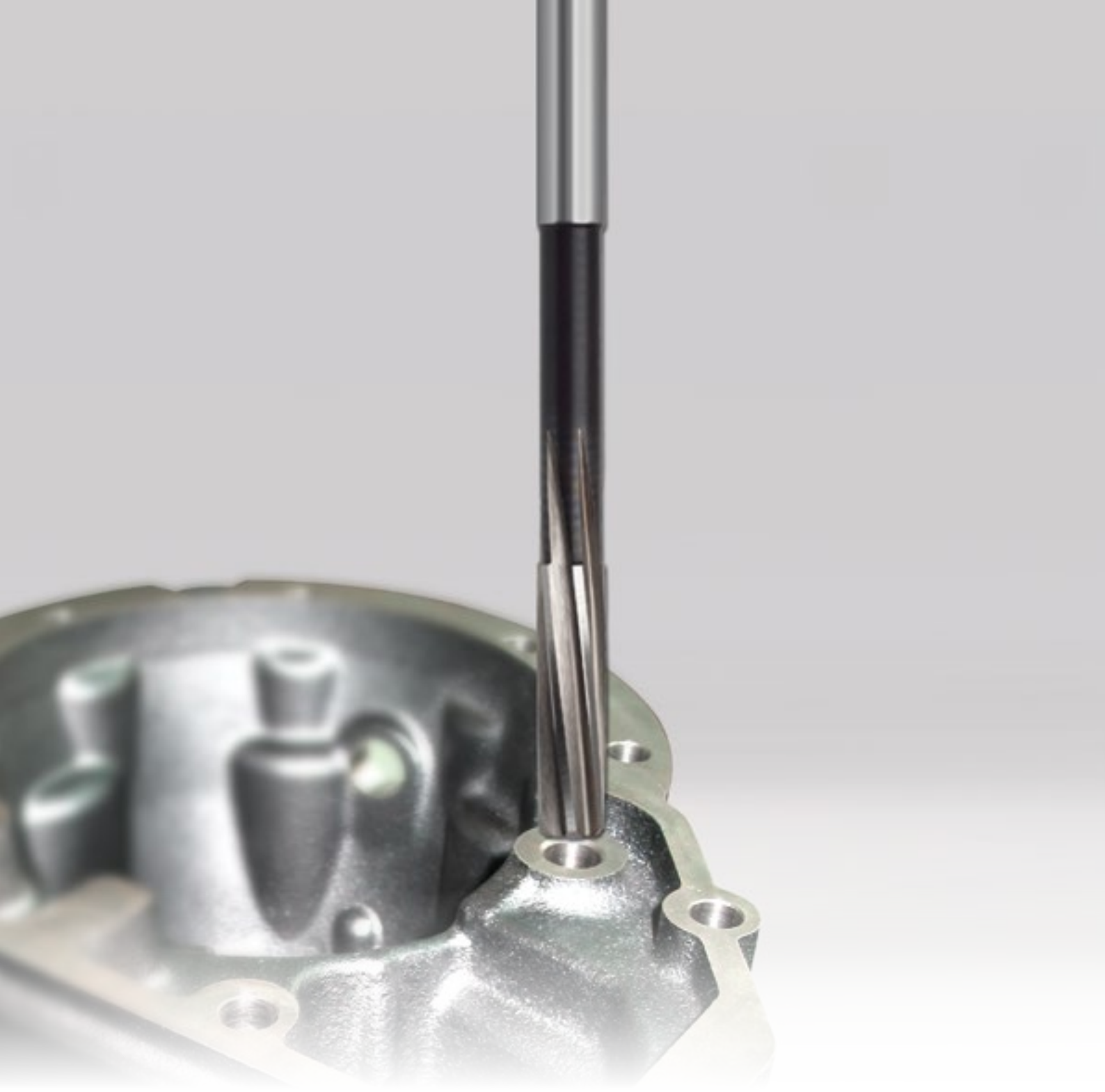
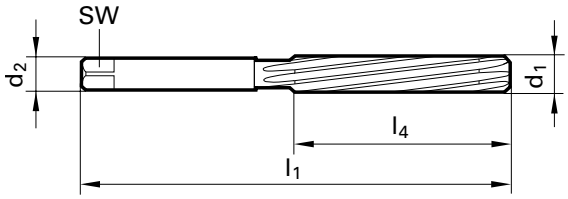


REAMERS

METRIC HAND REAMERS - HSS

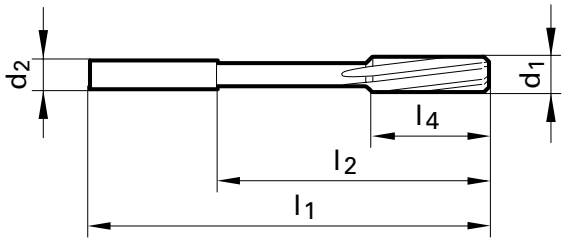
Guhring no.	**413**
Standard	**DIN 206**
Tool material	**HSS**
Surface	○
Form	**B**
Cutting direction	**rh**
Tolerance	**H7**



d1	d2	l1	l4	SW	z	AVAILABILITY
mm	mm	mm	mm	mm		
5.000	5.000	87.00	44.00	3.80	6	•
6.000	6.000	93.00	47.00	4.90	6	•
7.000	7.000	107.00	54.00	5.50	6	•
8.000	8.000	115.00	58.00	6.20	6	•
9.000	9.000	124.00	62.00	7.00	6	•
10.000	10.000	133.00	66.00	8.00	6	•
11.000	11.000	142.00	71.00	9.00	6	•
12.000	12.000	152.00	76.00	9.00	6	•
13.000	13.000	152.00	76.00	10.00	6	•
14.000	14.000	163.00	81.00	11.00	8	•
15.000	15.000	163.00	81.00	12.00	8	•
16.000	16.000	175.00	87.00	12.00	8	•
17.000	17.000	175.00	87.00	13.00	8	•
18.000	18.000	188.00	93.00	14.50	8	•
19.000	19.000	188.00	93.00	14.50	8	•
20.000	20.000	201.00	100.00	16.00	8	•

MACHINE CHUCKING REAMERS - HSS-E

Guhring no.	**468**	**5004**
Standard	**DIN 212**	
Tool material	**HSS-E**	**HSS-E**
Surface	○	○
Form	**D**	**D**
Cutting direction	**rh**	**rh**
Tolerance	**H7**	**H7**

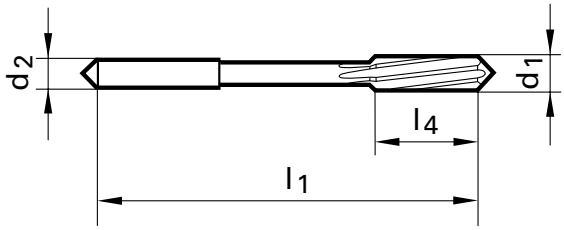


d1		d2	l1	l2	l4	z	AVAILABILITY	
mm	inch	mm	mm	mm	mm			
4.000		4.000	75.00	43.00	19.00	6	•	
4.500		4.500	80.00	47.00	21.00	6	•	
5.000		5.000	86.00	52.00	23.00	6	•	
5.500		5.600	93.00	57.00	26.00	6	•	
6.000		5.600	93.00	57.00	26.00	6	•	
6.500		6.300	101.00	63.00	28.00	6	•	
7.000		7.100	109.00	69.00	31.00	6	•	
8.000		8.000	117.00	75.00	33.00	6	•	
9.000		9.000	125.00	81.00	36.00	6	•	
10.000		10.000	133.00	87.00	38.00	6	•	
11.000		10.000	142.00	96.00	41.00	6	•	
12.000		10.000	151.00	105.00	44.00	6	•	
13.000		10.000	151.00	105.00	44.00	6	•	
14.000		12.500	160.00	110.00	47.00	8	•	
15.000		12.500	162.00	112.00	50.00	8	•	
16.000		12.500	170.00	120.00	52.00	8	•	
17.000		14.000	175.00	123.00	54.00	8	•	
18.000		14.000	182.00	130.00	56.00	8	•	
19.000		16.000	189.00	131.00	58.00	8	•	
20.000		16.000	195.00	137.00	60.00	8	•	
12.700	1/2	10.000	151.00	111.00	44.00	6		•
14.287	9/16	12.500	162.00	117.00	50.00	8		•
15.875	5/8	12.500	170.00	125.00	52.00	8		•
19.050	3/4	16.000	189.00	141.00	58.00	8		•
22.225	7/8	18.000	217.00	161.00	66.00	8		•
25.400	1	20.000	234.00	174.00	70.00	8		•

○ Bright ● Steam Tempered ◓ Nitrided Lands (S) S-Coated (TiN) (A) A-Coated (TiAlN) (C) C-Coated (TiCN) (F) F-Coated (FIRE)

MACHINE CHUCKING REAMERS - HSS-E

Guhring no.	496
Standard	DIN 212
Tool material	HSS-E
Surface	◯
Form	B/D
Cutting direction	rh
Tolerance	-0/+0.005

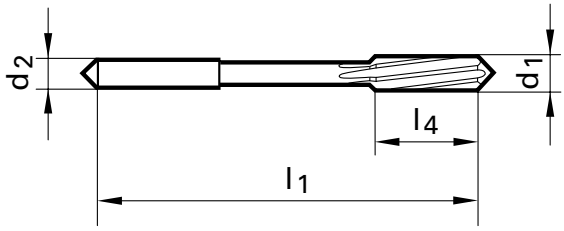


Available in .01mm increments on request

d1		d2	l1	l4	z	AVAILABILITY
mm	inch	mm	mm	mm		
1.000		1.00	34.00	5.50	3	•
1.020		1.10	34.00	5.50	3	•
1.100		1.10	34.00	5.50	3	•
1.200		1.20	38.00	7.50	3	•
1.300		1.30	38.00	7.50	3	•
1.320		1.40	38.00	7.50	3	•
1.400		1.40	40.00	8.00	3	•
1.500		1.50	40.00	8.00	3	•
1.520		1.60	43.00	9.00	3	•
1.590	1/18	1.60	43.00	9.00	3	•
1.600		1.60	43.00	9.00	3	•
1.700		1.70	43.00	9.00	3	•
1.780		1.80	46.00	10.00	4	•
1.800		1.80	46.00	10.00	4	•
1.870		1.90	46.00	10.00	4	•
1.900		1.90	46.00	10.00	4	•
1.990		2.00	49.00	11.00	4	•
2.000		2.00	49.00	11.00	4	•
2.010		2.10	49.00	11.00	4	•
2.020		2.10	49.00	11.00	4	•
2.100		2.10	49.00	11.00	4	•
2.200		2.20	53.00	12.00	4	•
2.300		2.30	53.00	12.00	4	•
2.400		2.50	57.00	14.00	4	•
2.490		2.50	57.00	14.00	4	•
2.500		2.50	57.00	14.00	4	•
2.520		2.50	57.00	14.00	4	•
2.530		2.50	57.00	14.00	4	•
2.600		2.50	57.00	14.00	4	•
2.700		2.80	61.00	15.00	6	•
2.800		2.80	61.00	15.00	6	•
2.900		3.00	61.00	15.00	6	•
2.960		3.00	61.00	15.00	6	•

MACHINE CHUCKING REAMERS - HSS-E

Guhring no.	**496**
Standard	**DIN 212**
Tool material	**HSS-E**
Surface	○
Form	**B/D**
Cutting direction	**rh**
Tolerance	**-0/+0.005**

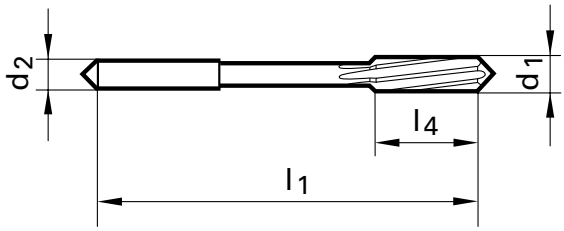


Available in .01mm increments on request

d1		d2	l1	l4	z	AVAILABILITY
mm	inch	mm	mm	mm		
2.980		3.00	61.00	15.00	6	•
2.990		3.00	61.00	15.00	6	•
3.000		3.00	61.00	15.00	6	•
3.010		3.20	65.00	16.00	6	•
3.020		3.20	65.00	16.00	6	•
3.100		3.20	65.00	16.00	6	•
3.170	1/8	3.20	65.00	16.00	6	•
3.180		3.20	65.00	16.00	6	•
3.200		3.20	65.00	16.00	6	•
3.300		3.20	65.00	16.00	6	•
3.370		3.50	70.00	18.00	6	•
3.380		3.50	70.00	18.00	6	•
3.400		3.50	70.00	18.00	6	•
3.480		3.50	70.00	18.00	6	•
3.500		3.50	70.00	18.00	6	•
3.520		3.50	70.00	18.00	6	•
3.570	9/64	3.50	70.00	18.00	6	•
3.600		3.50	70.00	18.00	6	•
3.700		3.50	70.00	18.00	6	•
3.730		3.50	70.00	18.00	6	•
3.760		4.00	75.00	19.00	6	•
3.800		4.00	75.00	19.00	6	•
3.900		4.00	75.00	19.00	6	•
3.970	5/32	4.00	75.00	19.00	6	•
3.980		4.00	75.00	19.00	6	•
3.990		4.00	75.00	19.00	6	•
4.010		4.00	75.00	19.00	6	•
4.020		4.00	75.00	19.00	6	•
4.030		4.00	75.00	19.00	6	•
4.100		4.00	75.00	19.00	6	•
4.150		4.00	75.00	19.00	6	•
4.200		4.00	75.00	19.00	6	•
4.300		4.50	80.00	21.00	6	•

MACHINE CHUCKING REAMERS - HSS-E

Guhring no.	**496**
Standard	**DIN 212**
Tool material	**HSS-E**
Surface	○
Form	**B/D**
Cutting direction	**rh**
Tolerance	**-0/+0.005**

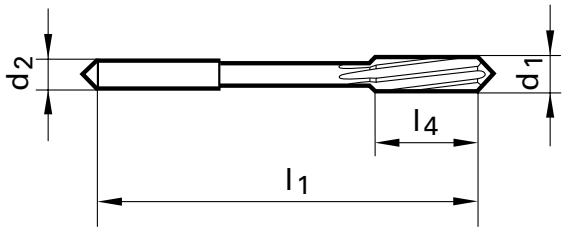


Available in .01mm increments on request

d1		d2	l1	l4	z	AVAILABILITY
mm	inch	mm	mm	mm		
4.370	11/64	4.50	80.00	21.00	6	•
4.400		4.50	80.00	21.00	6	•
4.600		4.50	80.00	21.00	6	•
4.700		4.50	80.00	21.00	6	•
4.750		4.50	80.00	21.00	6	•
4.760	3/16	5.00	86.00	23.00	6	•
4.800		5.00	86.00	23.00	6	•
4.900		5.00	86.00	23.00	6	•
4.980		5.00	86.00	23.00	6	•
4.990		5.00	86.00	23.00	6	•
5.010		5.00	86.00	23.00	6	•
5.020		5.00	86.00	23.00	6	•
5.040		5.00	86.00	23.00	6	•
5.100		5.00	86.00	23.00	6	•
5.200		5.00	86.00	23.00	6	•
5.300		5.00	86.00	23.00	6	•
5.400		5.60	93.00	26.00	6	•
5.500		5.60	93.00	26.00	6	•
5.600		5.60	93.00	26.00	6	•
5.700		5.60	93.00	26.00	6	•
5.800		5.60	93.00	26.00	6	•
5.900		5.60	93.00	26.00	6	•
5.980		5.60	93.00	26.00	6	•
5.990		5.60	93.00	26.00	6	•
6.010		6.30	101.00	28.00	6	•
6.020		6.30	101.00	28.00	6	•
6.100		6.30	101.00	28.00	6	•
6.200		6.30	101.00	28.00	6	•
6.300		6.30	101.00	28.00	6	•
6.340		6.30	101.00	28.00	6	•
6.350	1/4	6.30	101.00	28.00	6	•
6.370		6.30	101.00	28.00	6	•
6.400		6.30	101.00	28.00	6	•

MACHINE CHUCKING REAMERS - HSS-E

Guhring no.	496
Standard	DIN 212
Tool material	HSS-E
Surface	◯
Form	B/D
Cutting direction	rh
Tolerance	-0/+0.005

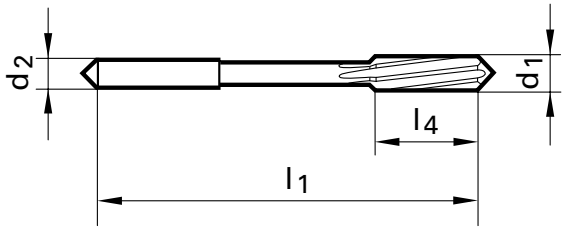


Available in .01mm increments on request

d1		d2	l1	l4	z	AVAILABILITY
mm	inch	mm	mm	mm		
6.500		6.30	101.00	28.00	6	
6.600		6.30	101.00	28.00	6	•
6.700		6.30	101.00	28.00	6	•
6.800		7.10	109.00	31.00	6	•
6.900		7.10	109.00	31.00	6	•
7.020		7.10	109.00	31.00	6	•
7.100		7.10	109.00	31.00	6	•
7.140	9/32	7.10	109.00	31.00	6	•
7.200		7.10	109.00	31.00	6	•
7.300		7.10	109.00	31.00	6	•
7.400		7.10	109.00	31.00	6	•
7.500		7.10	109.00	31.00	6	•
7.600		8.00	117.00	33.00	6	•
7.700		8.00	117.00	33.00	6	•
7.800		8.00	117.00	33.00	6	•
7.900		8.00	117.00	33.00	6	•
7.930		8.00	117.00	33.00	6	•
7.940	5/16	8.00	117.00	33.00	6	•
7.980		8.00	117.00	33.00	6	•
8.010		8.00	117.00	33.00	6	•
8.020		8.00	117.00	33.00	6	•
8.030		8.00	117.00	33.00	6	•
8.100		8.00	117.00	33.00	6	•
8.200		8.00	117.00	33.00	6	•
8.300		8.00	117.00	33.00	6	•
8.400		8.00	117.00	33.00	6	•
8.500		8.00	117.00	33.00	6	•
8.600		9.00	125.00	36.00	6	•
8.700		9.00	125.00	36.00	6	•
8.730	11/32	9.00	125.00	36.00	6	•
8.800		9.00	125.00	36.00	6	•
8.900		9.00	125.00	36.00	6	•
8.960		9.00	125.00	36.00	6	•

MACHINE CHUCKING REAMERS - HSS-E

Guhring no.	496
Standard	DIN 212
Tool material	HSS-E
Surface	◯
Form	B/D
Cutting direction	rh
Tolerance	-0/+0.005

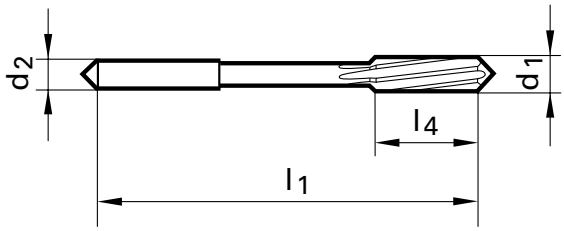


Available in .01mm increments on request

d1		d2	l1	l4	z	AVAILABILITY
mm	inch	mm	mm	mm		
8.980		9.00	125.00	36.00	6	•
9.100		9.00	125.00	36.00	6	•
9.200		9.00	125.00	36.00	6	•
9.300		9.00	125.00	36.00	6	•
9.400		9.00	125.00	36.00	6	•
9.500		9.00	125.00	36.00	6	•
9.520	3/8	10.00	133.00	38.00	6	•
9.530		10.00	133.00	38.00	6	•
9.540		10.00	133.00	38.00	6	•
9.600		10.00	133.00	38.00	6	•
9.700		10.00	133.00	38.00	6	•
9.800		10.00	133.00	38.00	6	•
9.900		10.00	133.00	38.00	6	•
9.980		10.00	133.00	38.00	6	•
9.990		10.00	133.00	38.00	6	•
10.010		10.00	133.00	38.00	6	•
10.020		10.00	133.00	38.00	6	•
10.030		10.00	133.00	38.00	6	•
10.100		10.00	133.00	38.00	6	•
10.200		10.00	133.00	38.00	6	•
10.300		10.00	133.00	38.00	6	•
10.320	13/32	10.00	133.00	38.00	6	•
10.400		10.00	133.00	38.00	6	•
10.500		10.00	133.00	38.00	6	•
10.530		10.00	133.00	38.00	6	•
10.600		10.00	133.00	38.00	6	•
10.700		10.00	142.00	41.00	6	•
10.800		10.00	142.00	41.00	6	•
10.900		10.00	142.00	41.00	6	•
11.020		10.00	142.00	41.00	6	•
11.100		10.00	142.00	41.00	6	•
11.110	7/16	10.00	142.00	41.00	6	•
11.200		10.00	142.00	41.00	6	•

MACHINE CHUCKING REAMERS - HSS-E

Guhring no.	**496**
Standard	**DIN 212**
Tool material	**HSS-E**
Surface	○
Form	**B/D**
Cutting direction	**rh**
Tolerance	**-0/+0.005**



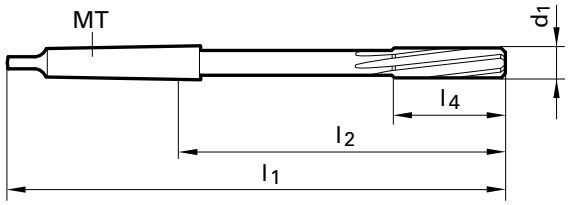
d1		d2	l1	l4	z	AVAILABILITY
mm	inch	nn	mm	mm		
11.300		10.00	142.00	41.00	6	•
11.400		10.00	142.00	41.00	6	•
11.500		10.00	142.00	41.00	6	•
11.600		10.00	142.00	41.00	6	•
11.700		10.00	142.00	41.00	6	•
11.800		10.00	142.00	41.00	6	•
11.900		10.00	151.00	44.00	6	•
11.980		10.00	151.00	44.00	6	•
11.990		10.00	151.00	44.00	6	•
12.020		10.00	151.00	44.00	6	•
12.040		10.00	151.00	44.00	6	•

Available in 0.01mm increments on request

○ Bright ● Steam Tempered ◓ Nitrided Lands (S) S-Coated (TiN) (A) A-Coated (TiAlN) (C) C-Coated (TiCN) (F) F-Coated (FIRE)

MACHINE REAMERS TAPER SHANK - HSS-E

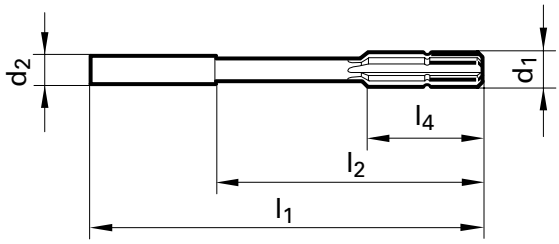
Guhring no.	**405**
Standard	**DIN 208**
Tool material	**HSS-E**
Surface	○
Form	**B**
Cutting direction	**rh**
Tolerance	**h7**



d1	MT	l1	l2	l4	z	AVAILABILITY
mm		mm	mm	mm		
13.000	1	182.00	120.00	44.00	6	•
14.000	1	189.00	127.00	47.00	8	•
15.000	2	204.00	129.00	50.00	8	•
16.000	2	210.00	135.00	52.00	8	•
17.000	2	214.00	139.00	54.00	8	•
18.000	2	219.00	144.00	56.00	8	•
19.000	2	223.00	148.00	58.00	8	•
20.000	2	228.00	153.00	60.00	8	•
21.000	2	232.00	157.00	62.00	8	•
22.000	2	237.00	162.00	64.00	8	•
23.000	2	241.00	166.00	66.00	8	•
24.000	3	268.00	174.00	68.00	8	•
25.000	3	268.00	174.00	68.00	8	•
26.000	3	273.00	179.00	70.00	8	•
28.000	3	277.00	183.00	71.00	10	•
30.000	3	281.00	187.00	73.00	10	•
32.000	4	317.00	199.50	77.00	10	•
34.000	4	321.00	203.50	78.00	10	•
35.000	4	321.00	203.50	78.00	10	•
36.000	4	325.00	207.50	79.00	10	•
38.000	4	329.00	211.50	81.00	10	•
40.000	4	329.00	211.50	81.00	10	•
50.000	4	344.00	226.50	86.00	12	•

MACHINE CHUCKING REAMERS - CARBIDE

Guhring no.	1409
Standard	Guhring std.
Tool material	Carbide
Carbide grade	K10
Surface	◯
Form	B
Cutting direction	rh
Tolerance	H7

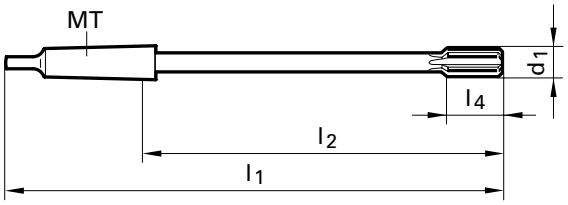


d1	d2	l1	l2	l4	z	AVAILABILITY
mm	mm	mm	mm	mm		
1.000	1.000	34.00	10.50	5.50	3	•
2.000	2.000	49.00	16.00	11.00	4	•
3.000	3.000	61.00	20.00	15.00	6	•
4.000	4.000	75.00	43.00	19.00	6	•
5.000	5.000	86.00	52.00	23.00	6	•
6.000	5.600	93.00	57.00	26.00	6	•
7.000	7.100	109.00	69.00	31.00	6	•
8.000	8.000	117.00	75.00	33.00	6	•
9.000	9.000	125.00	81.00	36.00	6	•
10.000	10.000	133.00	87.00	38.00	6	•
11.000	10.000	142.00	96.00	41.00	6	•
12.000	10.000	151.00	105.00	44.00	6	•
14.000	12.000	160.00	110.00	47.00	6	•
16.000	12.000	170.00	120.00	52.00	6	•
20.000	16.000	195.00	137.00	60.00	6	•

◯ Bright ◯ Steam Tempered ◓ Nitrided Lands (S) S-Coated (TiN) (A) A-Coated (TiAlN) (C) C-Coated (TiCN) (F) F-Coated (FIRE)

MACHINE REAMERS TAPER SHANK - CARBIDE

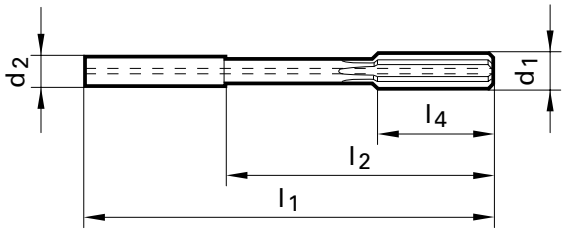
Guhring no.	720
Standard	Guhring std.
Tool material	Carbide
Carbide grade	K10
Surface	◯
Form	B
Cutting direction	rh
Tolerance	h7



d1	MT	l1	l2	l4	z	AVAILABILITY
mm		mm	mm	mm		
20.000	2	228.00	153.00	19.00	6	•
22.000	2	237.00	162.00	22.00	6	•
24.000	3	268.00	174.00	22.00	8	•
25.000	3	268.00	174.00	22.00	8	•
26.000	3	273.00	179.00	22.00	8	•
30.000	3	281.00	187.00	25.00	8	•

HIGH PERFORMANCE MACHINE REAMERS - CARBIDE

Guhring no.	1685
Standard	Guhring std.
Tool material	Solid Carbide
Carbide grade	k10
Surface	A
Form	S
Cutting direction	rh
Tolerance	H7



d1	d2	l1	l2	l4	z	AVAILABILITY
mm	mm	mm	mm	mm		
6.000	6.000	76.00	40.00	5.50	4	•
8.000	8.000	101.00	65.00	11.00	6	•
10.000	10.000	101.00	20.00	61.00	6	•
12.000	12.000	130.00	43.00	85.00	6	•

Other sizes available on request

Bright · Steam Tempered · Nitrided Lands · S S-Coated (TiN) · A A-Coated (TiAlN) · C C-Coated (TiCN) · F F-Coated (FIRE)

SPECIAL SOLUTION HR 500 GT CARBIDE- OR CERMET-TIPPED HIGH-PERFORMANCE REAMERS - SPECIAL DESIGNS FOR Ø > 40 mm

Also above 40 mm diameter Guhring's HR 500 technology is the first choice for high-performance reaming. Numerous intelligent solutions ensure that even with these large diameters optimal quality is guaranteed:

Diversity for perfect machining results

HR 500 GT tool heads are available as a semi-standard with short delivery for the diameter range > 40 to 75 mm. The following material specific designs with individually optimised cutting edge geometry are available:

- Carbide-tipped with nanoA-coating for stainless steels, GGG 60, special alloys and non-ferrous metals
- Carbide-tipped with nanoA Cast-coating for GG
- Cermet-tipped for steels and GGG 40/50

We also manufacture special tools to customer specification upon request.

Secure clamping

For the secure clamping of the HR 500 GT tool head the straight shank is also fitted with a tang. Special, particularly slimGuhring hydraulic chucks, gauge lengths 150 and 250 mm and Ø 25 and 30 mm possess a corresponding internal contour in which the shank sits perfectly and securely. For short reaming depths HR 500 GT tool heads can also be clamped in conventional hydraulic chucks with maximum accuracy. In all cases, handling is very simple and flexible.

Optimal cooling lubrication

Thanks to the TiN-coated positioning screw on the face of the HR 500 GT tool head the cooling lubricant accurately reaches the cutting edges. A blocking of the coolant exits by chips during the machining process is impossible due to the very flat construction of the positioning screw. It is, however, possible to machine blind holes directly up to the base of the hole.

CUTTING SPEED RECOMMENDATION REAMING

Drill ø mm	Feed Column No. High Performance Reamers						
	71	72	73	74	75	76	77
	f (mm/rev)						
<4.00	0.080	0.100	0.125	0.300	0.500	0.800	1.000
4.00	0.100	0.125	0.160	0.300	0.500	1.000	1.200
5.00	0.100	0.125	0.160	0.400	0.600	1.000	1.400
6.30	0.125	0.160	0.200	0.400	0.700	1.200	1.600
8.00	0.160	0.200	0.250	0.600	1.000	1.800	2.400
10.00	0.200	0.250	0.315	0.600	1.200	1.800	2.400
12.50	0.200	0.250	0.315	0.800	1.200	2.000	2.500
16.00	0.250	0.315	0.400	0.800	1.400	2.200	2.600
20.00	0.315	0.400	0.500	0.800	1.400	2.200	2.600
25.00	0.400	0.500	0.630	1.000	1.600	3.500	3.000
31.50	0.400	0.500	0.630	1.000	2.000	3.000	3.600
40.00	0.500	0.630	0.800	1.200	2.000	3.000	3.600
50.00	0.630	0.800	1.000	1.400	2.200	3.200	3.600
>50.00	0.800	1.000	1.250	1.600	2.200	3.200	3.600

Drill ø mm	Feed Column No. Reamers f (mm/rev)								
	1	2	3	4	5	6	7	8	9
2.00	0.020	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.127
2.50	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.150
3.15	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.150
4.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.180
5.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.257
6.30	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.308
8.00	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.370
10.00	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.440
12.50	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.523
16.00	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.633
20.00	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.752
25.00	0.160	0.200	0.250	0.315	0.400	0.500	0.630	0.800	0.893

Coolant ● Soluble Oil ● Oil ○ Air

Tool Material	HSCO		Carbide		Carbide
Surface Finish		○		○	○
Guhring No.	468 / 496	405	1409	720	1685
Type	B+D	B	B	B	B
Internal Cooling	-	-	-	-	YES
DIN	212	208	8093	8051	Guhring std.

Material Group	Material Examples	Tens. Strength (N/mm²)	Hardness	Coolant	v_c m/min	Feed col.no.	v_c m/min	Feed col.no.	v_c m/min	Feed col.no.
Common Structural Steels	Mild steel, Grade 250 plate, Grade 350 plate	≤ 500		●	16	5	18	7	120-250	75-76
		> 500-850		●	14	5	16	7	120-250	75-76
Free-Cutting Steels	1020, S1214, S1213, S12L13, S12L14	≤ 850		●	14	5	18	7	120-250	75-76
		850-1000		●	10	5	16	7	120-250	75-76
Unalloyed Heat-Treatable Steels	1035, 1045, 1055, 1060, 1025	≤ 700		●	16	5	18	6	120-250	75-76
		700-850		●	14	5	16	6	120-250	75-76
		850-1000		●	10	4	14	6	120-250	75-76
Alloyed Heat-Treatable Steels	3140, 4130, 4140, 4150, 4340, 6150, EN16, EN26	850-1000		●	10	4	14	6	120-250	75-76
		1000-1200		●	8	4	12	5	120-250	75-76
Unalloyed Case Hardened Steels	1010, 1015	≤ 750		●	16	5	18	7	120-250	75-76
Alloyed Case Hardened Steels	3310, 3415, 5115, 4615, 4620, 5120, 8617, 8620, N33, EN36A	850-1000		●	10	4	14	6	120-250	75-76
		1000-1200		●	8	4	12	5	120-250	75-76
Nitriding Steels	1.8504 34CrAl6, 1.8519 31CrMo V9, 1.8550 34CrAlNi7	≥ 850-1000		●	10	4	14	5	120-250	75-76
		1000-1200		●	8	4	12	5	120-250	75-76
Tool Steels	H11, H13, P20, D2, D3	≤ 850		●	14	4	12	5	120-250	75-76
		850-1000		●	10	4	10	4	120-250	75-76
High Speed Steels	M2, M3, M35, M45	≥ 650-1000		●	10	3	10	4	60-120	75-76
Spring Steels	5155, 6150, 9255		≤ 330 HB	●			10	4	30-60	73-74
Stainless Steels, Sulphured	410S, 430F, 630	≤ 850		●	6	4	10	4	60-120	74-75
Austenitic	302, 303, 304, 310, 316, 316Ti, 321	≤ 850		●	6	4	8	4	40-80	74-75
Martensitic	410, 410X, 416, 420, 420C, 431, 440C	≤ 850		●	4	4	8	4	60-120	74-75
Hardened Steels	-		≤ 40-48 HRC	●					40-60	73-74
			> 48-60 HRC	●					30-60	73-74
Special Alloys	Nimonic, Inconel, Monel, Hastelloy, Bisalloy	≤ 1200		●	4	3	6	3	40-60	74-75
Cast Iron	GG10, GG15, GG20, GG25, GG30, GG35, GG40		≤ 240 HB	●○	14	5	30	7	60-140	75-76
			≤ 300 HB	●○	12	5	25	7	60-140	75-76
Spheroidal Graphite and Malleable Cast Iron	GGG40, GGG50, GGG60, GGG70, 32510, 50005, Nodular Iron		≤ 240 HB	●	14	5	30	7	120-250	75-76
			≤ 300 HB	●	12	5	25	7	60-120	75-76
Chilled Cast Iron	-		≤ 350 HB	●			4	4	30-50	74-75
Ti and Ti-alloys	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤ 850		●	6	4	10	5	40-80	74-75
	3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, -TiAl8Mo 1V1	850-1200		●	4	4	10	5	40-80	74-75
Al and Ti-alloys	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤ 400		●	20	7	30	8		
Al Wrought Alloys	3.0615 AlMgSiPb, 3.1325 AlCiMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤ 450		●	20	7	30	8		
Al Cast Alloys ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤ 600		●	20	6	30	8		
Al Cast Alloys >10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, -GAlSi12CuNiMg	≤ 600		●	18	6	25	8		
Magnesium Alloys	MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	≤ 450		○	20	6	25	8	80-160	75-76
Copper, Low-Alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤ 450		●	18	6	25	7		
Brass, Short-Chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤ 600		●	20	6	35	8	100-250	75-76
Brass, Long-Chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤ 600		●	16	6	30	8		
Bronze, Short-Chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤ 600		●●	20	6	35	8	100-250	75-76
	2.0790 CuNi18Zn19Pb	> 600 -850		●	18	6	30	8	100-250	75-76
Bronze, Long-Chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤ 850		●	18	6	30	7		
	2.0980 CuAl11Ni, 2.1247 CuBe2	850-1000		●	16	6	25	7		
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren		-	○	12	8	20	8	80-200	75-76
Thermoplastics	Plexiglas, Hostalen,Novodur, Makralon		-	●○	14	8	10	8	80-200	75-76
Kevlar	Kevlar			○	10	8	20	8	80-200	75-76
Glass, carbon Concentr. Plastics	GFK/CFK			○	8	8	20	8	80-200	75-76

○ Bright ● Steam Tempered ◓ Nitrided Lands (S) S-Coated (TiN) (A) A-Coated (TiAlN) (C) C-Coated (TiCN) (F) F-Coated (FIRE)