



TOP PERFORMANCE FOR TOP QUALITY.

The European solution for the aerospace industry.

A European partner always at your side

The fascination of flying: mankind's eternal dream. Thanks to extremely strict security standards applied throughout the whole world, this dream has long since become a reality.



As Europe's leading system partner, we not only offer you the widest range of quality products, but we are also at your side to respond to your individual requirements with our unique combination of trading, manufacturing and service competence, which will guarantee you:

- A delivery availability of 99%.
- 65,000 products immediately available.
- 500 brands from leading manufacturers worldwide.
- Our quality brand GARANT.
- Experts who will accompany all your current and future projects.



An international presence

Currently, we employ over 2,700 staff members in over 50 countries, with 1,200 of these acting as specialist consultants who will gladly put their knowledge at your disposal in a world without frontiers.



The certificates of the Hoffmann Group - certified quality.

Audits and certificates confirm that we comply with the highest standards of safety, quality and delivery capability. For many customers, e.g. from the aerospace or automotive industry, these independently certified performance records are a prerequisite for any cooperation. For all others they are a clear indication of our manufacturing, trading and service competence. And for us they simply are a matter of course.

- TÜV certified Quality Management System to ISO 9001 and VDA 6.4.
- Certification by MTU Aeroengines GmbH to EN 9100.
- Maximum working safety: certification to OHSAS 18001.
- Calibration laboratory certified by DAkkS to standards EN ISO 17025, EN ISO 9001.
- TÜV certified Quality Management System to ISO 14001.



Supplier certificates
ISO 9001 and VDA 6.4.

You will always find the tool you are looking for

The largest choice of quality tools by Europe's No.1:

- 65,000 quality tools at the best cost/benefit ratio, sourced from 500 worldleading manufacturers.
- A catalogue in print and online, available in 18 languages.
- More than 500,000 listed items, with access to our manufacturers special "aerospace catalogues".


MIRKA
KNIPEX
Wera
LUKAS
PB SWISS TOOLS
APEX TOOL GROUP
SolidCAM
PFERD
STAHLWILLE
LESSMANN
DRANTOUSTEN · WERE BRUGUES

HAZET
IDEAL
POWERED BY WAYETEK

KYOCERA
KENAMETAL
gt
ALLMATIC
Spannsysteme

FACOM
INOVA
SIMPLY SOPHISTICATED

DMC DANIELS MANUFACTURING CORPORATION

Hausmann
Werkzeuge

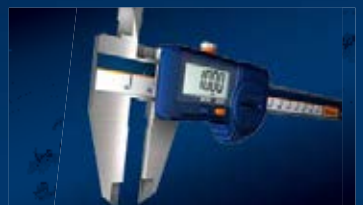
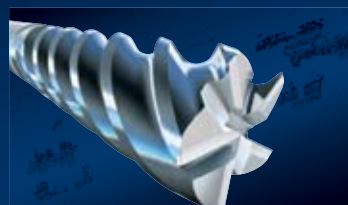


GARANT: HOFFMANN GROUP'S PREMIUM BRAND

- More than 25,000 quality tools for all fields of application.
- Maximum innovative strength and maximum reliability.
- Top quality products offering the best cost/benefit ratio.
- 10 year statutory warranty.



Premium Quality by Hoffmann Group



Outstanding delivery performance

Thanks to our highly efficient logistics, our TÜV certified delivery availability is 99% and our error rate just 0.1%. For you this means security of supply, within 24 hours in Germany and 48 hours throughout Europe.



Our 20,000 m² logistics centre near Munich (Germany) dedicated to Workstations and Storage Equipment, with more than 2,000 products immediately available.





**Europe's largest logistics centre for quality tools
based in Nuremberg (Germany):**

- 36,000 m² storage area.
- 60,000 items / day.
- Zero error strategy.
- Delivery availability > 99 %.
- Within 24 h in Germany and 48 h throughout Europe.



Maximum security

Hoffmann Group offers you:

- Outstanding competence in the field of machining.
- An optimum selection of tools for machining aluminium, titanium, GRP / CRP, etc.
- Ergonomic tools:
Comfortable grip, ergonomics and maximum stability allowing use even in inaccessible places.
- Guaranteed quality even under the most extreme working conditions.
- Tool management to prevent FOD.

Missing tools will be noticed immediately:

- **eForm:** Our online configurator enables you to plan your tailor-made rigid foam inlay with the help of an easy, intuitive and clear process:
a safe and intelligent system which will aid and guide the user in controlling the storage of tools.





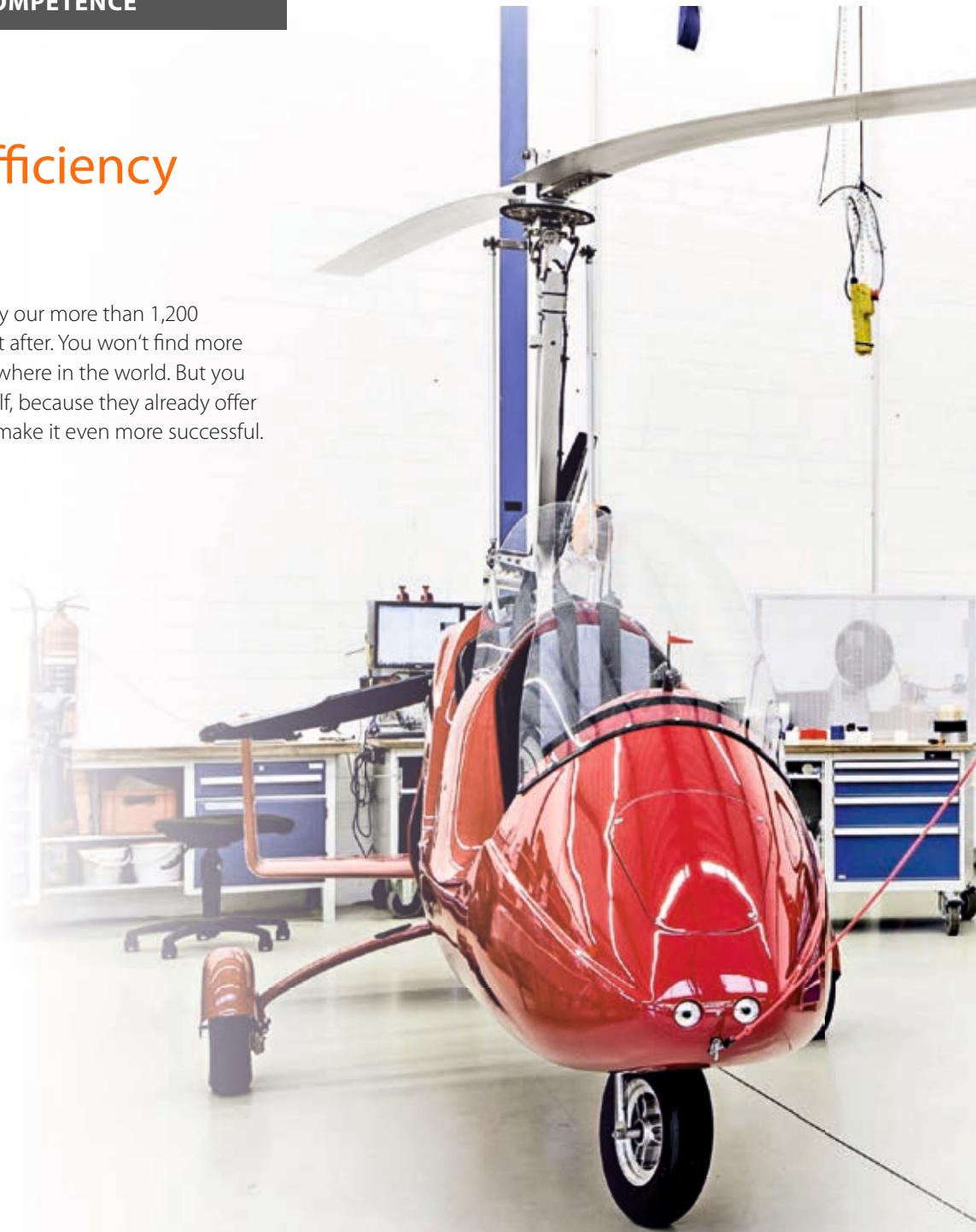
Precision and an extensive range of services in the field of metrology for reliable inspection:

- Calibrated torque tools.
- Quick, simple and reliable : calibration of tools, logistics included, in a licenced calibration laboratory certified to standards EN ISO 17025 and EN ISO 9001:2000.
- Personalised laser marking.



Maximum efficiency

We are perfectly well aware why our more than 1,200 technical advisers are so sought after. You won't find more highly skilled professionals anywhere in the world. But you don't need to hire them yourself, because they already offer your company a full service to make it even more successful. That's a promise!



A worldwide network of expert advisers means you will always receive a solution to help you move forward:

- Reliable and competent commercial advisers.
- Machining and metrology experts.
- Workstations & Storage Equipment specialists.
- Advisers on business process optimization.





e-Solutions to help you achieve your objectives faster and in complete security:

- Efficient solutions for a streamlined electronic purchasing process.
- Straight-forward processing, quick, easy and secure, around the clock.
- Reducing processing costs compared to conventional order processes.

eScan: Easier administration of your stocks!

- Thanks to our new eScanner, you can place repeat orders faster and easier, using a barcode scanned from packaging or product, or from your own barcode lists (generated in the Hoffmann Group eShop).





135 000 customers,
and each one is the most important to us.





As market leader in the field of quality tools we have a large number of satisfied customers, 95% of whom consider us to be a preferred supplier. That's probably because we consider 100% of our customers to be preferred customers.

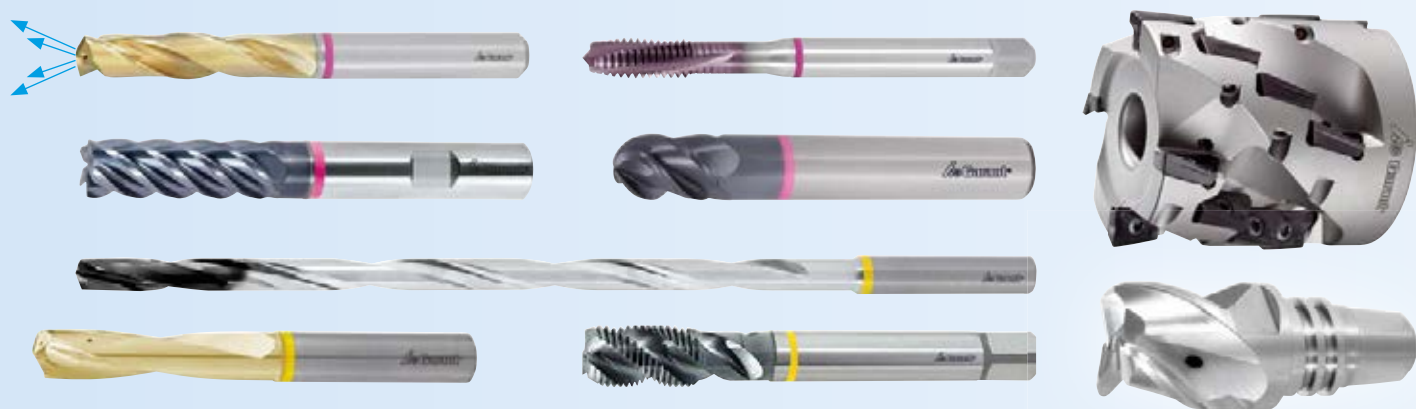
Reliability

We have been elected «Supplier of the Year» and received an award for our exceptional delivery capability.



Award "Supplier of the Year" PFW Aerospace AG.

MACHINING



METROLOGY

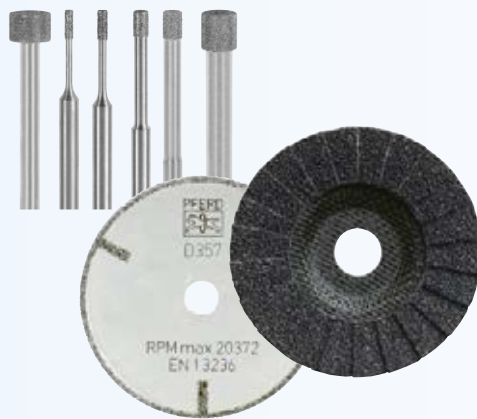


ASSEMBLY & MAINTENANCE



WORKSTATIONS & STORAGE





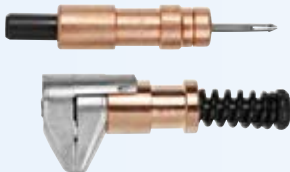
MACHINING

Machining titanium and Inconel.....	20 – 25
Deep hole drilling.....	26 – 29
Machining aluminium	30 – 35
Machining composites	42 – 43
Abrasives	44 – 47
GARANT ZeroClamp	48 – 53
Machining accessories.....	54 – 55



METROLOGY

Measuring microscopes.....	56 – 57
Surface roughness testers	59
Torque wrenches & calibration devices	60 – 62



ASSEMBLY & MAINTENANCE

Hand tools & tool cases	64 – 69
Special tools Hausmann.....	70 – 73
Crimp tools DMC.....	74 – 76
Hand tools FOD FACOM	78 – 79
Assembly tools APEX.....	80 – 81



GARANT Tool24 Smartline



eForm

WORKSTATIONS & STORAGE

GARANT roller cabinet & worktops.....	82 – 83
Modular workstations.....	84 – 85
eForm (5S method)	86 – 87
GARANT Tool24 Smartline.....	90 – 91





The products featured in this brochure are a special selection for the aerospace industry. You can find our complete range in our current catalogue or online at www.hoffmann-group.com.

Material application table





Helping you find the correct tool quickly and easily.

Material	Aluminium long chipping	Aluminium cast (> 10 % Si)	PEEK	PVDF GF20
Designation	–	–	Polyether ether ketone	Polyvinylidene fluoride
Type	Non-ferrous metal wrought alum. alloy	Non-ferrous metal casting alloys above 10 % Si	Thermoplastics: semi-crystalline	Thermoplastics: semi-crystalline
Brands (extract)	–	–	Tecapeek, Victrex PEEK	–
Characteristics	Corrosion resistant and low density	Higher resistance and high abrasiveness, corrosion resistant	High tensile strength, good machinability	High chemical resistance, difficult to machine, abra- sive, risk of delamination
Fibre content in %	–	–	–	20 % glass fibre
Tg (°C)	–	–	145	150
Modulus of elasticity (N/mm ²)	70 000 – 90 000	90 000 – 140 000	3 600	10 000
Tensile strength (N/mm ²)	100 – 450	190 – 525	70	–
Expansion coefficient	–	–	5 · 10 ⁻⁵ · 1/K	13 · 10 ⁻⁵ · 1/K
Absorption of humidity in %	–	–	0.1	0.04
Absorption of water in %	–	–	0.5	0.05

v_c = m/min	Alu 	Alu 	Alu cast > 10 % Si	PMMA Acrylic	PEEK	AFK Aramid	PVDF GF20	PA66 GF30	PEEK GF30	PTI CF2
ISO code:	N	N	N	N	N	N	N	N	N	N
	Aluminium			Thermoplastics		Plastics and fib				

Material	Aluminium short chipping	PMMA Acrylic	AFK Aramid	PA66 GF30
Designation	–	Polymethyl methacrylate	Aramid, polyaramide fibre composite	Polyamide
Type	Non-ferrous metal wrought alum. alloy	Thermoplastics: amorphous	Thermoplastics: semi-crystalline	Thermoplastics: semi-crystalline
Brands (extract)	–	Plexiglas, Deglas, Perspex	Kevlar, Nomex	–
Characteristics	Corrosion resistant and low density	Sensitive to alcohol, can be polished, resistant to scratches, good machinability	Difficult to machine, special geometry required, risk of delamination	Difficult to machine, abrasive, risk of delamination
Fibre content in %	–	–	–	30 % glass fibre
Tg (°C)	–	105	200	80
Modulus of elasticity (N/mm ²)	70 000 – 90 000	3 200	59 000 – 127 000	5 200
Tensile strength (N/mm ²)	100 – 450	70	–	–
Expansion coefficient	–	7 · 10 ⁻⁵ · 1/K	–	8 · 10 ⁻⁵ · 1/K
Absorption of humidity in %	–	1	–	2.8
Absorption of water in %	–	2	–	8.5



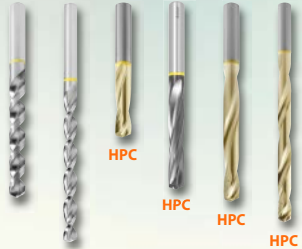







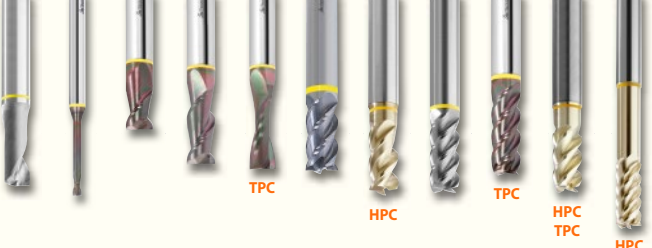


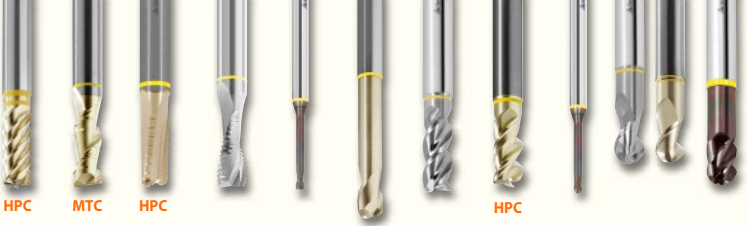
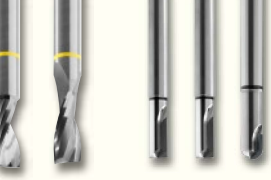
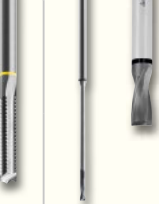
PEEK GF30	Hybrid	MMC	GRP	Inconel®
Polyether ether ketone	–	Metal matrix composites	–	Superalloys
Thermoplastics: semi-crystalline	Combination of metals, polymers and fibres in at least 3 layers	Combination of metals and ceramics, also with fibre fillers	Glass fibre composite materials	Nickel-chrome alloy for ex. 2.4668
–	–	–	–	Inconel / ATI
Difficult to machine, abrasive, risk of delamination	Difficult to machine, different materials	Very difficult to machine, only with diamond or PKD /CVD coating	Very low heat expansion coefficient, very abrasive, only with diamond or PKD / CVD coating	Corrosion resistant and high resistance. Excellent resistance to creep below a temperature of 700°C.
30 % glass fibre	Depending on material	Depending on material	Up to 80 % glass fibre	–
145	Depending on material	Depending on material	–	–
8 100	Depending on material	Depending on material	140 000 (traction) 12 000 (lateral)	–
–	Depending on material	Depending on material	–	760 – 1460
5 · 10 ⁻⁵ · 1/K	Depending on material	Depending on material	–	–
0.1	Depending on material	Depending on material	–	–
0.5	Depending on material	Depending on material	–	–




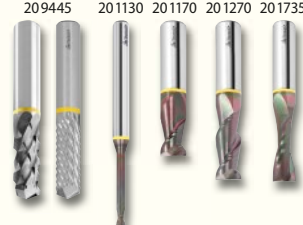


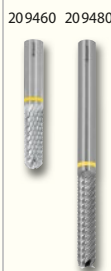




















FE	Hybrid	Honey-comb Sandwich	MMC	GRP	CRP	Ti > 850 N	Inconel®	GJS ADI ≥ 800 N					Air
5	N	N	N	N	N	S	S	K		max	min		
res				Duro		Superalloys		Cast Iron					

PTFE CF25	Honeycomb Sandwich	CRP	Ti	GJS ADI
Polytetrafluoroethylene	–	–	Superalloys	Cast
Thermoplastics: semi-crystalline	Honeycomb structure with a protective layer, metals, polymers, fibres	Carbon fibre – types of fibres of thermosetting re- sins: HTA, HTS, IMS, cyanate ester resin, cross-linked	Titanium alloys α - β , for ex. Ti6Al4V	Austempered Ductile Iron Cast iron GGG / GJS bainite structure
Teflon, Kynar, Tecaflon	–	–	–	–
Difficult to machine, abrasive, risk of delamination	Difficult to machine, due to vertical and horizontal material	Extremely low heat expan- sion coefficient, very abra- sive, only with diamond or PKD /CVD coating	Very tough, combined with high corrosion resistance	Very abrasive Hardening possible Cooling required
25 % carbon fibre	Depending on material	Up to 80 % carbon fibre	–	–
260	Depending on material	–	–	–
4 200	Depending on material	140 000 (traction)12 000 (lateral)	113 000	–
–	Depending on material	–	720 – 960	800 – 1 400
$13 \cdot 10^{-5} \cdot 1/K$	Depending on material	–	–	–
0.1	Depending on material	–	–	–
0.1	Depending on material	–	–	–

Overview of the range

Finding the tool suited to your requirements for maximum machining efficiency.

	Alu 	Alu 	Alu cast >10 % Si	PMMA Acrylic	PEEK	AFK Aramid	PVDF GF20
	N	N	N	N	N	N	N
MACHINING	114200 116040 122308 122606 122875 123180  HPC HPC HPC HPC	123588 - 123595  HPC HPC HPC HPC	131100 131120 133370/ 137880 134200 134250 134270 136210 137340 133420/ 138020 139171 139610/ 139715 			121230 	
METROLOGY	150378 150382 150383 150855 	164346 164347  HPC HPC	179800 179820 185010  HPC			150382 	
ASSEMBLY & MAINTENANCE	201040 201130 201170 201270 201735 202243 202247 202248 202259 202480 202545 202548 202553 203170 203175  TPC HPC TPC HPC TPC HPC		191075 191100 191320 191340 192491 192510 192520  MTC			209410 209445 	
WORKSTATIONS & STORAGE	203177 205010 205080 205135 205170 205240 206032 206035 206040 206085 206190 206192 206260 206265 207022 207024 207026 207095 207441 207443  HPC MTC HPC		209310 209322 209610 - 209666 			209510 209710 209711 	

PA66	PEEK	PTFE	Hybrid	Honeycomb	MMC	GRP	CRP	Ti	Inconel®	GJS ADI														
GF30	GF30	CF25		Sandwich				> 850 N		> 800 N														
N	N	N	N	N	N	N	N	S	S	K														
<div>122509 122512 – 122534</div> <div></div> <div>131140 132420 135750 135760 137055</div> <div></div> <div>150386 150855</div> <div></div> <div>209430 209445 201130 201170 201270 201735</div> <div></div> <div>202515 206032 207022 209515 209520 209525</div> <div></div> <div>209715 209755 209776 209790</div> <div></div> <div>209713 209730 209750 209760 209783 209785 209795</div> <div></div>					<div>139610 139615</div> <div></div> <div>150386</div> <div></div> <div>164355 164357</div> <div></div> <div>209610 – 209666</div> <div></div>					<div>122509 122512 – 122534</div> <div></div> <div>131140</div> <div></div> <div>150382 150855 164355 164357</div> <div></div> <div>185010</div> <div></div> <div>209515 209520 209525 209512 209517 209522 209538</div> <div></div> <div>209610 – 209666</div> <div></div> <div>209710 209711 209713 209760 209783 209795</div> <div></div>					<div>114470 122430 122670</div> <div></div> <div>HPC HPC</div> <div>132400 132450 133380/138030 135750 135760 137055 132420</div> <div></div> <div>150025 150383 150386</div> <div></div> <div>179800 179820</div> <div></div> <div>203028 203082 203083 205711 206358</div> <div></div> <div>HPC MTC MTC TPC</div> <div>206356 206358 207480 207485</div> <div></div> <div>HPC HPC HPC HPC</div>					<div>122690</div> <div></div> <div>132555 132565</div> <div></div> <div>150384</div> <div></div>				

Maximise your returns!

Working with titanium and Inconel.

Machining of superalloys:
an extreme challenge for tools

Suitable GARANT
colour ring



High Performance Cutting

Exploit the maximum performance with the GARANT HPC tools.



Jobber drill plain shank HSS/E H 10 mm

11 4470

Version:

Profile ground: High concentricity and pitch accuracy. Precision ground point. Drill for production use.

Strengthened core, bright, **flute length to DIN 1897, overall length DIN 338.**

Also for **HARDOX** materials.



Solid carbide HPC drill with 4 cooling channels

12 2430

Version:

Cutting chisel edge **with high centring accuracy** - due to **strong core and special point geometry**.

Excellent chip evacuation due to **4 internal coolant channels**.

Straight cutting edges with honed edges and special flute profile for **short chips**.

Special coating for **longest tool life** and **high metal removal rate**.



SolidCAM

SolidCAM and iMachining

Save 70% or more in CNC machining time ?

Extend tool life dramatically ?

This is now possible with iMachining developed by SolidCAM!

SolidCAM's unique revolutionary iMachining technology:

- using its unique patented Technology Wizard, provides optimal feeds and speeds, taking into account the toolpath, stock and tool material and machine specifications.
- provides unbelievable savings and increased efficiency

in your milling CNC operations, translating into profits and success.

Some of the benefits of the iMachining technology:

- Increased productivity due to shorter cycles - time savings 70% and more.
- Dramatically increased tool life - up to 3x longer.
- Unmatched hard material machining.
- High programming productivity...



Multi Task Cutting

Maximum performance even under unfavourable machining conditions with the GARANT MTC tools.



Trochoidal Performance Cutting

Maximum metal removal rate:
Maximum performance thanks to the trochoidal strategy with GARANT TPC tools.



Through hole machine tap TiCN 1/4-20

13 3380

Version:

Very sturdy design, with **15° left-hand chip flutes** and **special cutting edge geometry** for superalloys and high-temperature steels up to 1400 N/mm². For use with emulsion (fat content minimum 8%).

Application:

For UNJC coarse threads ASME-B1.15 and ISO3161 (aerospace).



Through hole machine tap TiCN 10-32

13 3435

Version:

Very sturdy design, with **15° left-hand chip flutes** and **special cutting edge geometry** for superalloys and high-temperature steels up to 1400 N/mm². For use with emulsion (fat content minimum 8%).

Application:

For UNJF uniform fine threads ASME-B1.15 and ISO3161 (aerospace).



Blind hole machine tap TiCN 1/4-20

13 7890

Version:

Very sturdy design, with **15° right-hand chip flutes** and **special cutting edge geometry** for superalloys and high-temperature steels ≤1400 N/mm². For use with emulsion (fat content minimum 8%).

Application:

For UNJC coarse threads ASME-B1.15 and ISO3161 (aerospace).



Blind hole machine tap TiCN 1/4-28

13 8030

Version:

Very sturdy design, with **15° right-hand chip flutes** and **special cutting edge geometry** for superalloys and high-temperature steels ≤1400 N/mm². For use with emulsion (fat content minimum 8%).

Application:

For UNJF uniform fine threads ASME-B1.15 and ISO3161 (aerospace).

GARANT HPC, MTC and TPC tools

Speed up your processes and significantly reduce your costs!

- » Dynamic without compromise
- » Maximum process security
- » Reduced manufacturing costs



Example of workpieces in iMachining.



SolidCAM's unique patented Technology Wizard provides optimal feeds and speeds, taking into account the toolpath, stock and tool material and machine specifications. It thus provides unbelievable savings and increased efficiency in your milling CNC operations, translating into profits.



Solid carbide end mill MTC / TPC TiAlN 10 mm

20 3082

Version:

Specially ground with corner radii similar to torus cutters and **special coating** for best tool life and high metal removal rates. Dimensions to DIN 6527 long.

Application:

For milling **titanium** and **high temperature steels**.

Especially for **MTC (Multi Task Cutting)** use on the new generation of turning milling centres.



Solid carbide end mill TPC TiAlN 10 mm

20 3083

Version:

High-performance end mills for machining superalloys, **specially designed for TPC applications**. Specially ground with corner radii similar to torus cutters.

Strengthened core.



Solid carbide roughing end mill HPC TiAlN 12 mm with internal coolant supply

20 5717

Version:

Special geometry with chip breakers for small chips. High performance coating **for roughing Ti-based and Ni-based superalloys**. With corner radii similar to torus cutters.

Also outstandingly suitable for stainless steels.

Internal coolant supply via the central bore.

Application:

For:

- Cutting speed (vc) 50 m/min for Ti-based superalloys up to 1200 N/mm², special alloys up to 1200 N/mm².
- Cutting speed (vc) 15 m/min for Ni-based alloys, such as Inconel®, Nimonic® and Hastelloy®. Cooling via internal coolant supply (also for Co- and Fe-based superalloys).
- Use with minimum 4 % emulsion.



SolidCAM



Solid carbide torus cutter HPC DIN 6535 HA TiAlN 10/1.0 mm

20 6356

Version:

With 38° flutes for milling **Ti-based alloys**.

Tolerance: Size nominal $\varnothing D_C = e8$.

Tolerance: corner radius $RS_1 = \pm 0.005 \text{ mm}$.

Application:

For:

- Cutting speed (vc) 55 m/min for Ti-based superalloys up to 1200 N/mm², special alloys up to 1200 N/mm².
- Use with minimum 4 % emulsion.



Solid carbide torus cutter HPC with internal cooling DIN 6535 HB TiAlN 10/1.0 mm

20 6361

Version:

With internal coolant supply.

Special coating for the best tool life and high metal removal rates.

Tolerance: Size nominal $\varnothing D_C = f8$.

With balance quality G2.5.

With 35° flutes for milling **Ni-based alloys**.



Solid carbide torus cutter HPC TiAlN 10/0.5 mm

20 6510

Version:

Special coating for the best tool life and high metal removal rates.

For milling **Ni-based alloys**.

Application:

For:

- Cutting speed (vc) 35 m/min for Ni-based superalloys, such as Inconel®, Nimonic® and Hastelloy® (also Co-based and Fe-based superalloys).
- Use with minimum 4 % emulsion.



Solid carbide ball nose slot drill HPC TiAlN 10 mm

20 7480

Version:

Special geometry for machining **titanium and titanium superalloys**.

4 centre cutting edges to the centre. Therefore can be used as a true **4-edge drill** at all depths of cut.

Tolerance: **Radius contour** = $\pm 0.005 \text{ mm}$.

For perfect processing

Helping you find the milling cutter and the inserts that you need.



Copy and face milling cutter with cooling 63/6 mm 21 2500

Version:

Sturdy toolholder body for reinforced ceramic indexable inserts. Precise insert bedding and easy clamping using wedge with surface pressure.

Application:

For copy and face milling at high cutting speeds in tool and die making.

Spare parts:

Wedge 219930 + clamping screw 219931 (SW3 3 Nm).



Indexable shell end mill 90° Softcut® 50/3 mm 21 5161

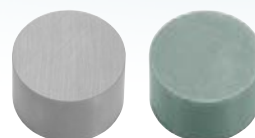
Version:

High-precision indexable end mill with irregular pitch for very smooth cutting, very high precision, and very high metal removal rate.

New generation of high performance indexable end mill **with special geometry for reduced cutting forces for MTC applications** under unstable conditions or for spindles with low drive power.

Note:

The insert pocket must be modified when using indexable inserts with a radius greater than 3.1 mm.



Milling inserts 25 5769 25 5771

Version:

High quality, high-temperature ceramic tool material for reliable operation in materials that are hard and difficult to machine.

KU 7410: Sialon ceramic for roughing and finishing high-temperature materials, even with interrupted cutting.

KU 7415: Aluminium oxide silicon carbide whisker ceramic for roughing and finishing exotic materials such as Inconel, Stellite.



Softcut® milling inserts APMT 133504 ER HB 7930 TI

21 5253

21 5366

Version:

With 2 cutters, E-tolerance ground all round, M-tolerance precision sintered. High-performance milling inserts with cutting force reduction.

Application:

For:

- 40 m/min cutting speed (vc) in Ti-based superalloys up to 1200 N/mm², special alloys up to 1200 N/mm².
- Applicable for dry machining.



Indexable face mill 90° MEC11T with bore 100/9 mm

227310

Spare parts:

Insert screw for indexable insert No. 229708 (T8 1.2 Nm).



Indexable insert BDMT 11T302 ER-JS CA6535 S

227361

Application:

Suitable for:

- 240 m/min cutting speed (vc) in sulphuretted stainless steels up to 700 N/mm², austenitic stainless steels up to 850 N/mm².
- 220 m/min cutting speed (vc) in stainless and acid-free steels martensitic / ferritic up to 1100 N/mm².
- 30 m/min cutting speed (vc) in Ti-based superalloys up to 1200 N/mm², special alloys up to 1200 N/mm².
- Applicable for dry machining.
- For use with compressed air feed.

Note:

Standard application values for $a_e = 0.3 \times D$.
Exactly 90° up to $a_p = 5.5$ mm.



Indexable insert CN. G 120408 HB7415

250158

Semi-finishing.

Application: Titanium / titanium alloys.

Indexable insert CNMG 120408 PR1325

250212

Semi-finishing.

Application: Titanium / titanium alloys.

GARANT deep hole drilling system

DEEP HOLE DRILLING SYSTEM AND PROCESS SECURITY

The deep hole drilling system allows drilling to great depths without problems in a process reliable way. The single tools are exactly attuned to one another for the required drilling depths. Thus a perfect coordination in regard to geometries, point angles, and, above all, cutting edge tolerances is achieved. This system of tolerances makes it possible to integrate the respective subsequent tool seamlessly into the production process. .



1. NC spotting drill



2. Pilot drill



3. Co-pilot drill



4. Deep hole drill



Premium Quality by Hoffmann Group



Solid carbide HPC pilot drill
DIN 6535 HA COX 10 mm

12 2606

Version:

Spiral fluted, with 6 **guide chamfers** and internal cooling channels. New generation of high performance pilot drills in the HPC range. With **140° point angle** and special **p6 cutting edge tolerance** for optimum generation of a pilot hole.

High roundness and alignment accuracy of the pilot hole.

Effective length:

up to $\varnothing 11.8 \text{ mm} = 6 \times D$, from $\varnothing 12 \text{ mm} = 5 \times D$.



Solid carbide HPC deep hole drill

12 3588

12 3595

Plain shank DIN 6535 HA 16×D COX 10.2 mm

Plain shank DIN 6535 HA 30×D COX 10 mm

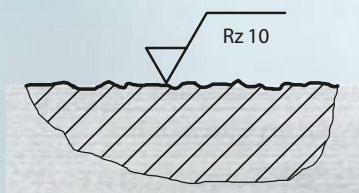
Version:

Spiral fluted, with 6 **guide chamfers** and internal cooling channels. New generation of high performance deep hole drills in the HPC range. With **135° point angle** and special **h7 cutting edge tolerance** for optimum generation of a deep hole. **High roundness and alignment accuracy of the deep hole.**

Deep-hole drilling with process reliability in 4 operations

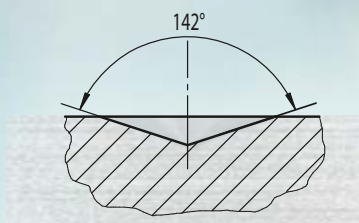
1. Face milling

At right angles to the hole axis, with the lowest **surface roughness** possible.



2. Centring

NC spotting drill with 142° point angle for **exact location** and **alignment accuracy**.

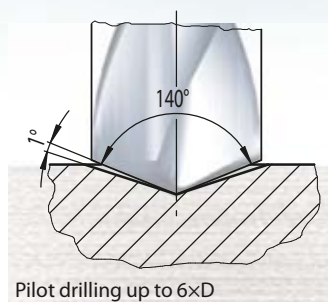


NC spot drilling is always advisable for process reliability

3. Pilot hole drilling

Minimum hole depth (depending on the desired deep hole depth) **according to the depth table**. The use of a pilot hole eases the subsequent deep-hole drilling operation and improves the life of the deep-hole drill. **Generating a pilot** is part of the production process. It ensures **process reliability** and **reduces the cost**.

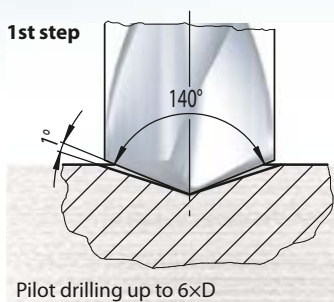
For deep-hole drilling 16–30×D



Pilot drilling up to 6×D

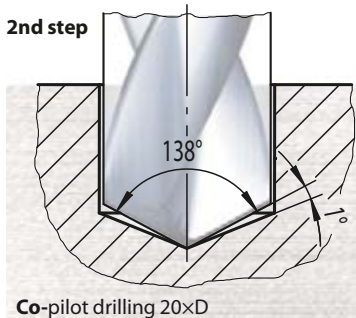
For deep-hole drilling 40–50×D

1st step



Pilot drilling up to 6×D

2nd step



Co-pilot drilling 20×D

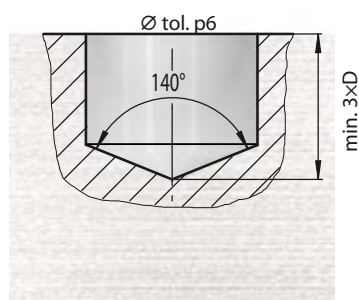
Depth table

Deep-hole drill	Pilot hole drilling (minimum drilling depth)
12×D	3×D (for centring with a 142° NC spotting drill)
16×D	4×D (for centring with a 142° NC spotting drill)
20×D	6×D
25×D	6×D
30×D	6×D
40×D	6×D and 20×D
50×D	6×D and 20×D

Generating a countersink

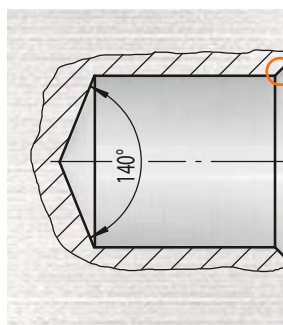
Vertical machining:

Countersinking is recommended, but not absolutely necessary if centre drilling is performed.



Horizontal machining:

After drilling the pilot hole, apply a 90° or 60° countersink.



Countersink necessary

A countersink should be drilled to make the introduction of the deep-hole drill easier.



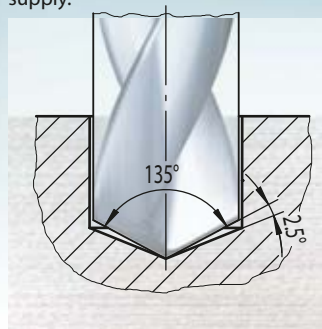
Solid carbide or HSS countersink, green ring or blue ring.

4a. Deep-hole drilling 16xD-30xD (after pilot drilling)

Positioning

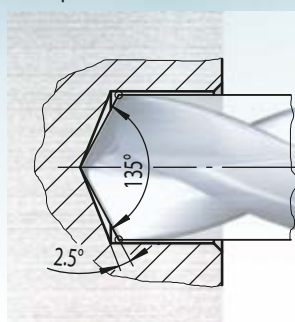
Vertical machining:

Introduce the deep-hole drill with **anticlockwise rotation** up to $0.5 \times D$ before the end of the pilot hole, without internal coolant supply.



Horizontal machining:

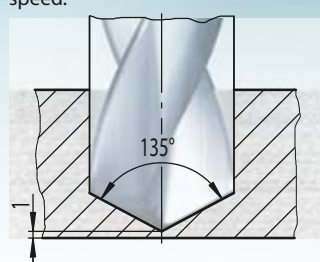
Position the **cutting corners** of the deep-hole drill **vertically, at zero rotation** introduce the drill into the hole as far as $0.5 \times D$ short of the end of the pilot hole.



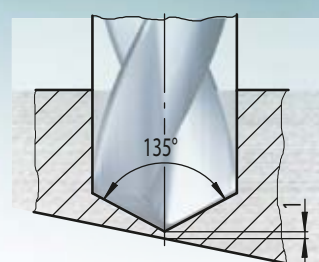
Implementation

Drilling the deep hole:

Work without a drilling cycle (no chip evacuation necessary). Switch on the internal coolant supply, increase the rotational speed (as smoothly as possible) to the final working value v_c . When drilling a through hole, approx. 1 mm before the deep-hole drill breaks through, reduce the v_f speed.



Breaking through at right angles:
reduce v_f by 50%.



Breaking through obliquely and breaking through into cross holes:
reduce v_f by 40%.

Backing out the deep-hole drill

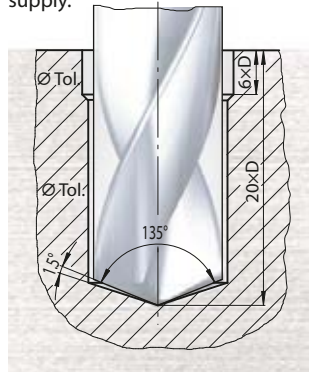
Before backing out the deep-hole drill **switch off the internal coolant supply** and then **back out the drill optionally with or without reducing the drill speed** ($v_f=1000$).

4b. Deep-hole drilling 40xD – 50xD (after pilot and co-pilot drilling)

Positioning

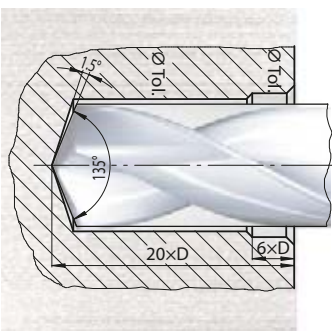
Vertical machining:

Introduce the deep-hole drill with **anticlockwise rotation** up to $0.5 \times D$ before the end of the pilot hole, without internal coolant supply.



Horizontal machining:

Position the **cutting corners** of the deep-hole drill **vertically, at zero rotation** introduce the drill into the hole as far as $0.5 \times D$ short of the end of the pilot hole.

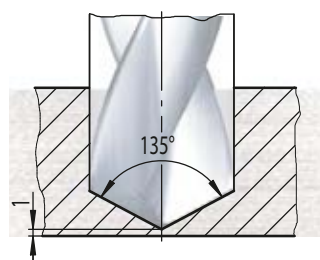


Implementation

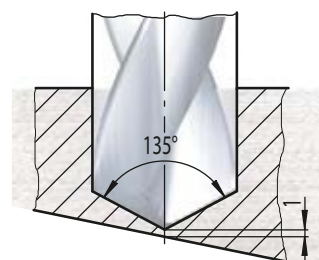
Drilling the deep hole:

When drilling deep holes $40 \times D / 50 \times D$, **chip evacuation is necessary every $3 \times D$** (perform chip evacuation by pulling the drill back from the bottom of the hole in cycles of not more than $3 \times D$).

When drilling a through hole, approx. 1 mm before the deep-hole drill breaks through, reduce the v_f speed.



Breaking through at right angles:
reduce v_f by 50%.



Breaking through obliquely and breaking through into cross holes:
reduce v_f by 40%.

Backing out the deep-hole drill

Before backing out the deep-hole drill **switch off the internal coolant supply** and then **back out the drill optionally with or without reducing the drill speed** ($v_f=1000$).

Safety instructions

Deep-hole drills $\geq 12 \times D$ may **never** be operated at v_c max without pilot hole guidance.

Working with aluminium

Optimise your machining with our range of products with yellow ring.

Suitable GARANT
colour ring



Solid carbide 4-flute drill HPC DIN 6535 HA ZOX 10.2 mm

12 2308

Version:

with dynamic flutes for reliable chip evacuation.

Advantage:

For high performance drilling in aluminium materials.



Solid carbide HPC pilot drill plain shank DIN 6535 HA COX 10 mm

12 2606

Version:

Spiral fluted, with **6 guide chamfers** and internal cooling channels. New generation of high performance pilot drills in the HPC range. With **140° point angle** and special **p6 cutting edge tolerance** for optimum generation of a pilot hole.

High roundness and alignment accuracy of the pilot hole.

Effective length:

Up to $\varnothing 11.8 \text{ mm} = 6 \times D$, from $\varnothing 12 \text{ mm} = 5 \times D$.



Solid carbide 4-flute drill HPC plain shank DIN 6535 HA ZOX 10 mm

12 2875

Version:

With dynamic flutes for reliable chip evacuation.

Advantage:

For high performance drilling in aluminium materials.



Solid carbide 4-flute drill HPC plain shank DIN 6535 HA ZOX 10 mm

12 3180

Version:

With dynamic flutes for reliable chip evacuation.

4 cooling channels for process reliable deep hole drilling.

Advantage:

For high performance drilling in aluminium materials.



SolidCAM



Example of production of a part with iMachining (SolidCAM).



Through hole machine tap for synchronised spindles with internal coolant supply DLC M10

13 1128

Version:

Sturdy design with spiral point and shank to DIN 1835-B.
Special geometry for use on machines with **synchronised spindle drives**.
The tap is controlled by the synchronising spindle of the machine.
With the latest generation of special DLC coating sp² for optimum tool life.
Applicable with **emulsion** (fat content minimum 8 %).
With internal coolant supply for maximum tool life.



Machine tap HSSE-PM DLC 10-24

13 3370

Version:

With the latest generation of **DLC coating sp²**.
Very sturdy design, with spiral point and special cutting edge geometry for lightweight materials.
For use with **emulsion** (fat content minimum 8%).



Blind hole machine tap HSSE-PM 2xD G1

13 7340

Version:

Hard chrome-plated surface for reduced edge build-up and increased tool life.



Solid carbide end mill TPC DLC 16 mm

20 2515

Version:

Extra sharp cutting edges.
Dimensions similar to DIN 6527.
With the latest generation of **DLC coating sp²**.



Solid carbide ball nose slot drill DLC 16 mm

20 7441

Version:

With the latest generation of **DLC coating sp²**.
For **high-performance milling of aluminium materials**.
4 centre cutting edges to the centre. Therefore can be used as a **true 4-edge drill** at all depths of cut.
Tolerance: **Radius contour** = ± 0.005 mm.



Solid carbide end mill HPC / TPC ZOX 10 mm

20 2549

Version:

Sturdy roughing end mill **without** knuckle profile.
With strong core, **special chip breaker recesses** and **large polished flutes**.
Special ZOX coating.

Reduced set-up times, increased productivity.

With GARANT TopCut tools.



Torus milling head TopCut

21 0255

For aluminium HB 7820 10/1 mm.

- Flexibility with 16 milling head types in 26 variants, heads from ground carbide with a coating for drilling in a variety of materials.
- Diameter 10 – 25 mm available.



Arbor TopCut

21 0561

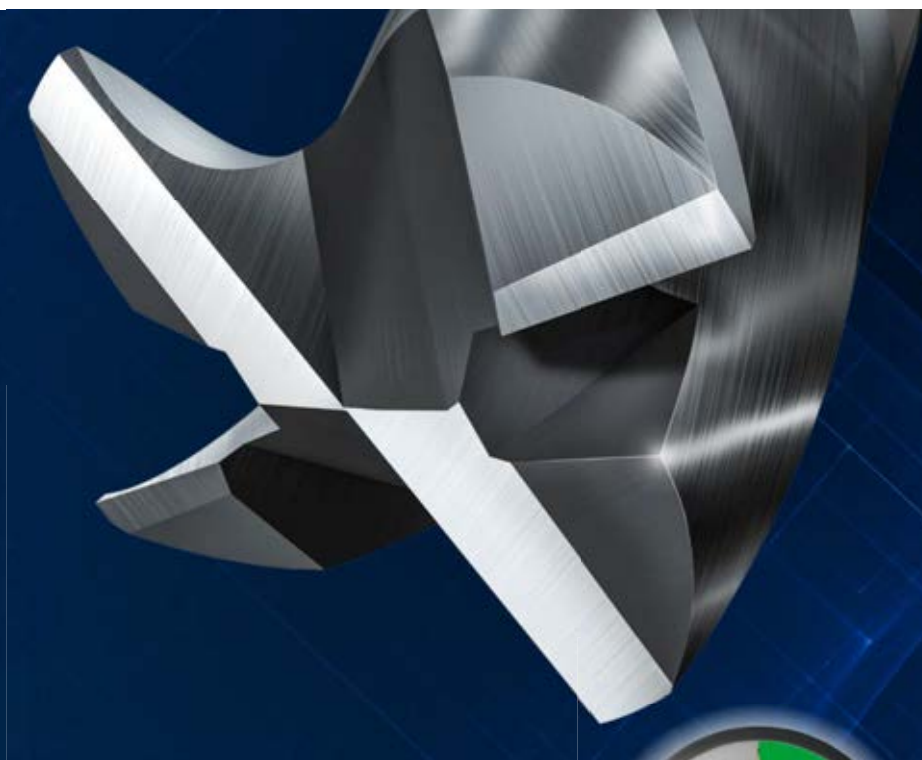
Solid carbide arbor 90°, plain shank, short 12 mm.

Version:

Precision-ground arbor for GARANT TopCut screw-in heads.

System radial run-out $\leq 10 \mu\text{m}$ due to the combination of taper and flat face.

With plain shank (for HSC machining). **Tolerance = h6.**



Machine downtime



Unscrew



Screw in

Immediate advantages with the GARANT TopCut tools:

- » Reduced machine downtimes.
- » Arbor can remain on the machines.
- » Fast and precise tool change.



Premium Quality by Hoffmann Group

Working with aluminium for the aerospace industry's high demands on precision.



Face mill with bore HPC 35/3 mm

21 2910

Version:

Latest generation of face mill in HPC machining. Dynamic cutting edge geometry for highest feed rates. Extremely smooth cutting due to **self-stabilising insert bedding**. **Optimised geometry** for reduced cutting forces, thereby **reducing the stress on the main spindle**.

Advantage:

Particularly cost-effective due to **exceptionally stable 4-edge inserts**.

Application:

For increased productivity in face and pocket milling. Permits plunge milling even at long overhangs.



Milling insert XDLW 120408 ER HU 7810 ALU

21 2966

Version:

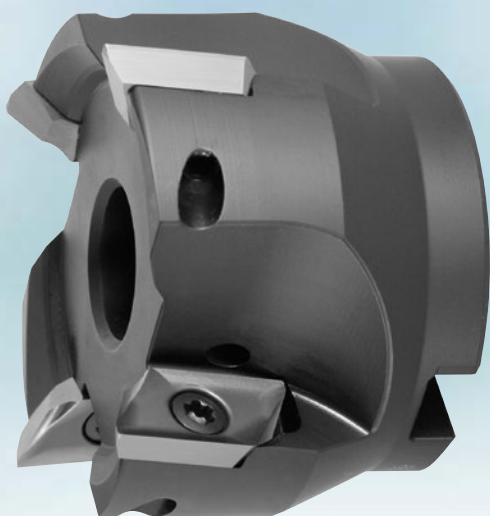
4-edge indexable insert. Optimised substrates together with application-specific surface geometries ensure very high metal removal rates in both continuous and interrupted cutting.

Carbide indexable inserts.

GARANT ToolScout

Intelligent tool selection and
technology data determination





End mill 90°

22 0803

5720VZ16 with bore 42/3 mm

Version:

Milling body with plain shank, balanced to $G = 6.3$ at 30,000 rpm. Shell-type milling cutters with modular interfaces have to be balanced together with their arbor before use in high speed machining.

Their design allows all radii of indexable inserts up to $r_e = 6.0$ mm to be mounted without modification to the milling head and without length correction.

Note:

HSK shanks and special features on request.



Indexable insert ZDET 16M530 FR-721 GH1 ALU

22 0824

Recommendation:

When exchanging the indexable inserts, please also replace the screws. Spare screws are supplied with the indexable inserts.

Search no longer!

YOUR ADVANTAGES:

- » Easy and quick finding of appropriate solutions for your cutting task!
- » Reliable cutting data, material and tool information.
- » Finding tools, determining cutting data and ordering directly via the eShop all in one online medium.
- » Free of charge, easy to use and always up-to-date.



Premium Quality by Hoffmann Group

→ www.toolscout.com

An ingeniously simple colour ring system for the machining of lightweight materials.

The materials of the future are lightweight, robust but yet demanding to machine. The consistent coding of the cutting tools with only 3 colour rings allows quick and easy determination of the suitable tool for the respective machining task.



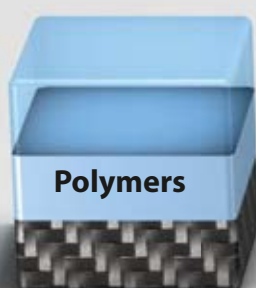
Aluminium

Cast alloys

- » Differences in Si, Mg, Cu and Zn content
- » Different strengths in edge and core zones

Wrought alloys

- » Differences in Si, Mg, Cu and Zn content
- » Short-chipping or long-chipping



Polymers

Thermoplastics

- » Amorphous or semi-crystalline

Thermoset

- » Cross-linked

Fibre reinforcement

- » Fibre orientation uni-directional or multi-directional
- » Glass fibre (GRP)
- » Carbon fibre (CRP)
- » Aramid (AFRP)
- » Fibre proportion (in %)



Hybrid

Hybrid structure

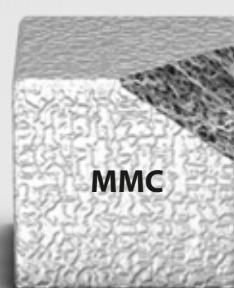
Material combination of metal, polymers and fibres, with at least 3 layers



Honeycomb

Layer-column structure

Extremely light honeycomb structure (metal, polymers, fibres)

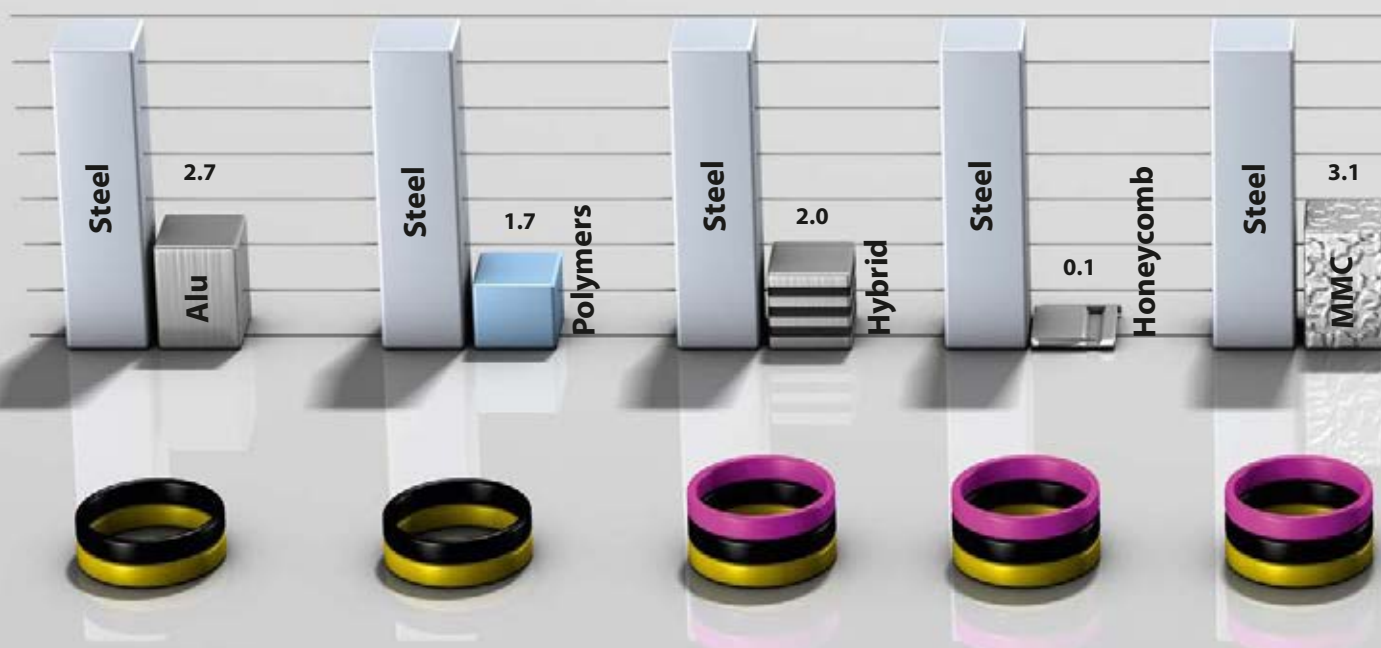


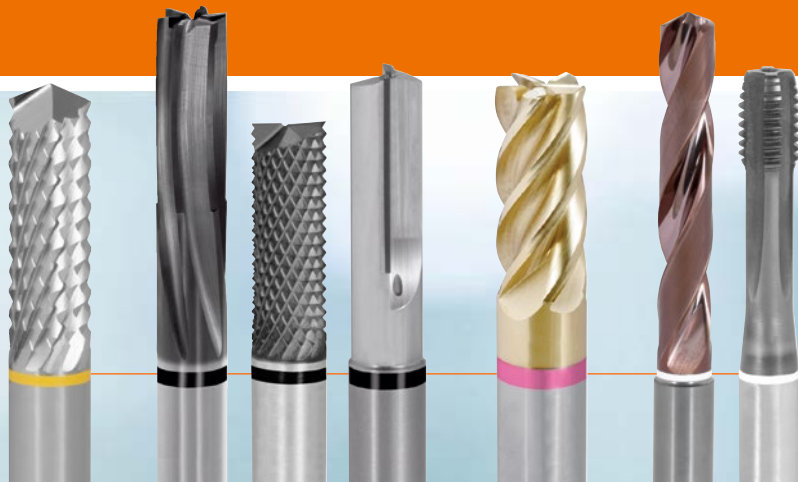
MMC

Metal-matrix composite

Composite materials of metal and ceramic

Relative density in g/cm³ compared to steel (7.85 g/cm³).





Colour ring system

Consistent colour coding of cutting tools – for quick and easy determination of the suitable tool.

Superalloys (forged, tempered, annealed, cast)

Fe

Iron-based alloys
High-temperature
resistant special alloys

Co

Cobalt-based alloys
Highly wear-resistant
special alloys

Ti

**Titanium-based
alloys**
Corrosion-resistant
and very tough

Ni

Nickel-based alloys
High-temperature
resistant, indispen-
sable in aerospace

ADI

Austempered
Ductile Iron
GGG cast iron / cast
iron with bainitic
structure

7.9

8.0

8.19

7.2

Steel

Incoloy®

Steel

Stellite®

Steel

Ti6Al4V

Steel

ATI 718plus®

Steel

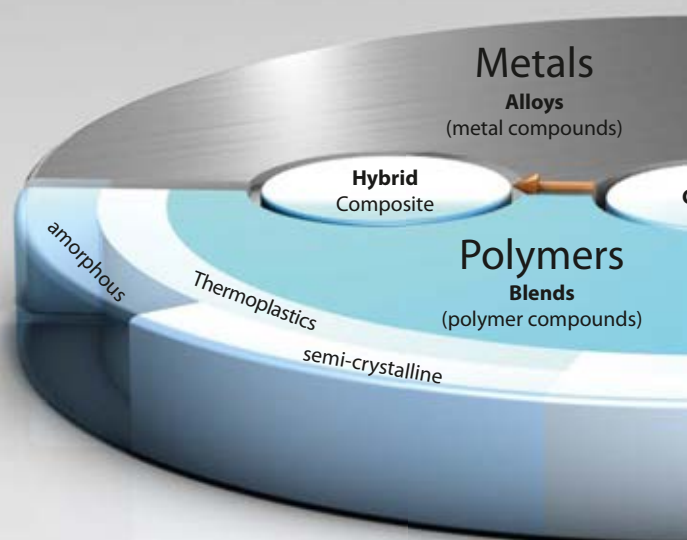
EN-GJS-1200-2



Polymers

The glass transition temperature (TG)

Suitable GARANT
colour rings



Thermoplastics
amorphous



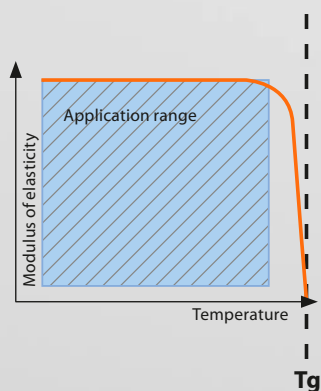
Thermoplastics
semi-crystalline



Thermoset
cross-linked

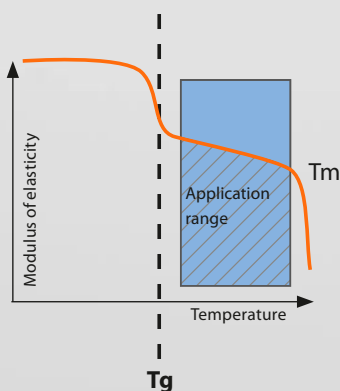


CRP / GRP / aramid
Polymers with fibre
reinforcement, note **Tg**
and **fibre orientation**.



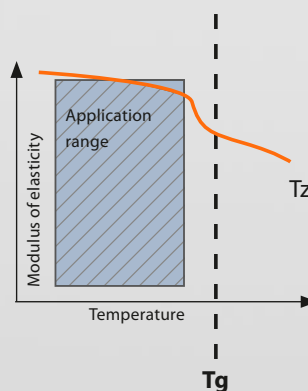
Machining of amorphous plastics:
only below Tg.
If the heating continues, the
degradation process sets in.

amorphous:
temperature-sensitive



Machining of semi-crystalline
plastics: **between Tg and Tm**
(melting point).
If the heating continues, the
melting sets in.

semi-crystalline:
higher machining temperature
possible



Machining of thermoset:
below Tg.
If the heating continues, the
degradation process (Tz) sets in.

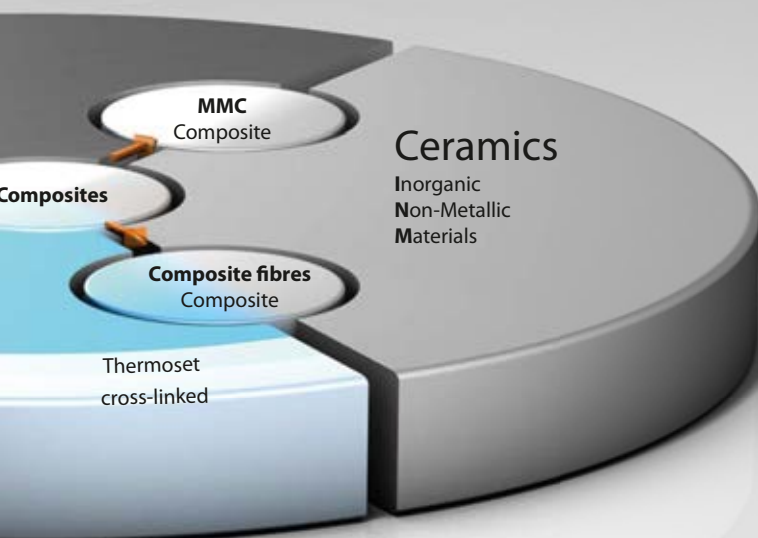
cross-linked:
less temperature-sensitive,
disintegrate



High structural stiffness
with low weight,
extremely suitable for
the automotive
engineering and the
sports industry.

Composites

Individual material mixture



Suitable GARANT colour rings



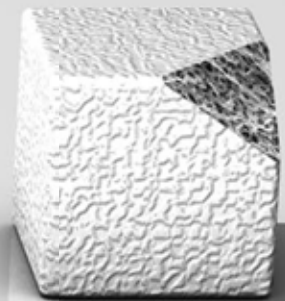
Hybrid

Observe the sequence of the materials when machining.



Honeycomb

Delicate layer-column construction. Take notice of the two different effective directions when machining.

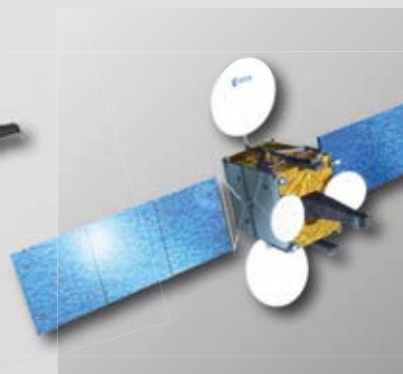


MMC

Often ceramic substances bound in metal matrix - difficult to machine.



The combination of metals and ceramic substances makes the combination of the respective advantages possible - for instance in the aerospace industry.



Ultra-light and tough at the same time - for instance in satellite technology.



Hard and tough as well as thermally resistant - ideal for the high stresses that arise in the construction of high-performance engines.

Machinability of superalloys

An extreme challenge for cutting tools.

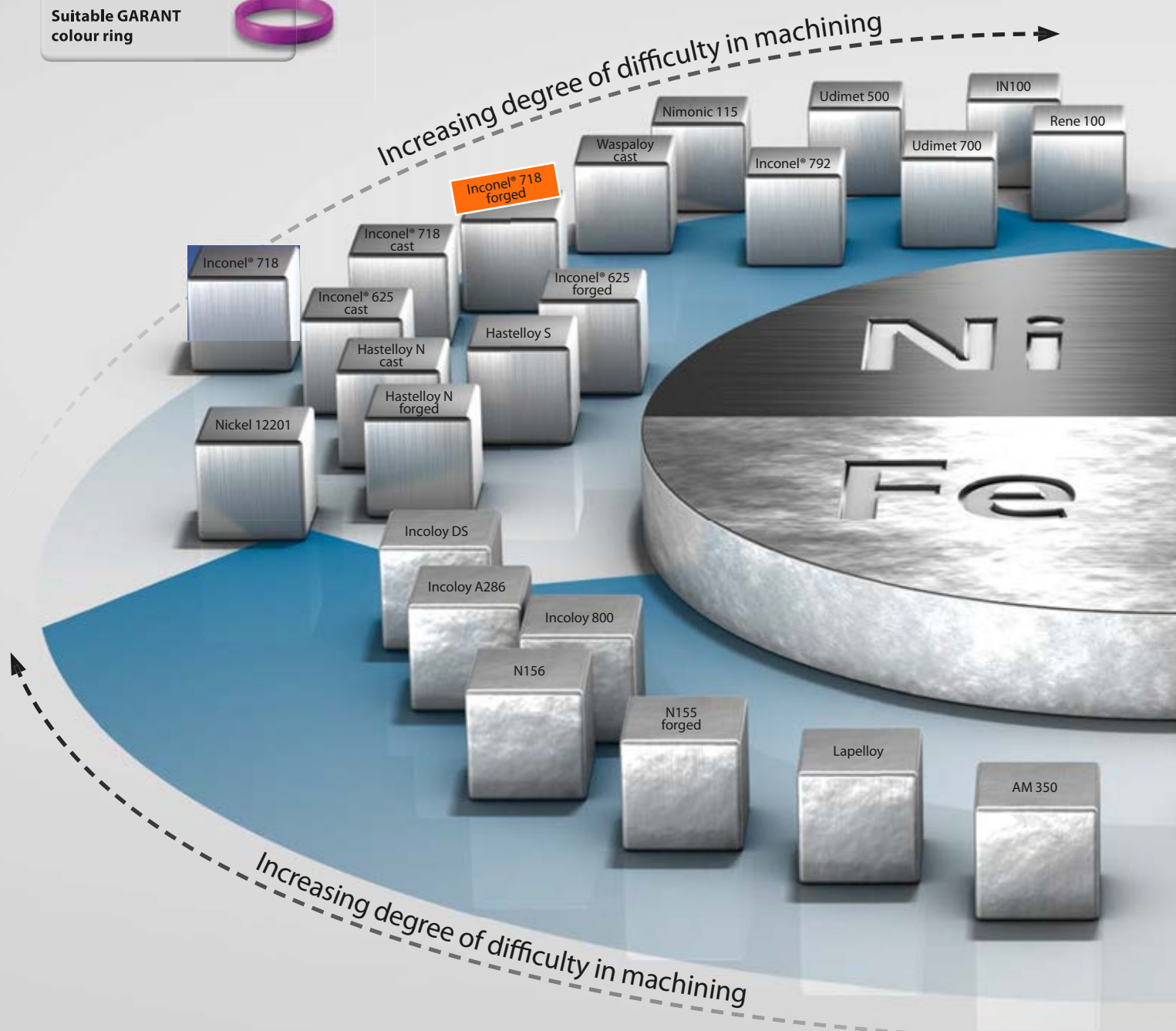
Specifically:

High torque at **low speed** to reduce the high wear and the transfer of almost **75% of the process heat** to the tool's cutting edge.

Suitable GARANT
colour ring



Increasing degree of difficulty in machining

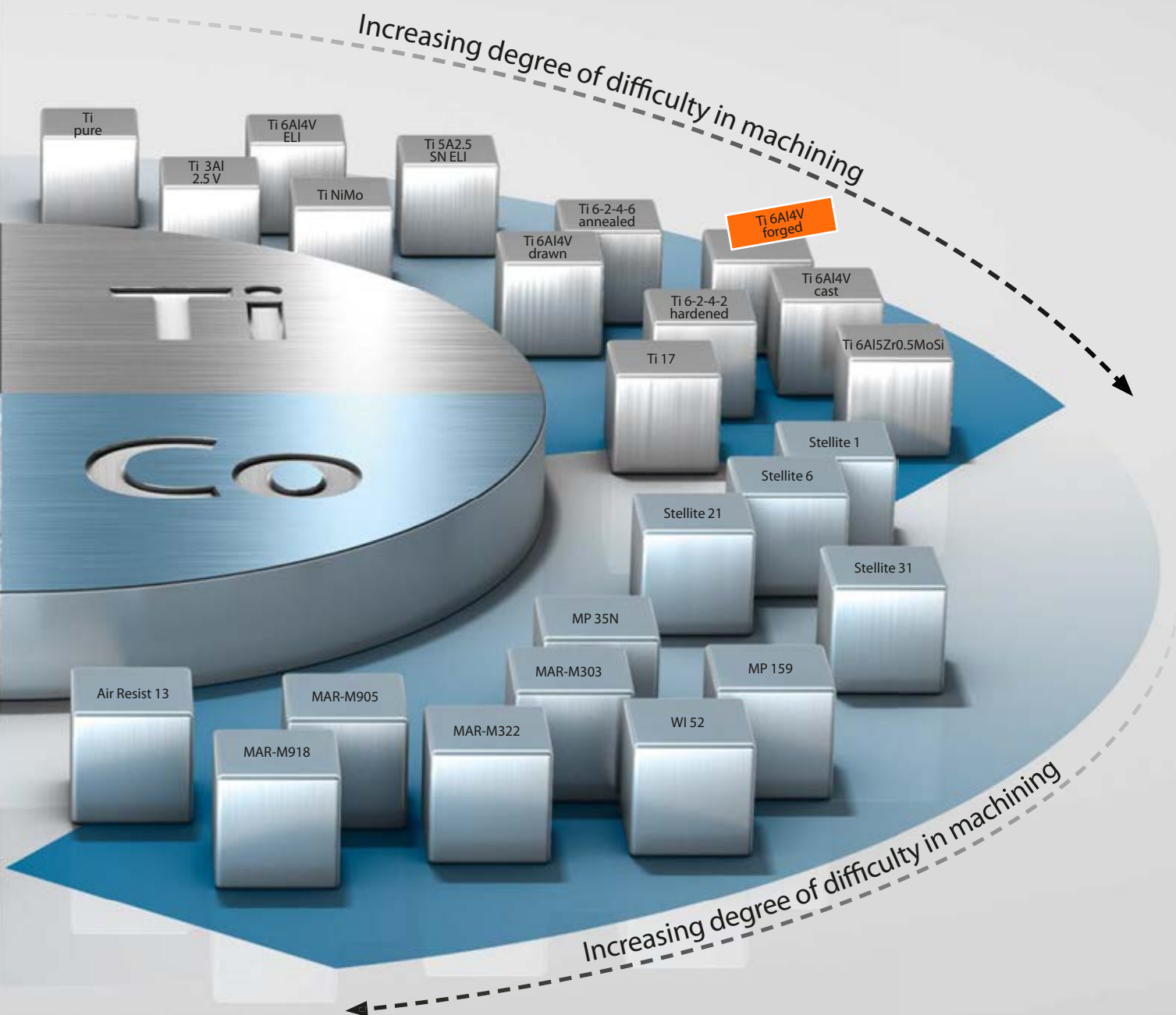


Note:

- » Climb milling
- » Low cutting speeds
- » Cooling
- » Optimum lubricant
- » Manufacturing process (forged, annealed,...)

The reasons:

- » Tendency of the chips to stick
- » Spring effect because of the low modulus of elasticity
- » Tendency of the unstable components to chatter
- » Strip-form chips

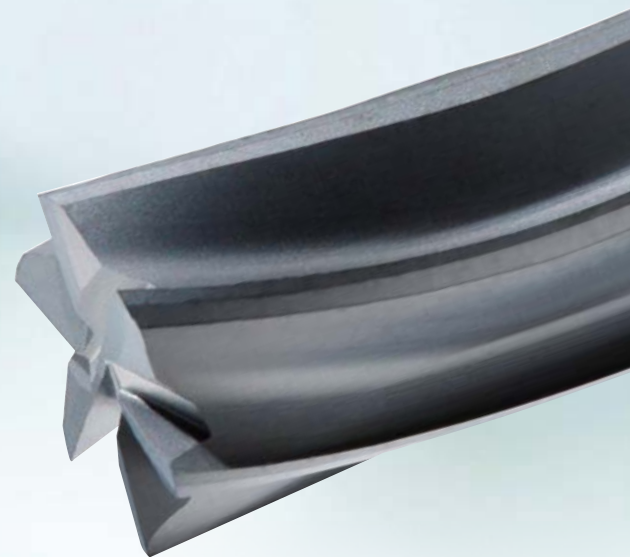


Working with composites

Process security with suitable tools – black colour ring.

GARANT machining tools will help you process high-performance plastics more efficiently.

Suitable GARANT colour ring



PCD high performance solid head drill plain shank 12 2509

DIN 6535 HA PCD 10 mm

Version:

Drill with **PCD solid tip**.

Special tip and **special cutting edge geometry** to avoid delamination, **projecting fibres**, and **burr formation**. Very **long tool life**, **high dimensional accuracy** and **surface quality** due to **PCD solid head**.

Tolerance: Size nominal $\varnothing -0.015$.



Solid carbide high performance drill plain shank multi-directional 12 2512

DIN 6535 HA diamond 0.9 mm

Version:

With the latest generation of **crystalline diamond coating sp³**, for process reliability in machining **fibre reinforced composites**, **CRP**, **GRP**, and **graphite**. With **90° point angle** and special geometry to **avoid delamination**.

With **guide chamfer** for materials with **multi-directional fibre orientation**.



Solid carbide high performance drill plain shank, uni-directional 12 2532

DIN 6535 HA diamond 10 mm

Version:

With the latest generation of **crystalline diamond coating sp³**, for process reliability in machining **fibre reinforced composites**, **CRP**, **GRP**, and **graphite**. With **90° point angle** and special geometry to **avoid delamination**.

Under optimum conditions of use, the **double flute face** can generate high precision holes with **roundness < 15 µm** to **base tolerance IT 7**. Low heat generation due to **internal cooling** permits **higher speeds and feeds**.



Solid carbide end mill

20 9515 20 9520

Diamond 10 mm
Diamond 6 mm

Version:

Twisted and curved cutting edges, which enable **burr-free milling** of both the upper and lower edges of fibre-reinforced composites. Delamination is prevented because the cutter performs a cut which is **simultaneously dragging** and **compacting**. The cutter must be positioned centrally to the cross section of the material.

Version:

Contra-twisted flutes, which enable **burr-free milling** of both the upper and lower edges of fibre-reinforced composites. Delamination is prevented because the cutter **simultaneously** performs a **dragging** and a **compacting cut**. To achieve this, the cutter has to be positioned centrally to the cross section of the material.



SolidCAM



PCD ball nose slot drill with internal cooling straight cut PCD 12 mm

20 9655

Version:

High performance PCD slot drill for the **highest demands in respect to material removal rates** when machining **GRP, CRP and graphite**.

Straight flutes for a neutral cut.



Solid carbide micro precision slot drill Diamond 0.2X1.5 mm

20 9710

Version:

With the latest generation of **sp³ crystalline diamond coating** for process reliability in machining **fibre reinforced composites, CRP, GRP, and graphite**.

Double relief ground with 2 hollow-ground chamfers.

High precision version in respect of concentricity and all tolerances.

Recess angle $\alpha = 16^\circ$.

Tolerances:

• Size nominal \varnothing : **DC = 0 / - 0.01 mm.**

• Neck \varnothing : **D4 = 0 / - 0.02 mm.**



Solid carbide torus cutter Diamond 1.5/0.15 mm

20 9750

Version:

With the latest generation of **sp³ crystalline diamond coating**, for process reliability in machining **fibre reinforced composites, CRP, GRP, and graphite**.

Double relief ground side clearance angle.

High precision version in respect of concentricity and all tolerances.

For copy milling with angle $\alpha = 1^\circ 30'$.

Tolerance: Corner radius **RS1 = ± 0.01 mm.**



Solid carbide ball nose slot drill Diamond 0.2X1.5 mm

20 9776

Version:

With the latest generation of **sp³ crystalline diamond coating**, for process reliability in machining **fibre reinforced composites, CRP, GRP, and graphite**.

Double relief ground side clearance angle.

High precision version in respect of concentricity and all tolerances.

Tolerance: **Corner radius = ± 0.01 mm.**

Requirements on surface quality

Faced with high demands on surface quality, our range of abrasive tools will help you find the correct tool to achieve excellent surface quality.



Diamond needle file

529210

Diamond needle file, 140 mm grit D 126 (medium - universal) 1

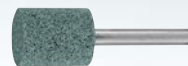
529220

Diamond needle file, 140 mm grit D 181 (coarse) 1

529230

Version:

The blanks for these needle files are forged and ground from special steel. The diamond needle files are evenly spread with diamond powder of uniform grit and electro-bonded in place. The even diamond coating and the hardness of the diamond ensure best filing results. **Overall file length = 140 mm**; diamond coated length = 70 mm; shank Ø = 3 mm.



Grinding point fine SiC ZY1013

55 1780

Version:

Ceramic bonded **SiC** grinding point, 80 grit (fine), with high self-sharpening effect and open-pore structure for improved reduction of clogging. Shank Ø 6 mm.

Application:

For grinding **aluminium alloys** and **soft materials (non-ferrous metals)**. Recommended circumferential speed : 25 - 40 m/s.



Diamond spherical point D 126 6 mm

55 2600

Version:

Precision ground point with diamond coating 126 / 357.

Universal grit with high cutting performance and very long working life due to **galvanic nickel bonding**.

Application:

For hand-held use and with internal / jig grinding machines.

Carbide, reinforced plastics (GRP / CRP), glass, ceramic, ferrite, silicon, porcelain, graphite, rubber.





Grinding point J hardness fine AWCO ZY0613

55 1791

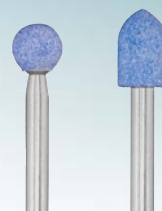
Version:

Grinding point in **J hardness**, in a soft bonded combination of **white electro-bonded aluminium oxide** and **ceramic micro-crystalline sintered aluminium oxide** with high self-sharpening characteristics for consistently high metal removal rates coupled with cool grinding behaviour.

Fine, grit 80.

Application:

For surface grinding of superalloys that are difficult to grind such as **titanium** materials, **nickel**, and **cobalt-based alloys**, and also **hardened steel**. Recommended circumferential speed: 30 - 50 m/s



Diamond cylindrical point D 126 1 mm

55 2500

Version:

Precision ground point with diamond coating 126 / 357.

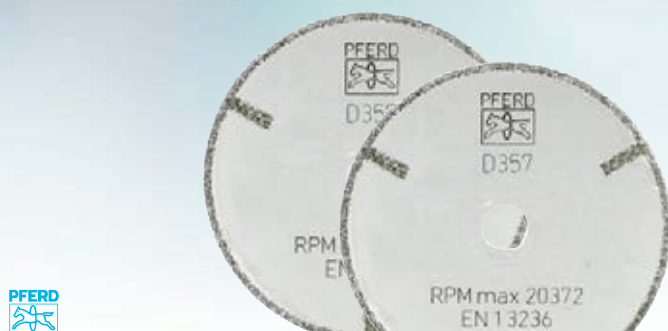
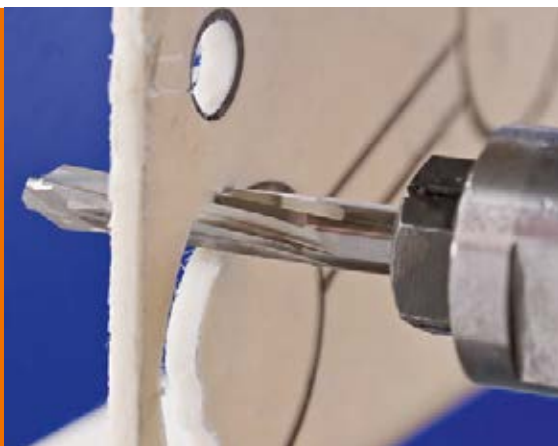
Precision ground points with diamond or CBN coating 126 / 357. Universal grit with high cutting performance and very long working life due to **galvanic nickel bonding**.

Application:

For hand-held use and with internal / jig grinding machines.

Carbide, reinforced plastics (GRP / CRP), glass, ceramic, ferrite, silicon, porcelain, graphite, rubber.



**Diamond cutting disc 50 mm**

56 3490

Version:

Single-layer **galvanically distributed** diamond cutting disc with **lateral protective segments**. Very easy cutting due to large chip clearance space. Overall disc width 2.0 mm, steel baseplate 1.0 mm.

Application:

For cutting, trimming, and parting off fibre-reinforced plastics (CRP / GRP) on angle grinders (size 115 / 125) or straight grinders (size 50 / 75) with mandrel No. 563496.

**Flap disc V2 power**

56 5486

(SiC) glass fibre pad, flat-dished for aluminium Ø 125 mm 40

Version:

The patented sickle-shaped segments and configuration permit an exceptionally high coating density and a long working life. High-quality mounting on a steel or glass fibre pad for low-vibration working at reduced noise levels.

SiC: Particularly coarse **Silicon Carbide grit**, does not clog. Highly suitable for aluminium and fibre-reinforced composite materials.

**Burr P tooth type - plastic carbide AB0313mm**

54 7300

Version:

The special tooth geometry generates reduced **cutting forces** and **avoids frayed fibres**. Shape A cylindrical (ZYA).

Cutter geometry ideal for hard CRP/GRP with fibre content > 40 %.

Application:

Side milling, contour milling and deburring (especially of fibre-reinforced plastics).

**Burr FVK - tooth type carbide AZB0625**

54 7310

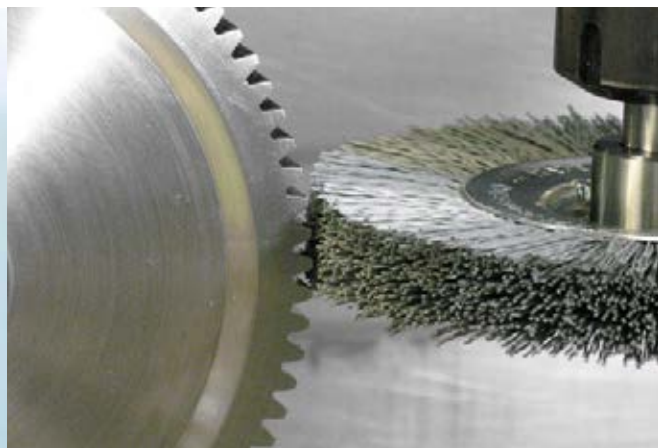
Version:

The special tooth geometry generates reduced **cutting forces** and **avoids frayed fibres**. Shape A cylindrical (ZYA).

Cutter geometry ideal for hard CRP/GRP with fibre content > 40 %.

Application:

Side milling, contour milling and deburring (especially of fibre-reinforced plastics).



MIRKA

Velour-backed abrasive disc ABRANET® Ø 150 mm 600 MIRKA 600 56 7800

Version:

The patented **ABRANET®** grinding system consists of a **mesh structure** of polyamide fabric containing thousands of holes and coated with abrasive grit.

Advantage:

- **Dust-free grinding:** very little contamination of the workplace or environment.
- No clogging of the grinding disc (surface finish defects and dust balls are avoided).
- Guaranteed **improved surface finishes** with less grinding material consumption.
- **High effectiveness** - the removal rate increases by several orders of magnitude depending on the surface.



Burr PLAST - tooth type carbide AZB0625 54 7320

Version:

The special tooth geometry generates reduced **cutting forces** and **avoids frayed fibres**. Shape A cylindrical (ZYA).

Cutter geometry for the **least possible delamination**, ideal for less hard CRP/GRP with fibre content < 40 %.

Application:

Side milling, contour milling and deburring (especially of fibre-reinforced plastics).



LESSMANN®
DRAHTSTRICH - WIRE BRUSHES

Wheel brush with shank micro-abrasive, SiC grit 120 50x10 mm 57 4440

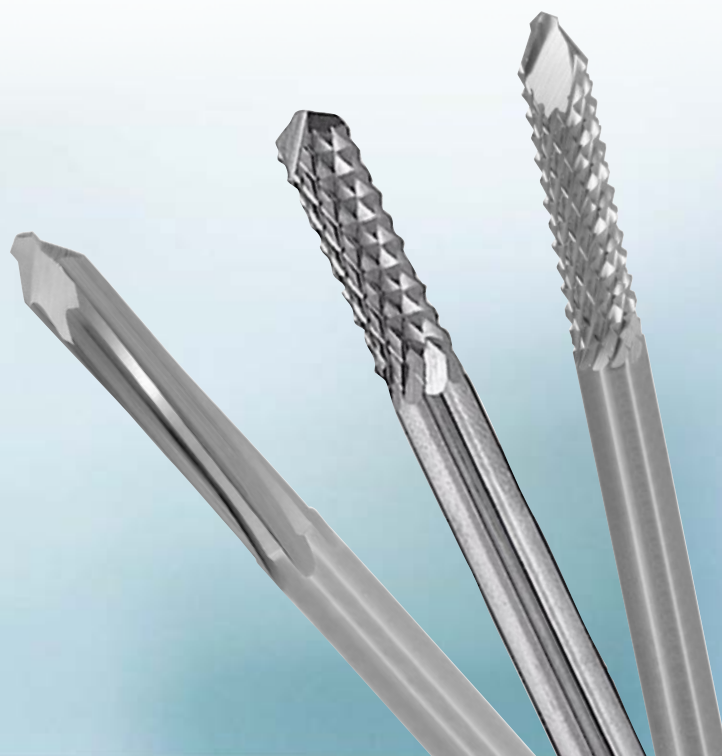
Version:

Abrasive nylon strands with silicon carbide, crimped into steel sleeve, shank Ø 6 mm.

Application:

Wet and dry fine rubbing down of aluminium, steel, stainless steel and plastics.

Maximum operating temperature 80 °C.



One base unit – immense flexibility

THE ZERO-POINT CLAMPING SYSTEM FOR A WIDE RANGE OF APPLICATIONS



GARANT
high pressure centring vice



GARANT
multi-point clamping rail 80



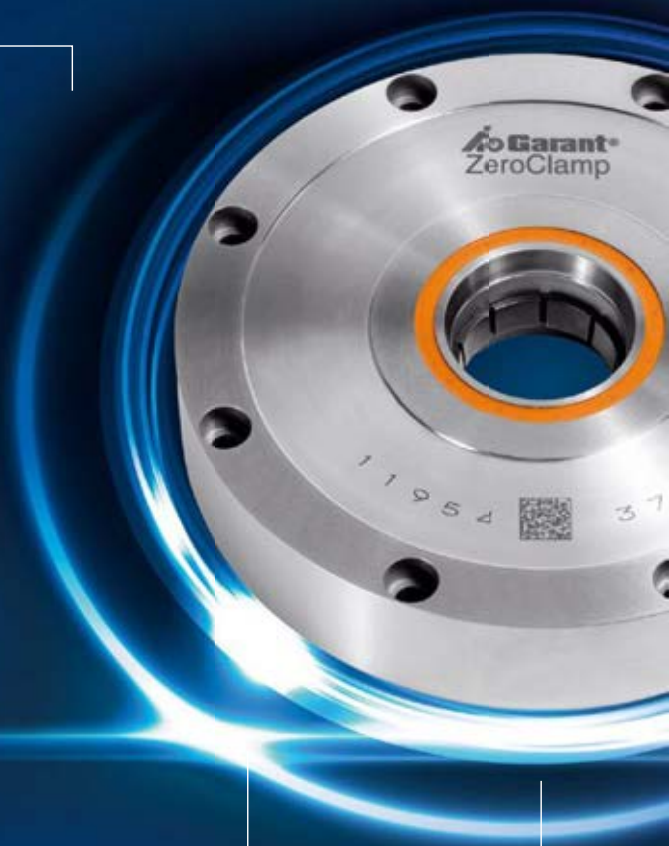
GARANT ZeroClamp
clamping pot socket

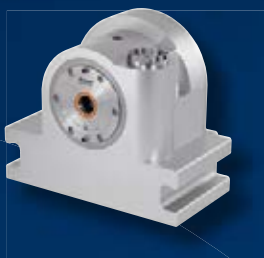


HAINBUCH "Manok"



ALLMATIC "T-REX"





GARANT ZeroClamp
dividing head



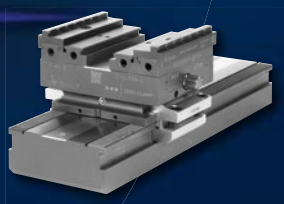
GARANT ZeroClamp
base plate



GARANT ZeroClamp
extension base



SAV magnetic
clamp



GARANT
centring vice



GARANT
NC-high pressure vice



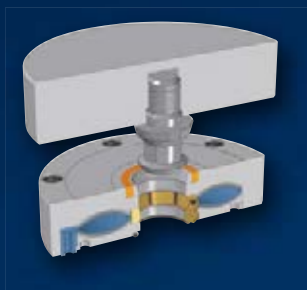
Premium Quality by Hoffmann Group

GARANT ZeroClamp

ONLY 5 BAR COMPRESSED AIR IS NEEDED FOR RELEASING THE BOLTS – LOCKS VIA SPRING ACCUMULATOR

- » 25 kN holding force (for clamping pot Ø 120 mm), not self-locking.
- » Low maintenance, sealed system without hydraulic oil: no leakages, insensitive to swarf.
- » Process reliability due to very easy operation.

CROSS SECTION OF FUNCTIONAL PRINCIPLE



The pallet is simply placed on the open GARANT ZeroClamp clamping pot. There is no risk of jamming.



The spring elements keep the locking unit (clamping wedges) open due to the air pressure (5 bar) in the air hose.

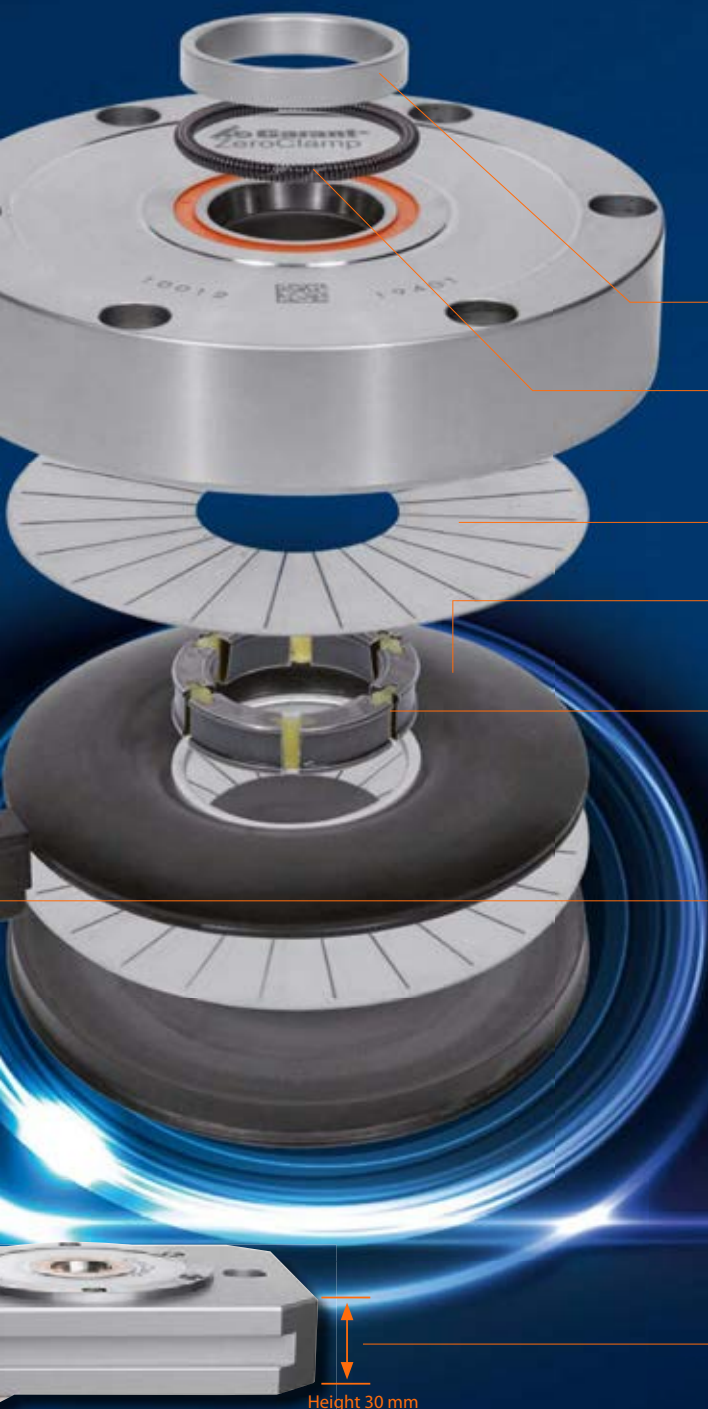


ZeroClamp positions the workpiece on the planar support faces with a retention force of 25 kN (at a repeatable accuracy of 5 µm).



The centre piece

**ONLY 8 PIECES FOR RELIABLE
CLAMPING FORCE.**



Free of play, centric clamping
in a hardened steel cone

Radial spring
embedded in NBR

All components are made of stainless
or corrosion resistant steel

Wear-free technology
An air hose and clamping plates
provide the required clamping force.

Locking unit

Air connection for releasing

Easy handling

Low weight and small dimensions
(base plate made of high-tensile
aluminium, surface treated).

Height 30 mm



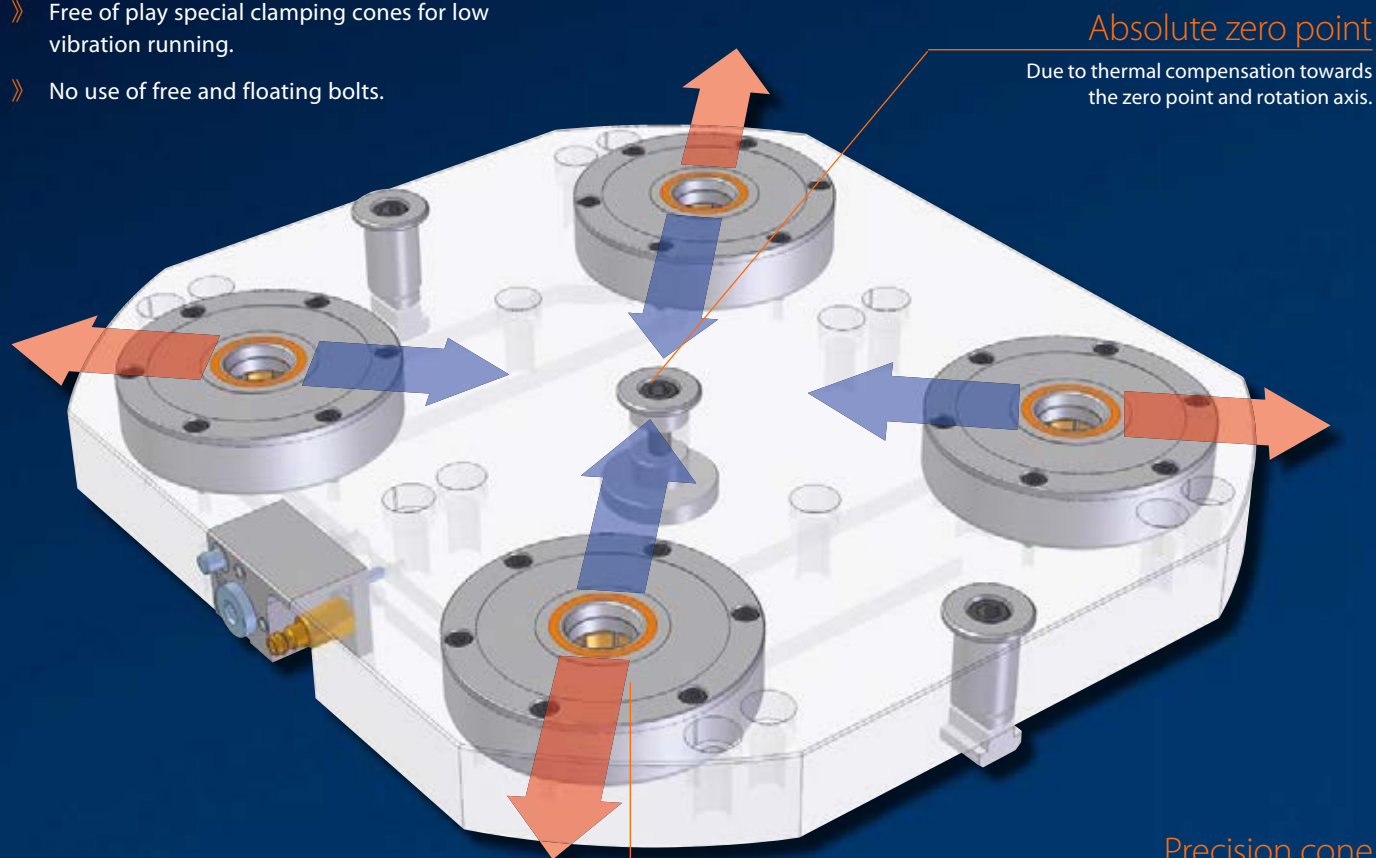
Premium Quality by Hoffmann Group



The decisive advantage

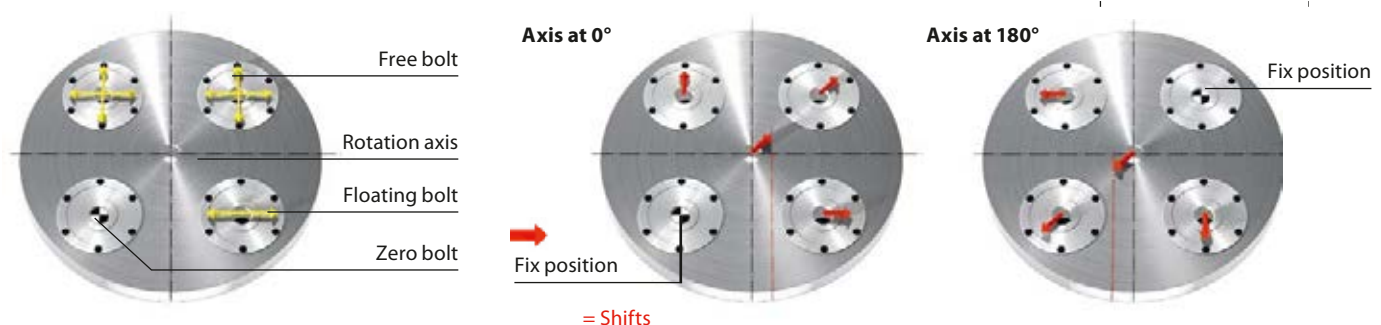
THERMAL SYMMETRY – ALWAYS TOWARDS THE CENTRE.

- » The absolute zero point: Compensating the thermal expansion always to the centre axis.
- » Free of play special clamping cones for low vibration running.
- » No use of free and floating bolts.



Conventional technologies compensate thermal expansion using floating bolts – especially inaccurate with component rotation around the central axis. With GARANT ZeroClamp an absolute thermal symmetry is provided due to the central zero point!

THE DRAWBACKS OF CONVENTIONAL ZERO POINT CLAMPING SYSTEMS



Precision in every detail!

ADD-ON COMPONENTS

Closure stud

To shut off clamping positions which are not in use
No. 36 0035

Quick-release coupling

Adapter for connecting to the compressed air supply
No. 36 0019

Connection block "Komfort"

Changeover function clamp / release. Push button for blow-out function **No. 36 0017**

Alignment set

facilitates the pre-positioning of the base units
No. 36 0015

Centring set

For centralized alignment in the centre bore
No. 36 0016

Cover plate

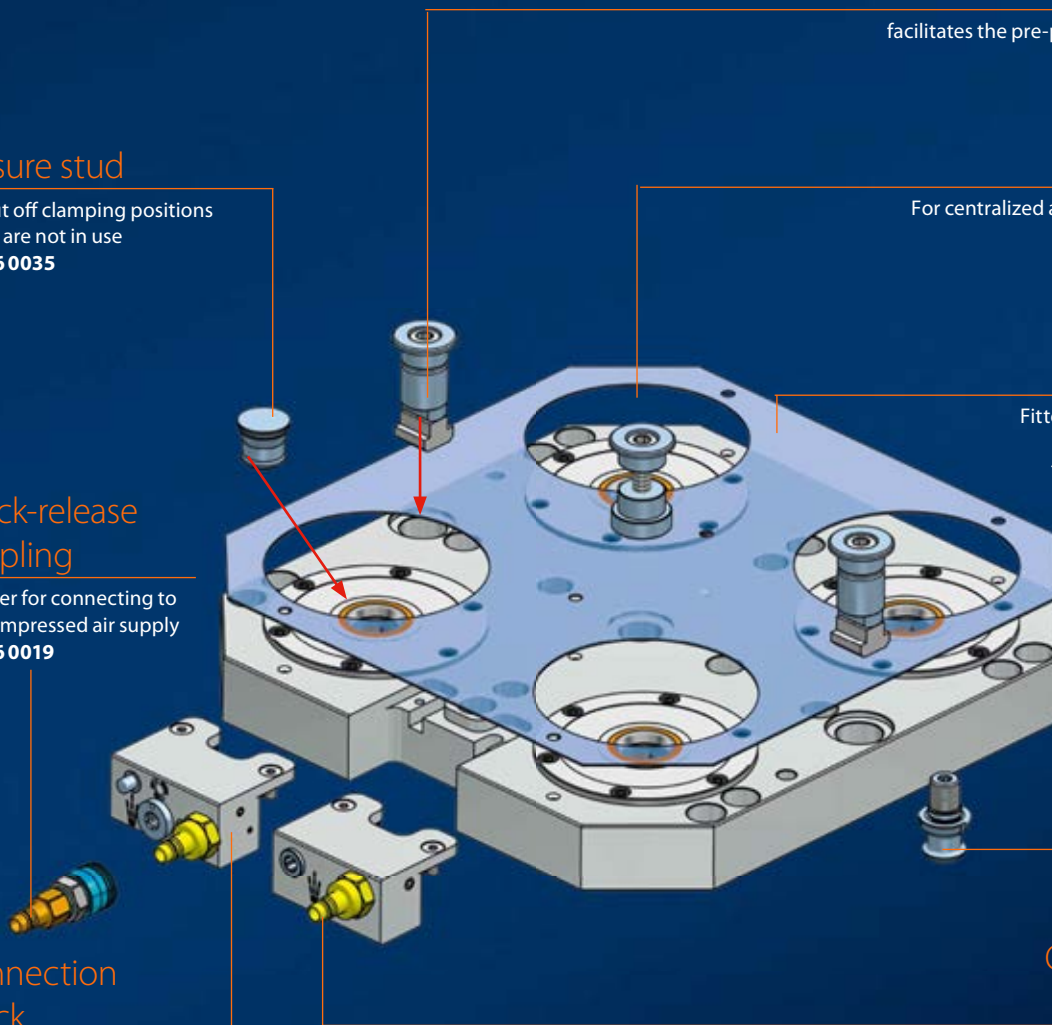
Fitted with countersunk screws, surface protection to avoid swarf accumulation
No. 36 0021

Clamping stud

No. 36 0025

Connection block "Standard"

Includes connection for control and blow-out function
No. 36 0017



Process reliability:

Reliable clamping force and surface finish without compromise!



Shrink-fit chuck "SP" – DIN 69871

30 2322

Version:

- High-temperature steel.
- Integrated tool length adjustment, adjustment travel 10 mm.
- For HSS and carbide.
- Shanks hard turned (for smooth running).
- With Balluffchip bore.
- Glass bead blasted.

Application:

For clamping tools with plain shank to h6 tolerance.
Suitable for inductive, contact, and hot-air shrink units.



Hydraulic chuck, version HT – with pull-out protection – DIN 69871

30 2368

Version:

- Very high overall stiffness due to optimised design.
- With Balluffchip bore.
- Axial length adjustment up to 10 mm possible.
- Flexibility thanks to the use of reducing adaptors.

Advantage:

- Process security – for workpiece and tool.
- Very high metal removal rate.
- Minimum out-of-balance compared to other clamping systems (Weldon flats).
- Use of milling cutters with HB shank = standard tools!

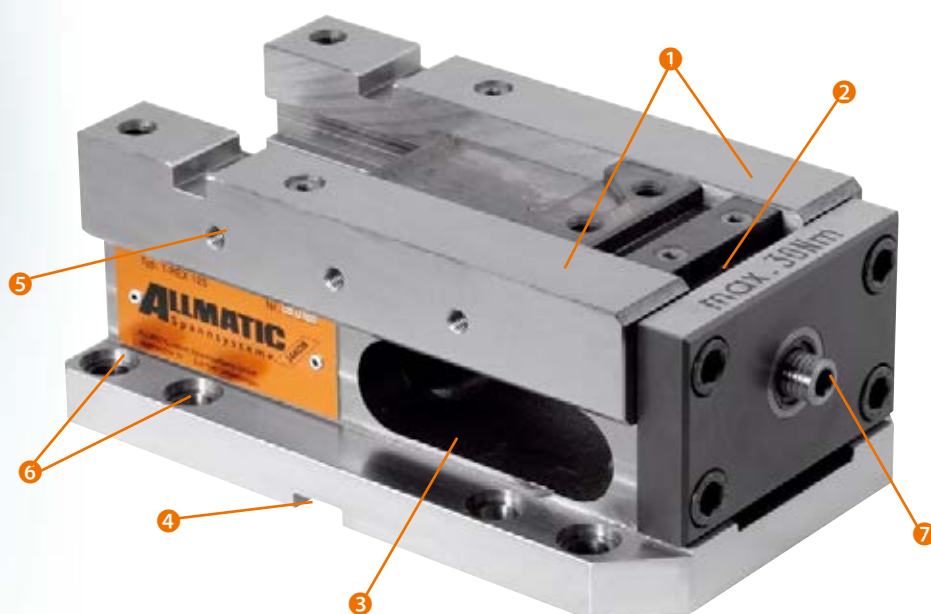
Application:

For drilling and milling. Primarily for use in heavy-duty machining of tough and high-tensile materials (such as titanium alloys).

Process reliability: no milling tool pull-out!



Significantly better surface quality with GARANT "SP" strengthened high-performance shrink-fit chuck. Low tendency to vibrate, smoother cutting action.



T-Rex NC high-pressure vice 125

36 1202

Version:

Top and bottom faces ground.

Function:

Clamping using adjustable torque wrench (maximum 30 Nm), requiring only minimal lost clearance around the component (in connection with jaws / gripper inserts). Using special high pressure spindle and mechanical power intensifier.

Features:

Sturdy, compact base body (GGG 60) with large clamping span. Fully enclosed and nitrided spindle (increased operational reliability, optimised swarf protection, minimised cleaning requirements).

- ① Slides induction hardened and ground.
- ② Maintenance-free, enclosed high pressure spindle with mechanical power intensifier. No reduction in clamping force.
- ③ Outlets for swarf and coolant.
- ④ Precise guide groove (and positioning hole on No. 36 1202).
- ⑤ Thread for workpiece backstop No. 36 2650 and No. 36 0555.
- ⑥ Securing holes for M12 bolts in the clamping shoulder (only 1202).
- ⑦ Clamping using torque wrench (max. 30 Nm).

Application examples:



Clamping range min. = 65 mm



max. = 226 mm



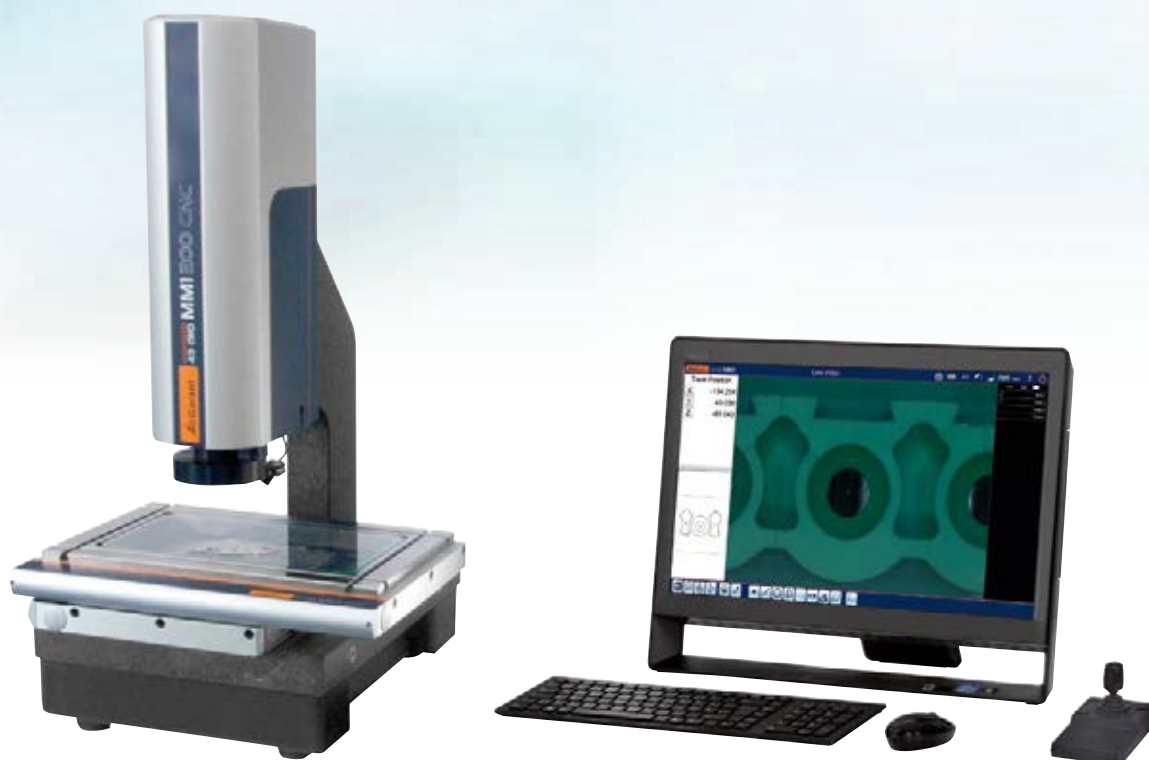
min. = 26 mm



max. = 184 mm

More precision with the GARANT measuring microscopes

The video measuring microscopes MM1 and MM2 with colour camera for efficient and ergonomic measuring.



Video measuring microscope CNC MM1-200CNC

49 1907

Version:

CNC-controllable video measuring microscope with incremental measuring system, image processing, 1.3 megapixel colour camera, and a Multitouch panel based on a PC, easy to operate, suitable for the workshop environment.

- Easy installation and use of **measurement programmes**.
 - Practical **automation** of measuring processes.
 - Modern user-friendly measurement software for **intuitive** operation.
- Incident light: 56 white LEDs in 2 concentric rings. 1 ring and 4 segments can each be separately switched and dimmed.
- Transillumination: LED, telecentric, can be switched and dimmed. **Solid granite base** with steel cross table, surface hardened. **Diode laser** as positioning guide. Very high repetition accuracy thanks to **automatic edge detection**.

Application:

- In goods receiving, in the measuring room, in manufacturing.
- Suitable for general purpose use due to flexible four-quadrant incident light and compact QC300 measurement computer.
- A wide variety of geometric shapes and materials can be reliably measured and documented using user-friendly controls.

Supplied with:

PC (21.5"), wireless mouse and keyboard, dust cover, mains adapter, test certificate, and multi-language user manual.

Optional extras:

Lens No. 49 1912, software No. 49 1913.

Note:

Version with **additional tactile type TP20 measurement system** available on request.

We will be pleased to offer you on request for your GARANT video measuring microscopes:

- Maintenance contract.
 - Installation and commissioning with short instructions on use.
 - Individual training for your employees.
 - On-site calibration.
- We reserve the right to make technical changes and to change the touch panel version.



Video measuring microscope CNC MM2

49 1911

Version:

With 3-axis CNC control via servomotor and joystick.

- Axis movement control in manual mode using a joystick.
- IK5000 measurement computer for efficient and ergonomic measurement of 2D and 3D geometries.
- As well as the standard image processing tools, additional powerful tools such as position recognition and contour tracing are provided.
- The integral CAD module permits the measurement points to be overlaid on to DXF or IGES files.
- By setting a tolerance band and an automatic "fit-routine", free-form contours can be compared quickly and reliably.
- The integral scaling routine, in conjunction with a high resolution camera achieves a large field of view at high pixel resolution.
- The use of an optical zoom with the associated physical errors is eliminated.

- Digitising and archiving of live images.
- Results can be tolerance-checked to DIN / ISO 1101 and automatically entered into a form or sent directly into Microsoft Office® applications.
- An ODBC interface enables the data transfer into data bases or SPC / QS systems.
- Report generator for measurement tasks for first-off inspections. Actions performed during the measurement can be saved as measurement macros.
- The programme interface can be password-protected and tailored to various operating levels thus it is perfect both for use as a production support tool and also in the measuring room.

Optional extras:

Lens No. 49 1912; calibration standard No. 49 1928 and calibration sphere No. 49 1929.

Our GARANT measurement technology video

ALL YOU NEED TO KNOW IN 4.38 MINUTES!



→ Find all the videos about our **GARANT products** on our website www.hoffmann-group.com/service/downloads/videos

THE HIGH QUALITY MEASURING MICROSCOPES OFFER YOU THE FOLLOWING ADVANTAGES:

- » High repeatability
- » Extreme versatility
- » Compact and ergonomic
- » Easy to use, user-friendly
- » Intuitive metrology software, accessible to all





High measurement accuracy and user-friendly operation



Surface roughness measuring tool ST1

49 9030

Version:

Portable roughness measuring device for precise roughness measurement and documentation conforming to standards, using the stylus tracing method. Ideal for portable use in manufacturing and for stationary use in the inspection room due to battery and mains operation, integral printer, and memory for up to 40 000 measured values and 30 profiles. All popular parameters and characteristic curves to DIN / ISO / JIS can be used for evaluating a measured profile.

- Measuring range up to 350 μm (0.014 inch).
- Standards: ISO / ASME / JIS and MOTIF switchable.
- Probe travel to DIN EN ISO 4288 / ASME B46. 1: 1.75 mm, 5.6 mm, 17.5 mm (0.07 inch, 0.22 inch, 0.7 inch) to EN ISO 12085 (MOTIF): 1 mm, 2 mm, 4 mm, 8 mm, 12 mm, 16 mm.
- Number of traverse lengths selectable from 1 to 5.
- Automatic selection of filters and probe travels to the standard.

- Phase correction Gauß filter to DIN EN ISO 11562.
- Cutoff 0.25 mm, 0.80 mm, 2.50 mm (0.010 inch, 0.032 inch, 0.100 inch).
- Reduced cutoff can be selected.
- Parameters to DIN ISO SEP: Ra, Rq, Rz, Rmax, Rp, Rt, R3z, Rk, Rvk, Rpk, Mr1, Mr2, Rmr, RSm, R_{PC} and others.
- Tolerance monitoring in display and printed record.
- Automatic or fixed selectable scaling.
- Printing of R-profile (ISO / ASME / JIS), P-profile (MOTIF), material share curve, results report.
- Report of data and/or time of measurement.
- Dynamic calibration function.
- Locking and / or password protection for parameter settings.

For controlled tightening

Controlled tightening without compromise with our range of torque wrenches.



"Slipper" torque wrench with scale 5 Nm

65 7760

Accuracy: $\pm 6\%$ of the set value.

Version:

The special slipping trigger mechanism reliably **prevents unintentional overtightening**.

Torque wrench with **micrometer scale for setting**, self-triggering. Lock at the end of the handle to prevent inadvertent change of setting. With integral ratchet function and ejector.

Function:

On reaching the set torque value the wrench triggers a clearly detectable deflection and is then immediately ready for use again. The special trigger mechanism ensures that the set torque values are reliably achieved, but **not exceeded**.

Advantage:

Precision triggering mechanism facilitates working in inaccessible places.



Simple and precise use, No. 65 7760



"Slipper" torque wrench without scale 1.5 Nm

65 7765

Accuracy: $\pm 4\%$ of the set value.

Version:

The special slipping trigger mechanism reliably **prevents unintentional overtightening**.

Torque wrench **without scale**. Wrench setting using a torque analyser.

Bit holder with magnet to take 1/4" bits.

Handy and lightweight aluminium handle, ideal for applying small torques.

Function:

On reaching the set torque value the wrench triggers a clearly detectable deflection and is then immediately ready for use again. The special trigger mechanism ensures that the set torque values are reliably achieved, but **not exceeded**.

Advantage:

Precision triggering mechanism facilitates working in inaccessible places.



Electronic torque wrench with plug-in ratchet 10 Nm

65 5230

Version:

Highly precise electronic torque / rotational angle wrench for very reliable screw tightening and checking of screw fastenings. Clear OLED display with colour screen and extremely simple menu navigation. Sturdy wrench with compact housing and sturdy rectangular section shaft.

- "Direct mode" allows quick general-purpose use.
- Up to 200 user-specific screw tightening cases can be programmed. Screw tightening cases can be grouped into procedure plans.
- 4 measurement modes: Torque and angle of rotation. Process reliability results achieved by torque with angular monitoring or rotational angle with torque monitoring.
- Up to 2500 measurement values can be saved.
- Convenient rotational angle measurement, no need for a reference arm.
- Can be programmed by PC, password protection available for security against tampering.
- Peak and Track function modes.
- Specification of target value and tolerances.

As well as the functional modes Peak and Track, the wrench can also be used in trigger mode. When the set torque or rotational angle is reached the wrench triggers with audible and tactile signals like a conventional mechanical torque wrench.



Electronic torque wrench without plug-in head 10 Nm

65 5235

Version:

Highly precise electronic torque / rotational angle wrench for very reliable screw tightening and checking of screw fastenings. Clear OLED display with colour screen and extremely simple menu navigation. Sturdy wrench with compact housing and sturdy rectangular section shaft.

- "Direct mode" allows quick general-purpose use.
- Up to 200 user-specific screw tightening cases can be programmed. Screw tightening cases can be grouped into procedure plans.
- 4 measurement modes: Torque and angle of rotation. Process reliability results achieved by torque with angular monitoring or rotational angle with torque monitoring.
- Up to 2500 measurement values can be saved.
- Convenient rotational angle measurement, no need for a reference arm.
- Can be programmed by PC, password protection available for security against tampering.
- Peak and Track function modes.
- Specification of target value and tolerances.

As well as the functional modes Peak and Track, the wrench can also be used in trigger mode. When the set torque or rotational angle is reached the wrench triggers with audible and tactile signals like a conventional mechanical torque wrench..



QuickSelect torque wrench with reversible plug-in ratchet 20 Nm

65 7090

Version:

Sturdy compact one-armed torque wrench, adjustable to scale and self-triggering. The accuracy is sustained for many thousands of operations, because high quality material is used for all wear parts with stressed parts only briefly loaded on each occasion. Body and handle are of sturdy square section, handle covered with a non-slip rubber grip, scales are adjustable.

Left-hand tightening by reversing the plug-in head.

With **plug-in reversible ratchet.**

Advantage:

- Ergonomically shaped two-component handle, resistant to aggressive liquids such as fuel, Skydrol etc.
- Adjustment scale behind glass for protection against dirt and damage.
- Quick, precise, and reliable setting: Pull the setting knob, "Twist" to set the desired value and "Press" to save it. Setting knob moves easily since there is no spring pressure to be overcome.

Calibration of your tools

For maximum security and precision, have your tools calibrated in our calibration laboratory!



Software & USB adapter cable.



Special accessories:
Test set for calibrating torque screwdrivers.



Mechanical calibration system 1100 Nm

65 4240

Version:

Complete calibration system with components well matched to each other. A special torque transmission system avoids movement of the torque application point during calibration.

Application:

Calibration means the regular checking of the precision and reliability of torque drive tools and the documenting and management thereof.

For torque drive tools to deliver precise and reliable measurement values over a long period of time, they must be checked regularly for calibration, and documented.

Supplied with:

Mechanical operating device for quick and precise loading of the torque wrench. This ensures that in accordance with DIN EN ISO 6789 the torque is applied slowly and progressively.

- Transducer No. 654255 (display variation from measured value is $\pm 0.25\%$ in the range 20 - 100 % of the nominal value, $\pm 0.5\%$ in the range 10 - 20 % of the nominal value, below that $\pm 1\%$).

- Software for generating calibration certificates to DIN 6789 and measuring equipment management.

- USB adapter cable for connecting measurement transducers to a PC.

- Square drive adapters to accept various square drives.

Note:

An additional test set is required for testing torque screwdrivers. Requirements for PC: min. 1 USB port. Measurement transducer No. 654255 can also be used for the workshop torque analyser No. 654250.



Motorised calibration and adjustment device

The electronic perfectControl calibration device with electric drive greatly reduces the forces and time required for calibration and adjustment.

Functions:

- Fully automatic calibration of mechanical torque wrenches.
- Fully automatic calibration of STAHLWILLE electronic torque wrenches.
- Measurement without movement of the torque application point.
- The precision bearings of the spindle and the accurately controlled motor prevent incorrect measurement.
- Extremely precise calibration by optimising the bearings and the square sockets of the transducer.
- The QuickRelease locking allows transducers to be changed more quickly and with fewer problems.
- Convenient push-button operation for clockwise and anti-clockwise measurements, with automatic speed control.
- Time saving by fixing the bridge attachment with one hand using the eccentric clamp.
- Measured values transferred by USB interface to a PC for post-processing and archiving.
- After calibration, a calibration certificate can be printed or saved as a PDF file.
- Input and output calibrations can be documented.
- During the calibration, DIN EN ISO 6789 : 2003 is supported in many languages.



- 1 Quick-Release locking
- 2 Convenient push-button operation
- 3 Space for a laptop
- 4 USB interface
- 5 Measuring without movement of working point
- 6 Eccentric clamp operation with one hand

On request

Hand tools for the aerospace industry

The aerospace industry requires reliable and efficient assembly tools.



MACHINING

METROLOGY

ASSEMBLY & MAINTENANCE

WORKSTATIONS & STORAGE

Assembly

Tailor-made, ergonomic tools.



Double open ended spanner set 11ZOLL

Standard:

DIN 3110 / ISO 3318.

Version:

Drop forged. With tightly toleranced jaws.

STAHLWILLE - With easy grip fluted shaft. Optimum flexural strength, good torque transmission.

Material:

STAHLWILLE - Chrome alloy steel, non-flaking chrome-plated over nickel smoothed finish surface.



61 1000



Small open ended spanner set 9ZOLL

61 2400

Version:

With very slim heads.

Unequal jaw angles (15° and 75°), both ends with same jaw width.

Material:

Chrome alloy steel non-flaking, chrome-plated over nickel.



Combination spanner set chromium plated 13ZOLL HOLEX

61 3960

Standard:

DIN 3113 A / ISO 3318 / ISO 7738.

Version:

Drop forged. With close tolerance jaw width.

HOLEX - With oval shaft.



Single open ended / ratchet ring spanner

61 4825

Version:

Drop forged.

Ring end with particularly smooth-running sturdy ring ratchet.

Extremely small working arc of 5°.

Material:

Chrome vanadium steel, matt chrome-plated.



Double ended ring spanner set deep cranked 10ZOLL

61 5500

Standard:

DIN 838 / ISO 3318.

Version:

Drop forged. With close tolerance jaw widths.

STAHLWILLE - With easy-grip fluted shaft.

Optimum flexural strength, good torque transmission.

Ring end with **AS-drive** profile.

Material:

STAHLWILLE - Chrome alloy steel, non-flaking chrome-plated over nickel smoothed finish surface.





Torx® key L-wrench set with MagicSpring® retention function 13

62 5025

Version:

L-form shaft, through hardened (hard and tough). Long arm with MagicSpring® retaining spring from size TX6, which reliably holds all Torx® screws secure.

The plastic clip enables easy removal of each individual wrench without the need to move another one.

Material:

Chrome vanadium steel, electro-galvanised.



Hexagon key L-wrench set with ball point, chrome-plated 12Z

62 7330

Version:

L-form shaft ball-point can be applied up to an angle of 30°.

Maximum hardness with special toughness due to PB Swiss Tools special alloy. Chrome-plated, ends chamfered.



Hexagon key L-wrench set, long, with ball point and short arm

62 7377

Powder-coated, 9

Version:

L-form shaft, ball point can be applied up to an angle of 30°. Maximum hardness with special toughness due to PB Swiss Tools special alloy. Surface chrome-plated over nickel and **powder-coated** for quick location by clear "Rainbow" colour coding.

Application:

Thanks to the short arm and the angle of 100°, can reach even into places where access is difficult.



Socket set 1/4" square drive 38 pieces

63 0330

Version:

Plastic case with **non-slip 2-component coating**.

Application:

For nuts / bolts M3 - M8 and for hexagon socket-head screws M4 - M8. For cross-head screws (Phillips / Pozidriv) M2-M6, slot-head screws M3 - M5, and for internal Torx screws M3-M8.



"Zyklop Metal" precision ratchet, push-through square drive 1/4" with ejector

63 2290

Standard:

External square drives to DIN 3120-A 6.3 with spring ball, square socket drives to DIN 3120.

Suitable for:

Manual use.

Version:

With captive push-through square for reversible right and left-hand action. With ejector.

Material:

Chrome molybdenum steel, matt chrome-plated.



Socket set 1/4" square drive 13 pieces inch sizes

63 0560

Version:

Drive components / connecting parts to DIN 3122 / 3123, sockets to DIN 3124. Internal / external square drives to DIN 3120.

All parts in sturdy steel cases with moulded plastic insets.

STAHLWILLE: Sheet steel case with foam inlay.

Material:

Chrome alloy steel, non-flaking, chrome-plated over nickel.

Application:

For hexagon nuts / bolts up to 3/8" (American inch sizes).



Bits set 61 pieces M

67 5900

Content:

Bits C 6.3 (1/4") set, 1 coupling shank.



Bits set with drive tool 32 pieces

67 6160

Version:

System box of virtually indestructible ABS plastic with integral hinges and snap fastener. The bits are widely spaced so that when the box is open they can be easily accessed and taken out.

Content:

Assorted bits C 6.3 (1/4"), 1 coupling shank, 1 adaptor, 1 bit ratchet.



Socket shank E 6.3 with magnet 5.5 mm

67 4265

Standard: DIN 3126.

Version:

One piece, i.e. shank and tip of one piece. Shanks to DIN 3126 for direct fitting in electric screwdrivers.

Material:

PB Swiss Tools - of PB Swiss Tools special alloy with maximum hardness and special toughness.

Application: For hexagon nuts and bolts DIN 3126.



TRI-WING® screwdriver set, 4

66 9050

Suitable for:

For all screws in the TRI-WING® system, which is mainly used in the household goods production, electrical and aviation industries.

Version:

Kraftform handle made of impact resistant plastic with integral soft zones for easier transmission of torque.

Blade made of high alloy tool steel, nicromatt chrome-plated, black tips. Drive symbol and size on end of handle.



TRI-WING bit 1/4"

67 5370

Standard:

DIN 3126 C6,3 (1/4").

Version:

For use in manual drivers, machines with suitable hexagon holder, or for use in adaptors No. 67 5000 - 67 5050.

Application:

For all screws in the TRI-WING® system, widely used in the household goods, electrical and aviation industries.



Countersinking bit three-flute 6.3 mm

67 6310

Version:

1/4" hexagon shank to DIN 3126 C 6,3.

Advantage:

Quick uncomplicated changes between drill, countersink and screw bits.

Application:

Ideal for repair and assembly work in mobile situations.

For use in power drills using adapter (No. 67 5000 - 67 5030) or in screwdriver holders (No. 67 6400 - 67 6760).



**"Twister" ratchet handle for 1/4" bits with magnet 67 6655
100 mm**

Suitable for:

1/4" bits C 6.3 shank.

Version:

"Multicraft" ratchet handle with easy-grip **Santoprene®** surface. For left and right driving (working arc 15°) plus integral central setting (ratchet locked). Bit holder for 1/4" bits C 6.3, with strong permanent magnet.



Ratchet wrench for 1/4" bits C 6.3 and E 6.3

67 6690

Suitable for:

1/4" bits with C 6.3 shank and E 6.3 shank.

Version:

Reversible for left-hand/right-hand operation using lever. Bit holder D 6.3 / F 6.3.



Universal toolholder with 3-jaw chuck

83 6435

Version:

Universal toolholder with 3-jaw chuck. Sturdy hardened clamping jaws (58 HRC), comfortable to use, transmits high torques via the aluminium handle with non-slip plastic covering.

Advantage:

3-jaw chuck accepts various geometries (such as hexagonal tools / round tools).

Application:

Quick and secure clamping of a wide variety of tools such as countersinks, scrapers, key files etc.



Universal deburrer set, in a plastic box 7 pieces

83 8960

Supplied with:

Aluminium handle with 1 each HSS blade No. 838510 sizes S20, S100, and S150, No. 839677 as well as 1 hole deburring head No. 838610 size 16.5, and 1 external deburring head No. 838660.



ALL.IN.ONE tool case, with wheels and pull handle, with 4 drawers with drawer divisions

69 3155

Version:

Sturdy tool case of polypropylene with wheels and handle (4 sturdy wheels and telescopic handle) and 2 handles at the side. Cover and front flap removable. Can be locked centrally via a cylinder lock, also each flap can be locked separately with a padlock. Cover compartment with removable work tray, front compartment fitted with 4 drawers with extension limit.

Internal fittings:

1 removable work tray, 1 drawer 30 mm with dimpled foam insert, 1 drawer 60 mm with adjustable dividers (23 compartments for small parts), 1 drawer 60 mm with dimpled foam insert, 1 drawer 90 mm with 5 small part bins in various sizes.

Optional extras:

Mobility set with 4 wheels (rotation through 360°) No. 693160. Tool board for mounting in the upper cover No. 693170 / 693175 (only 1 board can be fitted).



Water-tight tool case "Explorer" 3818

69 2930

Version:

Extremely sturdy tool case of impact resistant plastic, filled with pre-shaped chequer foam. Lockable with padlock No. 085830 - 085875.

Application:

For protection, packaging, and transport of delicate parts and devices.

Note:

Many other case sizes, fittings variants, and accessories available on request.



Precision circlip pliers set, 8-piece, for internal and external circlips

70 0155

Standard:

DIN / ISO 5256 C and D - for internal circlips.

DIN / ISO 5254 A and B - for external circlips.

Version:

Forged grip and joint, precision made tips of special steel inserted and pressed into the body. Pliers chemically treated grey. Plastic coated handles. Joint with integral opening spring.

Advantage:

Pressed-in tips are highly durable even in long term use. Up to 10 times the working life of turned tips.

Supplied with:

1x each circlip pliers No. 719790 size J1 - J2 - J11 - J21.

1x each circlip pliers No. 719890 size A1 - A2 - A11 - A21.

Supplied in a plastic case with foam inlay



Water pump pliers with stepped fine adjustment, black 180 mm 70 6000

Standard:
ISO 8976 (DIN 5231 D).

Version:

Box joint (= double guide). Designed to prevent fingers being trapped. Push-button **fine step adjustment**. Concave profile serrated jaws, self-clamping.

Surface manganese phosphated, polished jaws.

Ergonomically shaped handles with non-slip plastic coating.

Material:

Chrome vanadium steel, drop-forged.



Pipe grip pliers with plastic jaws 230 mm 70 6710

Version:

With 4-step adjustable sliding joint, thin PVC coated handles.

With exchangeable smooth plastic jaws.

Material:

Chrome vanadium steel, drop forged chrome-plated.

Application:

For threaded connectors and couplings and chrome-plated or polished components (fittings).



Wire twisting pliers 230 mm 70 7920

Version:

Drop forged body. Inner face of jaws serrated. Induction hardened cutting edges. **Front of jaws chamfered to 40°.**

Material:

Special steel, burnished or painted finish, bright finished head.

Application:

For twisting locking wires (see diagram) by moving along any length can be worked. For wire Ø up to approx. 1.6 mm. For right-handed and left-handed action, with automatic return.



Mechanic's pliers chromium plated snipe-nosed, cranked 200 mm 71 6800

Version:

Strong, long serrated jaws.

Pliers chrome-plated, handles with multi-component covering.

Material:

Chrome vanadium electro-steel, drop-forged and oil-hardened.



Wire twisting pliers 230 mm 70 7910

Version:

Drop forged body. Inner face of jaws serrated. Induction hardened cutting edges. **Front of jaws chamfered to 40°.**

Material:

Special steel, burnished or painted finish, bright finished head.

Application:

For twisting locking wires (see diagram) by moving along any length can be worked. For wire Ø up to approx. 1.6 mm. For right-handed and left-handed action, with automatic return.



Pliers wrench 180 mm 81 3500

Version:

Parallel guided, smooth jaws chrome-plated version. Ratchet adjustment at the push of a button. Clamping lever for high contact pressure at the jaws. The travel between the gripping faces is large enough to permit **release and grip on a ratchet basis.**

User-friendly working due to ergonomically shaped handles with non-slip plastic coating, reducing the risk of slipping.

With scale for accurate pre-setting. Pliers wrench, chrome-plated.

Application:

Grips screws, nuts, chrome-plated fittings etc. **without damaging them.**

Our special tools

A selection of the Hausmann range

Special tools ideal for assembly and riveting.

hausmann
Werkzeuge



Cylindrical body fastener CBX CBXL

CBX / CBXL

Version:

Fastener for hand or machine assembly tools. Metal, different diametres and lengths available.

Application:

For temporary assembly of two metal sheets before riveting/drilling.

hausmann
Werkzeuge



Fastener, spring-loaded, plier operated

2071Z

Version:

Fastener, plier operated.

Metal, different diametres and lengths available.

Application:

For temporary assembly of two metal sheets before riveting/drilling.

hausmann
Werkzeuge



Fastener wing-nut type KWN

KWN

Version:

Fastener with wing-nut. Metal, different diametres and lengths available.

Application:

For temporary assembly of two metal sheets before riveting/drilling.

hausmann
Werkzeuge



Pliers for fasteners

TP74

Version:

Pliers for fastener, metal, plastic handles.

Application:

For setting fastener 2071Z / side grips (KSG).

hausmann
Werkzeuge



Fastener with knurled nut and safety cap

2072ku-24

Version:

Plastic body, different diametres and lengths available.

Application:

For temporary assembly of two metal sheets before riveting/drilling.

hausmann
Werkzeuge



Side grips, plier operated edge clamps KSG

KSG

Version:

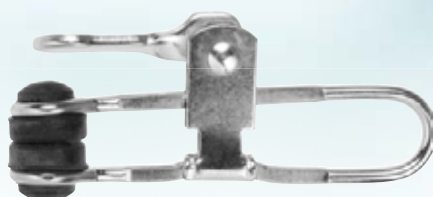
Metal, plier operated.

Application:

For temporary assembly of two metal sheets before riveting/drilling.



hausmann
Werkzeuge



"Handi-Klamps", hand operated

K-1_2

Version:

Hand operated clamps, metal.

Application:

For temporary assembly of two metal sheets before riveting/drilling.

hausmann
Werkzeuge



High-speed microstop countersink with swivel shank

ZT666 – ZT667

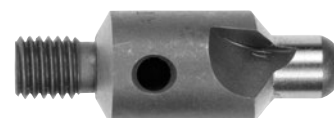
Version:

Metal, different toolholders and types available.

Application:

Depth control for countersinking.

hausmann
Werkzeuge



Countersink cutters

420D4-14-100

Version:

Different models, angles and lengths available.

Application:

Countersinking for rivets.

hausmann
Werkzeuge



Burraway tools

CTP

Version:

Metal, automatic retraction of the blade as the tool passes through the workpiece.

Application:

Fast mechanical deburring of holes.

hausmann
Werkzeuge



Rivet hole brush

TP6801

Version:

Stainless steel, different diameters available, rated up to 8000 rpm.

Application:

Cleans paint, dirt, rust etc. from around rivet holes.



Hausmann
Werkzeuge



Hi-Lok collar removal pliers

EH3579

Version:

Metal, yellow handle.

Application:

For collar with minimum 1/4" outside diameter.

Hausmann
Werkzeuge



Hi-Lok collar removal pliers

ZHP 200

Version:

Metal, yellow handle.

Application:

For collar with minimum 1/2" outside diameter.

Hausmann
Werkzeuge



Hi-Lok scales

2-612

Version:

Metal

Application:

For measuring depth of hole and grip length of fasteners.

Hausmann
Werkzeuge



Pin Protrusion Gauges Hi-Lok

2-1522

Version:

6 different diameters, with chain.

Application:

Pin protrusion gauge for inspection of pins for correct grip length.

Hausmann
Werkzeuge



Hi-Lok Box ratchet wrench

ATBR-3134

Version:

Straight type, non-reversible.

Application:

Setting Hi-Lok rivets.

Hausmann
Werkzeuge



Hi-Lok Box ratchet wrench

ATBR0-2125

Version:

25° offset type, reversible.

Application:

Setting Hi-Lok rivets in places that are difficult to access.



hausmann
Werkzeuge



Hi-Lok roller drive wrench

Zrdw80s-250

Version:

Metal, very compact.

Application:

For setting Hi-Lok rivets.

hausmann
Werkzeuge



Sealant removal cutter

11212

Version:

Plastic, threads 1/4-28".

Application:

Aggressively removes sealant without damaging substrate.

hausmann
Werkzeuge



Scrapers

11200

Version:

Plastic, different shapes and lengths available, different degrees of hardness.

Application:

Removal of sealant / remnants of glue.

hausmann
Werkzeuge



PRY tool

11202

Version:

Plastic, different shapes and lengths available, different degrees of hardness.

Application:

Lifting / moving sheet metal parts.

hausmann
Werkzeuge



Set of scrapers for sealant

11205

Version:

3 scrapers in a transport pouch, different hardnesses available.

Application:

Application and spreading of sealant.

Crimping tools suited to the requirements of the standards

Tools covering standard MIL-SPEC M2250 as well as technologies type SAFE-T-CABLE.



Crimp tool

AF8 AS22520/1-01

Version:

The 8 impression crimp assures absolute maximum tensile strength with almost every closed barrel contact, AWG12-22 to SAE AS22520/1-01. Positive crimp depth is controlled by an 8 position selector knob. A variety of turret heads are available to adapt the tool frame to your specific contact/wire combination.



Miniature crimp tool

615717

Version:

The miniature 8-step adjustable hand crimping tool's 8-indent crimp configuration provides excellent results on contacts sizes 20-28 and wire sizes 20-32 AWG. To SAE AS22520/2-01.

A wide variety of MS and proprietary contacts and wire compositions can be crimped by simply attaching a positioner in the bayonet-type socket and adjusting the selector to one of the eight preselected settings.



Crimp tool

AFM8-CT

Version:

Manual Crimp Tool is a hand held, self-contained crimp tool intended to crimp machined contacts onto copper and aluminum cable. The crimp tool is equipped with the CrimpTrax™ memory and communication system and is intended to be used in conjunction with the CrimpTrax™ software.



Digital crimping tool

D612118

Version:

The New Infinitely Adjustable Digital Crimp Tool, incorporates the latest digital technology into a proven crimp tool design, and is specifically designed for high-reliability crimp terminations.

The D612118 tool is adjustable in 0.001 inch (0.25mm) increments. The LCD interface features a user-resettable crimp count. The display offers a 0.001 inch resolution.



Crimp tool HX 3 Crimp tool HX 4

M22520/10-01
M22520/ 5-01

Version:

The DMC HX4 and HX3 series crimp tools feature a system of interchangeable dies which eliminate the need of separate fixed die crimp tools for each and every different application. "Open-Frame" tool to AS22520/10-01 and /05-01.



Single step banding tool DBS-2100

AS81306/1-01

Version:

The manual banding tool is primarily designed for termination of EMI/RFI shielding materials. Affords the user a repeatable and reliable means of terminating shielding on to aerospace wiring systems. Tool to SAE AS81306/1, for all bands qualified to AS85049/128.

DBS-2100 is the .250 Wide Band Application Tool M81306/1A
DBS-2200 is the .125 Wide Mini-Band Application M81306/1B



Shield termination bands

AS85049/128

Version:

M85049/128 Shield Termination Bands.
STAMPED buckle band - this configuration is low profile style with a slot for the other end of the band to pass through.



Safe-T-Cable

AS4536, AS3509, AS3510, AS3511

Version:

Safe-T-Cable™ is constructed of high tensile strength, stranded cable. It is more flexible than its Safety Wire counterpart, although the working diameters are equivalent. This provides a stronger assembly which has greater strength and lighter weight. The cable ends are electrically fused to form an easy threading end.



Safe-T-Cable application tool

SCT327

Version:

The Daniels SCT Series Safe-T-Cable® application tool is designed to terminate ferrules to Safe-T-Cable® in accordance with SAE specification AS4536. The application tool is compatible with Safe-T-Cable® kits identified in SAE specifications AS3509, AS3510 and AS3511.



Twist-Strip cable stripper

TSK7000QC

Version:

The patented Twist-Strip™ Tool (Part Number TSK7000QC) utilizes a pair of interchangeable dies with integral precision cutting blades that are attached to a free rotating core.

The dies match the outer jacket profile of the cable being stripped and guide the cutting blades in a precise track designed to eliminate shield damage.





Custom Stripmaster

45-2835

Version:

Cable stripping tool for cables "DR" AWG16-26 (also available for other cable types). Parallel pads.

Advantages:

Easy and quick stripping of cables without damaging the inner conductor.



Hose clamps

Version:

Alternative to classic hose clamps, made from extremely light and resistant material (Nomax).

Advantage:

User friendly. Lighter and higher resistance to thermal shocks than currently used hose clamps.



Custom stripmaster.

45-2824-9

Version:

Cable stripping tool for cables "AD" AWG16-26 (also available for other cable types). Parallel pad.

Advantage:

Easy and quick stripping of cables without damaging the inner conductor.



Tool for fixing hose clamps

Version:

Tool for fixing bands of type Ideal Lacing.

Advantage:

Repeatable results thanks to the adjustable clamping force.



Stripping tool

55-2906

Version:

Ergonomically engineered for superior comfort, balance and control. Excellent strength and reduced weight compared to metal cable stripping tools. For cables "DL" ASNE E0437.

Advantage:

Reduced weight and more ergonomic handles than standard cable stripping tools.



Top reliability
requires premium tools.

Hand tools by Facom

Safety without compromise

Thanks to FOD tools, you can rest assured of maximum safety across the range.



FACOM

1/4" drive socket and bit set - RL.NANO-U112 RL.NANO-U112

Content :

Drive socket 1/4"

Ratchet 1/4" - RL.161

Screwdriver bits

Drive sockets 1/4" :

- 12 point socket - 7/32'
- 12 point socket - 1/4'
- 12 point socket - 9/32'
- 12 point socket - 5/16'
- 12 point socket - 11/32'
- 12 point socket - 3/8'
- 12 point socket - 13/32'
- 12 point socket - 7/16'
- 12 point socket - 1/2'
- 12 point socket - 9/16'



FACOM

Inch straight ratchet ring wrenches - FLUO 64.1/4X5/16F

- » Fluorescent tool, detectable by ultraviolet light. Detectable in dark or dimly lit areas for up to 3 metres.
- » Straight ratchet ring wrenches: to reach the nut flat.
- » Compact ratchet mechanism and reversible by flipping the wrench.
- » Increment 5° (7.5° for dimension 1/4"; 6° for dimensions 5/16" and 11/32").
- » Dimensions in inches: from 1/4" to 5/16".
- » Presentation: satin chrome finish.



FACOM

Hinged ratchet combination wrench set + clip 467F.JP8U

- » 8-piece set of hinged ratchet combination wrenches in a clip.
- » Productivity and safety = easy to organise, easy to spot, always with you.
- » Dimensions in inch: 5/16 - 3/8 - 7/16 - 1/2 - 9/16 - 5/8 - 11/16 - 3/4".
- » Resistant to chemicals and impacts.
- » Portable case : CK.467FJ1U.
- » Weight : 1.200 kg.



FACOM

Metric 15° hinged ratchet ring wrenches - FLUO 65.16X18SPL

- » Fluorescent tool, detectable by ultraviolet light. Detectable in dark or dimly lit areas for up to 3 metres.
- » 15° hinged ratchet ring wrenches: ring offset to clear fingers or obstacles.
- » Compact ratchet mechanism and reversible by lever.
- » Increment 5° (7.5° for dimension 6 mm; 6° for dimensions 7, 8 and 9 mm).
- » Ring head angled at 15°.
- » Metric sizes: 6 to 24 mm.
- » Presentation: satin chrome finish.



Ratchet Hi-Lok® 1/4 Fluo + 3/8 Fluo

JL.161HLF

- » Ratchet especially for use on Hi-Lok®, Hi-Lite® or Hi-Tigue® rivets.
- » The sockets are locked onto the square drive by a metal clip.
- » Ratchet head includes a hole for inserting a key to prevent rotation of the fastener during tightening.
- » Ultra-compact head.
- » Square drive socket 3/8.
- » 72 teeth mechanism for 5° increments.
- » Fluorescent tool, detectable by ultraviolet light. Detectable in dark and dimly lit areas for 3 metres.



Long half round nose pliers - FLUO

185.20CPEF

- » Fluorescent tool, detectable by ultraviolet light. Detectable in dark or dimly lit areas for up to 3 metres.
- » Narrow, finely serrated tips with pipe-grip.
- » Side cutter for copper and hard steel wire (max. 160 kg/mm²).
- » 185 : straight jaws.
- » 195 : jaws angled 40°.
- » Ergonomic grips resistant to chemical agents.
- » Removable return spring.
- » Finish: chromed.



Combination pliers - FLUO

187.16CPEF

- » Fluorescent tool, detectable by ultraviolet light. Detectable in dark or dimly lit areas for up to 3 metres.
- » Cutting edges designed to cut through all types of wire: piano wire, soft wires and modern materials (max. Fe 200 kg/mm²).
- » Long lever arm, offset pivot for minimum cutting effort.
- » High durability Chrome-Molybdenum-Vanadium steel, very hard cutting edges 61/63 HRC.
- » Ergonomic grips resistant to chemical agents.
- » Removable return spring.
- » Finish: chromed.



Short half round nose pliers - FLUO

195.16CPEF

- » Fluorescent tool, detectable by ultraviolet light. Detectable in dark or dimly lit areas for up to 3 metres.
- » Narrow, finely serrated tips, 40° angled, with pipe-grip.
- » Side cutter for copper and hard steel wire (max. 160 kg/mm²).
- » Ergonomic grips resistant to chemical agents.
- » Removable return spring.
- » Finish: chromed.



High performance diagonal cutters - FLUO

192.16CPEF

- » Fluorescent tool, detectable by ultraviolet light. Detectable in dark or dimly lit areas for up to 3 metres.
- » Cutting edges designed to cleanly cut all types of wire: piano wire, soft wires and modern materials 200 kg/mm²).
- » Minimum cutting force thanks to long lever arm and offset axis.
- » High durability Chrome-Molybdenum-Vanadium steel, very hard cutting edges 61/63 HRC.
- » Ergonomic grips resistant to chemical agents.
- » Removable return spring.
- » Finish: chromed.



Long slim half round nose pliers - FLUO

183.20CPEF

- » Fluorescent tool, detectable by ultraviolet light. Detectable in dark or dimly lit areas for up to 3 metres.
- » Narrow, finely serrated tips, 40° angled nose.
- » Side cutter for copper and hard steel wire (max. 160 kg/mm²).
- » Ergonomic grips resistant to chemical agents.
- » Removable return spring.
- » Finish: chromed.

Assembly tools

MACHINING

METROLOGY

ASSEMBLY & MAINTENANCE

WORKSTATIONS & STORAGE



Cutter with solid pilot

RB 156 - 307

EXPERT ADVICE

In some cases, microstop cages are impractical or too bulky to be used. Then Recoules recommends to use drilling adaptors (see chapter A).



Cutters with pilot insert HSS-E

RB 156 - 307

EXPERT ADVICE

Recoules recommends the use of Dotco material removal tools 14 CFS (see catalogue SP 102)
For microstop cages selection, refer to chapter A.



Cutters with pilot insert, for rivets and screws

RB 156 - 307

Avantages

- » High quality PCD inserts provide ►superior surface finish to composite materials requiring minimal effort from the operator.
- » Superior characteristics of PCD ►ensure cutters with extended life.



Cutters with pilot insert, for rivets and screws

RB 156 - 307

EXPERT ADVICE

Recoules recommends the use of Dotco material removal tools 14 CFS (see catalogue SP 102)
For microstop cages selection, refer to chapter A.



Cutters with pilot insert, for rivets and screws

RB 156 - 307

Avantages

- » Unique cutter geometry ►provides excellent surface finish and prevents tearing of fibres.



Cutters with pilot insert, for rivets and screws

RB 156 - 307

Avantages

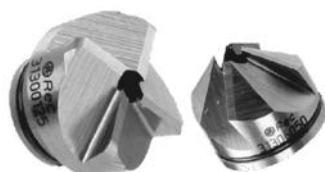
- » Unique cutter geometry ►provides excellent surface finish and prevents tearing of fibres.



Spotfacing cutters

RB 156 - 307

With pilot insert



Back spotfacing and countersink cutters

RB 156 - 307

With bayonet-locking pilot

Alternative cutters can be made on request with :

- special diameters and / or radius
- special angles (eg : 90°, 120°, ...)
- carbide, HSS-E or PCD



Pilots, bayonet locking

RB 156 - 307

Alternative pilots can be manufactured on request with:

- special diameters and lengths

To use with back spotfacing and countersink cutters. Special attachment diameters can be made to collet size.

Workstations and storage equipment for the highest requirements



ToolCar roller cabinet with GARANT ComfortClose

91 6302

Version:

GARANT ComfortClose. Self-closing drawers with damping. ABS tray with storage area / compartments for small components, cans, and screwdrivers.

Drawer fronts and roller cabinet stiles are clad with PP bumpers.

In the event of collisions they reduce the damage to vulnerable surfaces and tools.



ToolTruck mobile workbench with full extension drawers GARANT 6 pc.

91 6330

Version:

Bench top of HDPE for highly demanding technical applications. Side cupboard with **2 shelves**, door with **cylinder lock**. **Cabinet stiles are clad with PP bumpers.**

Colour:

Two-tone **powder-coated**, silver combined with steel blue RAL 5011.

Supplied with:

Dividers:

2 slotted dividers for each 60 mm drawer,

1 slotted divider for each 120 mm drawer.



GARANT ComfortClose self-closing drawers with damping.

The individual one: Bamboo – glued cross-wise



Worktop in modern design with **hard-wearing** surface for **demanding applications**. Bamboo is the quickest-growing raw material, it places little demand on resources and is environmentally sound. The worktop consists of bamboo strips, waterproof and distortion-proof cross-glued in 5 layers. The edges are radiused all round, the surface is sanded and oiled leaving no residues. Regular cleaning and oiling of the surface extends its life and prevents the development of cracks and stains. Bamboo is approx. 30 % harder than oak and is less liable to warp than beech or maple. **Bamboo worktops** are resistant to sprayed water and to dirt, and largely resistant to oil, grease, solvents, and chemicals. (These do, however, affect the appearance of the surface).

Cross-glued bamboo strips.

The universal one: Beech – ply



Worktop for **general requirements**. Of peeled beech veneer, with multiple cross layers, glued, non-warping, and waterproof. The edges are smoothed, the surface is sanded and sealed with clear UV varnish. **Beech marine ply** is resistant to sprayed water and to dirt, and largely resistant to oil, grease, solvents, and chemicals. (These do, however, affect the appearance of the surface).

Optional: With galvanised sheet steel or stainless sheet steel covering.

Plywood core.

The robust one: Beech – glued strips



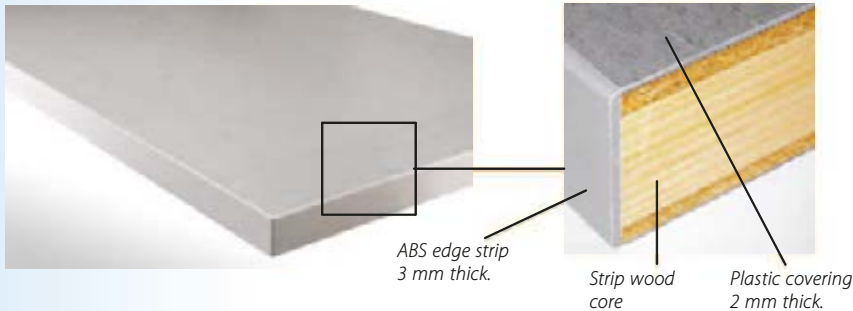
Worktop for heavy work such as in **machine tool building or steelwork fabrication**. Of solid beech block board, waterproof glued (with comb profile on the long edges). The edges are smoothed, the surface is sanded and sealed with clear UV varnish.

Beech wood worktops are resistant to sprayed water and to dirt, and largely resistant to oil, grease, solvents, and chemicals. (These do, however, affect the appearance of the surface).

Optional: With inlaid metal edge protection strip (50×50×4 mm), powder-coated.

Solid wood blocks with comb profile on the long edges.

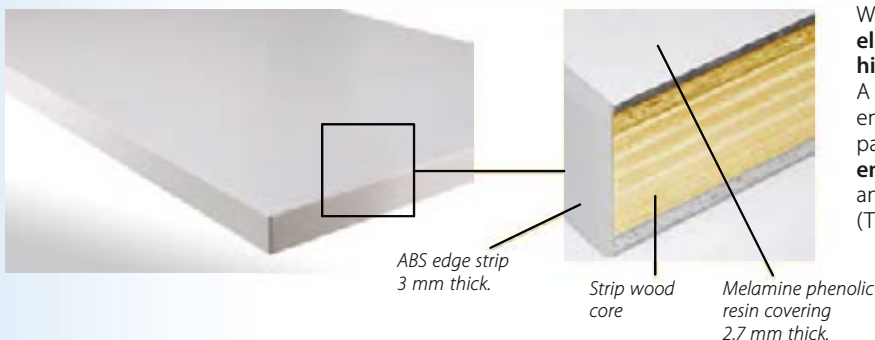
The technical one: Eluplan plastic covering (linoleum covering)



Worktop for **assembly, inspection, and laboratory** work. The surface consists of a medium-hard covering that is permanently anti-static and highly wear-resistant, 2 mm thick. A central strip wood core and a matching bottom face covering ensure a non-warping worktop. The end faces are provided with a pale grey ABS edge strip, 3 mm thick. Eluplan worktops are largely resistant to oil, grease, weak acids, and alkalis. (These do, however, affect the appearance of the surface).

Resistant to SKYDROL

The specialist: Eterlux (melamine / phenolic resin)



Worktop for **laboratory** (suitable for decontamination) – **electronics, optics, and office** workplaces. The surface consists of a **highly scratch-resistant** and **heat-resistant** covering, 2.7 mm thick. A central strip wood core and a matching bottom face covering ensure a non-warping worktop. The end faces are provided with a pale grey ABS edge strip, 3 mm thick. Eluplan worktops are **enormously wear-resistant** and resistant to oil, grease, weak acids, and alkalis. Heat resistant for short periods against flames and solder. (These do, however, affect the appearance of the surface).

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mLevel workstation

92 0001
92 0003

Version:

mLevel workstation, the workstation that adapts to your needs.
Classic manual height adjustment in 25 mm steps using a support leg with securing bolts.

Colour:

Light grey RAL 7035, **powder-coated**.



eLevel workstation

92 0011
92 0013

Version:

eLevel workstation – height steplessly adjustable electrically.
Easy height adjustment by an electronic control panel. Control panel with display and memory functions.
Push-button adjustment for a suitable **height of the entire workstation**.



Roller cabinet 27 x 36 U 860/5

94 2946

Version:

With 2 ball-bearing fixed wheels and 2 castors (Ø 100 mm), lockable. With anti-roll lip on 4 sides, ribbed rubber worktop, and 2 push handles. Can be locked using central locking.

With 4 or 5 drawers, central locking. **Full extension drawers** as described under No. 943021, fitted with **individual locking** - prevents drawers opening during movement.

Colour:

Body light grey RAL 7035, drawers signal blue RAL 5005, **powder-coated**.



Roller cabinet 36 x 36 U 710/6

94 3225

Version:

With 2 ball-bearing fixed wheels and 2 castors (Ø 100 mm), lockable. With anti-roll lip on 4 sides, ribbed rubber worktop, and 2 push handles. Can be locked using central locking.

Full extension drawers as described under No. 943021, fitted with **individual locking** - prevents drawers opening during movement. Drawers with 75 kg load capacity.

Colour:

Body light grey RAL 7035, drawers signal blue RAL 5005, **powder-coated**.

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