



Standard Programme – High Performance Reamers

HNC-Plus

BECK
MAPAL GROUP



HNC-Plus

One tool for blind and through bore

With the powerful high-performance HNC-Plus reamer for machining almost all materials, both through bores and blind bores can be machined with one and the same reamer.

This is made possible by the innovative design. It is therefore also suitable for use with small to medium quantities. The universal application reduces storage costs.

In addition, the short design conserves hard metal resources and improves the stability of the tool. The result of all these optimizations is an increase in tool life of up to 100 %.

HNC-Plus

Cost-efficient and productive

New carbide substrates specially adapted to machining, in combination with new coatings ensure better tool life. Thanks to a new circular ground chamfer the reamers are even better guided in the bore - roundness and cylinder shapes are improved even further.

1 High-performance coating

for the processing of



2 Patented arc land chamfer

for up to 30 % better roundness and cylinder shape

3 Prime number division

Less vibrations, better surface finish, smoother running and longer tool life

4 Innovative coolant supplies

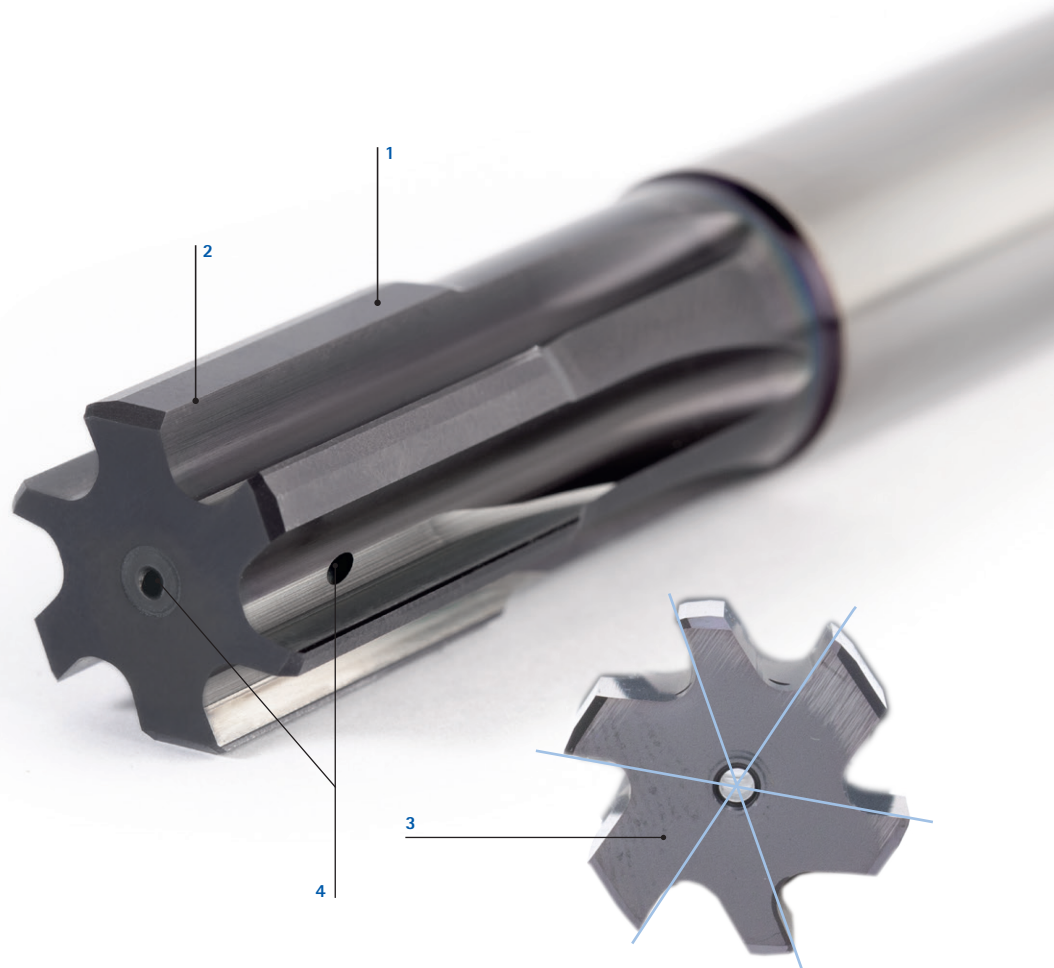
Optimum cooling lubricant supply for blind and through bores.

Universally applicable

One design for machining blind and through bores to reduce storage costs

Short design

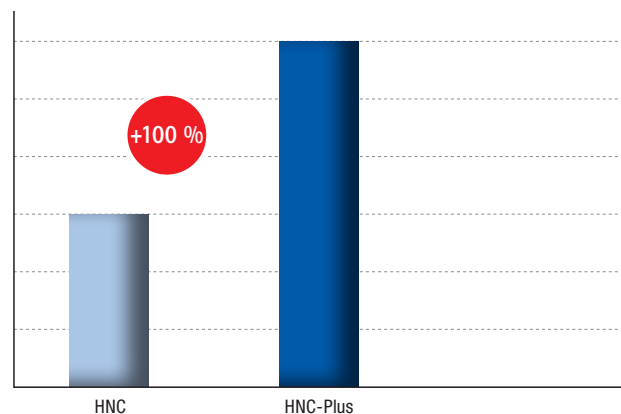
for more stability and higher feeds



Features

- One reamer for through bore and blind bore
- Up to 100 % increase in tool life
- Low storage costs, as universally applicable
- Short design increases stability and conserves carbide resources
- In the diameter range from 3.701 to 20.200 mm
- Perfectly matched to almost all materials
- Patented circular ground chamfer

Tool life

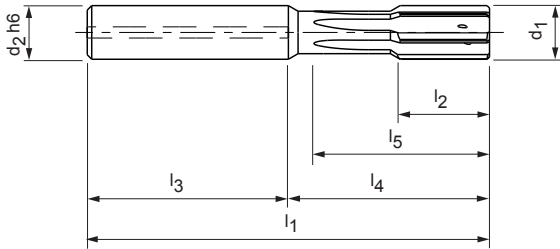


HNC-Plus PK

Fixed version, straight fluted, for blind and through bores
B043565, internal coolant supply

Design:

Diameter: 3,701 - 20,200 mm
Cutting direction: Right-hand cutting
Cutting material: Solid carbide, BPK-coated
Flute form: Straight fluted
Geometry: HPC, EU spacing



Preferred series in stock

Dimensions								z	Specification	Order no.
d ₁	Tolerance	d ₂ h6	l ₁	l ₂	l ₃	l ₄	l ₅			
3,97	+0,005	4	50	12	28	22	19	4	B04356503.97+5	31174797
3,98	+0,005	4	50	12	28	22	19	4	B04356503.98+5	31174798
3,99	+0,005	4	50	12	28	22	19	4	B04356503.99+5	31174799
4,00	H7	4	50	12	28	22	19	4	B04356504.00H7	31142699
4,01	+0,005	4	50	12	28	22	19	4	B04356504.01+5	31174800
4,02	+0,005	4	50	12	28	22	19	4	B04356504.02+5	31174801
4,03	+0,005	4	50	12	28	22	19	4	B04356504.03+5	31174802
4,97	+0,005	4	50	12	28	22	19	4	B04356504.97+5	31174803
4,98	+0,005	4	50	12	28	22	19	4	B04356504.98+5	31174804
4,99	+0,005	4	50	12	28	22	19	4	B04356504.99+5	31174805
5,00	H7	4	50	12	28	22	19	4	B04356505.00H7	31142761
5,01	+0,005	4	50	12	28	22	19	4	B04356505.01+5	31174806
5,02	+0,005	4	50	12	28	22	19	4	B04356505.02+5	31174807
5,03	+0,005	4	50	12	28	22	19	4	B04356505.03+5	31174808
5,97	+0,005	6	64	12	36	28	25	6	B04356505.97+5	31174809
5,98	+0,005	6	64	12	36	28	25	6	B04356505.98+5	31174810
5,99	+0,005	6	64	12	36	28	25	6	B04356505.99+5	31174811
6,00	H7	6	64	12	36	28	25	6	B04356506.00H7	31142763
6,01	+0,005	6	64	12	36	28	25	6	B04356506.01+5	31174812
6,02	+0,005	6	64	12	36	28	25	6	B04356506.02+5	31174813
6,03	+0,005	6	64	12	36	28	25	6	B04356506.03+5	31174814
7,00	H7	6	70	16	36	34	31	6	B04356507.00H7	31142765
7,97	+0,005	8	75	16	36	39	36	6	B04356507.97+5	31174815
7,98	+0,005	8	75	16	36	39	36	6	B04356507.98+5	31174816
7,99	+0,005	8	75	16	36	39	36	6	B04356507.99+5	31174817
8,00	H7	8	75	16	36	39	36	6	B04356508.00H7	31142767
8,01	+0,005	8	75	16	36	39	36	6	B04356508.01+5	31174818
8,02	+0,005	8	75	16	36	39	36	6	B04356508.02+5	31174819
8,03	+0,005	8	75	16	36	39	36	6	B04356508.03+5	31174820
9,00	H7	8	80	20	36	44	41	6	B04356509.00H7	31142769
9,97	+0,005	10	80	20	40	40	37	6	B04356509.97+5	31174821
9,98	+0,005	10	80	20	40	40	37	6	B04356509.98+5	31174822
9,99	+0,005	10	80	20	40	40	37	6	B04356509.99+5	31174823
10,00	H7	10	80	20	40	40	37	6	B043565010.00H7	31142771
10,01	+0,005	10	80	20	40	40	37	6	B043565010.01+5	31174824

HNC-Plus PK I B043565, fixed version, straight fluted, for blind and through bores

Dimensions								z	Specification	Order no.
d ₁	Tolerance	d ₂ h6	l ₁	l ₂	l ₃	l ₄	l ₅			
10,02	+0,005	10	80	20	40	40	37	6	B043565Ø10.02+5	31174825
10,03	+0,005	10	80	20	40	40	37	6	B043565Ø10.03+5	31174826
11,00	H7	10	85	20	40	45	42	6	B043565Ø11.00H7	31142773
11,97	+0,005	12	90	20	45	45	42	6	B043565Ø11.97+5	31174827
11,98	+0,005	12	90	20	45	45	42	6	B043565Ø11.98+5	31174828
11,99	+0,005	12	90	20	45	45	42	6	B043565Ø11.99+5	31174829
12,00	H7	12	90	20	45	45	42	6	B043565Ø12.00H7	31142775
12,01	+0,005	12	90	20	45	45	42	6	B043565Ø12.01+5	31174830
12,02	+0,005	12	90	20	45	45	42	6	B043565Ø12.02+5	31174831
12,03	+0,005	12	90	20	45	45	42	6	B043565Ø12.03+5	31174832
13,00	H7	12	90	22	45	45	42	6	B043565Ø13.00H7	31142776
14,00	H7	14	95	22	45	50	47	6	B043565Ø14.00H7	31142777
15,00	H7	14	100	22	45	55	52	6	B043565Ø15.00H7	31142778
16,00	H7	16	105	25	48	57	54	6	B043565Ø16.00H7	31142779
17,00	H7	16	110	25	48	62	59	6	B043565Ø17.00H7	31142780
18,00	H7	18	110	25	48	62	59	6	B043565Ø18.00H7	31142781
19,00	H7	18	110	25	48	62	59	6	B043565Ø19.00H7	31142782
20,00	H7	20	115	25	50	65	62	6	B043565Ø20.00H7	31142783

Configurable features



Bore diameter tolerance ≥ IT6:
- Diameter in increments of 0.001 mm freely selectable



Specification:
B043565[Diameter][Tolerance]

G-variant (see page 11):
- Diameter in increments of 0.001 mm freely selectable
- From tolerance ≥ 5 µm orderable

Specification G-variant:
B043565[Diameter][Tolerance]

Example tolerance IT8:
B043565-Ø11.530H8

Bore diameter d₁ = 11,530 H8

Example G-variant:
B043565-Ø11.530+5

Special tool diameter d₁ = 11,530 +5 µm

Dimensions configurable series IT6

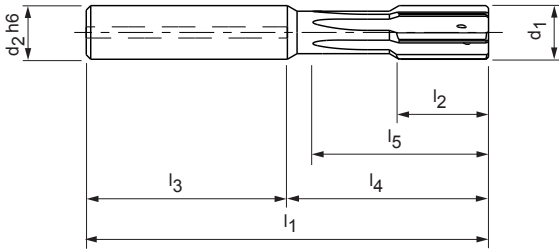
d ₁	d ₂ h6	l ₁	l ₂	l ₃	l ₄	l ₅	z
3,701 - 5,200	4	50	12	28	22	19	4
5,201 - 6,200	6	64	12	36	28	25	4
6,201 - 7,700	6	70	16	36	34	31	6
7,701 - 8,200	8	75	16	36	39	36	6
8,201 - 8,700	8	75	20	36	39	36	6
8,701 - 9,700	8	80	20	36	44	41	6
9,701 - 10,700	10	80	20	40	40	37	6
10,701 - 11,700	10	85	20	40	45	42	6
11,701 - 13,200	12	90	20	45	45	42	6
13,201 - 14,200	14	95	22	45	50	47	6
14,201 - 15,200	14	100	22	45	55	52	6
15,201 - 16,200	16	105	25	48	57	54	6
16,201 - 17,200	16	110	25	48	62	59	6
17,201 - 19,200	18	110	25	48	62	59	6
19,201 - 20,200	20	115	25	50	65	62	6

HNC-Plus MS

Fixed version, straight fluted, for blind and through bore
B043575, internal coolant supply

Design:

Diameter: 3,701 - 20,200 mm
Cutting direction: Right-hand cutting
Cutting material: Solid carbide, BMS-coated
Flute form: Straight fluted
Geometry: HPC, EU spacing



Configurable features



Bore diameter tolerance ≥ IT6:
- Diameter in increments of 0.001 mm freely selectable

Specification:
B043575[Diameter][Tolerance]

G-variant (see page 11):
- Diameter in increments of 0.001 mm freely selectable
- From tolerance ≥ 5 µm orderable

Specification G-variant:
B043575[Diameter][Tolerance]

Example tolerance IT8:
B043575-Ø11.530H8

Bore diameter $d_1 = 11,530 \text{ H8}$

Example G-variant:
B043575-Ø11.530+5

Special tool diameter $d_1 = 11,530 +5 \mu\text{m}$

Dimensions configurable series IT6

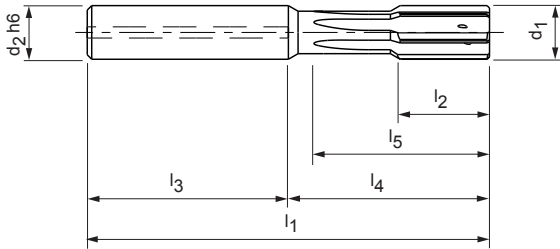
d_1	$d_2 h_6$	l_1	l_2	l_3	l_4	l_5	z
3,701 - 5,200	4	50	12	28	22	19	4
5,201 - 6,200	6	64	12	36	28	25	4
6,201 - 7,700	6	70	16	36	34	31	6
7,701 - 8,200	8	75	16	36	39	36	6
8,201 - 8,700	8	75	20	36	39	36	6
8,701 - 9,700	8	80	20	36	44	41	6
9,701 - 10,700	10	80	20	40	40	37	6
10,701 - 11,700	10	85	20	40	45	42	6
11,701 - 13,200	12	90	20	45	45	42	6
13,201 - 14,200	14	95	22	45	50	47	6
14,201 - 15,200	14	100	22	45	55	52	6
15,201 - 16,200	16	105	25	48	57	54	6
16,201 - 17,200	16	110	25	48	62	59	6
17,201 - 19,200	18	110	25	48	62	59	6
19,201 - 20,200	20	115	25	50	65	62	6

HNC-Plus AL

Fixed version, straight fluted, for blind and through bores
B043555, internal coolant supply

Design:

Diameter: 3,701 - 20,200 mm
Cutting direction: Right-hand cutting
Cutting material: Solid carbide, BAL-coated
Flute form: Straight fluted
Geometry: HPC, EU spacing



Configurable features



Bore diameter tolerance ≥ IT6:
- Diameter in increments of 0.001 mm freely selectable

Specification:
B043555[Diameter][Tolerance]

G-variant (see page 11):
- Diameter in increments of 0.001 mm freely selectable
- From tolerance ≥ 4 μm orderable

Specification G-variant:
B043555[Diameter][Tolerance]

Example tolerance IT8:
B043555-Ø11.530H8

Bore diameter $d_1 = 11,530 H8$

Example G-variant:
B043555-Ø11.530+4

Special tool diameter $d_1 = 11,530 +4 \mu m$

Dimensions configurable series IT6

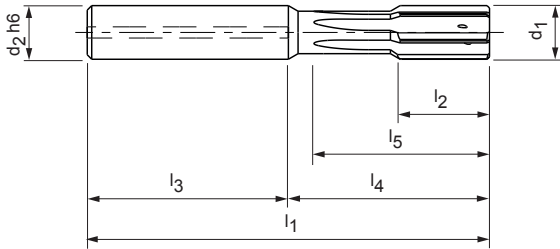
d_1	$d_2 h_6$	l_1	l_2	l_3	l_4	l_5	z
3,701 - 5,200	4	50	12	28	22	19	4
5,201 - 6,200	6	64	12	36	28	25	4
6,201 - 7,700	6	70	16	36	34	31	6
7,701 - 8,200	8	75	16	36	39	36	6
8,201 - 8,700	8	75	20	36	39	36	6
8,701 - 9,700	8	80	20	36	44	41	6
9,701 - 10,700	10	80	20	40	40	37	6
10,701 - 11,700	10	85	20	40	45	42	6
11,701 - 13,200	12	90	20	45	45	42	6
13,201 - 14,200	14	95	22	45	50	47	6
14,201 - 15,200	14	100	22	45	55	52	6
15,201 - 16,200	16	105	25	48	57	54	6
16,201 - 17,200	16	110	25	48	62	59	6
17,201 - 19,200	18	110	25	48	62	59	6
19,201 - 20,200	20	115	25	50	65	62	6

HNC-Plus H

Fixed version, straight fluted, for blind and through bore
B043585, internal coolant supply

Design:

Diameter: 3,701 - 20,200 mm
Cutting direction: Right-hand cutting
Cutting material: Solid carbide, BHT-coated
Flute form: Straight fluted
Geometry: HPC, EU spacing



Configurable features



Bore diameter tolerance ≥ IT6:
- Diameter in increments of 0.001 mm freely selectable

Specification:
B043585[Diameter][Tolerance]

G-variant (see page 11):
- Diameter in increments of 0.001 mm freely selectable
- From tolerance ≥ 5 µm orderable

Specification G-variant:
B043585[Diameter][Tolerance]

Example tolerance IT8:
B043585-Ø11.530H8

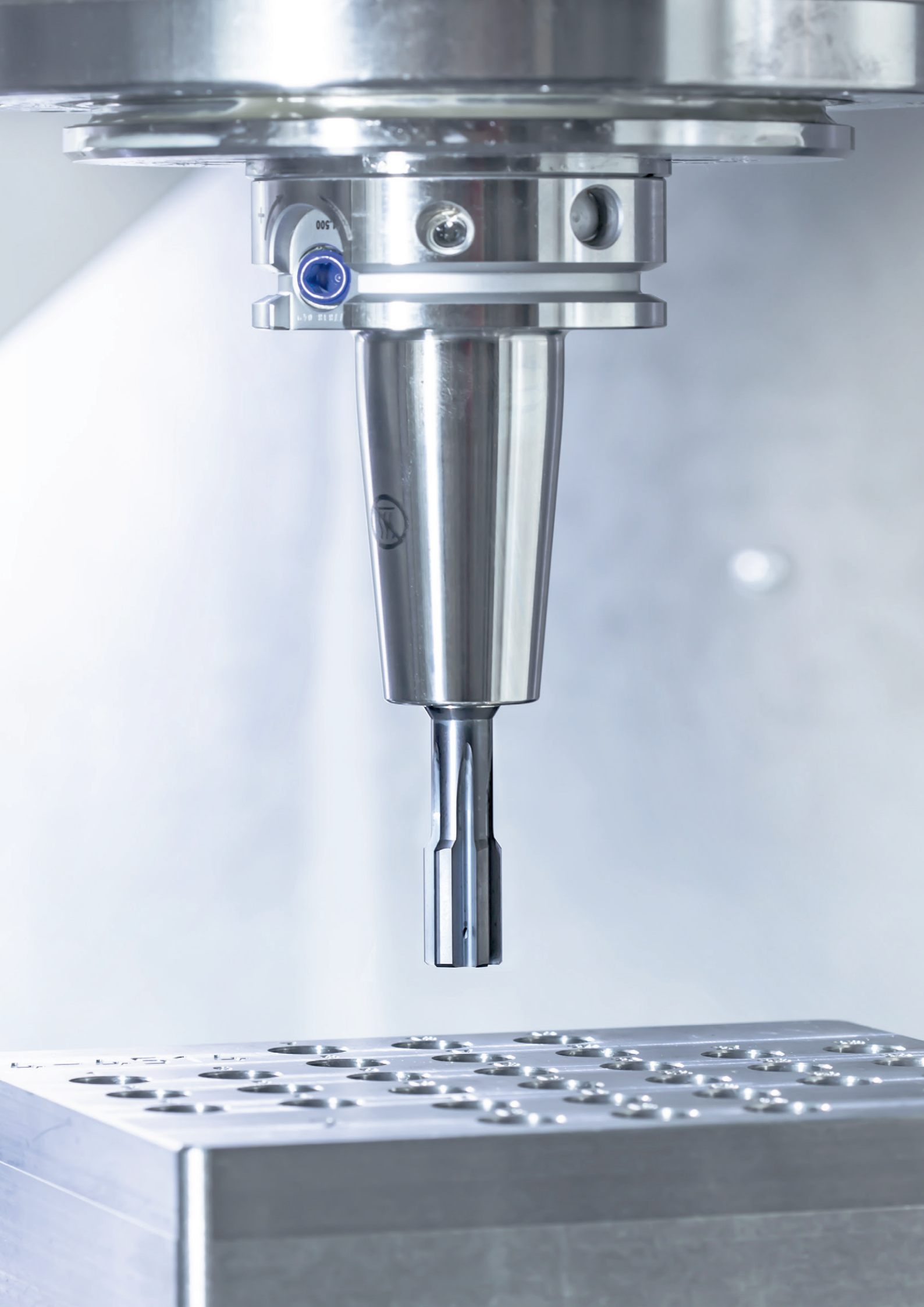
Bore diameter $d_1 = 11,530 \text{ H8}$

Example G-variant:
B043585-Ø11.530+5

Special tool diameter $d_1 = 11,530 +5 \mu\text{m}$

Dimensions configurable series IT6

d_1	$d_2 h_6$	l_1	l_2	l_3	l_4	l_5	z
3,701 - 5,200	4	50	12	28	22	19	4
5,201 - 6,200	6	64	12	36	28	25	4
6,201 - 7,700	6	70	16	36	34	31	6
7,701 - 8,200	8	75	16	36	39	36	6
8,201 - 8,700	8	75	20	36	39	36	6
8,701 - 9,700	8	80	20	36	44	41	6
9,701 - 10,700	10	80	20	40	40	37	6
10,701 - 11,700	10	85	20	40	45	42	6
11,701 - 13,200	12	90	20	45	45	42	6
13,201 - 14,200	14	95	22	45	50	47	6
14,201 - 15,200	14	100	22	45	55	52	6
15,201 - 16,200	16	105	25	48	57	54	6
16,201 - 17,200	16	110	25	48	62	59	6
17,201 - 19,200	18	110	25	48	62	59	6
19,201 - 20,200	20	115	25	50	65	62	6



Recommended cutting values

Cutting speed v_c [m/min], feed rate f [mm/rev] and stock a [mm].

HNC-Plus | B043555, B043565, B043575, B043585

MG*		Material	Strength/ Hardness [N/mm ²] [HRC]	v_c	Feed f (mm/u) and stock a (mm) for tool diameter												
					< 5,7		> 5,7-6,2		> 6,2-8		> 8-12		> 12-16,2		> 16,2-20,2		
					f	a	f	a	f	a	f	a	f	a	f	a	
P	P1	P1.1	Structural, free-cutting, case-hardening and heat-treatable steels, unalloyed	< 700	180	0,60	0,10	1,00	0,10	1,20	0,10	1,20	0,15	1,50	0,20	1,80	0,20
		P1.2	Structural, free-cutting, case-hardening and heat-treatable steels, unalloyed	< 1.200	150	0,40	0,10	0,80	0,10	1,00	0,10	1,00	0,15	1,20	0,20	1,50	0,20
	P2	P2.1	Nitriding, case-hardening and heat-treatable steels, alloyed	< 900	180	0,60	0,10	1,00	0,10	1,20	0,10	1,20	0,15	1,50	0,20	1,80	0,20
		P2.2	Nitriding, case-hardening and heat-treatable steels, alloyed	< 1.400	140	0,30	0,10	0,60	0,10	0,80	0,10	0,80	0,15	1,00	0,20	1,20	0,20
	P3	P3.1	Tool steels, rolling bearing steels, spring steels and high-speed steels**	< 800	180	0,60	0,10	1,00	0,10	1,20	0,10	1,20	0,15	1,50	0,20	1,80	0,20
		P3.2	Tool steels, rolling bearing steels, spring steels and high-speed steels**	< 1.000	160	0,40	0,10	0,80	0,10	1,00	0,10	1,00	0,15	1,20	0,20	1,50	0,20
		P3.3	Tool steels, rolling bearing steels, spring steels and high-speed steels**	< 1.500	140	0,30	0,10	0,60	0,10	0,80	0,10	0,80	0,15	1,00	0,20	1,20	0,20
	P4	P4.1	Stainless steels, ferritic and martensitic		40	0,10	0,05	0,15	0,10	0,30	0,10	0,40	0,10	0,50	0,20	0,60	0,20
	P5	P5.1	Cast steel		140	0,30	0,10	0,60	0,10	0,80	0,10	0,80	0,15	1,00	0,20	1,20	0,20
	P6	P6.1	Stainless steel castings, ferritic and martensitic		40	0,10	0,05	0,15	0,10	0,30	0,10	0,40	0,10	0,50	0,20	0,60	0,20
M	M1	M1.1	Stainless steels, austenitic	< 700	50	0,15	0,05	0,20	0,10	0,40	0,10	0,50	0,10	0,70	0,2	0,80	0,20
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1.000	40	0,15	0,05	0,20	0,10	0,40	0,10	0,50	0,10	0,70	0,2	0,80	0,20
	M2	M2.1	Cast stainless steels, austenitic	< 700	50	0,15	0,05	0,20	0,10	0,40	0,10	0,50	0,10	0,70	0,2	0,80	0,20
	M3	M3.1	Stainless cast steel, ferritic/austenitic (duplex)	< 1.000	40	0,15	0,05	0,20	0,10	0,40	0,10	0,50	0,10	0,70	0,2	0,80	0,20
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), GJL	< 300	100	0,50	0,10	1,20	0,10	1,20	0,10	1,50	0,20	1,80	0,20	1,80	0,20
		K2.1	Cast iron with spheroidal graphite, GJS	< 500	100	0,50	0,10	1,20	0,10	1,20	0,10	1,50	0,20	1,80	0,20	1,80	0,20
	K2	K2.2	Cast iron with spheroidal graphite, GJS	≤ 800	100	0,50	0,10	1,20	0,10	1,20	0,10	1,50	0,20	1,80	0,20	1,80	0,20
		K2.3	Spheroidal graphite cast iron, GJS	> 800	100	0,50	0,10	1,20	0,10	1,20	0,10	1,50	0,20	1,80	0,20	1,80	0,20
	K3	K3.1	Vermicular graphite cast iron, GJV; Malleable cast iron, GJM	< 500	100	0,50	0,10	1,20	0,10	1,20	0,10	1,50	0,20	1,80	0,20	1,80	0,20
		K3.2	Cast iron with vermicular graphite, GJV; malleable cast iron, GJM	> 500	100	0,50	0,10	1,20	0,10	1,20	0,10	1,50	0,20	1,80	0,20	1,80	0,20
N	N1	N1.1	Aluminium, unalloyed and alloyed < 3 % Si		250	0,50	0,10	0,60	0,10	0,80	0,10	1,30	0,20	1,50	0,30	1,80	0,30
		N1.2	Aluminium, alloyed ≤ 7 % Si		250	0,50	0,10	0,60	0,10	0,80	0,10	1,30	0,20	1,50	0,30	1,80	0,30
		N1.3	Aluminium, alloyed > 7-12 % Si		250	0,50	0,10	0,60	0,10	0,80	0,10	1,30	0,20	1,50	0,30	1,80	0,30
		N1.4	Aluminium, alloyed > 12 % Si	< 300	250	0,50	0,10	0,60	0,10	0,80	0,10	1,30	0,20	1,50	0,30	1,80	0,30
S	S1	S1.1	Titanium, titanium alloys	< 40	20	0,20	0,05	0,30	0,05	0,30	0,10	0,30	0,10	0,30	0,15	0,30	0,20
		S2.1	Titanium, titanium alloys	> 1.200	20	0,20	0,05	0,30	0,05	0,30	0,10	0,30	0,10	0,30	0,15	0,30	0,20
	S2	S2.2	Titanium, titanium alloys	< 1.200	20	0,20	0,05	0,30	0,05	0,30	0,10	0,30	0,10	0,30	0,15	0,30	0,20
		S3.1	Nickel, unalloyed and alloyed	> 900	20	0,20	0,05	0,30	0,05	0,30	0,10	0,30	0,10	0,30	0,15	0,30	0,20
	S3	S3.2	Nickel, unalloyed and alloyed	> 900	20	0,20	0,05	0,30	0,05	0,30	0,10	0,30	0,10	0,30	0,15	0,30	0,20
		S4.1	High temperature superalloy, Ni-, Co-, and Fe-based		20	0,20	0,05	0,30	0,05	0,30	0,10	0,30	0,10	0,30	0,15	0,30	0,20
S5	S5.1	Tungsten and molybdenum alloy		20	0,20	0,05	0,30	0,05	0,30	0,10	0,30	0,10	0,30	0,15	0,30	0,20	
H	H1	H1.1	Hardened steel / cast steel	< 44	10	0,06	0,05	0,10	0,05	0,12	0,05	0,12	0,10	0,18	0,10	0,18	0,20
		H1.2	Hardened steel / cast steel	< 55	10	0,06	0,05	0,10	0,05	0,12	0,05	0,12	0,10	0,18	0,10	0,18	0,20

The values given are guide values.

The optimum data for the respective machining case may deviate slightly.

* BECK machining groups

** If the alloy components Cr, Mo, Ni, V, W in total > 8 %, then select the next higher BECK machining group.

Explanation

Pictograms



Product with Configurable features



Performance Line:
Specialist tools for selected applications
maximum precision and productivity



Through bore



Blind Bore



Maximum achievable achievable bore tolerance $\geq IT$



Preferred series in H7



Tolerance Tool grinding diameter



Coolant supply



Cylindrical shank HA according to DIN

Material suitability



Ideally suited



Conditionally suitable

Ex. standard material suitability table

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

Explanation G-variant: Permissible workpiece tolerances for selecting the tool diameter.

Design G-variant: The G-variant specifies the tool diameter of the reamer with our manufacturing tolerances.

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