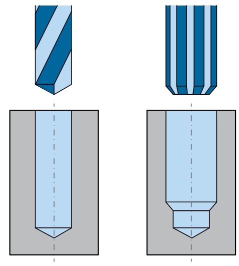
The basics of reaming

reaming is part of the precision machining process or finishing process. holes are mainly reamed in case of special requirements around surface quality, roundness, cylindricity and diameter tolerance.

set the hole with a particular allowance, see allowance table, then create the desired fit with the reamer.

Note: if not necessary, do not countersink hole due to the negative impact on the service life of the reamer.



Surfaces that can be achieved compared with other procedures

Average surface finish Ra	25	12,5	6,3	3,2		1,6	0,8		0,4	0,2	0,1	0,05	0,025
average roughness Rz	100	63	40	25	16	10	6,3	4	2,5	1,6	1	0,63	0,25
Drilling													
Drilling out													
Spindles													
Grinding													
Sanding													
Honing													
Rolling													

Producible

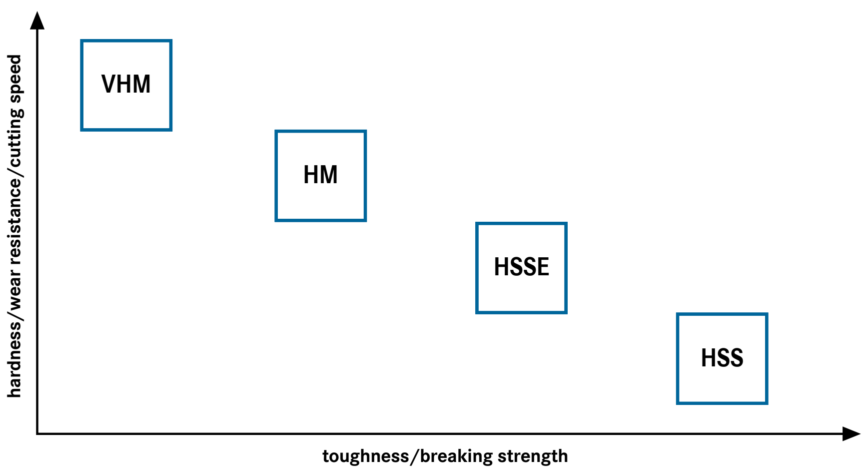
Conditionally producible

Producible surface qualities during reaming in various materials

	Average surface finish Ra	25	12,5	6,3	3,2		1,6	0,8		0,4	0,2	0,1	0,05	0,025
	average roughness Rz	100	63	40	25	16	10	6,3	4	2,5	1,6	1	0,63	0,25
ISO P	low and high alloyed steels													
ISO M	Stainless steels													
ISO N	Non-ferrous metals													
ISO K	Cast metal													
ISO S	Special alloys / titanium													
ISO H	Hardened steel up to 65 HRC													

Producible ⟷ Conditionally producible

Cutting materials of reamers



solid carbide
- cutting material for application up to 63 HRC
- high cutting speed
- high precision

CC carrier equipped with cemented carbide
- high elasticity
- high cutting speed
- high precision

HSSE high-speed steel
- cutting material for application up to 1300 N/mm^2
- small to medium cutting speeds
- approx. 5% cobalt content
- very high elasticity

HSS high-speed steel
- cutting material for application up to 1000 N/mm^2
- low cutting speeds
- low alloy content
- very high elasticity

Coatings for reamers

Titanium nitride

TiN

- Long proven standard layer
- High hardness
- Very good adhesive strength
- Sufficient toughness
- Affordable universal layer
- Vickers hardness: 2200 HV
- Friction coefficient of steel: 0.5
- temperature resistance: 600°
- Colour: gold
- Coating process: PVD

Titanium carbon nitride

TiCN

- Very high hardness
- High adhesive strength
- Relatively high thermal conductivity
- Low friction coefficient against steel
- Vickers hardness: 3500 HV
- Friction coefficient of steel: 0.2
- Temperature resistance: 400°
- Colour: blue-grey
- Coating process: PVD

titanium aluminium nitride

TiAlN

- universal layer for high-performance machining with high cutting speed
- marked thermal and chemical stability
- very high hardness
- very good heat resistance
- relatively low thermal conductivity
- Vickers hardness: 3200 HV
- friction coefficient of steel: 0.55
- temperature resistance: 900–1000°
- colour: dark blue-grey
- coating process: PVD

Titanium aluminium carbon nitride

TiAlCN

- Universal layer for high-performance machining with high cutting speed
- Low friction
- Very high hardness
- High oxidation resistance
- Relatively low thermal conductivity
- Vickers hardness: 3500 HV
- Friction coefficient of steel: 0.20
- Temperature resistance: 800°
- Colour: antique pink
- Coating process: PVD

titanium aluminium silicone nitrides

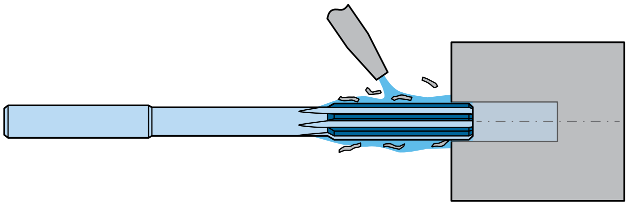
TiAlSiN

- high-performance cutting for machining very abrasive or hard materials such as steel up to 63 HRC
- very high hardness
- high wear resistance
- Vickers hardness: 3500 HV
- friction coefficient of steel: 0.70
- temperature resistance: 900°
- colour: blue-violet
- coating process: PVD

Flute shapes and applications for reamers

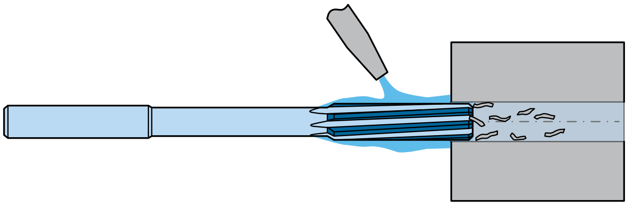
straight flute

- for blind holes
- chips are transported backwards
- larger chip angle



left-twisted flute

- For through-bores
- chips are transported forwards
- better with intermittent cuts
- reduced chip angle



Bore hole allowance when reaming

Allowance range aR	Allowance a (mm) in bore hole diameter:								
	Ø < 5 mm	Ø > 5 mm	Ø > 8 mm	Ø > 10 mm	Ø > 15 mm	Ø > 20 mm	Ø > 30 mm	Ø > 40 mm	Ø> 50 mm
A	0,1	0,1	0,1	0,1	0,1-0,2	0,2	–	–	–
B	0,1-0,2	0,1-0,2	0,2	0,2	0,2	0,3	0,3	0,3	0,4
C	0,1-0,2	0,2	0,25	0,2	0,3	0,3	0,4	0,4	0,4
D	0,05-0,1	0,05-0,1	0,05-0,1	0,1	0,1	0,1-0,2	–	–	–
E	–	–	–	0,2	0,3	0,3	0,3	0,3	–
F	–	–	–	0,1	0,1-0,2	0,1-0,2	0,1-0,2	0,1-0,2	–
g	–	–	–	0,2	0,2	0,2	0,3	0,3	–

		Material	Strength	DIN	Material	Allowance ranges code				
			N/mm²	No.	No.	HSSE	HSSE coated	Solid carbide/ cemented carbide	solid carbide HPC coated	Solid carbide HPC Modular
ISO P	1.	**Steels**								
	1.1	Free machining steel	< 900	9 S 20	1.0711	B	B	B	A	E
	1.2	Structural steel	< 500	ST 37-2	1.0037	B	B	B	A	E
	1.3	Structural steel	> 500	ST 60-2	1.0060	B	B	B	A	E
	1.4	Heat-treated steel	<1000	42 CrMo 4	1.7225	B	B	B	A	E
	1.5	Cast steel	<1000	GS-45	1.0446	A	A	A	A	E
	1.6	Case-hardening steel	<1200	16 MnCr 5	1.7131	A	A	A	A	E
	1.7	Rust and acid-resistant steel and ferritic, martensitic steel casting	<1100	X 10 Cr 13	1.4006	A	A	A	A	E
	1.8	Heat-treated steel	>1000	43 CrMo 4	1.3563	A	A	A	A	E
	1.9	Nitriding steel	<1300	31 CrMoV 9	1.8519	A	A	A	A	E
	1.10	Tool steel (up to 45 HRC)	<1300	X 38 CrMoV 5 1	1.2343	A	A	A	A	E
ISO M	2.	**Stainless steels**								
	2.1	Rust and acid-resistant steel/austenitic steel casting	<1100	G-X 2 CrNiMo 18 15	1.3953	A	A	A	A	g
ISO N	3.	**Non-ferrous metals**								
	3.1	Aluminium alloy, long-chipping/ wrought alloy/pure metals/magnesium alloy	<500	Al99.9	3.0305	C	C	C	A	–
	3.2	Aluminium alloys, short-chipping	<500	G - AlSi12	3.2581	C	C	C	A	–
	3.3	Copper alloy (bronze), long-chipping	<1200	CuSn4	2.1016	C	C	C	A	–
	3.4	Copper alloy (bronze), short-chipping	<850	CuNi12Zn24	2.0730	C	C	C	A	–
	3.5	Copper alloy (brass), long-chipping	<600	Cu Zn 20	2.0250	C	C	C	A	–
	3.6	Copper alloy (brass), short-chipping	<600	Cu Zn 39 Pb 3	2.0381	C	C	C	A	–
	3.7	Thermoplast	<100	PVC, acrylic glass	–	B	B	B	–	–
	3.8	Duroplast	<150	Bakelite, melamine	–	B	B	B	–	–
	3.9	Fibre-reinforced plastics	<1500	CFRP, GFRP	–	B	B	B	–	–
	3.10	Graphite	<60	C8000	–	–	–	–	–	–
	3.11	Composite materials	–	–	–	–	–	–	–	–
ISO K	4.	**Cast metal**								
	4.1	Grey cast iron	<260	GG10	0.6010	B	B	B	A	F
	4.2	Ductile graphite iron	<400	GGG 40	0.7040	B	B	B	A	F
	4.3	Malleable cast iron	<550	GTW-55	0.8055	B	B	B	A	F
ISO S	5.	**Special alloys**								
	5.1	Titanium alloys	<1200	TiAl5Sn2.5	3.7115	A	A	A	A	–
	5.2	Nickel-based alloys	<1400	NiCr21Mo	2.4858	B	B	B	A	–
	5.3	Super alloys	<1300	X45CrSi 9 3	1.4718	B	B	B	A	–
ISO H	6.	**Hard materials**								
	6.1	Hardened materials - 63 HRC	>1300	G-X 260 NiCr 4 2	0.9620	–	–	–	D	–

Coverable tolerance classes with 1/100 reamers

with 1/100 reamers, available in increments of 0.01 mm, various fit tolerance dimensions can be catered to. the system ranges up to a diameter of 12.10mm. a brief example would be, for instance, a 1/100 reamer 11.03mm capable of producing a fit tolerance of 11.0 F8. further fit tolerance dimensions catered to are shown in the table below.

hole tolerance table for 1/100 machine reamers:

Hole Ø (mm)	C8	C9	C10	C11	CD7	D7	D8	D9	D10	D11	D12	E7	E8	E9	EF8	F7	F8	F9
1,0	1,07	1,07	1,08	1,10	1,04	1,02	1,03	-	1,04	1,06	1,08	1,02	1,02	1,03	1,02	1,01	1,01	1,02
2,0	2,07	2,07	2,08	2,10	2,04	2,02	2,03	-	2,04	2,06	2,08	2,02	2,02	2,03	2,02	2,01	2,01	2,02
3,0	3,07	3,07	3,08	3,10	3,04	3,02	3,03	-	3,04	3,06	3,08	3,02	3,02	3,03	3,02	3,01	3,01	3,02
4,0	4,08	4,09	-	-	4,05	4,04	4,04	4,05	4,06	4,08	4,10	-	4,03	4,04	4,03	-	4,02	4,03
5,0	5,08	5,09	-	-	5,05	5,04	5,04	5,05	5,06	5,08	5,10	-	5,03	5,04	5,03	-	5,02	5,03
6,0	6,08	6,09	-	-	6,05	6,04	6,04	6,05	6,06	6,08	6,10	-	6,03	6,04	6,03	-	6,02	6,03
7,0	7,09	7,10	-	-	7,06	7,05	7,05	7,06	7,08	7,10	-	7,03	7,04	7,05	7,03	7,02	7,03	-
8,0	8,09	8,10	-	-	8,06	8,05	8,05	8,06	8,08	8,10	-	8,03	8,04	8,05	8,03	8,02	8,03	-
9,0	9,09	9,10	-	-	9,06	9,05	9,05	9,06	9,08	9,10	-	9,03	9,04	9,05	9,03	9,02	9,03	-
10,0	10,09	10,10	-	-	10,06	10,05	10,05	10,06	10,08	10,10	-	10,03	10,04	10,05	10,03	10,02	10,03	-
11,0	-	-	-	-	-	11,06	-	11,08	11,10	-	-	11,04	11,05	11,06	-	-	11,03	11,04
12,0	-	-	-	-	-	12,06	-	12,08	12,10	-	-	12,04	12,05	12,06	-	-	12,03	12,04

Hole Ø (mm)	F10	G6	G7	H5	H6	H7	H8	H9	H10	H11	H12	H13	J6	J7	JS7	J8	JS8	JS9
1,0	-	-	1,01	1,00	1,00	-	1,01	-	1,02	1,04	1,06	1,09	1,00	1,00	1,00	1,00	1,00	1,00
2,0	-	-	2,01	2,00	2,00	-	2,01	-	2,02	2,04	2,06	2,09	2,00	2,00	2,00	2,00	2,00	2,00
3,0	-	-	3,01	3,00	3,00	-	3,01	-	3,02	3,04	3,06	3,09	3,00	3,00	3,00	3,00	3,00	3,00
4,0	4,04	4,01	4,01	4,00	4,00	-	4,01	4,02	4,03	4,05	4,08	-	4,00	4,00	4,00	4,00	4,00	4,00
5,0	5,04	5,01	5,01	5,00	5,00	-	5,01	5,02	5,03	5,05	5,08	-	5,00	5,00	5,00	5,00	5,00	5,00
6,0	6,04	6,01	6,01	6,00	6,00	-	6,01	6,02	6,03	6,05	6,08	-	6,00	6,00	6,00	6,00	6,00	6,00
7,0	7,05	7,01	7,01	7,00	7,00	7,01	7,01	7,02	7,04	7,06	7,10	-	7,00	7,00	7,00	7,00	7,00	-
8,0	8,05	8,01	8,01	8,00	8,00	8,01	8,01	8,02	8,04	8,06	8,10	-	8,00	8,00	8,00	8,00	8,00	-
9,0	9,05	9,01	9,01	9,00	9,00	9,01	9,01	9,02	9,04	9,06	9,10	-	9,00	9,00	9,00	9,00	9,00	-
10,0	10,05	10,01	10,01	10,00	10,00	10,01	10,02	10,02	10,04	10,06	10,10	-	10,00	10,00	10,00	10,00	10,00	-
11,0	11,06	11,01	-	11,00	-	11,01	11,02	11,03	11,05	11,07	-	-	11,00	11,00	11,00	11,00	11,00	-
12,0	12,06	12,01	-	12,00	-	12,01	12,02	12,03	12,05	12,07	-	-	12,00	12,00	12,00	12,00	12,00	-

Hole Ø (mm)	K6	K7	K8	M6	M7	M8	N6	N7	N8	P6	P7	P8	R6	R7	S6	S7	U6	U7
1,0	-	-	0,99	-	-	0,99	0,99	0,99	0,99	0,99	0,99	0,99	-	-	0,98	0,98	0,98	0,98
2,0	-	-	1,99	-	-	1,99	1,99	1,99	1,99	1,99	1,99	1,99	-	-	1,98	1,98	1,98	1,98
3,0	-	-	2,99	-	-	2,99	2,99	2,99	2,99	2,99	2,99	2,99	-	-	2,98	2,98	2,98	2,98
4,0	4,00	4,00	4,00	3,99	-	3,99	3,99	3,99	3,99	-	-	3,98	-	-	3,98	3,98	-	-
5,0	5,00	5,00	5,00	4,99	-	4,99	4,99	4,99	4,99	-	-	4,98	-	-	4,98	4,98	-	-
6,0	6,00	6,00	6,00	5,99	-	5,99	5,99	5,99	5,99	-	-	5,98	-	-	5,98	5,98	-	-
7,0	-	7,00	7,00	6,99	6,99	6,99	-	6,99	6,99	-	-	-	6,98	6,98	-	-	6,97	6,97
8,0	-	8,00	8,00	7,99	7,99	7,99	-	7,99	7,99	-	-	-	7,98	7,98	-	-	7,97	7,97
9,0	-	9,00	9,00	8,99	8,99	8,99	-	8,99	8,99	-	-	-	8,98	8,98	-	-	8,97	8,97
10,0	-	10,00	10,00	9,99	9,99	9,99	-	9,99	9,99	-	-	-	9,98	9,98	-	-	9,97	9,97
11,0	-	11,00	11,00	10,99	10,99	10,99	-	10,99	10,99	10,98	10,98	10,97	-	-	10,97	10,97	-	-
12,0	-	12,00	12,00	11,99	11,99	11,99	-	11,99	11,99	11,98	11,98	11,97	-	-	11,97	11,97	-	-

Hole Ø (mm)	X7	X8	X9	Z7	Z8	Z9	Z10	ZA7	ZA8	ZA9	ZB8	ZB9
1,0	-	0,97	0,97	0,97	0,97	-	0,96	0,96	-	-	0,95	0,95
2,0	-	1,97	1,97	1,97	1,97	-	1,96	1,96	-	-	1,95	1,95
3,0	-	2,97	2,97	2,97	2,97	-	2,96	2,96	-	-	2,95	2,95
4,0	3,97	-	3,96	3,96	3,96	3,95	3,95	3,96	-	-	3,94	3,94
5,0	4,97	-	4,96	4,96	4,96	4,95	4,95	4,96	-	-	4,94	4,94
6,0	5,97	-	5,96	5,96	5,96	5,95	5,95	5,96	-	-	5,94	5,94
7,0	-	6,96	6,95	6,96	6,95	-	6,94	6,94	6,94	-	-	6,92
8,0	-	7,96	7,95	7,96	7,95	-	7,94	7,94	7,94	-	-	7,92
9,0	-	8,96	8,95	8,96	8,95	-	8,94	8,94	8,94	-	-	8,92
10,0	-	9,96	9,95	9,96	9,95	-	9,94	9,94	9,94	-	-	9,92
11,0	10,96	10,95	-	10,95	10,94	-	10,93	-	10,93	-	10,90	10,90
12,0	11,96	11,95	-	11,95	11,94	-	11,93	-	11,93	-	11,90	11,90

clamping device recommendation for reaming

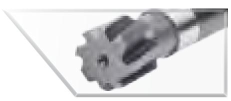
	standard collet chucks	precision collet chucks	shrink-fit chucks	hydro-expansion chucks
				
concentricity	◉	●	●	●
vibration-reducing	◉	◉	○	●
speed/balancing quality	◉	●	●	●
internal cooling	yes	yes	yes	yes
flexibility	●	●	○	●
overall rating	**limited suitability**	**highly suitable**	**well suited**	**highly suitable**

● = very well suited ◉ = suitable ○ = limited suitability

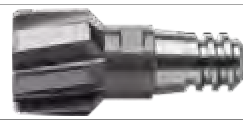
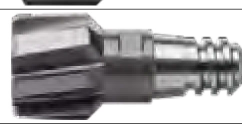
Solid carbide HPC machine reamers modular

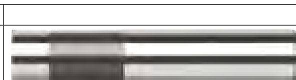
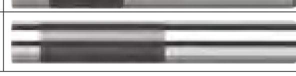
Application:
For producing clearances in medium to large batch sizes for the diameters 10.00 mm - 40.00 mm

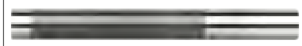
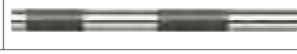
Advantage:
- Steel/cast iron and stainless steel geometries available for through hole and blind hole machining
- High-precision tool change also possible in the machine
- Perfect system concentricity thanks to ground thread and tapered contact face
- Innovative cutting geometry provides very high stability and process reliability, with very high cutting parameters
- Hard-to-reach clearances can be produced owing to various bracket lengths
- Longer service life due to innovative coatings
- Perfect chip removal owing to coolant outlet directly on the cutter
- HPC reamers as H7 available from stock
- Diameters and clearances can be ordered individually with short delivery times



H7 VHM

		Ø	Cutting material	Tolerance of fit	P 1000 N/mm²	P 1300 N/mm²	M	K		page
11785110-140	SC HPC interchangeable head reamer for use in steel and cast iron up to 1300 N/mm²	10-40 mm	VHM	H7	●	●		●		141-142
11785210-240	SC HPC interchangeable head reamer for use in steel and cast iron up to 1300 N/mm²	10-40 mm	VHM	H7	●	●		●		142-143
11785310-340	SC HPC interchangeable head reamer For use on stainless steels	10-40 mm	VHM	H7			●			143-144
11785410-440	SC HPC interchangeable head reamer For use on stainless steels	10-40 mm	VHM	H7			●			144-145

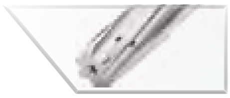
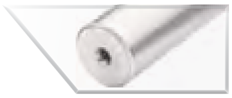
		Overall length	Material		page
11785510-527	Interchangeable head holder For reamer interchangeable head no. 11785	Short	Steel		145
11785511-528	Interchangeable head holder For reamer interchangeable head no. 11785	Standard	Steel		145

		Overall length	Material		page
11785512-529	Interchangeable head holder For reamer interchangeable head no. 11785	Long	Steel		145
11785522-530	Interchangeable head holder For reamer interchangeable head no. 11785	Extra long	Steel		145

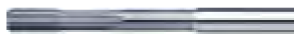
Solid carbide HPC machine reamers

Application:
For series manufacture of clearances on modern CNC machines with stable tool and workpiece clamping.

Advantage:
- Innovative cutting geometry provides very high stability and process reliability, with very high cutting parameters
- High-quality solid carbide cutting material and coating ensure a very long service life
- Innovative coating technology ensures a longer service life
- Internal cooling ensures optimal transportation of chips
- Wide range with specialist tools for the most common materials
- Diameters and clearances can be ordered individually with short delivery times
- HPC reamers as H7, 1/100 mm and special reamers available
- All geometries available for through hole and blind hole machining


H7 | 0,001 | 0,00X | VHM

		Ø	Cutting material	Tolerance of fit	P 1000 N/mm²	P 1300 N/mm²	M	N	K	H 65HRC		page
11783658-674	Solid carbide TiALN high-performance reamer For use on stainless steels	4.0-20.0 mm	VHM	H7			●	○				146-147
11783675-691	Solid carbide TiALN high-performance reamer For use on stainless steels	4.0-20.0 mm	VHM	H7			●	○				146-147
11734200-292	Solid carbide TiALCN high-performance reamer for universal use up to 1300N/mm²	3.97-20.0 mm	VHM	H7	●	●			●			147-148
11737200-288	Solid carbide TiALCN high-performance reamer for universal use up to 1300N/mm²	3.97-20.0 mm	VHM	H7	●	●			●			147-148

solid carbide machine reamers H7
For demanding serial users

Application:
For cutting H7 fit tolerances on conventional machines and CNC machines.

advantage:
- universal range of diameters from 1.00 mm to 20.00 mm
- various types of reamers
- very long service life
- high cutting values can be realised
- precisely ground in accordance with DIN 1420
- more dimensions available on request

H7 | VHM

		Ø	Cutting material	P 700 N/mm²	P 1000 N/mm²	P 1300 N/mm²	M	N	K	S		page
11726010-200	NC machine reamer, solid carbide with universal shank for universal use up to 1300N/mm²	1.0-20.0 mm	VHM	●	●	●	○	●	●	●		148-149
11770020-120	NC machine reamer, solid carbide For universal use up to 1300 N/mm²	2.0-12.0 mm	VHM	●	●	●	○	●	●	●		150

		Ø	Cutting material	P 700 N/mm^2	P 1000 N/mm^2	P 1300 N/mm^2	M	N	K	S		page
11772330-500	Automatic machine reamers, solid carbide For universal use up to 1300 N/mm^2	3.0-20.0 mm	VHM	●	●	●	○	●	●	●		150
11772630-800	Automatic machine reamers, solid carbide For universal use up to 1300 N/mm^2	3.0-20.0 mm	VHM	●	●	●	○	●	●	●		150
11744050-200	Carbide machine reamer for universal use up to 1300N/mm^2	5.0-20.0 mm	Carbide	●	●	●	○	●	●	●		-
11779	machine reamer HM for universal use up to 1300 N/mm^2	5.0-32.0 mm	Carbide	●	●	●	○	●	●	●		-

solid carbide machine reamers 1/100 mm

For demanding serial users

application:

for cutting high-precision fit tolerances (0/+0.003 mm) on conventional machines and CNC machines.

advantage:

- covers a wide range of tolerances
- manufacture of special reamers not required
- in stock
- high cutting values can be realised
- universal range of diameters from 0.90 mm to 12.03 mm
- tight tolerance for high precision (0/+0.003 mm)
- very long service life through high-quality cemented carbide cutting material

0,001

VHM

		Ø	Cutting material	P 700 N/mm^2	P 1000 N/mm^2	P 1300 N/mm^2	M	N	K	S		page
11730	NC machine reamer, solid carbide, with uniform shank for universal use up to 1300 N/mm^2	0.9-12.03 mm	VHM	●	●	●	○	●	●	●		151

HSSE machine reamers H7

Application:

For cutting H7 fit tolerances on conventional machines and CNC machines.

advantage:

- universal range of diameters from 1.00 mm to 40.00 mm
- various types of reamers
- very long service life
- precisely ground in accordance with DIN 1420
- coated versions for higher cutting values
- more dimensions available on request

H7

HSSE

		Ø	Cutting material	P 700 N/mm^2	P 1000 N/mm^2	P 1300 N/mm^2	M	N	K	S		page
11628010-027	NC machine reamer HSSE with straight shank For universal use up to 1000 N/mm^2	1.0-2.7 mm	HSSE	●	●	○	○	○	●	○		152-153
11628028-200	NC machine reamer HSSE with straight shank For universal use up to 1000 N/mm^2	20.0-2.8 mm	HSSE	●	●	○	○	○	●	○		152-153
11630010-025	Machine reamer HSSE for universal use up to 1000N/mm^2	1.0-2.5 mm	HSSE	●	●	○	○	○	●	○		153
11630030-200	Machine reamer HSSE for universal use up to 1000N/mm^2	3.0-20.0 mm	HSSE	●	●	○	○	○	●	○		153
11628330-420	NC machine reamer HSSE-TiN with straight shank For universal use up to 1300 N/mm^2	3.0-12.0 mm	HSSE	●	●	●	○	○	●	○		-

		Ø	Cutting material	P 700 N/mm^2	P 1000 N/mm^2	P 1300 N/mm^2	M	N	K	S		page
11628630-720	NC machine reamer HSSE-TiALN with straight shank For universal use up to 1300 N/mm^2	3.0-12.0 mm	HSSE	●	●	○	○	○	●	○		-
11626040-200	HSSE automated machine reamer for universal use up to 1000N/mm^2	4.0-20.0 mm	HSSE	●	●	○	○	○	●	○		154
11627020-120	Machine reamer, extra-long, HSSE for universal use up to 1000N/mm^2	2.0-12.0 mm	HSSE	●	●	○	○	○	●	○		154
11646030-120	Machine bottoming reamer, HSSE For universal use up to 1000 N/mm^2	3.0-12.0 mm	HSSE	●	●	○	○	○	●	○		155
11643125-300	Machine reamer, extra-long, HSSE for universal use up to 1000N/mm^2	12.0-30.0 mm	HSSE	●	●	○	○	○	●	○		156
11642030-400	Machine reamer HSSE for universal use up to 1000N/mm^2	3.0-40.0 mm	HSSE	●	●	○	○	○	●	○		155-156

HSSE machine reamers 1/100 mm

application:
for cutting high-precision fit tolerances (0/+0.003 mm) on conventional machines and CNC machines.

advantage:
- covers a wide range of tolerances
- manufacture of special reamers not required
- in stock
- universal range of diameters from 0.90 mm to 12.03 mm
- tight tolerance for high precision (0/+0.003 mm)
- cheaper alternative to solid carbide tools

0,001

HSSE

		Ø	Cutting material	P 700 N/mm^2	P 1000 N/mm^2	P 1300 N/mm^2	M	N	K	S		page
11624100-203	NC machine reamer 1/100 mm HSSE with universal shaft For universal use up to 1000 N/mm^2	1.0-2.03 mm	HSSE	●	●	○	○	○	●	○		157
11624298-019	HSSE NC machine reamer 1/100 mm with uniform shank For universal use up to 1000 N/mm^2	2.47-12.03 mm	HSSE	●	●	○	○	○	●	○		157

solid carbide machine reamers with selectable diameter and fit
For demanding serial users

application:
for cutting individually selectable fit tolerances on conventional machines and CNC machines.

advantage:
- wide range of diameters from 0.95 mm to 20.00 mm
- individually selectable diameter and tolerance
- short delivery times
- high cutting values can be realised
- very long service life
- precisely ground in accordance with DIN 1420
- universal application

0,00X

VHM

		Ø	Cutting material	P 700 N/mm^2	P 1000 N/mm^2	P 1300 N/mm^2	M	N	K	S		page
11730950-987	NC machine reamer, solid carbide, with uniform shank **(fit tolerance and diameter can be selected)** for universal use up to 1300 N/mm^2	0.95-20.02 mm	VHM	●	●	●	○	●	●	●		158-160
11731500-576	NC machine reamer, solid carbide, with uniform shank **(diameter can be selected)** for universal use up to 1300 N/mm^2	0.95-12.05 mm	VHM	●	●	●	○	●	●	●		158-160

HSSE machine reamers with selectable diameter and fit

application:
for cutting individually selectable fit tolerances on conventional machines and CNC machines.

advantage:
- wide range of diameters from 0.95 mm to 20.00 mm
- individually selectable diameter and tolerance
- short delivery times
- very long service life
- precisely ground in accordance with DIN 1420
- universal application

0,00X | HSSE

		Ø	Cutting material	P 700 N/ mm²	P 1000 N/ mm²	P 1300 N/ mm²	M	N	K	S		page
11624911-995	HSSE NC machine reamer with uniform shank **(fit tolerance and diameter can be selected)** For universal use up to 1000 N/mm²	0.95-20.0 mm	HSSE	●	●	○	○	○	●	○		160-162
11625500-564	HSSE NC machine reamer with uniform shank **(diameter can be selected)** for universal use up to 1000 N/mm²	0.95-12.05 mm	HSSE	●	●	○	○	○	●	○		160-162

HSS / HSSE rivet hole reamers and machine taper reamers

application:
for the production of conical tolerances for tapered pins and rivet holes on conventional and CNC machines.

advantage:
- wide range
- very good surfaces can be achieved
- various shaft variants
- very high feed rates can be realised
- further dimensions available on request

HSS | HSSE

		Ø	Cutting material	P 700 N/ mm²	P 1000 N/ mm²	P 1300 N/ mm²	M	N	K	S		page
11670100-300	Rivet hole reamer, HSS for universal use up to 1000N/mm²	10.0-30.0 mm	HSS	●	●	○	○	○	●	○		162
11674	Machine taper shell reamer HSS 1:50 For universal use up to 1000 N/mm²	1.5-12.0 mm	HSSE	●	●	○	○	○	●	○		163

HSS hand reamers

application:
for manually producing H7 or 1/100 tolerances and reworking existing tolerances

advantage:
- cost-effective alternative for manual work
- longer threaded start to correctly align the reamer
- Adjustable variants
- straight and spiralised versions
- square shaft serves as carrier
- universal application

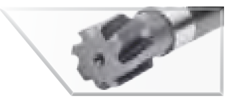
HSS | H7 | 0,001

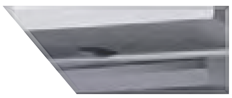
		Ø	Cutting material	P 700 N/mm²	P 1000 N/mm²	P 1300 N/mm²	M	N	K	S		page
11602	HSS hand reamer for universal use up to 1000N/mm²	1.5-40.0 mm	HSS	●	●	○	○	○	○	○		163-164
11603	HSS hand reamer for universal use up to 1000N/mm²	2.0-20.0 mm	HSS	●	●	○	○	○	○	○		163-164
11604	HSS hand reamer for universal use up to 1000N/mm²	1.5-40.0 mm	HSS	●	●	○	○	○	○	○		163-164
11672015-120	HSS hand taper reamers 1:50 for universal use up to 1000N/mm²	1.5-12.0 mm	HSS	●	●	○	○	○	○	○		164-165
11673030-200	HSS hand taper reamers 1:50 for universal use up to 1000N/mm²	3.0-20.0 mm	HSS	●	●	○	○	○	○	○		164-165
11672301-328	HSS hand taper reamers 1:10 for universal use up to 1000N/mm²	3.0-45.0 mm	HSS	●	●	○	○	○	○	○		165

Solid carbide HPC machine reamers modular

Application:
For producing clearances in medium to large batch sizes for the diameters 10.00 mm - 40.00 mm

Advantage:
- Steel/cast iron and stainless steel geometries available for through hole and blind hole machining
- High-precision tool change also possible in the machine
- Perfect system concentricity thanks to ground thread and tapered contact face
- Innovative cutting geometry provides very high stability and process reliability, with very high cutting parameters
- Hard-to-reach clearances can be produced owing to various bracket lengths
- Longer service life due to innovative coatings
- Perfect chip removal owing to coolant outlet directly on the cutter
- HPC reamers as H7 available from stock
- Diameters and clearances can be ordered individually with short delivery times



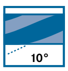


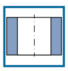
H7 VHM

ATORN® Interchangeable head reamer SC HPC

for use in steel and cast iron up to 1300 N/mm²

VHM | TiAlN | H7 | HPC





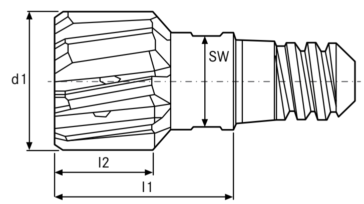
Application:
For HPC reaming of through holes in the diameter range 10.00 mm - 40.00 mm

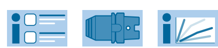
Execution:
- Left-hand diagonal toothing with extremely uneven pitch

Advantage:
- System concentricity in installed state <5 µ

- Internal cooling ensures optimum chip removal
- Ground thread and tapered flat face for maximum changeover accuracy and high strength
- Various holder lengths available
- Simple to change in the machine

Notes:
Configurable dimensions available on request. Note: Please refer to dimension table.





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Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plastics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11785110-140	160	160	160											120					

d1 (mm)	Tolerance of fit	Replaceable head system	l1 (mm)	l2 (mm)	Z (PCS)	SW	f steel 1300 ●	Groove type	Tightening torque (Nm)	11785... Ident. No.	
10	H7	WKS 6	18	10	6	6 mm	0.7	Left-hand twist, 10°	5	110	●
11	H7	WKS 8	20	10	6	8 mm	0.7	Left-hand twist, 10°	12.5	111	○
12	H7	WKS 8	20	10	6	8 mm	0.7	Left-hand twist, 10°	12.5	112	●
13	H7	WKS 10	22	10	6	10 mm	1	Left-hand twist, 10°	15	113	○
14	H7	WKS 10	22	12	6	10 mm	1	Left-hand twist, 10°	15	114	●
15	H7	WKS 10	22	12	6	10 mm	1	Left-hand twist, 10°	15	115	●
16	H7	WKS 10	22	12	6	10 mm	1	Left-hand twist, 10°	15	116	●
17	H7	WKS 10	22	12	8	10 mm	1.5	Left-hand twist, 10°	15	117	○
18	H7	WKS 12	26	14	8	13 mm	1.5	Left-hand twist, 10°	20	118	●
19	H7	WKS 12	26	14	8	13 mm	1.5	Left-hand twist, 10°	20	119	○
20	H7	WKS 12	26	14	8	13 mm	1.5	Left-hand twist, 10°	20	120	●
21	H7	WKS 12	26	14	8	13 mm	1.5	Left-hand twist, 10°	20	121	○
22	H7	WKS 16	26	14	8	16 mm	1.5	Left-hand twist, 10°	25	122	●
23	H7	WKS 16	26	14	8	16 mm	1.5	Left-hand twist, 10°	25	123	○
24	H7	WKS 16	26	14	8	16 mm	1.5	Left-hand twist, 10°	25	124	●
25	H7	WKS 16	26	14	8	16 mm	1.5	Left-hand twist, 10°	25	125	●
26	H7	WKS 16	26	14	8	16 mm	1.5	Left-hand twist, 10°	25	126	○
27	H7	WKS 16	26	14	8	16 mm	1.5	Left-hand twist, 10°	25	127	○
28	H7	WKS 16+	26	14	8	24 mm	1.5	Left-hand twist, 10°	25	128	●
29	H7	WKS 16+	26	14	8	24 mm	1.5	Left-hand twist, 10°	25	129	○
30	H7	WKS 16+	26	14	8	24 mm	1.5	Left-hand twist, 10°	25	130	●
31	H7	WKS 16+	30	14	8	24 mm	2	Left-hand twist, 10°	25	131	○
32	H7	WKS 16+	30	14	8	24 mm	2	Left-hand twist, 10°	25	132	●
33	H7	WKS 16+	30	14	8	24 mm	2	Left-hand twist, 10°	25	133	○
34	H7	WKS 16+	30	14	8	24 mm	2	Left-hand twist, 10°	25	134	○
35	H7	WKS 16+	30	14	8	24 mm	2	Left-hand twist, 10°	25	135	●
36	H7	WKS 16+	30	14	8	24 mm	2	Left-hand twist, 10°	25	136	●
37	H7	WKS 16+	30	14	8	24 mm	2	Left-hand twist, 10°	25	137	○
38	H7	WKS 16+	30	14	8	24 mm	2	Left-hand twist, 10°	25	138	○
39	H7	WKS 16+	30	14	8	24 mm	2	Left-hand twist, 10°	25	139	○
40	H7	WKS 16+	30	14	8	24 mm	2	Left-hand twist, 10°	25	140	●

Prod. Gr. 1BK

ATORN® Interchangeable head reamer SC HPC

for use in steel and cast iron up to 1300 N/mm²

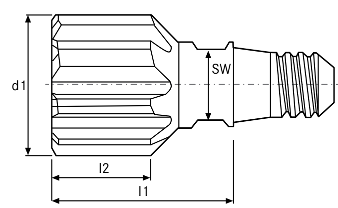
VHM | TiAlN | H7 | HPC | 0° | IK

Application:
For HPC reaming of blind holes in the diameter range 10.00 mm–40.00 mm

Execution:
- Straight grooves with extremely uneven pitch

Advantage:
- System concentricity in installed state <5 µ
- Internal cooling ensures optimum chip removal
- Ground thread and tapered flat face for maximum changeover accuracy and high strength
- Various holder lengths available
- Simple to change in the machine

Notes:
Configurable dimensions available on request. Note: Please refer to dimension table.



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Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11785210-240	160	160	160											120					

d1 (mm)	Tolerance of fit	Replaceable head system	l1 (mm)	l2 (mm)	Z (PCS)	SW	f steel 1300	Groove type	Tightening torque (Nm)	11785... Ident. No.	
10	H7	WKS 6	18	10	6	6 mm	0.7	Straight	5	210	●
11	H7	WKS 6	20	10	6	6 mm	0.7	Straight	5	211	○
12	H7	WKS 6	20	10	6	6 mm	0.7	Straight	5	212	●
13	H7	WKS 6	22	12	6	6 mm	1	Straight	5	213	○
14	H7	WKS 6	22	12	6	6 mm	1	Straight	5	214	●
15	H7	WKS 8	22	12	6	8 mm	1	Straight	12.5	215	●
16	H7	WKS 8	22	12	6	8 mm	1	Straight	12.5	216	●
17	H7	WKS 10	22	12	8	10 mm	1.5	Straight	15	217	○
18	H7	WKS 10	26	14	8	10 mm	1.5	Straight	15	218	●
19	H7	WKS 10	26	14	8	10 mm	1.5	Straight	15	219	○
20	H7	WKS 10	26	14	8	10 mm	1.5	Straight	15	220	●
21	H7	WKS 12	26	14	8	13 mm	1.5	Straight	20	221	○
22	H7	WKS 12	26	14	8	13 mm	1.5	Straight	20	222	●
23	H7	WKS 12	26	14	8	13 mm	1.5	Straight	20	223	○
24	H7	WKS 12	26	14	8	13 mm	1.5	Straight	20	224	●
25	H7	WKS 16	26	14	8	16 mm	1.5	Straight	25	225	●
26	H7	WKS 16	26	14	8	16 mm	1.5	Straight	25	226	○
27	H7	WKS 16	26	14	8	16 mm	1.5	Straight	25	227	○
28	H7	WKS 16	26	14	8	16 mm	1.5	Straight	25	228	●
29	H7	WKS 16	26	14	8	16 mm	1.5	Straight	25	229	○
30	H7	WKS 16	26	14	8	16 mm	1.5	Straight	25	230	●
31	H7	WKS 16	30	14	8	16 mm	2	Straight	25	231	○
32	H7	WKS 16	30	14	8	16 mm	2	Straight	25	232	●
33	H7	WKS 16+	30	14	8	24 mm	2	Straight	25	233	○
34	H7	WKS 16+	30	14	8	24 mm	2	Straight	25	234	○
35	H7	WKS 16+	30	14	8	24 mm	2	Straight	25	235	●
36	H7	WKS 16+	30	14	8	24 mm	2	Straight	25	236	●
37	H7	WKS 16+	30	14	8	24 mm	2	Straight	25	237	○
38	H7	WKS 16+	30	14	8	24 mm	2	Straight	25	238	○
39	H7	WKS 16+	30	14	8	24 mm	2	Straight	25	239	○
40	H7	WKS 16+	30	14	8	24 mm	2	Straight	25	240	●

Prod. Gr. 1BK

ATORN® Interchangeable head reamer SC HPC

For use on stainless steels

VHM | TiAlN | H7 | HPC VA | 10° | IK

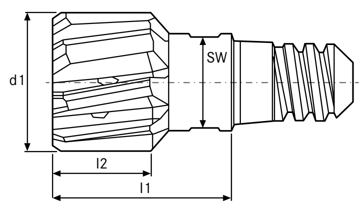
Application:
For HPC reaming of through holes in the diameter range 10.00 mm - 40.00 mm

Execution:
- Left-hand diagonal toothing with extremely uneven pitch

Advantage:
- System concentricity in installed state <5 µ

- Internal cooling ensures optimum chip removal
- Ground thread and tapered flat face for maximum changeover accuracy and high strength
- Various holder lengths available
- Simple to change in the machine

Notes:
Configurable dimensions available on request. Note: Please refer to dimension table.



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Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11785310-340				40	40														

d1 (mm)	Tolerance of fit	Replaceable head system	l1 (mm)	l2 (mm)	Z (PCS)	SW	f steinl. st.	Groove type	Tightening torque (Nm)	11785... Ident. No.	
10	H7	WKS 6	18	10	6	6 mm	0.4	Left-hand twist, 10°	5	310	●
11	H7	WKS 8	20	10	6	8 mm	0.4	Left-hand twist, 10°	12.5	311	○
12	H7	WKS 8	20	10	6	8 mm	0.4	Left-hand twist, 10°	12.5	312	●
13	H7	WKS 10	22	10	6	10 mm	0.4	Left-hand twist, 10°	15	313	○
14	H7	WKS 10	22	12	6	10 mm	0.4	Left-hand twist, 10°	15	314	●
15	H7	WKS 10	22	12	6	10 mm	0.4	Left-hand twist, 10°	15	315	●

d1 (mm)	Tolerance of fit	Replaceable head system	l1 (mm)	l2 (mm)	Z (PCS)	SW	f steinl. st.	Groove type	Tightening torque (Nm)	11785... Ident. No.	
16	H7	WKS 10	22	12	6	10 mm	0.4	Left-hand twist, 10°	15	316	●
17	H7	WKS 10	22	12	8	10 mm	0.5	Left-hand twist, 10°	15	317	○
18	H7	WKS 12	26	14	8	13 mm	0.5	Left-hand twist, 10°	20	318	●
19	H7	WKS 12	26	14	8	13 mm	0.5	Left-hand twist, 10°	20	319	○
20	H7	WKS 12	26	14	8	13 mm	0.5	Left-hand twist, 10°	20	320	●
21	H7	WKS 12	26	14	8	13 mm	0.5	Left-hand twist, 10°	20	321	○
22	H7	WKS 16	26	14	8	16 mm	0.5	Left-hand twist, 10°	25	322	●
23	H7	WKS 16	26	14	8	16 mm	0.5	Left-hand twist, 10°	25	323	○
24	H7	WKS 16	26	14	8	16 mm	0.5	Left-hand twist, 10°	25	324	●
25	H7	WKS 16	26	14	8	16 mm	0.5	Left-hand twist, 10°	25	325	●
26	H7	WKS 16	26	14	8	16 mm	0.5	Left-hand twist, 10°	25	326	○
27	H7	WKS 16	26	14	8	16 mm	0.5	Left-hand twist, 10°	25	327	○
28	H7	WKS 16+	26	14	8	24 mm	0.5	Left-hand twist, 10°	25	328	●
29	H7	WKS 16+	26	14	8	24 mm	0.5	Left-hand twist, 10°	25	329	○
30	H7	WKS 16+	26	14	8	24 mm	0.5	Left-hand twist, 10°	25	330	●
31	H7	WKS 16+	30	14	8	24 mm	1.2	Left-hand twist, 10°	25	331	○
32	H7	WKS 16+	30	14	8	24 mm	1.2	Left-hand twist, 10°	25	332	●
33	H7	WKS 16+	30	14	8	24 mm	1.2	Left-hand twist, 10°	25	333	○
34	H7	WKS 16+	30	14	8	24 mm	1.2	Left-hand twist, 10°	25	334	○
35	H7	WKS 16+	30	14	8	24 mm	1.2	Left-hand twist, 10°	25	335	●
36	H7	WKS 16+	30	14	8	24 mm	1.2	Left-hand twist, 10°	25	336	●
37	H7	WKS 16+	30	14	8	24 mm	1.2	Left-hand twist, 10°	25	337	○
38	H7	WKS 16+	30	14	8	24 mm	1.2	Left-hand twist, 10°	25	338	○
39	H7	WKS 16+	30	14	8	24 mm	1.2	Left-hand twist, 10°	25	339	○
40	H7	WKS 16+	30	14	8	24 mm	1.2	Left-hand twist, 10°	25	340	●

Prod. Gr. 1BK

ATORN®

Interchangeable head reamer SC HPC

For use on stainless steels

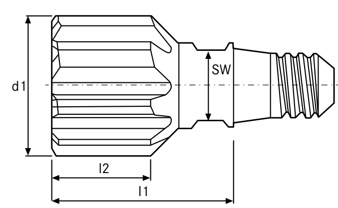
VHM | TiAlN | H7 | HPC VA | 0° | IK

Application:
For HPC reaming of blind holes in the diameter range 10.00 mm–40.00 mm

Execution:
- Straight grooves with extremely uneven pitch

Advantage:
- System concentricity in installed state <5 µ
- Internal cooling ensures optimum chip removal
- Ground thread and tapered flat face for maximum changeover accuracy and high strength
- Various holder lengths available
- Simple to change in the machine

Notes:
Configurable dimensions available on request. Note: Please refer to dimension table.



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Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11785410-440				40	40														

d1 (mm)	Tolerance of fit	Replaceable head system	l1 (mm)	l2 (mm)	Z (PCS)	SW	f steinl. st.	Groove type	Tightening torque (Nm)	11785... Ident. No.	
10	H7	WKS 6	18	10	6	6 mm	0.4	Straight	5	410	●
11	H7	WKS 6	20	10	6	6 mm	0.4	Straight	5	411	○
12	H7	WKS 6	20	10	6	6 mm	0.4	Straight	5	412	●
13	H7	WKS 6	22	12	6	6 mm	0.4	Straight	5	413	○

d1 (mm)	Tolerance of fit	Replaceable head system	l1 (mm)	l2 (mm)	Z (PCS)	SW	f steinl. st.	Groove type	Tightening torque (Nm)	11785... Ident. No.	
14	H7	WKS 6	22	12	6	6 mm	0.4	Straight	5	414	●
15	H7	WKS 8	22	12	6	8 mm	0.4	Straight	12.5	415	●
16	H7	WKS 8	22	12	6	8 mm	0.4	Straight	12.5	416	●
17	H7	WKS 10	22	12	8	10 mm	0.5	Straight	15	417	○
18	H7	WKS 10	26	14	8	10 mm	0.5	Straight	15	418	●
19	H7	WKS 10	26	14	8	10 mm	0.5	Straight	15	419	○
20	H7	WKS 10	26	14	8	10 mm	0.5	Straight	15	420	●
21	H7	WKS 12	26	14	8	13 mm	0.5	Straight	20	421	○
22	H7	WKS 12	26	14	8	13 mm	0.5	Straight	20	422	●
23	H7	WKS 12	26	14	8	13 mm	0.5	Straight	20	423	○
24	H7	WKS 12	26	14	8	13 mm	0.5	Straight	20	424	●
25	H7	WKS 16	26	14	8	16 mm	0.5	Straight	25	425	●
26	H7	WKS 16	26	14	8	16 mm	0.5	Straight	25	426	○
27	H7	WKS 16	26	14	8	16 mm	0.5	Straight	25	427	○
28	H7	WKS 16	26	14	8	16 mm	0.5	Straight	25	428	●
29	H7	WKS 16	26	14	8	16 mm	0.5	Straight	25	429	○
30	H7	WKS 16	26	14	8	16 mm	0.5	Straight	25	430	●
31	H7	WKS 16	30	14	8	16 mm	1.2	Straight	25	431	○
32	H7	WKS 16	30	14	8	16 mm	1.2	Straight	25	432	●
33	H7	WKS 16+	30	14	8	24 mm	1.2	Straight	25	433	○
34	H7	WKS 16+	30	14	8	24 mm	1.2	Straight	25	434	○
35	H7	WKS 16+	30	14	8	24 mm	1.2	Straight	25	435	●
36	H7	WKS 16+	30	14	8	24 mm	1.2	Straight	25	436	●
37	H7	WKS 16+	30	14	8	24 mm	1.2	Straight	25	437	○
38	H7	WKS 16+	30	14	8	24 mm	1.2	Straight	25	438	○
39	H7	WKS 16+	30	14	8	24 mm	1.2	Straight	25	439	○
40	H7	WKS 16+	30	14	8	24 mm	1.2	Straight	25	440	●

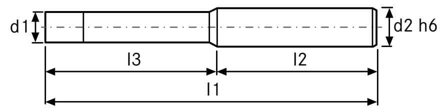
Prod. Gr. 1BK

ATORN® Interchangeable head holder

For reamer interchangeable head no. 11785

Notes:
Also available as a special design in solid carbide or Densimet

Ident. No. 511, 514, 517, 520, 524, 528



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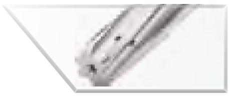
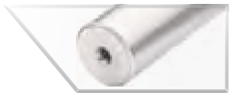
d1 (mm)	Replaceable head system	Anzugsdrehmoment (Nm) (Nm)	d2 h6 (mm)	l1 (mm)	l3 (mm)	l2 (mm)	Overall length	11785... Ident. No.	
7.8	WKS 6	5	10	60	20	40	Short	510	●
7.8	WKS 6	5	10	85	45	40	Standard	511	●
7.8	WKS 6	5	10	150	110	40	Long	512	●
9.8	WKS 8	12.5	12	70	25	45	Short	513	●
9.8	WKS 8	12.5	12	90	45	45	Standard	514	●
9.8	WKS 8	12.5	12	150	105	45	Long	515	●
11.8	WKS 10	15	16	70	22	48	Short	516	●
11.8	WKS 10	15	16	90	42	48	Standard	517	●
11.8	WKS 10	15	16	150	102	48	Long	518	●
15.8	WKS 12	20	16	80	32	48	Short	519	●
15.8	WKS 12	20	16	105	57	48	Standard	520	●
15.8	WKS 12	20	16	150	102	48	Long	521	●
15.8	WKS 12	20	16	200	152	48	Extra long	522	●
19.8	WKS 16	25	25	90	34	56	Short	523	●
19.8	WKS 16	25	25	120	64	56	Standard	524	●
19.8	WKS 16	25	25	200	144	56	Long	525	●
19.8	WKS 16	25	25	250	194	56	Extra long	526	●
26.0	WKS 16+	25	25	90	34	56	Short	527	●
26.0	WKS 16+	25	25	120	64	56	Standard	528	●
26.0	WKS 16+	25	25	200	144	56	Long	529	●
26.0	WKS 16+	25	25	250	194	56	Extra long	530	●

Prod. Gr. 1BK

Solid carbide HPC machine reamers

Application:
For series manufacture of clearances on modern CNC machines with stable tool and workpiece clamping.

Advantage:
- Innovative cutting geometry provides very high stability and process reliability, with very high cutting parameters
- High-quality solid carbide cutting material and coating ensure a very long service life
- Innovative coating technology ensures a longer service life
- Internal cooling ensures optimal transportation of chips
- Wide range with specialist tools for the most common materials
- Diameters and clearances can be ordered individually with short delivery times
- HPC reamers as H7, 1/100 mm and special reamers available
- All geometries available for through hole and blind hole machining


H7 | 0,001 | 0,00X | VHM

ATORN® Solid carbide TiALN high-performance reamer

For use on stainless steels

VHM | TiAlN | 0,00X | H7 | HPC VA | ≈7–8° | 0° | HA | IK

Ident. No. 604–628, 658–674

Ident. No. 633–657, 675–691

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Application:
Ident. No. 604–628, 658–674: for cutting fit tolerances **in through holes** on modern CNC machines with steady tool and workpiece clamping, in stainless steel.
Ident. No. 633–657, 675–691: for cutting fit tolerances **in blind holes** on modern CNC machines with steady tool and workpiece clamping, in stainless steels.

Execution:
- **Ident. No. 604–628, 658–674:** 7–8° left-hand spiral, extremely variable pitch and inner cooling, **type B**
- **Ident. No. 633–657, 675–691:** Straight grooved, extremely variable pitch and internal cooling, **type A**

Advantage:
- innovative cutting geometry ensures excellent dimensional accuracy and process reliability for very high cutting parameters
- high-quality solid carbide cutting material and coating ensure a very long service life
- **Ident. No. 604–628, 658–691:** Internal cooling ensures optimum chip removal
- **Ident. No. 633–657:** inner cooling ensures optimum transport of chippings

Notes:
Ident. No. 604–628: Make sure that tools are accurately and tightly clamped (ideally use a hydro-mechanical clamping chuck or precision collet chuck). When ordering, specify the desired fit and diameter (e.g. 8.05 H7)
Note: Please refer to dimension table.
Ident. No. 633–657: Make sure that tools are accurately and tightly clamped (ideally use a hydro-mechanical clamping chuck or precision collet chuck). When ordering, specify the desired fit and diameter (e.g. 8.05 H7)
Note! Please refer to dimension table.
Ident. No. 658–691: Make sure that tools are accurately and tightly clamped (ideally use a hydro-mechanical clamping chuck or precision collet chuck).
Note: Please refer to dimension table.

Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plastics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11783604-628				35	30	60	70	50	60	50	60				15				
11783633-657				35	30	60	70	50	60	50	60				15				
11783658-674				35	30	60	70	50	60	50	60				15				
11783675-691				35	30	60	70	50	60	50	60				15				

mm		Min./max. cutting edge Ø	mm	mm	mm	mm h6	z	Groove type: f steinl. st. (mm/U)	Left-hand twist, 7-8°: 11783... Ident. No.		Straight: 11783... Ident. No.	
4	Optional	3.80-4.20 mm	75	12	36	6	4	0.1	604	○	633	○
4	H7	4-4 mm	75	12	36	6	4	0.1	658	●	675	●
4.5	Optional	4.21-4.70 mm	75	12	36	6	4	0.1	605	○	634	○
5	Optional	4.71-5.20 mm	75	12	37	6	4	0.1	606	○	635	○
5	H7	5-5 mm	75	12	37	6	4	0.1	659	●	676	●
5.5	Optional	5.21-5.70 mm	75	12	37	6	4	0.1	607	○	636	○
6	Optional	5.71-6.20 mm	75	12	37	6	4	0.1	608	○	637	○
6	H7	6-6 mm	75	12	37	6	4	0.1	660	●	677	●
6.5	Optional	6.21-6.70 mm	100	16	62	8	6	0.1	609	○	638	○
7	Optional	6.71-7.20 mm	100	16	62	8	6	0.1	610	○	639	○
7	H7	7-7 mm	100	16	62	8	6	0.1	661	●	678	●
7.5	Optional	7.21-7.70 mm	100	16	62	8	6	0.15	611	○	640	○
8	Optional	7.71-8.20 mm	100	16	62	8	6	0.15	612	○	641	○
8	H7	8-8 mm	100	16	62	8	6	0.15	662	●	679	●
8.5	Optional	8.21-8.70 mm	100	20	57	10	6	0.15	613	○	642	○
9	Optional	8.71-9.20 mm	100	20	58	10	6	0.15	614	○	643	○
9	H7	9-9 mm	100	20	58	10	6	0.15	663	●	680	●
9.5	Optional	9.21-9.70 mm	120	20	78	10	6	0.15	615	○	644	○
10	Optional	9.71-10.20 mm	120	20	78	10	6	0.2	616	○	645	○
10	H7	10-10 mm	120	20	78	10	6	0.2	664	●	681	●

Ø mm	Tolerance	Min./max. cutting edge Ø	mm	mm	mm	h6 mm	z	Groove type f steinl. st. (mm/U)	Left-hand twist, 7-8° 11783... Ident. No.		Straight 11783... Ident. No.	
10.5	Optional	10.21-10.70 mm	120	20	72	12	6	0.2	617	○	646	○
11	Optional	10.71-11.20 mm	120	20	73	12	6	0.2	618	○	647	○
11	H7	11-11 mm	120	20	73	12	6	0.2	665	●	682	●
11.5	Optional	11.21-11.70 mm	120	20	73	12	6	0.2	619	○	648	○
12	Optional	11.71-12.20 mm	120	20	73	12	6	0.2	620	○	649	○
12	H7	12-12 mm	120	20	73	12	6	0.2	666	●	683	●
13	Optional	12.21-13.20 mm	130	22	82	14	6	0.2	621	○	650	○
13	H7	13-13 mm	130	22	82	14	6	0.2	667	●	684	●
14	Optional	13.21-14.20 mm	130	22	83	14	6	0.2	622	○	651	○
14	H7	14-14 mm	130	22	83	14	6	0.2	668	●	685	●
15	Optional	14.21-15.20 mm	150	22	99	16	6	0.2	623	○	652	○
15	H7	15-15 mm	150	22	99	16	6	0.2	669	●	686	●
16	Optional	15.21-16.20 mm	150	25	100	16	6	0.3	624	○	653	○
16	H7	16-16 mm	150	25	100	16	6	0.3	670	●	687	●
17	Optional	16.21-17.20 mm	150	25	99	18	8	0.3	625	○	654	○
17	H7	17-17 mm	150	25	99	18	8	0.3	671	●	688	●
18	Optional	17.21-18.20 mm	150	25	100	18	8	0.3	626	○	655	○
18	H7	18-18 mm	150	25	100	18	8	0.3	672	●	689	●
19	Optional	18.21-19.20 mm	150	25	97	20	8	0.3	627	○	656	○
19	H7	19-19 mm	150	25	97	20	8	0.3	673	●	690	●
20	Optional	19.21-20.20 mm	150	25	98	20	8	0.4	628	○	657	○
20	H7	20-20 mm	150	25	98	20	8	0.4	674	●	691	●

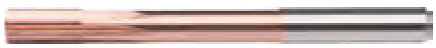
Prod. Gr. 1BK

ORION® Solid carbide TiALCN high-performance reamer

For universal use up to 1300 N/mm²

VHM | TiAlCN | H7 | HPC UNI | ≈7-8° | 0° | HA | IK

No. 11734



No. 11737

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Application:
No. 11734: for cutting H7 fit tolerances **in through holes** on modern CNC machines with steady tool and workpiece clamping up to 1300 N/mm².
No. 11737: for cutting H7 fit tolerances **in blind holes** on modern CNC machines with steady tool and workpiece clamping up to 1300 N/mm².

Advantage:
- innovative cutting geometry ensures excellent dimensional accuracy and process reliability for very high cutting parameters
- high-quality solid carbide cutting material and coating ensure a very long service life
- Internal cooling ensures optimum chip removal

Notes:
Note: Please refer to dimension table.

Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11734200-292	135	125	120											100					
11737200-288	135	125	120											100					

Ø mm	Tolerance	mm	mm	mm	h6 mm	z	Groove type f steel 1300 (mm/U)	Left-hand twist, 7-8° 11734... Ident. No.		Straight 11737... Ident. No.	
3.97	H7	75	12	35	6	6	0.3	200	●	200	●
3.98	H7	75	12	35	6	6	0.3	202	●	202	●
3.99	H7	75	12	35	6	6	0.3	204	●	204	●
4	H7	75	12	35	6	6	0.3	206	●	206	●
4.01	H7	75	12	35	6	6	0.3	208	●	208	●
4.02	H7	75	12	35	6	6	0.3	210	●	210	●
4.03	H7	75	12	35	6	6	0.3	212	●	212	●
4.97	H7	75	12	35	6	6	0.4	214	●	214	●
4.98	H7	75	12	35	6	6	0.4	216	●	216	●
4.99	H7	75	12	35	6	6	0.4	218	●	218	●
5	H7	75	12	35	6	6	0.4	220	●	220	●
5.01	H7	75	12	35	6	6	0.4	222	●	222	●
5.02	H7	75	12	35	6	6	0.4	224	●	224	●
5.03	H7	75	12	35	6	6	0.4	226	●	226	○
5.97	H7	75	12	35	6	6	0.4	228	●	228	●
5.98	H7	75	12	35	6	6	0.4	230	●	230	●
5.99	H7	75	12	35	6	6	0.4	232	●	232	●
6	H7	75	12	35	6	6	0.4	234	●	234	●
6.01	H7	75	12	35	6	6	0.4	236	●	236	●
6.02	H7	75	12	35	6	6	0.4	238	●	238	●
6.03	H7	75	12	35	6	6	0.4	240	●	240	●
7	H7	100	16	60	8	6	0.4	242	●	-	-
7.97	H7	100	16	60	8	6	0.4	244	●	242	●
7.98	H7	100	16	60	8	6	0.4	246	●	244	●
7.99	H7	100	16	60	8	6	0.4	248	●	246	●
8	H7	100	16	60	8	6	0.4	250	●	248	●
8.01	H7	100	16	60	8	6	0.4	252	●	250	●
8.02	H7	100	16	60	8	6	0.4	254	●	252	●
8.03	H7	100	16	60	8	6	0.4	256	●	254	●
9.97	H7	120	20	76	10	6	0.6	258	●	256	●
9.98	H7	120	20	76	10	6	0.6	260	●	258	●
9.99	H7	120	20	76	10	6	0.6	262	●	260	●

mm		mm	mm	mm	mm h6	z	Groove type: f steel 1300 (mm/U)	Left-hand twist, 7-8°: 11734... Ident. No.		Straight: 11737... Ident. No.	
10	H7	120	20	76	10	6	0.6	264	●	262	●
10.01	H7	120	20	76	10	6	0.6	266	●	264	●
10.02	H7	120	20	76	10	6	0.6	268	●	266	●
10.03	H7	120	20	76	10	6	0.6	270	●	268	●
11.97	H7	120	20	71	12	6	0.6	272	●	270	●
11.98	H7	120	20	71	12	6	0.6	274	●	272	●
11.99	H7	120	20	71	12	6	0.6	276	●	274	●
12	H7	120	20	71	12	6	0.6	278	●	276	●
12.01	H7	120	20	71	12	6	0.6	280	●	278	●
12.02	H7	120	20	71	12	6	0.6	282	●	280	●
12.03	H7	120	20	71	12	6	0.6	284	●	282	●
14	H7	130	22	81	14	6	0.7	286	●	-	-
16	H7	150	25	98	16	6	0.8	288	●	284	●
18	H7	150	25	98	18	6	1.0	290	●	286	●
20	H7	150	25	98	20	6	1.0	292	●	288	●

Prod. Gr. 1BL

solid carbide machine reamers H7
For demanding serial users

Application:
For cutting H7 fit tolerances on conventional machines and CNC machines.

advantage:
- universal range of diameters from 1.00 mm to 20.00 mm
- various types of reamers
- very long service life
- high cutting values can be realised
- precisely ground in accordance with DIN 1420
- more dimensions available on request

H7 VHM

ATORN® NC machine reamer, solid carbide with uniform shank (DIN Similar to 8093)

For universal use up to 1300N/mm²

VHM H7 ≈7-8° HA

Application:
For producing H7 fit tolerances in through holes on NC machines up to 1300 N/mm².

Advantage:
- good bore hole quality (dimensional tolerance, roundness, surface quality)

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Execution:
- 7-8° left-hand spiral, type B

Application No.	Steel (N/mm²) <700	Steel <1000	Steel <1300	Stainless steel marten.	Stainless steel austen.	Alu short	Alu long	Brass short	Brass long	Bronze short	Bronze long	Plastics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat. <55 HRC	Hard mat. <65 HRC
11726010-200	18	15	12	10	8	20	20	20	20	18	16	18		12	8	8	6		

mm		mm	mm	mm	mm h6	z	f steel 1300 (mm/U)	11726... Ident. No.	
1	H7	34	6	20	1	3	0.12	010	●
1.5	H7	40	8	24	2	3	0.12	015	●
1.6	H7	43	9	25	2	3	0.12	016	●
1.7	H7	43	9	25	2	4	0.12	017	●
1.8	H7	46	10	28	2	4	0.12	018	●
1.9	H7	46	10	28	2	4	0.12	019	●
2	H7	49	11	29	2	4	0.12	020	●
2.1	H7	49	11	29	2	4	0.12	021	●
2.2	H7	53	12	32	3	4	0.12	022	●
2.3	H7	53	12	32	3	4	0.12	023	●
2.4	H7	57	14	34	3	4	0.12	024	●
2.5	H7	57	14	34	3	4	0.12	025	●
2.6	H7	57	15	41	3	4	0.12	026	●
2.7	H7	57	15	41	3	4	0.12	027	●
2.8	H7	61	15	41	3	6	0.12	028	●
2.9	H7	61	15	41	3	6	0.12	029	●
3	H7	61	15	41	3	6	0.12	030	●
3.1	H7	65	16	41	4	6	0.12	031	●
3.2	H7	65	16	41	4	6	0.12	032	●
3.3	H7	65	16	41	4	6	0.12	033	●
3.4	H7	70	18	43	4	6	0.12	034	●
3.5	H7	70	18	43	4	6	0.12	035	●
3.6	H7	70	18	43	4	6	0.12	036	●
3.7	H7	70	18	43	4	6	0.12	037	●
3.8	H7	75	19	43	4	6	0.12	038	●
3.9	H7	75	19	43	4	6	0.12	039	●
4	H7	75	19	43	4	6	0.12	040	●
4.1	H7	75	19	43	4	6	0.12	041	●
4.2	H7	80	21	47	4	6	0.12	042	●
4.3	H7	80	21	47	5	6	0.12	043	●
4.4	H7	80	21	47	5	6	0.12	044	●
4.5	H7	80	21	47	5	6	0.12	045	●
4.6	H7	80	21	47	5	6	0.12	046	●
4.7	H7	80	21	47	5	6	0.12	047	●
4.8	H7	80	23	52	5	6	0.12	048	●
4.9	H7	86	23	52	5	6	0.12	049	●
5	H7	86	23	52	5	6	0.12	050	●
5.1	H7	86	23	52	5	6	0.12	051	●
5.2	H7	86	23	52	5	6	0.12	052	●
5.3	H7	93	26	57	6	6	0.12	053	●
5.4	H7	93	26	57	6	6	0.12	054	●
5.5	H7	93	26	57	6	6	0.12	055	●
5.6	H7	93	26	57	6	6	0.12	056	●
5.7	H7	93	26	57	6	6	0.12	057	●

mm		mm	mm	mm	h6 mm	z	f steel 1300 ● (mm/U)	11726... Ident. No.	
5.8	H7	93	26	57	6	6	0.12	058	●
5.9	H7	93	26	57	6	6	0.12	059	●
6	H7	93	26	57	6	6	0.12	060	●
6.1	H7	101	28	63	6	6	0.12	061	●
6.2	H7	101	28	63	6	6	0.12	062	●
6.3	H7	101	28	63	6	6	0.12	063	●
6.4	H7	101	28	63	6	6	0.12	064	●
6.5	H7	101	28	63	6	6	0.12	065	●
6.6	H7	101	28	69	6	6	0.12	066	●
6.7	H7	109	31	69	6	6	0.12	067	●
6.8	H7	109	31	69	8	6	0.12	068	●
6.9	H7	109	31	69	8	6	0.12	069	●
7	H7	109	31	69	8	6	0.12	070	●
7.1	H7	109	31	69	8	6	0.12	071	●
7.2	H7	109	31	69	8	6	0.12	072	●
7.3	H7	109	31	69	8	6	0.12	073	●
7.4	H7	109	31	69	8	6	0.12	074	●
7.5	H7	109	31	69	8	6	0.12	075	●
7.6	H7	117	33	75	8	6	0.12	076	●
7.7	H7	117	33	75	8	6	0.12	077	●
7.8	H7	117	33	75	8	6	0.12	078	●
7.9	H7	117	33	75	8	6	0.12	079	●
8	H7	117	33	75	8	6	0.15	080	●
8.1	H7	117	33	75	8	6	0.15	081	●
8.2	H7	117	33	75	8	6	0.15	082	●
8.3	H7	117	33	75	8	6	0.15	083	●

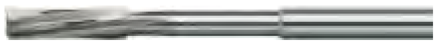
mm		mm	mm	mm	h6 mm	z	f steel 1300 ● (mm/U)	11726... Ident. No.	
8.4	H7	117	33	75	8	6	0.15	084	●
8.5	H7	117	33	75	8	6	0.15	085	●
8.6	H7	125	36	81	10	6	0.15	086	●
8.7	H7	125	36	81	10	6	0.15	087	●
8.8	H7	125	36	81	10	6	0.15	088	●
8.9	H7	125	36	81	10	6	0.15	089	●
9	H7	125	36	81	10	6	0.15	090	●
9.1	H7	125	36	81	10	6	0.15	091	●
9.2	H7	125	36	81	10	6	0.15	092	●
9.3	H7	125	36	81	10	6	0.15	093	●
9.4	H7	125	36	81	10	6	0.15	094	●
9.5	H7	125	36	81	10	6	0.15	095	○
9.6	H7	133	38	87	10	6	0.15	096	●
9.7	H7	133	38	87	10	6	0.15	097	●
9.8	H7	133	38	87	10	6	0.15	098	●
9.9	H7	133	38	87	10	6	0.15	099	●
10	H7	133	38	87	10	6	0.15	100	●
11	H7	142	41	96	10	6	0.15	110	●
12	H7	151	44	105	10	6	0.15	120	●
13	H7	151	44	105	10	8	0.15	130	●
14	H7	160	47	110	12.5	8	0.18	140	●
15	H7	162	50	112	12.5	8	0.18	150	●
16	H7	170	52	120	12.5	8	0.18	160	●
18	H7	182	56	130	14	8	0.18	180	●
20	H7	195	60	137	16	8	0.2	200	●

Prod. Gr. 117

ORION® NC machine reamer, solid carbide with uniform shank (DIN 8093)

For universal use up to 1300N/mm²

VHM | H7 | ≈7–8° | HA



Application:
For producing H7 fit tolerances in through holes on NC machines up to 1300 N/mm².

Advantage:
- good bore hole quality (dimensional tolerance, roundness, surface quality)

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Execution:
- 7-8° left-hand spiral, type B

Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11727015-160	18	15	12	10	8	20	20	20	20	18	16	18		12	8	8	6		

mm		mm	mm	mm	h6 mm	z	f steel 1300 ● (mm/U)	11727... Ident. No.	
1.5	H7	50	9	22	4	3	0.12	015	●
2	H7	50	12	22	4	4	0.12	020	●
2.5	H7	60	16	32	4	4	0.12	025	●
3	H7	64	17	36	4	6	0.12	030	●
4	H7	77	21	45	4	6	0.12	040	●
5	H7	93	26	59	6	6	0.12	050	●
6	H7	93	26	57	6	6	0.12	060	●
7	H7	109	31	69	8	6	0.12	070	●
8	H7	117	33	75	8	6	0.15	080	●
9	H7	125	36	81	10	6	0.15	090	●
10	H7	133	38	87	10	6	0.15	100	●
11	H7	142	41	96	10	6	0.15	110	●
12	H7	151	44	105	12	6	0.15	120	●
13	H7	160	44	114	14	6	0.15	130	●
14	H7	160	47	110	14	6	0.15	140	●
15	H7	170	50	120	16	6	0.18	150	●
16	H7	170	50	120	16	6	0.18	160	●

Prod. Gr. 104

ATORN® Solid carbide NC machine reamer (DIN Similar to 8093)

For universal use up to 1300 N/mm²

VHM | H7 | ≈7–8° | HA

Application:
For producing H7 fit tolerances in through holes on an NC machine in material groups up to 1300 N/mm².

Execution:
- 7-8° left-hand spiral and variable pitch, cemented carbide quality K10

Advantage:
- good bore hole quality (dimensional tolerance, roundness, surface quality)

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Application No.	Steel (N/mm²) <700	Steel <1000	Steel <1300	Stainless steel marten.	Stainless steel austen.	Alu short	Alu long	Brass short	Brass long	Bronze short	Bronze long	Plastics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat. <55 HRC	Hard mat. <65 HRC
11770020-120	18	15	12	10	8	20	20	20	20	18	16	18		12	8	8	6		

mm		mm	mm	mm	z	f steel 1300 (mm/U)	11770... Ident. No.	
2	H7	49	11	2	4	0.12	020	●
3	H7	61	20	3	6	0.12	030	●
4	H7	75	22	4	6	0.12	040	●
5	H7	86	28	5	6	0.12	050	●
6	H7	93	30	5.6	6	0.12	060	●
7	H7	109	30	7.1	6	0.12	070	●
8	H7	117	32	8	6	0.12	080	●
9	H7	125	36	9	6	0.12	090	○
10	H7	133	38	10	6	0.15	100	●
11	H7	142	41	10	6	0.15	110	●
12	H7	151	44	10	6	0.15	120	●

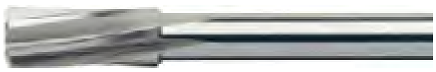
Prod. Gr. 117

ATORN® Solid carbide automatic precision machine reamers (DIN Similar to 8089)

For universal use up to 1300 N/mm²

VHM | H7 | 0° | ≈7–8° | HA

Ident. No. 330–500



Ident. No. 630–800

Application:
Ident. No. 330–500: For cutting H7 fit tolerances **in through holes** on automated machines and NC machines up to 1300 N/mm².
Ident. No. 630–800: For cutting H7 fit tolerances **in through holes** on automated machines and NC machines up to 1300 N/mm².

Execution:
- **Ident. No. 330–500:** straight-grooved and extremely variable pitch, **type A**
- **Ident. No. 630–800:** 7-8° left-hand spiral and extremely variable pitch, **type B**

Advantage:
- good bore hole quality (dimensional tolerance, roundness, surface quality)
- short design ensures good accessibility in cramped spaces and stable cutting conditions

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Application No.	Steel (N/mm²) <700	Steel <1000	Steel <1300	Stainless steel marten.	Stainless steel austen.	Alu short	Alu long	Brass short	Brass long	Bronze short	Bronze long	Plastics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat. <55 HRC	Hard mat. <65 HRC
11772330-500	18	15	12	10	8	20	20	20	20	18	16	18		12	8	8	6		
11772630-800	18	15	12	10	8	20	20	20	20	18	16	18		12	8	8	6		

						Groove type	Straight		Left-hand twist, 7-8°	
mm		mm	mm	mm	z	f steel 1300 (mm/U)	11772... Ident. No.		11772... Ident. No.	
3	H7	56	20	2.5	6	0.15	330	●	630	●
4	H7	56	20	3.6	6	0.15	340	●	640	●
5	H7	63	22	4	6	0.15	350	●	650	●
6	H7	63	22	5	6	0.15	360	●	660	●
7	H7	71	25	6.3	6	0.15	370	●	670	●
8	H7	71	25	6.3	6	0.15	380	●	680	●
9	H7	71	25	8	6	0.15	390	●	690	●
10	H7	71	25	8	6	0.2	400	●	700	●
12	H7	80	28	10	6	0.2	420	●	720	●
14	H7	90	32	12.5	8	0.2	440	●	740	●
16	H7	90	32	12.5	8	0.2	460	●	760	●
18	H7	100	36	16	8	0.25	480	●	780	●
20	H7	100	36	16	8	0.25	500	●	800	○

Prod. Gr. 117

solid carbide machine reamers 1/100 mm
For demanding serial users

application:
for cutting high-precision fit tolerances (0/+0.003 mm) on conventional machines and CNC machines.

advantage:
- covers a wide range of tolerances
- manufacture of special reamers not required
- in stock
- high cutting values can be realised
- universal range of diameters from 0.90 mm to 12.03 mm
- tight tolerance for high precision (0/+0.003 mm)
- very long service life through high-quality cemented carbide cutting material

0,001 | VHM

ATORN® NC machine reamer, solid carbide with uniform shank (DIN Similar to 8093)

For universal use up to 1300N/mm²

VHM | 0,001 | ≈7–8° | HA

Application:
for producing fit tolerances (tolerance = 0/+0.003 mm) in through holes on NC machines up to 1300 N/mm².

Execution:
- 7–8° left-hand spiral, type B

Advantage:
- good bore hole quality (dimensional tolerance, roundness, surface quality)

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Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11730	18	15	12	10	8	20	20	20	20	18	16	18		12	8	8	6		

mm		mm	mm	mm	mm h6	z	f steel 1300 ● (mm/U)	11730... Ident. No.	
0.9	0 / +0,003 mm	34	6	20	1	3	0.12	090	●
1	0 / +0,003 mm	34	6	20	1	3	0.12	100	●
1.01	0 / +0,003 mm	34	6	20	1	3	0.12	101	○
1.02	0 / +0,003 mm	34	6	20	1	3	0.12	102	●
1.03	0 / +0,003 mm	34	6	20	1	3	0.12	103	●
1.48	0 / +0,003 mm	40	8	24	2	3	0.12	148	●
1.49	0 / +0,003 mm	40	8	24	2	3	0.12	149	●
1.5	0 / +0,003 mm	40	8	24	2	2	0.12	150	●
1.51	0 / +0,003 mm	43	9	25	2	3	0.12	151	●
1.52	0 / +0,003 mm	43	9	25	2	3	0.12	152	●
1.53	0 / +0,003 mm	43	9	25	2	3	0.12	153	●
1.98	0 / +0,003 mm	49	11	29	2	4	0.12	198	●
1.99	0 / +0,003 mm	49	11	29	2	4	0.12	199	●
2	0 / +0,003 mm	49	11	29	2	4	0.12	200	●
2.01	0 / +0,003 mm	49	11	29	2	4	0.12	201	●
2.02	0 / +0,003 mm	49	11	29	2	4	0.12	202	●
2.03	0 / +0,003 mm	49	11	29	2	4	0.12	203	●
2.97	0 / +0,003 mm	61	15	41	3	4	0.12	297	●
2.98	0 / +0,003 mm	61	15	41	3	6	0.12	298	●
2.99	0 / +0,003 mm	61	15	41	3	6	0.12	299	●
3	0 / +0,003 mm	61	15	41	3	6	0.12	300	●
3.01	0 / +0,003 mm	61	15	41	3	6	0.12	301	●
3.02	0 / +0,003 mm	61	15	41	3	6	0.12	302	●
3.03	0 / +0,003 mm	61	15	41	3	6	0.12	303	●
3.97	0 / +0,003 mm	75	19	43	4	4	0.12	397	●
3.98	0 / +0,003 mm	75	19	43	4	6	0.12	398	●
3.99	0 / +0,003 mm	75	19	43	4	6	0.12	399	●
4	0 / +0,003 mm	75	19	43	4	6	0.15	400	●
4.01	0 / +0,003 mm	75	19	43	4	6	0.15	401	●
4.02	0 / +0,003 mm	75	19	43	4	6	0.15	402	●
4.03	0 / +0,003 mm	75	19	43	4	6	0.15	403	●
4.97	0 / +0,003 mm	86	23	52	5	6	0.15	497	●
4.98	0 / +0,003 mm	86	23	52	5	6	0.15	498	●
4.99	0 / +0,003 mm	86	23	52	5	6	0.15	499	●
5	0 / +0,003 mm	86	23	52	5	6	0.15	500	●
5.01	0 / +0,003 mm	86	23	52	5	6	0.15	501	●
5.02	0 / +0,003 mm	86	23	52	5	6	0.15	502	●
5.03	0 / +0,003 mm	86	23	52	5	6	0.15	503	●

mm		mm	mm	mm	mm h6	z	f steel 1300 ● (mm/U)	11730... Ident. No.	
5.98	0 / +0,003 mm	93	26	57	6	6	0.15	598	●
5.99	0 / +0,003 mm	93	26	57	6	6	0.15	599	●
6	0 / +0,003 mm	93	26	57	6	6	0.15	600	●
6.01	0 / +0,003 mm	101	28	63	6	6	0.15	601	●
6.02	0 / +0,003 mm	101	28	63	6	6	0.15	602	●
6.03	0 / +0,003 mm	101	28	63	6	6	0.15	603	●
6.98	0 / +0,003 mm	109	31	69	8	6	0.15	698	●
6.99	0 / +0,003 mm	109	31	69	8	6	0.15	699	●
7	0 / +0,003 mm	109	31	69	8	6	0.15	700	●
7.01	0 / +0,003 mm	109	31	69	8	6	0.15	701	●
7.02	0 / +0,003 mm	109	31	69	8	6	0.15	702	●
7.03	0 / +0,003 mm	109	31	69	8	6	0.15	703	●
7.97	0 / +0,003 mm	117	33	75	8	6	0.15	797	●
7.98	0 / +0,003 mm	117	33	75	8	6	0.15	798	●
7.99	0 / +0,003 mm	117	33	75	8	6	0.15	799	●
8	0 / +0,003 mm	117	33	75	8	6	0.15	800	●
8.01	0 / +0,003 mm	117	33	75	8	6	0.15	801	●
8.02	0 / +0,003 mm	117	33	75	8	6	0.15	802	●
8.03	0 / +0,003 mm	117	33	75	8	6	0.15	803	●
8.98	0 / +0,003 mm	125	36	81	10	6	0.15	898	○
8.99	0 / +0,003 mm	125	36	81	10	6	0.15	899	●
9	0 / +0,003 mm	125	36	81	10	6	0.15	900	○
9.01	0 / +0,003 mm	125	36	81	10	6	0.15	901	●
9.02	0 / +0,003 mm	125	36	81	10	6	0.15	902	●
9.03	0 / +0,003 mm	125	36	81	10	6	0.15	903	●
9.97	0 / +0,003 mm	133	38	87	10	6	0.15	997	●
9.98	0 / +0,003 mm	133	38	87	10	6	0.15	998	●
9.99	0 / +0,003 mm	133	38	87	10	6	0.15	009	●
10	0 / +0,003 mm	133	38	87	10	6	0.15	010	●
10.01	0 / +0,003 mm	133	38	87	10	6	0.15	011	●
10.02	0 / +0,003 mm	133	38	87	10	6	0.15	012	●
10.03	0 / +0,003 mm	133	38	87	10	6	0.15	013	●
11.98	0 / +0,003 mm	151	44	105	10	6	0.15	014	●
11.99	0 / +0,003 mm	151	44	105	10	6	0.15	015	●
12	0 / +0,003 mm	151	44	105	10	6	0.15	016	●
12.01	0 / +0,003 mm	151	44	105	10	6	0.15	017	●
12.02	0 / +0,003 mm	151	44	105	10	6	0.15	018	●
12.03	0 / +0,003 mm	151	44	105	10	6	0.15	019	●

Prod. Gr. 117

HSSE machine reamers H7

Application:
For cutting H7 fit tolerances on conventional machines and CNC machines.

advantage:

- universal range of diameters from 1.00 mm to 40.00 mm
- various types of reamers
- very long service life
- precisely ground in accordance with DIN 1420
- coated versions for higher cutting values
- more dimensions available on request

H7 HSSE

ATORN® ORION® HSSE NC machine reamers (DIN 212)

For universal use up to 1000 N/mm²

HSSE H7 ≈7-8° HA

No. 11628 028–11638 200

p. 134 p. 62 p. 703 p. 168

Application:
for cutting H7 fit tolerances in through holes and blind holes on NC machines or conventional machines up to 1000 N/mm².

Execution:

- **No. 11628 010–11628 027:** 7-8° left-hand spiral, **type B, with centring points on both sides** and continuous shank
- **No. 11628 028–11628 200:** 7-8° left-hand spiral, **type D, with centring hole** and offset shank
- **No. 11638:** 7-8° left-hand spiral, **type D, with centring hole** and offset shank

Advantage:

- good bore hole quality (dimensional tolerance, roundness, surface quality)

Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11628010-027	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		
11628028-200	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		

mm		mm	mm	mm	mm		Surface f steel 1000 ● (mm/U)	ATORN Uncoated 11628... Ident. No.		ORION Uncoated 11638... Ident. No.	
1	H7	34	5.5	15	1	3	0.1	010	●	-	-
1.1	H7	36	6.5	15.5	1	3	0.1	011	●	-	-
1.2	H7	38	8	16.5	1	3	0.1	012	●	-	-
1.3	H7	38	8	16.5	1	3	0.1	013	●	-	-
1.4	H7	40	8	18	2	3	0.1	014	●	-	-
1.5	H7	40	8	18	2	3	0.1	015	●	-	-
1.6	H7	43	9	20	2	3	0.1	016	●	-	-
1.7	H7	43	9	20	2	3	0.1	017	●	-	-
1.8	H7	46	10	22	2	4	0.1	018	●	-	-
1.9	H7	46	10	22	2	4	0.1	019	●	-	-
2	H7	49	11	24	2	4	0.1	020	●	-	-
2.1	H7	49	11	24	2	4	0.1	021	●	-	-
2.2	H7	53	12	25	3	4	0.1	022	●	-	-
2.3	H7	53	12	25	3	4	0.1	023	●	-	-
2.4	H7	57	14	29	3	4	0.1	024	●	-	-
2.5	H7	57	14	29	3	4	0.1	025	●	-	-
2.6	H7	57	14	29	3	4	0.1	026	●	-	-
2.7	H7	61	15	33	3	4	0.1	027	●	-	-
2.8	H7	61	15	33	3	6	0.1	028	●	-	-
2.9	H7	61	15	33	3	6	0.1	029	●	-	-
3	H7	61	15	33	3	6	0.1	030	●	030	●
3.1	H7	65	16	37	4	6	0.1	031	●	-	-
3.2	H7	65	16	37	4	6	0.1	032	●	-	-
3.3	H7	65	16	37	4	6	0.1	033	●	-	-
3.4	H7	70	18	42	4	6	0.1	034	●	-	-
3.5	H7	70	18	42	4	6	0.1	035	●	035	●
3.6	H7	70	18	42	4	6	0.1	036	●	-	-
3.7	H7	70	18	42	4	6	0.1	037	●	-	-
3.8	H7	75	19	47	4	6	0.1	038	●	-	-
3.9	H7	75	19	47	4	6	0.1	039	●	-	-
4	H7	75	19	47	4	6	0.1	040	●	040	●
4.1	H7	75	19	47	4	6	0.1	041	●	-	-
4.2	H7	75	19	47	4	6	0.1	042	●	-	-
4.3	H7	80	21	52	5	6	0.1	043	●	-	-
4.4	H7	80	21	52	5	6	0.1	044	●	-	-
4.5	H7	80	21	52	5	6	0.1	045	●	045	●
4.6	H7	80	21	52	5	6	0.1	046	●	-	-
4.7	H7	80	21	52	5	6	0.1	047	●	-	-
4.8	H7	86	23	58	5	6	0.1	048	●	-	-
4.9	H7	86	23	58	5	6	0.1	049	●	-	-

mm		mm	mm	mm	mm		Surface f steel 1000 ● (mm/U)	ATORN Uncoated 11628... Ident. No.		ORION Uncoated 11638... Ident. No.	
5	H7	86	23	58	5	6	0.1	050	●	050	●
5.1	H7	86	23	58	5	6	0.1	051	●	-	-
5.2	H7	86	23	58	5	6	0.1	052	●	-	-
5.3	H7	86	23	58	5	6	0.1	053	●	-	-
5.4	H7	93	26	57	6	6	0.1	054	●	-	-
5.5	H7	93	26	57	6	6	0.1	055	●	055	●
5.6	H7	93	26	57	6	6	0.1	056	●	-	-
5.7	H7	93	26	57	6	6	0.1	057	●	-	-
5.8	H7	93	26	57	6	6	0.1	058	●	-	-
5.9	H7	93	26	57	6	6	0.1	059	●	-	-
6	H7	93	26	57	6	6	0.1	060	●	060	●
6.1	H7	101	28	65	6	6	0.1	061	●	-	-
6.2	H7	101	28	65	6	6	0.1	062	●	-	-
6.3	H7	101	28	65	6	6	0.1	063	●	-	-
6.4	H7	101	28	65	6	6	0.1	064	●	-	-
6.5	H7	101	28	65	6	6	0.1	065	●	065	●
6.6	H7	101	28	65	6	6	0.1	066	●	-	-
6.7	H7	101	28	65	6	6	0.1	067	●	-	-
6.8	H7	109	31	73	8	6	0.1	068	●	-	-
6.9	H7	109	31	73	8	6	0.1	069	●	-	-
7	H7	109	31	73	8	6	0.1	070	●	070	●
7.1	H7	109	31	73	8	6	0.1	071	●	-	-
7.2	H7	109	31	73	8	6	0.1	072	●	-	-
7.3	H7	109	31	73	8	6	0.1	073	●	-	-
7.4	H7	109	31	73	8	6	0.1	074	●	-	-
7.5	H7	109	31	73	8	6	0.1	075	●	075	●
7.6	H7	117	33	81	8	6	0.1	076	●	-	-
7.7	H7	117	33	81	8	6	0.1	077	●	-	-
7.8	H7	117	33	81	8	6	0.1	078	●	-	-
7.9	H7	117	33	81	8	6	0.1	079	●	-	-
8	H7	117	33	81	8	6	0.1	080	●	080	●
8.1	H7	117	33	81	8	6	0.13	081	●	-	-
8.2	H7	117	33	81	8	6	0.13	082	●	-	-
8.3	H7	117	33	81	8	6	0.13	083	●	-	-
8.4	H7	117	33	81	8	6	0.13	084	●	-	-
8.5	H7	117	33	81	8	6	0.13	085	●	085	●
8.6	H7	125	36	85	10	6	0.13	086	○	-	-
8.7	H7	125	36	85	10	6	0.13	087	●	-	-
8.8	H7	125	36	85	10	6	0.13	088	●	-	-
8.9	H7	125	36	85	10	6	0.13	089	●	-	-

mm		mm	mm	mm	h6 mm	z	Surface f steel 1000 ● (mm/U)	ATORN Uncoated 11628... Ident. No.		ORION Uncoated 11638... Ident. No.	
9	H7	125	36	85	10	6	0.13	090	●	090	●
9.1	H7	125	36	85	10	6	0.13	091	●	-	-
9.2	H7	125	36	85	10	6	0.13	092	●	-	-
9.3	H7	125	36	85	10	6	0.13	093	●	-	-
9.4	H7	125	36	85	10	6	0.13	094	●	-	-
9.5	H7	125	36	85	10	6	0.13	095	●	095	●
9.6	H7	133	38	93	10	6	0.13	096	●	-	-
9.7	H7	133	38	93	10	6	0.13	097	●	-	-
9.8	H7	133	38	93	10	6	0.13	098	●	-	-
9.9	H7	133	38	93	10	6	0.13	099	●	-	-

mm		mm	mm	mm	h6 mm	z	Surface f steel 1000 ● (mm/U)	ATORN Uncoated 11628... Ident. No.		ORION Uncoated 11638... Ident. No.	
10	H7	133	38	93	10	6	0.15	100	●	100	●
11	H7	142	41	102	10	6	0.15	110	●	110	●
12	H7	151	44	111	10	6	0.15	120	●	120	●
13	H7	151	44	111	10	8	0.15	130	●	130	●
14	H7	160	47	115	14	8	0.15	140	●	140	●
15	H7	162	50	117	14	8	0.2	150	●	150	●
16	H7	170	52	125	14	8	0.2	160	●	160	●
17	H7	175	54	130	14	8	0.2	170	●	170	●
18	H7	182	56	137	14	8	0.2	180	●	180	●
20	H7	195	60	147	16	8	0.25	200	●	200	●

ORION = Prod. Gr. 104
ATORN® = Prod. Gr. 117

ATORN® ORION® HSSE machine reamers (DIN 212)

For universal use up to 1000 N/mm²

HSSE | H7 | 0° | ≈7–8° | HA

Application:
No. 11630–11633: for cutting H7 fit tolerances in blind holes on conventional machines and NC machines up to 1000 N/mm².
No. 11634: for producing H7 fit tolerances in through holes on conventional machines and NC machines up to 1000 N/mm².

Execution:
- **No. 11630 010–11630 025, 11633 015–11633 025:** straight design, type A, with continuous shank and lathe centre on both sides
- **No. 11630 030–11630 200, 11633 030–11633 160:** straight design, type C, with reduced shank and centring hole on both sides
- **No. 11634 015–11634 025:** 7-8° left-hand spiral, type B, with continuous shank and centring point on both sides
- **No. 11634 030–11634 200:** 7-8° left-hand spiral, type D, with reduced shank and centring hole on both sides

Advantage:
- good bore hole quality (dimensional tolerance, roundness, surface quality)


No. 11630


No. 11633


No. 11634

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Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11630010-025	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		
11630030-200	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		
11633015-025	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		
11633030-160	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		
11634015-025	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		
11634030-200	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		

mm		mm	mm	mm	h6 mm	z	Groove type / f steel 1000 ● (mm/U)	ATORN Straight 11630... Ident. No.		ORION Straight 11633... Ident. No.		ORION Left-hand twist, 7-8° 11634... Ident. No.	
1	H7	34	6	15	1	3	0.1	010	●	-	-	-	-
1.5	H7	40	8	18	1.5	3	0.1	015	●	015	●	015	●
2	H7	49	11	24	2	4	0.1	020	●	020	●	020	●
2.5	H7	57	14	29	2.5	4	0.1	025	●	025	●	025	●
3	H7	61	15	33	3	6	0.1	030	●	030	●	030	●
3.5	H7	70	18	42	3.5	6	0.1	-	-	035	●	035	●
4	H7	75	19	47	4	6	0.1	040	●	040	●	040	●
4.5	H7	80	21	52	4.5	6	0.1	-	-	045	●	045	●
5	H7	86	23	58	5	6	0.1	050	●	050	●	050	●
6	H7	93	26	57	5.6	6	0.1	060	●	060	●	060	●
7	H7	109	31	73	7.1	6	0.1	070	●	070	●	070	●
8	H7	117	33	81	8	6	0.15	080	●	080	●	080	●
9	H7	125	36	85	9	6	0.15	090	●	090	●	090	●
10	H7	133	38	93	10	6	0.15	100	●	100	●	100	●
11	H7	142	41	102	10	6	0.15	-	-	110	●	110	●
12	H7	151	44	111	10	6	0.15	120	●	120	●	120	●
13	H7	151	44	111	10	6	0.15	130	○	130	●	130	●
14	H7	160	47	115	12.5	8	0.15	140	●	140	●	140	●
15	H7	162	50	117	12.5	8	0.15	150	○	150	●	150	●
16	H7	170	52	125	12.5	8	0.2	160	●	160	●	160	●
17	H7	175	54	130	14	8	0.2	170	○	-	-	-	-
18	H7	182	56	137	14	8	0.2	180	○	-	-	180	●
20	H7	195	60	147	16	8	0.25	200	○	-	-	200	●

ORION = Prod. Gr. 104
ATORN® = Prod. Gr. 117

ATORN® HSSE automated machine reamer (DIN 8089)

For universal use up to 1000N/mm²

HSSE | H7 | ≈7-8° | HA

Application:
For producing H7 fit tolerances in through holes on automated machines and NC machines up to 1000 N/mm².

Execution:
- 7-8° left-hand spiral, short design for automated machining

Advantage:
- short design ensures good accessibility in cramped spaces and stable cutting conditions
- good bore hole quality (dimensional tolerance, roundness, surface quality)

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Application No.	Steel (N/mm²) <700	Steel <1000	Steel <1300	Stainless steel marten.	Stainless steel austen.	Alu short	Alu long	Brass short	Brass long	Bronze short	Bronze long	Plastics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat. <55 HRC	Hard mat. <65 HRC
11626040-200	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		

mm		mm	mm	mm h6	z	f steel 1000 (mm/U)	11626... Ident. No.	
4	H7	56	20	3.55	6	0.1	040	●
5	H7	63	22	4	6	0.1	050	●
6	H7	63	22	5	6	0.15	060	●
8	H7	71	25	6.3	6	0.15	080	●
10	H7	71	25	8	6	0.15	100	●
11	H7	80	28	10	6	0.15	110	●
12	H7	80	28	10	6	0.15	120	●
14	H7	90	32	12.5	8	0.15	140	●
15	H7	90	32	12.5	8	0.2	150	●
16	H7	90	32	12.5	8	0.2	160	●
18	H7	100	36	16	8	0.2	180	●
20	H7	100	36	16	8	0.25	200	●

Prod. Gr. 117

ATORN® HSSE machine reamer, extra-long (DIN Similar to 212)

For universal use up to 1000N/mm²

HSSE | H7 | HA | 10°

Application:
For producing H7 fit tolerances in deep-set through holes up to 1000 N/mm².

Execution:
- 10° left-hand spiral, long design

Advantage:
- good bore hole quality (dimensional tolerance, roundness, surface quality)
- long design ensures good accessibility for deep-set or difficult-to-reach drill holes

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Application No.	Steel (N/mm²) <700	Steel <1000	Steel <1300	Stainless steel marten.	Stainless steel austen.	Alu short	Alu long	Brass short	Brass long	Bronze short	Bronze long	Plastics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat. <55 HRC	Hard mat. <65 HRC
11627020-120	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		

mm		mm	mm	mm	mm h6	z	f steel 1000 (mm/U)	11627... Ident. No.	
2	H7	65	14	45	2	6	0.1	020	●
2	H7	80	20	60	2	6	0.1	025	●
3	H7	90	14	70	3	6	0.1	030	●
3	H7	120	30	100	3	6	0.1	035	●
4	H7	105	16	80	4	6	0.1	040	●
4	H7	160	30	135	4	6	0.1	045	●
5	H7	115	16	90	5	6	0.1	050	●
5	H7	200	30	175	5	6	0.1	055	●
6	H7	130	16	100	6	6	0.1	060	●
6	H7	250	35	220	6	6	0.1	065	●
8	H7	160	18	130	8	6	0.1	080	●
8	H7	250	35	220	8	6	0.13	085	●
10	H7	190	20	150	10	6	0.13	100	●
10	H7	250	35	220	10	6	0.15	105	●
12	H7	210	20	160	12	6	0.15	120	●

Prod. Gr. 117

ORION® HSSE machine bottoming reamer

For universal use up to 1000 N/mm²

HSSE | H7 | 0° | HA

Application:
for cutting H7 fit tolerances with precisely defined drill spacings (tolerance of pre-drilling counterbalanced) on conventional machines and NC machine up to 1000 N/mm². the face cut overcomes the eccentricity between the bore and tool axis and does not follow the pilot hole.

Execution:
- straight-grooved, teeth around the circumference with circular grinding chamfer to the duct

Advantage:
- good bore hole quality (dimensional tolerance, roundness, surface quality)
- a groove is inserted for each to improve the supply of coolant

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Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11646030-120	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		

mm		mm	mm	mm	mm h6	z	Length of milled slots (mm)	f steel 1000 ● (mm/U)	11646... Ident. No.	
3	H7	61	12	33	3	4	21	0.1	030	●
4	H7	75	16	44	4	6	28	0.1	040	●
5	H7	86	20	53	5	6	33	0.1	050	●
6	H7	93	20	59	6	6	39	0.1	060	●
7	H7	109	22	69	7	6	47	0.15	070	●
8	H7	117	24	71	8	6	47	0.15	080	●
9	H7	125	24	77	9	6	53	0.15	090	●
10	H7	133	26	84	10	6	58	0.15	100	●
11	H7	142	26	89	11	6	63	0.15	110	●
12	H7	151	26	96	12	6	70	0.2	120	●

Prod. Gr. 104

ATORN® ORION® HSSE machine reamers (DIN 208)

For universal use up to 1000 N/mm²

HSSE | H7 | ≈7-8° | 0° | MK

Application:
No. 11636 030–11636 320, 11642 030–11642 400: for producing H7 fit tolerances in through holes on conventional machines and NC machines up to 1000 N/mm².
No. 11641: for cutting H7 fit tolerances in blind holes on conventional machines and NC machines up to 1000 N/mm².

Execution:
- **No. 11636 030–11636 320, 11642 030–11642 400:** 7-8° left-hand spiral, type B
- **No. 11641:** straight version

Advantage:
- good bore hole quality (dimensional tolerance, roundness, surface quality)

No. 11636

No. 11641

No. 11642

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Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11636030-320	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		
11641050-300	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		
11642030-400	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		

								ATORN®		ORION®			
							Groove type	Left-hand twist, 7-8°		Left-hand twist, 7-8°		Straight	
mm		mm	mm	mm		z	f steel 1000 ● (mm/U)	11636... Ident. No.		11642... Ident. No.		11641... Ident. No.	
3	H7	112	15	49.5	MK 1	6	0.1	030	●	030	●	-	-
4	H7	125	19	59.5	MK 1	6	0.1	040	●	040	●	-	-
5	H7	133	23	67.5	MK 1	6	0.1	050	●	050	●	050	●
6	H7	138	26	72.5	MK 1	6	0.1	060	●	060	●	060	●
7	H7	150	31	84.5	MK 1	6	0.1	070	●	070	●	-	-
8	H7	156	33	90.5	MK 1	6	0.1	080	●	080	●	080	●
9	H7	162	36	96.5	MK 1	6	0.1	-	-	090	●	090	●
10	H7	168	38	102.5	MK 1	6	0.13	100	●	100	●	100	●
11	H7	175	41	109.5	MK 1	6	0.15	110	●	110	●	110	●
12	H7	182	44	116.5	MK 1	6	0.15	120	●	120	●	120	●
13	H7	182	44	116.5	MK 1	8	0.15	130	●	130	●	130	●
14	H7	189	47	123.5	MK 1	8	0.15	140	●	140	●	140	●
15	H7	204	50	124	MK 2	8	0.15	150	●	150	●	150	●
16	H7	210	52	130	MK 2	8	0.2	160	●	160	●	160	●
17	H7	214	54	134	MK 2	8	0.2	170	●	170	●	170	●
18	H7	219	56	139	MK 2	8	0.2	180	●	180	●	180	●
19	H7	223	58	143	MK 2	8	0.2	190	●	190	●	190	●
20	H7	228	60	148	MK 2	8	0.2	200	●	200	●	200	●

								ATORN		ORION			
							Groove type	Left-hand twist, 7-8°		Left-hand twist, 7-8°		Straight	
mm		mm	mm	mm		z	f steel 1000 (mm/U)	11636... Ident. No.		11642... Ident. No.		11641... Ident. No.	
21	H7	232	62	152	MK 2	8	0.2	-	-	210	●	210	●
22	H7	237	64	157	MK 2	8	0.2	220	●	220	●	220	●
23	H7	241	66	161	MK 2	8	0.25	-	-	230	●	230	●
24	H7	268	68	169	MK 3	8	0.25	240	●	240	●	240	●
25	H7	268	68	169	MK 3	10	0.25	250	●	250	●	250	●
26	H7	273	70	174	MK 3	10	0.25	260	●	260	●	260	●
27	H7	277	71	178	MK 3	10	0.25	-	-	270	●	-	-
28	H7	277	71	178	MK 3	10	0.25	280	●	280	●	280	●
29	H7	281	73	182	MK 3	10	0.25	-	-	290	●	-	-
30	H7	281	73	182	MK 3	10	0.25	300	●	300	●	300	●
32	H7	317	77	193	MK 4	12	0.3	320	●	320	●	-	-
34	H7	321	78	197	MK 4	12	0.3	-	-	340	●	-	-
35	H7	321	78	197	MK 4	12	0.3	-	-	350	●	-	-
36	H7	325	79	201	MK 4	12	0.3	-	-	360	●	-	-
38	H7	329	81	205	MK 4	12	0.3	-	-	380	●	-	-
40	H7	329	81	205	MK 4	12	0.3	-	-	400	●	-	-

ORION = Prod. Gr. 104
ATORN® = Prod. Gr. 117

ATORN® HSSE machine reamer, extra-long (DIN Similar to 208)

For universal use up to 1000N/mm²

HSSE | H7 | MK | 10°

Application:
for producing H7 fit tolerances in deep-set or difficult-to-reach through holes on conventional machines and NC machines up to 1000 N/mm².

Execution:
- 10° left-hand spiral, type B, long design

Advantage:
- good bore hole quality (dimensional tolerance, roundness, surface quality)
- long design ensures good accessibility for deep-set or difficult-to-reach drill holes

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Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11643125-300	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		

mm		mm	mm	mm		z	f steel 1000 (mm/U)	11643... Ident. No.	
12	H7	315	40	250	MK 1	6	0.15	125	●
14	H7	245	22	180	MK 1	8	0.15	140	●
14	H7	315	40	250	MK 1	8	0.15	145	●
15	H7	260	22	180	MK 2	8	0.15	150	●
16	H7	260	25	180	MK 2	8	0.15	160	●
16	H7	350	45	270	MK 2	8	0.15	165	●
18	H7	260	25	180	MK 2	8	0.2	180	●
18	H7	350	45	270	MK 2	8	0.2	185	○
20	H7	270	28	190	MK 2	8	0.2	200	●
20	H7	350	45	270	MK 2	8	0.25	205	●
22	H7	280	28	200	MK 2	8	0.25	220	○
24	H7	300	32	200	MK 3	8	0.25	240	●
25	H7	320	32	220	MK 3	8	0.25	250	●
26	H7	330	32	236	MK 3	10	0.25	260	●
30	H7	350	36	250	MK 3	10	0.25	300	●

Prod. Gr. 117

HSSE machine reamers 1/100 mm

application:
for cutting high-precision fit tolerances (0/+0.003 mm) on conventional machines and CNC machines.

advantage:
- covers a wide range of tolerances
- manufacture of special reamers not required
- in stock
- universal range of diameters from 0.90 mm to 12.03 mm
- tight tolerance for high precision (0/+0.003 mm)
- cheaper alternative to solid carbide tools

0,001 | HSSE

ATORN® NC machine reamer 1/100 mm HSSE with universal shaft (DIN Similar to 212)

For universal use up to 1000N/mm²

HSSE | 0,001 | ≈7-8° | HA

Ident. No. 009–019, 247–998

Ident. No. 100–203

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Application:
for producing fit tolerances in through holes (tolerance=0/+0.003 mm) on NC machines or conventional machines up to 1000 N/mm².

Execution:
- **Ident. No. 009–019, 247–998:** 7-8° left-hand spiral, **type D, with centring hole** and offset shank
- **Ident. No. 100–203:** 7-8° left-hand spiral, **type B, with centring points on both sides** and continuous shank

Advantage:
- good bore hole quality (dimensional tolerance, roundness, surface quality)

Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plastics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11624298-019	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		
11624100-203	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		

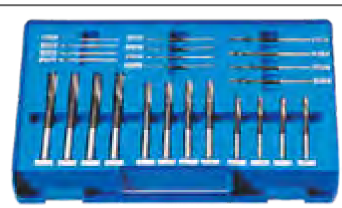
mm		mm	mm	mm	mm (h6)	z	Surface f steel 1000 (mm/U)	Uncoated 11624... Ident. No.	
1	0 / +0,003 mm	34	5.5	15	1	3	0.08	100	●
1.01	0 / +0,003 mm	34	5.5	15	1	3	0.08	101	●
1.02	0 / +0,003 mm	34	5.5	15	1	3	0.08	102	●
1.03	0 / +0,003 mm	34	5.5	15	1	3	0.08	103	●
1.5	0 / +0,003 mm	40	8	18	2	3	0.08	150	●
1.51	0 / +0,003 mm	43	9	20	2	4	0.09	151	●
1.52	0 / +0,003 mm	43	9	20	2	4	0.09	152	●
1.53	0 / +0,003 mm	43	9	20	2	4	0.09	153	●
1.97	0 / +0,003 mm	49	11	24	2	4	0.09	197	●
1.98	0 / +0,003 mm	49	11	24	2	4	0.09	198	●
1.99	0 / +0,003 mm	49	11	24	2	4	0.09	199	●
2	0 / +0,003 mm	49	11	24	2	4	0.09	200	●
2.01	0 / +0,003 mm	49	11	24	2	4	0.09	201	●
2.02	0 / +0,003 mm	49	11	24	2	4	0.09	202	●
2.03	0 / +0,003 mm	49	11	24	2	4	0.09	203	●
2.47	0 / +0,003 mm	57	14	29	3	6	0.1	247	●
2.48	0 / +0,003 mm	57	14	29	3	6	0.1	248	●
2.49	0 / +0,003 mm	57	14	29	3	6	0.1	249	●
2.51	0 / +0,003 mm	57	14	29	3	6	0.1	251	●
2.52	0 / +0,003 mm	57	14	29	3	6	0.1	252	●
2.53	0 / +0,003 mm	57	14	29	3	6	0.1	253	●
2.97	0 / +0,003 mm	61	15	33	3	6	0.1	297	●
2.98	0 / +0,003 mm	61	15	33	3	6	0.1	298	●
2.99	0 / +0,003 mm	61	15	33	3	6	0.1	299	●
3	0 / +0,003 mm	61	15	33	3	6	0.1	300	●
3.01	0 / +0,003 mm	61	15	37	3	6	0.1	301	●
3.02	0 / +0,003 mm	61	15	37	3	6	0.1	302	●
3.03	0 / +0,003 mm	61	15	37	3	6	0.1	303	●
3.97	0 / +0,003 mm	75	19	47	4	6	0.1	397	●
3.98	0 / +0,003 mm	75	19	47	4	6	0.1	398	●
3.99	0 / +0,003 mm	75	19	47	4	6	0.1	399	●
4	0 / +0,003 mm	75	19	47	4	6	0.1	400	●
4.01	0 / +0,003 mm	75	19	47	4	6	0.1	401	●
4.02	0 / +0,003 mm	75	19	47	4	6	0.1	402	●
4.03	0 / +0,003 mm	75	19	47	4	6	0.1	403	●
4.97	0 / +0,003 mm	86	23	58	5	6	0.1	497	●
4.98	0 / +0,003 mm	86	23	58	5	6	0.1	498	●
4.99	0 / +0,003 mm	86	23	58	5	6	0.1	499	●
5	0 / +0,003 mm	86	23	58	5	6	0.1	500	●
5.01	0 / +0,003 mm	86	23	58	5	6	0.1	501	●
5.02	0 / +0,003 mm	86	23	58	5	6	0.1	502	●
5.03	0 / +0,003 mm	86	23	58	5	6	0.1	503	●
5.97	0 / +0,003 mm	93	26	57	6	6	0.1	597	●
5.98	0 / +0,003 mm	93	26	57	6	6	0.1	598	●
5.99	0 / +0,003 mm	93	26	57	6	6	0.1	599	●
6	0 / +0,003 mm	93	26	57	6	6	0.1	600	●
6.01	0 / +0,003 mm	101	28	65	6	6	0.1	601	●
6.02	0 / +0,003 mm	101	28	65	6	6	0.12	602	●
6.03	0 / +0,003 mm	101	28	65	6	6	0.12	603	●
6.97	0 / +0,003 mm	109	31	73	8	6	0.12	697	●
6.98	0 / +0,003 mm	109	31	73	8	6	0.12	698	●
6.99	0 / +0,003 mm	109	31	73	8	6	0.12	699	●
7	0 / +0,003 mm	109	31	73	8	6	0.12	700	●
7.01	0 / +0,003 mm	109	31	73	8	6	0.12	701	●
7.02	0 / +0,003 mm	109	31	73	8	6	0.12	702	●
7.03	0 / +0,003 mm	109	31	73	8	6	0.12	703	●
7.97	0 / +0,003 mm	117	33	81	8	6	0.12	797	●
7.98	0 / +0,003 mm	117	33	81	8	6	0.12	798	●
7.99	0 / +0,003 mm	117	33	81	8	6	0.12	799	●
8	0 / +0,003 mm	117	33	81	8	6	0.12	800	●
8.01	0 / +0,003 mm	117	33	81	8	6	0.13	801	●
8.02	0 / +0,003 mm	117	33	81	8	6	0.13	802	●
8.03	0 / +0,003 mm	117	33	81	8	6	0.13	803	●
9	0 / +0,003 mm	125	36	85	10	6	0.13	900	●
9.01	0 / +0,003 mm	125	36	85	10	6	0.13	901	●
9.02	0 / +0,003 mm	125	36	85	10	6	0.13	902	●
9.03	0 / +0,003 mm	125	36	85	10	6	0.13	903	●
9.97	0 / +0,003 mm	133	38	93	10	6	0.13	997	●
9.98	0 / +0,003 mm	133	38	93	10	6	0.13	998	●
9.99	0 / +0,003 mm	133	38	93	10	6	0.13	009	●
10	0 / +0,003 mm	133	38	93	10	6	0.13	010	●
10.01	0 / +0,003 mm	133	38	93	10	6	0.13	011	●
10.02	0 / +0,003 mm	133	38	93	10	6	0.13	012	●
10.03	0 / +0,003 mm	133	38	93	10	6	0.13	013	●
11.98	0 / +0,003 mm	151	44	111	10	6	0.15	014	●
11.99	0 / +0,003 mm	151	44	111	10	6	0.15	015	●
12	0 / +0,003 mm	151	44	111	10	6	0.15	016	●
12.01	0 / +0,003 mm	151	44	111	10	6	0.15	017	●
12.02	0 / +0,003 mm	151	44	111	10	6	0.15	018	●
12.03	0 / +0,003 mm	151	44	111	10	6	0.15	019	●

Prod. Gr. 117

ATORN® NC machine reamer set, 1/100 mm HSSE with universal shaft (DIN Similar to 212)

For universal use up to 1000N/mm²

HSSE | 0,001 | ≈7-8° | HA



Application:
For producing fit tolerances in through holes (nominal size=0/+0.003 mm) on a NC machine or conventional machines up to 1000 N/mm².

Execution:
- 7-8° left-hand spiral, type B up to diameter 2.03 mm with dual-sided centring point and continuous shank, type D from diameter 2.98 mm with centring hole and offset shank

Advantage:
- good bore hole quality (dimensional tolerance, roundness, surface quality)

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Composition of set	Tolerance of fit	Number of pieces in assortment/set (PCS)	Surface Uncoated 11622... Ident. No.	
3/4/5/6/8/10/12	0 / +0,003 mm	7	010	●

Composition of set	Tolerance of fit	Number of pieces in assortment/set (PCS)	Surface: Uncoated 11622... Ident. No.	
2.98/3.0/3,01/3.02/3.98/4.00/4.01/4.02/4.98/5.00/5.01/5.02/5.98/6.00/6.01/6.02/7.98/8.00/8.01/8.02/9.98/10.00/10.01/10.02	0 / +0,003 mm	24	015	●
0.98/0.99/1,00/1.01/1.02/1.98/1.99/2.00/2.01/2.02/2.98/2.99/3.00/3.01/3.02/3.98/3.98/3.99/4.00/4.01/4.02/4.98/4.99/5.00/5.01/5.02	0 / +0,003 mm	25	030	●
5.98/5.99/6,00/6.01/6.02/6.98/6.99/7.00/7.01/7.02/7.98/7.99/8.00/8.01/8.02/8.98/8.99/9.00/9.01/9.02/9.98/9.99/10.00/10.01/10.02	0 / +0,003 mm	25	040	●

Prod. Gr. 117

Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11622010-040	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		

solid carbide machine reamers with selectable diameter and fit
For demanding serial users

application:
for cutting individually selectable fit tolerances on conventional machines and CNC machines.

advantage:
- wide range of diameters from 0.95 mm to 20.00 mm
- individually selectable diameter and tolerance
- short delivery times
- high cutting values can be realised
- very long service life
- precisely ground in accordance with DIN 1420
- universal application

0,00X

VHM

ATORN® NC machine reamer, solid carbide, with uniform shank (fit tolerance and diameter can be selected) (DIN Similar to 8093)

For universal use up to 1300N/mm²

VHM | 0,00X | 0,001 | ≈7–8° | HA

Application:
For producing fit tolerances in through holes on a NC machine in material groups up to 1300 N/mm².

Execution:
- Left-hand spiral, type B

Advantage:
- high-quality solid carbide cutting material ensures a very long service life
- good bore hole quality (dimensional tolerance, roundness, surface quality)

- **No. 11730:** Diameter and fit can be ordered to suit, shortest possible delivery time
- **No. 11731:** Delivered ex stock

Notes:
No. 11730: Caution when ordering, specify the **diameter and fit tolerance** (for example 8.53 H7)
No. 11731: Caution: when ordering, only enter the diameter. The tolerance cannot be selected (e.g. 8.53 mm +0.005 mm)

Fit and diameter can be selected!

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Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11730950-987	18	15	12	10	8	20	20	20	20	18	16	18		12	8	8	6		
11731500-576	18	15	12	10	8	20	20	20	20	18	16	18		12	8	8	6		

mm		mm	mm	mm	mm h6	z	f steel 1300 ● (mm/U)	11730... Ident. No.		11731... Ident. No.	
0.95-1.06 mm	Optional	50	6	19	4	3	0.12	950	○	-	-
0.95-1.06 mm	0 / +0,004 mm	50	6	19	4	3	0.12	-	-	500	○
1.07-1.18 mm	Optional	50	9	19	4	3	0.12	990	○	-	-
1.07-1.18 mm	0 / +0,004 mm	50	9	19	4	3	0.12	-	-	502	○
1.19-1.32 mm	Optional	50	9	19	4	3	0.12	951	○	-	-
1.19-1.32 mm	0 / +0,004 mm	50	9	19	4	3	0.12	-	-	504	○
1.33-1.42 mm	Optional	50	9	19	4	3	0.12	952	○	-	-
1.33-1.42 mm	0 / +0,004 mm	50	9	19	4	3	0.12	-	-	506	○
1.43-1.5 mm	Optional	50	9	19	4	3	0.12	953	○	-	-

mm		mm	mm	mm	h6 mm	z	f steel 1300 ● (mm/U)	11730... Ident. No.		11731... Ident. No.	
1.43-1.5 mm	0 / +0,004 mm	50	9	19	4	3	0.12	-	-	508	○
1.51-1.7 mm	Optional	50	10	19	4	3	0.12	954	○	-	-
1.51-1.7 mm	0 / +0,004 mm	50	10	19	4	3	0.12	-	-	510	○
1.71-1.9 mm	Optional	50	11	19	4	4	0.12	955	○	-	-
1.71-1.9 mm	0 / +0,004 mm	50	11	19	4	4	0.12	-	-	512	○
1.91-2.12 mm	Optional	50	12	19	4	4	0.12	956	○	-	-
1.91-2.12 mm	0 / +0,004 mm	50	12	19	4	4	0.12	-	-	514	○
2.13-2.36 mm	Optional	50	12	19	4	4	0.12	957	○	-	-
2.13-2.36 mm	0 / +0,004 mm	50	12	19	4	4	0.12	-	-	516	○
2.37-2.65 mm	Optional	60	16	29	4	4	0.12	958	○	-	-
2.37-2.65 mm	0 / +0,004 mm	60	16	29	4	4	0.12	-	-	518	○
2.66-2.8 mm	Optional	65	17	33	4	6	0.12	959	○	-	-
2.66-2.8 mm	0 / +0,004 mm	65	17	33	4	6	0.12	-	-	520	○
2.81-3.0 mm	Optional	65	17	33	4	6	0.12	960	○	-	-
2.81-3.0 mm	0 / +0,004 mm	65	17	33	4	6	0.12	-	-	522	○
3.01-3.35 mm	Optional	65	18	37	4	6	0.12	961	○	-	-
3.01-3.35 mm	0 / +0,004 mm	65	18	37	4	6	0.12	-	-	524	○
3.36-3.75 mm	Optional	75	18	43	4	6	0.12	962	○	-	-
3.36-3.75 mm	0 / +0,004 mm	75	18	43	4	6	0.12	-	-	526	○
3.76-4.09 mm	Optional	75	19	45	4	6	0.12	963	○	-	-
3.76-4.09 mm	0 / +0,004 mm	75	19	45	4	6	0.12	-	-	528	○
4.1-4.79 mm	Optional	80	21	42	6	6	0.12	964	○	-	-
4.1-4.79 mm	0 / +0,004 mm	80	21	42	6	6	0.12	-	-	530	○
4.8-5.3 mm	Optional	93	23	55	6	6	0.12	965	○	-	-
4.8-5.3 mm	0 / +0,004 mm	93	23	55	6	6	0.12	-	-	532	○
5.31-5.6 mm	Optional	93	26	55	6	6	0.12	966	○	-	-
5.31-5.6 mm	0 / +0,004 mm	93	26	55	6	6	0.12	-	-	534	○
5.61-6.03 mm	Optional	93	26	55	6	6	0.12	967	○	-	-
5.61-6.03 mm	0 / +0,005 mm	93	26	55	6	6	0.12	-	-	536	○
6.04-6.7 mm	Optional	101	28	63	8	6	0.12	968	○	-	-
6.04-6.7 mm	0 / +0,005 mm	101	28	63	8	6	0.12	-	-	538	○
6.71-7.1 mm	Optional	109	31	71	8	6	0.12	969	○	-	-
6.71-7.1 mm	0 / +0,005 mm	109	31	71	8	6	0.12	-	-	540	○
7.11-7.6 mm	Optional	109	31	71	8	6	0.12	970	○	-	-
7.11-7.6 mm	0 / +0,005 mm	109	31	71	8	6	0.12	-	-	542	○
7.61-8.09 mm	Optional	117	33	79	8	6	0.12	971	○	-	-
7.61-8.09 mm	0 / +0,005 mm	117	33	79	8	6	0.12	-	-	544	○
8.1-8.6 mm	Optional	117	33	79	8	6	0.15	972	○	-	-
8.1-8.6 mm	0 / +0,005 mm	117	33	79	8	6	0.15	-	-	546	○
8.61-9.1 mm	Optional	125	36	83	10	6	0.15	973	○	-	-
8.61-9.1 mm	0 / +0,005 mm	125	36	83	10	6	0.15	-	-	548	○
9.11-9.69 mm	Optional	125	36	83	10	6	0.15	974	○	-	-
9.11-9.69 mm	0 / +0,005 mm	125	36	83	10	6	0.15	-	-	550	○
9.7-10.05 mm	Optional	133	38	91	10	6	0.15	975	○	-	-
9.7-10.05 mm	0 / +0,005 mm	133	38	91	10	6	0.15	-	-	552	○
10.06-10.6 mm	Optional	133	38	91	10	6	0.15	976	○	-	-
10.06-10.6 mm	0 / +0,005 mm	133	38	91	10	6	0.15	-	-	554	○
10.61-11.05 mm	Optional	142	41	100	10	6	0.15	977	○	-	-
10.61-11.05 mm	0 / +0,005 mm	142	41	100	10	6	0.15	-	-	556	○
11.06-11.8 mm	Optional	142	41	100	10	6	0.15	978	○	-	-
11.06-11.8 mm	0 / +0,005 mm	142	41	100	10	6	0.15	-	-	558	○
11.81-12.05 mm	0 / +0,005 mm	151	44	104	12	6	0.15	-	-	560	○
11.81-12.2 mm	Optional	151	44	104	12	6	0.15	979	○	-	-
12.21-13.2 mm	Optional	151	44	104	12	8	0.15	980	○	-	-
13.21-14.00 mm	Optional	160	47	110	16	8	0.15	981	○	-	-
14.01-15.2 mm	Optional	162	50	112	16	8	0.15	982	○	-	-
15.21-16.2 mm	Optional	170	52	120	16	8	0.18	983	○	-	-

mm		mm	mm	mm	h6 mm	z	f steel 1300 (mm/U)	11730... Ident. No.		11731... Ident. No.	
16.21-17.2 mm	Optional	175	52	125	18	8	0.18	984	○	-	-
17.21-18.2 mm	Optional	182	52	132	18	8	0.18	985	○	-	-
18.21-19.2 mm	Optional	189	52	137	20	8	0.2	986	○	-	-
19.21-20.2 mm	Optional	195	52	143	20	8	0.2	987	○	-	-

Prod. Gr. 1BK

HSSE machine reamers with selectable diameter and fit

application:
for cutting individually selectable fit tolerances on conventional machines and CNC machines.

advantage:
- wide range of diameters from 0.95 mm to 20.00 mm
- individually selectable diameter and tolerance
- short delivery times
- very long service life
- precisely ground in accordance with DIN 1420
- universal application

0,00X HSSE

ATORN® HSSE NC machine reamer with uniform shank (fit tolerance and diameter can be selected) (DIN Similar to 212)

For universal use up to 1000 N/mm²

HSSE 0,00X 0,001 ≈7-8° HA

Application:
for producing fit tolerances in through holes on NC machines or conventional machines up to 1000 N/mm².

Execution:
- 7–8° left-hand spiral, type B

Advantage:
- high-quality HSSE cutting material for a very long service life
- good bore hole quality (dimensional tolerance, roundness, surface quality)

- **No. 11624:** Diameter and fit can be ordered to suit, shortest possible delivery time
- **No. 11625:** Diameter can be ordered to suit, shortest possible delivery time

Notes:
No. 11624: Caution: when ordering, specify the **diameter and fit tolerance** (for example 8.53 H7)
No. 11625: Caution: when ordering, only enter the diameter. The tolerance cannot be selected (e.g. 8.53 mm +0.005 mm)

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Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11624911-995	12	9	7	8	7	17	17	17	17	13	13			11	5	5			
11625500-564	12	9	7	8	7	17	17	17	17	13	13			11	5	5			

mm		mm	mm	mm	h6 mm	z	f steel 1300 (mm/U)	11624... Ident. No.		11625... Ident. No.	
0.95-1.06 mm	Optional	34	5.5	13	1	3	0.12	911	○	-	-
0.95-1.06 mm	0 / +0,004 mm	34	5.5	13	1	3	0.12	-	-	500	○
1.07-1.18 mm	Optional	36	6.5	14	1	3	0.12	912	○	-	-
1.07-1.18 mm	0 / +0,004 mm	36	6.5	14	1	3	0.12	-	-	502	○
1.19-1.32 mm	Optional	38	7.5	13	2	3	0.12	913	○	-	-
1.19-1.32 mm	0 / +0,004 mm	38	7.5	13	2	3	0.12	-	-	504	○
1.33-1.41 mm	Optional	40	8	15	2	3	0.12	914	○	-	-
1.33-1.41 mm	0 / +0,004 mm	40	8	15	2	3	0.12	-	-	506	○
1.42-1.50 mm	Optional	40	8	22	2	3	0.12	992	○	-	-
1.42-1.50 mm	0 / +0,004 mm	40	8	22	2	3	0.12	-	-	508	○
1.51-1.70 mm	Optional	43	9	23	2	3	0.12	993	○	-	-
1.51-1.70 mm	0 / +0,004 mm	43	9	23	2	3	0.12	-	-	510	○
1.71-1.90 mm	Optional	46	10	20	2	4	0.12	915	○	-	-
1.71-1.90 mm	0 / +0,004 mm	46	10	20	2	4	0.12	-	-	512	○
1.91-2.12 mm	Optional	49	11	22	2	4	0.12	916	○	-	-
1.91-2.12 mm	0 / +0,004 mm	49	11	22	2	4	0.12	-	-	514	○
2.13-2.36 mm	Optional	53	12	21	3	4	0.12	917	○	-	-

mm		mm	mm	mm	mm h6	z	f steel 1300 ● (mm/U)	11624... Ident. No.		11625... Ident. No.	
2.13-2.36 mm	0 / +0,004 mm	53	12	21	3	4	0.12	-	-	516	○
2.37-2.65 mm	Optional	57	14	26	3	4	0.12	918	○	-	-
2.37-2.65 mm	0 / +0,004 mm	57	14	26	3	4	0.12	-	-	518	○
2.66-2.80 mm	Optional	61	15	30	3	6	0.12	994	○	-	-
2.66-2.80 mm	0 / +0,004 mm	61	15	30	3	6	0.12	-	-	520	○
2.81-3.00 mm	Optional	61	15	30	3	6	0.12	919	○	-	-
2.81-3.00 mm	0 / +0,004 mm	61	15	30	3	6	0.12	-	-	522	○
3.01-3.35 mm	Optional	65	16	33	4	6	0.12	921	○	-	-
3.01-3.35 mm	0 / +0,004 mm	65	16	33	4	6	0.12	-	-	524	○
3.36-3.75 mm	Optional	70	18	39	4	6	0.12	922	○	-	-
3.36-3.75 mm	0 / +0,004 mm	70	18	39	4	6	0.12	-	-	526	○
3.76-4.05 mm	Optional	75	19	46	4	6	0.12	923	○	-	-
3.76-4.05 mm	0 / +0,004 mm	75	19	46	4	6	0.12	-	-	528	○
4.06-4.25 mm	Optional	75	19	46	4	6	0.12	924	○	-	-
4.06-4.25 mm	0 / +0,004 mm	75	19	46	4	6	0.12	-	-	530	○
4.26-4.75 mm	Optional	80	21	51	5	6	0.12	925	○	-	-
4.26-4.75 mm	0 / +0,004 mm	80	21	51	5	6	0.12	-	-	532	○
4.76-5.05 mm	Optional	86	23	57	5	6	0.12	927	○	-	-
4.76-5.05 mm	0 / +0,004 mm	86	23	57	5	6	0.12	-	-	534	○
5.06-5.30 mm	Optional	86	23	57	5	6	0.12	929	○	-	-
5.06-5.30 mm	0 / +0,004 mm	86	23	57	5	6	0.12	-	-	536	○
5.31-5.60 mm	Optional	93	26	56	5	6	0.12	995	○	-	-
5.31-5.60 mm	0 / +0,004 mm	93	26	56	5	6	0.12	-	-	538	○
5.61-6.00 mm	Optional	93	26	56	6	6	0.12	931	○	-	-
5.61-6.00 mm	0 / +0,005 mm	93	26	56	6	6	0.12	-	-	540	○
6.01-6.70 mm	Optional	101	28	64	6	6	0.12	933	○	-	-
6.01-6.70 mm	0 / +0,005 mm	101	28	64	6	6	0.12	-	-	542	○
6.71-7.05 mm	Optional	109	31	72	8	6	0.12	935	○	-	-
6.71-7.05 mm	0 / +0,005 mm	109	31	72	8	6	0.12	-	-	544	○
7.06-7.50 mm	Optional	109	31	72	8	6	0.12	937	○	-	-
7.06-7.50 mm	0 / +0,005 mm	109	31	72	8	6	0.12	-	-	546	○
7.51-8.05 mm	Optional	117	33	80	8	6	0.15	939	○	-	-
7.51-8.05 mm	0 / +0,005 mm	117	33	80	8	6	0.15	-	-	548	○
8.06-8.50 mm	Optional	117	33	80	8	6	0.15	941	○	-	-
8.06-8.50 mm	0 / +0,005 mm	117	33	80	8	6	0.15	-	-	550	○
8.51-9.05 mm	Optional	125	36	84	10	6	0.15	943	○	-	-
8.51-9.05 mm	0 / +0,005 mm	125	36	84	10	6	0.15	-	-	552	○
9.06-9.50 mm	Optional	125	36	84	10	6	0.15	945	○	-	-
9.06-9.50 mm	0 / +0,005 mm	125	36	84	10	6	0.15	-	-	554	○
9.51-10.05 mm	Optional	133	38	92	10	6	0.15	954	○	-	-
9.51-10.05 mm	0 / +0,005 mm	133	38	92	10	6	0.15	-	-	556	○
10.06-10.60 mm	Optional	133	38	92	10	6	0.15	955	○	-	-
10.06-10.60 mm	0 / +0,005 mm	133	38	92	10	6	0.15	-	-	558	○
10.61-11.05 mm	Optional	142	41	101	10	6	0.15	957	○	-	-
10.61-11.05 mm	0 / +0,005 mm	142	41	101	10	6	0.15	-	-	560	○
11.06-11.80 mm	Optional	142	41	101	10	6	0.15	958	○	-	-
11.06-11.80 mm	0 / +0,005 mm	142	41	101	10	6	0.15	-	-	562	○
11.81-12.05 mm	Optional	151	44	110	10	6	0.15	959	○	-	-
11.81-12.05 mm	0 / +0,005 mm	151	44	110	10	6	0.15	-	-	564	○
12.06-12.60 mm	Optional	151	44	110	10	6	0.15	961	○	-	-
12.61-13.20 mm	Optional	151	44	110	10	6	0.15	963	○	-	-
13.21-13.55 mm	Optional	160	47	113	14	8	0.15	965	○	-	-
13.56-14.00 mm	Optional	160	47	113	14	8	0.15	967	○	-	-
14.01-14.50 mm	Optional	162	50	115	14	8	0.15	969	○	-	-
14.51-15.00 mm	Optional	162	50	115	14	8	0.18	971	○	-	-
15.01-15.50 mm	Optional	170	52	123	14	8	0.18	973	○	-	-

mm		mm	mm	mm	mm h6	z	f steel 1300 ● (mm/U)	11624... Ident. No.		11625... Ident. No.	
15.51-16.00 mm	Optional	170	52	123	14	8	0.18	975	○	-	-
16.01-16.50 mm	Optional	175	54	129	14	8	0.18	977	○	-	-
16.51-17.00 mm	Optional	175	54	129	14	8	0.18	979	○	-	-
17.01-17.50 mm	Optional	182	56	136	14	8	0.18	981	○	-	-
17.51-18.00 mm	Optional	182	56	136	14	8	0.18	983	○	-	-
18.01-18.50 mm	Optional	189	58	140	16	8	0.2	985	○	-	-
18.51-19.00 mm	Optional	189	58	140	16	8	0.2	987	○	-	-
19.01-19.50 mm	Optional	195	60	146	16	8	0.2	989	○	-	-
19.51-20.00 mm	Optional	195	60	146	16	8	0.2	991	○	-	-

Prod. Gr. 1BK

HSS / HSSE rivet hole reamers and machine taper reamers

application:
for the production of conical tolerances for tapered pins and rivet holes on conventional and CNC machines.

advantage:
- wide range
- very good surfaces can be achieved
- various shaft variants
- very high feed rates can be realised
- further dimensions available on request


HSS

HSSE

ORION® HSS rivet hole reamer (DIN 311)

For universal use up to 1000N/mm²

HSS 25°

Application:
For reaming rivet holes that must be perfectly aligned to one another. On both conventional machines and NC machines up to 1000 N/mm².

Advantage:
- good bore hole quality (dimensional tolerance, roundness, surface quality)
- excellent cutting performance due to stripping cut

Execution:
- 25° left-hand spiral, cone-shaped section 1:10 on taper lead length

Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11670100-300	12	9	7	8	7	17	17	17	17	13	13			11	5	5			

mm	Min. Ø (mm)	Max. Ø (mm)	Lead angle length (mm)	mm	mm		z	f steel 1000 ● (mm/U)	11670... Ident. No.	
10	7.0	10.1	30	171	95	MK 1	4	0.15	100	●
11	7.7	11.1	33	176	100	MK 1	5	0.15	110	●
12	8.1	12.11	39	199	105	MK 2	5	0.15	120	●
13	9.1	13.11	39	199	105	MK 2	5	0.15	130	●
14	9.8	14.11	42	209	115	MK 2	5	0.15	140	●
15	10.5	15.11	45	219	125	MK 2	5	0.15	150	●
16	11.2	16.11	48	229	135	MK 2	5	0.2	160	●
17	11.9	17.11	51	251	135	MK 3	5	0.2	170	●
18	12.2	18.11	58	261	145	MK 3	5	0.2	180	●
19	13.2	19.13	58	261	145	MK 3	5	0.2	190	●
20	13.8	20.13	62	271	155	MK 3	5	0.25	200	●
21	14.8	21.13	62	271	155	MK 3	5	0.25	210	●
22	15.4	22.13	66	281	165	MK 3	5	0.25	220	●
23	16.4	23.13	66	281	165	MK 3	5	0.25	230	●
24	16.8	24.13	72	296	180	MK 3	5	0.25	240	●
25	17.8	25.13	72	296	180	MK 3	5	0.25	250	●
26	18.8	26.13	72	296	180	MK 3	5	0.25	260	●
27	19.3	27.13	78	311	195	MK 3	5	0.25	270	○
28	20.3	28.13	78	311	195	MK 3	5	0.25	280	●
30	22.3	30.13	78	311	195	MK 3	5	0.3	300	●

Prod. Gr. 104

ATORN® High-helix taper pin machine reamers 1:50 (DIN 2179)

For universal use up to 1000 N/mm²

HSSE | 45° | 01:50 | HA

Application:
for cutting tapered fit tolerances 1:50 for taper pins in accordance with DIN 258, DIN EN 22339, 28737, 28736 on conventional machines and NC machines up to 1000 N/mm².

Execution:
- 45° left-hand spiral, 1:50 taper and straight shank with retaining lugs

Advantage:
- good bore hole quality (dimensional tolerance, roundness, surface quality)

Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11674	12	9	7	8	7	17	17	17	17	13	13	13		11	5	5	5		

mm	Min. Ø (mm)	Max. Ø (mm)	mm	mm	mm (h6)	z	f steel 1000 (mm/U)	ATORN 11674... Ident. No.	
1.5	1.4	2.14	70	37	2.1	2	0.1	015	●
2	1.9	2.86	86	48	3.15	3	0.1	020	●
2.5	2.4	3.36	86	48	3.15	3	0.1	025	●
3	2.9	4.06	100	58	4	3	0.1	030	●
4	3.9	5.26	112	68	5	3	0.1	040	●
5	4.9	6.36	122	73	6.3	3	0.1	050	●
6	5.9	8	160	105	8	3	0.1	060	●
6.5	6.4	8.78	188	119	8.5	3	0.15	065	○
8	7.9	10.8	207	145	10	3	0.15	080	●
10	9.9	13.4	245	175	12.5	3	0.2	100	●
12	11.8	16	290	210	16	3	0.2	120	●

Prod. Gr. 117

HSS hand reamers

application:
for manually producing H7 or 1/100 tolerances and reworking existing tolerances

advantage:
- cost-effective alternative for manual work
- longer threaded start to correctly align the reamer
- Adjustable variants
- straight and spiralised versions
- square shaft serves as carrier
- universal application

HSS | H7 | 0,001

ATORN® ORION® HSS hand reamers

For universal use up to 1000 N/mm²

HSS | H7 | ≈7-8° | 0°

No. 11602 015–11602 400, 11604 015–11604 400

No. 11603

Application:
No. 11602 015–11602 400, 11604 015–11604 400: For cutting H7 fit tolerances manually in through holes or with interrupted cutting conditions up to 1000 N/mm².
No. 11603: For cutting H7 fit tolerances manually in the blind hole up to 1000 N/mm².

Execution:
- 7-8° left-hand spiral, uneven pitch and long notch shape

Advantage:
- Good bore hole quality (dimensional tolerance, roundness, surface quality)

Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11602	●	●	○	○	○	●	○	●	○	●	○	○		○	○	○			
11603	●	●	○	○	○	●	○	●	○	●	○	○		○	○	○			
11604	●	●	○	○	○	●	○	●	○	●	○	○		○	○	○			

						ATORN		ORION		ATORN	
					Form	B		B		A	
					Groove type	Left-hand twist, 7-8°		Left-hand twist, 7-8°		Straight	
mm	H7	mm	mm	z	mm	11602... Ident. No.		11604... Ident. No.		11603... Ident. No.	
1.5	H7	41	20	4	1.12	015	●	015	●	-	-

						ATORN		ORION		ATORN	
					Form	B		B		A	
					Groove type	Left-hand twist, 7-8°		Left-hand twist, 7-8°		Straight	
mm		mm	mm	z	mm	11602... Ident. No.		11604... Ident. No.		11603... Ident. No.	
2	H7	50	25	4	1.6	020	●	020	●	020	●
2.5	H7	58	29	4	2	025	●	025	●	-	-
3	H7	62	31	6	2.24	030	●	030	●	030	●
3.5	H7	71	35	6	2.8	035	●	035	●	-	-
4	H7	76	38	6	3.15	040	●	040	●	040	●
4.5	H7	81	41	6	3.55	045	●	045	●	-	-
5	H7	87	44	6	4	050	●	050	●	050	●
6	H7	93	47	6	4.5	060	●	060	●	060	●
7	H7	107	54	6	5.6	070	●	070	●	-	-
8	H7	115	58	6	6.3	080	●	080	●	080	●
9	H7	124	62	6	7.1	090	●	090	●	090	●
10	H7	133	66	6	8	100	●	100	●	100	●
11	H7	142	71	8	9	110	●	110	●	-	-
12	H7	152	76	8	10	120	●	120	●	120	●
13	H7	152	76	8	10	130	●	130	●	-	-
14	H7	163	81	8	11.2	140	●	140	●	140	●
15	H7	163	81	8	11.2	150	●	150	●	-	-
16	H7	175	87	8	12.5	160	●	160	●	160	●
17	H7	175	87	8	12.5	-	-	170	●	170	●
18	H7	188	93	8	14	180	●	180	●	180	●
19	H7	188	93	8	14	-	-	190	●	-	-
20	H7	201	100	10	16	200	●	200	●	200	●
22	H7	215	107	10	18	220	●	220	●	-	-
24	H7	231	115	10	20	240	●	240	●	-	-
25	H7	231	115	10	20	250	●	250	●	-	-
26	H7	231	115	10	20	-	-	260	●	-	-
28	H7	247	124	10	22.4	-	-	280	●	-	-
30	H7	247	124	10	22.4	300	●	300	●	-	-
32	H7	265	133	12	25	320	●	320	●	-	-
35	H7	284	142	12	28	350	●	350	●	-	-
40	H7	305	152	12	31.5	400	●	400	●	-	-

ORION = Prod. Gr. 104
ATORN = Prod. Gr. 117

ATORN® HSS hand reamer set (DIN 206)

For universal use up to 1000N/mm²

HSS | H7 | ≈7-8°

Application:
For cutting H7 fit tolerances manually in through holes or with interrupted cutting conditions up to 1000 N/mm².

Execution:
- 7-8° left-hand spiral, uneven pitch and long notch shape

Advantage:
- Good bore hole quality (dimensional tolerance, roundness, surface quality)

Composition of set		Diameters 1.5/2/2.5/3/3.5/4/4.5/5/5.5/6/6.6/7/7.5/8/8.5/9/9.5/10
Tolerance of fit		H7
Number of pieces in assortment/set (PCS)		19
11602...	Ident. No.	900
		●

Prod. Gr. 117

Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plastics	Graphite G(C)FK	GG(G) GJMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11602900	●	●	○	○	○	●	○	●	○	●	○	○		○	○	○			

ATORN® HSS hand taper reamers 1: 50 (DIN 9)

For universal use up to 1000 N/mm²

HSS | 0° | ≈7-8° | 01:50

No. 11672

No. 11673

Application:
No. 11672: For cutting tapered fit tolerances 1:50 (without cutting interruption) manually up to 1000 N/mm².
No. 11673: For cutting tapered fit tolerances 1:50 (also suitable for cutting interruption) manually up to 1000 N/mm².

Execution:
- **No. 11672:** Straight grooves, with conical cutter, type A
- **No. 11673:** Twisted with conical cutter, type B

Advantage:
- Good bore hole quality (dimensional tolerance, roundness, surface quality)

						Form	A		B	
Cutting edge Ø (mm)	Min. Ø (mm)	Max. Ø (mm)	Length (mm)	Cutting edge length (mm)	Shank square (mm)	Number of cutting edges (PCS)	11672... Ident. No.		11673... Ident. No.	
1.5	1.4	2.14	57	37	2.5	4	015	●	-	-

Cutting edge Ø (mm)	Min. Ø (mm)	Max. Ø (mm)	Length (mm)	Cutting edge length (mm)	Shank square (mm)	Form Number of cutting edges (PCS)	A 11672... Ident. No.		B 11673... Ident. No.	
3	2.9	4.06	80	58	3.15	5	-	-	030	●

Prod. Gr. 117

Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11672015-120	●	●	○	○	○	●	○	●	○	●	○	○		○	○	○			
11673030-200	●	●	○	○	○	●	○	●	○	●	○	○		○	○	○			

ATORN® HSS hand taper reamers 1: 10

for universal use

No. 11672

No. 11673

Application:
No. 11672: For cutting tapered fit tolerances 1:10 (without cutting interruption) manually up to 1000 N/mm².
No. 11673: For cutting tapered fit tolerances 1:10 (also suitable for cutting interruption) manually up to 1000 N/mm².

Execution:
- **No. 11672:** Straight grooves, with conical cutter, type A
- **No. 11673:** Twisted with conical cutter, type B

Advantage:
- Good bore hole quality (dimensional tolerance, roundness, surface quality)

Technical data:
- Min. diameter: 3 mm
- Max. diameter: 10 mm
- Length: 100 mm
- Cutting edge length: 70 mm
- Shank square: 6.3 mm
- Number of cutting edges: 5 PCS

Groove type	Straight 11672... Ident. No.		Left-hand twist, 7-8° 11673... Ident. No.	
	301	●	301	●

Prod. Gr. 117

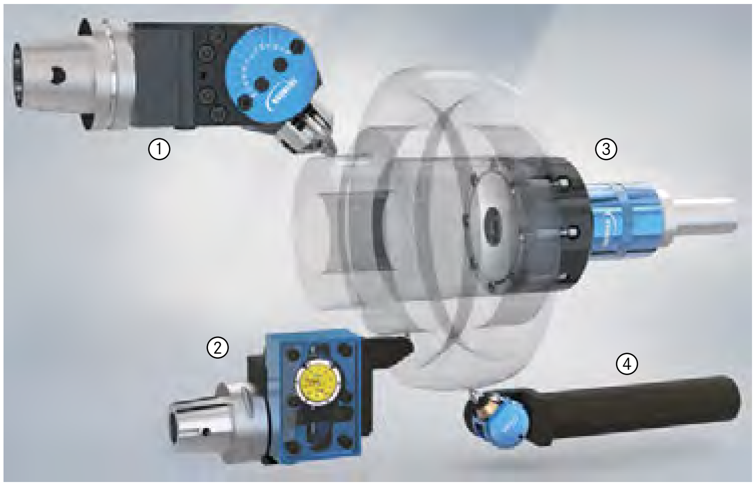
Application	Steel (N/mm²)			Stainless steel		Alu		Brass		Bronze		Plas-tics	Graphite G(C)FK	GG(G) GjMW	Titan-alloy	Nickel-alloy	Super-alloy	Hard mat.	
No.	<700	<1000	<1300	marten.	austen.	short	long	short	long	short	long							<55 HRC	<65 HRC
11672301-328	●	●	○	○	○	●	○	●	○	●	○	○		○	○	○			
11673301-328	●	●	○	○	○	●	○	●	○	●	○	○		○	○	○			

Burnishing tools
Optimised surfaces through smoothing and hardening

In times of ever increasing cost pressure and increasing quality requirements, roller burnishing (also referred to as ‚surface finishing by rolling‘) is a finish machining method which is unrivalled in many cases.

Advantages:
- Maximum process reliability
- Short lead times
- High fitting accuracy
- surface strengthening
- High percentage contact area
- Surface roughness down to below 0.001 mm Rt
- No grinding debris

For enquiries or orders please indicate the following information:
- through hole, blind hole or outside machining
- Diameter
- roller burnishing length
- Required support



① Single-roll roller burnishing tool, variable
② Diamond smoothing tool
③ Multi-roll roller burnishing tool
④ Diamond smoothing tool, variable

Roller burnishing or diamond smoothing procedure:

Smoothing
Roller burnishing or diamond smoothing is a method of chipless shaping for the production of smooth and wear-resistant surfaces on all metallic materials. Through a forming process in the edge layer of the workpiece, the profile tips are elastically cold-formed under the pressure of one or more rollers (or a smoothing diamond) and „flow“ in the μ-range into the profile valleys, therefore levelling the existing roughness. In this case, roughness depths of < 1 μ can be achieved depending on the material to be processed. Compelling factor for series production: the results achieved are process reliable.

The special advantage is that complex and cost-intensive finishing such as grinding or honing can be replaced by this fast, cheap and environmentally friendly procedure. Thus, in many cases roller burnishing proves the most economical method of finishing, as, in addition, the achievable surface qualities are often considerably better than with grinding or honing. Furthermore, roller burnished surfaces are noted for their higher resistance to corrosion.

Strengthening:
By rolling the profile peaks into the profile indentations, hardening of the edge layer and an increase in edge hardness is simultaneously achieved. In addition, compressive residual stress in the edge layer is produced as a result of this forming procedure, which in conjunction with the enhanced surface quality ensures a significant improvement in the dynamic load-bearing capacity (flexural strength).

What materials can be roller burnished?
Essentially, all elastically deformable materials can be roller burnished. The maximum material hardness is in the range of 50 HRC, for diamond smoothing 60 HRC.

Preliminary work:
Grinding or fine lathing. To achieve an optimum roller burnishing result, the ideal pre-machined surface roughness – depending on the material – is Rz 5-15

Which machines are suitable for roller burnishing?
Roller burnishing tools and diamond smoothing tools do not require equipment and can therefore be used on all common machine tools. For example: turning, drilling and milling machines. they can be easily used on CNC machines and specialist machines such as transfer lines and rotary transfer machines.

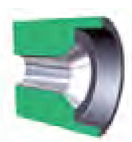
Which materials can be roller burnished?

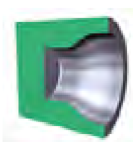

Cylindrical bores from Ø 4 mm


Blind hole bores from Ø 5 mm

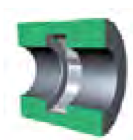

Tapered bores from Ø 0.1 mm


Flat surfaces


Bores with radius


Internal contours


Step holes


Internal cut grooves


External cut grooves

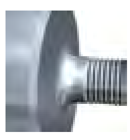

Outer cone/ taper


External diameter from 1 mm

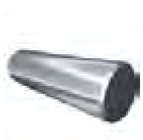

External contours


Ball studs


Thin-walled workpieces


Radii


Axial grooves


Continuous shafts

Diamond smoothing

Source: Hahn+Kolb Werkzeuge GmbH
Technical data subject to change.
Availability subject to country specific rules and regulations.

Mounting instructions SC HPC machine reamer modular
Mounting of solid carbide interchangeable heads

Note:
- To avoid the risk of injury, we recommend wearing gloves

1. Clean the interchangeable head with compressed air and a cloth on the tapered contact face and thread.

2. Clean the interchangeable head holder with compressed air and a cloth on the tapered contact face and thread.

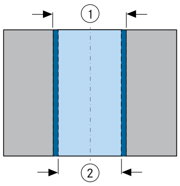
3. Then screw the interchangeable head clockwise by hand into the interchangeable head holder. Afterwards, clamp the interchangeable head holder and tool into the machine holder.

4. Place the torque wrench as horizontally as possible onto the interchangeable head without tilting with the wrench surface.
Tighten the interchangeable head using the torque wrench and the appropriate jaw socket wrench to the specified tightening torque.

Tightening torques of the interchangeable heads:

Separation point size WKS	Tightening torque [Nm]
6	5
8	12,5
10	15
12	20
16	25

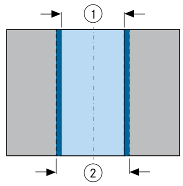
Troubleshooting when reaming



① Reaming dimension
② Nominal dimension

bore too large

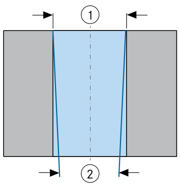
- cutting speed too high
- tool diameter too big
- built-up edges
- reamer cut too short or uneven
- excessive amount of oil in the coolant
- radial run-out of the spindle or tool
- misalignment between drill and reamer



hole too small

- cutting speed too low
- very thin-walled workpiece
- tool wear limit reached
- insufficient reaming

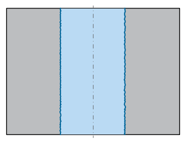
① reaming dimension ② nominal dimension



Bore hole is conical

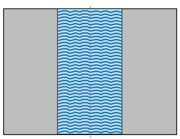
- Radial run-out of the spindle or tool
- Pre-bored hole too imprecise
- Misalignment between drill and reamer
- Incorrect angle

① Reaming dimension ② Incorrect dimension



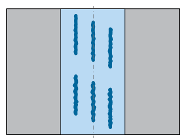
Poor surface quality

- Poor chip removal
- Cutting speed/feed too high
- Built-up edges due to insufficient or no cooling
- Breakages at the tool cutting edge
- Existing poor surface created during pre-drilling



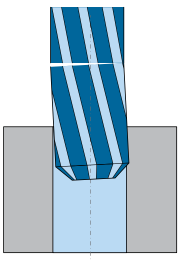
feed scoring marks in the bore hole

- breakages at the tool cutting edge
- cutting speed/feed too low
- tool wear limit reached
- built-up edges
- misalignment between drill and reamer



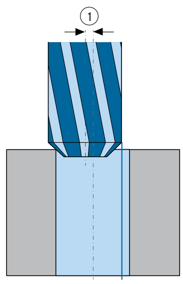
Chatter marks in the bore hole

- Built-up edges
- Insufficient amount of oil in the coolant
- Insufficient reaming
- Reamer clamped incorrectly or too loosely
- Radial run-out of the spindle or tool
- Circular grinding chamfer too narrow



Reamer grips and breaks

- Misalignment between drill and reamer
- Feed too high
- Excessive reaming
- Poor chip removal
- Circular grinding chamfer too wide
- Insufficient taper
- First cut incorrectly sanded



Incorrect bore hole position

- Misalignment between drill and reamer
- Radial run-out of the spindle or tool
- If necessary, work with bottoming reamer

① Alignment offset