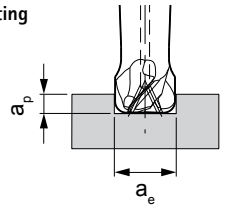
Full/part-contact cutting



a_p = 0.5 x D
a_e = D

Mill diameter [mm]									
6 - 10		12 - 14		16 - 18		20 - 25		32	
v_c	$f_{z\,max}$	v_c	$f_{z\,max}$	v_c	$f_{z\,max}$	v_c	$f_{z\,max}$	v_c	$f_{z\,max}$
225-715	0.23	450-990	0.26	600-1275	0.28	750-1760	0.30	1200-2250	0.32
190-605	0.23	380-840	0.26	510-1080	0.28	635-1495	0.30	1020-1910	0.32
170-545	0.23	340-750	0.26	460-970	0.28	570-1345	0.30	915-1720	0.32
155-490	0.23	300-675	0.26	410-870	0.28	510-1210	0.30	820-1550	0.32
		450-990	0.29	600-1275	0.31	750-1760	0.33	1200-2250	0.35
		380-840	0.29	510-1080	0.31	635-1495	0.33	1020-1910	0.35
		340-750	0.29	460-970	0.31	570-1345	0.33	915-1720	0.35
		300-675	0.29	410-870	0.31	510-1210	0.33	820-1550	0.35

Full/part-contact cutting



a_p = 0.3 x D
a_e = D

Mill diameter [mm]									
6 - 10		12 - 14		16 - 18		20 - 25		32	
v_c	$f_{z\,max}$	v_c	$f_{z\,max}$	v_c	$f_{z\,max}$	v_c	$f_{z\,max}$	v_c	$f_{z\,max}$
225-715	0.29	450-990	0.32	600-1275	0.34	750-1760	0.35	1200-2250	0.36
190-605	0.29	380-840	0.32	510-1080	0.34	635-1495	0.35	1020-1910	0.36
170-545	0.29	340-750	0.32	460-970	0.34	570-1345	0.35	915-1720	0.36
155-490	0.29	300-675	0.32	410-870	0.34	510-1210	0.35	820-1550	0.36
		450-990	0.35	600-1275	0.37	750-1760	0.38	1200-2250	0.39
		380-840	0.35	510-1080	0.37	635-1495	0.38	1020-1910	0.39
		340-750	0.35	460-970	0.37	570-1345	0.38	915-1720	0.39
		300-675	0.35	410-870	0.37	510-1210	0.38	820-1550	0.39

14		16 - 18		20 - 25	
v_c	$f_{z\,max}$	v_c	$f_{z\,max}$	v_c	$f_{z\,max}$
335-740	0.21	450-955	0.23	560-1320	0.25
285-630	0.21	380-810	0.23	470-1120	0.25
255-565	0.21	340-730	0.23	420-1005	0.25
230-505	0.21	305-655	0.23	380-905	0.25
370-810	0.23	495-1050	0.25	610-1450	0.27
315-685	0.23	420-890	0.25	520-1230	0.27
280-615	0.23	380-800	0.25	465-1105	0.27
250-550	0.23	340-720	0.25	420-995	0.27

14		16 - 18		20 - 25	
v_c	$f_{z\,max}$	v_c	$f_{z\,max}$	v_c	$f_{z\,max}$
335-740	0.27	450-955	0.29	560-1320	0.30
285-630	0.27	380-810	0.29	470-1120	0.30
255-565	0.27	340-730	0.29	420-1005	0.30
230-505	0.27	305-655	0.29	380-905	0.30
370-810	0.29	495-1050	0.31	610-1450	0.32
315-685	0.29	420-890	0.31	520-1230	0.32
280-615	0.29	380-800	0.31	465-1105	0.32
250-550	0.29	340-720	0.31	420-995	0.32

6 - 10		12 - 14		16 - 18		20 - 25		32	
v_c	$f_{z\,max}$	v_c	$f_{z\,max}$	v_c	$f_{z\,max}$	v_c	$f_{z\,max}$	v_c	$f_{z\,max}$
300-950	0.19	600-1320	0.22	800-1700	0.24	1000-2350	0.26	1600-3000	0.28
255-805	0.19	510-1120	0.22	680-1445	0.24	850-1995	0.26	1360-2550	0.28
230-720	0.19	460-1010	0.22	610-1300	0.24	765-1795	0.26	1225-2295	0.28
205-650	0.19	410-910	0.22	550-1170	0.24	685-1615	0.26	1100-2065	0.28
		600-1320	0.25	800-1700	0.27	1000-2350	0.29	1600-3000	0.31
		510-1120	0.25	680-1445	0.27	850-1995	0.29	1360-2550	0.31
		460-1010	0.25	610-1300	0.27	765-1795	0.29	1225-2295	0.31
		410-910	0.25	550-1170	0.27	685-1615	0.29	1100-2065	0.31

6 - 10		12 - 14		16 - 18		20 - 25		32	
v_c	$f_{z\,max}$	v_c	$f_{z\,max}$	v_c	$f_{z\,max}$	v_c	$f_{z\,max}$	v_c	$f_{z\,max}$
300-950	0.25	600-1320	0.28	800-1700	0.30	1000-2350	0.31	1600-3000	0.32
255-805	0.25	510-1120	0.28	680-1445	0.30	850-1995	0.31	1360-2550	0.32
230-720	0.25	460-1010	0.28	610-1300	0.30	765-1795	0.31	1225-2295	0.32
205-650	0.25	410-910	0.28	550-1170	0.30	685-1615	0.31	1100-2065	0.32
		600-1320	0.31	800-1700	0.33	1000-2350	0.34	1600-3000	0.35
		510-1120	0.31	680-1445	0.33	850-1995	0.34	1360-2550	0.35
		460-1010	0.31	610-1300	0.33	765-1795	0.34	1225-2295	0.35
		410-910	0.31	550-1170	0.33	685-1615	0.34	1100-2065	0.35

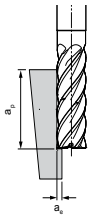
32									
v_c	$f_{z\,max}$								
1600-3000	0.26								
1360-2550	0.26								
1225-2295	0.26								
1100-2065	0.26								

32		40		50	
v_c	$f_{z\,max}$	v_c	$f_{z\,max}$	v_c	$f_{z\,max}$
1600-3000	0.32	1500-3770	0.34	1900-4700	0.36
1360-2550	0.32	1275-3200	0.34	1615-3995	0.36
1225-2295	0.32	1150-2880	0.34	1450-3595	0.36
1100-2065	0.32	1035-2590	0.34	1305-3235	0.36

Cutting data recommendation for trochoidal mills

Feed and cutting speed

Trochoidal milling



a_p = max. 3 x D
a_e = depending on material

OptiMill-PM-Trochoid | SCM59

MMG*			Material	Strength/ hardness [N/mm²] [HRC]	Cooling			v_c [m/min]	f_z [mm/tooth] as a percentage of D	f_z [mm/tooth] as a percentage of D	f_z [mm/tooth] as a percentage of D
					MQL/air	Dry	Wet				
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700	✓	✓	✓	**380-520**	1,4-2,0	14-18	0,66-0,80
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200	✓	✓	✓	**320-460**	1,2-1,8	12-16	0,62-0,76
	P2	P2.1	Nitrided, case hardened and heat-treated steels, alloyed	< 900	✓	✓	✓	**340-480**	1,2-1,8	10-14	0,58-0,71
		P2.2	Nitrided, case hardened and heat-treated steels, alloyed	< 1400	✓		✓	**280-380**	1,0-1,6	8-12	0,56-0,68
	P3	P3.1	Tool, bearing, spring and high-speed steels	< 900	✓	✓	✓	**240-350**	1,0-1,6	8-14	0,54-0,65
		P3.2	Tool, bearing, spring and high-speed steels	< 1500	✓		✓	**210-320**	0,8-1,4	6-12	0,52-0,62
	P4	P4.1	Stainless steels, ferritic and martensitic		✓		✓	**180-260**	0,8-1,2	6-12	0,50-0,60
	P5	P5.1	Cast steel					**220-300**	1,2-1,8	8-12	0,54-0,62
	P6	P6.1	Stainless cast steel, ferritic and martensitic				✓	**160-240**	0,8-1,4	6-12	0,50-0,60
M	M1	M1.1	Stainless steels, austenitic	< 700	✓		✓	**140-220**	0,6-1,0	5-10	0,48-0,60
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000			✓	**110-180**	0,6-1,0	5-10	0,46-0,58
	M2	M2.1	Stainless cast steel, austenitic	< 700	✓		✓	**130-200**	0,8-1,2	6-12	0,52-0,60
	M3	M3.1	Stainless cast steel, austenitic (duplex)	< 1000			✓	**120-180**	0,8-1,2	5-10	0,46-0,56

OptiMill-S-Trochoid | SCM60, OptiMill-Titan-Trochoid | SCM63

S	S1	S1.1	Titanium, titanium alloys	< 400			✓	**110-170**	0,65-1,3	6-12	0,52-0,60
	S2	S2.1	Titanium, titanium alloys	< 1200			✓	**90-150**	0,6-1,2	5-10	0,46-0,56
		S2.2	Titanium, titanium alloys	> 1200			✓	**70-130**	0,4-1,0	5-10	0,42-0,54
	S3	S3.1	Nickel, non-alloyed and alloyed	< 900			✓	**60-120**	0,4-1,0	5-10	0,40-0,52
		S3.2	Nickel, non-alloyed and alloyed	> 900			✓	**50-100**	0,3-0,9	5-10	0,40-0,52
	S4	S4.1	Highly heat-resistant super alloys, Ni-, Co-, and Fe- based				✓	**35-90**	0,3-0,8	4-8	0,38-0,46
	S5	S5.1	Tungsten-based and molybdenum-based alloys				✓	**35-90**	0,3-0,8	4-8	0,38-0,46

Note:
With trochoidal milling, the stated cutting conditions change during the machining process. This is also dependent on the CAM software used and the machining position of the tool in the workpiece. Feed and contact width or contact angle change constantly during the machining process so that the average chip thickness remains as constant as possible for each contour.

	Machining example	
	16MnCr5 ø = 12 mm v_c = 500 m/min f_z = 0,18 mm a_e = 1,4 mm a_p = 32 mm **42CrMo4** ø = 12 mm v_c = 375 m/min f_z = 0,16 mm a_e = 1,2 mm a_p = 32 mm	
	X5CrNi18-8 ø = 12 mm v_c = 180 m/min f_z = 0,09 mm a_e = 1,2 mm a_p = 32 mm	
	TiAl6V4 ø = 12 mm v_c = 140 m/min f_z = 0,09 mm a_e = 1,2 mm a_p = 30 mm	

Cutting data recommendation for solid carbide drills

Feed and cutting speed

MEGA-Drill-Composite-MD | SCD25

MMG*			Material	Strength/hardness [N/mm²] [HRC]	
N	N3	N3.1	Graphite		
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)		
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		
	C2	C2.1	Carbon matrix, carbon fibre reinforced (CFC)		
	C4	C4.1	Sandwich construction, honeycomb core		
		C4.2	Sandwich construction, foam core		

MEGA-Drill-Composite-MD | SCD27

MMG*			Material	Strength/hardness [N/mm²] [HRC]	
N	N3	N3.1	Graphite		
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)		
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		
	C2	C2.1	Carbon matrix, carbon fibre reinforced (CFC)		
	C4	C4.1	Sandwich construction, honeycomb core		
		C4.2	Sandwich construction, foam core		

MEGA-Drill-Aramid | SCD28

MMG*			Material	Strength/hardness [N/mm²] [HRC]	
N	N4	N4.1	Plastic, thermoplastic		
		N4.2	Plastic, Duroplast		
		N4.3	Plastic, foam		
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)		
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		
	C4	C4.1	Sandwich construction, honeycomb core		
		C4.2	Sandwich construction, foam core		

MEGA-Stack-Drill-CT | SCD43

MMG*			Material	Strength/hardness [N/mm²] [HRC]	
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		
		N1.2	Aluminium, alloyed ≤ 7% Si		
		N1.3	Aluminium, alloyed > 7-12 % Si		
		N1.4	Aluminium, alloyed > 12 % Si		
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)		
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)		
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)		
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)		
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)		
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)		

Cutting speed v_c [m/min]				Feed f [mm] at specified drill diameters					
Internal cooling	External cooling	MQL	Air	2.5	3.4	4.7	6.4	8.8	12.0
			150	0.07	0.07	0.08	0.08	0.10	0.12
			90	0.03	0.04	0.05	0.07	0.07	0.08
			90	0.03	0.04	0.05	0.07	0.07	0.08
			90	0.03	0.04	0.05	0.07	0.07	0.08
			150	0.03	0.04	0.05	0.05	0.06	0.08
			150	0.03	0.04	0.05	0.05	0.06	0.08

				3	4	5.5	7.5	10	12
			150	0.07	0.07	0.08	0.08	0.10	0.12
			90	0.04	0.05	0.06	0.07	0.07	0.08
			90	0.04	0.05	0.06	0.07	0.07	0.08
			90	0.04	0.05	0.06	0.07	0.07	0.08
			150	0.03	0.04	0.05	0.05	0.06	0.08

				3	4	5.5	7.5	10	12
	90			0.04	0.05	0.08	0.10	0.14	0.20
	100			0.05	0.06	0.09	0.11	0.15	0.21
			200	0.06	0.08	0.09	0.12	0.14	0.16
			100	0.04	0.04	0.05	0.06	0.07	0.08
			150	0.04	0.04	0.05	0.06	0.07	0.08
			150	0.04	0.04	0.05	0.06	0.07	0.08

				3	4	5.5	7.5	10	12
120	**120**	**120**		0.05	0.05	0.07	0.07	0.10	0.10
120	**120**	**120**		0.07	0.09	0.11	0.13	0.15	0.18
120	**120**	**120**		0.07	0.09	0.11	0.13	0.15	0.18
120	**120**	**120**		0.07	0.09	0.11	0.13	0.15	0.18
		90		0.07	0.07	0.10	0.10	0.12	0.12

Cutting data recommendation for solid carbide drills

Feed and cutting speed

MEGA-Stack-Drill-CT | SCD55

MMG*			Material	Strength/hardness [N/mm²] [HRC]	
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)		
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)		
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)		
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)		
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)		
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)		
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	

MEGA-Stack-Drill-Robot-CA | SCD45

N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		
		N1.2	Aluminium, alloyed ≤ 7% Si		
		N1.3	Aluminium, alloyed > 7-12 % Si		
		N1.4	Aluminium, alloyed > 12 % Si		
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)		
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)		
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)		
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)		
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)		
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)		

MEGA-Stack-Drill-Robot-CT | SCD46

C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)		
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)		
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)		
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)		
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)		
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)		
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	

	Cutting speed v_c [m/min]				Feed f [mm] at specified drill diameters					
	Internal cooling	External cooling	MQL	Air	3	4	5.5	7.5	10	12
			30		0.05	0.05	0.07	0.10	0.10	0.12
	30		**30**		0.05	0.05	0.07	0.10	0.10	0.12
	30		**30**		0.05	0.05	0.07	0.10	0.10	0.12
	30		**30**		0.05	0.05	0.07	0.10	0.10	0.12

					8	9.5	11.5	14	17	20
	120	**120**	**120**		0.05	0.05	0.07	0.07	0.10	0.10
	120	**120**	**120**		0.07	0.09	0.11	0.13	0.15	0.18
	120	**120**	**120**		0.07	0.09	0.11	0.13	0.15	0.18
	120	**120**	**120**		0.07	0.09	0.11	0.13	0.15	0.18
			90		0.07	0.07	0.10	0.10	0.12	0.12

					8	9.5	11.5	14	17	20
			30		0.05	0.05	0.07	0.10	0.10	0.12
	30		**30**		0.05	0.05	0.07	0.10	0.10	0.12
	30		**30**		0.05	0.05	0.07	0.10	0.10	0.12
	30		**30**		0.05	0.05	0.07	0.10	0.10	0.12

Cutting data recommendation for solid carbide drills

Feed and cutting speed

Mono-Drill-Plastic | SCD57

MMG*			Material	Strength/hardness [N/mm²] [HRC]	
N	N4	N4.1	Plastic, thermoplastic		
		N4.2	Plastic, Duroplast		
		N4.3	Plastic, foam		
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)		
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		

MEGA-Drill-Alu | SCD13

N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		
		N1.2	Aluminium, alloyed ≤ 7% Si		
		N1.3	Aluminium, alloyed > 7-12 % Si		
		N1.4	Aluminium, alloyed > 12 % Si		
	N2	N2.1	Copper, non-alloyed and low alloyed	< 300 N/mm²	
		N2.2	Copper, alloyed	> 300 N/mm²	
		N2.3	Brass, bronze, gunmetal	< 1200 N/mm²	

MEGA-Speed-Drill-Inox | SCD41

P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700 N/mm²	
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200 N/mm²	
	P2	P2.1	Nitrided, case hardened and heat-treated steels, alloyed	< 900 N/mm²	
		P2.2	Nitrided, case hardened and heat-treated steels, alloyed	< 1400 N/mm²	
	P3	P3.1	Tool, bearing, spring and high-speed steels	< 900 N/mm²	
		P3.2	Tool, bearing, spring and high-speed steels	< 1500 N/mm²	
	P4	P4.1	Stainless steels, ferritic and martensitic		
	P5	P5.1	Cast steel		
	P6	P6.1	Stainless cast steel, ferritic and martensitic		
M	M1	M1.1	Stainless steels, austenitic	< 700 N/mm²	
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm²	
	M2	M2.1	Stainless cast steel, austenitic	< 700 N/mm²	
	M3	M3.1	Stainless cast steel, austenitic (duplex)	< 1000 N/mm²	
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	
	S3	S3.1	Nickel, non-alloyed and alloyed	< 900 N/mm²	
		S3.2	Nickel, non-alloyed and alloyed	> 900 N/mm²	
	S4	S4.1	Highly heat-resistant super alloys, Ni-, Co-, and Fe- based		
	S5	S5.1	Tungsten-based and molybdenum-based alloys		

	Cutting speed v_c [m/min]				Feed f [mm] at specified drill diameters					
	Internal cooling	External cooling	MQL	Air	3	4.5	6.5	9.5	14	20
		60		**50**	0.04	0.05	0.06	0.08	0.12	0.17
		65		**40**	0.05	0.06	0.08	0.11	0.15	0.21
		60		**55**	0.03	0.03	0.04	0.05	0.06	0.08

	300	**200**	**250**		0.09	0.12	0.15	0.19	0.25	0.30
	250	**180**	**200**		0.11	0.15	0.19	0.25	0.32	0.40
	220	**150**	**180**		0.11	0.15	0.19	0.25	0.32	0.40
	180	**120**	**150**		0.11	0.15	0.19	0.25	0.32	0.40
					0.09	0.12	0.15	0.19	0.25	0.30
	200	**160**			0.10	0.14	0.18	0.25	0.32	0.40

	150	**135**	**135**		0.09	0.12	0.15	0.19	0.25	0.30
	135	**115**	**115**		0.11	0.15	0.19	0.24	0.31	0.38
	150	**130**	**130**		0.11	0.14	0.18	0.23	0.29	0.36
	105	**90**	**90**		0.09	0.12	0.14	0.18	0.23	0.28
	115	**100**	**100**		0.10	0.12	0.16	0.20	0.26	0.32
	90	**85**	**85**		0.08	0.10	0.13	0.17	0.22	0.26
	70	**55**	**60**		0.06	0.08	0.10	0.14	0.17	0.21
	150	**130**	**130**		0.11	0.14	0.18	0.23	0.29	0.36
	70	**55**	**60**		0.06	0.08	0.10	0.14	0.17	0.21
	80	**50**	**50**		0.08	0.10	0.13	0.17	0.22	0.26
	75	**45**	**45**		0.07	0.09	0.11	0.14	0.19	0.23
	80	**50**	**50**		0.08	0.10	0.13	0.17	0.22	0.26
	75	**45**	**45**		0.07	0.09	0.11	0.14	0.19	0.23
	50	**30**			0.08	0.10	0.13	0.16	0.21	0.25
	35	**25**			0.07	0.08	0.11	0.14	0.18	0.22
	30	**20**			0.05	0.07	0.09	0.12	0.15	0.18
	25	**20**			0.04	0.06	0.07	0.09	0.12	0.14
	20	**10**			0.05	0.07	0.09	0.12	0.15	0.18
	20	**10**			0.04	0.06	0.07	0.09	0.12	0.14
	20	**10**			0.04	0.06	0.07	0.09	0.12	0.14

Cutting data recommendation for solid carbide drills

Feed and cutting speed

MEGA-Drill-Inco | SCD29

MMG*			Material	Strength/hardness [N/mm²] [HRC]	
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	
	S3	S3.1	Nickel, non-alloyed and alloyed	< 900 N/mm²	
		S3.2	Nickel, non-alloyed and alloyed	> 900 N/mm²	
	S4	S4.1	Highly heat-resistant super alloys, Ni-, Co-, and Fe- based		
	S5	S5.1	Tungsten-based and molybdenum-based alloys		

MEGA-Speed-Drill-Titan | SCD30

S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	
	S3	S3.1	Nickel, non-alloyed and alloyed	< 900 N/mm²	
		S3.2	Nickel, non-alloyed and alloyed	> 900 N/mm²	
	S4	S4.1	Highly heat-resistant super alloys, Ni-, Co-, and Fe- based		
	S5	S5.1	Tungsten-based and molybdenum-based alloys		

	Cutting speed v_c [m/min]				Feed f [mm] at specified drill diameters					
	Internal cooling	External cooling	MQL	Air	3	4.5	6.5	9.5	14	20
	30		**30**		0.05	0.05	0.07	0.10	0.10	0.12
	30		**30**		0.05	0.05	0.07	0.10	0.10	0.12
	30		**30**		0.05	0.05	0.07	0.10	0.10	0.12
	30		**30**		0.05	0.05	0.07	0.10	0.10	0.12
	30		**30**		0.05	0.05	0.07	0.10	0.10	0.12
	20	**15**			0.04	0.05	0.06	0.08	0.10	0.12
	20	**15**			0.04	0.05	0.06	0.08	0.10	0.12

	50	**40**			0.06	0.06	0.08	0.08	0.10	0.15
	40	**30**			0.06	0.06	0.08	0.08	0.10	0.15
	30	**20**			0.06	0.06	0.08	0.08	0.10	0.15
	30	**20**			0.06	0.06	0.08	0.08	0.10	0.15
	20	**10**			0.06	0.06	0.08	0.08	0.10	0.15
	20	**15**			0.04	0.05	0.06	0.08	0.10	0.12
	20	**15**			0.04	0.05	0.06	0.08	0.10	0.12

Cutting data recommendation for replaceable-head drills

Feed and cutting speed

TTD – type 12 – composite

MMG*			Material	Strength/hardness [N/mm²] [HRC]	
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		
		N1.2	Aluminium, alloyed ≤ 7% Si		
		N1.3	Aluminium, alloyed > 7-12 % Si		
		N1.4	Aluminium, alloyed > 12 % Si		
	N2	N2.1	Copper, non-alloyed and low alloyed	< 300 N/mm²	
		N2.2	Copper, alloyed	> 300 N/mm²	
		N2.3	Brass, bronze, gunmetal	< 1200 N/mm²	
	N3	N3.1	Graphite		
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)		
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		
	C2	C2.1	Carbon matrix, carbon fibre reinforced (CFC)		
	C4	C4.1	Sandwich construction, honeycomb core		
		C4.2	Sandwich construction, foam core		

TTD – type 21 – stack CA

N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		
		N1.2	Aluminium, alloyed ≤ 7% Si		
		N1.3	Aluminium, alloyed > 7-12 % Si		
		N1.4	Aluminium, alloyed > 12 % Si		
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)		
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)		
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)		
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)		
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)		
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)		

TTD – type 22 – stack CT

C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)		
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)		
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)		
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)		
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)		
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)		
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	

	Cutting speed v_c [m/min]				Feed f [mm] at specified drill diameters					
	Internal cooling	External cooling	MQL	Air	12	15.5	19.5	25	32	40
	300	**200**	**250**		0.23	0.26	0.30	0.33	0.33	0.33
	250	**180**	**200**		0.29	0.35	0.39	0.43	0.44	0.44
	220	**150**	**180**		0.29	0.35	0.39	0.43	0.44	0.44
	180	**120**	**150**		0.29	0.35	0.39	0.43	0.44	0.44
	140	**100**			0.23	0.26	0.30	0.33	0.33	0.33
				150	0.07	0.07	0.08	0.08	0.10	0.12
				90	0.03	0.04	0.05	0.07	0.07	0.08
				90	0.03	0.04	0.05	0.07	0.07	0.08
				90	0.03	0.04	0.05	0.07	0.07	0.08
				150	0.03	0.04	0.05	0.05	0.06	0.08

	300	**200**	**250**		0.23	0.26	0.30	0.33	0.33	0.33
	250	**180**	**200**		0.29	0.35	0.39	0.43	0.44	0.44
	220	**150**	**180**		0.29	0.35	0.39	0.43	0.44	0.44
	180	**120**	**150**		0.29	0.35	0.39	0.43	0.44	0.44
			90		0.12	0.12	0.15	0.15	0.20	0.20

			30		0.12	0.12	0.15	0.15	0.18	0.18
	30		**30**		0.12	0.15	0.17	0.19	0.21	0.23
	30		**30**		0.12	0.15	0.17	0.19	0.21	0.23
	30		**30**		0.12	0.15	0.17	0.19	0.21	0.23

Cutting data recommendation for replaceable-head drills

Feed and cutting speed

TTD – type 03 – alu

MMG*			Material	Strength/hardness [N/mm²] [HRC]	
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		
		N1.2	Aluminium, alloyed ≤ 7% Si		
		N1.3	Aluminium, alloyed > 7-12 % Si		
		N1.4	Aluminium, alloyed > 12 % Si		
	N2	N2.1	Copper, non-alloyed and low alloyed	< 300 N/mm²	
		N2.2	Copper, alloyed	> 300 N/mm²	
		N2.3	Brass, bronze, gunmetal	< 1200 N/mm²	

TTD – type 02 – inox

P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700 N/mm²	
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200 N/mm²	
	P2	P2.1	Nitrided, case hardened and heat-treated steels, alloyed	< 900 N/mm²	
		P2.2	Nitrided, case hardened and heat-treated steels, alloyed	< 1400 N/mm²	
	P3	P3.1	Tool, bearing, spring and high-speed steels	< 900 N/mm²	
		P3.2	Tool, bearing, spring and high-speed steels	< 1500 N/mm²	
	P4	P4.1	Stainless steels, ferritic and martensitic		
	P5	P5.1	Cast steel		
	P6	P6.1	Stainless cast steel, ferritic and martensitic		
M	M1	M1.1	Stainless steels, austenitic	< 700 N/mm²	
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm²	
	M2	M2.1	Stainless cast steel, austenitic	< 700 N/mm²	
	M3	M3.1	Stainless cast steel, austenitic (duplex)	< 1000 N/mm²	
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	
	S3	S3.1	Nickel, non-alloyed and alloyed	< 900 N/mm²	
		S3.2	Nickel, non-alloyed and alloyed	> 900 N/mm²	
	S4	S4.1	Highly heat-resistant super alloys, Ni-, Co-, and Fe- based		
	S5	S5.1	Tungsten-based and molybdenum-based alloys		

	Cutting speed v_c [m/min]				Feed f [mm] at specified drill diameters					
	Internal cooling	External cooling	MQL	Air	12	15.5	19.5	25	32	40
	300	**200**	**250**		0.23	0.26	0.30	0.33	0.33	0.30
	250	**180**	**200**		0.29	0.35	0.39	0.43	0.44	0.40
	220	**150**	**180**		0.29	0.35	0.39	0.43	0.44	0.40
	180	**120**	**150**		0.29	0.35	0.39	0.43	0.44	0.40
	140	**100**			0.23	0.26	0.30	0.33	0.33	0.30
	120	**90**			0.29	0.35	0.39	0.43	0.44	0.40
	200	**160**	**160**	**120**	0.37	0.43	0.49	0.55	0.56	0.51
	100	**90**	**90**		0.20	0.24	0.27	0.29	0.30	0.27
	90	**75**	**75**		0.25	0.30	0.33	0.37	0.38	0.34
	100	**85**	**85**		0.24	0.28	0.32	0.35	0.36	0.33
	70	**60**	**60**		0.19	0.22	0.25	0.27	0.28	0.26
	75	**65**	**65**		0.22	0.25	0.28	0.31	0.32	0.30
	60	**55**	**55**		0.18	0.21	0.23	0.25	0.26	0.24
	60	**45**	**50**		0.14	0.17	0.19	0.21	0.21	0.19
	100	**85**	**85**		0.24	0.28	0.32	0.35	0.36	0.33
	60	**45**	**50**		0.14	0.17	0.19	0.21	0.21	0.19
	55	**35**	**35**		0.18	0.21	0.24	0.26	0.27	0.24
	50	**30**	**30**		0.16	0.18	0.20	0.22	0.23	0.21
	55	**35**	**35**		0.18	0.21	0.24	0.26	0.27	0.24
	50	**30**	**30**		0.16	0.18	0.20	0.22	0.23	0.21
	40	**25**			0.16	0.18	0.21	0.23	0.23	0.21
	30	**20**			0.14	0.16	0.18	0.20	0.20	0.18
	25	**15**			0.11	0.13	0.15	0.16	0.17	0.15
	20	**15**			0.09	0.11	0.12	0.13	0.13	0.12
	15	**10**			0.11	0.13	0.15	0.16	0.17	0.15
	15	**10**			0.09	0.11	0.12	0.13	0.13	0.12
	15	**10**			0.09	0.11	0.12	0.13	0.13	0.12

Cutting data recommendation for FixReam FXR

Feed and cutting speed

FXR510

Cutting material: HC614 | Cutting lead: MF1M

MMG*			Material	Strength/hardness [N/mm²] [HRC]	Application data for ø [mm]					
					< 5			5 - 6.2		
					v_c [m/min]	f [mm/U]	Stock removal a	v_c [m/min]	f [mm/U]	Stock removal a
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)		**50**	0.25	0.10	**50**	0.25	0.10
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		**50**	0.25	0.10	**50**	0.25	0.10
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		**50**	0.25	0.10	**50**	0.25	0.10

FXR500

Cutting material: HP622 | Cutting lead: MG0A

					< 5			5 - 6.2		
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		**250**	0.50	0.10	**250**	0.60	0.10
		N1.2	Aluminium, alloyed ≤ 7% Si		**250**	0.50	0.10	**250**	0.60	0.10
		N1.3	Aluminium, alloyed > 7-12 % Si		**250**	0.50	0.10	**250**	0.60	0.10
		N1.4	Aluminium, alloyed > 12 % Si		**250**	0.50	0.10	**250**	0.60	0.10

FXR510

Cutting material: HP145 | Cutting lead: MF1M

P	P4	P4.1	Stainless steels, ferritic and martensitic							
	P5	P5.1	Cast steel							
	P6	P6.1	Stainless cast steel, ferritic and martensitic		**40**	0.10	0.05	**40**	0.15	0.05
M	M1	M1.1	Stainless steels, austenitic	< 700 N/mm²	**40**	0.10	0.05	**40**	0.15	0.05
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm²	**30**	0.10	0.05	**30**	0.15	0.05
	M2	M2.1	Stainless cast steel, austenitic	< 700 N/mm²	**40**	0.10	0.05	**40**	0.15	0.05
	M3	M3.1	Stainless cast steel, austenitic (duplex)	< 1000 N/mm²	**30**	0.10	0.05	**30**	0.15	0.05

FXR510

Cutting material: HP613 | Cutting lead: MF1M

					< 5			5 - 6.2		
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	**15**	0.08	0.05	**15**	0.12	0.05
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	**15**	0.08	0.05	**15**	0.12	0.05
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	**15**	0.08	0.05	**15**	0.12	0.05
	S3	S3.1	Nickel, non-alloyed and alloyed	< 900 N/mm²	**15**	0.08	0.05	**15**	0.12	0.05
		S3.2	Nickel, non-alloyed and alloyed	> 900 N/mm²	**15**	0.08	0.05	**15**	0.12	0.05
	S4	S4.1	Highly heat-resistant super alloys, Ni-, Co-, and Fe- based		**15**	0.08	0.05	**15**	0.12	0.05
	S5	S5.1	Tungsten-based and molybdenum-based alloys		**15**	0.08	0.05	**15**	0.12	0.05

	Application data for ø [mm]															
	> 6.2 - 8			> 8 - 12			> 12 - 16			16 - 16.2			> 16.2 - 20.2			
	v_c [m/min]	f [mm/U]	Stock removal a	v_c [m/min]	f [mm/U]	Stock removal a	v_c [m/min]	f [mm/U]	Stock removal a	v_c [m/min]	f [mm/U]	Stock removal a	v_c [m/min]	f [mm/U]	Stock removal a	
	50	0.40	0.10	**50**	0.40	0.10	**50**	0.40	0.10	**50**	0.40	0.10	**50**	0.40	0.10	
	50	0.40	0.10	**50**	0.40	0.10	**50**	0.40	0.10	**50**	0.40	0.10	**50**	0.40	0.10	
	50	0.40	0.10	**50**	0.40	0.10	**50**	0.40	0.10	**50**	0.40	0.10	**50**	0.40	0.10	

	> 6.2 - 8			> 8 - 12			16.2 - 16.2			> 16.2 - 20		
	250	0.80	0.10	**250**	1.30	0.10	**250**	1.50	0.15	**250**	1.80	0.15
	250	0.80	0.10	**250**	1.30	0.10	**250**	1.50	0.15	**250**	1.80	0.15
	250	0.80	0.10	**250**	1.30	0.10	**250**	1.50	0.15	**250**	1.80	0.15
	250	0.80	0.10	**250**	1.30	0.10	**250**	1.50	0.15	**250**	1.80	0.15

	40	0.30	0.05	**40**	0.40	0.10	**40**	0.50	0.10	**40**	0.60	0.10	**40**	0.60	0.10	
	40	0.30	0.05	**40**	0.40	0.10	**40**	0.50	0.10	**40**	0.60	0.10	**40**	0.60	0.10	
	30	0.30	0.05	**30**	0.40	0.10	**30**	0.50	0.10	**30**	0.60	0.10	**30**	0.60	0.10	
	40	0.30	0.05	**40**	0.40	0.10	**40**	0.50	0.10	**40**	0.60	0.10	**40**	0.60	0.10	
	30	0.30	0.05	**30**	0.40	0.10	**30**	0.50	0.10	**30**	0.60	0.10	**30**	0.60	0.10	

	> 6.2 - 8			> 8 - 12			16.2 - 16.2			> 16.2 - 20		
	15	0.15	0.05	**15**	0.10	0.05	**15**	0.20	0.08	**15**	0.25	0.10
	15	0.16	0.05	**15**	0.10	0.05	**15**	0.20	0.08	**15**	0.25	0.10
	15	0.17	0.05	**15**	0.10	0.05	**15**	0.20	0.08	**15**	0.25	0.10
	15	0.18	0.05	**15**	0.10	0.05	**15**	0.20	0.08	**15**	0.25	0.10
	15	0.19	0.05	**15**	0.10	0.05	**15**	0.20	0.08	**15**	0.25	0.10
	15	0.20	0.05	**15**	0.10	0.05	**15**	0.20	0.08	**15**	0.25	0.10
	15	0.21	0.05	**15**	0.10	0.05	**15**	0.20	0.08	**15**	0.25	0.10

Cutting data recommendation for drilling from solid (first hole)

FAL-Countersink-Drill, HSS | FAD20

MMG*			Material	Strength/hardness [N/mm²] [HRC]	v_c [m/min]	Feed f [mm/U] at tool-Ø [mm]			
						< 5	5 - 6.35		
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700 N/mm²	9	0.03	0.06		
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200 N/mm²	9	0.03	0.06		
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.05	0.08		
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.05	0.08		
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.05	0.08		
		N1.4	Aluminium, alloyed > 12 % Si		12	0.05	0.08		
	N4	N4.1	Plastic, thermoplastic		30	0.06	0.09		
		N4.2	Plastic, Duroplast		30	0.06	0.09		
		N4.3	Plastic, foam						
C	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)						
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)						
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		9	0.03	0.06		
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						

FAL-Countersink-Drill, solid carbide| FAD21

P	P4	P4.1	Stainless steels, ferritic and martensitic		9	0.03	0.06		
M	M1	M1.1	Stainless steels, austenitic	< 700 N/mm²	9	0.03	0.06		
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm²	9	0.03	0.06		
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.05	0.08		
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.05	0.08		
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.05	0.08		
		N1.4	Aluminium, alloyed > 12 % Si		12	0.05	0.08		
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)						
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		30	0.06	0.09		
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		30	0.06	0.09		
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)		15	0.06	0.08		
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)		9	0.03	0.06		
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)						
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	9	0.03	0.06		
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	9	0.03	0.06		
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	9	0.03	0.06		

MEGA-Stack-Drill-Hand-CC | SCD50
FAL-Drill-Composite | FAD11

						< 5	5 - 8	8 - 13.02	
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)						
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		30	0.06	0.09	0.10	
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		30	0.06	0.09	0.10	
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)						
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)						
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)		30	0.06	0.09	0.10	
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)						
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						

FAL-Drill-Uni | FAD10

MMG*			Material	Strength/hardness [N/mm²] [HRC]	v_c [m/min]	Feed f [mm/U] at tool-Ø [mm]			
						< 5	5 - 6.35		
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700 N/mm²	9	0.03	0.06		
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200 N/mm²	9	0.03	0.06		
M	M1	M1.1	Stainless steels, austenitic	< 700 N/mm²	9	0.03	0.06		
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm²	9	0.03	0.06		
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.05	0.08		
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.05	0.08		
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.05	0.08		
		N1.4	Aluminium, alloyed > 12 % Si		12	0.05	0.08		
	N4	N4.1	Plastic, thermoplastic		30	0.06	0.09		
		N4.2	Plastic, Duroplast		30	0.06	0.09		
		N4.3	Plastic, foam						
C	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)						
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)						
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		9	0.03	0.06		
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						

MEGA-Stack-Drill-Hand-CTA | SCD48

						< 5	5 - 8	8 - 13.02	
P	P4	P4.1	Stainless steels, ferritic and martensitic		9	0.03	0.06	0.08	
M	M1	M1.1	Stainless steels, austenitic	< 700 N/mm²	9	0.03	0.06	0.08	
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm²	9	0.03	0.06	0.08	
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.05	0.08	0.10	
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.05	0.08	0.10	
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.05	0.08	0.10	
		N1.4	Aluminium, alloyed > 12 % Si		12	0.05	0.08	0.10	
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)						
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		30	0.06	0.09	0.10	
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		30	0.06	0.09	0.10	
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)		15	0.06	0.08	0.10	
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)		9	0.03	0.06	0.08	
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)						
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	9	0.03	0.06	0.08	
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	9	0.03	0.06	0.08	
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	9	0.03	0.06	0.08	

Cutting data recommendation for boring and reaming (final hole)

MEGA-Stack-CoreDrill-Hand-CTA | SCD52

MMG*			Material	Strength/hardness [N/mm²] [HRC]	v_c [m/min]	Feed f [mm/U] at tool-Ø [mm]			
						< 5	5 - 8	8 - 12	
P	P4	P4.1	Stainless steels, ferritic and martensitic		9	0.03	0.06	0.08	
M	M1	M1.1	Stainless steels, austenitic	< 700 N/mm²	9	0.03	0.06	0.08	
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm²	9	0.03	0.06	0.08	
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.05	0.08	0.10	
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.05	0.08	0.10	
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.05	0.08	0.10	
		N1.4	Aluminium, alloyed > 12 % Si		12	0.05	0.08	0.10	
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)						
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		30	0.06	0.09	0.10	
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		30	0.06	0.09	0.10	
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)		15	0.06	0.08	0.10	
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)		9	0.03	0.06	0.08	
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)						
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	9	0.03	0.06	0.08	
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	9	0.03	0.06	0.08	
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	9	0.03	0.06	0.08	

MEGA-Stack-Reamer-Hand-CTA | SCD54

						< 5	5 - 8	8 - 13.02	
P	P4	P4.1	Stainless steels, ferritic and martensitic		9	0.10	0.15	0.18	
M	M1	M1.1	Stainless steels, austenitic	< 700 N/mm²	9	0.10	0.15	0.18	
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm²	9	0.10	0.15	0.18	
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.15	0.18	0.20	
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.15	0.18	0.20	
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.15	0.18	0.20	
		N1.4	Aluminium, alloyed > 12 % Si		12	0.15	0.18	0.20	
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)						
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		30	0.15	0.18	0.20	
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		30	0.15	0.18	0.20	
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)		15	0.15	0.18	0.20	
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)		9	0.10	0.15	0.18	
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)						
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	9	0.10	0.15	0.18	
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	9	0.10	0.15	0.18	
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	9	0.10	0.15	0.18	

Cutting data recommendation for boring and reaming (final hole)

FAL-Handreamer-America, HSS | FAR110

MMG*			Material	Strength/hardness [N/mm²] [HRC]	v_c [m/min]	Feed f [mm/U] at tool-Ø [mm]			
						< 5	5 - 8	8 - 20	20 - 25.384
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700 N/mm²	9	0.10	0.15	0.18	0.20
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200 N/mm²	9	0.10	0.15	0.18	0.20
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.15	0.18	0.20	0.22
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.15	0.18	0.20	0.22
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.15	0.18	0.20	0.22
		N1.4	Aluminium, alloyed > 12 % Si		12	0.15	0.18	0.20	0.22
C	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)						
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)						
		C5.3	Multilayer composite (stack), non-ferrous metal-non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal-non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		9	0.10	0.15	0.18	0.20
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						

FAL-Handreamer-America, solid carbide | FAR110

P	P4	P4.1	Stainless steels, ferritic and martensitic		9	0.10	0.15	0.18	0.20
M	M1	M1.1	Stainless steels, austenitic	< 700 N/mm²	9	0.10	0.15	0.18	0.20
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm²	9	0.10	0.15	0.18	0.20
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.15	0.18	0.20	0.22
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.15	0.18	0.20	0.22
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.15	0.18	0.20	0.22
		N1.4	Aluminium, alloyed > 12 % Si		12	0.15	0.18	0.20	0.22
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)						
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		30	0.15	0.18	0.20	0.22
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		30	0.15	0.18	0.20	0.22
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)		15	0.15	0.18	0.20	0.22
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)		9	0.10	0.15	0.18	0.20
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)		30	0.15	0.18	0.20	0.22
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)						
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	9	0.10	0.15	0.18	0.20
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	9	0.10	0.15	0.18	0.20
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	9	0.10	0.15	0.18	0.20

Cutting data recommendation for boring and reaming (final hole)

FAL-Handreamer-Pilot | FAR310

MMG*			Material	Strength/hardness [N/mm²] [HRC]	v_c [m/min]	Feed f [mm/U] at tool-Ø [mm]			
						< 5	5 - 8	8 - 16.842	
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700 N/mm²	9	0.10	0.15	0.18	
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200 N/mm²	9	0.10	0.15	0.18	
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.15	0.18	0.20	
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.15	0.18	0.20	
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.15	0.18	0.20	
		N1.4	Aluminium, alloyed > 12 % Si		12	0.15	0.18	0.20	
C	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)						
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)						
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		9	0.10	0.15	0.18	
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						

FAL-Handreamer-Paris, HSS | FAR200

						< 5	5 - 8	8 - 20	20 - 25.4
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700 N/mm²	9	0.10	0.15	0.18	0.20
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200 N/mm²	9	0.10	0.15	0.18	0.20
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.15	0.18	0.20	0.22
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.15	0.18	0.20	0.22
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.15	0.18	0.20	0.22
		N1.4	Aluminium, alloyed > 12 % Si		12	0.15	0.18	0.20	0.22
C	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)						
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)						
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		9	0.10	0.15	0.18	0.20
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						

FAL-Handreamer-Paris, solid carbide| FAR200

						< 5	5 - 8	8 - 20	20 - 25.4
P	P4	P4.1	Stainless steels, ferritic and martensitic		9	0.10	0.15	0.18	0.20
M	M1	M1.1	Stainless steels, austenitic	< 700 N/mm²	9	0.10	0.15	0.18	0.20
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm²	9	0.10	0.15	0.18	0.20
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.15	0.18	0.20	0.22
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.15	0.18	0.20	0.22
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.15	0.18	0.20	0.22
		N1.4	Aluminium, alloyed > 12 % Si		12	0.15	0.18	0.20	0.22
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)						
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		30	0.15	0.18	0.20	0.22
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		30	0.15	0.18	0.20	0.22
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)		15	0.15	0.18	0.20	0.22
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)		9	0.10	0.15	0.18	0.20
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)		30	0.15	0.18	0.20	0.22
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)						
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	9	0.10	0.15	0.18	0.20
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	9	0.10	0.15	0.18	0.20
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	9	0.10	0.15	0.18	0.20

Cutting data recommendation countersinking

FAL-Countersink-180°-Reverse, HSS | FAC10

MMG*			Material	Strength/hardness [N/mm²] [HRC]	v_c [m/min]	Feed f [mm/U] at tool-Ø [mm]			
						10 - 20	20 - 30	30 - 40	40 - 54
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700 N/mm²	9	0.06	0.08	0.10	0.12
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200 N/mm²	9	0.04	0.06	0.08	0.10
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.08	0.10	0.12	0.14
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.08	0.10	0.12	0.14
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.08	0.10	0.12	0.14
		N1.4	Aluminium, alloyed > 12 % Si		12	0.08	0.10	0.12	0.14
C	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)						
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)						
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		9	0.06	0.08	0.10	0.12
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						

FAL-Countersink-180°-Reverse, solid carbide| FAC11

						16 - 20	20 - 25	25 - 31	
P	P4	P4.1	Stainless steels, ferritic and martensitic		9	0.06	0.08	0.10	
M	M1	M1.1	Stainless steels, austenitic	< 700 N/mm²	9	0.06	0.08	0.10	
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm²	9	0.06	0.08	0.10	
	M2	M2.1	Stainless cast steel, austenitic	< 700 N/mm²	9	0.06	0.08	0.10	
	M3	M3.1	Stainless cast steel, austenitic (duplex)	< 1000 N/mm²	9	0.06	0.08	0.10	
C	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)						
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)						
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)						
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	9	0.06	0.08	0.10	
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	9	0.06	0.08	0.10	
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	9	0.06	0.08	0.10	

FAL-Spotfacer-180°-Plugin-Pilot | FAC12

						8 - 12	12 - 16	16 - 25	25 - 30
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700 N/mm²	9	0.03	0.04	0.06	0.08
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200 N/mm²	9	0.02	0.03	0.05	0.07
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.04	0.06	0.08	0.10
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.04	0.06	0.08	0.10
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.04	0.06	0.08	0.10
		N1.4	Aluminium, alloyed > 12 % Si		12	0.04	0.06	0.08	0.10
C	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)						
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)						
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		9	0.02	0.03	0.05	0.07
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						

Cutting data recommendation countersinking

FAL-Countersink-100°-Plugin-Pilot (z=2), HSS | FAC14

MMG*			Material	Strength/hardness [N/mm²] [HRC]	v_c [m/min]	Feed f [mm/U] at tool-Ø [mm]			
						10 - 16	16 - 22		
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700 N/mm²	9	0.12	0.14		
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200 N/mm²	9	0.10	0.12		
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.14	0.18		
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.14	0.18		
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.14	0.18		
		N1.4	Aluminium, alloyed > 12 % Si		12	0.14	0.18		
C	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)						
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)						
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		9	0.10	0.12		
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						

FAL-Countersink-100°-Pilot, HSS | FAC15

						10 - 16	16 - 21		
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700 N/mm²	9	0.12	0.14		
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200 N/mm²	9	0.10	0.12		
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.14	0.18		
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.14	0.18		
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.14	0.18		
		N1.4	Aluminium, alloyed > 12 % Si		12	0.14	0.18		
C	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)						
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)						
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		9	0.10	0.12		
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						

FAL-Countersink-100°-Plugin-Pilot (z=3), HSS | FAC16

						10 - 16	16 - 22		
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700 N/mm²	9	0.12	0.14		
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200 N/mm²	9	0.10	0.12		
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.14	0.18		
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.14	0.18		
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.14	0.18		
		N1.4	Aluminium, alloyed > 12 % Si		12	0.14	0.18		
C	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)						
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)						
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		9	0.10	0.12		
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						

FAL-Countersink-100°-Pilot, solid carbide | FAC17

MMG*			Material	Strength/hardness [N/mm²] [HRC]	v_c [m/min]	Feed f [mm/U] at tool-Ø [mm]			
						10 - 16	16 - 21		
P	P4	P4.1	Stainless steels, ferritic and martensitic		9	0.06	0.08		
M	M1	M1.1	Stainless steels, austenitic	< 700 N/mm²	9	0.06	0.08		
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm²	9				
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.14	0.18		
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.14	0.18		
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.14	0.18		
		N1.4	Aluminium, alloyed > 12 % Si		12	0.14	0.18		
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)						
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		30	0.12	0.18		
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		30	0.12	0.18		
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)		15	0.12	0.18		
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)		9	0.06	0.08		
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)		30	0.12	0.18		
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)						
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	9	0.06	0.08		
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	9	0.06	0.08		
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	9	0.06	0.08		
	S4	S4.1	Highly heat-resistant super alloys, Ni-, Co-, and Fe- based		6	0.06	0.08		

FAL-Countersink-100°-Plugin-Pilot, solid carbide | FAC18

						10 - 16	16 - 22		
P	P4	P4.1	Stainless steels, ferritic and martensitic		9	0.06	0.08		
M	M1	M1.1	Stainless steels, austenitic	< 700 N/mm²	9	0.06	0.08		
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm²	9				
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.14	0.18		
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.14	0.18		
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.14	0.18		
		N1.4	Aluminium, alloyed > 12 % Si		12	0.14	0.18		
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)						
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		30	0.12	0.18		
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		30	0.12	0.18		
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)		15	0.12	0.18		
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)		9	0.06	0.08		
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)		30	0.12	0.18		
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)						
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	9	0.06	0.08		
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	9	0.06	0.08		
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	9	0.06	0.08		
	S4	S4.1	Highly heat-resistant super alloys, Ni-, Co-, and Fe- based		6	0.06	0.08		

Cutting data recommendation countersinking

FAL-Countersink-100°-Plugin-Pilot, PCD | FAC19

MMG*			Material	Strength/hardness [N/mm²] [HRC]	v_c [m/min]	Feed f [mm/U] at tool-Ø [mm]			
						10 - 16	16 - 21		
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.14	0.18		
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.14	0.18		
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.14	0.18		
		N1.4	Aluminium, alloyed > 12 % Si		12	0.14	0.18		
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)						
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		30	0.12	0.18		
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		30	0.12	0.18		
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)		15	0.12	0.18		
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)						
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)		30	0.12	0.18		
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)						
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						

FAL-Countersink-100°-Plugin-Pilot, PCD | FAC20

						10 - 16	16 - 22		
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.14	0.18		
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.14	0.18		
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.14	0.18		
		N1.4	Aluminium, alloyed > 12 % Si		12	0.14	0.18		
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)						
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		30	0.12	0.18		
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		30	0.12	0.18		
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)		15	0.12	0.18		
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)						
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)		30	0.12	0.18		
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)						
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						

FAL-Countersink-100°-Reverse | FAC13

						10 - 16	16 - 20		
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700 N/mm²	9	0.12	0.14		
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200 N/mm²	9	0.10	0.12		
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.14	0.18		
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.14	0.18		
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.14	0.18		
		N1.4	Aluminium, alloyed > 12 % Si		12	0.14	0.18		
C	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)						
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)						
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		9	0.10	0.12		
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						

FAL-Deburring-90° | FAC21

MMG*			Material	Strength/hardness [N/mm²] [HRC]	v_c [m/min]	Feed f [mm/U] at tool-Ø [mm]			
						10 - 20	20 - 35		
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700 N/mm²	9	0.12	0.14		
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200 N/mm²	9	0.10	0.12		
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.14	0.18		
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.14	0.18		
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.14	0.18		
		N1.4	Aluminium, alloyed > 12 % Si		12	0.14	0.18		
C	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)						
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)						
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		9	0.10	0.12		
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						

FAL-Countersink-90°, HSS | FAC22

						4.3 - 8	8 - 16	16 - 25	25 - 31
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700 N/mm²	9	0.06	0.10	0.14	0.18
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200 N/mm²	9	0.04	0.08	0.12	0.16
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.08	0.12	0.18	0.22
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.08	0.12	0.18	0.22
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.08	0.12	0.18	0.22
		N1.4	Aluminium, alloyed > 12 % Si		12	0.08	0.12	0.18	0.22
C	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)						
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)						
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)						
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)		9	0.04	0.08	0.12	0.16
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						

FAL-Countersink-90°, solid carbide | FAC23

						4.3 - 8	8 - 16	16 - 25	25 - 31
P	P4	P4.1	Stainless steels, ferritic and martensitic		9	0.04	0.06	0.09	0.12
M	M1	M1.1	Stainless steels, austenitic	< 700 N/mm²	9	0.04	0.06	0.09	0.12
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm²	9	0.04	0.06	0.09	0.12
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		15	0.08	0.12	0.18	0.22
		N1.2	Aluminium, alloyed ≤ 7% Si		15	0.08	0.12	0.18	0.22
		N1.3	Aluminium, alloyed > 7-12 % Si		12	0.08	0.12	0.18	0.22
		N1.4	Aluminium, alloyed > 12 % Si		12	0.08	0.12	0.18	0.22
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)						
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP		30	0.10	0.12	0.14	0.18
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP		30	0.10	0.12	0.14	0.18
	C5	C5.1	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-alu)		15	0.08	0.12	0.18	0.22
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)		9	0.04	0.06	0.09	0.12
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)		30	0.10	0.12	0.14	0.18
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)						
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)						
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)						
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	9	0.04	0.06	0.09	0.12
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	9	0.04	0.06	0.09	0.12
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	9	0.04	0.06	0.09	0.12
	S4	S4.1	Highly heat-resistant super alloys, Ni-, Co-, and Fe- based		9	0.04	0.06	0.09	0.12

Cutting data recommendation countersinking

Feed and cutting speed

Precision countersink cutter, HSS | COS11

MMG*			Material	Strength/hardness [N/mm²] [HRC]	
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700 N/mm²	
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200 N/mm²	
	P2	P2.1	Nitrided, case hardened and heat-treated steels, alloyed	< 900 N/mm²	
		P2.2	Nitrided, case hardened and heat-treated steels, alloyed	< 1400 N/mm²	
	P3	P3.1	Tool, bearing, spring and high-speed steels	< 900 N/mm²	
		P3.2	Tool, bearing, spring and high-speed steels	< 1500 N/mm²	
	P4	P4.1	Stainless steels, ferritic and martensitic		
	P5	P5.1	Cast steel		
	P6	P6.1	Stainless cast steel, ferritic and martensitic		
M	M1	M1.1	Stainless steels, austenitic	< 700 N/mm²	
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm²	
	M2	M2.1	Stainless cast steel, austenitic	< 700 N/mm²	
	M3	M3.1	Stainless cast steel, austenitic (duplex)	< 1000 N/mm²	
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si		
		N1.2	Aluminium, alloyed ≤ 7% Si		
		N1.3	Aluminium, alloyed > 7-12 % Si		
		N1.4	Aluminium, alloyed > 12 % Si		
	N2	N2.1	Copper, non-alloyed and low alloyed	< 300 N/mm²	
		N2.2	Copper, alloyed	> 300 N/mm²	
		N2.3	Brass, bronze, gunmetal	< 1200 N/mm²	
	N3	N3.1	Graphite		
	N4	N4.1	Plastic, thermoplastic		
		N4.2	Plastic, Duroplast		
		N4.3	Plastic, foam		
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²	
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²	
		S2.2	Titanium, titanium alloys	> 1200 N/mm²	
	S3	S3.1	Nickel, non-alloyed and alloyed	< 900 N/mm²	
		S3.2	Nickel, non-alloyed and alloyed	> 900 N/mm²	
	S4	S4.1	Highly heat-resistant super alloys, Ni-, Co-, and Fe- based		
	S5	S5.1	Tungsten-based and molybdenum-based alloys		

	ø < 5 [mm]		ø < 5 - 8 [mm]		ø < 8 - 12 [mm]		ø < 12 - 16 [mm]		ø < 16 - 20 [mm]		ø < 20 - 25 [mm]		ø < 25 - 31 [mm]	
	v_c [m/min]	f [mm/U]	v_c [m/min]	f [mm/U]	v_c [m/min]	f [mm/U]	v_c [m/min]	f [mm/U]	v_c [m/min]	f [mm/U]	v_c [m/min]	f [mm/U]	v_c [m/min]	f [mm/U]
	40	0.06	**40**	0.08	**40**	0.10	**40**	0.12	**40**	0.14	**40**	0.18	**40**	0.22
	30	0.04	**30**	0.06	**30**	0.08	**30**	0.10	**30**	0.12	**30**	0.14	**30**	0.18
	30	0.04	**30**	0.06	**30**	0.08	**30**	0.10	**30**	0.12	**30**	0.14	**30**	0.18
	12	0.03	**12**	0.04	**12**	0.05	**12**	0.06	**12**	0.08	**12**	0.10	**12**	0.12
	30	0.04	**30**	0.06	**30**	0.08	**30**	0.10	**30**	0.12	**30**	0.14	**30**	0.18
	12	0.03	**12**	0.04	**12**	0.05	**12**	0.06	**12**	0.08	**12**	0.10	**12**	0.12
	15	0.04	**15**	0.05	**15**	0.06	**15**	0.07	**15**	0.08	**15**	0.09	**15**	0.12
	30	0.04	**30**	0.06	**30**	0.08	**30**	0.10	**30**	0.12	**30**	0.14	**30**	0.18
	15	0.04	**15**	0.05	**15**	0.06	**15**	0.07	**15**	0.08	**15**	0.09	**15**	0.12
	15	0.04	**15**	0.05	**15**	0.06	**15**	0.07	**15**	0.08	**15**	0.09	**15**	0.12
	10	0.04	**10**	0.05	**10**	0.06	**10**	0.07	**10**	0.08	**10**	0.09	**10**	0.12
	15	0.04	**15**	0.05	**15**	0.06	**15**	0.07	**15**	0.08	**15**	0.09	**15**	0.12
	50	0.08	**50**	0.10	**50**	0.12	**50**	0.14	**50**	0.18	**50**	0.22	**50**	0.26
	50	0.08	**50**	0.10	**50**	0.12	**50**	0.14	**50**	0.18	**50**	0.22	**50**	0.26
	40	0.08	**40**	0.10	**40**	0.12	**40**	0.14	**40**	0.18	**40**	0.22	**40**	0.26
	40	0.08	**40**	0.10	**40**	0.12	**40**	0.14	**40**	0.18	**40**	0.22	**40**	0.26
	40	0.10	**40**	0.12	**40**	0.14	**40**	0.18	**40**	0.20	**40**	0.24	**40**	0.30
	40	0.10	**40**	0.12	**40**	0.14	**40**	0.18	**40**	0.20	**40**	0.24	**40**	0.30
	40	0.10	**40**	0.12	**40**	0.14	**40**	0.18	**40**	0.20	**40**	0.24	**40**	0.30
	40	0.10	**40**	0.12	**40**	0.14	**40**	0.18	**40**	0.20	**40**	0.24	**40**	0.30
	40	0.10	**40**	0.12	**40**	0.14	**40**	0.18	**40**	0.20	**40**	0.24	**40**	0.30
	40	0.10	**40**	0.12	**40**	0.14	**40**	0.18	**40**	0.20	**40**	0.24	**40**	0.30
	10	0.04	**10**	0.05	**10**	0.06	**10**	0.07	**10**	0.08	**10**	0.09	**10**	0.12

Cutting data recommendation countersinking

Feed and cutting speed

Precision countersink cutter, solid carbide | COS11

MMG*			Material	Strength/hardness [N/mm²] [HRC]
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 700 N/mm²
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, unalloyed	< 1200 N/mm²
	P2	P2.1	Nitrided, case hardened and heat-treated steels, alloyed	< 900 N/mm²
		P2.2	Nitrided, case hardened and heat-treated steels, alloyed	< 1400 N/mm²
	P3	P3.1	Tool, bearing, spring and high-speed steels	< 900 N/mm²
		P3.2	Tool, bearing, spring and high-speed steels	< 1500 N/mm²
	P4	P4.1	Stainless steels, ferritic and martensitic	
	P5	P5.1	Cast steel	
	P6	P6.1	Stainless cast steel, ferritic and martensitic	
M	M1	M1.1	Stainless steels, austenitic	< 700 N/mm²
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm²
	M2	M2.1	Stainless cast steel, austenitic	< 700 N/mm²
	M3	M3.1	Stainless cast steel, austenitic (duplex)	< 1000 N/mm²
N	N1	N1.1	Aluminium, non-alloyed and alloyed < 3 % Si	
		N1.2	Aluminium, alloyed ≤ 7% Si	
		N1.3	Aluminium, alloyed > 7-12 % Si	
		N1.4	Aluminium, alloyed > 12 % Si	
	N2	N2.1	Copper, non-alloyed and low alloyed	< 300 N/mm²
		N2.2	Copper, alloyed	> 300 N/mm²
		N2.3	Brass, bronze, gunmetal	< 1200 N/mm²
	N3	N3.1	Graphite	
	N4	N4.1	Plastic, thermoplastic	
		N4.2	Plastic, Duroplast	
		N4.3	Plastic, foam	
C	C1	C1.1	Plastic matrix, aramid fibre reinforced (AFRP)	
		C1.2	Plastic matrix (thermosetting), CFRP/GFRP	
		C1.3	Plastic matrix (thermoplastic), CFRP/GFRP	
	C2	C2.1	Carbon matrix, carbon fibre reinforced (CFC)	
	C3	C3.1	Metal matrix (MMC)	
	C4	C4.1	Sandwich construction, honeycomb core	
		C4.2	Sandwich construction, foam core	
	C5	C5.1	Multilayer composite (stack), non-metal—non-ferrous metal composite (CFRP-alu)	
		C5.2	Multilayer composite (stack), non-metal–non-ferrous metal composite (CFRP-titanium)	
		C5.3	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (CFRP-CFRP)	
		C5.4	Multilayer composite (stack), non-ferrous metal–non-ferrous metal composite (alu-alu)	
		C5.5	Multilayer composite (stack), non-ferrous metal–metal composite (alu-inox)	
		C5.6	Multilayer composite (stack), metal-metal composite (CFRP-titanium)	
S	S1	S1.1	Titanium, titanium alloys	< 400 N/mm²
	S2	S2.1	Titanium, titanium alloys	< 1200 N/mm²
		S2.2	Titanium, titanium alloys	> 1200 N/mm²
	S3	S3.1	Nickel, non-alloyed and alloyed	< 900 N/mm²
		S3.2	Nickel, non-alloyed and alloyed	> 900 N/mm²
	S4	S4.1	Highly heat-resistant super alloys, Ni-, Co-, and Fe- based	
	S5	S5.1	Tungsten-based and molybdenum-based alloys	

	ø < 5 [mm]		ø < 5 - 8 [mm]		ø < 8 - 12 [mm]		ø < 12 - 16 [mm]		ø < 16 - 20 [mm]		ø < 20 - 25 [mm]		ø < 25 - 31 [mm]	
	v_c [m/min]	f [mm/U]	v_c [m/min]	f [mm/U]	v_c [m/min]	f [mm/U]	v_c [m/min]	f [mm/U]	v_c [m/min]	f [mm/U]	v_c [m/min]	f [mm/U]	v_c [m/min]	f [mm/U]
	60	0.06	60	0.08	60	0.10	60	0.12	60	0.14	60	0.18	60	0.22
	50	0.04	50	0.06	50	0.08	50	0.10	50	0.12	50	0.14	50	0.18
	50	0.04	50	0.06	50	0.08	50	0.10	50	0.12	50	0.14	50	0.18
	40	0.03	40	0.04	40	0.05	40	0.06	40	0.08	40	0.10	40	0.12
	50	0.04	50	0.06	50	0.08	50	0.10	50	0.12	50	0.14	50	0.18
	40	0.03	40	0.04	40	0.05	40	0.06	40	0.08	40	0.10	40	0.12
	30	0.04	30	0.05	30	0.06	30	0.07	30	0.08	30	0.09	30	0.12
	50	0.04	50	0.06	50	0.08	50	0.10	50	0.12	50	0.14	50	0.18
	30	0.04	30	0.05	30	0.06	30	0.07	30	0.08	30	0.09	30	0.12
	30	0.04	30	0.05	30	0.06	30	0.07	30	0.08	30	0.09	30	0.12
	25	0.04	25	0.05	25	0.06	25	0.07	25	0.08	25	0.09	25	0.12
	30	0.04	30	0.05	30	0.06	30	0.07	30	0.08	30	0.09	30	0.12
	25	0.04	25	0.05	25	0.06	25	0.07	25	0.08	25	0.09	25	0.12
	80	0.08	80	0.10	80	0.12	80	0.14	80	0.18	80	0.22	80	0.26
	80	0.08	80	0.10	80	0.12	80	0.14	80	0.18	80	0.22	80	0.26
	60	0.08	60	0.10	60	0.12	60	0.14	60	0.18	60	0.22	60	0.26
	60	0.08	60	0.10	60	0.12	60	0.14	60	0.18	60	0.22	60	0.26
	70	0.10	70	0.12	70	0.14	70	0.18	70	0.20	70	0.24	70	0.30
	70	0.10	70	0.12	70	0.14	70	0.18	70	0.20	70	0.24	70	0.30
	70	0.10	70	0.12	70	0.14	70	0.18	70	0.20	70	0.24	70	0.30
	25	0.06	25	0.10	25	0.12	25	0.14	25	0.18	25	0.20	25	0.25
	70	0.10	70	0.12	70	0.14	70	0.18	70	0.20	70	0.24	70	0.30
	70	0.10	70	0.12	70	0.14	70	0.18	70	0.20	70	0.24	70	0.30
	70	0.10	70	0.12	70	0.14	70	0.18	70	0.20	70	0.24	70	0.30
	25	0.06	25	0.10	25	0.12	25	0.14	25	0.18	25	0.20	25	0.25
	25	0.06	25	0.10	25	0.12	25	0.14	25	0.18	25	0.20	25	0.25
	25	0.06	25	0.10	25	0.12	25	0.14	25	0.18	25	0.20	25	0.25
	25	0.06	25	0.10	25	0.12	25	0.14	25	0.18	25	0.20	25	0.25
	25	0.06	25	0.10	25	0.12	25	0.14	25	0.18	25	0.20	25	0.25
	25	0.06	25	0.10	25	0.12	25	0.14	25	0.18	25	0.20	25	0.25
	25	0.06	25	0.10	25	0.12	25	0.14	25	0.18	25	0.20	25	0.25
	25	0.06	25	0.10	25	0.12	25	0.14	25	0.18	25	0.20	25	0.25
	25	0.06	25	0.10	25	0.12	25	0.14	25	0.18	25	0.20	25	0.25
	15	0.04	15	0.05	15	0.06	15	0.07	15	0.08	15	0.09	15	0.12
	15	0.04	15	0.05	15	0.06	15	0.07	15	0.08	15	0.09	15	0.12
	15	0.04	15	0.05	15	0.06	15	0.07	15	0.08	15	0.09	15	0.12
	15	0.04	15	0.05	15	0.06	15	0.07	15	0.08	15	0.09	15	0.12
	15	0.04	15	0.05	15	0.06	15	0.07	15	0.08	15	0.09	15	0.12
	15	0.04	15	0.05	15	0.06	15	0.07	15	0.08	15	0.09	15	0.12
	15	0.04	15	0.05	15	0.06	15	0.07	15	0.08	15	0.09	15	0.12

Corporate Office - Germany
ADD Engineering GMBH, Hildeser str. 9b, D-98590 Schwallungen, Germany
Tel. +49-3684 8402 958 | Fax +49- 3684 8274 38 | info@add-engineering.de

Regional Office - India
ADD Engineering Components India Pvt Ltd, #630 4th Main Road, NGEF Layout,
Nagarabhavi, Bangalore - 560 072, Karnataka, India | TeleFax: +91 (80) 23216669 | info@addengineering.co.in

Regional Office - Russia
ADD Engineering OOO, Dm. Ulianova Str, 42, Office 404, 117218, Moscow, Russia
Tel : +7 (495) 517 91 91 | Fax : +7 (499) 125 91 81 | russia@add-engineering.de

ADD engineering