



Fromm präzision

main catalog

2022

HSS + HSS/E reamer
Carbide + carbide-tipped reamer
Coredrill, countersink
Special application reamer

Fromm Präzision GmbH & Co.KG
manufacturer for precision tools

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catalog edition 2022

General terms and conditions

1. Order placement:

An order is only deemed to have been placed if it has been confirmed by us in writing. Additions, changes or verbal agreements require our written confirmation to be effective. The documents contained in our printed matter, such as dimensions and weights, illustrations and descriptions, are only approximately authoritative, without there being any obligation to notify us of changes that have been made. In illustrations, drawings, sketches and other documents we reserve ownership and copyright; they may not be made accessible to others without our permission and must be returned immediately upon request. The customer assumes full liability for the documents to be supplied by him, such as drawings, gauges, samples or the like. Verbal information about dimensions and the like require written confirmation. For documents that the customer makes available, he bears full responsibility with regard to commercial legal protection. Samples are only delivered with retention of title. Call orders are to be fulfilled within a maximum of 12 months or an agreed term.

2. Prices:

The prices are ex works and do not include packaging, freight, postage and value insurance. The same applies to partial deliveries and express shipments. Packaging and shipping are done to the best of our judgement, but without any obligation.

3. Terms of payment:

Payments are to be made in EURO without any deductions free to our payment office in accordance with the agreed terms of payment. Orders with a net value of less than €150 will be subject to a €50 processing fee. In the event of late payment, interest will be charged at the rate charged by our bank for credit claims, subject to the right to claim further damages. The withholding of payments or offsetting due to any counterclaims by the customer are excluded. We reserve ownership of the delivered goods until the purchase price has been paid in full, including interest and the costs of any legal action, including against third parties. We are entitled to assert the retention of title, except to charge an additional flat-rate fee of 10% of the sales price for the proven expenses. Deliveries to companies unknown to us are only made if the amount is sent in advance. In the event of suspension of payment or bankruptcy of the customer, the purchase price claim is due immediately.

4. Delivery time:

The delivery time is calculated from the day of the order confirmation until dispatch from the factory. Adherence to this presupposes that the customer has fulfilled his contractual obligations, in particular the agreed terms of payment, and that all documents to be supplied by the customer have been received in good time. Unforeseen obstacles - regardless of whether they occur in our plant itself or at our subcontractors - such as: cases of force majeure, political influences, strikes, rejects or other delays in the completion of essential delivery parts through no fault of our own, general difficulties in procuring materials for the industry, others Malfunctions, delays in transport release us from adhering to the agreed delivery times. In such cases, the delivery time will be extended appropriately. Even then, the aforementioned circumstances are not acceptable to the supplier

General terms and conditions

responsible if they occur during an already existing delay in delivery. The customer is not entitled to compensation if the delivery time is exceeded.

5. Shipping:

Shipping is at the risk of the customer. Goods lost or damaged during transport will only be replaced by us on the basis of a new order against calculation of the currently valid prices. We only take out insurance against transport damage if expressly requested by the customer for his account and to the best of our judgement. Deviations from the delivery note or the invoice must be reported in writing immediately after receipt of the goods.

6. Liability for defects:

Defective tools will be replaced free of charge within the statutory limitation period. No liability is assumed for tools that are subject to premature consumption due to their material properties or the way they are used, nor for damage resulting from natural wear and tear, incorrect or negligent treatment, excessive stress, unsuitable operating resources, chemical, electrochemical or electrical influences, Weather or other natural influences. All orders, especially orders with abnormal dimensions and special orders, will be confirmed by us. The customer is obliged to this order confirmation to check that they are correct and to correct any discrepancies immediately. The text of our order confirmation is decisive for the execution of the order.

7. Special tools:

When ordering non-catalogue items, the delivery quantity may be about 10% more or less than the order quantity. With order quantities up to 5 pieces by 1 piece, with order quantities from 6 to 20 pieces by 2 pieces. The delivery quantity is calculated.

8. Miscellaneous:

Conditions of purchase of the customer that contradict these conditions are non-binding for us, even if they form the basis of the order and we have not expressly objected to their content. The sole place of jurisdiction for all disputes arising directly or indirectly from the contractual relationship is D-88471 Laupheim. The liability of the above terms of delivery is not affected by the ineffectiveness of individual points.

9. Raw material surcharges:

We reserve the right to charge variable raw material surcharges separately. For HSS and HSS/E: alloy surcharge (LZ) and for HM, solid carbide, cermet, PCD/PKB: raw material price surcharge (RTZ)

10. Privacy/Other:

Our data protection declaration, consent and additional information can be found on our website at <https://fromm-precision.de/datenschutz>



Our plants: (GERMANY)

You can find our regional and international representatives on our website:
<https://fromm-praezision.de/en/Company/Partners/>



About us:



For almost 90 years **Fromm Präzision** is the innovative partner for industry and commerce all over the world. In 2 different branches situated in Thüringen and Baden-Württemberg. 45 employees manufacture precision tools for the metal industry.



Long and deep experiences, permanent cooperation with all our customers, the know-how, the responsibility of our specialists as well as our up-to-date working machines and the own examination laboratory are the main points giving us the reputation of a reliable partner in cooperation.

First class quality can be furnished in HSS, HSS/E, carbide-tipped, solid carbide, CERMET, PCD and PCB.

World wide represented in:

Europe

Asia

America

Range of tools:

Reamers

HSS-HSS/E hand- and machine reamers

Carbide-tipped hand- and machine reamers

Solid carbide hand- and machine reamers

Solid carbide machine reamers with NC-shank and coolant supply on the flutes or through the centre for blind- or through hole

CERMET-machine reamers

PCD+PCB tools

Polycrystalline diamond tools are mainly manufacture according to customer's requirements. If required we will supply a drawing to the offer

Core drills+Countersinks

HSS core drills

Carbide-tipped core drills

HSS, HSS/E + Carbide-tipped countersinks

HSS + HSS/E counter bores

HSS/E pointed countersinks and deburring tools

Special tools

Special tools we manufacturers for all well known automobile manufactures and their suppliers. But also for the aircraft industry and print-machine manufacturers we are the first to address. (Our department for tool construction will supply the required drawing to the offer)

Our stock system guaranties best availability and good readiness in supplying all our goods. Our stock tolerance for reamers is H7. But because of our well appointed stock of "raw"-tools we have the ability to act in a very short time also for other tolerances or diameters which are not listed in our catalogue.

References:

AIRBUS	Aircraft industry
AUDI	Automobile industry
Daimler	Automobile industry
EADS	Aircraft industry
EDSCHA	Automobile industry
Evobus	Automobile industry
KBA	Print-machine manufacturer
MAN	Automobile industry Print-machine manufacturer
MTU	Engine manufacturer
ROLLS-ROYCE	Aircraft industry
VW	Automobile industry
ZF	Gear manufacturer

Please find a selection of our range of tools in our actual catalogue.



Reg.-Nr.: Q1 0297028

HSS + HSS/E reamer

- in full Ø H7, different intermediate dimensions and special tolerances or in steps of 1/100 mm (centesimal)
- with straight- or MT-shank, or as shell reamer + holder
- cylindrical or different taper reamer
- adjustable
- NC-execution for direct clamping in hydraulic high-precision and shrink chucks
- extra long version
- coated e.g. TiN, TiCN, TiAlN
- standard reamer sets in boxes



Solid carbide + carbide-tipped/brazed reamer

- in full Ø H7, different intermediate dimensions and special tolerances or in steps of 1/100 mm (centesimal)
- with straight- or MT-shank, or as shell reamer + holder
- cylindrical or different taper reamer
- adjustable
- NC-execution for direct clamping in hydraulic high-precision and shrink chucks
- extra long version
- with internal coolant
- coated e.g. TiN, TiCN, TiAlN
- standard reamer sets in boxes



Coredrill + countersink

- with straight- or MT-shank
- 3-fluted or multifluted version
- coated e.g. TiN, TiCN, TiAlN
- in standard sets



Special (reamer) application

- according customers drawing or processing case
- coated e.g. TiN, TiCN, TiAlN
- creation of release drawing and cutting value recommendations
- PCD- und PCB-reamer
- Cermet and Cermet-tipped/brazed



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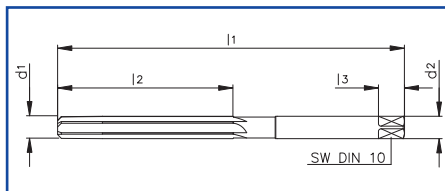
Hand reamer

Catalog-No. 301

DIN 206

HSS

righthand cutting
straight shank with square
straight- and spiral fluted



nom.-Ø H7	flute- length	total- length	shank-Ø e9	ISO-square accdg. DIN 10		number of teeth	weight each pc.
d ₁ mm	l ₂ mm	l ₁ mm	d ₂ mm	a h ₁₁ mm	l ₃ mm	z	ca. kg
1,0*	13	34	1,0	-	-	3	0,002
1,1*	13	34	1,0	-	-	3	0,002
1,2*	16	38	1,2	-	-	3	0,003
1,3*	16	38	1,2	-	-	3	0,003
1,4	20	41	1,4	1,12	4	4	0,003
1,5	20	41	1,5	1,12	4	4	0,003
1,6	21	44	1,6	1,25	4	4	0,003
1,8	23	47	1,8	1,40	4	4	0,003
2,0	25	50	2,0	1,60	4	4	0,003
2,2	27	54	2,2	1,80	4	4	0,003
2,5	29	58	2,5	2,10	5	4	0,004
2,8	31	62	2,8	2,10	5	6	0,004
3,0	31	62	3,0	2,40	5	6	0,005
3,2	33	66	3,2	2,40	5	6	0,006
3,5	35	71	3,5	2,70	6	6	0,007
4,0	38	76	4,0	3,00	6	6	0,008
4,5	41	81	4,5	3,40	6	6	0,009
5,0	44	87	5,0	3,80	7	6	0,010
5,5	47	93	5,5	4,30	7	6	0,013
6,0	47	93	6,0	4,90	8	6	0,017
6,5	50	100	6,5	4,90	8	6	0,019
7,0	54	107	7,0	5,50	8	6	0,025
8,0	58	115	8,0	6,20	9	6	0,036
9,0	62	124	9,0	7,00	10	6	0,048
10,0	66	133	10,0	8,00	11	6	0,057
11,0	71	142	11,0	9,00	12	8	0,080
12,0	76	152	12,0	9,00	12	8	0,110
13,0	76	152	13,0	10,00	13	8	0,130
14,0	81	163	14,0	11,00	14	8	0,150
15,0	81	163	15,0	12,00	15	8	0,200
16,0	87	175	16,0	12,00	15	8	0,230
17,0	87	175	17,0	13,00	16	8	0,280
18,0	93	188	18,0	14,50	17	8	0,330
19,0	93	188	19,0	14,50	17	8	0,370
20,0	100	201	20,0	16,00	19	10	0,450
21,0	100	201	21,0	16,00	19	10	0,480
22,0	107	215	22,0	18,00	21	10	0,570
23,0	107	215	23,0	18,00	21	10	0,610
24,0	115	231	24,0	18,00	21	10	0,700
25,0	115	231	25,0	20,00	23	10	0,830
26,0	115	231	26,0	20,00	23	10	0,850
27,0	124	247	27,0	22,00	25	10	0,980
28,0	124	247	28,0	22,00	25	10	1,060
29,0	124	247	29,0	22,00	25	10	1,200
30,0	124	247	30,0	24,00	27	10	1,400



straight



spiral

* FROMM standard



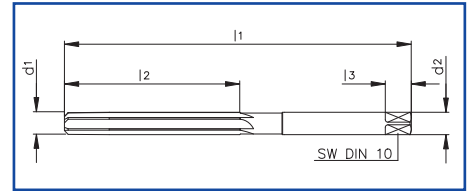
Hand reamer

Catalog-No. 301

DIN 206

continuation

HSS
 righthand cutting
 straight shank with square
 straight- and spiral fluted



straight



spiral

nom.-Ø H7	flute- length	total- length	shank-Ø e9	ISO-square accdg. DIN 10		number of teeth	weight each pc.
				α h ₁₁ mm	l ₃ mm		
d ₁ mm	l ₂ mm	l ₁ mm	d ₂ mm	α h ₁₁ mm	l ₃ mm	z	ca. kg
31,0	133	265	31,0	24,00	27	12	1,440
32,0	133	265	32,0	24,00	27	12	1,500
33,0	133	265	33,0	26,00	29	12	1,720
34,0	142	284	34,0	26,00	29	12	1,800
35,0	142	284	35,0	29,00	32	12	2,050
36,0	142	284	36,0	29,00	32	12	2,300
37,0	142	284	37,0	29,00	32	12	2,420
38,0	152	305	38,0	29,00	32	12	2,600
39,0	152	305	39,0	32,00	35	12	2,750
40,0	152	305	40,0	32,00	35	12	3,000
41,0	152	305	41,0	32,00	35	12	3,300
42,0	152	305	42,0	32,00	35	12	3,500
43,0	163	326	43,0	35,00	38	12	3,600
44,0	163	326	44,0	35,00	38	12	4,000
45,0	163	326	45,0	35,00	38	14	4,180
46,0	163	326	46,0	35,00	38	14	4,600
47,0	163	326	47,0	39,00	42	14	5,000
48,0	174	347	48,0	39,00	42	14	5,300
49,0	174	347	49,0	39,00	42	14	5,400
50,0	174	347	50,0	39,00	42	14	5,500
51,0	174	347	51,0	39,00	42	14	6,250
52,0	174	347	52,0	39,00	42	14	6,400
53,0	174	347	53,0	44,00	47	14	7,200
54,0	184	367	54,0	44,00	47	14	7,350
55,0	184	367	55,0	44,00	47	16	7,500
56,0	184	367	56,0	44,00	47	16	8,105
57,0	184	367	57,0	44,00	47	16	8,200
58,0	184	367	58,0	44,00	47	16	8,400
59,0	184	367	59,0	49,00	52	16	9,150
60,0	184	367	60,0	49,00	52	16	9,300

Order details:

301-xx.xx-A straight fluted
 301-xx.xx-B spiral fluted

xx.xx = nom.-Ø

Hand reamer - set

Catalog-No. 301A/B

DIN 206

HSS

righthand cutting
 straight shank with square
 straight- and spiral fluted

size	Ø-range, H7	pcs.
1	1,0 to 10,0 mm in steps of 0,5 mm	19
2	1,0 to 5,9 mm in steps of 0,1 mm	50
3	6,0 to 10,0 mm in steps of 0,1 mm	41
4	1,0 to 6,0 mm in steps of 0,1 mm	51



size 1



size 2



size 3



size 4

Order details:

301A-size straight fluted
 301B-size spiral fluted

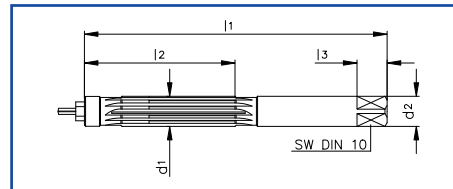


Hand reamer

Catalog-No. 302

DIN 859

HSS
 righthand cutting
 expandable, slotted
 with pilot pin
 straight shank with square
 straight- and spiral fluted



straight

spiral

nom.-Ø	flute-length	total-length	shank-Ø e9	ISO-square accdg. DIN 10		number of teeth	weight each pc.
d ₁ mm	l ₂ mm	l ₁ mm	d ₂ mm	α h ₁₁ mm	l ₃ mm	z	ca. kg
4,0*	38	76	4,0	3,00	6	6	0,010
5,0*	44	87	5,0	3,80	7	6	0,010
6,0	47	93	6,0	4,90	8	6	0,015
7,0	54	107	7,0	5,50	8	9	0,020
8,0	58	115	8,0	6,20	9	9	0,025
9,0	62	124	9,0	7,00	10	9	0,045
10,0	66	133	10,0	8,00	11	9	0,055
11,0	71	142	11,0	9,00	12	9	0,070
12,0	76	152	12,0	9,00	12	9	0,100
13,0	76	152	13,0	10,00	13	9	0,120
14,0	81	163	14,0	11,00	14	9	0,150
15,0	81	163	15,0	12,00	15	9	0,190
16,0	87	175	16,0	12,00	15	9	0,220
17,0	87	175	17,0	13,00	16	9	0,300
18,0	93	188	18,0	14,50	17	9	0,320
19,0	93	188	19,0	14,50	17	9	0,340
20,0	100	201	20,0	16,00	19	9	0,400
21,0	100	201	21,0	16,00	19	9	0,420
22,0	107	215	22,0	18,00	21	12	0,500
23,0	107	215	23,0	18,00	21	12	0,650
24,0	115	231	24,0	18,00	21	12	0,700
25,0	115	231	25,0	20,00	23	12	0,780
26,0	115	231	26,0	20,00	23	12	0,800
27,0	124	247	27,0	22,00	25	12	0,900
28,0	124	247	28,0	22,00	25	12	1,000
29,0	124	247	29,0	22,00	25	12	1,100
30,0	124	247	30,0	24,00	27	12	1,250
31,0	133	265	31,0	24,00	27	12	1,300
32,0	133	265	32,0	24,00	27	12	1,400
33,0	133	265	33,0	26,00	29	12	1,500
34,0	142	284	34,0	26,00	29	12	1,650
35,0	142	284	35,0	29,00	32	12	1,800
36,0	142	284	36,0	29,00	32	12	1,900
37,0	142	284	37,0	29,00	32	12	2,000
38,0	152	305	38,0	29,00	32	12	2,150
39,0	152	305	39,0	32,00	35	12	2,250
40,0	152	305	40,0	32,00	35	12	2,500
41,0	152	305	41,0	32,00	35	12	3,000
42,0	152	305	42,0	32,00	35	12	3,250
43,0	163	326	43,0	35,00	38	12	3,500
44,0	163	326	44,0	35,00	38	12	3,700
45,0	163	326	45,0	35,00	38	12	4,000

* only form A available

Hand reamer

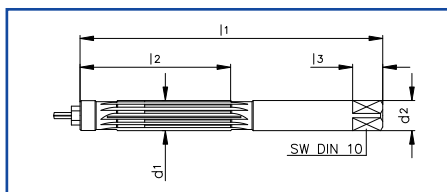
Catalog-No. 302

DIN 859

continuation

HSS

righthand cutting
expandable, slotted
with pilot pin
straight shank with square
straight- and spiral fluted



nom.-Ø	flute-length	total-length	shank-Ø e9	ISO-square accdg. DIN 10		number of teeth	weight each pc.
d_1 mm	l_2 mm	l_1 mm	d_2 mm	a h_{11} mm	l_3 mm	z	ca. kg
46,0	163	326	46,0	35,00	38	12	4,200
47,0	163	326	47,0	39,00	42	12	4,500
48,0	174	347	48,0	39,00	42	12	4,800
49,0	174	347	49,0	39,00	42	12	5,000
50,0	174	347	50,0	39,00	42	12	5,100
52,0	174	347	52,0	39,00	42	16	5,400
55,0	181	367	55,0	44,00	47	16	6,550
58,0	181	367	58,0	44,00	47	16	7,000
60,0	181	367	60,0	49,00	52	16	8,000

Adjustability:

- Ø 4 - 10mm about 0,10 mm
- Ø 11 - 15 mm about 0,15 mm
- Ø 16 - 22 mm about 0,20 mm
- Ø 23 - 30 mm about 0,30 mm
- Ø 31 - 45 mm about 0,40 mm
- Ø 46 - 60 mm about 0,60 mm



straight

spiral

Order details:

- 302-xx.xx-A straight fluted
- 302-xx.xx-B spiral fluted

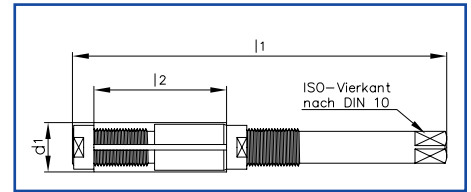
xx.xx = nom.-Ø



Rapidly adjustable hand reamer

Catalog-No. 303

Special steel or hard-chromed steel
righthand cutting with adjustable blades
straight shank with square
blades are eccentrically vault-grounded



nom.-Ø range	nom.-Ø range	flute-length	total-length	ISO-square accdg. DIN 10	no. of blades	weight each pc.
mm	Zoll	l ₂ mm	l ₁ mm	a h ₁₁ mm	z	ca. kg
6,4 - 7,2	1/4 - 9/32	32	111	3,0	4	0,015
7,2 - 8,0	9/32 - 5/16	32	111	3,5	4	0,015
8,0 - 9,0	5/16 - 23/64	32	111	4,3	5	0,025
9,0 - 10,0	23/64 - 25/64	32	115	4,3	5	0,035
10,0 - 11,0	25/64 - 7/16	35	120	4,9	5	0,040
11,0 - 12,0	7/16 - 15/32	35	125	6,2	5	0,045
12,0 - 13,5	15/32 - 17/32	42	130	6,2	5	0,075
13,5 - 15,5	17/32 - 39/64	50	145	7,0	5	0,100
15,5 - 18,0	39/64 - 45/64	60	165	8,0	5	0,155
18,0 - 21,0	45/64 - 53/64	65	180	9,0	5	0,225
21,0 - 24,0	53/64 - 15/16	70	190	10,0	5	0,320
24,0 - 27,5	15/16 - 1 5/64	75	205	11,0	5	0,430
27,5 - 31,5	1 5/64 - 1 15/64	80	225	12,0	6	0,600
31,5 - 37,0	1 15/64 - 1 29/64	90	240	14,5	6	0,870
37,0 - 45,0	1 29/64 - 1 49/64	100	285	16,0	6	1,410
45,0 - 55,0	1 49/64 - 2 5/32	109	320	20,0	6	2,320
55,0 - 65,0	2 5/32 - 2 9/16	120	350	24,0	8	3,830

Sets



nom.-Ø range	nom.-Ø range	number of reamers	weight each pc.
mm	Zoll		ca. kg
8,0 - 31,5	21/64 - 1 15/64	11	3,100
8,0 - 45,0	21/64 - 1 49/64	13	5,700

Order details:

303AS	Set 8,0 - 31,5	303-xx.xx-S	S = spezial steel
303BS	Set 8,0 - 45,0	303-xx.xx-H	H = hard-chromed
303AH	Set 8,0 - 31,5		
303BH	Set 8,0 - 45,0		xx.xx = 1. nom.-Ø

Spare blades and -nuts for catalog-No. 303

Special steel or hard-chromed special steel

nom.-Ø range	nom.-Ø range	weight of the blade	weight of the nut
mm	Zoll	ca. kg	ca. kg
6,4 - 7,2	1/4 - 9/32	0,005	0,001
7,2 - 8,0	9/32 - 5/16	0,005	0,001
8,0 - 9,0	5/16 - 23/64	0,005	0,001
9,0 - 10,0	23/64 - 25/64	0,005	0,001
10,0 - 11,0	25/64 - 7/16	0,005	0,002
11,0 - 12,0	7/16 - 15/32	0,005	0,002
12,0 - 13,5	15/32 - 17/32	0,008	0,002
13,5 - 15,5	17/32 - 39/64	0,015	0,004
15,5 - 18,0	39/64 - 45/64	0,022	0,004
18,0 - 21,0	45/64 - 53/64	0,025	0,006
21,0 - 24,0	53/64 - 15/16	0,040	0,011
24,0 - 27,5	15/16 - 1 5/64	0,055	0,015
27,5 - 31,5	1 5/64 - 1 15/64	0,075	0,025
31,5 - 37,0	1 15/64 - 1 29/64	0,130	0,030
37,0 - 45,0	1 29/64 - 1 49/64	0,230	0,030
45,0 - 55,0	1 49/64 - 2 5/32	0,320	0,060
55,0 - 65,0	2 5/32 - 2 9/16	0,435	0,093



Order details: (only sets are saled)

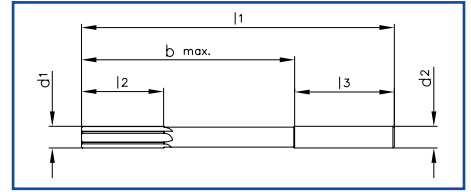
303-xx.xx-M M = nut
 303-xx.xx-SE SE = blade-set special steel
 303-xx.xx-HE HE = blade-set hard-chromed special steel xx.xx = 1. nom.-Ø

Machine reamer

Catalog-No. 407

DIN 212

HSS/E
 righthand cutting
 straight shank
 straight- and spiral fluted



straight

spiral

nom-Ø H7	flute- length	max. friction length	total- length	shank-Ø h9	shank- length	number of teeth	weight each pc.
d_1 mm	l_2 mm	b_{max} mm	l_1 mm	d_2 mm	l_3 mm	z	ca. kg
1,0*	5,5	15	34	1,0	19	3	0,001
1,1*	6,5	15,5	36	1,1	20,5	3	0,001
1,2*	7,5	16,5	38	1,2	21,5	3	0,001
1,3*	7,5	16,5	38	1,2	21,5	3	0,002
1,4	8	18	40	1,4	22	3	0,002
1,5	8	18	40	1,5	22	3	0,002
1,6	9	20	43	1,6	23	3	0,002
1,8	10	22	46	1,8	24	4	0,002
2,0	11	24	49	2,0	25	4	0,002
2,2	12	25	53	2,2	28	4	0,002
2,5	14	29	57	2,5	28	4	0,003
2,8	15	33	61	2,8	28	6	0,003
3,0	15	33	61	3,0	28	6	0,003
3,2	16	37	65	3,2	28	6	0,004
3,5	18	42	70	3,5	28	6	0,004
4,0	19	47	75	4,0	28	6	0,004
4,5	21	52	80	4,5	28	6	0,006
5,0	23	58	86	5,0	28	6	0,010
5,5	26	57	93	5,6	36	6	0,015
6,0	26	57	93	5,6	36	6	0,015
6,5	28	65	101	6,3	36	6	0,020
7,0	31	73	109	7,1	36	6	0,022
8,0	33	81	117	8,0	36	6	0,035
9,0	36	85	125	9,0	40	6	0,040
10,0	38	93	133	10,0	40	6	0,060
11,0	41	102	142	10,0	40	6	0,110
12,0	44	111	151	10,0	40	6	0,130
13,0	44	111	151	10,0	40	8	0,150
14,0	47	115	160	12,5	45	8	0,160
15,0	50	117	162	12,5	45	8	0,240
16,0	52	125	170	12,5	45	8	0,270
17,0	54	130	175	14,0	45	8	0,290
18,0	56	137	182	14,0	45	8	0,320
19,0	58	141	189	16,0	48	8	0,350
20,0	60	147	195	16,0	48	8	0,380

* FROMM standard

Order details:

407-xx.xx-A/C
 407-xx.xx-B/D

straight fluted, up to nom.-Ø 2,9 -A, from nom.-Ø 3,0 -C
 spiral fluted, up to nom.-Ø 2,9 -B, from nom.-Ø 3,0 -D

xx.xx = nom.-Ø

Machinen reamer-set

DIN 212

Catalog-No. 407A/B

HSS/E

righthand cutting

straight shank

straight- and spiral fluted

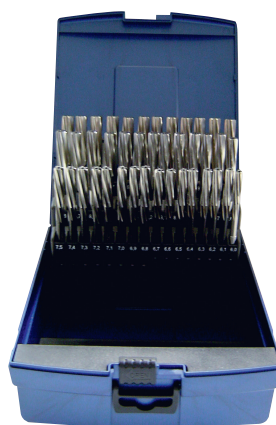
size	Ø-range, H7	pc.
1	from 1,0 to 10,0 mm in steps of 0,5 mm	19
2	from 1,0 to 5,9 mm in steps of 0,1 mm	50
3	from 6,0 to 10,0 mm in steps of 0,1 mm	41
4	from 1,0 to 6,0 mm in steps of 0,1 mm	51
5	from 3,0 to 12,0 mm in steps of 1 mm (content: Ø 3, 4, 5, 6, 8, 10, 12 H7)	7



size 1



size 2



size 3



size 4



size 5

Order details:

407A-size

straight fluted

407B-size

spiral fluted

Machine reamer in steps of 0,01 mm

DIN 212

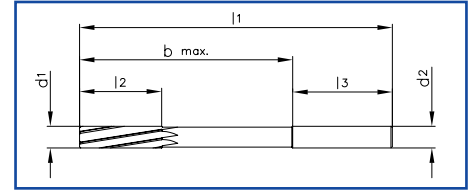
Catalog-No. 399

HSS/E

righthand cutting

straight shank

spiral fluted



Tolerance 0/+0,003



spiral

nom-Ø	flute-length	max. friction length	total-length	shank-Ø h9	shank-length	number of teeth
d_1 mm	l_2 mm	b_{max} mm	l_1 mm	d_2 mm	l_3 mm	z
0,90 - 1,06*	5,5	15	34	1,0	19	3
1,07 - 1,18*	6,5	15,5	36	1,1	20,5	3
1,19 - 1,32*	8	16,5	38	1,2	21,5	3
1,33 - 1,50	8	18	40	1,5	22	3
1,51 - 1,70	9	20	43	1,6	23	3
1,71 - 1,90	10	22	46	1,8	24	4
1,91 - 2,12	11	24	49	2,0	25	4
2,13 - 2,36	12	25	53	2,2	28	4
2,37 - 2,65	14	29	57	2,5	28	4
2,66 - 2,79	15	33	61	2,8	28	4
2,80 - 2,89	15	33	61	2,8	28	6
2,90 - 3,00	15	33	61	3,0	28	6
3,01 - 3,35	16	37	65	3,2	28	6
3,36 - 3,75	18	42	70	3,5	28	6
3,76 - 4,25	19	47	75	4,0	28	6
4,26 - 4,75	21	52	80	4,5	28	6
4,76 - 5,30	23	58	86	5,0	28	6
5,31 - 6,00	26	57	93	5,6	36	6
6,01 - 6,70	28	65	101	6,3	36	6
6,71 - 7,50	31	73	109	7,1	36	6
7,51 - 8,50	33	81	117	8,0	36	6
8,51 - 9,50	36	85	125	9,0	40	6
9,51 - 10,60	38	93	133	10,0	40	6
10,61 - 11,80	41	102	142	10,0	40	6
11,81 - 12,25	44	111	151	10,0	40	6
12,26 - 13,20	44	111	151	10,0	40	8

* FROMM standard

Order details:

399-xx.xx

spiral fluted

xx.xx = nom.-Ø

NC-Machine reamer

DIN 212

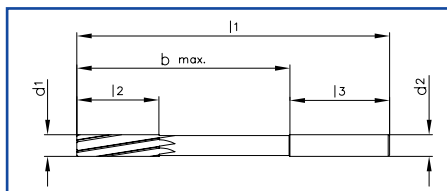
Catalog-No. NC407

HSS/E

righthand cutting

straight shank with tol. h6 for NC-machine

spiral fluted



nom-Ø H7	flute- length	max. friction length	total- length	shank-Ø h6	shank- length	number of teeth	weight each pc.
d ₁ mm	l ₂ mm	b _{max} mm	l ₁ mm	d ₂ mm	l ₃ mm	z	ca. kg
1,0	5,5	15	34	1,0	19	3	0,001
1,1	6,5	15,5	36	1,0	20,5	3	0,001
1,2	8	16,5	38	2,0	21,5	3	0,001
1,3	8	16,5	38	2,0	21,5	3	0,002
1,4	8	18	40	2,0	22	3	0,002
1,5	8	18	40	2,0	22	3	0,002
1,6	9	20	43	2,0	23	3	0,002
1,8	10	22	46	2,0	24	4	0,002
2,0	11	24	49	2,0	25	4	0,002
2,2	12	25	53	3,0	28	4	0,002
2,5	14	29	57	3,0	28	4	0,003
2,8	15	33	61	3,0	28	6	0,003
3,0	15	33	61	3,0	28	6	0,003
3,2	16	37	65	4,0	28	6	0,004
3,5	18	42	70	4,0	28	6	0,004
4,0	19	47	75	4,0	28	6	0,004
4,5	21	52	80	5,0	28	6	0,006
5,0	23	58	86	5,0	28	6	0,010
5,5	26	57	93	6,0	36	6	0,015
6,0	26	57	93	6,0	36	6	0,015
6,5	28	65	101	6,0	36	6	0,020
7,0	31	73	109	8,0	36	6	0,022
8,0	33	81	117	8,0	36	6	0,035
9,0	36	85	125	10,0	40	6	0,040
10,0	38	93	133	10,0	40	6	0,060
11,0	41	102	142	10,0	40	6	0,110
12,0	44	111	151	10,0	40	6	0,130
13,0	44	111	151	10,0	40	8	0,150
14,0	47	115	160	14,0	45	8	0,160
15,0	50	117	162	14,0	45	8	0,240
16,0	52	125	170	14,0	45	8	0,270
17,0	54	130	175	14,0	45	8	0,290
18,0	56	137	182	14,0	45	8	0,320
19,0	58	141	189	16,0	48	8	0,350
20,0	60	147	195	16,0	48	8	0,380



spiral



Order details:

NC407-xx.xx-B spiral fluted up to nom.-Ø 2,9mm

NC407-xx.xx-D spiral fluted up to nom.-Ø 3,0mm

xx.xx = nom.-Ø



NC-Machine reamer in steps of 0,01 mm

DIN 212

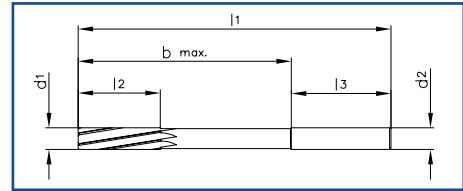
Catalog-No. NC399

HSS/E

righthand cutting

straight shank with tol. h6 for NC-machine

spiral fluted



Tolerance 0/+0,003



spiral

nom-Ø	flute-length	max. friction length	total-length	shank-Ø h6	shank-length	number of teeth
d_1 mm	l_2 mm	b_{max} mm	l_1 mm	d_2 mm	l_3 mm	z
0,90 - 1,06	5,5	15	34	1,0	19	3
1,07 - 1,18	6,5	15,5	36	1,0	20,5	3
1,19 - 1,32	8	16,5	38	2,0	21,5	3
1,33 - 1,50	8	18	40	2,0	22	3
1,51 - 1,70	9	20	43	2,0	23	3
1,71 - 1,90	10	22	46	2,0	24	4
1,91 - 2,12	11	24	49	2,0	25	4
2,13 - 2,36	12	25	53	3,0	28	4
2,37 - 2,65	14	29	57	3,0	28	4
2,66 - 2,79	15	33	61	3,0	28	4
2,80 - 3,00	15	33	61	3,0	28	6
3,01 - 3,35	16	37	65	4,0	28	6
3,36 - 3,75	18	42	70	4,0	28	6
3,76 - 4,25	19	47	75	4,0	28	6
4,26 - 4,75	21	52	80	5,0	28	6
4,76 - 5,30	23	58	86	5,0	28	6
5,31 - 6,00	26	57	93	6,0	36	6
6,01 - 6,70	28	65	101	6,0	36	6
6,71 - 7,50	31	73	109	8,0	36	6
7,51 - 8,50	33	81	117	8,0	36	6
8,51 - 9,50	36	85	125	10,0	40	6
9,51 - 10,60	38	93	133	10,0	40	6
10,61 - 11,80	41	102	142	10,0	40	6
11,81 - 12,25	44	111	151	10,0	40	6
12,26 - 13,20	44	111	151	10,0	40	8



Order details:

NC399-xx.xx

spiral fluted

xx.xx = nom. -Ø

NC-Machinen reamer-set in steps of 0,01 mm

DIN 212

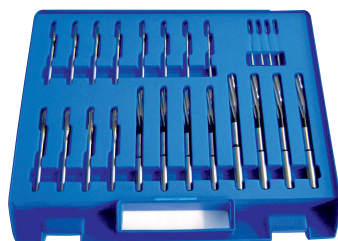
Catalog-No. NC399

HSS/E

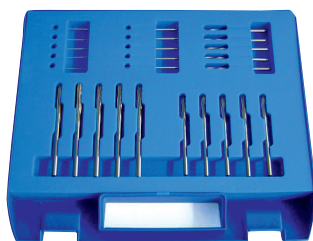
righthand cutting

straight shank with tol. h6 for NC-machine spiral fluted

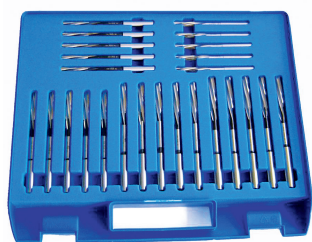
Tolerance 0/+0,003



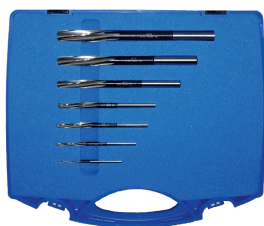
size 1



size 2



size 3



size 4

size	Ø-range tol. 0/+0,003	pc.
1	from 2,98 to 10,02 mm in steps of 0,01 mm Content: 2,98 / 3,00 - 3,02 / 3,98 / 4,00 - 4,02 / 4,98 / 5,00 - 5,02 / 5,98 / 6,00 - 6,02 / 7,98 / 8,00 - 8,02 / 9,98 / 10,00 - 10,02	24
2	from 0,98 to 5,02 mm in steps of 0,01 mm Content: 0,98 - 1,02 / 1,98 - 2,02 / 2,98 - 3,02 / 3,98 - 4,02 / 4,98 - 5,02	25
3	from 5,98 to 10,02 mm in steps of 0,01 mm Content: 5,98 - 6,02 / 6,98 - 7,02 / 7,98 - 8,02 / 8,98 - 9,02 / 9,98 - 10,02	25
4	from 3,00 to 12,00 mm in steps of 1 mm Content: 3,00 - 6,00 / 8,00 / 10,00 / 12,00	7

Order details:

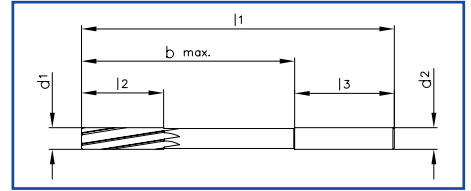
NC399-size

Machine reamer

Catalog-No. 405

DIN 212

HSS/E + TiN
 righthand cutting
 straight shank
 spiral fluted



spiral

nom-Ø H7	flute- length	max. friction length	total- length	shank-Ø h9	shank- length	number of teeth	weight each pc.
d_1 mm	l_2 mm	b_{max} mm	l_1 mm	d_2 mm	l_3 mm	z	ca. kg
3,0	15	33	61	3,0	28	6	0,003
3,5	18	42	70	3,5	28	6	0,004
4,0	19	47	75	4,0	28	6	0,004
4,5	21	52	80	4,5	28	6	0,006
5,0	23	58	86	5,0	28	6	0,010
5,5	26	57	93	5,6	36	6	0,015
6,0	26	57	93	5,6	36	6	0,015
6,5	28	65	101	6,3	36	6	0,020
7,0	31	73	109	7,1	36	6	0,022
8,0	33	81	117	8,0	36	6	0,035
9,0	36	85	125	9,0	40	6	0,040
10,0	38	93	133	10,0	40	6	0,060
11,0	41	102	142	10,0	40	6	0,110
12,0	44	111	151	10,0	40	6	0,130
13,0	44	111	151	10,0	40	8	0,150
14,0	47	115	160	12,5	45	8	0,160
15,0	50	117	162	12,5	45	8	0,240
16,0	52	125	170	12,5	45	8	0,270
17,0	54	130	175	14,0	45	8	0,290
18,0	56	137	182	14,0	45	8	0,320
19,0	58	141	189	16,0	48	8	0,350
20,0	60	147	195	16,0	48	8	0,380

Order details:

405-xx.xx-D

spiral fluted

xx.xx = nom-Ø

NC-Machine reamer

DIN 212

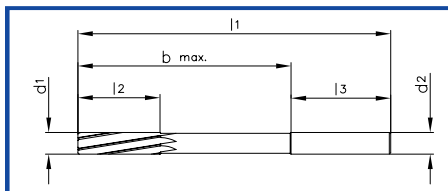
Catalog-No. NC407-TIN

HSS/E + TiN

righthand cutting

straight shank with tol. h6 for NC-machine

spiral fluted



nom-Ø H7	flute- length	max. friction length	total- length	shank-Ø h6	shank- length	number of teeth	weight each pc.
d_1 mm	l_2 mm	b_{max} mm	l_1 mm	d_2 mm	l_3 mm	z	ca. kg
3,0	15	33	61	3,0	28	6	0,003
3,5	18	42	70	4,0	28	6	0,004
4,0	19	47	75	4,0	28	6	0,004
4,5	21	52	80	5,0	28	6	0,006
5,0	23	58	86	5,0	28	6	0,010
5,5	26	57	93	6,0	36	6	0,015
6,0	26	57	93	6,0	36	6	0,015
6,5	28	65	101	6,0	36	6	0,020
7,0	31	73	109	8,0	36	6	0,022
8,0	33	81	117	8,0	36	6	0,035
9,0	36	85	125	10,0	40	6	0,040
10,0	38	93	133	10,0	40	6	0,060
11,0	41	102	142	10,0	40	6	0,110
12,0	44	111	151	10,0	40	6	0,130
13,0	44	111	151	10,0	40	8	0,150
14,0	47	115	160	14,0	45	8	0,160
15,0	50	117	162	14,0	45	8	0,240
16,0	52	125	170	14,0	45	8	0,270
17,0	54	130	175	14,0	45	8	0,290
18,0	56	137	182	14,0	45	8	0,320
19,0	58	141	189	16,0	48	8	0,350
20,0	60	147	195	16,0	48	8	0,380



spiral



Order details:

NC407-xx.xx-D-TIN

spiral fluted

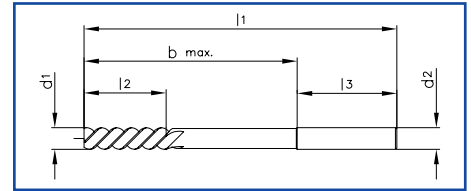
xx.xx = nom.-Ø

Helical machine reamer

Catalog-No. 409

DIN 212

HSS/E
 righthand cutting
 straight shank
 45° lefthand spiral (helical)



helical

nom-Ø H7	flute- length	max. friction length	total- length	shank-Ø h9	shank- length	number of teeth	weight each pc.
d_1 mm	l_2 mm	b_{max} mm	l_1 mm	d_2 mm	l_3 mm	z	ca. kg
2,0	11	24	49	2,0	25	3	0,002
2,5	14	29	57	2,5	28	3	0,003
3,0	15	33	61	3,0	28	3	0,003
3,2	16	37	65	3,2	28	3	0,004
3,5	18	42	70	3,5	28	3	0,004
4,0	19	47	75	4,0	28	3	0,004
4,5	21	52	80	4,5	28	3	0,006
5,0	23	58	86	5,0	28	3	0,010
6,0	26	57	93	5,6	36	3	0,015
7,0	31	73	109	7,1	36	3	0,022
8,0	33	81	117	8,0	36	3	0,035
9,0	36	85	125	9,0	40	3	0,040
10,0	38	93	133	10,0	40	3	0,060
11,0	41	102	142	10,0	40	3	0,110
12,0	44	111	151	10,0	40	4	0,130
13,0	44	111	151	10,0	40	4	0,150
14,0	47	115	160	12,5	45	4	0,160
15,0	50	117	162	12,5	45	4	0,240
16,0	52	125	170	12,5	45	4	0,270
17,0	54	130	175	14,0	45	4	0,290
18,0	56	137	182	14,0	45	4	0,320
19,0	58	141	189	16,0	48	4	0,350
20,0	60	147	195	16,0	48	4	0,380

Oder details:

409-xx.xx-E

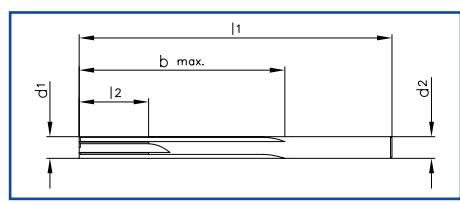
helical fluted

xx.xx = nom.-Ø

Machine front reamer

Catalog-No. 410

HSS/E
 righthand cutting
 straight shank
 straight fluted
 front cutting



nom-Ø H7	flute- length	max. friction length	total- length	shank-Ø h9	number of teeth	weight each pc.
d_1 mm	l_2 mm	b_{max} mm	l_1 mm	d_2 mm	z	ca. kg
3,0	12	33	61	3,0	4	0,003
3,5	12	39	70	3,5	4	0,004
4,0	16	44	75	4,0	6	0,005
4,5	16	48	80	4,5	6	0,007
5,0	20	53	86	5,0	6	0,010
6,0	20	59	93	6,0	6	0,015
7,0	22	69	109	7,0	6	0,022
8,0	24	71	117	8,0	6	0,035
9,0	24	77	125	9,0	6	0,040
10,0	26	84	133	10,0	6	0,060
11,0	26	89	142	11,0	6	0,110
12,0	26	96	151	12,0	6	0,130



straight

Order details:

410-xx.xx

xx.xx = nom.-Ø

Short stub reamer

Catalog-No. 411

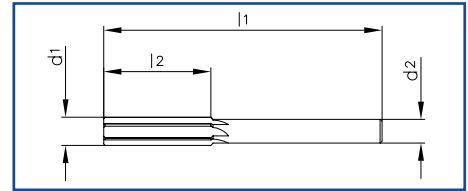
DIN 8089

HSS/E

righthand cutting

straight shank

straight- and lefthand spiral fluted



straight

spiral

nom-Ø H7	flute- length	total- length	shank-Ø h8	number of teeth	weight each pc.
d_1 mm	l_2 mm	l_1 mm	d_2 mm	z	ca. kg
1,5*	12	45	1,5	4	0,002
2,0*	16	50	2,0	4	0,003
2,5*	18	56	2,5	4	0,004
3,0*	18	56	3,0	6	0,004
3,5*	20	56	3,0	6	0,005
4,0	20	56	3,55	6	0,005
4,5	22	63	4,0	6	0,008
5,0	22	63	4,0	6	0,010
5,5	22	63	5,0	6	0,010
6,0	22	63	5,0	6	0,012
6,5	22	63	5,0	6	0,016
7,0	25	71	6,3	6	0,018
7,5	25	71	6,3	6	0,020
8,0	25	71	6,3	6	0,020
8,5	25	71	6,3	6	0,025
9,0	25	71	8,0	6	0,025
9,5	25	71	8,0	6	0,030
10,0	25	71	8,0	6	0,035
11,0	28	80	10,0	6	0,040
12,0	28	80	10,0	6	0,045
13,0	28	80	10,0	6	0,050
14,0	32	90	12,5	8	0,085
15,0	32	90	12,5	8	0,150
16,0	32	90	12,5	8	0,200
17,0	32	90	12,5	8	0,220
18,0	36	100	16,0	8	0,250
19,0	36	100	16,0	8	0,300
20,0	36	100	16,0	8	0,350

* FROMM standard

Order details:

411-xx.xx-A straight fluted, righthand cutting

411-xx.xx-B lefthand spiral fluted, righthand cutting

xx.xx = nom.-Ø

Machinen reamer

DIN 208

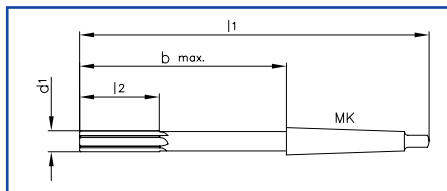
Catalog-No. 401

HSS/E

righthand cutting

morse taper (MT) shank

straight- and spiral fluted



nom.-Ø H7	flute- length	max. friction length	total- length	MT- shank	number of teeth	weight each pc.
d_1 mm	l_2 mm	b_{max} mm	l_1 mm	MT	z	ca. kg
3,0*	15	46,5	112	1	6	0,050
4,0*	19	59,5	125	1	6	0,050
5,0	23	67,5	133	1	6	0,060
6,0	26	72,5	138	1	6	0,060
7,0	31	84,5	150	1	6	0,070
8,0	33	90,5	156	1	6	0,080
9,0	36	96,5	162	1	6	0,090
10,0	38	102,5	168	1	6	0,100
11,0	41	109,5	175	1	6	0,110
12,0	44	116,5	182	1	6	0,130
13,0	44	116,5	182	1	8	0,150
14,0	47	123,5	189	1	8	0,160
15,0	50	124,0	204	2	8	0,270
16,0	52	130,0	210	2	8	0,270
17,0	54	134,0	214	2	8	0,290
18,0	56	139,0	219	2	8	0,320
19,0	58	143,0	223	2	8	0,350
20,0	60	148,0	228	2	8	0,380
21,0	62	152,0	232	2	8	0,420
22,0	64	157,0	237	2	8	0,460
23,0	66	161,0	241	2	8	0,620
24,0	68	169,0	268	3	10	0,700
25,0	68	169,0	268	3	10	0,750
26,0	70	174,0	273	3	10	0,780
27,0	71	178,0	277	3	10	0,840
28,0	71	178,0	277	3	10	0,880
29,0	73	182,0	281	3	10	0,920
30,0	73	182,0	281	3	10	1,000
31,0	75	186,0	285	3	12	1,100
32,0	77	193,0	317	4	12	1,200
33,0	77	193,0	317	4	12	1,700
34,0	78	197,0	321	4	12	1,730
35,0	78	197,0	321	4	12	1,750
36,0	79	201,0	325	4	12	1,800
37,0	79	201,0	325	4	12	1,850
38,0	81	205,0	329	4	12	1,950
39,0	81	205,0	329	4	12	2,000
40,0	81	205,0	329	4	12	2,050
41,0	82	209,0	333	4	12	2,100



straight



spiral

* FROMM standard

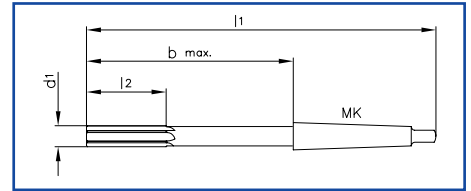
Machine reamer

Catalog-No. 401

DIN 208

continuation

HSS/E
 righthand cutting
 morse taper (MT) shank
 straight- and spiral fluted



straight

spiral

nom.-Ø H7	flute- length	max. friction length	total- length	MT- shank	number of teeth	weight each pc.
d_1 mm	l_2 mm	b_{max} mm	l_1 mm	MT	z	ca. kg
42,0	82	209,0	333	4	12	2,150
43,0	83	212,0	336	4	12	2,400
44,0	83	212,0	336	4	14	2,550
45,0	83	212,0	336	4	14	2,600
46,0	84	216,0	340	4	14	2,620
47,0	84	216,0	340	4	14	2,650
48,0	86	220,0	344	4	14	2,950
49,0	86	220,0	344	4	14	3,000
50,0	86	220,0	344	4	14	3,050
52,0*	90	236,0	360	4	14	3,150
54,0*	90	236,0	360	4	14	3,200
55,0*	90	236,0	360	4	14	3,300
56,0*	90	236,0	360	4	14	3,350
58,0*	90	234,0	390	5	16	3,450
60,0*	90	234,0	390	5	16	3,550

* FROMM standard

Order details:

401-xx.xx-A straight fluted
 401-xx.xx-B spiral fluted

xx.xx = nom.-Ø

Helical machine reamer

DIN 208

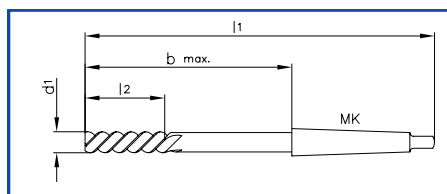
Catalog-No. 403

HSS/E

righthand cutting

morse taper (MT) shank

45° lefthand spiral (helical)



nom.-Ø H7	flute- length	max. friction length	total- length	MT- shank	number of teeth	weight each pc.
d_1 mm	l_2 mm	b_{max} mm	l_1 mm	MT	z	ca. kg
5,0	23	67,5	133	1	3	0,060
6,0	26	72,5	138	1	3	0,060
7,0	31	84,5	150	1	3	0,070
8,0	33	90,5	156	1	3	0,080
9,0	36	96,5	162	1	3	0,090
10,0	38	102,5	168	1	4	0,100
11,0	41	109,5	175	1	4	0,110
12,0	44	116,5	182	1	4	0,130
13,0	44	116,5	182	1	4	0,150
14,0	47	123,5	189	1	4	0,160
15,0	50	124,0	204	2	4	0,240
16,0	52	130,0	210	2	4	0,270
17,0	54	134,0	214	2	4	0,290
18,0	56	139,0	219	2	4	0,320
19,0	58	143,0	223	2	4	0,350
20,0	60	148,0	228	2	4	0,380
21,0	62	152,0	232	2	4	0,420
22,0	64	157,0	237	2	4	0,460
23,0	66	161,0	241	2	4	0,540
24,0	68	169,0	268	3	4	0,700
25,0	68	169,0	268	3	4	0,750
26,0	70	174,0	273	3	6	0,780
27,0	71	178,0	277	3	6	0,840
28,0	71	178,0	277	3	6	0,880
29,0	73	182,0	281	3	6	0,930
30,0	73	182,0	281	3	6	1,000
31,0	75	186,0	285	3	6	1,100
32,0	77	218,0	317	4	6	1,200



helical

Order details:

403-xx.xx-C

xx.xx = nom.-Ø



Machine front reamer

Catalog-No. 404

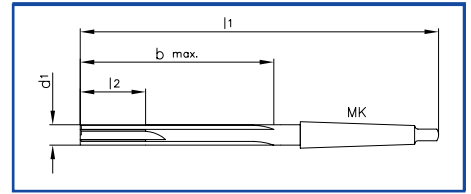
HSS/E

righthand cutting

morse taper (MT) shank

straight fluted

front cutting



straight

nom.-Ø H7	flute- length	max. friction length	total- length	MT- shank	number of teeth	weight each pc.
d ₁ mm	l ₂ mm	b _{max} mm	l ₁ mm	MT	z	ca. kg
8,0	24	71	156	1	6	0,080
9,0	24	77	162	1	6	0,090
10,0	26	84	168	1	6	0,100
11,0	26	89	175	1	6	0,110
12,0	26	96	182	1	6	0,130
13,0	26	96	182	1	8	0,150
14,0	28	103	189	1	8	0,160
15,0	28	104	204	2	8	0,200
16,0	30	108	210	2	8	0,270
17,0	30	112	214	2	8	0,290
18,0	30	117	219	2	8	0,320
19,0	32	118	223	2	8	0,350
20,0	32	124	228	2	8	0,380
21,0	34	133	232	2	8	0,420
22,0	34	133	237	2	8	0,460
23,0	34	139	268	3	8	0,540
24,0	34	139	268	3	10	0,700
25,0	36	139	268	3	10	0,750
26,0	36	144	273	3	10	0,780
27,0	38	148	277	3	10	0,840
28,0	38	148	277	3	10	0,880
29,0	42	150	281	3	10	0,950
30,0	42	150	281	3	10	1,000
31,0	44	157	317	4	12	1,100
32,0	44	157	317	4	12	1,200

Order details:

404-xx.xx

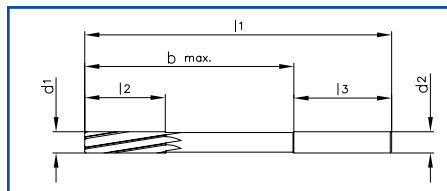
xx.xx = nom-Ø

Long machine reamer

sim. DIN 212

Catalog-No. 408

HSS/E
 righthand cutting
 straight shank
 spiral fluted



nom-Ø H7	flute- length	max. friction length	total- length	shank-Ø h6	shank- length	number of teeth	weight each pc.
d_1 mm	l_2 mm	b_{max} mm	l_1 mm	d_2 mm	l_3 mm	z	ca. kg
2,0	11	45	65	2,0	20	4	0,002
2,5	14	55	75	2,5	20	4	0,002
3,0	15	65	90	3,0	25	6	0,004
3,5	18	65	90	3,5	25	6	0,006
4,0	19	70	105	4,0	35	6	0,007
4,5	21	70	105	4,5	35	6	0,010
5,0	23	80	115	5,0	35	6	0,014
5,5	26	80	115	5,5	35	6	0,017
6,0	26	90	130	6,0	40	6	0,022
6,0	26	210	250	6,0	40	6	0,041
6,5	28	90	130	6,0	40	6	0,025
7,0	31	95	140	7,0	45	6	0,029
7,5	31	95	140	7,0	45	6	0,036
8,0	33	115	160	8,0	45	6	0,050
8,0	33	205	250	8,0	45	6	0,080
8,5	33	115	160	8,0	45	6	0,055
9,0	36	130	175	9,0	45	6	0,065
9,5	36	130	175	9,0	45	6	0,070
10,0	38	140	190	10,0	50	6	0,085
10,0	38	200	250	10,0	50	6	0,114
11,0	41	150	200	10,0	50	6	0,110
12,0	44	160	210	12,0	50	6	0,145



spiral

Order details:

408-xx.xx-y

xx.xx = nom.-Ø

y = total length

Long machine reamer

sim. DIN 208

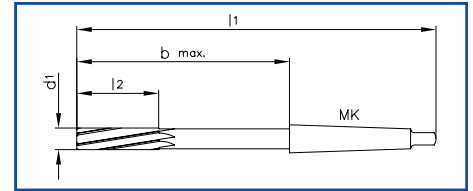
Catalog-No. 406

HSS/E

righthand cutting

morse taper (MT) shank

spiral fluted



spiral

nom.-Ø H7	flute- length	max. friction length	total- length	MT- shank	number of teeth	weight each pc.
d_1 mm	l_2 mm	b_{max} mm	l_1 mm	MT	z	ca. kg
12,0	44	245	315	1	6	0,212
13,0	44	179	245	1	8	0,190
14,0	47	179	245	1	8	0,190
14,0	47	245	315	1	8	0,245
15,0	50	180	260	2	8	0,280
16,0	52	180	260	2	8	0,300
16,0	52	270	350	2	8	0,350
18,0	56	180	260	2	8	0,320
18,0	56	270	350	2	8	0,380
20,0	60	190	270	2	8	0,360
20,0	60	270	350	2	8	0,580
22,0	64	200	280	2	8	0,420
24,0	68	200	300	3	10	0,500
25,0	68	220	320	3	10	0,900
26,0	70	230	330	3	10	1,000
28,0	71	210	310	3	10	1,000
30,0	73	250	350	3	10	1,200
32,0	77	250	375	4	12	1,800
34,0	78	250	375	4	12	1,900
36,0	79	250	375	4	12	2,000
38,0	81	270	395	4	12	2,400
40,0	81	270	395	4	12	2,600
42,0	82	280	405	4	12	3,000
45,0	83	280	405	4	14	3,100
50,0	86	290	415	4	14	3,500

Order details:

406-xx.xx-y

xx.xx = nom.-Ø

y = total length

Machine bridge reamer

DIN 311

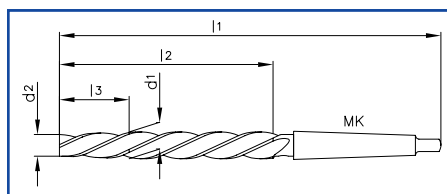
Catalog-No. 421

HSS

righthand cutting

morse taper (MT) shank

25° lefthand spiral fluted



large Ø k11	small Ø	flute-length	total-length	chamfer 1:10	MT-shank	number of teeth	weight each pc.
d ₁ mm	d ₂ mm	l ₂ mm	l ₁ mm	l ₃ mm	MT	z	ca. kg
6,4	4,5	75	151	19	1	3	0,080
7,4	5,2	80	156	22	1	3	0,090
8,0	5,5	85	161	25	1	3	0,095
8,4	5,9	85	161	25	1	3	0,100
9,0	6,3	90	166	27	1	4	0,105
9,5	6,8	90	166	27	1	4	0,110
10,0	7,0	95	171	30	1	4	0,125
11,0	7,7	100	176	33	1	4	0,140
12,0	8,1	105	199	39	2	5	0,170
13,0*	9,1	120	195	39	1	5	0,175
13,0	9,1	105	199	39	2	5	0,180
14,0	9,8	115	209	42	2	5	0,210
15,0	10,5	125	219	45	2	5	0,240
16,0	11,2	135	229	48	2	5	0,300
17,0*	11,9	150	238	51	2	5	0,320
17,0	11,9	135	251	51	3	5	0,390
18,0	12,2	145	261	58	3	5	0,430
19,0	13,2	145	261	58	3	5	0,465
20,0	13,8	155	271	62	3	5	0,520
21,0*	14,8	155	255	62	2	5	0,550
21,0	14,8	155	271	62	3	5	0,630
22,0	15,4	165	281	66	3	5	0,750
23,0	16,4	165	281	66	3	5	0,850
24,0	16,8	180	296	72	3	5	0,950
25,0	17,8	180	296	72	3	5	1,000
26,0	18,8	180	296	72	3	5	1,100
27,0	19,2	195	311	78	3	5	1,200
28,0	20,2	195	311	78	3	5	1,300
29,0	21,2	195	311	78	3	5	1,400
30,0	22,2	195	311	78	3	5	1,500
31,0	22,6	210	326	84	3	5	1,650
32,0	23,6	210	354	84	4	5	1,750
33,0	24,6	210	354	84	4	5	1,900
34,0	25,2	220	364	88	4	5	2,000
35,0	26,2	220	364	88	4	5	2,100
36,0	27,2	220	364	88	4	5	2,200
37,0	28,2	220	364	88	4	5	2,300
38,0	28,8	230	374	92	4	5	2,500
39,0	29,8	230	374	92	4	5	2,750
40,0	30,8	230	374	92	4	5	3,000

* FROMM standard



Order details:

421-xx.xx-MKy

xx.xx = large Ø

y = MT size

Shell reamer

Catalog No. 412

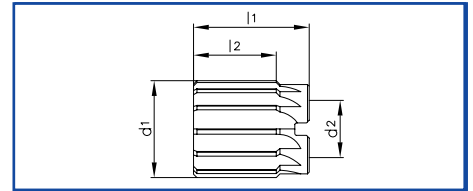
DIN 219

HSS/E

righthand cutting

with taper-hole 1:30 and transverse slot DIN 138

straight- and spiral fluted



straight



spiral

nom.-Ø H7	flute- length	total- length	taper hole Ø	shell holder	number of teeth	weight each pc.
d ₁ mm	l ₂ mm	l ₁ mm	d ₂ mm	size	z	ca. kg
25,0	32	45	13	2	8	0,100
26,0	32	45	13	2	8	0,110
27,0	32	45	13	2	8	0,120
28,0	32	45	13	2	8	0,150
29,0	32	45	13	2	8	0,170
30,0	32	45	13	2	8	0,180
31,0	36	50	16	3	10	0,190
32,0	36	50	16	3	10	0,200
33,0	36	50	16	3	10	0,210
34,0	36	50	16	3	10	0,220
35,0	36	50	16	3	10	0,230
36,0	40	56	19	4	10	0,240
37,0	40	56	19	4	10	0,245
38,0	40	56	19	4	10	0,250
39,0	40	56	19	4	10	0,260
40,0	40	56	19	4	10	0,270
41,0	40	56	19	4	10	0,300
42,0	40	56	19	4	10	0,320
43,0	45	63	22	5	12	0,380
44,0	45	63	22	5	12	0,410
45,0	45	63	22	5	12	0,420
46,0	45	63	22	5	12	0,430
47,0	45	63	22	5	12	0,470
48,0	45	63	22	5	12	0,480
49,0	45	63	22	5	12	0,490
50,0	45	63	22	5	12	0,520
52,0	50	71	27	6	12	0,530
55,0	50	71	27	6	12	0,660
56,0	50	71	27	6	12	0,690
58,0	50	71	27	6	12	0,800
60,0	50	71	27	6	12	0,830
62,0	56	80	32	7	14	0,870
65,0	56	80	32	7	14	1,000
68,0	56	80	32	7	14	1,100
70,0	56	80	32	7	14	1,200
72,0	63	90	40	8	14	1,300
75,0	63	90	40	8	14	1,400
78,0	63	90	40	8	14	1,500
80,0	63	90	40	8	14	1,600

Shell reamer

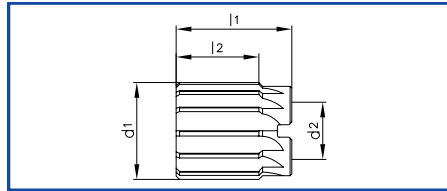
Catalog No. 412

DIN 219

continuation

HSS/E

righthand cutting
with taper-hole 1:30 and transverse slot DIN 138
straight- and spiral fluted



nom.-Ø H7	flute- length	total- length	taper hole Ø	shell holder	number of teeth	weight each pc.
d_1 , mm	l_2 , mm	l_1 , mm	d_2 , mm	size	z	ca. kg
82,0	63	90	40	8	14	1,700
85,0	63	90	40	8	14	1,800
88,0	71	100	50	9	16	1,900
90,0	71	100	50	9	16	2,000
92,0	71	100	50	9	16	2,100
95,0	71	100	50	9	16	2,200
98,0	71	100	50	9	16	2,300
100,0	71	100	50	9	16	2,500



straight



spiral



straight



spiral

Order details:

412-xx.xx-A

straight fluted

412-xx.xx-B

spiral fluted

xx.xx = nom.-Ø



Helical shell reamer

DIN 219

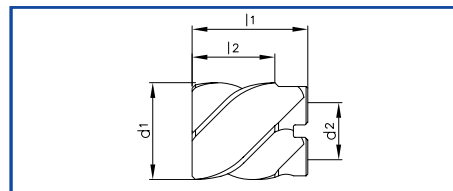
Catalog-No. 413

HSS/E

righthand cutting

with taper-hole 1:30 and transverse slot DIN 138

45° lefthand spiral (helical)



helical

nom.-Ø H7	flute- length	total- length	taper hole Ø	shell holder	number of teeth	weight each pc.
d ₁ mm	l ₂ mm	l ₁ mm	d ₂ mm	size	z	ca. kg
25,0	32	45	13	2	6	0,100
26,0	32	45	13	2	6	0,110
27,0	32	45	13	2	6	0,120
28,0	32	45	13	2	6	0,150
29,0	32	45	13	2	6	0,170
30,0	32	45	13	2	6	0,180
31,0	36	50	16	3	6	0,190
32,0	36	50	16	3	6	0,200
33,0	36	50	16	3	6	0,210
34,0	36	50	16	3	6	0,220
35,0	36	50	16	3	6	0,230
36,0	40	56	19	4	6	0,240
37,0	40	56	19	4	6	0,245
38,0	40	56	19	4	6	0,250
39,0	40	56	19	4	6	0,260
40,0	40	56	19	4	6	0,270
41,0	40	56	19	4	6	0,300
42,0	40	56	19	4	6	0,320
43,0	45	63	22	5	6	0,380
44,0	45	63	22	5	6	0,410
45,0	45	63	22	5	6	0,420
46,0	45	63	22	5	6	0,430
47,0	45	63	22	5	8	0,470
48,0	45	63	22	5	8	0,480
49,0	45	63	22	5	8	0,490
50,0	45	63	22	5	8	0,520
52,0	50	71	27	6	8	0,530
55,0	50	71	27	6	8	0,660
56,0	50	71	27	6	8	0,690
58,0	50	71	27	6	8	0,800
60,0	50	71	27	6	8	0,830
62,0	56	80	32	7	8	0,870
65,0	56	80	32	7	8	1,000
68,0	56	80	32	7	8	1,100
70,0	56	80	32	7	8	1,200
72,0	63	90	40	8	8	1,300
75,0	63	90	40	8	10	1,400
78,0	63	90	40	8	10	1,500
80,0	63	90	40	8	10	1,600

Helical shell reamer

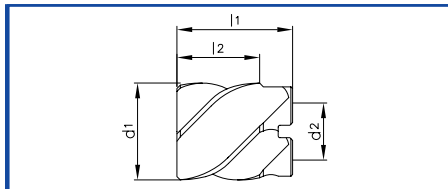
Catalog-No. 413

DIN 219

continuation

HSS/E

righthand cutting
with taper-hole 1:30 and transverse slot DIN 138
45° lefthand spiral (helical)



nom.-Ø H7	flute- length	total- length	taper hole Ø	shell holder	number of teeth	weight each pc.
d_1 , mm	l_2 , mm	l_1 , mm	d_2 , mm	size	z	ca. kg
82,0	63	90	40	8	10	1,700
85,0	63	90	40	8	10	1,800
88,0	71	100	50	9	10	1,900
90,0	71	100	50	9	10	2,000
92,0	71	100	50	9	10	2,100
95,0	71	100	50	9	10	2,200
98,0	71	100	50	9	10	2,300
100,0	71	100	50	9	10	2,500



helical



Order details:

413-xx.xx-C

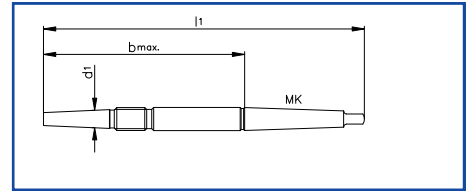
xx.xx = nom.-Ø

Shell holder (arbor)

Catalog-No. 201

DIN 217

use for shell reamer and shell core drill
with taper-hole 1:30
morse taper shank (MT)



nom.-Ø	size	max. friction length	total-length	MT-shank	area of application	area of application	area of application	weight each pc.
d_1 mm		b_{max} mm	l_1 mm	MT	DIN 219	DIN 222	DIN 8054	ca. kg
13,0	2	150	250	3	25 - 30	25 - 35	30 - 35	0,600
16,0	3	160	261	3	31 - 35	36 - 45	36 - 45	0,700
19,0	4	174	298	4	36 - 42	46 - 53	46 - 53	1,200
22,0	5	188	312	4	43 - 50	54 - 63	54 - 63	1,400
27,0	6	203	359	5	51 - 60	64 - 75	64 - 75	2,100
32,0	7	220	396	5	61 - 71	76 - 90		3,500
40,0	8	240	396	5	72 - 85	91 - 100		4,700
50,0	9	260	416	5	88 - 100			7,200

spare parts for shell holder:



clutch drive ring



forcing nut



spring

Order details:

201-xx

201-xx-M (clutch drive ring)

201-xx-A (forcing nut)

201-xx-P (spring)

xx = nom.-Ø

Taper hand reamer 1:50

DIN 9

Catalog-No. 501

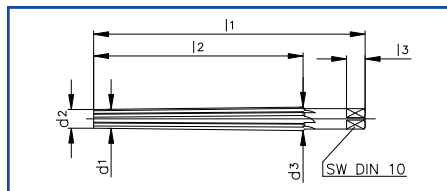
HSS

taper 1:50

righthand cutting

straight shank with square

straight- and spiral fluted



nom.- Ø	small Ø	large Ø	flute- length	total- length	ISO-square accdg. DIN 10		number of teeth	weight each pc.
d, mm	d ₂ mm	d ₃ mm	l ₂ mm	l ₁ mm	a h ₁₁ mm	l ₃ mm	z	ca. kg
1,0	0,90	1,46	28	46	2,40	5	3	0,002
1,5	1,40	2,14	37	57	2,40	5	3	0,003
1,6*	1,50	2,24	37	57	2,40	5	3	0,003
2,0	1,90	2,86	48	68	2,40	5	3	0,004
2,5	2,40	3,36	48	68	2,40	5	4	0,005
3,0	2,90	4,06	58	80	3,00	6	5	0,006
3,5*	3,40	4,66	63	87	3,40	6	5	0,009
4,0	3,90	5,26	68	93	3,80	7	5	0,010
4,5*	4,40	5,80	70	95	4,30	7	5	0,016
5,0	4,90	6,36	73	100	4,90	8	5	0,018
5,5*	5,40	7,20	90	118	5,50	8	6	0,032
6,0	5,90	8,00	105	135	6,20	9	6	0,035
6,5*	6,40	8,60	110	140	6,20	9	6	0,035
7,0*	6,90	9,40	125	160	7,00	10	6	0,055
8,0	7,90	10,80	145	180	8,00	11	6	0,060
9,0*	8,90	12,10	160	195	9,00	12	6	0,110
10,0	9,90	13,40	175	215	10,00	13	6	0,130
12,0	11,80	16,00	210	255	11,00	14	8	0,200
13,0*	12,80	17,00	210	255	12,00	15	8	0,220
14,0*	13,80	18,00	210	255	12,00	15	8	0,250
16,0	15,80	20,40	230	280	14,50	17	8	0,580
20,0	19,80	24,80	250	310	18,00	21	10	0,850
25,0	24,70	30,70	300	370	22,00	25	10	1,600
30,0	29,70	36,10	320	400	24,00	27	12	2,200
40,0	39,70	46,50	340	430	32,00	35	12	4,200
50,0	49,70	56,90	360	460	39,00	42	14	5,900



* FROMM standard, Ø 1 only straight fluted, Form A available

For taper pins accdg. DIN 1, DIN 258, DIN 7977, DIN 7978

Order details:

501-xx.xx-A

straight fluted

501-xx.xx-B

spiral fluted

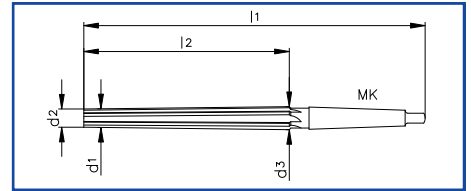
xx.xx = nom.-Ø

Taper machine reamer 1:50

Catalog-No. 502

sim. DIN 9

HSS
 taper 1:50
 righthand cutting
 morse taper (MT) shank
 straight- and spiral fluted



straight

spiral

nom.- Ø	small Ø	large Ø	flute- length	total- length	MT- shank	number of teeth	weight each pc.
d ₁ mm	d ₂ mm	d ₃ mm	l ₂ mm	l ₁ mm	MT	z	ca. kg
8	7,90	10,80	145	227	1	6	0,100
10	9,90	13,40	175	257	1	6	0,135
12	11,80	16,00	210	315	2	8	0,200
13	12,86	16,74	194	295	2	8	0,230
14	13,86	17,74	194	295	2	8	0,270
16	15,80	20,40	230	335	2	8	0,420
20	19,80	24,80	250	377	3	10	0,850
25	24,70	30,70	300	427	3	10	1,800
30	29,70	36,10	320	475	4	12	2,450
40	39,70	46,50	340	495	4	12	4,500
50	49,70	56,90	360	550	5	14	7,400

For taper pins accdg. DIN 1, DIN 258, DIN 7977, DIN 7978

Order details:

502-xx.xx-A straight fluted
 502-xx.xx-B spiral fluted

xx.xx = nom.-Ø

Taper machine reamer 1:50 (Helical) DIN 2179

Catalog-No. 503

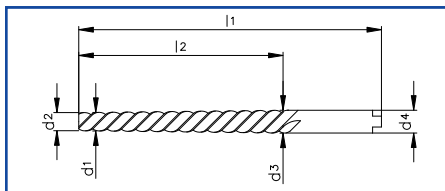
HSS/E

taper 1:50

righthand cutting

straight shank with tang DIN 1809

45° lefthand spiral (helical)



nom.- Ø	small Ø	large Ø	flute- length	total- length	shank-Ø h9	number of teeth	weight each pc.
d ₁ mm	d ₂ mm	d ₃ mm	l ₂ mm	l ₁ mm	d ₄ mm	z	ca. kg
1,5*	1,40	2,26	43	64	2,00	2	0,003
2,0	1,90	2,86	48	86	3,15	2	0,004
2,5	2,40	3,36	48	86	3,15	3	0,005
3,0	2,90	4,06	58	100	4,00	3	0,010
4,0	3,90	5,26	68	112	5,00	3	0,013
5,0	4,90	6,36	73	122	6,30	3	0,025
6,0	5,90	8,00	105	160	8,00	3	0,040
6,5*	6,40	8,78	119	187	8,50	3	0,045
8,0	7,90	10,80	145	207	10,00	3	0,095
10,0	9,90	13,40	175	245	12,50	3	0,145
12,0	11,80	16,00	210	290	16,00	3	0,200
13,0*	12,86	16,74	194	275	16,00	3	0,260
14,0*	13,86	17,74	194	275	17,00	3	0,300
16,0*	15,84	21,12	264	355	20,00	3	0,480
20,0*	19,80	25,20	270	370	24,00	3	0,740
25,0*	24,74	30,94	310	420	28,00	4	0,850

* FROMM standard,
(Ø1,5 without tang)



helical

For taper pins accdg. DIN 1, DIN 258, DIN 7977, DIN 7978

Order details:

503-xx.xx

xx.xx = nom.-Ø

Taper machine reamer 1:50 (Helical)

DIN 2180

Catalog-No. 504

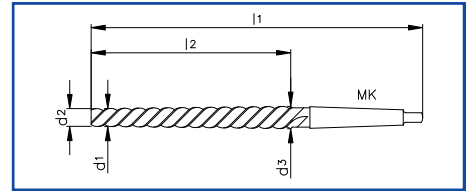
HSS

taper 1:50

righthand cutting

morse taper (MT) shank

45° lefthand spiral (helical)



helical

nom.- Ø	small Ø	large Ø	flute- length	total- length	MT- shank	number of teeth	weight each pc.
d ₁ mm	d ₂ mm	d ₃ mm	l ₂ mm	l ₁ mm	MT	z	ca. kg
4,0*	3,90	5,40	75	170	1	3	0,050
5,0	4,90	6,36	73	155	1	3	0,050
6,0	5,90	8,00	105	187	1	3	0,070
6,5*	6,40	8,78	119	205	1	3	0,075
8,0	7,90	10,80	145	227	1	3	0,100
10,0	9,90	13,40	175	257	1	3	0,135
12,0	11,80	16,00	210	315	2	3	0,210
13,0*	12,86	16,74	194	300	2	3	0,230
14,0*	13,86	17,74	194	300	2	3	0,260
16,0	15,80	20,40	230	335	2	3	0,420
20,0	19,80	24,80	250	377	3	3	0,850
25,0	24,70	30,70	300	427	3	4	1,300
30,0	29,70	36,10	320	475	4	6	2,500
40,0	39,70	46,50	340	495	4	8	4,500
50,0	49,70	56,90	360	550	5	8	7,400

* FROMM standard

For taper pins accdg. DIN 1, DIN 258, DIN 7977, DIN 7978

Order details:

504-xx.xx

xx.xx = nom.-Ø

Taper hand reamer 1:10

Catalog-No. 505

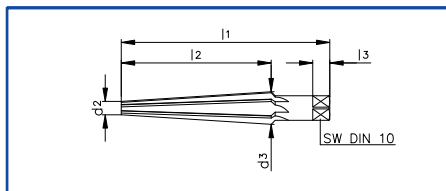
HSS

taper 1:10

righthand cutting

straight shank with square

straight- and spiral fluted



small Ø	large Ø	flute-length	total-length	ISO-square accdg. DIN 10		number of teeth	weight each pc.	
d_2 mm	d_3 mm	l_2 mm	l_1 mm	a mm	h_{11} mm	l_3 mm	z	ca. kg
3	10	70	100	6,2	9	5	0,020	
5	15	100	140	9,0	12	5	0,080	
10	25	150	195	16,0	19	7	0,350	
15	35	200	250	24,0	27	9	1,000	
23	45	220	275	32,0	35	11	1,970	
30	55	250	310	39,0	42	13	3,500	
37	65	280	345	44,0	47	15	5,100	
45	75	300	370	49,0	52	17	7,600	

Order details:

505-xxxx-A

straight fluted

505-xxxx-B

spiral fluted

xxxx = small + large Ø



straight

spiral

Taper machine reamer 1:10

Catalog-No. 506

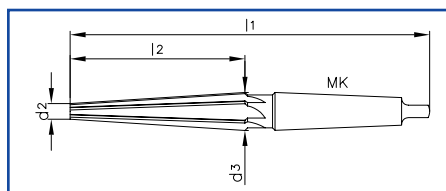
HSS

taper 1:10

righthand cutting

morse taper (MT) shank

straight- and spiral fluted



small Ø	large Ø	flute-length	total-length	MT-shank	number of teeth	weight each pc.
d_2 mm	d_3 mm	l_2 mm	l_1 mm	MT	z	ca. kg
5	15	100	195	2	5	0,200
10	25	150	270	3	7	0,500
15	35	200	345	4	9	1,400
23	45	220	365	4	11	1,800
30	55	250	430	5	13	4,000
37	65	280	460	5	15	5,500
45	75	300	550	6	17	8,300

Order details:

506-xxxx-A

straight fluted

506-xxxx-B

spiral fluted

xxxx = small + large Ø



straight

spiral



NPT-taper hand reamer 1:16

Catalog-No. 509

HSS

taper 1:16

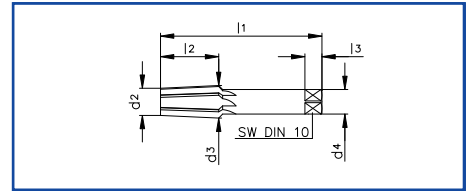
righthand cutting

straight shank with square

straight- and spiral fluted

for conical threads:

Whitworth-pipe-NPT-NPTF-API



Type A - straight fluted



straight

nom.- Ø	small Ø	large Ø	flute- length	total- length	shank-Ø e9	ISO-square accdg. DIN 10		number of teeth	weight each pc.
d ₁ mm	d ₂ mm	d ₃ mm	l ₂ mm	l ₁ mm	d ₄ mm	α h ₁₁ mm	l ₃ mm	z	ca. kg
1/16"	5,935	6,998	17	70	6	4,9	8	6	0,015
1/8"	8,042	9,105	17	70	8	6,2	9	6	0,025
1/4"	10,308	11,996	27	80	11	9,0	12	6	0,050
3/8"	13,728	15,416	27	85	12	9,0	12	8	0,080
1/2"	16,938	19,126	35	95	16	12,0	15	8	0,140
3/4"	22,253	24,411	35	105	20	16,0	19	10	0,280
1"	27,996	30,684	43	130	25	20,0	23	10	0,500
1 1/4"	36,721	39,471	44	140	32	24,0	27	12	0,900
1 1/2"	42,791	45,604	45	150	36	29,0	32	12	1,250
2"	54,803	57,678	46	160	48	35,0	38	14	2,200

Type B - spiral fluted



spiral

nom.- Ø	small Ø	large Ø	flute- length	total- length	shank-Ø e9	ISO-square accdg. DIN 10		number of teeth	weight each pc.
d ₁ mm	d ₂ mm	d ₃ mm	l ₂ mm	l ₁ mm	d ₄ mm	α h ₁₁ mm	l ₃ mm	z	ca. kg
1/16"	5,935	6,998	17	70	6	4,9	8	6	0,015
1/8"	8,042	9,105	17	70	8	6,2	9	6	0,025
1/4"	10,308	11,996	27	80	11	9,0	12	6	0,050
3/8"	13,728	15,416	27	85	12	9,0	12	8	0,080
1/2"	16,938	19,126	35	95	16	12,0	15	8	0,140
3/4"	22,253	24,411	35	105	20	16,0	19	10	0,280
1"	27,996	30,684	43	130	25	20,0	23	10	0,500
1 1/4"	36,721	39,471	44	140	32	24,0	27	12	0,900
1 1/2"	42,791	45,604	45	150	36	29,0	32	12	1,250
2"	54,803	57,678	46	160	48	35,0	38	14	2,200

Order details:

509-x/x-AN

straight fluted

509-x/x-BN

spiral fluted

x/x = nom.-Ø

Taper hand reamer 1:20

Catalog-No. 510

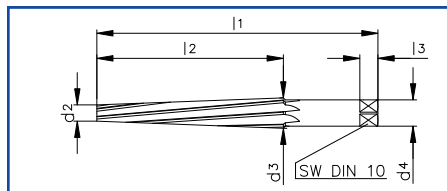
HSS

taper 1:20

righthand cutting

straight shank with square

spiral fluted



small Ø	large Ø	flute- length	total- length	shank-Ø h9	ISO-square accdg. DIN 10		number of teeth	weight each pc.
d ₂ mm	d ₃ mm	l ₂ mm	l ₁ mm	d ₄ mm	a h ₁₁ mm	l ₃ mm	z	ca. kg
2,0	5,0	60	85	5	3,8	7	4	0,006
2,5	5,5	60	85	6	4,9	8	4	0,008
3,0	7,0	80	110	7	5,5	8	5	0,016
3,5	7,5	80	110	7	5,5	8	5	0,018
4,0	8,0	80	120	8	6,2	9	5	0,028
4,5	9,0	90	130	9	7,0	10	6	0,035
5,0	9,5	90	130	10	8,0	11	6	0,040
5,5	10,0	90	130	10	8,0	11	6	0,045
6,0	11,0	100	140	11	9,0	12	6	0,055
7,0	12,0	100	140	12	9,0	12	6	0,060
8,0	14,0	120	165	14	11,0	14	6	0,110
9,0	15,0	120	165	15	12,0	15	8	0,140
10,0	16,0	120	165	16	12,0	15	8	0,155



spiral

Order details:

510-xx.xx-B

spiral fluted

xx.xx = small-Ø

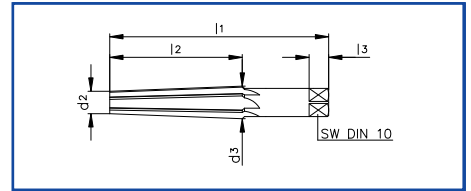
MT-hand reamer

Catalog-No. 516

DIN 204

HSS

righthand cutting
straight shank with square
straight- and spiral fluted



Form **A** finishing reamer, straight fluted
Catalog-No. 516-A

Form **B** finishing reamer, spiral fluted
Catalog-No. 516-B

Form **W** roughing reamer, straight fluted
Catalog-No. 516-W



Form A Form B

for morse-taper	small Ø	large Ø	flute-length	total-length	ISO-square accdg. DIN 10		number of teeth	weight each pc.
MT	d ₂ mm	d ₃ mm	l ₂ mm	l ₁ mm	a h ₁₁ mm	l ₃ mm	z	ca. kg
0	6,547	9,722	61	93	6,2	9	6	0,030
1	9,571	12,863	66	102	8,0	11	8	0,065
2	14,733	18,679	79	121	11,0	14	8	0,160
3	20,010	24,829	96	146	16,0	19	10	0,370
4	26,229	32,410	119	179	20,0	23	10	0,775
5	37,873	45,767	150	222	24,0	27	12	1,900
6	54,172	65,016	208	300	35,0	38	16	5,100



Form W

Order details:

516-x-A finishing reamer, straight fluted

516-x-B finishing reamer, spiral fluted

516-x-W roughing reamer with chip breaker, straight fluted

x = MT

MT-machine reamer

DIN 1895

Catalog-No. 517/518

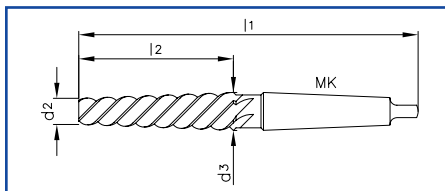
HSS

righthand cutting

morse taper (MT) shank

straight- spiral and 45° (helical) fluted

Form D roughing reamer (helical)
catalog-no. 517-D



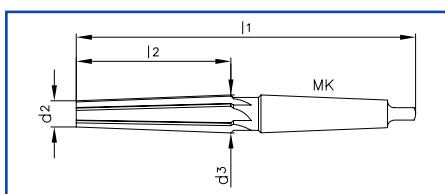
for morse-taper	small Ø	large Ø	flute-length	total-length	MT-shank	number of teeth	weight each pc.
MT	d ₂ mm	d ₃ mm	l ₂ mm	l ₁ mm	MT	z	ca. kg
0	6,338	9,513	61	137	1	3	0,065
1	9,571	12,664	66	142	1	3	0,090
2	14,533	18,479	79	173	2	4	0,230
3	19,809	24,628	96	212	3	5	0,500
4	25,917	32,098	119	263	4	6	0,760
5	37,558	45,452	150	331	5	6	1,900
6	53,859	64,704	208	389	5	7	5,800



helical

Form E finishing reamer, straight fluted
catalog-no. 518-E

Form C finishing reamer, spiral fluted
catalog-no. 518-C



for morse-taper	small Ø	large Ø	flute-length	total-length	MT-shank	number of teeth	weight each pc.
MT	d ₂ mm	d ₃ mm	l ₂ mm	l ₁ mm	MT	z	ca. kg
0	6,547	9,722	61	137	1	6	0,065
1	9,571	12,863	66	142	1	6	0,090
2	14,733	18,679	79	173	2	8	0,230
3	20,010	24,829	96	212	3	10	0,500
4	26,229	32,410	119	263	4	10	0,760
5	37,873	45,767	150	331	5	10	1,900
6	54,380	65,016	208	389	5	14	5,800



straight



spiral

Order details:

517-x-D roughing reamer (helical)

518-x-E finishing reamer, straight fluted

518-x-C finishing reamer, spiral fluted

x = MT



Taper hand reamer 1:48

Catalog-No. 513

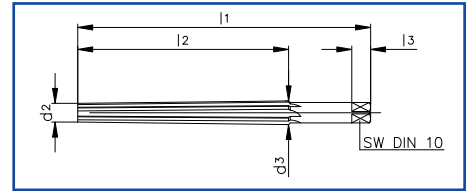
HSS

taper 1/4" : 12"

righthand cutting

straight shank with square

straight fluted



straight

No.	small Ø	large Ø	flute-length	total-length	ISO-square accdg. DIN 10		number of teeth	weight each pc.
	d ₂ mm d ₂ in inch	d ₃ mm d ₃ in inch	l ₂ mm l ₂ in inch	l ₁ mm l ₁ in inch	a h ₁₁ mm	l ₃ mm	z	ca. kg
7/0	1,255 0,0497	1,692 0,0666	21 13/26	46 1 13/64	1,25	4	4	0,001
6/0	1,548 0,0611	2,047 0,0806	24 15/16	49 1 15/16	1,60	4	4	0,001
5/0	1,830 0,0719	2,454 0,0966	30 1 3/16	56 2 3/16	2,00	5	4	0,001
4/0	2,215 0,8690	2,901 0,1142	33 1 5/16	59 2 5/16	2,10	5	4	0,002
3/0	2,621 0,1031	3,307 0,1302	33 1 5/16	59 2 5/16	2,40	5	4	0,002
2/0	2,881 0,1137	3,713 0,1462	40 1 9/16	65 2 9/16	2,70	6	5	0,003
0	3,267 0,1287	4,161 0,1638	43 1 11/16	75 2 15/16	3,00	6	6	0,004
1	3,673 0,1447	4,567 0,1798	43 1 11/16	75 2 15/16	3,40	6	6	0,005
2	4,081 0,1605	5,100 0,2008	49 1 15/16	81 2 3/16	3,80	7	6	0,008
3	4,621 0,1813	5,827 0,2294	58 2 5/16	94 3 11/16	4,30	7	6	0,011
4	5,262 0,2071	6,614 0,2604	65 2 9/16	103 4 1/16	4,90	8	6	0,017
5	6,128 0,2441	7,605 0,2994	71 2 13/16	110 4 5/16	5,50	8	6	0,027
6	7,037 0,2773	8,992 0,0354	94 3 11/16	138 5 7/16	7,00	10	6	0,045
7	8,387 0,3297	10,719 0,4220	112 4 7/16	160 6 5/16	8,00	11	6	0,070
8	10,082 0,3971	12,827 0,5050	132 5 3/16	182 7 3/16	9,00	12	6	0,130
9	12,205 0,4805	15,408 0,6066	154 6 1/16	210 8 5/16	12,00	15	8	0,210
10	14,731 0,5799	18,329 0,7216	173 6 13/16	235 9 5/16	14,50	17	8	0,340

Order details:

513-x

straight fluted

x = No.

Taper hand reamer 1:100

Catalog-No. 514

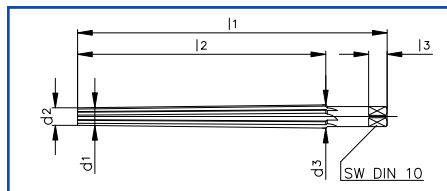
HSS

taper 1:100

righthand cutting

straight shank with square

straight fluted



nom.- Ø	small Ø	large Ø	flute- length	total- length	ISO-square accdg. DIN 10		number of teeth	weight each pc.
d, mm	d ₂ mm	d ₃ mm	l ₂ mm	l ₁ mm	a h ₁₁ mm	l ₃ mm	z	ca. kg
1,50	1,40	1,77	37	62	1,25	4	4	0,003
1,75	1,65	2,08	45	68	1,60	4	4	0,004
2,00	1,90	2,38	48	73	1,80	4	4	0,004
2,25	2,15	2,66	51	77	2,10	5	4	0,005
2,50	2,40	2,93	53	80	2,40	5	4	0,005
3,00	2,90	3,53	63	91	2,70	6	6	0,006
3,50	3,40	4,09	69	96	3,00	6	6	0,007
4,00	3,90	4,65	75	100	3,00	6	6	0,010
4,50	4,40	5,21	81	108	3,80	7	6	0,012
5,00	4,90	5,77	87	115	4,30	7	6	0,018
5,50	5,40	6,43	103	133	4,90	8	6	0,025
6,00	5,90	7,09	119	150	5,50	8	6	0,035
7,00	6,90	8,20	130	164	6,20	9	6	0,045
8,00	7,90	9,31	141	177	7,00	10	6	0,060
9,00	8,90	10,42	152	190	8,00	11	6	0,090
10,00	9,90	11,53	163	205	9,00	12	8	0,130
11,00	10,90	12,63	173	216	10,00	13	8	0,150
12,50	12,40	14,29	189	234	11,00	14	8	0,190
14,00	13,90	15,97	207	257	12,00	15	8	0,250
16,00	15,90	18,24	234	290	14,50	17	8	0,580
18,00	17,90	20,42	252	325	16,00	19	8	0,650
20,00	19,80	22,50	270	340	16,00	19	8	0,850



straight

Order details:

514-xx.xx

straight fluted

xx.xx = nom.-Ø

SOLID CARBIDE REAMER CARBIDE-TIPPED REAMER CERMET REAMER TOP-SPEED-REAMER

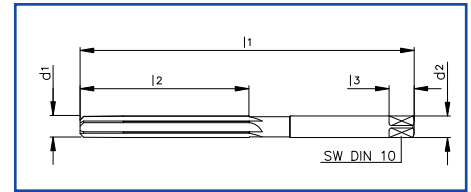
	<u>catalogue-no. page</u>		
Solid carbide hand reamer sim. DIN 206	6010	51	
Carbide-tipped hand reamer sim. DIN 206	600	51	
Solid carbide machine reamer sim. DIN 8093	6011	52	
Solid carbide machine reamer DIN 8093-2 with NC-shank	NEW NC6111	53	
Solid carbide machine reamer sim. DIN 8093-2 with NC-shank	NC6011	54	
Solid carbide machine reamer DIN 8093-2 in steps of 0.01mm	NEW NC6199	55	
Solid carbide machine reamer sim. DIN 8093-2 in steps of 0.01mm	NC699	56	
Solid carbide machine reamer DIN 8093-2 with coolant	NEW NC6111IK	57	
Solid carbide machine reamer sim. DIN 8093-2 with coolant	NC6011IK	58	
Solid carbide machine reamer DIN 8093-2 TiAlN-coated	NEW NC6111T	59	
Solid carbide stub reamer sim. DIN 8089	6012	60	
Carbide-tipped machine reamer DIN 8093	601	61	
Carbide-tipped machine reamer DIN 8050	602	62	
Carbide-tipped machine reamer DIN 8094	603	63	
Carbide-tipped machine reamer DIN 8051	604	64	
Solid carbide machine reamer sim. DIN 8094	6013	65	
Carbide-tipped shell reamer DIN 8054	606	66	
Carbide-tipped expandable machine reamer sim. DIN 8050	610	67	
Carbide-tipped expandable machine reamer sim. DIN 8051	609	68	
Carbide machine reamer with rough cutting step	611	69	
Solid carbide taper reamer 1:50 sim. DIN 9	6050	70	
CERMET machine reamer sim. DIN 8093 with NC-shank	7010	71	
Solid carbide Top-Speed-Reamer with inner coolant	TS3020	72-73	for steel, cast iron, aluminium-alloys, ...
Solid carbide Top-Speed-Reamer with inner coolant and coating	TS3025	74-75	for steel and cast iron
Solid carbide Top-Speed-Reamer with coolant, coating, in steps of 0.01mm	TS3030	76-77	
Solid carbide Top-Speed-Reamer with inner coolant, coating	TS4025	78-79	for stainless steel
Solid carbide Top-Speed-Reamer with inner coolant, coating	TS5025	80-81	for hardened steel
CERMET Top-Speed-Reamer witho coolant	TS7010	82-83	for steel and cast iron
Carbide-tipped Top-Speed-Reamer, long, not expandable	TS2520	84	
Carbide-tipped Top-Speed-Reamer, short, not expandable	TS2525	85	
Carbide-tipped Top-Speed-Reamer, long, expandable	TS2560	86	
Carbide-tipped Top-Speed-Reamer, short, expandable	TS2565	87	
CERMET-tipped Top-Speed-Reamer, not expandable	TS7525	88	
CERMET-tipped Top-Speed-Reamer, expandable	TS7565	89	



Hand reamer Catalog-No. 6010

sim. DIN 206

solid carbide K10 (monobloc)
righthand cutting
straight shank with square
straight fluted



straight

nom.-Ø H7	flute- length	total- length	shank-Ø e9	ISO-square accdg. DIN 10		number of teeth	weight each pc.	
d_1 mm	l_2 mm	l_1 mm	d_2 mm	a mm	h_{11} mm	l_3 mm	z	ca. kg
1,5	20	40	1,5	1,12	4	4	4	0,001
2,0	25	49	2,0	1,60	4	4	4	0,002
2,5	29	57	2,5	2,10	5	4	4	0,003
3,0	31	61	3,0	2,40	5	6	6	0,005
3,5	35	70	3,5	2,70	6	6	6	0,008
4,0	38	75	4,0	3,00	6	6	6	0,012
4,5	41	80	4,5	3,40	6	6	6	0,020
5,0	44	86	5,0	3,80	7	6	6	0,030
6,0	47	93	6,0	4,90	8	6	6	0,035
7,0	54	109	7,0	5,50	8	6	6	0,055
8,0	58	117	8,0	6,20	9	6	6	0,075
9,0	62	125	9,0	7,00	10	6	6	0,090

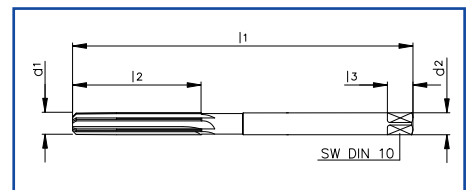
Order details:

6010-xx.xx-A xx.xx = nom.-Ø

Hand reamer Catalog-No. 600

sim. DIN 206

Carbide-tipped (brazed) K10
righthand cutting
straight shank with square
straight fluted



straight

nom.-Ø H7	flute- length	total- length	shank-Ø e9	ISO-square accdg. DIN 10		number of teeth	weight each pc.	
d_1 mm	l_2 mm	l_1 mm	d_2 mm	a mm	h_{11} mm	l_3 mm	z	ca. kg
10,0	45	133	10,0	8,0	11	6	6	0,050
11,0	45	142	11,0	9,0	12	6	6	0,100
12,0	45	152	12,0	9,0	12	6	6	0,125
13,0	45	152	13,0	10,0	13	6	6	0,145
14,0	45	163	14,0	11,0	14	6	6	0,170
15,0	45	163	15,0	12,0	15	6	6	0,180
16,0	56	175	16,0	12,0	15	6	6	0,200
17,0	56	175	17,0	13,0	16	6	6	0,220
18,0	56	188	18,0	14,5	17	6	6	0,280
19,0	56	188	19,0	14,5	17	6	6	0,295
20,0	56	201	20,0	16,0	19	6	6	0,330

Order details:

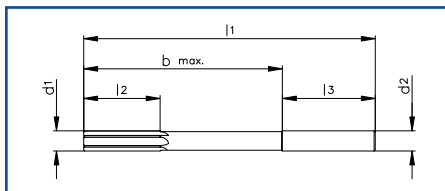
600-xx.xx-A xx.xx = nom.-Ø

Machine reamer

Catalog-No. 6011

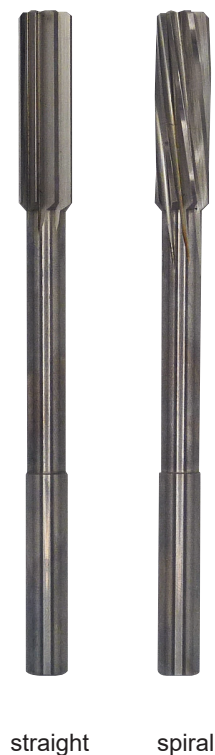
ähnl. DIN 8093

Solid carbide K10
 righthand cutting
 straight shank
 straight. and spiral fluted



up to Ø 13 mm solid carbide (monobloc)
 from Ø 14 mm solid carbide head and steel shank

nom-Ø H7	flute- length	max. friction length	total- length	shank-Ø h9	shank- length	number of teeth	weight each pc.
d ₁ mm	l ₂ mm	b _{max.} mm	l ₁ mm	d ₂ mm	l ₃ mm	z	ca. kg
1,0	6	15	34	1,0	19	3	0,001
1,2	7,5	16,5	38	1,2	21,5	3	0,001
1,4	8	18	40	1,4	22	3	0,001
1,5	8	18	40	1,5	22	3	0,001
1,6	9	20	43	1,6	23	3	0,001
1,8	10	22	46	1,8	24	4	0,002
2,0	11	24	49	2,0	25	4	0,002
2,2	12	25	53	2,2	28	4	0,002
2,5	14	29	57	2,5	28	4	0,003
2,8	15	33	61	2,8	28	6	0,004
3,0	15	33	61	3,0	28	6	0,005
3,2	16	37	65	3,2	28	6	0,006
3,5	18	42	70	3,5	28	6	0,008
4,0	19	47	75	4,0	28	6	0,012
4,5	21	52	80	4,5	28	6	0,020
5,0	23	58	86	5,0	28	6	0,021
5,5	26	57	93	5,6	36	6	0,025
6,0	26	57	93	5,6	36	6	0,033
6,5	28	65	101	6,3	36	6	0,040
7,0	31	73	109	7,1	36	6	0,051
7,5	31	73	109	7,1	36	6	0,061
8,0	33	81	117	8,0	36	6	0,071
8,5	33	81	117	8,0	36	6	0,081
9,0	36	85	125	9,0	40	6	0,090
9,5	36	85	125	9,0	40	6	0,092
10,0	38	93	133	10,0	40	6	0,095
10,5	38	93	133	10,0	40	6	0,097
11,0	41	102	142	10,0	40	6	0,100
11,5	41	102	142	10,0	40	6	0,102
12,0	44	111	151	10,0	40	6	0,105
13,0	44	111	151	10,0	40	8	0,120
14,0	47	115	160	12,5	45	8	0,160
15,0	50	117	162	12,5	45	8	0,210
16,0	52	125	170	12,5	45	8	0,215
17,0	54	130	175	14,0	45	8	0,320
18,0	56	137	182	14,0	45	8	0,380
19,0	58	141	189	16,0	48	8	0,460
20,0	60	147	195	16,0	48	8	0,500



Order details:

6011-xx.xx-A straight fluted
 6011-xx.xx-B spiral fluted

xx.xx = nom.-Ø

NEW

NC-machine reamer

DIN 8093-2

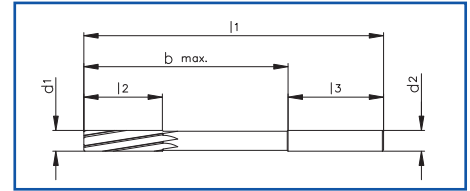
Catalog-No. NC6111

Solid carbide K10

righthand cutting

straight shank with tol. h6 for NC-machine

spiral fluted



up to Ø 13 mm solid carbide (monobloc)

from Ø 14 mm solid carbide head and steel shank



spiral

nom-Ø H7	flute- length	max. friction length	total- length	shank-Ø h6	shank- length	number of teeth	weight each pc.
d ₁ mm	l ₂ mm	b _{max.} mm	l ₁ mm	d ₂ mm	l ₃ mm	z	ca. kg
1,0	6	22	50	3,0	28	3	0,001
1,1	9	22	50	3,0	28	3	0,001
1,2	9	22	50	3,0	28	3	0,001
1,4	9	22	50	3,0	28	3	0,001
1,5	9	22	50	3,0	28	3	0,001
1,6	10	22	50	3,0	28	3	0,001
1,8	11	22	50	3,0	28	4	0,002
2,0	12	22	50	3,0	28	4	0,002
2,2	12	22	50	3,0	28	4	0,002
2,5	16	32	60	3,0	28	4	0,003
2,8	17	37	65	4,0	28	6	0,004
3,0	17	37	65	4,0	28	6	0,005
3,2	18	37	65	4,0	28	6	0,006
3,5	18	47	75	4,0	28	6	0,008
4,0	19	47	75	4,0	28	6	0,012
4,5	21	44	80	6,0	36	6	0,020
5,0	23	57	93	6,0	36	6	0,021
5,5	26	57	93	6,0	36	6	0,025
6,0	26	57	93	6,0	36	6	0,033
6,5	28	65	101	6,0	36	6	0,040
7,0	31	73	109	8,0	36	6	0,051
7,5	31	73	109	8,0	36	6	0,065
8,0	33	81	117	8,0	36	6	0,071
8,5	33	81	117	8,0	36	6	0,085
9,0	36	85	125	10,0	40	6	0,090
9,5	36	85	125	10,0	40	6	0,095
10,0	38	93	133	10,0	40	6	0,095
10,5	38	93	133	10,0	40	6	0,098
11,0	41	102	142	10,0	40	6	0,100
11,5	41	102	142	10,0	40	6	0,103
12,0	44	106	151	12,0	45	6	0,105
13,0	44	106	151	12,0	45	8	0,120
14,0	47	112	160	16,0	48	8	0,160
15,0	50	114	162	16,0	48	8	0,210
16,0	52	122	170	16,0	48	8	0,215
17,0	52	127	175	18,0	48	8	0,320
18,0	52	134	182	18,0	48	8	0,380
19,0	52	139	189	20,0	50	8	0,460
20,0	52	145	195	20,0	50	8	0,500

Order details:

NC6111-xx.xx-B xx.xx = nom.-Ø



NC-machine reamer

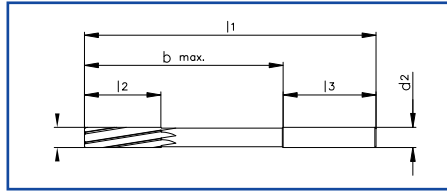
sim. DIN 8093-2

Catalog-No. NC6011

Solid carbide K10

righthand cutting

straight shank with tol. h6 for NC-machine
spiral fluted



up to Ø 13 mm solid carbide (monobloc)
from Ø 14 mm solid carbide head and steel shank

nom-Ø H7	flute- length	max. friction length	total- length	shank-Ø h6	shank- length	number of teeth	weight each pc.
d_1 mm	l_2 mm	$b_{max.}$ mm	l_1 mm	d_2 mm	l_3 mm	z	ca. kg
1,0	6	20	34	1,0	14	3	0,001
1,2	6	20	34	1,0	14	3	0,001
1,4	8	24	40	2,0	16	3	0,001
1,5	8	24	40	2,0	16	3	0,001
1,6	9	25	43	2,0	18	3	0,001
1,8	10	28	46	2,0	18	4	0,002
2,0	11	29	49	2,0	20	4	0,002
2,2	12	32	53	3,0	21	4	0,002
2,5	14	34	57	3,0	23	4	0,003
2,8	15	41	61	3,0	20	6	0,004
3,0	15	41	61	3,0	20	6	0,005
3,2	16	41	65	4,0	24	6	0,006
3,5	18	43	70	4,0	27	6	0,008
4,0	19	43	75	4,0	32	6	0,012
4,5	21	47	80	5,0	33	6	0,020
5,0	23	52	86	5,0	34	6	0,021
5,5	26	57	93	6,0	36	6	0,025
6,0	26	57	93	6,0	36	6	0,033
6,5	28	63	101	6,0	38	6	0,040
7,0	31	69	109	8,0	40	6	0,051
7,5	31	69	109	8,0	40	6	0,065
8,0	33	75	117	8,0	42	6	0,071
8,5	33	75	117	10,0	42	6	0,085
9,0	36	81	125	10,0	44	6	0,090
9,5	36	81	125	10,0	44	6	0,095
10,0	38	87	133	10,0	46	6	0,095
10,5	38	87	133	10,0	46	6	0,098
11,0	41	96	142	10,0	46	6	0,100
11,5	41	96	142	10,0	46	6	0,103
12,0	44	105	151	10,0	46	6	0,105
13,0	44	105	151	10,0	46	8	0,120
14,0	47	110	160	14,0	50	8	0,160
15,0	50	112	162	14,0	50	8	0,210
16,0	52	120	170	14,0	50	8	0,215
17,0	54	123	175	14,0	52	8	0,320
18,0	56	130	182	14,0	52	8	0,380
19,0	58	131	189	16,0	58	8	0,460
20,0	60	137	195	16,0	58	8	0,500



spiral



Order details:

NC6011-xx.xx-B xx.xx = nom.-Ø

(after sold out only NC6111 available
as standard, see page 53)

NEW

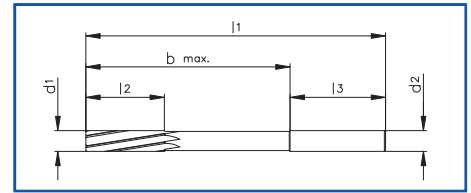
NC-machine reamer in steps of 0,01mm

Catalog-No. NC6199**Solid carbide K10 (monobloc)**

righthand cutting

straight shank with tol. h6 for NC-machine

spiral fluted

DIN 8093-2

Tolerance 0/+0,003



spiral

nom-Ø	flute-length	max. friction length	total-length	shank-Ø h6	shank-length	number of teeth
d_1 mm	l_2 mm	$b_{max.}$ mm	l_1 mm	d_2 mm	l_3 mm	z
0,90 - 1,06	6	22	50	3,0	28	3
1,07 - 1,50	9	22	50	3,0	28	3
1,51 - 1,70	10	22	50	3,0	28	3
1,71 - 1,90	11	22	50	3,0	28	4
1,91 - 2,12	12	22	50	3,0	28	4
2,13 - 2,36	12	22	50	3,0	28	4
2,37 - 2,65	16	32	60	3,0	28	4
2,66 - 2,79	17	37	65	4,0	28	4
2,80 - 3,00	17	37	65	4,0	28	6
3,01 - 3,35	18	37	65	4,0	28	6
3,36 - 3,75	18	47	75	4,0	28	6
3,76 - 4,25	19	47	75	4,0	28	6
4,26 - 4,75	21	44	80	6,0	36	6
4,76 - 5,30	23	57	93	6,0	36	6
5,31 - 6,00	26	57	93	6,0	36	6
6,01 - 6,70	28	65	101	6,0	36	6
6,71 - 7,50	31	73	109	8,0	36	6
7,51 - 8,50	33	81	117	8,0	36	6
8,51 - 9,50	36	85	125	10,0	40	6
9,51 - 10,60	38	93	133	10,0	40	6
10,61 - 11,80	41	102	142	10,0	40	6
11,81 - 12,25	44	106	151	12,0	45	6
12,26 - 13,20	44	106	151	12,0	45	8

**Order details**

NC6199-xx.xx

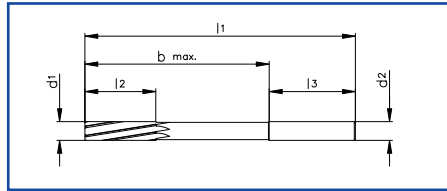
xx.xx = nom.-Ø

NC-machine reamer in steps of 0,01 mm

sim. DIN 8093-2

Catalog-No. NC699

Solid carbide K10 (monobloc)
righthand cutting
straight shank with tol. h6 for NC-machine
spiral fluted



Tolerance 0/+0,003

nom-Ø	flute-length	max. friction length	total-length	shank-Ø h6	shank-length	number of teeth
d ₁ mm	l ₂ mm	b _{max.} mm	l ₁ mm	d ₂ mm	l ₃ mm	z
0,90 - 1,30	6	20	34	1,0	14	3
1,31 - 1,50	8	24	40	2,0	16	3
1,51 - 1,61	9	25	43	2,0	18	3
1,62 - 1,70	9	25	43	2,0	18	3
1,71 - 1,90	10	28	46	2,0	18	4
1,91 - 2,12	11	29	49	2,0	20	4
2,13 - 2,36	12	32	53	3,0	21	4
2,37 - 2,65	14	34	57	3,0	23	4
2,66 - 2,79	15	41	61	3,0	20	4
2,80 - 3,09	15	41	61	3,0	20	6
3,10 - 3,35	16	41	65	4,0	24	6
3,36 - 3,75	18	43	70	4,0	27	6
3,76 - 4,10	19	43	75	4,0	32	6
4,11 - 4,25	19	43	75	4,0	32	6
4,26 - 4,75	21	47	80	5,0	33	6
4,76 - 5,20	23	52	86	5,0	34	6
5,21 - 6,00	26	57	93	6,0	36	6
6,01 - 6,60	28	63	101	6,0	38	6
6,61 - 6,70	28	63	101	6,0	38	6
6,71 - 7,50	31	69	109	8,0	40	6
7,51 - 8,50	33	75	117	8,0	42	6
8,51 - 9,50	36	81	125	10,0	44	6
9,51 - 10,60	38	87	133	10,0	46	6
10,61 - 11,80	41	96	142	10,0	46	6
11,81 - 12,25	44	105	151	10,0	46	6
12,26 - 13,20	44	105	151	10,0	46	8



spiral



(after sold out only NC6199 available
as standard, see page 55)



Order details:

NC699-xx.xx xx.xx = nom.-Ø

NEW

NC-machine reamer

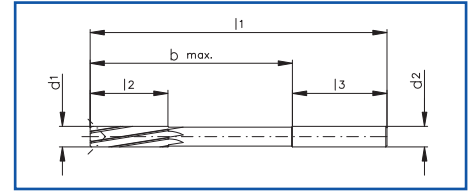
Catalog-No. NC6111IK

DIN 8093-2

Solid carbide K10
righthand cutting
straight shank with tol. h6 for NC-machine
spiral fluted

with internal coolant supply (I.C.)

- Coolant outlet at blade level (radial)
- Coolant outlet from the center(axial)



spiral

nom-Ø H7	flute- length	max. friction length	total- length	shank-Ø h6	shank- length	number of teeth	weight each pc.
d_1 mm	l_2 mm	$b_{max.}$ mm	l_1 mm	d_2 mm	l_3 mm	z	ca. kg
4,0	19	47	75	4,0	28	6	0,012
4,5	21	44	80	6,0	36	6	0,020
5,0	23	57	93	6,0	36	6	0,021
5,5	26	57	93	6,0	36	6	0,025
6,0	26	57	93	6,0	36	6	0,033
6,5	28	65	101	6,0	36	6	0,040
7,0	31	73	109	8,0	36	6	0,051
8,0	33	81	117	8,0	36	6	0,071
9,0	36	85	125	10,0	40	6	0,090
10,0	38	93	133	10,0	40	6	0,095
11,0	41	102	142	10,0	40	6	0,100
12,0	44	106	151	12,0	45	6	0,105
13,0	44	106	151	12,0	45	8	0,120
14,0	47	112	160	16,0	48	8	0,160
15,0	50	114	162	16,0	48	8	0,210
16,0	52	122	170	16,0	48	8	0,215
17,0	52	127	175	18,0	48	8	0,320
18,0	52	134	182	18,0	48	8	0,380
19,0	52	139	189	20,0	50	8	0,460
20,0	52	145	195	20,0	50	8	0,500

up to Ø 13 mm solid carbide (monobloc)
from Ø 14 mm solid carbide head and steel shank



Order details:

NC6111IKS-xx.xx-B Coolant blades

NC6111IKZ-xx.xx-B Coolant center

xx.xx = nom.-Ø

NC-machine reamer

sim. DIN 8093-2

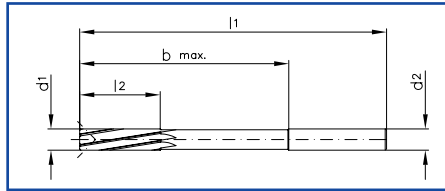
Catalog-No. NC6011IK

Solid carbide K10

righthand cutting
straight shank with tol. h6 for NC-machine
spiral fluted

with internal coolant supply (I.C.)

- Coolant outlet at blade level (radial)
- Coolant outlet from the center(axial)



spiral



nom-Ø H7	flute- length	max. friction length	total- length	shank-Ø h6	shank- length	number of teeth	weight each pc.
d_1 mm	l_2 mm	$b_{max.}$ mm	l_1 mm	d_2 mm	l_3 mm	z	ca. kg
4,0	19	43	75	4,0	32	6	0,012
4,5	21	47	80	5,0	33	6	0,020
5,0	23	52	86	5,0	34	6	0,021
5,5	26	57	93	6,0	36	6	0,025
6,0	26	57	93	6,0	36	6	0,033
6,5	28	63	101	6,0	38	6	0,040
7,0	31	69	109	8,0	40	6	0,051
8,0	33	75	117	8,0	42	6	0,071
9,0	36	81	125	10,0	44	6	0,090
10,0	38	87	133	10,0	46	6	0,095
11,0	41	96	142	10,0	46	6	0,100
12,0	44	105	151	10,0	46	6	0,105
13,0	44	105	151	10,0	46	8	0,120
14,0	47	110	160	14,0	50	8	0,160
15,0	50	112	162	14,0	50	8	0,210
16,0	52	120	170	14,0	50	8	0,215
17,0	54	123	175	14,0	52	8	0,320
18,0	56	130	182	14,0	52	8	0,380
19,0	58	131	189	16,0	58	8	0,460
20,0	60	137	195	16,0	58	8	0,500

up to Ø 13 mm solid carbide (monobloc)
from Ø 14 mm solid carbide head and steel shank

(after sold out only NC6111IK available as
standard, see page 57)



Order details:

NC6011IKS-xx.xx-B Coolant blades

NC6011IKZ-xx.xx-B Coolant center

xx.xx = nom.-Ø

NEW

NC-machine reamer

DIN 8093-2

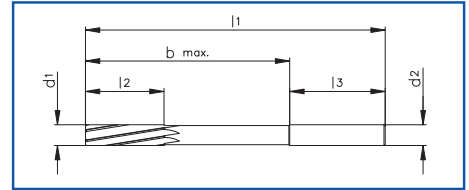
Catalog-No. NC6111T

Solid carbide K10 + TiAlN

righthand cutting

straight shank with tol. h6 for NC-machine

spiral fluted



up to Ø 13 mm solid carbide (monobloc)
from Ø 14 mm solid carbide head and steel shank



spiral

nom-Ø H7	flute- length	max. friction length	total- length	shank-Ø h6	shank- length	number of teeth	weight each pc.
d ₁ mm	l ₂ mm	b _{max.} mm	l ₁ mm	d ₂ mm	l ₃ mm	z	ca. kg
1,0	6	22	50	3,0	28	3	0,001
1,1	9	22	50	3,0	28	3	0,001
1,2	9	22	50	3,0	28	3	0,001
1,4	9	22	50	3,0	28	3	0,001
1,5	9	22	50	3,0	28	3	0,001
1,6	10	22	50	3,0	28	3	0,001
1,8	11	22	50	3,0	28	4	0,002
2,0	12	22	50	3,0	28	4	0,002
2,2	12	22	50	3,0	28	4	0,002
2,5	16	32	60	3,0	28	4	0,003
2,8	17	37	65	4,0	28	6	0,004
3,0	17	37	65	4,0	28	6	0,005
3,2	18	37	65	4,0	28	6	0,006
3,5	18	47	75	4,0	28	6	0,008
4,0	19	47	75	4,0	28	6	0,012
4,5	21	44	80	6,0	36	6	0,020
5,0	23	57	93	6,0	36	6	0,021
5,5	26	57	93	6,0	36	6	0,025
6,0	26	57	93	6,0	36	6	0,033
6,5	28	65	101	6,0	36	6	0,040
7,0	31	73	109	8,0	36	6	0,051
7,5	31	73	109	8,0	36	6	0,065
8,0	33	81	117	8,0	36	6	0,071
8,5	33	81	117	8,0	36	6	0,085
9,0	36	85	125	10,0	40	6	0,090
9,5	36	85	125	10,0	40	6	0,095
10,0	38	93	133	10,0	40	6	0,095
10,5	38	93	133	10,0	40	6	0,098
11,0	41	102	142	10,0	40	6	0,100
11,5	41	102	142	10,0	40	6	0,103
12,0	44	106	151	12,0	45	6	0,105
13,0	44	106	151	12,0	45	8	0,120
14,0	47	112	160	16,0	48	8	0,160
15,0	50	114	162	16,0	48	8	0,210
16,0	52	122	170	16,0	48	8	0,215
17,0	52	127	175	18,0	48	8	0,320
18,0	52	134	182	18,0	48	8	0,380
19,0	52	139	189	20,0	50	8	0,460
20,0	52	145	195	20,0	50	8	0,500



Order details:

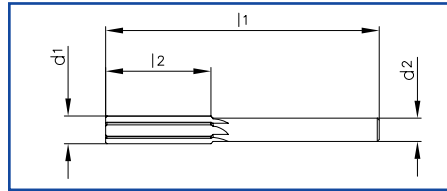
NC6111T-xx.xx-B xx.xx = nom.-Ø

Short stub reamer

Catalog-No. 6012

sim. DIN 8089

Solid carbide K10 (monobloc)
 righthand cutting
 straight shank
 straight- and lefthand spiral fluted



nom-Ø H7	flute- length	total- length	shank-Ø h8	number of teeth	weight each pc.
d_1 mm	l_2 mm	l_1 mm	d_2 mm	z	ca. kg
2,0	16	50	2,0	4	0,002
2,5	18	56	2,5	4	0,003
3,0	20	56	2,5	6	0,005
3,2	20	56	2,8	6	0,005
3,5	20	56	3,0	6	0,006
4,0	20	56	3,6	6	0,008
4,5	22	63	4,0	6	0,012
5,0	22	63	4,0	6	0,012
5,5	22	63	5,0	6	0,017
6,0	22	63	5,0	6	0,017
6,5	22	63	5,0	6	0,018
7,0	25	71	6,3	6	0,029
7,5	25	71	6,3	6	0,032
8,0	25	71	6,3	6	0,035
8,5	25	71	6,3	6	0,038
9,0	25	71	8,0	6	0,047
9,5	25	71	8,0	6	0,050
10,0	25	71	8,0	6	0,052
11,0	28	80	10,0	6	0,080
12,0	28	80	10,0	6	0,088
13,0	28	80	10,0	6	0,090
14,0	32	90	12,5	8	0,155
15,0	32	90	12,5	8	0,160
16,0	32	90	12,5	8	0,170
17,0	32	90	12,5	8	0,180
18,0	36	100	16,0	8	0,220
19,0	36	100	16,0	8	0,235
20,0	36	100	16,0	8	0,250



straight

spiral



Order details:

6012-xx.xx-A

straight fluted, righthand cutting

6012-xx.xx-B

lefthand spiral fluted, righthand cutting

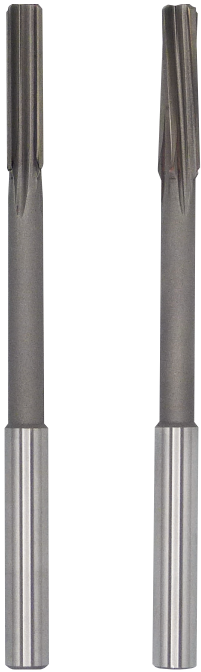
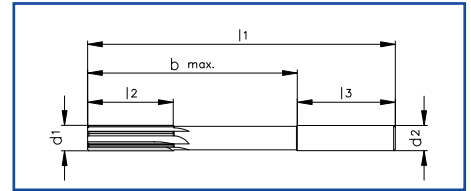
xx.xx = nom.-Ø

Machine reamer

Catalog-No. 601

DIN 8093

Carbide-tipped (brazed) K10
with long flutes
righthand cutting
straight shank
straight- and spiral fluted



straight

spiral

nom-Ø H7	flute- length	max. friction length	total- length	shank-Ø h9	shank- length	number of teeth	weight each pc.
d_1 mm	l_2 mm	b_{max} mm	l_1 mm	d_2 mm	l_3 mm	z	ca. kg
5,0*	30	58	86	5,0	28	4	0,012
6,0	30	57	93	5,6	36	4	0,015
7,0	30	73	109	7,1	36	4	0,022
8,0	30	81	117	8,0	36	4	0,035
9,0	30	85	125	9,0	40	4	0,040
10,0	45	93	133	10,0	40	6	0,060
11,0	45	102	142	10,0	40	6	0,110
12,0	45	111	151	10,0	40	6	0,130
13,0	45	111	151	10,0	40	6	0,150
14,0	45	115	160	12,5	45	6	0,160
15,0	45	117	162	12,5	45	6	0,240
16,0	56	125	170	12,5	45	6	0,270
17,0	56	130	175	14,0	45	6	0,290
18,0	56	137	182	14,0	45	6	0,320
19,0	56	141	189	16,0	48	6	0,350
20,0	56	147	195	16,0	48	6	0,380

* FROMM standard, Ø 5 only straight fluted, form A available

Order details:

601-xx.xx-A

straight fluted

601-xx.xx-B

spiral fluted

xx.xx = nom.-Ø

Machine reamer

Catalog-No. 602

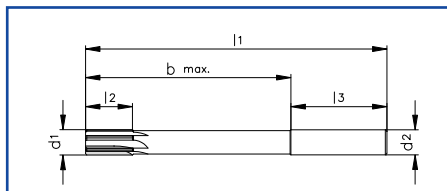
Carbide-tipped (brazed) K10
with short flutes

righthand cutting

straight shank

straight- and spiral fluted

DIN 8050



nom-Ø H7	flute- length	max. friction length	total- length	shank-Ø h9	shank- length	number of teeth	weight each pc.
d_1 mm	l_2 mm	$b_{max.}$ mm	l_1 mm	d_2 mm	l_3 mm	z	ca. kg
5,0*	16	52	86	5,0	34	4	0,012
6,0	16	57	93	5,6	36	4	0,015
7,0	16	69	109	7,1	40	4	0,022
8,0	16	75	117	8,0	42	4	0,035
9,0	19	81	125	9,0	44	4	0,040
10,0	19	87	133	10,0	46	6	0,060
11,0	19	96	142	10,0	46	6	0,110
12,0	19	105	151	10,0	46	6	0,130
13,0	19	105	151	10,0	46	6	0,150
14,0	19	110	160	12,5	50	6	0,160
15,0	19	112	162	12,5	50	6	0,240
16,0	22	120	170	12,5	50	6	0,270
17,0	22	123	175	14,0	52	6	0,290
18,0	22	130	182	14,0	52	6	0,320
19,0	22	131	189	16,0	58	6	0,350
20,0	22	137	195	16,0	58	6	0,380

* FROMM standard, Ø 5 only straight fluted, form A available



straight



spiral



Order details:

602-xx.xx-A

straight fluted

602-xx.xx-B

spiral fluted

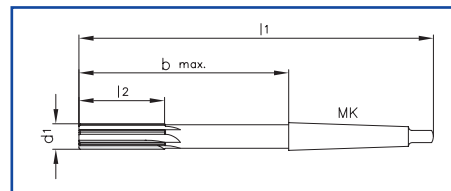
xx.xx = nom.-Ø

Machine reamer

Catalog-No. 603

DIN 8094

Carbide-tipped (brazed) K10
with long flutes
righthand cutting
morse taper (MT) shank
straight- and spiral fluted



straight

spiral

nom.-Ø H7	flute- length	max. friction length	total- length	MT- shank	number of teeth	weight each pc.
d ₁ mm	l ₂ mm	b _{max.} mm	l ₁ mm	MT	z	ca. kg
5,0*	30	67,5	133	1	4	0,060
6,0*	30	72,5	138	1	4	0,060
7,0*	30	84,5	150	1	4	0,070
8,0	30	90,5	156	1	4	0,080
9,0	30	96,5	162	1	4	0,090
10,0	45	102,5	168	1	6	0,100
11,0	45	109,5	175	1	6	0,110
12,0	45	116,5	182	1	6	0,130
13,0	45	116,5	182	1	6	0,150
14,0	45	123,5	189	1	6	0,160
15,0	45	124,0	204	2	6	0,240
16,0	45	130,0	210	2	6	0,260
17,0	56	134,0	214	2	6	0,290
18,0	56	139,0	219	2	6	0,320
19,0	56	143,0	223	2	6	0,350
20,0	56	148,0	228	2	6	0,380
21,0	56	152,0	232	2	6	0,420
22,0	56	157,0	237	2	6	0,460
23,0	56	161,0	241	2	6	0,520
24,0	70	169,0	268	3	8	0,700
25,0	70	169,0	268	3	8	0,750
26,0	70	174,0	273	3	8	0,780
27,0	70	178,0	277	3	8	0,840
28,0	70	178,0	277	3	8	0,880
29,0	70	182,0	281	3	8	0,920
30,0	70	182,0	281	3	8	1,000
31,0	70	186,0	285	3	8	1,100
32,0	70	193,0	317	4	8	1,200
34,0	70	197,0	321	4	8	1,750
35,0	70	197,0	321	4	8	1,800
36,0	70	201,0	325	4	8	1,850
38,0	70	205,0	329	4	8	2,050
40,0	70	205,0	329	4	8	2,150

* FROMM standard, Ø 5 only straight fluted, form A available

Order details:

603-xx.xx-A straight fluted
603-xx.xx-B spiral fluted

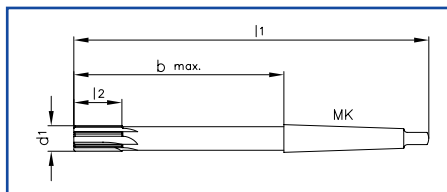
xx.xx = nom.Ø

Machine reamer

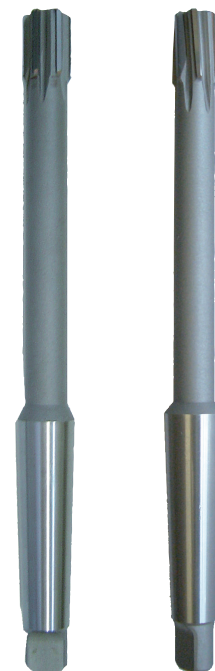
Catalog-No. 604

DIN 8051

Carbide-tipped (brazed) K10
with short flutes
 righthand cutting
 morse taper (MT) shank
 straight- and spiral fluted



nom.-Ø H7	flute- length	max. friction length	total- length	MT- shank	number of teeth	weight each pc.
d_1 mm	l_2 mm	$b_{max.}$ mm	l_1 mm	MT	z	ca. kg
5,0*	16	67,5	133	1	4	0,050
6,0*	16	72,5	138	1	4	0,050
7,0*	16	84,5	150	1	4	0,055
8,0	16	90,5	156	1	4	0,060
9,0	19	96,5	162	1	4	0,070
10,0	19	102,5	168	1	6	0,090
11,0	19	109,5	175	1	6	0,100
12,0	19	116,5	182	1	6	0,110
13,0	19	116,5	182	1	6	0,130
14,0	19	123,5	189	1	6	0,140
15,0	19	124,0	204	2	6	0,150
16,0	22	130,0	210	2	6	0,240
17,0	22	134,0	214	2	6	0,250
18,0	22	139,0	219	2	6	0,270
19,0	22	143,0	223	2	6	0,300
20,0	22	148,0	228	2	6	0,350
21,0	25	152,0	232	2	6	0,380
22,0	25	157,0	237	2	6	0,420
23,0	25	161,0	241	2	6	0,500
24,0	25	169,0	268	3	8	0,610
25,0	25	169,0	268	3	8	0,650
26,0	25	174,0	273	3	8	0,700
27,0	30	178,0	277	3	8	0,730
28,0	30	178,0	277	3	8	0,760
29,0	30	182,0	281	3	8	0,890
30,0	30	182,0	281	3	8	0,950
31,0	30	186,0	285	3	8	1,000
32,0	30	193,0	317	4	8	1,100
34,0	30	197,0	321	4	8	1,730
35,0	30	197,0	321	4	8	1,750
36,0	30	201,0	325	4	8	1,800
38,0	30	205,0	329	4	8	1,950
40,0	30	205,0	329	4	8	2,050



gerade

spiral

* FROMM standard, Ø 5 only straight fluted, form A available

Order details:

604-xx.xx-A

straight fluted

604-xx.xx-B

spiral fluted

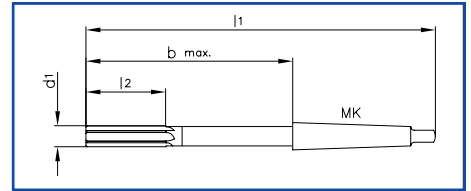
xx.xx = nom.-Ø

Machine reamer

Catalog-No. 6013

ähnl. DIN 8094

solid carbide K10 head and steel shank
 righthand cutting
 morse taper (MT) shank
 straight- and spiral fluted



spiral

nom.-Ø H7	flute- length	max. friction length	total- length	MT- shank	number of teeth	weight each pc.
d ₁ mm	l ₂ mm	b _{max.} mm	l ₁ mm	MT	z	ca. kg
5,0	23	67,5	133	1	6	0,060
6,0	26	72,5	138	1	6	0,065
7,0	31	84,5	150	1	6	0,075
8,0	33	90,5	156	1	6	0,085
9,0	36	96,5	162	1	6	0,095
10,0	38	102,5	168	1	6	0,105
11,0	41	109,5	175	1	6	0,115
12,0	44	116,5	182	1	6	0,140
13,0	44	116,5	182	1	8	0,160
14,0	47	123,5	189	1	8	0,175
15,0	50	124,0	204	2	8	0,250
16,0	52	130,0	210	2	8	0,270
17,0	54	134,0	214	2	8	0,300
18,0	56	139,0	219	2	8	0,330
19,0	58	143,0	223	2	8	0,360
20,0	60	148,0	228	2	8	0,400

Nom.-Ø more than 20 mm please find on page 63 in carbide-tipped (brazed) version.

Order details:

6013-xx.xx-A straight fluted
 6013-xx.xx-B spiral fluted

xx.xx = nom.-Ø

Shell reamer

Catalog No. 606

DIN 8054

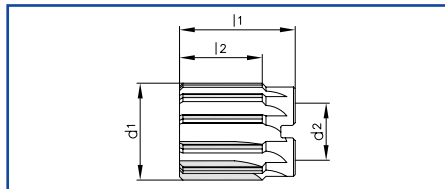
Carbide-tipped (brazed) K10

righthand cutting

with short flutes

with taper-hole 1:30 and transverse slot DIN 138

straight fluted



nom.-Ø H7	flute- length	total- length	taper hole Ø	number of teeth	weight each pc.
d ₁ mm	l ₂ mm	l ₁ mm	d ₂ mm	z	ca. kg
30,0	30	45	13	6	0,120
31,0	30	45	13	8	0,130
32,0	30	45	13	8	0,140
34,0	30	45	13	8	0,160
35,0	30	45	13	8	0,180
36,0	30	50	16	8	0,190
37,0	30	50	16	8	0,200
38,0	30	50	16	8	0,220
39,0	30	50	16	8	0,240
40,0	30	50	16	8	0,260
41,0	30	50	16	8	0,300
42,0	30	50	16	8	0,330
43,0	30	50	16	8	0,350
44,0	30	50	16	8	0,370
45,0	30	50	16	8	0,380
46,0	30	56	19	10	0,440
47,0	30	56	19	10	0,450
48,0	30	56	19	10	0,460
49,0	30	56	19	10	0,480
50,0	30	56	19	10	0,500
52,0	30	56	19	10	0,530
54,0	30	63	22	10	0,560
55,0	30	63	22	10	0,570
58,0	30	63	22	10	0,620
60,0	30	63	22	10	0,680
62,0	30	63	22	10	0,700
65,0	30	71	27	12	0,800
68,0	30	71	27	12	0,850
70,0	30	71	27	12	0,950
72,0	30	71	27	12	1,200
75,0	30	71	27	12	1,400



straight



Shell holder (arbor) DIN 217 find on page 38.

Order details:

606-xx.xx

xx.xx = nom.-Ø

Expandable machine reamer

sim. DIN 8050

Catalog-No. 610

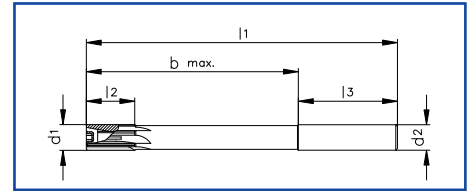
Carbide-tipped (brazed) K10

righthand cutting

with short flutes

straight shank

straight fluted



Can be stretched by approx. 0.03 mm using the front screw



straight

nom-Ø H7	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d_1 mm	l_2 mm	$b_{max.}$ mm	l_1 mm	l_3 mm	d_2 mm	z	ca. kg
8,0	12	75	117	42	8,0	4	0,040
9,0	12	79	125	46	10,0	6	0,060
10,0	12	87	133	46	10,0	6	0,070
11,0	12	96	142	46	10,0	6	0,075
12,0	12	105	151	46	10,0	6	0,080
13,0	12	105	151	46	10,0	6	0,100
14,0	16	110	160	50	12,0	6	0,130
15,0	16	112	162	50	12,0	6	0,135
16,0	19	120	170	50	12,0	6	0,145
17,0	19	123	175	52	14,0	6	0,170
18,0	19	130	182	52	14,0	6	0,190
19,0	19	131	189	58	16,0	6	0,240
20,0	19	137	195	58	16,0	6	0,275

Order details:

610-xx.xx

xx.xx = nom.-Ø

Expandable machine reamer

sim. DIN 8051

Catalog-No. 609

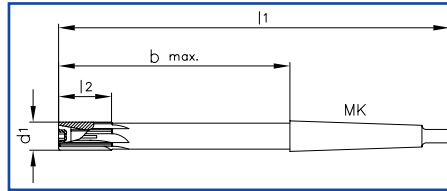
Carbide-tipped (brazed) K10

righthand cutting

with short flutes

morse taper (MT) shank

straight fluted



Can be stretched by approx. 0.03 mm using the front screw

nom.-Ø H7	flute- length	max. friction length	total- length	MT- shank	number of teeth	weight each pc.
d_1 mm	l_2 mm	b_{max} mm	l_1 mm	MT	z	ca. kg
8,0	12	90,5	156	1	4	0,070
9,0	12	96,5	162	1	4	0,075
10,0	12	102,5	168	1	6	0,085
11,0	12	109,5	175	1	6	0,100
12,0	12	116,5	182	1	6	0,110
13,0	12	116,5	182	1	6	0,125
14,0	16	123,5	189	1	6	0,135
15,0	16	124,0	204	2	6	0,150
16,0	19	130,0	210	2	6	0,235
17,0	19	134,0	214	2	6	0,245
18,0	19	139,0	219	2	6	0,280
19,0	19	143,0	223	2	6	0,300
20,0	19	148,0	228	2	6	0,330
21,0	19	152,0	232	2	6	0,370
22,0	22	157,0	237	2	6	0,400
23,0	22	161,0	241	2	6	0,500
24,0	22	169,0	268	3	6	0,680
25,0	22	169,0	268	3	6	0,720
26,0	22	174,0	273	3	6	0,730
27,0	25	178,0	277	3	6	0,760
28,0	25	178,0	277	3	6	0,780
30,0	25	182,0	281	3	6	0,960
32,0	25	193,0	317	4	6	1,150
34,0	25	197,0	321	4	8	1,780
35,0	25	197,0	321	4	8	1,850
36,0	25	201,0	325	4	8	1,900
38,0	25	205,0	329	4	8	2,100
40,0	25	205,0	329	4	8	2,200



gerade



Order details:

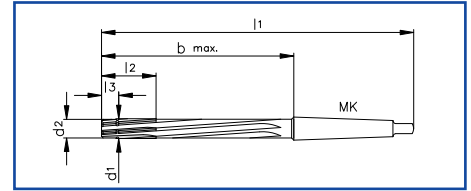
609-xx.xx

xx.xx = nom.-Ø

Machine reamer with pre-cutting step

Catalog-No. 611

Carbide-tipped (brazed) K10
 righthand cutting
 morse taper (MT) shank
 spiral fluted



spiral

nom.-Ø H7	max. friction length	total- length	flute- length	length of pre-cutting step	Ø of the step	MT- shank	number of teeth	weight each pc.
d_1 mm	b_{max} mm	l_1 mm	l_2 mm	l_3 mm	d_2 mm	MT	z	ca. kg
5,0	99,5	165	25	10	4,92	1	6	0,070
6,0	99,5	165	25	10	5,92	1	6	0,080
7,0	119,5	185	25	10	6,92	1	6	0,090
8,0	139,5	205	25	10	7,92	1	6	0,100
9,0	149,5	215	23	10	8,90	1	6	0,110
10,0	164,5	230	23	12	9,90	1	6	0,120
11,0	164,5	230	28	12	10,90	1	6	0,140
12,0	164,5	230	28	12	11,90	1	6	0,160
14,0	164,5	230	28	12	13,90	1	6	0,190
15,0	165,0	245	28	12	14,90	2	6	0,300
16,0	170,0	250	28	12	15,90	2	6	0,320
18,0	175,0	255	28	12	17,90	2	6	0,390
19,0	180,0	260	28	12	18,90	2	6	0,450
20,0	180,0	260	33	15	19,90	2	6	0,450
22,0	185,0	265	33	15	21,85	2	6	0,520
24,0	186,0	285	33	15	23,85	3	8	0,800
25,0	186,0	285	33	15	24,85	3	8	0,850
30,0	201,0	300	33	15	29,85	3	8	1,150
35,0	211,0	335	33	15	34,85	4	8	1,800
40,0	221,0	345	33	15	39,85	4	8	2,300

Order details:

611-xx.xx

xx.xx = nom.-Ø

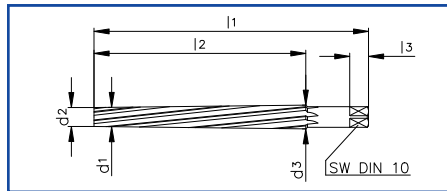
Carbide taper hand reamer

sim. DIN 9

Catalog-No. 6050

Solid carbide K10 (monobloc)

righthand cutting
straight shank with square
spiral fluted



nom.-Ø H7	small Ø	large Ø	flute- length	total- length	ISO-square accdg. DIN 10		number of teeth	weight each pc.
d ₁ mm	d ₂ mm	d ₃ mm	l ₂ mm	l ₁ mm	a h ₁₁ mm	l ₃ mm	z	ca. kg
1,5	1,40	2,14	37	57	2,40	5	3	0,003
2,0	1,90	2,86	48	68	2,40	5	4	0,004
3,0	2,90	4,06	58	80	3,00	6	5	0,006
4,0	3,90	5,26	68	93	3,80	7	5	0,010
5,0	4,90	6,36	73	100	4,90	8	5	0,018
6,0	5,90	8,00	105	135	6,20	9	6	0,035
8,0	7,90	10,80	145	180	8,00	11	6	0,060

For taper pins accdg. DIN 1, DIN 258, DIN 7977, DIN 7978



spiral

Order details:

6050-xx.xx-B

spiral fluted

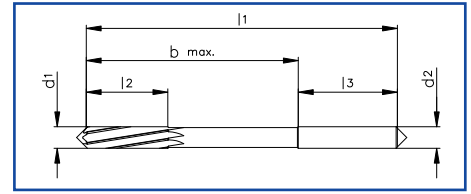
xx.xx = nom.-Ø

NC-machine reamer

Catalog-No. 7010

sim. DIN 8093

Solid CERMET (monobloc)
 righthand cutting
 straight shank with tol. h6 for NC-machine
 spiral fluted



spiral

nom-Ø H7	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d_1 mm	l_2 mm	$b_{max.}$ mm	l_1 mm	l_3 mm	d_2 mm	z	ca. kg
3,0	15	41	60	19	3	6	0,003
3,5	18	43	60	17	4	6	0,005
4,0	19	43	75	32	4	6	0,010
4,5	21	47	75	28	5	6	0,017
5,0	23	52	86	34	5	6	0,020
5,5	26	57	93	36	6	6	0,022
6,0	26	57	93	36	6	6	0,028
6,5	28	63	101	38	6	6	0,035
7,0	31	69	109	40	8	6	0,038
7,5	33	69	109	40	8	6	0,042
8,0	33	75	117	42	8	6	0,046
8,5	36	75	117	42	8	6	0,052
9,0	36	81	125	44	10	6	0,058
9,5	38	81	125	44	10	6	0,065
10,0	38	87	133	46	10	6	0,072
11,0	41	96	142	46	10	6	0,085
12,0	44	105	151	46	10	6	0,092

Solid cermet reamers in Top-Speed version with **internal coolant** see page 82-83.

Cermet-tipped (brazed) reamers in Top-Speed design with **internal coolant** see page 88-89.

Order details:

7010-xx.xx-B

xx.xx = nom.-Ø

Top-Speed-reamer

Catalog-No. TS3020

Solid carbide - K10F

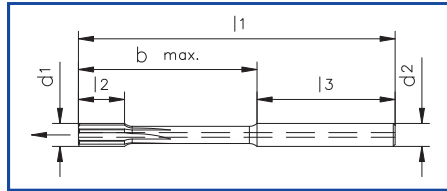
righthand cutting

straight shank with tol. h6 for NC-machine

straight fluted; EU-spacing

with internal coolant supply (I.C.)

- Coolant outlet from the center(axial)



recommended to work steel, cast, alu, Cu/Zn/Mg-alloy, bronze

nom-Ø H7	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d ₁ mm	l ₂ mm	b _{max.} mm	l ₁ mm	l ₃ mm	d ₂ mm	z	ca. kg
4,0	12	47	75	28	4,0	4	0,009
4,5	12	39	75	36	6,0	4	0,015
5,0	12	39	75	36	6,0	4	0,020
5,5	16	39	75	36	6,0	4	0,022
6,0	16	39	75	36	6,0	4	0,024
6,5	16	64	100	36	8,0	6	0,043
7,0	16	64	100	36	8,0	6	0,046
7,5	16	64	100	36	8,0	6	0,050
8,0	16	64	100	36	8,0	6	0,053
8,5	19	60	100	40	10,0	6	0,070
9,0	19	60	100	40	10,0	6	0,080
9,5	19	80	120	40	10,0	6	0,095
10,0	19	80	120	40	10,0	6	0,102
10,5	19	75	120	45	12,0	6	0,122
11,0	19	75	120	45	12,0	6	0,139
11,5	19	75	120	45	12,0	6	0,145
12,0	19	75	120	45	12,0	6	0,152
13,0	19	75	120	45	14,0	6	0,190
14,0	22	90	135	45	14,0	6	0,243
15,0	22	87	135	48	16,0	6	0,298
16,0	22	87	135	48	16,0	6	0,315
17,0	22	97	145	48	18,0	8	0,415
18,0	22	97	145	48	18,0	8	0,441
19,0	22	95	145	50	20,0	8	0,513
20,0	22	95	145	50	20,0	8	0,554



straight



Order details:

TS3020-xx.xx-A-C Coolant center

xx.xx = nom.-Ø

Top-Speed-reamer

Catalog-No. TS3020

Solid carbide - K10F

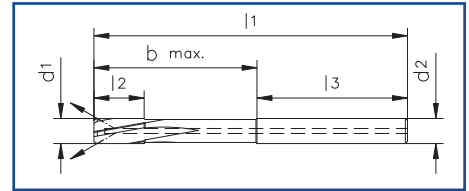
righthand cutting

straight shank with tol. h6 for NC-machine

spiral fluted; EU-spacing

with internal coolant supply (I.C.)

- Coolant outlet at blade level (radial)



recommended to work steel, cast, alu, Cu/Zn/Mg-alloy, bronze



spiral

nom-Ø H7	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d_1 mm	l_2 mm	$b_{max.}$ mm	l_1 mm	l_3 mm	d_2 mm	z	ca. kg
4,0	12	47	75	28	4,0	4	0,009
4,5	12	39	75	36	6,0	4	0,015
5,0	12	39	75	36	6,0	4	0,020
5,5	16	39	75	36	6,0	4	0,022
6,0	16	39	75	36	6,0	4	0,024
6,5	16	64	100	36	8,0	6	0,043
7,0	16	64	100	36	8,0	6	0,046
7,5	16	64	100	36	8,0	6	0,050
8,0	16	64	100	36	8,0	6	0,053
8,5	19	60	100	40	10,0	6	0,070
9,0	19	60	100	40	10,0	6	0,080
9,5	19	80	120	40	10,0	6	0,095
10,0	19	80	120	40	10,0	6	0,102
10,5	19	75	120	45	12,0	6	0,122
11,0	19	75	120	45	12,0	6	0,139
11,5	19	75	120	45	12,0	6	0,145
12,0	19	75	120	45	12,0	6	0,152
13,0	19	75	120	45	14,0	6	0,190
14,0	22	90	135	45	14,0	6	0,243
15,0	22	87	135	48	16,0	6	0,298
16,0	22	87	135	48	16,0	6	0,315
17,0	22	97	145	48	18,0	8	0,415
18,0	22	97	145	48	18,0	8	0,441
19,0	22	95	145	50	20,0	8	0,513
20,0	22	95	145	50	20,0	8	0,554

Order details:

TS3020-xx.xx-B-S Coolant blades

xx.xx = nom-Ø

Top-Speed-reamer

Catalog-No. TS3025

Solid carbide - K10F + PFB-coating

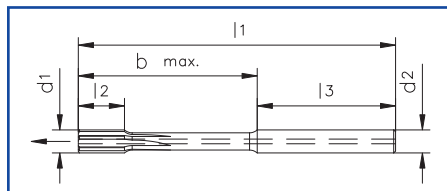
righthand cutting

straight shank with tol. h6 for NC-machine

straight fluted; EU-spacing

with internal coolant supply (I.C.)

- Coolant outlet from the center(axial)



recommended to work steel and cast

nom-Ø H7	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d ₁ mm	l ₂ mm	b _{max.} mm	l ₁ mm	l ₃ mm	d ₂ mm	z	ca. kg
4,0	12	47	75	28	4,0	4	0,009
4,5	12	39	75	36	6,0	4	0,015
5,0	12	39	75	36	6,0	4	0,020
5,5	16	39	75	36	6,0	4	0,022
6,0	16	39	75	36	6,0	4	0,024
6,5	16	64	100	36	8,0	6	0,043
7,0	16	64	100	36	8,0	6	0,046
7,5	16	64	100	36	8,0	6	0,050
8,0	16	64	100	36	8,0	6	0,053
8,5	19	60	100	40	10,0	6	0,070
9,0	19	60	100	40	10,0	6	0,080
9,5	19	80	120	40	10,0	6	0,095
10,0	19	80	120	40	10,0	6	0,102
10,5	19	75	120	45	12,0	6	0,122
11,0	19	75	120	45	12,0	6	0,139
11,5	19	75	120	45	12,0	6	0,145
12,0	19	75	120	45	12,0	6	0,152
13,0	19	75	120	45	14,0	6	0,190
14,0	22	90	135	45	14,0	6	0,243
15,0	22	87	135	48	16,0	6	0,298
16,0	22	87	135	48	16,0	6	0,315
17,0	22	97	145	48	18,0	8	0,415
18,0	22	97	145	48	18,0	8	0,441
19,0	22	95	145	50	20,0	8	0,513
20,0	22	95	145	50	20,0	8	0,554



straight

Order details:

TS3025-xx.xx-A-C Coolant center

xx.xx = nom.-Ø

Top-Speed-reamer

Catalog-No. TS3025

Solid carbide - K10F + PFB-coating

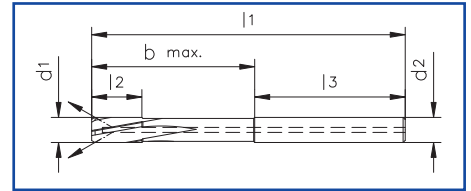
righthand cutting

straight shank with tol. h6 for NC-machine

spiral fluted; EU-spacing

with internal coolant supply (I.C.)

- Coolant outlet at blade level (radial)



recommended to work steel and cast



spiral

nom-Ø H7	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d_1 mm	l_2 mm	$b_{max.}$ mm	l_1 mm	l_3 mm	d_2 mm	z	ca. kg
4,0	12	47	75	28	4,0	4	0,009
4,5	12	39	75	36	6,0	4	0,015
5,0	12	39	75	36	6,0	4	0,020
5,5	16	39	75	36	6,0	4	0,022
6,0	16	39	75	36	6,0	4	0,024
6,5	16	64	100	36	8,0	6	0,043
7,0	16	64	100	36	8,0	6	0,046
7,5	16	64	100	36	8,0	6	0,050
8,0	16	64	100	36	8,0	6	0,053
8,5	19	60	100	40	10,0	6	0,070
9,0	19	60	100	40	10,0	6	0,080
9,5	19	80	120	40	10,0	6	0,095
10,0	19	80	120	40	10,0	6	0,102
10,5	19	75	120	45	12,0	6	0,122
11,0	19	75	120	45	12,0	6	0,139
11,5	19	75	120	45	12,0	6	0,145
12,0	19	75	120	45	12,0	6	0,152
13,0	19	75	120	45	14,0	6	0,190
14,0	22	90	135	45	14,0	6	0,243
15,0	22	87	135	48	16,0	6	0,298
16,0	22	87	135	48	16,0	6	0,315
17,0	22	97	145	48	18,0	8	0,415
18,0	22	97	145	48	18,0	8	0,441
19,0	22	95	145	50	20,0	8	0,513
20,0	22	95	145	50	20,0	8	0,554

Order details:

TS3025-xx.xx-B-S

Coolant blades

xx.xx = nom.-Ø

Top-Speed-reamer 1/100 (centesimal)

Catalog-No. TS3030

Solid carbide - K10F + PFB-coating

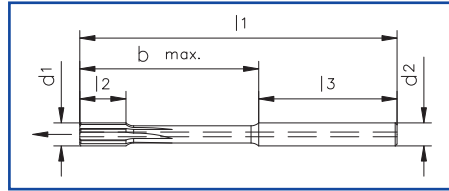
righthand cutting

straight shank with tol. h6 for NC-machine

straight fluted; EU-spacing

with internal coolant supply (I.C.)

- Coolant outlet from the center(axial)



recommended to work steel and cast

nom-Ø 0/+0.003	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d ₁ mm	l ₂ mm	b _{max.} mm	l ₁ mm	l ₃ mm	d ₂ mm	z	ca. kg
3,97	12	47	75	28	4,0	4	0,009
3,98	12	47	75	28	4,0	4	0,009
3,99	12	47	75	28	4,0	4	0,009
4,00	12	47	75	28	4,0	4	0,009
4,01	12	47	75	28	4,0	4	0,009
4,02	12	47	75	28	4,0	4	0,009
4,03	12	47	75	28	4,0	4	0,009
4,97	12	39	75	36	6,0	4	0,020
4,98	12	39	75	36	6,0	4	0,020
4,99	12	39	75	36	6,0	4	0,020
5,00	12	39	75	36	6,0	4	0,020
5,01	12	39	75	36	6,0	4	0,020
5,02	12	39	75	36	6,0	4	0,020
5,03	12	39	75	36	6,0	4	0,020
5,97	16	39	75	36	6,0	4	0,024
5,98	16	39	75	36	6,0	4	0,024
5,99	16	39	75	36	6,0	4	0,024
6,00	16	39	75	36	6,0	4	0,024
6,01	16	39	75	36	6,0	4	0,024
6,02	16	39	75	36	6,0	4	0,024
6,03	16	39	75	36	6,0	4	0,024
7,97	16	64	100	36	8,0	6	0,053
7,98	16	64	100	36	8,0	6	0,053
7,99	16	64	100	36	8,0	6	0,053
8,00	16	64	100	36	8,0	6	0,053
8,01	16	64	100	36	8,0	6	0,053
8,02	16	64	100	36	8,0	6	0,053
8,03	16	64	100	36	8,0	6	0,053
9,97	19	80	120	40	10,0	6	0,102
9,98	19	80	120	40	10,0	6	0,102
9,99	19	80	120	40	10,0	6	0,102
10,00	19	80	120	40	10,0	6	0,102
10,01	19	80	120	40	10,0	6	0,102
10,02	19	80	120	40	10,0	6	0,102
10,03	19	80	120	40	10,0	6	0,102
11,97	19	75	120	45	12,0	6	0,152
11,98	19	75	120	45	12,0	6	0,152
11,99	19	75	120	45	12,0	6	0,152
12,00	19	75	120	45	12,0	6	0,152
12,01	19	75	120	45	12,0	6	0,152
12,02	19	75	120	45	12,0	6	0,152
12,03	19	75	120	45	12,0	6	0,152



straight



Order details:

TS3030-xx.xx-A-C Coolant center

xx.xx = nom.-Ø

Top-Speed-reamer 1/100 (centesimal)

Catalog-No. TS3030

Solid carbide - K10F + PFB-coating

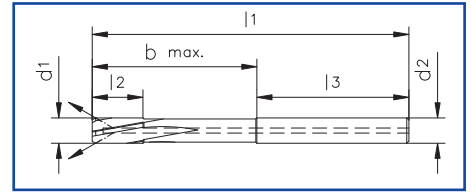
righthand cutting

straight shank with tol. h6 for NC-machine

spiral fluted; EU-spacing

with internal coolant supply (I.C.)

- Coolant outlet at blade level (radial)



recommended to work steel and cast



spiral

nom-Ø 0/+0.003	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d ₁ mm	l ₂ mm	b _{max.} mm	l ₁ mm	l ₃ mm	d ₂ mm	z	ca. kg
3,97	12	47	75	28	4,0	4	0,009
3,98	12	47	75	28	4,0	4	0,009
3,99	12	47	75	28	4,0	4	0,009
4,00	12	47	75	28	4,0	4	0,009
4,01	12	47	75	28	4,0	4	0,009
4,02	12	47	75	28	4,0	4	0,009
4,03	12	47	75	28	4,0	4	0,009
4,97	12	39	75	36	6,0	4	0,020
4,98	12	39	75	36	6,0	4	0,020
4,99	12	39	75	36	6,0	4	0,020
5,00	12	39	75	36	6,0	4	0,020
5,01	12	39	75	36	6,0	4	0,020
5,02	12	39	75	36	6,0	4	0,020
5,03	12	39	75	36	6,0	4	0,020
5,97	16	39	75	36	6,0	4	0,024
5,98	16	39	75	36	6,0	4	0,024
5,99	16	39	75	36	6,0	4	0,024
6,00	16	39	75	36	6,0	4	0,024
6,01	16	39	75	36	6,0	4	0,024
6,02	16	39	75	36	6,0	4	0,024
6,03	16	39	75	36	6,0	4	0,024
7,97	16	64	100	36	8,0	6	0,053
7,98	16	64	100	36	8,0	6	0,053
7,99	16	64	100	36	8,0	6	0,053
8,00	16	64	100	36	8,0	6	0,053
8,01	16	64	100	36	8,0	6	0,053
8,02	16	64	100	36	8,0	6	0,053
8,03	16	64	100	36	8,0	6	0,053
9,97	19	80	120	40	10,0	6	0,102
9,98	19	80	120	40	10,0	6	0,102
9,99	19	80	120	40	10,0	6	0,102
10,00	19	80	120	40	10,0	6	0,102
10,01	19	80	120	40	10,0	6	0,102
10,02	19	80	120	40	10,0	6	0,102
10,03	19	80	120	40	10,0	6	0,102
11,97	19	75	120	45	12,0	6	0,152
11,98	19	75	120	45	12,0	6	0,152
11,99	19	75	120	45	12,0	6	0,152
12,00	19	75	120	45	12,0	6	0,152
12,01	19	75	120	45	12,0	6	0,152
12,02	19	75	120	45	12,0	6	0,152
12,03	19	75	120	45	12,0	6	0,152

Order details:

TS3030-xx.xx-B-S Coolant blades

xx.xx = nom.-Ø

Top-Speed-reamer

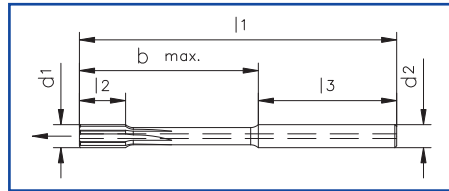
Catalog-No. TS4025

Solid carbide - K10F + PFB-coating

righthand cutting
 straight shank with tol. h6 for NC-machine
 straight fluted; EU-spacing

with internal coolant supply (I.C.)

- Coolant outlet from the center (axial)



recommended to work stainless steel

nom-Ø H7	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d ₁ mm	l ₂ mm	b _{max.} mm	l ₁ mm	l ₃ mm	d ₂ mm	z	ca. kg
4,0	12	47	75	28	4,0	4	0,009
4,5	12	39	75	36	6,0	4	0,015
5,0	12	39	75	36	6,0	4	0,020
5,5	16	39	75	36	6,0	4	0,022
6,0	16	39	75	36	6,0	4	0,024
6,5	16	64	100	36	8,0	6	0,043
7,0	16	64	100	36	8,0	6	0,046
7,5	16	64	100	36	8,0	6	0,050
8,0	16	64	100	36	8,0	6	0,053
8,5	19	60	100	40	10,0	6	0,070
9,0	19	60	100	40	10,0	6	0,080
9,5	19	80	120	40	10,0	6	0,095
10,0	19	80	120	40	10,0	6	0,102
10,5	19	75	120	45	12,0	6	0,122
11,0	19	75	120	45	12,0	6	0,139
11,5	19	75	120	45	12,0	6	0,145
12,0	19	75	120	45	12,0	6	0,152
13,0	19	75	120	45	14,0	6	0,190
14,0	22	90	135	45	14,0	6	0,243
15,0	22	87	135	48	16,0	6	0,298
16,0	22	87	135	48	16,0	6	0,315
17,0	22	97	145	48	18,0	8	0,415
18,0	22	97	145	48	18,0	8	0,441
19,0	22	95	145	50	20,0	8	0,513
20,0	22	95	145	50	20,0	8	0,554



straight



Order details

TS4025-xx.xx-A-C Coolant center

xx.xx = nom.-Ø

Top-Speed-reamer

Catalog-No. TS4025

Solid carbide - K10F + PFB-coating

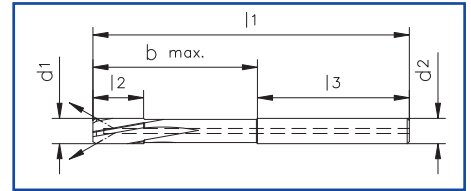
righthand cutting

straight shank with tol. h6 for NC-machine

spiral fluted; EU-spacing

with internal coolant supply (I.C.)

- Coolant outlet from the center (radial)



recommended to work stainless steel



spiral

nom-Ø H7	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d_1 mm	l_2 mm	$b_{max.}$ mm	l_1 mm	l_3 mm	d_2 mm	z	ca. kg
4,0	12	47	75	28	4,0	4	0,009
4,5	12	39	75	36	6,0	4	0,015
5,0	12	39	75	36	6,0	4	0,020
5,5	16	39	75	36	6,0	4	0,022
6,0	16	39	75	36	6,0	4	0,024
6,5	16	64	100	36	8,0	6	0,043
7,0	16	64	100	36	8,0	6	0,046
7,5	16	64	100	36	8,0	6	0,050
8,0	16	64	100	36	8,0	6	0,053
8,5	19	60	100	40	10,0	6	0,070
9,0	19	60	100	40	10,0	6	0,080
9,5	19	80	120	40	10,0	6	0,095
10,0	19	80	120	40	10,0	6	0,102
10,5	19	75	120	45	12,0	6	0,122
11,0	19	75	120	45	12,0	6	0,139
11,5	19	75	120	45	12,0	6	0,145
12,0	19	75	120	45	12,0	6	0,152
13,0	19	75	120	45	14,0	6	0,190
14,0	22	90	135	45	14,0	6	0,243
15,0	22	87	135	48	16,0	6	0,298
16,0	22	87	135	48	16,0	6	0,315
17,0	22	97	145	48	18,0	8	0,415
18,0	22	97	145	48	18,0	8	0,441
19,0	22	95	145	50	20,0	8	0,513
20,0	22	95	145	50	20,0	8	0,554

Order details:

TS4025-xx.xx-B-S Coolant blades

xx.xx = nom.-Ø

Top-Speed-reamer

Catalog-No. TS5025

Solid carbide - K10F + PFB-coating

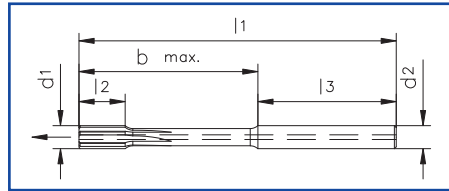
righthand cutting

straight shank with tol. h6 for NC-machine

straight fluted; EU-spacing

with internal coolant supply (I.C.)

- Coolant outlet from the center (axial)



recommended to work hardened steel

nom-Ø H7	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d ₁ mm	l ₂ mm	b _{max.} mm	l ₁ mm	l ₃ mm	d ₂ mm	z	ca. kg
4,0	12	47	75	28	4,0	4	0,009
4,5	12	39	75	36	6,0	4	0,015
5,0	12	39	75	36	6,0	4	0,020
5,5	16	39	75	36	6,0	4	0,022
6,0	16	39	75	36	6,0	4	0,024
6,5	16	64	100	36	8,0	6	0,043
7,0	16	64	100	36	8,0	6	0,046
7,5	16	64	100	36	8,0	6	0,050
8,0	16	64	100	36	8,0	6	0,053
8,5	19	60	100	40	10,0	6	0,070
9,0	19	60	100	40	10,0	6	0,080
9,5	19	80	120	40	10,0	6	0,095
10,0	19	80	120	40	10,0	6	0,102
10,5	19	75	120	45	12,0	6	0,122
11,0	19	75	120	45	12,0	6	0,139
11,5	19	75	120	45	12,0	6	0,145
12,0	19	75	120	45	12,0	6	0,152
13,0	19	75	120	45	14,0	6	0,190
14,0	22	90	135	45	14,0	6	0,243
15,0	22	87	135	48	16,0	6	0,298
16,0	22	87	135	48	16,0	6	0,315
17,0	22	97	145	48	18,0	8	0,415
18,0	22	97	145	48	18,0	8	0,441
19,0	22	95	145	50	20,0	8	0,513
20,0	22	95	145	50	20,0	8	0,554



straight



Order details:

TS5025-xx.xx-A-C Coolant center

xx.xx = nom.-Ø

Top-Speed-reamer

Catalog-No. TS5025

Solid carbide - K10F + PFB-coating

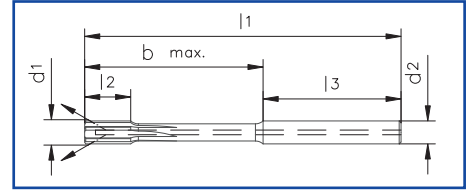
righthand cutting

straight shank with tol. h6 for NC-machine

straight fluted; EU-spacing

with internal coolant supply (I.C.)

- Coolant outlet from at blade level (radial)



recommended to work hardened steel



straight

nom-Ø H7	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d_1 mm	l_2 mm	$b_{max.}$ mm	l_1 mm	l_3 mm	d_2 mm	z	ca. kg
4,0	12	47	75	28	4,0	4	0,009
4,5	12	39	75	36	6,0	4	0,015
5,0	12	39	75	36	6,0	4	0,020
5,5	16	39	75	36	6,0	4	0,022
6,0	16	39	75	36	6,0	4	0,024
6,5	16	64	100	36	8,0	6	0,043
7,0	16	64	100	36	8,0	6	0,046
7,5	16	64	100	36	8,0	6	0,050
8,0	16	64	100	36	8,0	6	0,053
8,5	19	60	100	40	10,0	6	0,070
9,0	19	60	100	40	10,0	6	0,080
9,5	19	80	120	40	10,0	6	0,095
10,0	19	80	120	40	10,0	6	0,102
10,5	19	75	120	45	12,0	6	0,122
11,0	19	75	120	45	12,0	6	0,139
11,5	19	75	120	45	12,0	6	0,145
12,0	19	75	120	45	12,0	6	0,152
13,0	19	75	120	45	14,0	6	0,190
14,0	22	90	135	45	14,0	6	0,243
15,0	22	87	135	48	16,0	6	0,298
16,0	22	87	135	48	16,0	6	0,315
17,0	22	97	145	48	18,0	8	0,415
18,0	22	97	145	48	18,0	8	0,441
19,0	22	95	145	50	20,0	8	0,513
20,0	22	95	145	50	20,0	8	0,554

Order details:

TS5025-xx.xx-A-S Coolant blade

xx.xx = nom.-Ø

Top-Speed-reamer

Catalog-No. TS7010

Solid **CERMET**

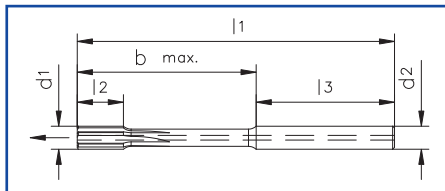
righthand cutting

straight shank with tol. h6 for NC-machine

straight fluted; EU-spacing

with internal coolant supply (I.C.)

- Coolant outlet from the center(axial)



recommended to work steel and cast

nom-Ø H7	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d ₁ mm	l ₂ mm	b _{max.} mm	l ₁ mm	l ₃ mm	d ₂ mm	z	ca. kg
4,0	12	34	70	36	6,0	4	0,006
4,5	12	34	70	36	6,0	4	0,008
5,0	12	34	70	36	6,0	4	0,010
5,5	16	34	70	36	6,0	4	0,012
6,0	16	34	70	36	6,0	6	0,014
6,5	16	39	75	36	8,0	6	0,015
7,0	16	39	75	36	8,0	6	0,017
7,5	16	39	75	36	8,0	6	0,019
8,0	16	39	75	36	8,0	6	0,021
8,5	19	35	75	40	10,0	6	0,027
9,0	19	35	75	40	10,0	6	0,032
9,5	19	35	75	40	10,0	6	0,037
10,0	19	60	100	40	10,0	6	0,042
10,5	19	55	100	45	12,0	6	0,055
11,0	19	55	100	45	12,0	6	0,060
11,5	19	55	100	45	12,0	6	0,065
12,0	19	55	100	45	12,0	6	0,070



straight



Order details:

TS7010-xx.xx-A-C Coolant center

xx.xx = nom.-Ø

Top-Speed-reamer

Catalog-No. TS7010

Solid CERMET

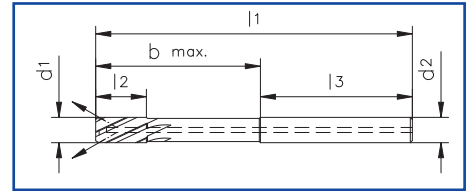
righthand cutting

straight shank with tol. h6 for NC-machine

spiral fluted; EU-spacing

with internal coolant supply (I.C.)

- Coolant outlet at blade level (radial)



recommended to work steel and cast



spiral

nom-Ø H7	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d_1 mm	l_2 mm	$b_{max.}$ mm	l_1 mm	l_3 mm	d_2 mm	z	ca. kg
4,0	12	34	70	36	6,0	4	0,006
4,5	12	34	70	36	6,0	4	0,008
5,0	12	34	70	36	6,0	4	0,010
5,5	16	34	70	36	6,0	4	0,012
6,0	16	34	70	36	6,0	6	0,014
6,5	16	39	75	36	8,0	6	0,015
7,0	16	39	75	36	8,0	6	0,017
7,5	16	39	75	36	8,0	6	0,019
8,0	16	39	75	36	8,0	6	0,021
8,5	19	35	75	40	10,0	6	0,027
9,0	19	35	75	40	10,0	6	0,032
9,5	19	35	75	40	10,0	6	0,037
10,0	19	60	100	40	10,0	6	0,042
10,5	19	55	100	45	12,0	6	0,055
11,0	19	55	100	45	12,0	6	0,060
11,5	19	55	100	45	12,0	6	0,065
12,0	19	55	100	45	12,0	6	0,070

Order details:

TS7010-xx.xx-B-S Coolant blade

xx.xx = nom.-Ø

Top-Speed-reamer

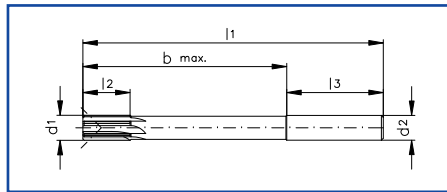
Catalog-No. TS2520

Carbide-tipped (brazed) K10

long version

not expandable

straight fluted



with internal coolant supply (I.C.)

- Coolant outlet at blade level (radial)
- Coolant outlet from the center(axial)

nom-Ø H7	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d_1 mm	l_2 mm	$b_{max.}$ mm	l_1 mm	l_3 mm	d_2 mm	z	ca. kg
8,0	16	78	123	45	12,0	4	0,038
9,0	19	78	123	45	12,0	4	0,044
10,0	19	115	160	45	12,0	6	0,070
11,0	19	115	160	45	12,0	6	0,080
12,0	19	115	160	45	12,0	6	0,090
13,0	19	115	160	45	12,0	6	0,150
14,0	19	115	160	45	12,0	6	0,165
15,0	19	115	160	45	12,0	6	0,180
16,0	22	132	180	48	16,0	6	0,250
17,0	22	132	180	48	16,0	6	0,290
18,0	22	132	180	48	16,0	6	0,325
19,0	22	150	200	50	20,0	6	0,365
20,0	22	150	200	50	20,0	6	0,380
21,0	22	150	200	50	20,0	6	0,395
22,0	22	150	200	50	20,0	6	0,410
23,0	22	150	200	50	20,0	6	0,420
24,0	22	150	200	50	20,0	6	0,435
25,0	22	150	200	50	20,0	6	0,450
26,0	22	154	210	56	25,0	6	0,580
27,0	22	154	210	56	25,0	6	0,605
28,0	22	154	210	56	25,0	6	0,630
29,0	22	154	210	56	25,0	6	0,650
30,0	22	154	210	56	25,0	6	0,690



Straight



Order details:

TS2520IKS-xx.xx-ZY Coolant flute

TS2520IKC-xx.xx-ZY Coolant center

xx.xx = nom.-Ø

Top-Speed-reamer

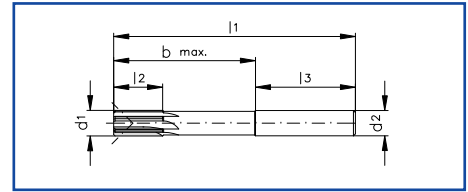
Catalog-No. TS2525

Carbide-tipped (brazed) K10

short version

not expandable

straight fluted



with internal coolant supply (I.C.)

- Coolant outlet at blade level (radial)
- Coolant outlet from the center(axial)



straight

nom-Ø H7	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d_1 mm	l_2 mm	b_{max} mm	l_1 mm	l_3 mm	d_2 mm	z	ca. kg
8,0	16	50	78	45	12,0	4	0,020
9,0	19	50	88	45	12,0	4	0,035
10,0	19	50	95	45	12,0	6	0,058
11,0	19	50	95	45	12,0	6	0,062
12,0	19	50	95	45	12,0	6	0,066
13,0	19	50	95	45	12,0	6	0,068
14,0	19	50	95	45	12,0	6	0,075
15,0	19	50	95	45	12,0	6	0,080
16,0	22	52	100	48	16,0	6	0,135
17,0	22	52	100	48	16,0	6	0,142
18,0	22	52	100	48	16,0	6	0,145
19,0	22	70	120	50	20,0	6	0,190
20,0	22	70	120	50	20,0	6	0,198
21,0	22	70	120	50	20,0	6	0,210
22,0	22	70	120	50	20,0	6	0,225
23,0	22	70	120	50	20,0	6	0,245
24,0	22	70	120	50	20,0	6	0,265
25,0	22	70	120	50	20,0	6	0,280
26,0	22	79	135	56	25,0	6	0,350
27,0	22	79	135	56	25,0	6	0,380
28,0	22	79	135	56	25,0	6	0,410
29,0	22	79	135	56	25,0	6	0,440
30,0	22	79	135	56	25,0	6	0,475

Order details:

TS2525IKS-xx.xx-ZY Coolant blade

TS2525IKC-xx.xx-ZY Coolant flute

xx.xx = nom.-Ø

Top-Speed-reamer

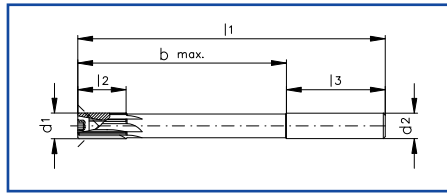
Catalog-No. TS2560

Carbide-tipped (brazed) K10

long version

expandable

straight fluted



with internal coolant supply (I.C.)

- Coolant outlet at blade level (radial)
- Coolant outlet from the center(axial)

Can be stretched by approx. 0.02 mm using the front screw

nom-Ø H7	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d_1 mm	l_2 mm	$b_{max.}$ mm	l_1 mm	l_3 mm	d_2 mm	z	ca. kg
8,0	16	87	123	45	12,0	4	0,058
9,0	19	87	123	45	12,0	4	0,061
10,0	19	115	160	45	12,0	6	0,085
11,0	19	115	160	45	12,0	6	0,090
12,0	19	115	160	45	12,0	6	0,095
13,0	19	115	160	45	12,0	6	0,105
14,0	19	115	160	45	12,0	6	0,120
15,0	19	115	160	45	12,0	6	0,132
16,0	22	132	180	48	16,0	6	0,240
17,0	22	132	180	48	16,0	6	0,255
18,0	22	132	180	48	16,0	6	0,268
19,0	22	150	200	50	20,0	6	0,320
20,0	22	150	200	50	20,0	6	0,335
21,0	22	150	200	50	20,0	6	0,350
22,0	22	150	200	50	20,0	6	0,368
23,0	22	150	200	50	20,0	6	0,385
24,0	22	150	200	50	20,0	6	0,400
25,0	22	150	200	50	20,0	6	0,415
26,0	22	154	210	56	25,0	6	0,465
27,0	22	154	210	56	25,0	6	0,480
28,0	22	154	210	56	25,0	6	0,498
29,0	22	154	210	56	25,0	6	0,515
30,0	22	154	210	56	25,0	6	0,530



straight



Order details:

TS2560IKS-xx.xx-ZY Coolant blade

TS2560IKC-xx.xx-ZY Coolant flute

xx.xx = nom.-Ø

Top-Speed-reamer

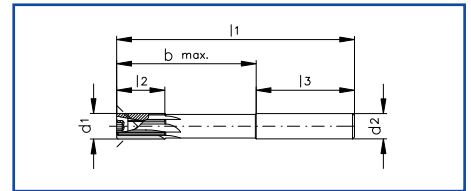
Catalog-No. TS2565

Carbide-tipped (brazed) K10

short version

expandable

straight fluted



with internal coolant supply (I.C.)

- Coolant outlet at blade level (radial)
- Coolant outlet from the center(axial)

Can be stretched by approx. 0.02 mm using the front screw



straight

nom-Ø H7	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d_1 mm	l_2 mm	b_{max} mm	l_1 mm	l_3 mm	d_2 mm	z	ca. kg
8,0	16	33	78	45	12,0	4	0,025
9,0	19	43	88	45	12,0	4	0,040
10,0	19	50	95	45	12,0	6	0,065
11,0	19	50	95	45	12,0	6	0,070
12,0	19	50	95	45	12,0	6	0,075
13,0	19	50	95	45	12,0	6	0,078
14,0	19	50	95	45	12,0	6	0,082
15,0	19	50	95	45	12,0	6	0,086
16,0	22	52	100	48	16,0	6	0,142
17,0	22	52	100	48	16,0	6	0,150
18,0	22	52	100	48	16,0	6	0,155
19,0	22	70	120	50	20,0	6	0,200
20,0	22	70	120	50	20,0	6	0,210
21,0	22	70	120	50	20,0	6	0,220
22,0	22	70	120	50	20,0	6	0,235
23,0	22	70	120	50	20,0	6	0,250
24,0	22	70	120	50	20,0	6	0,275
25,0	22	70	120	50	20,0	6	0,282
26,0	22	79	135	56	25,0	6	0,365
27,0	22	79	135	56	25,0	6	0,395
28,0	22	79	135	56	25,0	6	0,420
29,0	22	79	135	56	25,0	6	0,455
30,0	22	79	135	56	25,0	6	0,495

Order details:

TS2565IKS-xx.xx-ZY Coolant blade

TS2565IKC-xx.xx-ZY Coolant flute

xx.xx = nom.-Ø

Top-Speed-reamer

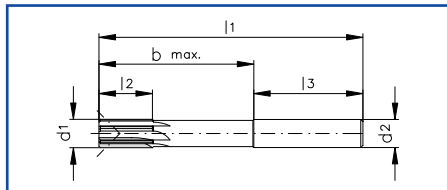
Catalog-No. TS7525

CERMET-tipped (brazed)

short version

not expandable

straight fluted



with internal coolant supply (I.C.)

- Coolant outlet at blade level (radial)
- Coolant outlet from the center(axial)

nom-Ø H7	flute- length	total- length	max. friction length	shank-Ø h6	shank- length	number of teeth	weight each pc.
d_1 mm	l_2 mm	l_1 mm	$b_{max.}$ mm	d_2 mm	l_3 mm	z	ca. kg
8,0	16	78	33	12,0	45	4	0,025
9,0	19	88	43	12,0	45	4	0,035
10,0	19	95	50	12,0	45	6	0,060
11,0	19	95	50	12,0	45	6	0,070
12,0	19	95	50	12,0	45	6	0,075
13,0	19	95	50	12,0	45	6	0,080
14,0	19	95	50	12,0	45	6	0,088
15,0	19	95	50	12,0	45	6	0,100
16,0	22	100	52	16,0	48	6	0,180
17,0	22	100	52	16,0	48	6	0,200
18,0	22	100	52	16,0	48	6	0,230
19,0	22	120	70	20,0	50	6	0,245
20,0	22	120	70	20,0	50	6	0,258
21,0	22	120	70	20,0	50	6	0,270
22,0	22	120	70	20,0	50	6	0,285
23,0	22	120	70	20,0	50	6	0,300
24,0	22	120	70	20,0	50	6	0,315
25,0	22	120	70	20,0	50	6	0,325
26,0	22	135	79	25,0	56	6	0,350
27,0	22	135	79	25,0	56	6	0,380
28,0	22	135	79	25,0	56	6	0,410
29,0	22	135	79	25,0	56	6	0,440
30,0	22	135	79	25,0	56	6	0,475



straight



Order details:

TS7525IKS-xx.xx-ZY Coolant blade

TS7525IKC-xx.xx-ZY Coolant flute

xx.xx = nom.-Ø

Top-Speed-reamer

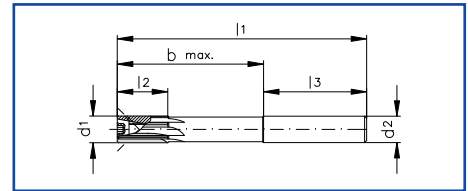
Catalog-No. TS7565

CERMET-tipped (brazed)

short version

expandable

straight fluted



with internal coolant supply (I.C.)

- Coolant outlet at blade level (radial)
- Coolant outlet from the center(axial)

Can be stretched by approx. 0.02 mm using the front screw



straight

nom-Ø H7	flute- length	max. friction length	total- length	shank- length	shank-Ø h6	number of teeth	weight each pc.
d_1 mm	l_2 mm	$b_{max.}$ mm	l_1 mm	l_3 mm	d_2 mm	z	ca. kg
8,0	16	33	78	45	12,0	4	0,020
9,0	19	43	88	45	12,0	4	0,035
10,0	19	50	95	45	12,0	6	0,050
11,0	19	50	95	45	12,0	6	0,060
12,0	19	50	95	45	12,0	6	0,065
13,0	19	50	95	45	12,0	6	0,070
14,0	19	50	95	45	12,0	6	0,078
15,0	19	50	95	45	12,0	6	0,080
16,0	22	52	100	48	16,0	6	0,135
17,0	22	52	100	48	16,0	6	0,145
18,0	22	52	100	48	16,0	6	0,152
19,0	22	70	120	50	20,0	6	0,195
20,0	22	70	120	50	20,0	6	0,205
21,0	22	70	120	50	20,0	6	0,215
22,0	22	70	120	50	20,0	6	0,230
23,0	22	70	120	50	20,0	6	0,242
24,0	22	70	120	50	20,0	6	0,265
25,0	22	70	120	50	20,0	6	0,274
26,0	22	79	135	56	25,0	6	0,350
27,0	22	79	135	56	25,0	6	0,382
28,0	22	79	135	56	25,0	6	0,410
29,0	22	79	135	56	25,0	6	0,420
30,0	22	79	135	56	25,0	6	0,482

Order details:

TS7565IKS-xx.xx-ZY Coolant blade

TS7565IKC-xx.xx-ZY Coolant flute

xx.xx = nom.-Ø

Coredrill Counterbore Countersinker

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HSS countersinker 90° DIN 335, 3 flutes, straight shank	760	100
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HSS countersinker 90° DIN 335, 3 flutes, TiN -coated, MT-shank	777	101
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HSS counterbore, MT-shank	735/736	121

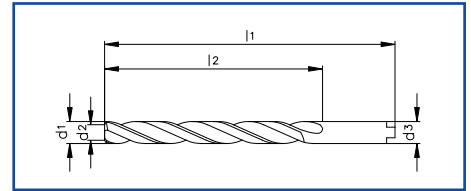


Coredrill

Catalog-No. 703

DIN 344

HSS
 righthand cutting
 with 3 flutes
 straight shank with tang DIN 1809
 righthand spiral fluted



nom.-Ø h8	smallest Ø of the chamfer	flute- length	total- length	shank- Ø	number of teeth	weight each pc.
d ₁ mm	d ₂ mm	l ₂ mm	l ₁ mm	d ₃ mm	z	ca. kg
2,80*	2,0	55	84	3,0	3	0,015
3,00*	2,0	55	84	3,0	3	0,015
3,80*	2,6	64	96	4,0	3	0,015
4,00*	2,6	64	96	4,0	3	0,015
4,80	3,2	74	108	5,0	3	0,020
5,00	3,2	74	108	5,0	3	0,020
5,80	3,9	80	116	6,0	3	0,025
6,00	3,9	80	116	6,0	3	0,025
6,30	3,9	86	124	6,5	3	0,030
6,50	3,9	86	124	6,5	3	0,030
6,80	4,5	93	133	7,0	3	0,035
7,00	4,5	93	133	7,0	3	0,035
7,80	5,2	100	142	8,0	3	0,050
8,00	5,2	100	142	8,0	3	0,050
8,80	5,8	107	151	9,0	3	0,070
9,00	5,8	107	151	9,0	3	0,070
9,80	6,5	116	162	10,0	3	0,080
10,00	6,5	116	162	10,0	3	0,080
10,75	7,1	125	173	11,0	3	0,110
11,00	7,1	125	173	11,0	3	0,110
11,75	7,8	134	184	12,0	3	0,120
12,00	7,8	134	184	12,0	3	0,120
12,75	8,4	134	184	13,0	3	0,130
13,00	8,4	134	184	13,0	3	0,130
13,75	9,1	142	194	14,0	3	0,140
14,00	9,1	142	194	14,0	3	0,140
14,75	9,7	147	202	15,0	3	0,150
15,00	9,7	147	202	15,0	3	0,150
15,75	10,4	153	211	16,0	3	0,220
16,00	10,4	153	211	16,0	3	0,220
16,75	11,0	159	218	17,0	3	0,240
17,00	11,0	159	218	17,0	3	0,240
17,75	11,7	165	226	18,0	3	0,270
18,00	11,7	165	226	18,0	3	0,270
18,70	12,3	171	234	19,0	3	0,290
19,00	12,3	171	234	19,0	3	0,290
19,70	13,0	177	242	20,0	3	0,340
20,00	13,0	177	242	20,0	3	0,340

* FROMM Standard

Order details:

703-xx.xx-N

xx.xx = nom.-Ø

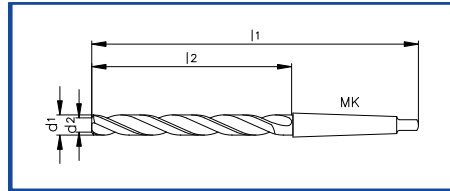
Coredrill

Catalog-No. 701

DIN 343

HSS

righthand cutting
with 3 flutes
morse taper (MT) shank
righthand spiral fluted



nom.-Ø h8	smallest Ø of the chamfer	flute- length	total- length	MT- shank	number of teeth	weight each pc.
d ₁ mm	d ₂ mm	l ₂ mm	l ₁ mm	MT	z	ca. kg
7,80*	5,2	75	156	1	3	0,070
8,00*	5,2	75	156	1	3	0,070
8,80	5,8	81	162	1	3	0,075
9,00	5,8	81	162	1	3	0,075
9,80	6,5	87	168	1	3	0,095
10,00	6,5	87	168	1	3	0,095
10,75	7,1	94	175	1	3	0,100
11,00	7,1	94	175	1	3	0,100
11,75	7,8	101	182	1	3	0,110
12,00	7,8	101	182	1	3	0,110
12,75	8,4	101	182	1	3	0,120
13,00	8,4	101	182	1	3	0,120
13,75	9,1	108	189	1	3	0,130
14,00	9,1	108	189	1	3	0,130
14,75	9,7	114	212	2	3	0,150
15,00	9,7	114	212	2	3	0,150
15,75	10,4	120	218	2	3	0,220
16,00	10,4	120	218	2	3	0,220
16,75	11,0	125	223	2	3	0,240
17,00	11,0	125	223	2	3	0,240
17,75	11,7	130	228	2	3	0,270
18,00	11,7	130	228	2	3	0,270
18,70	12,3	135	233	2	3	0,290
19,00	12,3	135	233	2	3	0,290
19,70	13,0	140	238	2	3	0,340
20,00	13,0	140	238	2	3	0,340
20,70	13,6	145	243	2	3	0,370
21,00	13,6	145	243	2	3	0,370
21,70	14,3	150	248	2	3	0,400
22,00	14,3	150	248	2	3	0,400
20,70	15,0	155	253	2	3	0,440
23,00	15,0	155	253	2	3	0,440
23,70	15,6	160	281	3	3	0,650
24,00	15,6	160	281	3	3	0,650
24,70	16,3	160	281	3	3	0,700
25,00	16,3	160	281	3	3	0,700
25,70	17,0	165	286	3	3	0,770
26,00	17,0	165	286	3	3	0,770
26,70	17,6	170	291	3	3	0,820
27,00	17,6	170	291	3	3	0,820
27,70	18,3	170	291	3	3	0,900
28,00	18,3	170	291	3	3	0,900
28,70	19,0	175	296	3	3	0,950
29,00	19,0	175	296	3	3	0,950
29,70	19,5	175	296	3	3	1,000

* FROMM Standard

Order details:

701-xx.xx-N

xx.xx = nom.-Ø

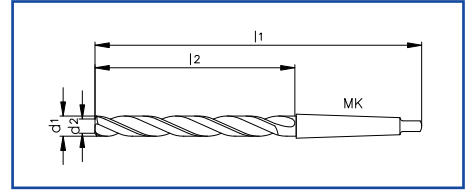
Coedrill

Catalog-No. 701

DIN 343

continuation

HSS
 righthand cutting
 with 3 flutes
 morse taper (MT) shank
 righthand spiral fluted



nom.-Ø h8	smallest Ø of the chamfer	flute- length	total- length	MT- shank	number of teeth	weight each pc.
d ₁ mm	d ₂ mm	l ₂ mm	l ₁ mm	MT	z	ca. kg
30,00	19,5	175	296	3	3	1,000
30,60	20,0	180	301	3	3	1,130
31,00	20,0	180	301	3	3	1,130
31,60	21,0	185	334	4	3	1,245
32,00	21,0	185	334	4	3	1,245
32,60	21,5	185	334	4	3	1,560
33,00	21,5	185	334	4	3	1,560
33,60	22,0	190	339	4	3	1,590
34,00	22,0	190	339	4	3	1,590
34,60	23,0	190	339	4	3	1,630
35,00	23,0	190	339	4	3	1,630
35,60	23,5	195	344	4	3	1,690
36,00	23,5	195	344	4	3	1,690
36,60	24,0	195	344	4	3	1,750
37,00	24,0	195	344	4	3	1,750
37,60	24,5	200	349	4	3	1,840
38,00	24,5	200	349	4	3	1,840
38,60	25,0	200	349	4	3	1,970
39,00	25,0	200	349	4	3	1,970
39,60	26,0	200	349	4	3	2,160
40,00	26,0	200	349	4	3	2,160
40,60	26,5	205	354	4	3	2,235
41,00	26,5	205	354	4	3	2,235
41,60	27,0	205	354	4	3	2,300
42,00	27,0	205	354	4	3	2,300
42,60	28,0	210	359	4	3	2,420
43,00	28,0	210	359	4	3	2,420
43,60	28,5	210	359	4	3	2,550
44,00	28,5	210	359	4	3	2,550
44,60	29,0	210	359	4	3	2,680
45,00	29,0	210	359	4	3	2,680
45,60	30,0	215	364	4	3	2,890
46,00	30,0	215	364	4	3	2,890
46,60	30,5	215	364	4	3	2,950
47,00	30,5	215	364	4	3	2,950
47,60	31,0	220	369	4	3	3,050
48,00	31,0	220	369	4	3	3,050
48,60	32,0	220	369	4	3	3,170
49,00	32,0	220	369	4	3	3,170
49,60	32,5	220	369	4	3	3,280
50,00	32,5	220	369	4	3	3,280

Order details:

701-xx.xx-N

xx.xx = nom.-Ø

Long coredrill

Catalog-No. 702

DIN 1864

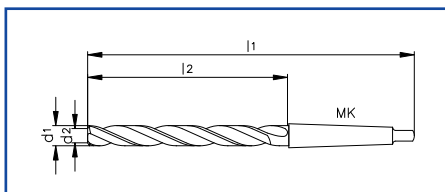
HSS

righthand cutting

with 3 flutes

morse taper (MT) shank

righthand spiral fluted



nom.-Ø h8	smallest Ø of the chamfer	flute- length	total- length	MT- shank	number of teeth	weight each pc.
d ₁ mm	d ₂ mm	l ₂ mm	l ₁ mm	MT	z	ca. kg
7,80	5,60	100	181	1	3	0,080
8,00	5,60	100	181	1	3	0,080
8,80	5,80	107	188	1	3	0,085
9,00	5,80	107	188	1	3	0,085
9,80	6,50	116	197	1	3	0,110
10,00	6,50	116	197	1	3	0,110
10,75	7,10	125	206	1	3	0,110
11,00	7,10	125	206	1	3	0,110
11,75	7,80	134	215	1	3	0,125
12,00	7,80	134	215	1	3	0,125
12,75	8,40	134	215	1	3	0,135
13,00	8,40	134	215	1	3	0,135
13,75	9,10	142	223	1	3	0,145
14,00	9,10	142	223	1	3	0,145
14,75	9,70	147	245	2	3	0,165
15,00	9,70	147	245	2	3	0,165
15,75	10,40	153	251	2	3	0,240
16,00	10,40	153	251	2	3	0,240
16,75	11,00	159	257	2	3	0,265
17,00	11,00	159	257	2	3	0,265
17,75	11,70	165	263	2	3	0,290
18,00	11,70	165	263	2	3	0,290
18,70	12,30	171	269	2	3	0,320
19,00	12,30	171	269	2	3	0,320
19,70	13,00	177	275	2	3	0,375
20,00	13,00	177	275	2	3	0,375
20,70	13,60	184	282	2	3	0,410
21,00	13,60	184	282	2	3	0,410
21,70	14,30	191	289	2	3	0,440
22,00	14,30	191	289	2	3	0,440
22,70	15,00	198	296	2	3	0,490
23,00	15,00	198	296	2	3	0,490
23,70	15,60	206	327	3	3	0,720
24,00	15,60	206	327	3	3	0,720
24,70	16,30	206	327	3	3	0,770
25,00	16,30	206	327	3	3	0,770
25,70	17,00	214	335	3	3	0,850
26,00	17,00	214	335	3	3	0,850
26,70	17,60	222	343	3	3	0,990
27,00	17,60	222	343	3	3	0,990
27,70	18,30	222	343	3	3	1,040
28,00	18,30	222	343	3	3	1,040
28,70	19,00	230	351	3	3	1,060
29,00	19,00	230	351	3	3	1,060
29,70	19,50	230	351	3	3	1,110
30,00	19,50	230	351	3	3	1,110
30,60	20,00	239	360	3	3	1,130
31,00	20,00	239	360	3	3	1,130



Order details:

702-xx.xx-N

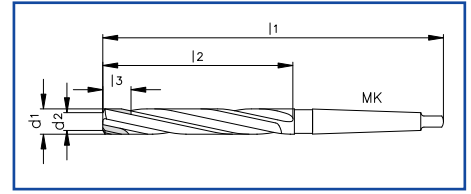
xx.xx = nom.-Ø

Coedrill

Catalog-No. 607

DIN 8043

Carbide-tipped (brazed) K10
 righthand cutting
 with 3 flutes
 morse taper (MT) shank
 righthand spiral fluted



nom.-Ø h8	smallest Ø of the chamfer	flute- length	total- length	MT- shank	length of the carbide tips	number of teeth	weight each pc.
d ₁ mm	d ₂ mm	l ₂ mm	l ₁ mm	MT	l ₃ mm	Z	ca. kg
10,00*	6,00	101	182	1	16	3	0,110
11,00*	7,00	101	182	1	16	3	0,120
12,00	8,00	101	182	1	16	3	0,120
13,00	9,00	101	182	1	16	3	0,120
14,00	8,00	108	189	1	19	3	0,130
15,00	9,00	114	212	2	19	3	0,150
16,00	10,00	120	218	2	19	3	0,220
17,00	11,00	125	223	2	19	3	0,240
18,00	10,00	130	228	2	22	3	0,270
19,00	11,00	135	233	2	22	3	0,290
20,00	12,00	140	238	2	22	3	0,340
21,00	13,00	145	243	2	22	3	0,370
22,00	14,00	150	248	2	22	3	0,400
23,00	15,00	155	253	2	22	3	0,440
24,00	16,00	160	281	3	22	3	0,650
25,00	17,00	160	281	3	22	3	0,700
26,00	18,00	165	286	3	22	3	0,770
27,00	17,00	170	291	3	25	3	0,850
28,00	18,00	170	291	3	25	3	0,900
29,00	19,00	175	296	3	25	3	0,950
30,00	20,00	175	296	3	25	3	1,000
31,00	21,00	180	301	3	25	3	1,150
32,00	22,00	185	334	4	25	3	1,250
33,00	23,00	185	334	4	25	3	1,560
34,00	24,00	190	339	4	25	3	1,600
35,00	25,00	190	339	4	25	3	1,630
36,00	26,00	195	344	4	25	3	1,690
37,00	27,00	195	344	4	25	3	1,750
38,00	28,00	200	349	4	25	3	1,840
39,00	29,00	200	349	4	25	3	1,970
40,00	30,00	200	349	4	25	3	2,160

* FROMM Standard

Order details:

607-xx.xx

xx.xx = nom.-Ø

Shell coredrill

Catalog No. 704

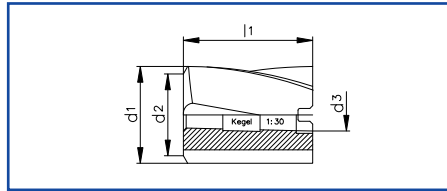
DIN 222

HSS

righthand cutting

with taper-hole 1:30 and transverse slot DIN 138

righthand spiral fluted



nom.-Ø h8	smallest Ø of the chamfer	total- length	taper hole Ø	number of teeth	weight each pc.
d ₁ mm	d ₂ mm	l ₁ mm	d ₃ mm	z	ca. kg
23,7	19,0	45	13	4	0,060
24,0	19,0	45	13	4	0,060
24,7	20,0	45	13	4	0,070
25,0	20,0	45	13	4	0,070
25,7	21,0	45	13	4	0,080
26,0	21,0	45	13	4	0,080
26,7	22,0	45	13	4	0,090
27,0	22,0	45	13	4	0,090
27,7	23,0	45	13	4	0,100
28,0	23,0	45	13	4	0,100
28,7	24,0	45	13	4	0,110
29,0	24,0	45	13	4	0,110
29,7	25,0	45	13	4	0,120
30,0	25,0	45	13	4	0,120
30,6	26,0	45	13	4	0,130
31,0	26,0	45	13	4	0,130
31,6	27,0	45	13	4	0,140
32,0	27,0	45	13	4	0,140
32,6	28,0	45	13	4	0,160
33,0	28,0	45	13	4	0,160
33,6	29,0	45	13	4	0,170
34,0	29,0	45	13	4	0,170
34,6	30,0	45	13	4	0,190
35,0	30,0	45	13	4	0,190
35,6	30,0	50	16	4	0,210
36,0	30,0	50	16	4	0,210
36,6	31,0	50	16	4	0,220
37,0	31,0	50	16	4	0,220
37,6	32,0	50	16	4	0,230
38,0	32,0	50	16	4	0,230
38,6	33,0	50	16	4	0,250
39,0	33,0	50	16	4	0,250
39,6	34,0	50	16	4	0,270
40,0	34,0	50	16	4	0,270
41,6	36,0	50	16	4	0,290
42,0	36,0	50	16	4	0,290
43,6	38,0	50	16	4	0,300
44,0	38,0	50	16	4	0,300
44,6	39,0	50	16	4	0,320
45,0	39,0	50	16	4	0,320
45,6	38,0	56	19	4	0,350
46,0	38,0	56	19	4	0,350
46,6	39,0	56	19	4	0,380
47,0	39,0	56	19	4	0,380
47,6	40,0	56	19	4	0,400

Order details:

704-xx.xx

xx.xx = nom.-Ø

Shell coredrill

Catalog No. 704

DIN 222

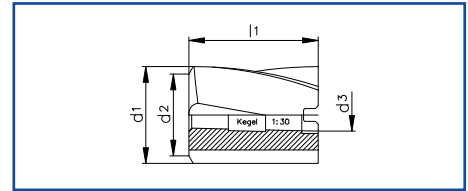
continuation

HSS

righthand cutting

with taper-hole 1:30 and transverse slot DIN 138

righthand spiral fluted



nom.-Ø h8	smallest Ø of the chamfer	total- length	taper hole Ø	number of teeth	weight each pc.
d ₁ mm	d ₂ mm	l ₁ mm	d ₃ mm	z	ca. kg
48,0	40,0	56	19	4	0,400
49,6	42,0	56	19	4	0,450
50,0	42,0	56	19	4	0,450
50,5	43,0	56	19	4	0,480
51,0	43,0	56	19	4	0,480
51,5	44,0	56	19	4	0,500
52,0	44,0	56	19	4	0,500
53,5	45,0	63	22	4	0,530
54,0	45,0	63	22	4	0,530
54,5	46,0	63	22	4	0,540
55,0	46,0	63	22	4	0,540
57,5	49,0	63	22	4	0,580
58,0	49,0	63	22	4	0,580
59,5	51,0	63	22	4	0,740
60,0	51,0	63	22	4	0,740
61,5	53,0	63	22	4	0,840
62,0	53,0	63	22	4	0,840
63,5	53,0	71	27	4	0,900
64,0	53,0	71	27	4	0,900
64,5	54,0	71	27	4	0,940
65,0	54,0	71	27	4	0,940
67,5	57,0	71	27	4	1,020
68,0	57,0	71	27	4	1,020
69,5	59,0	71	27	4	1,100
70,0	59,0	71	27	4	1,100
71,5	61,0	71	27	4	1,140
72,0	61,0	71	27	4	1,140
73,5	63,0	71	27	4	1,300
74,0	63,0	71	27	4	1,300
74,5	64,0	71	27	4	1,430
75,0	64,0	71	27	4	1,430
77,5	65,0	80	32	6	1,600
78,0	65,0	80	32	6	1,600
79,5	67,0	80	32	6	1,720
80,0	67,0	80	32	6	1,720
81,5	69,0	80	32	6	1,840
82,0	69,0	80	32	6	1,840
84,5	72,0	80	32	6	2,000
85,0	72,0	80	32	6	2,000
87,5	75,0	80	32	6	2,180
88,0	75,0	80	32	6	2,180
89,5	77,0	80	32	6	2,320
90,0	77,0	80	32	6	2,320
91,5	77,0	90	40	6	2,500
92,0	77,0	90	40	6	2,500

Order details:

704-xx.xx

xx.xx = nom.-Ø

Shell coredrill

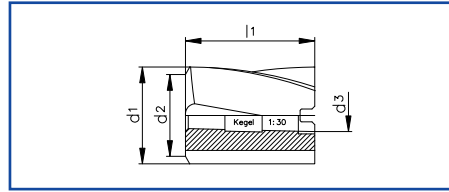
Catalog No. 704

DIN 222

continuation

HSS

righthand cutting
with taper-hole 1:30 and transverse slot DIN 138
righthand spiral fluted



nom.-Ø h8	smallest Ø of the chamfer	total- length	taper hole Ø	number of teeth	weight each pc.
d_1 mm	d_2 mm	l_1 mm	d_3 mm	z	ca. kg
94,5	80,0	90	40	6	2,720
95,0	80,0	90	40	6	2,720
97,5	83,0	90	40	6	2,950
98,0	83,0	90	40	6	2,950
99,5	85,0	90	40	6	3,300
100,0	85,0	90	40	6	3,300

Matching holders can be found on page 38

Order details:

704-xx.xx

xx.xx = nom.-Ø

Shell coredrill

DIN 8022

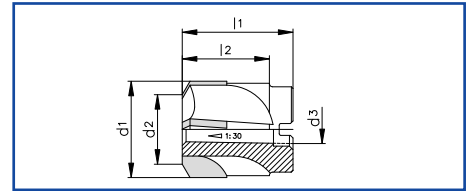
Catalog-No. 608

Carbide-tipped (brazed) K10

righthand cutting

with taper-hole 1:30 and transverse slot DIN 138

righthand spiral fluted



nom.-Ø h8	smallest Ø of the chamfer	flute- length	total- length	taper hole Ø	number of teeth	weight each pc.
d ₁ mm	d ₂ mm	l ₂ mm	l ₁ mm	d ₃ mm	z	ca. kg
30,0	22,0	36	45	13	4	0,110
31,0	23,0	36	45	13	4	0,120
32,0	24,0	36	45	13	4	0,130
33,0	25,0	36	45	13	4	0,140
34,0	26,0	36	45	13	4	0,150
35,0	27,0	36	45	13	4	0,170
36,0	28,0	40	50	16	4	0,180
37,0	29,0	40	50	16	4	0,190
38,0	30,0	40	50	16	4	0,200
40,0	32,0	40	50	16	4	0,220
42,0	34,0	40	50	16	4	0,240
44,0	36,0	40	50	16	4	0,270
45,0	37,0	40	50	16	4	0,280
46,0	36,0	45	56	19	4	0,290
47,0	37,0	45	56	19	4	0,300
48,0	38,0	45	56	19	4	0,320
50,0	40,0	45	56	19	4	0,360
52,0	42,0	45	56	19	4	0,420
54,0	38,0	50	63	22	4	0,520
55,0	39,0	50	63	22	4	0,530
58,0	42,0	50	63	22	4	0,620
60,0	44,0	50	63	22	4	0,680
62,0	46,0	50	63	22	4	0,750
65,0	49,0	56	71	27	4	0,950
68,0	52,0	56	71	27	4	1,050
70,0	54,0	56	71	27	4	1,200
72,0	56,0	56	71	27	4	1,400
75,0	59,0	56	71	27	4	1,500

Matching holders can be found on page 38

Order details:

608-xx.xx

xx.xx = nom.-Ø

Countersinker 90°

DIN 335

Catalog No. 760

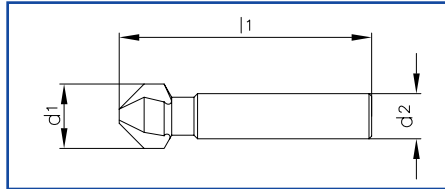
HSS

form C

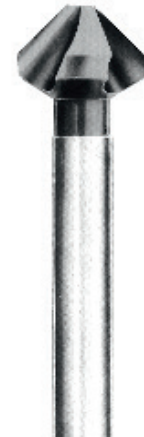
with 3 flutes

righthand cutting

straight shank



nom.-Ø	reverse Ø	total-length	shank-Ø h9	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	d ₂ mm	ca. kg
4,3	1,3	40	4	0,004
5,0	1,5	40	4	0,005
5,3	1,5	40	4	0,005
5,8	1,5	45	5	0,006
6,0	1,5	45	5	0,007
6,3	1,5	45	5	0,007
7,0	1,8	50	6	0,010
7,3	1,8	50	6	0,011
8,0	2,0	50	6	0,011
8,3	2,0	50	6	0,011
9,4	2,2	50	6	0,012
10,0	2,5	50	6	0,012
10,4	2,5	50	6	0,012
11,5	2,8	56	8	0,022
12,4	2,8	56	8	0,022
13,4	2,9	56	8	0,023
15,0	3,2	60	10	0,036
16,5	3,2	60	10	0,038
19,0	3,5	63	10	0,041
20,5	3,5	63	10	0,044
20,5*	3,5	63	8	0,038
23,0	3,8	67	10	0,050
25,0	3,8	67	10	0,055
25,0*	3,8	67	8	0,051
26,0	3,8	67	10	0,055
28,0	4,0	71	12	0,075
30,0	4,2	71	12	0,085
31,0	4,2	71	12	0,085
40,0*	10,0	75	12	0,110



Order details:

760-xx.xx-C

xx.xx = nom.-Ø

* FROMM Standard

Countersinker 90°

DIN 335

Catalog No. 765

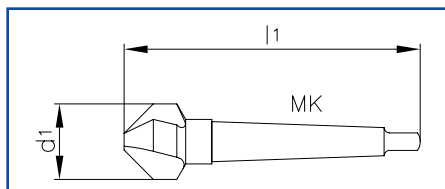
HSS

form D

with 3 flutes

righthand cutting

morse taper (MT) shank



nom.-Ø	reverse Ø	total-length	MT-shank	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	MT	ca. kg
16,5	3,2	85	1	0,060
20,5	3,5	100	2	0,145
25,0	3,8	106	2	0,165
30,0	4,2	112	2	0,185
31,0	4,2	112	2	0,190
34,0	4,5	118	2	0,220
37,0	4,8	118	2	0,230
40,0	10,0	140	3	0,440
50,0	14,0	150	3	0,520
63,0	16,0	180	4	1,015
80,0	22,0	190	4	1,425
100,0*	28,0	200	4	2,660



Order details:

765-xx.xx-D

xx.xx = nom.-Ø

* FROMM Standard

Countersinker 90°

DIN 335

Catalog No. 776

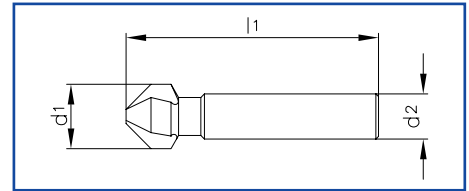
HSS + TiN

form C

with 3 flutes

righthand cutting

straight shank



nom.-Ø	reverse Ø	total-length	shank-Ø h9	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	d ₂ mm	ca. kg
4,3	1,3	40	4	0,004
5,0	1,5	40	4	0,005
5,3	1,5	40	4	0,005
5,8	1,5	45	5	0,006
6,0	1,5	45	5	0,007
6,3	1,5	45	5	0,007
7,0	1,8	50	6	0,010
7,3	1,8	50	6	0,011
8,0	2,0	50	6	0,011
8,3	2,0	50	6	0,011
9,4	2,2	50	6	0,012
10,0	2,5	50	6	0,012
10,4	2,5	50	6	0,012
11,5	2,8	56	8	0,022
12,4	2,8	56	8	0,022
13,4	2,9	56	8	0,023
15,0	3,2	60	10	0,036
16,5	3,2	60	10	0,038
19,0	3,5	63	10	0,041
20,5	3,5	63	10	0,044
23,0	3,8	67	10	0,050
25,0	3,8	67	10	0,055
26,0	3,8	67	10	0,055
28,0	4,0	71	12	0,075
31,0	4,2	71	12	0,085
40,0*	10,0	75	12	0,110

Order details:

776-xx.xx-C

xx.xx = nom.-Ø

* FROMM Standard

Countersinker 90°

DIN 335

Catalog No. 777

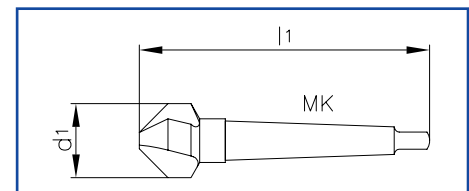
HSS + TiN

form D

with 3 flutes

righthand cutting

morse taper (MT) shank



nom.-Ø	reverse Ø	total-length	MT-shank	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	MT	ca. kg
30,0	4,2	112	2	0,185
31,0	4,2	112	2	0,190
34,0	4,5	112	2	0,190
37,0	4,8	118	2	0,230
40,0	10,0	140	3	0,440
50,0	14,0	150	3	0,520

Order details:

777-xx.xx-D

xx.xx = nom.-Ø

Countersinker-set 90°

Catalog No. 760/1 in box

DIN 335

HSS

form C

with 3 flutes

righthand cutting

straight shank



contains following Ø		contains following Ø		for screw
set 6.0 - 19.0	set 6.0 - 25.0	set 6.3 - 20.5	set 6.3 - 25.0	
nom.-Ø d ₁ mm	nom.-Ø d ₁ mm	nom.-Ø d ₁ mm	nom.-Ø d ₁ mm	M
6,0	6,0	6,3	6,3	M 3
8,0	8,0	8,3	8,3	M 4
10,0	10,0	10,4	10,4	M 5
11,5	11,5	12,4	12,4	M 6
15,0	15,0	16,5	16,5	M 8
19,0	19,0	20,5	20,5	M10
	25,0		25,0	

Order details:

760/1-x.x - xx.x

x= Ø-range

Countersinker-set 90°

Catalog No. 760/2 in box

DIN 335

HSS + TiN

form C

with 3 flutes

righthand cutting

straight shank



contains following Ø		contains following Ø		for screw
set 6.0 - 19.0	set 6.0 - 25.0	set 6.3 - 20.5	set 6.3 - 25.0	
				M
6,0	6,0	6,3	6,3	M 3
8,0	8,0	8,3	8,3	M 4
10,0	10,0	10,4	10,4	M 5
11,5	11,5	12,4	12,4	M 6
15,0	15,0	16,5	16,5	M 8
19,0	19,0	20,5	20,5	M10
	25,0		25,0	

Order details:

760/2-x.x - xx.x

x= Ø-range

Countersinker-set 90°

Catalog No. 760/3 in wooden block

DIN 335

HSS

form C

with 3 flutes

righthand cutting

straight shank



Typ 1 contains 10 countersinkers										
Ø d ₁ mm	6,3	7,3	8,3	9,4	10,4	12,4	13,4	16,5	20,5	25,0
Typ 2 contains 9 countersinkers										
Ø d ₁ mm	5,0	6,0	7,0	8,0	10,0	11,5	15,0	19,0	23,0	

Order details:

760/3-x

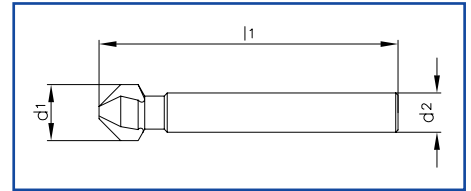
x = Typ

Countersinker 90° overlong

sim. DIN 335

Catalog No. 795

HSS
form C
with 3 flutes
righthand cutting
straight shank **100mm** long



nom.-Ø	reverse Ø	total-length	shank-Ø h9	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	d ₂ mm	ca. kg
5,8	1,5	104	5	0,013
6,3	1,5	104	5	0,015
8,3	2,0	105	6	0,023
9,4	2,2	106	6	0,025
10,4	2,5	107	6	0,025
11,5	2,8	108	6	0,026
12,4	2,8	108	8	0,045
15,0	3,2	109	10	0,062
16,5	3,2	111	10	0,066
20,5	3,5	114	10	0,076
25,0	3,8	118	10	0,095
31,0	4,2	140	12	0,161

Order details:

795-xx.xx xx.xx = nom.-Ø



Countersinker-set 90° overlong

sim. DIN 335

Catalog No. 797

HSS
form C
with 3 flutes
righthand cutting
straight shank **100mm** long

set in box



contains 6 countersinkers		weight each set (kg)
1 pc.	Ø 6,3 mm	0,585
1 pc.	Ø 8,3 mm	
1 pc.	Ø 10,4 mm	
1 pc.	Ø 12,4 mm	
1 pc.	Ø 16,5 mm	
1 pc.	Ø 20,5 mm	

Order details:

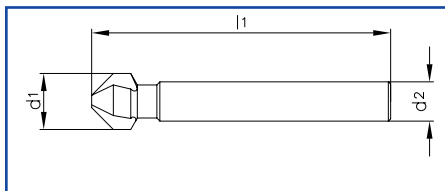
797-100

Countersinker 90° overlong

sim. DIN 335

Catalog No. 796

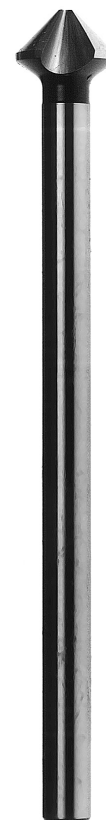
HSS
form C
with 3 flutes
righthand cutting
straight shank **150mm** long



nom.-Ø	reverse Ø	total-length	shank-Ø h9	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	d ₂ mm	ca. kg
6,3	1,5	154	5	0,022
8,3	2,0	155	6	0,034
10,4	2,5	157	6	0,036
12,4	2,8	158	8	0,065
15,0	3,2	159	10	0,088
16,5	3,2	161	10	0,093
20,5	3,5	164	10	0,107
25,0	3,8	168	10	0,135
31,0	4,2	190	12	0,210

Order details:

796-xx.xx xx.xx = nom.-Ø



Countersinker-set 90° overlong

sim. DIN 335

Catalog No. 797

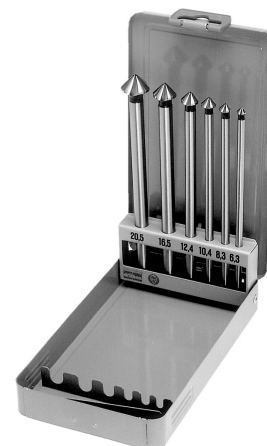
HSS
form C
with 3 flutes
righthand cutting
straight shank **150mm** long

set in box

contains 6 countersinkers		weight each set (kg)
1 pc.	Ø 6,3 mm	0,750
1 pc.	Ø 8,3 mm	
1 pc.	Ø 10,4 mm	
1 pc.	Ø 12,4 mm	
1 pc.	Ø 16,5 mm	
1 pc.	Ø 20,5 mm	

Order details:

797-150



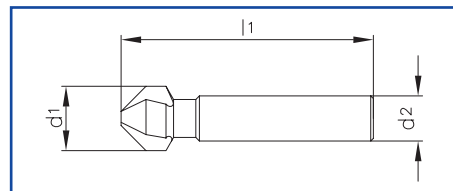
NEW

Countersinker 90°

Catalog No. 764

sim. DIN 335

HSS/E
 form C
 with 3 flutes, unequal spacing
 righthand cutting
 straight shank



nom.-Ø	reverse Ø	total- length	shank- Ø h9	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	d ₂ mm	ca. kg
6,0	1,5	45	5	0,007
6,3	1,5	45	5	0,007
8,0	2,0	50	6	0,011
8,3	2,0	50	6	0,011
10,0	2,5	50	6	0,012
10,4	2,5	50	6	0,013
11,5	2,8	56	8	0,022
12,4	2,8	56	8	0,022
15,0	3,2	60	10	0,036
16,5	3,2	60	10	0,038
19,0	3,5	63	10	0,041
20,5	3,5	63	10	0,044
25,0	3,8	67	10	0,055
31,0	4,2	71	12	0,085
40,0*	10,0	75	12	0,110

* FROMM Standard

Order details:

764-xx.xx-C

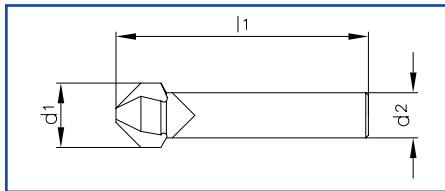
xx.xx = nom.-Ø

Countersinker 90°

sim. DIN 335

Catalog No. 778

Carbide
 form C
 with 3 flutes
 righthand cutting
 straight shank



nom.-Ø	reverse Ø	total-length	shank-Ø h9	carbide details	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	d ₂ mm		ca. kg
6,0	2,0	40	5	solid carbide (monobloc)	0,010
6,3	2,0	40	5	solid carbide (monobloc)	0,010
8,0	2,0	45	6	solid carbide (monobloc)	0,012
8,3	2,0	45	6	solid carbide (monobloc)	0,015
10,0	2,5	46	8	carbide head + steel shank	0,020
10,4	2,5	46	8	carbide head + steel shank	0,020
11,5	2,8	56	8	carbide head + steel shank	0,025
12,4	2,8	56	8	carbide head + steel shank	0,026
15,0	3,2	60	10	carbide head + steel shank	0,042
16,5	3,2	60	10	carbide head + steel shank	0,045
20,5	3,5	63	10	carbide head + steel shank	0,054
25,0	3,8	67	10	carbide head + steel shank	0,072
31,0	4,2	71	12	carbide head + steel shank	0,134



Order details:

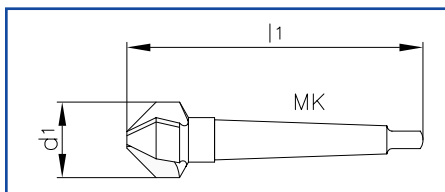
778-xx.xx-C xx.xx = nom.-Ø

Countersinker 90°

sim. DIN 335

Catalog No. 756

Carbide
 form D
 with 3 flutes
 righthand cutting
 morse taper (MT) shank



nom.-Ø	reverse Ø	total-length	MT-shank	carbide details	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	MT		ca. kg
25,0	9,0	103	2	carbide-tipped (brazed)	0,165
31,0	10,0	108	2	carbide-tipped (brazed)	0,200
40,0	14,0	137	3	carbide-tipped (brazed)	0,440
50,0	18,0	147	3	carbide-tipped (brazed)	0,570



Order details:

756-xx.xx-D xx.xx = nom.-Ø

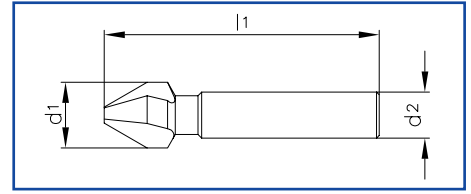


Countersinker 60°

DIN 334

Catalog No. 762

HSS
form C
with 3 flutes
righthand cutting
straight shank



nom.-Ø	reverse Ø	total-length	shank-Ø h9	weight each pc.
d_1 mm	d_3 mm	l_1 mm	d_2 mm	ca. kg
6,3	1,6	45	5	0,007
8,0	2,0	50	6	0,010
10,0	2,5	50	6	0,023
12,5	3,2	56	8	0,033
16,0	4,0	63	10	0,040
20,0	5,0	67	10	0,047
25,0	6,3	71	10	0,060
30,0*	10,0	75	12	0,100

* FROMM Standard

Order details:

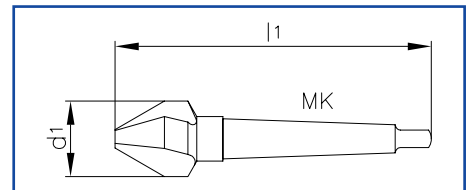
762-xx.xx-C xx.xx = nom.-Ø

Countersinker 60°

DIN 334

Catalog No. 763

HSS
form D
with 3 flutes
righthand cutting
morse taper (MT) shank



nom.-Ø	reverse Ø	total-length	MT-shank	weight each pc.
d_1 mm	d_3 mm	l_1 mm	MT	ca. kg
25,0	6,3	112	2	0,180
31,5	10,0	118	2	0,210
40,0	12,5	150	3	0,462
50,0	16,0	160	3	0,585
63,0	20,0	190	4	1,114
80,0	25,0	200	4	1,600

* FROMM Standard

Order details:

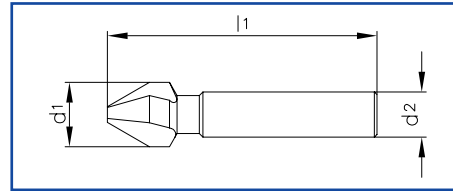
763-xx.xx-D xx.xx = nom.-Ø

Countersinker 60°

Catalog No. 770

ähnl. DIN 334

HSS + TiN
form C
with 3 flutes
righthand cutting
straight shank



nom.-Ø	reverse Ø	total-length	shank-Ø h9	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	d ₂ mm	ca. kg
6,3	1,6	45	5,0	0,007
8,0	2,0	50	6,0	0,010
10,0	2,5	50	6,0	0,023
12,5	3,2	56	8,0	0,033
16,0	4,0	63	10,0	0,040
20,0	5,0	67	10,0	0,047
25,0	6,3	71	10,0	0,060



Order details:

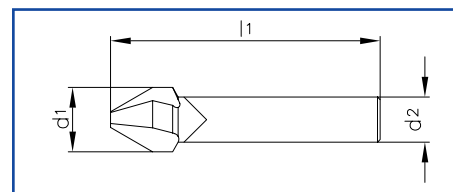
770-xx.xx-C xx.xx = nom.-Ø

Countersinker 60°

Catalog No. 771

sim. DIN 334

Carbide
form C
with 3 flutes
righthand cutting
straight shank



nom.-Ø	reverse Ø	total-length	shank-Ø h9	carbide details	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	d ₂ mm		ca. kg
8,0	2,0	50	6,0	solid carbide (monobloc)	0,019
10,0	2,5	50	8,0	carbide head + steel shank	0,025
12,5	3,2	56	8,0	carbide head + steel shank	0,029
16,0	4,0	63	10,0	carbide head + steel shank	0,040
20,0	5,0	67	10,0	carbide head + steel shank	0,065
25,0	6,3	71	10,0	carbide head + steel shank	0,082



Order details:

771-xx.xx-C xx.xx = nom.-Ø

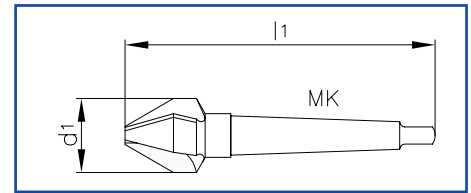


Countersinker 60°

sim. DIN 334

Catalog No. 755

Carbide
form D
with 3 flutes
righthand cutting
morse taper (MT) shank



nom.-Ø	reverse Ø	total-length	MT-shank	carbide details	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	MT		ca. kg
31,5	10,0	116	2	carbide-tipped (brazed)	0,210
40,0	14,0	147	3	carbide-tipped (brazed)	0,485

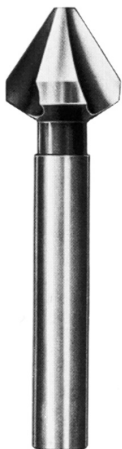
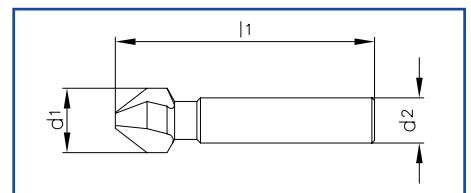
Order details:

755-xx.xx-D xx.xx = nom.-Ø

Countersinker 75°

Catalog No. 772

HSS
form A
with 3 flutes
righthand cutting
straight shank



nom.-Ø	reverse Ø	total-length	shank-Ø h9	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	d ₂ mm	ca. kg
8,0	2,0	50	6	0,011
10,4	2,5	51	6	0,013
12,5	2,8	54	8	0,021
15,0	3,2	56	8	0,023
16,5	3,2	61	10	0,027
20,0	3,5	63	10	0,042
25,0	6,3	71	10	0,065

Order details:

772-xx.xx-A xx.xx = nom.-Ø

Countersinker 80°

Catalog No. 774

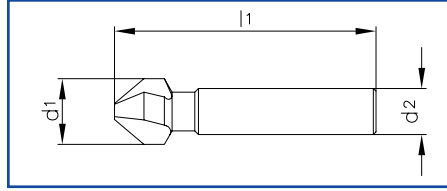
HSS

form C

with 3 flutes

righthand cutting

straight shank



nom.-Ø	reverse Ø	total-length	shank-Ø h9	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	d ₂ mm	ca. kg
6,0	1,5	45	5,0	0,007
8,0	2,0	50	6,0	0,011
10,0	2,5	50	6,0	0,012
13,4	2,9	56	8,0	0,022
16,5	3,2	60	10,0	0,038
20,5	3,5	63	10,0	0,044

Order details:

774-xx.xx-C

xx.xx = nom.-Ø

Countersinker 82°

Catalog No. 761

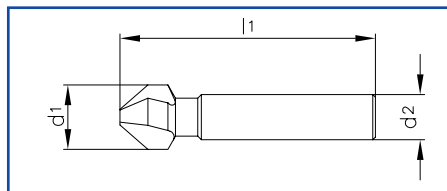
HSS

form C

with 3 flutes

righthand cutting

straight shank



nom.-Ø	reverse Ø	total-length	shank-Ø h9	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	d ₂ mm	ca. kg
6,3	1,5	45	5	0,007
8,3	2,0	50	6	0,011
10,4	2,5	50	6	0,012
12,4	2,8	56	8	0,022
16,5	3,2	60	10	0,038
20,5	3,5	63	10	0,044
25,0	3,8	67	10	0,055

Order details:

761-xx.xx-C

xx.xx = nom.-Ø

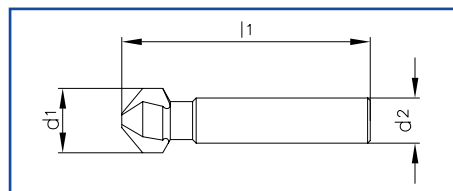


Countersinker 100°

Catalog No. 779



HSS
form C
with 3 flutes
righthand cutting
straight shank



nom.-Ø	reverse Ø	total-length	shank-Ø h9	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	d ₂ mm	ca. kg
6,3	1,5	44	5	0,009
8,0	2,0	49	6	0,011
10,4	2,5	49	6	0,012
12,4	2,8	55	8	0,022
16,5	3,2	59	10	0,037
20,5	3,5	62	10	0,043
25,0	3,8	65	10	0,060

Order details:

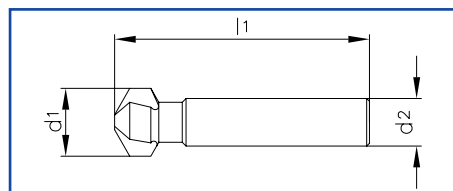
779-xx.xx-C
xx.xx = nom.-Ø

Countersinker 120°

Catalog No. 780



HSS
form C
with 3 flutes
righthand cutting
straight shank



nom.-Ø	reverse Ø	total-length	shank-Ø h9	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	d ₂ mm	ca. kg
6,3	1,5	49	5	0,009
8,0	2,0	49	6	0,010
12,5	2,8	54	8	0,022
14,4	2,0	57	8	0,029
16,0	3,2	57	10	0,035
20,0	3,5	59	10	0,040
25,0	3,8	63	10	0,049

Order details:

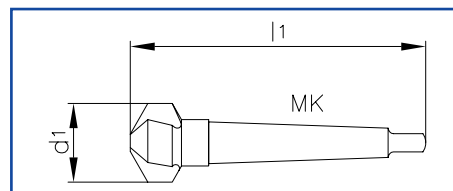
780-xx.xx-C
xx.xx = nom.-Ø

Countersinker 120°

Catalog No. 781



HSS
form D
with 3 flutes
righthand cutting
morse taper (MT) shank



nom.-Ø	reverse Ø	total-length	MT-shank	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	MT	ca. kg
25,0	3,8	102	2	0,160
31,5	4,2	107	2	0,180
40,0	10,0	134	3	0,420
50,0	14,0	143	3	0,490
63,0	16,0	170	4	0,970

Order details:

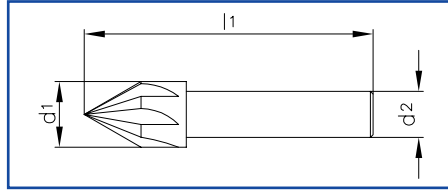
781-xx.xx-D
xx.xx = nom.-Ø

Countersinker 60°

DIN 334

Catalog No. 705

HSS
form A
righthand cutting
straight shank



nom.-Ø	reverse Ø	total-length	shank-Ø h9	number of teeth	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	d ₂ mm	unequal spacing	ca. kg
6,0*	1,0	50	6,0	3	0,009
8,0	1,5	50	8,0	5	0,017
10,0*	1,8	50	8,0	5	0,019
12,5	2,0	50	8,0	5	0,021
16,0	3,2	60	10,0	7	0,045
20,0	5,0	63	10,0	7	0,060
25,0*	7,0	75	12,0	9	0,120
31,5*	9,0	90	16,0	9	0,230

* FROMM Standard

Order details:

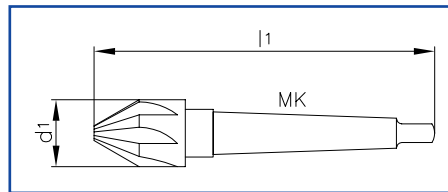
705-xx.xx-A xx.xx = nom.-Ø

Countersinker 60°

DIN 334

Catalog No. 706

HSS
form B
righthand cutting
morse taper (MT) shank



nom.-Ø	reverse Ø	total-length	MT-shank	number of teeth	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	MT	unequal spacing	ca. kg
25,0	7,0	125	2	9	0,230
31,5	9,0	132	2	9	0,300
40,0	12,0	160	3	11	0,615
50,0	16,0	170	3	13	0,840
63,0	20,0	200	4	15	1,550
80,0	25,0	215	4	17	2,480

Order details:

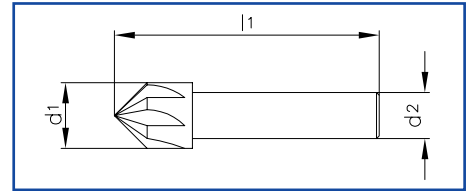
706-xx.xx-B xx.xx = nom.-Ø

Countersinker 90°

DIN 335

Catalog No. 707

HSS
form A
righthand cutting
straight shank



nom.-Ø	reverse Ø	total-length	shank-Ø h9	number of teeth	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	d ₂ mm	unequal spacing	ca. kg
6,0*	1,0	48	6,0	3	0,010
8,0	1,5	48	8,0	5	0,018
10,0*	1,8	48	8,0	5	0,019
12,5	2,0	48	8,0	5	0,022
16,0	3,2	56	10,0	7	0,044
20,0	5,0	60	10,0	7	0,060
25,0*	7,0	70	12,0	9	0,120
31,5*	9,0	80	16,0	9	0,210

* FROMM Standard

Order details:

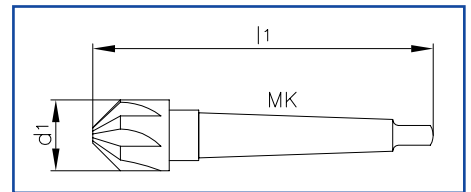
707-xx.xx-A xx.xx = nom.-Ø

Countersinker 90°

DIN 335

Catalog No. 708

HSS
form B
righthand cutting
morse taper (MT) shank



nom.-Ø	reverse Ø	total-length	MT-shank	number of teeth	weight each pc.
d ₁ mm	d ₃ mm	l ₁ mm	MT	unequal spacing	ca. kg
25,0	7,0	118	2	9	0,215
31,5	9,0	122	2	9	0,280
40,0	12,0	150	3	11	0,585
50,0	16,0	155	3	13	0,760
63,0	20,0	185	4	15	1,410
80,0	25,0	196	4	17	2,220

Order details:

708-xx.xx-B xx.xx = nom.-Ø

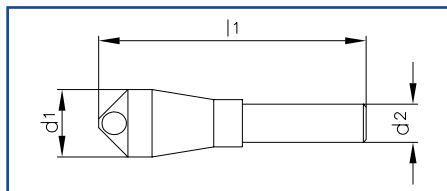
Countersinker + deburrer 90°

Catalog No. 768

HSS/E

form A

with inclined drill hole
straight shank



nom.-Ø	total-length	shank- Ø h9	for drill holes (deburring range)	weight each pc.
d_1 mm	l_1 mm	d_2 mm	mm	ca. kg
10,0	45	6	2 - 5	0,010
14,0	56	6	5 - 10	0,018
21,0	67	10	10 - 15	0,050
28,0	90	12	15 - 20	0,115
35,0	106	15	20 - 25	0,230

Order details:

768-xx.xx-A

xx.xx = nom.-Ø



Countersinker + deburrer 90°

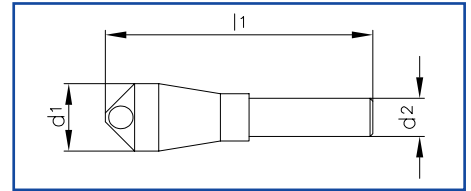
Catalog No. 784

HSS/E + TiN

form A

with inclined drill hole

straight shank



nom.-Ø	total-length	shank- Ø h9	for drill holes (deburring range)	weight each pc.
d_1 mm	l_1 mm	d_2 mm	mm	ca. kg
10,0	45	6	2 - 5	0,010
14,0	56	6	5 - 10	0,018
21,0	67	10	10 - 15	0,050
28,0	90	12	15 - 20	0,115
35,0	106	15	20 - 25	0,230

Order details:

784-xx.xx-A

xx.xx = nom.-Ø

Countersinker + deburrer 90°-set

Catalog No. 768/4

HSS/E

form A

with inclined drill hole

straight shank



set in box contains (4 pcs.)		
1 pc.	Ø 10 mm	for drill hole 2 - 5 mm
1 pc	Ø 14 mm	for drill holes 5 - 10 mm
1 pc	Ø 21 mm	for drill holes 10 - 15 mm
1 pc	Ø 28 mm	for drill holes 15 - 20 mm

Order details:

768/A

Countersinker + deburrer 90°

Catalog No. 786

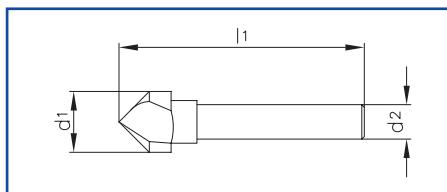
HSS/E

form A

with 1 flute

righthand cutting

straight shank



nom.-Ø	total-length	shank-Ø h9	for drill holes (deburring range)	weight each pc.
d ₁ mm	l ₁ mm	d ₂ mm	mm	ca. kg
5,0*	50	5	1 - 5	0,007
10,0*	60	10	1 - 10	0,033
15,0	65	10	2 - 15	0,040
20,0	73	10	2 - 20	0,060
25,0	80	10	2 - 25	0,070
30,0	82	12	3 - 30	0,100
40,0	92	12	3 - 40	0,210
50,0	100	12	3 - 50	0,320

* shank without neck



786-xx.xx-A

xx.xx = nom.-Ø

Hand deburrer 90°

Catalog No. 760/4

HSS

with plastic handle

with 3 flutes

righthand cutting

nom.-Ø	total-length	weight each pc.
d ₁ mm	ca. mm	ca. kg
12,4	129	0,074
16,5	146	0,102
20,5	149	0,110
25,0	152	0,120



Order details:

760/4-xx.xx

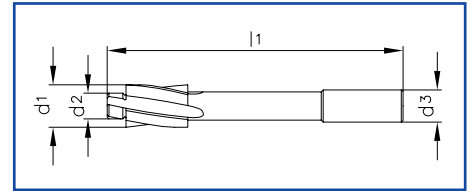
xx.xx = nom.-Ø

Counterbore

Catalog No. 730/731/732

DIN 373

HSS
with fix pilot
 righthand cutting, righthand spiral
 straight shank



For sinkings according to DIN 74, part 2, form H, J, K

Grade fine - for through hole

Cat.-No. 730

for thread	sinker- Ø	pilot- Ø e8	shank- Ø h9	total- length	weight each pc.
M	d ₁ mm	d ₂ mm	d ₃ mm	l ₁ mm	ca. kg
M2	4,3	2,2	4,3	56	0,005
M3	6,0	3,2	5,0	71	0,009
M4	8,0	4,3	5,0	71	0,012
M5	10,0	5,3	8,0	80	0,027
M6	11,0	6,4	8,0	80	0,029
M8	15,0	8,4	12,5	100	0,075
M10	18,0	10,5	12,5	100	0,085
M12	20,0	13,0	12,5	100	0,100

Grade medium - for through hole

Cat.-No. 731

for thread	sinker- Ø	pilot- Ø e8	shank- Ø h9	total- length	weight each pc.
M	d ₁ mm	d ₂ mm	d ₃ mm	l ₁ mm	ca. kg
M2	4,3	2,4	4,3	56	0,005
M3	6,0	3,4	5,0	71	0,009
M4	8,0	4,5	5,0	71	0,012
M5	10,0	5,5	8,0	80	0,027
M6	11,0	6,6	8,0	80	0,029
M8	15,0	9,0	12,5	100	0,075
M10	18,0	11,0	12,5	100	0,085
M12	20,0	13,5	12,5	100	0,100

For core hole

Cat.-No. 732

for thread	sinker- Ø	pilot- Ø e8	shank- Ø h9	total- length	weight each pc.
M	d ₁ mm	d ₂ mm	d ₃ mm	l ₁ mm	ca. kg
M2	4,3	1,6	4,3	56	0,005
M3	6,0	2,5	5,0	71	0,009
M4	8,0	3,3	5,0	71	0,012
M5	10,0	4,2	8,0	80	0,027
M6	11,0	5,0	8,0	80	0,029
M8	15,0	6,8	12,5	100	0,075
M10	18,0	8,5	12,5	100	0,085



Order details:

730/731/732-Mx.x x=thread

Counterbore

DIN 373

Catalog No. 711/712/713

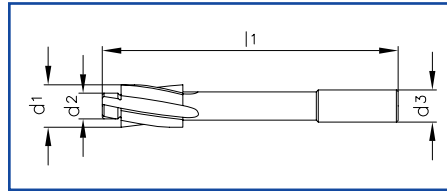
HSS/E

with fix pilot

righthand cutting, righthand spiral

straight shank

For sinkings according to DIN 74, part 2, form H, J, K



Grade fine - for through hole

Cat.-No. 711

for thread	sinker- Ø	pilot- Ø e8	shank- Ø h9	total- length	weight each pc.
M	d_1 mm	d_2 mm	d_3 mm	l_1 mm	ca. kg
M3 (6,0)	6,0	3,2	5,0	71	0,009
M3 (6,5)	6,5	3,2	5,0	71	0,009
M4	8,0	4,3	5,0	71	0,012
M5	10,0	5,3	8,0	80	0,027
M6	11,0	6,4	8,0	80	0,029
M8	15,0	8,4	12,5	100	0,075
M10	18,0	10,5	12,5	100	0,085
M12	20,0	13,0	12,5	100	0,100

Grade medium - for through hole

Cat.-No. 712

for thread	sinker- Ø	pilot- Ø e8	shank- Ø h9	total- length	weight each pc.
M	d_1 mm	d_2 mm	d_3 mm	l_1 mm	ca. kg
M3 (6,0)	6,0	3,4	5,0	71	0,009
M3 (6,5)	6,5	3,4	5,0	71	0,009
M4	8,0	4,5	5,0	71	0,012
M5	10,0	5,5	8,0	80	0,027
M6	11,0	6,6	8,0	80	0,029
M8	15,0	9,0	12,5	100	0,075
M10	18,0	11,0	12,5	100	0,085
M12	20,0	13,5	12,5	100	0,100

For core hole

Cat.-No. 713

for thread	sinker- Ø	pilot- Ø e8	shank- Ø h9	total- length	weight each pc.
M	d_1 mm	d_2 mm	d_3 mm	l_1 mm	ca. kg
M3 (6,0)	6,0	2,5	5,0	71	0,009
M3 (6,5)	6,5	2,5	5,0	71	0,009
M4	8,0	3,3	5,0	71	0,012
M5	10,0	4,2	8,0	80	0,027
M6	11,0	5,0	8,0	80	0,029
M8	15,0	6,8	12,5	100	0,075
M10	18,0	8,5	12,5	100	0,085
M12	20,0	10,2	12,5	100	0,100



F

Order details:

711/712/713-Mx.x x = thread

Counterbore

Catalog No. 730/731/732

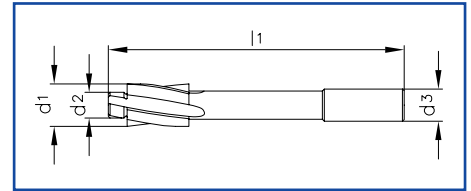
DIN 373

HSS/E+TiN

with fix pilot

righthand cutting, righthand spiral
straight shank

For sinkings according to DIN 74, part 2, form H, J, K



Grade fine - for through hole

Cat.-No. 714

for thread	sinker- Ø	pilot- Ø e8	shank- Ø h9	total- length	weight each pc.
M	d ₁ mm	d ₂ mm	d ₃ mm	l ₁ mm	ca. kg
M3 (6,0)	6,0	3,2	5,0	71	0,009
M3 (6,5)	6,5	3,2	5,0	71	0,009
M4	8,0	4,3	5,0	71	0,012
M5	10,0	5,3	8,0	80	0,027
M6	11,0	6,4	8,0	80	0,029
M8	15,0	8,4	12,5	100	0,075
M10	18,0	10,5	12,5	100	0,085
M12	20,0	13,0	12,5	100	0,100



Grade medium - for through hole

Cat.-No. 715

for thread	sinker- Ø	pilot- Ø e8	shank- Ø h9	total- length	weight each pc.
M	d ₁ mm	d ₂ mm	d ₃ mm	l ₁ mm	ca. kg
M3 (6,0)	6,0	3,4	5,0	71	0,009
M3 (6,5)	6,5	3,4	5,0	71	0,009
M4	8,0	4,5	5,0	71	0,012
M5	10,0	5,5	8,0	80	0,027
M6	11,0	6,6	8,0	80	0,029
M8	15,0	9,0	12,5	100	0,075
M10	18,0	11,0	12,5	100	0,085
M12	20,0	13,5	12,5	100	0,100

Order details:

714/715-Mx.x

x = thread



Counterbore-set

DIN 373

Catalog No.

HSS (730/1 - 730/2 - 730/3)

HSS/E (711/1 - 712/1 - 713/1)

HSS/E+TiN (714/1 - 715/1)

with fix pilot

righthand cutting, righthand spiral

straight shank

For sinkings according to DIN 74, part 2, form H, J, K

HSS

set in box for grade through hole fine 730/1			set in box for grade through hole medium 730/2			set in box for core hole 730/3		
M	sinker-Ø	pilot-Ø e8	M	sinker-Ø	pilot-Ø e8	M	sinker-Ø	pilot-Ø e8
M3	6,0	3,2	M3	6,0	3,4	M3	6,0	2,5
M4	8,0	4,3	M4	8,0	4,5	M4	8,0	3,3
M5	10,0	5,3	M5	10,0	5,5	M5	10,0	4,2
M6	11,0	6,4	M6	11,0	6,6	M6	11,0	5,0
M8	15,0	8,4	M8	15,0	9,0	M8	15,0	6,8
M10	18,0	10,5	M10	18,0	11,0	M10	18,0	8,5



HSS/E

set in box for grade through hole fine 711/1			set in box for grade through hole medium 712/1			set in box for core hole 712/1		
M	sinker-Ø	pilot-Ø e8	M	sinker-Ø	pilot-Ø e8	M	sinker-Ø	pilot-Ø e8
M3	6,0	3,2	M3	6,0	3,4	M3	6,0	2,5
M4	8,0	4,3	M4	8,0	4,5	M4	8,0	3,3
M5	10,0	5,3	M5	10,0	5,5	M5	10,0	4,2
M6	11,0	6,4	M6	11,0	6,6	M6	11,0	5,0
M8	15,0	8,4	M8	15,0	9,0	M8	15,0	6,8
M10	18,0	10,5	M10	18,0	11,0	M10	18,0	8,5



HSS/E + TiN

set in box for grade through hole fine 714/1			set in box for grade through hole medium 715/1		
M	sinker-Ø	pilot-Ø e8	M	sinker-Ø	pilot-Ø e8
M3	6,0	3,2	M3	6,0	3,4
M4	8,0	4,3	M4	8,0	4,5
M5	10,0	5,3	M5	10,0	5,5
M6	11,0	6,4	M6	11,0	6,6
M8	15,0	8,4	M8	15,0	9,0
M10	18,0	10,5	M10	18,0	11,0



Order details:

730/1 – 730/2 – 730/3 for HSS

711/1 – 712/1 – 713/1 for HSS/E

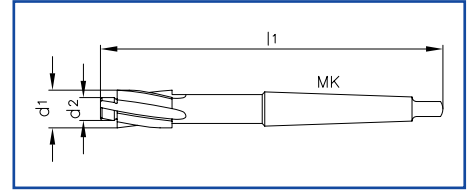
714/1 – 715/1 for HSS/E + TiN

Counterbore

Catalog No. 735/736

HSS
with fix pilot
 righthand cutting, righthand spiral
 morse taper (MT) shank

For sinkings according to DIN 74, part 2, form H, J, K



Grade fine - for through hole

Cat.-No. 735

for thread	sinker- Ø	pilot- Ø e8	MT- shank	total- length	weight each pc.
M	d ₁ mm	d ₂ mm	MT	l ₁ mm	ca. kg
M10	18,0	10,5	2	150	0,200
M12	20,0	13,0	2	150	0,215
M14	24,0	15,0	2	160	0,260
M16	26,0	17,0	3	190	0,480
M18	30,0	19,0	3	190	0,520
M20	33,0	21,0	3	190	0,545
M22	36,0	23,0	3	205	0,730
M24	40,0	25,0	3	205	0,810

Grade medium - for through hole

Cat.-No. 736

for thread	sinker- Ø	pilot- Ø e8	MT- shank	total- length	weight each pc.
M	d ₁ mm	d ₂ mm	MT	l ₁ mm	ca. kg
M10	18,0	11,0	2	150	0,200
M12	20,0	13,5	2	150	0,215
M14	24,0	15,5	2	160	0,260
M16	26,0	17,5	3	190	0,480
M18	30,0	20,0	3	190	0,520
M20	33,0	22,0	3	190	0,545
M22	36,0	24,0	3	205	0,730
M24	40,0	26,0	3	205	0,810



Order details:

735/736-Mxx-MK

x = thread

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1. Technical information about reamers

Extract from DIN 1420

Fundamental principles for fixing tolerance limits for the manufacture of reamers

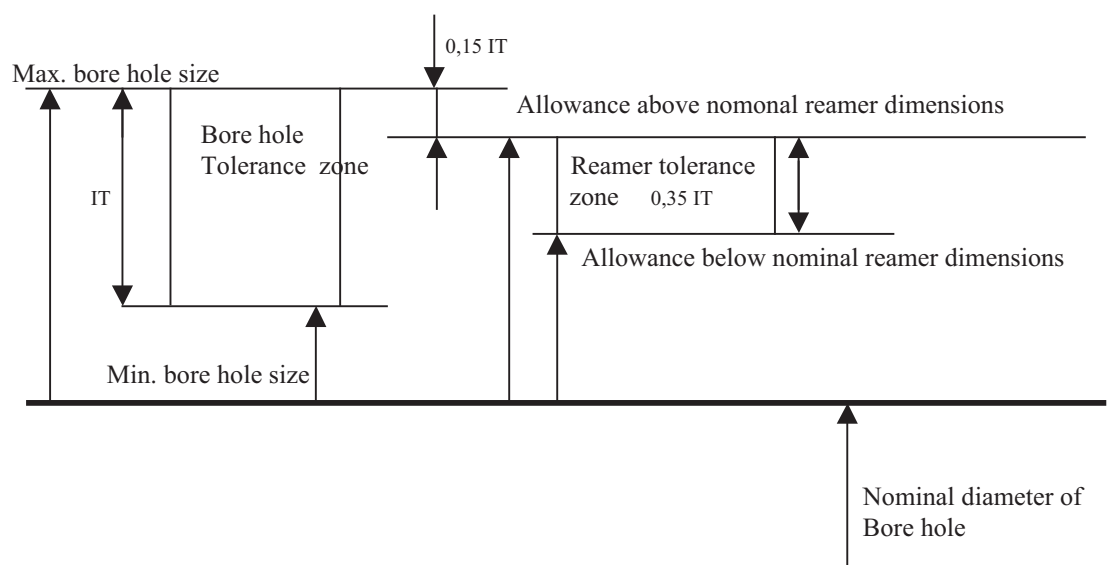
The manufacturing tolerance limits mentioned in this norm are based on the tolerance zones of the bore holes to be reamed (nominal tolerance zone). They ensure that the reamed bore hole lies within the given tolerance zone and, at the same time, that the reamer is used economically. Apart from the manufacturing tolerance, the size of the bore hole reamed is also influenced by other factors: e.g. effective cutting angle, lead angle, how the work piece has been clamped, the seat of the work piece, condition of the machine tool, material, cooling lubricant, etc.

Fixing minimum and maximum reamer dimensions

The maximum permitted diameter d_{max} of a reamer lies at 15% of the corresponding bore hole tolerance below the maximum permitted bore hole size (see diagram). The minimum permitted diameter d_{min} of the reamer lies at 35% of the corresponding bore hole tolerance below the maximum permitted diameter of the reamer d_{max} . The reamer itself is inscribed with the nominal diameter and tolerance zone of the bore hole.

Fixing minimum and maximum reamer dimensions

In special cases where reamers are ordered which have dimensions deviating from the minimum or maximum norm, the allowance above/ below the nominal size must be given in μm where the specification of the ISO abbreviation would normally be written. For example, with a reamer having a nominal diameter of 15mm, an upper allowance of $+30\mu\text{m}$ and a lower allowance of $+26\mu\text{m}$, the inscription reads 15p30p26. In the case of minus tolerance zones, the letter 'm' then replaces the letter 'p'.



List of tolerances

For 1/100-machine reamers according DIN 212



Fromm
Präzision
GmbH

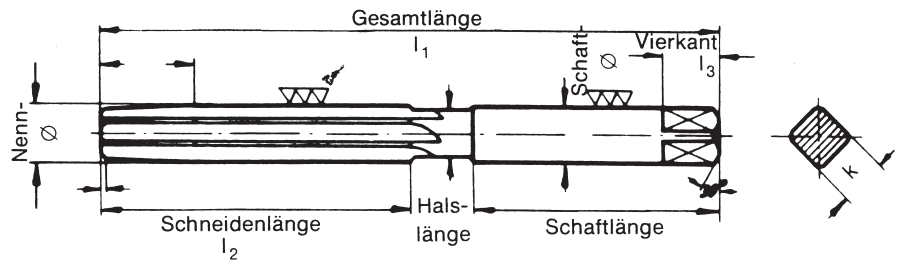
hole- \varnothing in mm	C8	C9	C10	C11	CD7	D7	D8	D9	D10	D11	D12	E7	E8	E9	EF8	F7	F8	F9	F10	G6	G7	H5	H6	H7	H8	H9	H10	H11	H12	H13	J6	J7	J8	JS7	JS8	JS9	K6	K7	K8			
1.0	1.07	1.07	1.08	1.10	1.04	1.02	1.03	-	1.04	1.06	1.08	1.02	1.02	1.03	1.02	1.01	1.01	1.02	-	-	1.01	1.00	1.00	-	1.01	-	1.02	1.04	1.06	1.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	-	0.99		
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	-	-	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	2.00	2.00	-	-	1.99	
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	-	-	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	3.00	3.00	-	-	2.99	
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	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	4.00	4.00	4.00	-	-	4.00
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	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	5.00	5.00	5.00	-	-	5.00
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	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	6.00	6.00	6.00	-	-	6.00
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	-	7.05	7.01	7.01	7.00	7.00	-	7.01	7.02	7.04	7.06	7.10	-	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	-	-	7.00	
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	-	8.05	8.01	8.01	8.00	8.00	-	8.01	8.02	8.04	8.06	8.10	-	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	-	-	8.00	
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	-	9.05	9.01	9.01	9.00	9.00	-	9.01	9.02	9.04	9.06	9.10	-	9.00	9.00	9.00	9.00	9.00	9.00	9.00	-	-	9.00		
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	-	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	10.00	-	-	10.00		
11.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
hole- \varnothing in mm	M6	M7	M8	N6	N7	N8	P6	P7	P8	R6	R7	S6	S7	U6	U7	X7	X8	X9	Z7	Z8	Z9	Z10	ZA8	ZA9	ZB8	ZB9																
1.0	-	-	0.99	0.99	0.99	0.99	0.99	0.99	0.99	-	-	0.98	0.98	0.98	0.98	-	0.97	0.97	0.97	0.97	-	0.96	0.96	-	-	0.95	0.95															
2.0	-	-	1.99	1.99	1.99	1.99	1.99	1.99	1.99	-	-	1.98	1.98	1.98	1.98	-	1.97	1.97	1.97	1.97	-	1.96	1.96	-	-	1.95	1.95															
3.0	-	-	2.99	2.99	2.99	2.99	2.99	2.99	2.99	-	-	2.98	2.98	2.98	2.98	-	2.97	2.97	2.97	2.97	-	2.96	2.96	-	-	2.95	2.95															
4.0	3.99	-	3.99	3.99	3.99	3.99	-	-	3.98	-	-	3.98	3.98	-	-	3.97	-	3.96	3.96	3.96	3.95	3.95	3.96	-	-	3.94	3.94															
5.0	4.99	-	4.99	4.99	4.99	4.99	-	-	4.98	-	-	4.98	4.98	-	-	4.97	-	4.96	4.96	4.96	4.95	4.95	4.96	-	-	4.94	4.94															
6.0	5.99	-	5.99	5.99	5.99	5.99	-	-	5.98	-	-	5.98	5.98	-	-	5.97	-	5.96	5.96	5.96	5.95	5.95	5.96	-	-	5.94	5.94															
7.0	6.99	6.99	6.99	-	6.99	6.99	-	-	6.98	6.98	-	-	6.97	6.97	-	6.96	6.95	6.95	6.95	6.95	-	6.94	6.94	6.94	-	-	6.92	6.92														
8.0	7.99	7.99	7.99	-	7.99	7.99	-	-	7.98	7.98	-	-	7.97	7.97	-	7.96	7.95	7.95	7.95	7.95	-	7.94	7.94	7.94	-	-	7.92	7.92														
9.0	8.99	8.99	8.99	-	8.99	8.99	-	-	8.98	8.98	-	-	8.97	8.97	-	8.96	8.95	8.95	8.95	8.95	-	8.94	8.94	8.94	-	-	8.92	8.92														
10.0	9.99	9.99	9.99	-	9.99	9.99	-	-	9.98	9.98	-	-	9.97	9.97	-	9.96	9.95	9.95	9.95	9.95	-	9.94	9.94	9.94	-	-	9.92	9.92														
11.0	10.99	10.99	10.99	-	10.99	10.99	10.98	10.98	10.97	-	-	10.97	10.97	-	-	10.96	10.95	-	10.95	10.94	-	10.93	10.93	10.93	-	-	10.90	10.90														
12.0	11.99	11.99	11.99	-	11.99	11.99	11.98	11.98	11.97	-	-	11.97	11.97	-	-	11.96	11.95	-	11.95	11.94	-	11.93	11.93	11.93	-	-	11.90	11.90														



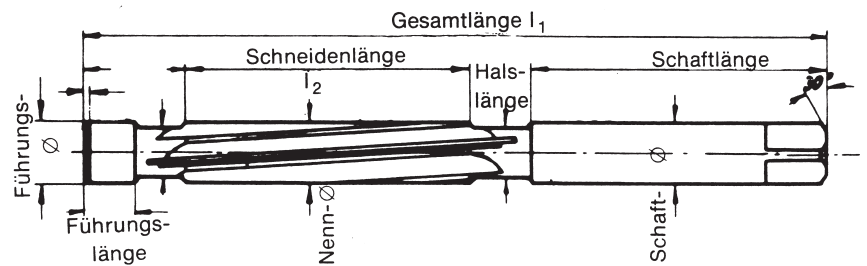


Definition of measurement

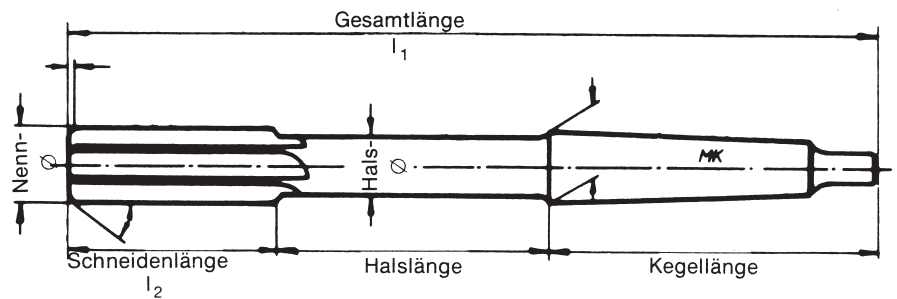
Handreibahle mit Zylinderschaft und Vierkant, rechtsschneidend, geradegenutet



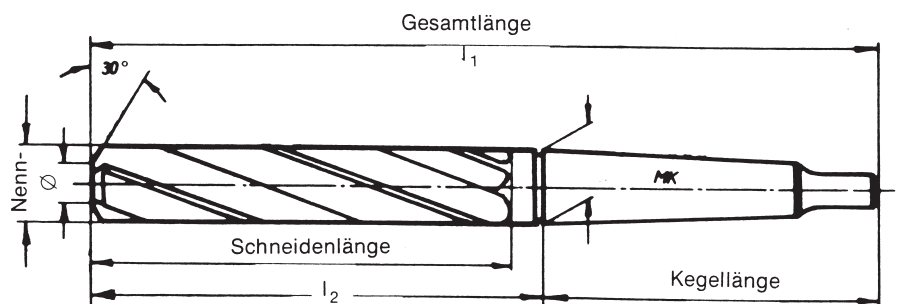
Handreibahle nachstellbar – mit Zylinderschaft und Vierkant, rechtsschneidend, spiralgenutet



Maschinenreibahle mit Morsekegel, rechtsschneidend, geradegenutet



Spiralsenker (Aufbohrer) rechtsspiral, rechtsschneidend

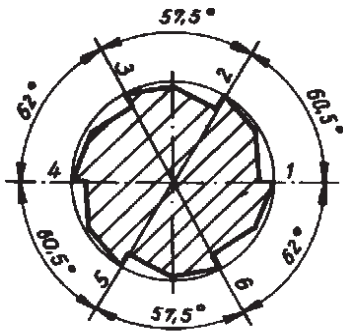


Achievable bore hole quality

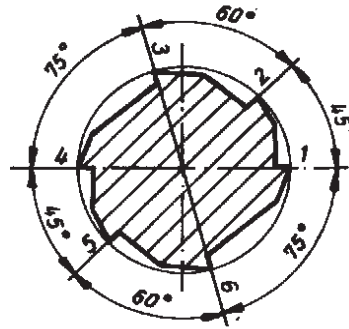


A decisive factor in obtaining bore roundness is reamer construction (unequal spacing, extremely unequal spacing or optimally unequal spacing) and the operating conditions (see also: Fault Analysis of Reaming).

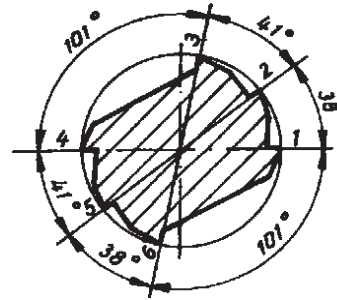
normal unequal spacing



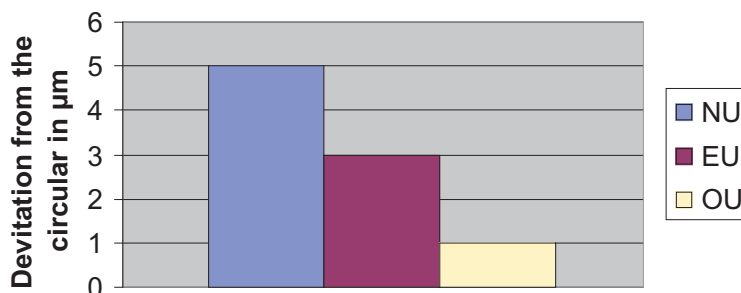
extremely unequal spacing



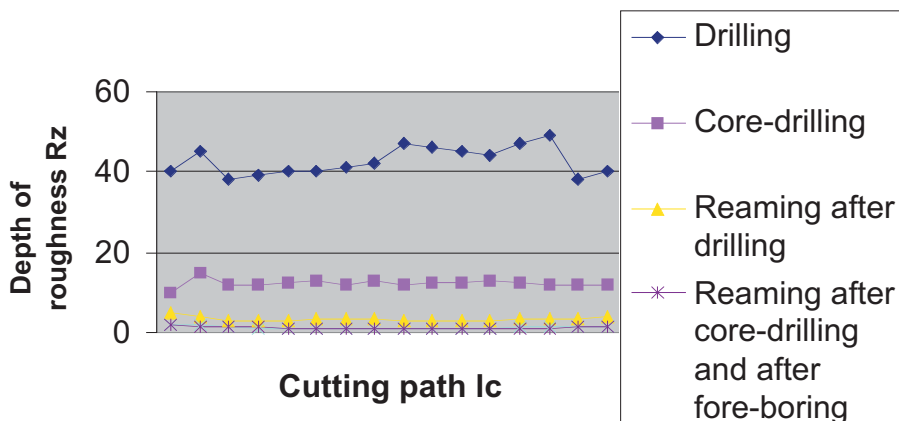
optimally unequal spacing



Influence of cutting pitch on the deviation of the bore hole from the circular



Influence of pre-work on surface roughness



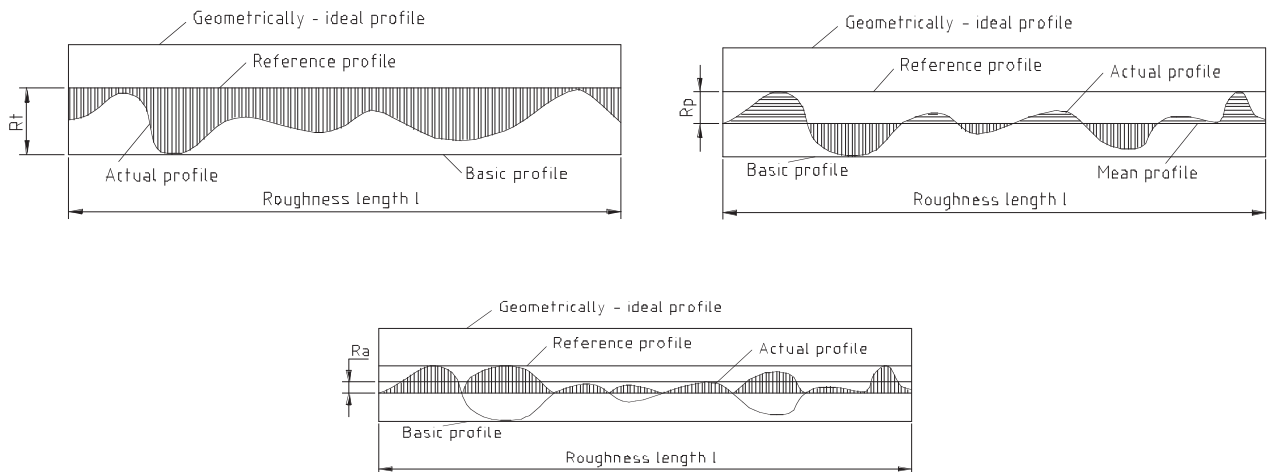
Definition of measuring roughness

The **depth of roughness R_t** is the maximum difference in measurement between the reference profile and basic profile. It is the most widely used measurement for determining surface roughness.

The **smoothing depth R_p** is the distance between the mean profile and the reference profile. Of all measurements of roughness, the smoothing depth gives the best statement concerning the functional pattern of a surface, especially with regard to sliding and pressed surfaces.

The **mean roughness value R_a** is the distance between one flattening line and the mean profile.

The **calculated mean depth of roughness R_z** is the arithmetical mean value calculated from five single peak-to-valley heights measured in five adjacent sections of the same length in Reference Section I.



Measurement of roughness

Average roughness $R_z \mu\text{m}$	Mean roughness value $R_a \mu\text{m}$	Depth of roughness $R_t \mu\text{m}$	Smoothing depth $R_p \mu\text{m}$
0,05	0,01	0,05	0,01
0,1	0,02	0,1	0,02
0,2	0,04	0,2	0,04
0,4	0,08	0,4	0,08
0,8	0,16	0,8	0,16
1,6	0,32	1,6	0,32
3,2	0,63	3,2	0,63
6,3	1,25	6,3	1,25
10	2,5	10	2,5
20	5	20	5
40	10	40	10
80	20	80	20
160	40	160	40

Pro and Contra about Cermet



ADVANTAGES

- mainly for machining steel
- mainly for finishing, precision and finish-machining (reaming, finish-turning, finish-cutting)
- very hard: less flank wear
- resistant to chemicals (minimal chemical reaction during machining operation):
 - less crater wear
 - fewer built-up edges
- no cooling agent required: lower costs, no work piece cleaning necessary
- due to resistance to chemicals and temperature = less edge wear. Results in improved surface quality and high measuring accuracy
- high cutting velocity: up to 500 m/min. on steel (lower work piece costs)

DISADVANTAGES

- not suitable for roughing, less suitable for machining cast iron
- considerably lower endurance than (coated) hard metal: not suitable if “labile chucking fixture” is present
- not suitable for interrupted cutting, cannot endure sudden loads on the edges
- unsuitable for compound materials, i.e. changing materials machined with one tool
- unsuitable where high rotational speeds create vibrations
- Cermet = conducts heat slower than hard metal. Therefore more sensitive to fluctuations in temperature (cooling)
- risk of thermal shock fissures
- a special technique is required to grind these tools (including centerless grinding).

Classification of materials

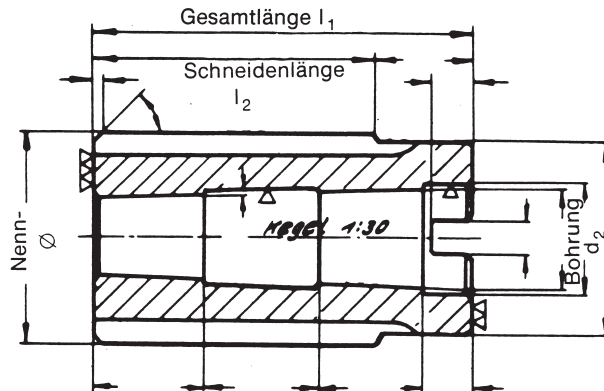
Material group		Examples	Rm(N/mmP)	K _{c1.1}	m _c
0	Plastics				
1	Soft plastic Hard plastic				
2	Steel				
3	Machining steel	9SMn28, 15S20, 9SMnPb28	400 - 700	1500	0,22
4	Constructional steel, carbon steel with C<0.5%	St36, Ck10, 19Mn6, C45, Gs60, St 52	< 550	1500	0,25
5	Low-alloy steel, cast steel, C-steel with C>0.5%	Ck60, 16CrMo44, 16MnCr5, X6CrMo17	550< 700	1700	0,24
6	Tool steel, tempering steel	C105W1, X20 Cr13, X90CrMoV18, 115CrV3	700< 900	1900	0,24
7	Hard-chipping tool steels High-tensile steels, hardened steels Size 3-6	X210CrW12, S6/5/2, X18CrN28, X105CrMo17 G-X120Mn12	900< 1200 >1200	2000 2900	0,24 0,22
8	Stainless steel				
9	Easy-chipping stainless steel	X5CrNi1810, X12CrNi189		1750	0,22
10	Stainless steel with Mo-content Austenitic, hard-chipping	X6CrNiTi1810, X5CrNiMo17133, X12CrNi2520 X5NiCrTi2515, X15CrNi2313, X2CrNiMo17132		1900 2150	0,2 0,2
11	Cast iron				
12	Medium hardness cast iron	GG15,GGG40, GTS55-04	< 400	1150	0,22
13	Low-alloy cast iron	GG25, GGLNiCr202, GGG60, GTS65-02	400 - 600	1225	0,25
14	Alloyed cast iron High-alloy cast iron	GG30, GGG70, GGGNiCr202, GTS 70-02 GG40, GTS70-02	600 - 700 > 700	1350 1470	0,28 0,3
15	Non-ferrous metals				
16	Al with <16% Si, brass, zink, Mg			700	0,25
17	Al with >16% Si, bronze, Cu, aluminum alloys			700	0,27
18	Super alloys, Ni, Co & Fe content with <30 HRC	Inconel601, 617, 625, Monel400		2600	0,24
19	Super alloys, Ni, Co & Fe content with >30 HRC Ti, Ti-alloys	Inconel718, 750, Monel K-500		3300 1450	0,24 0,23



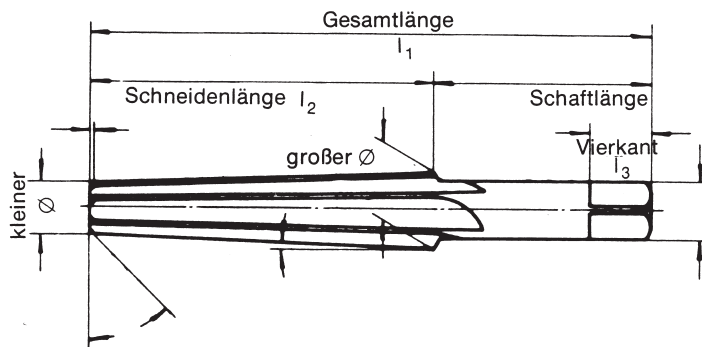
Definition of measurement



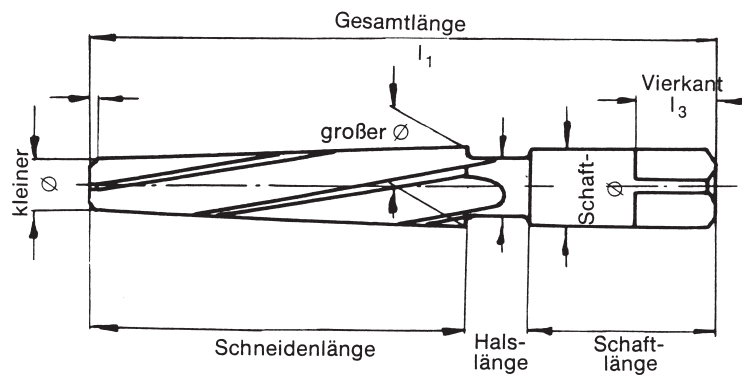
Aufsteckreibahle mit Kegelbohrung 1:30



Kegelreibahle mit Überlaufschaft, rechtsschneidend, geradegenutet



Kegelreibahle mit verstärktem Schaft, rechtsschneidend, spiralgenutet





Machining guidelines for reamers

Material group	Nr	V _C (m/min) f _R a _R	HSS reamer	HSS coated reamer	HM reamer	HM coated reamer	Cermet reamer	PCD/PCB reamer
Soft plastics	0	V _C f _R a _R	12-14 1 2		20-30 2 2			
Hard plastics	1	V _C f _R a _R	8-12 3 3		10-15 2 2	20-60 2 1		80-160 8 1
Machining steel	2	V _C f _R a _R	10-15 4 2	10-15 4 2	15-20 4 2	20-30 4 2	40-75 4 2	
Constructional steel	3	V _C f _R a _R	12-18 3 3	14-20 3 3	20-25 3 2	25-40 4 2	50-80 4 2	
Low-alloy steels	4	V _C f _R a _R	10-15 4 2	12-16 4 2	15-20 4 2	20-30 4 2	40-75 4 2	
Tempering steel	5	V _C f _R a _R	8-12 4 2	8-12 4 2	15-20 5 2	20-30 5 2	30-40 4 2	75-200 2 4
Tool steel	6	V _C f _R a _R	4-6 5 1	4-6 5 1	12-15 5 1	15-25 5 2	25-35 4 4	80-150 4 4
High tensile steels	7	V _C f _R a _R			8-12 6 1	10-15 6 1	15-25 4 4	80-150 4 4
Stainless steel	8	V _C f _R a _R			10-15 4 1	15-40 4 1	30-40 4 1	
Ditto with Mo-content	9	V _C f _R a _R			8-12 4 1	12-30 4 1	25-35 4 1	
Ditto austenitic	10	V _C f _R a _R			8-12 4 1	12-30 4 1	15-25 4 1	
Low-hardness cast iron	11	V _C f _R a _R	10-14 1 2	10-14 1 2	15-18 1 2	30-120 3 1	60-120 3 1	90-180 8 4
Low-alloy cast iron	12	V _C f _R a _R	8-12 3 2	8-12 3 2	12-15 3 2	30-120 3 1	60-120 3 1	90-180 8 4
Alloyed cast iron, medium hardness	13	V _C f _R a _R	4-6 5 2	4-6 5 2	8-12 5 2	20-80 3 1	30-80 3 1	90-180 8 4
High-alloy cast iron	14	V _C f _R a _R			6-10 5 2	15-30 5 2	20-40 5 2	90-180 8 4
Al, Mg, Zn	15	V _C f _R a _R	14-20 3 3		30-60 3 3		100-200 3 3	100-300 8 1
Al, Cu, Bronze	16	V _C f _R a _R			25-40 3 3		50-150 3 3	100-300 8 1
Inconel, Monel <30 HRC	17	V _C f _R a _R	6-8 4 2		8-12 4 2	15-18 4 2	15-18 4 2	
Inconel, Monel >30 HRC	18	V _C f _R a _R	4-6 4 2		5-8 4 2	10-15 4 2	10-15 4 2	
Ti, Ti-alloys	19	V _C f _R a _R	4-6 5 1		8-12 3 1	15-30 3 1		

V_C - cutting speed (m/min)
f_R, a_R - see Tables of feeds and over-measures

Tables of feeds and over-measures for reamers



Table of feeds

Series of feeds f_R	Feed f (mm/U) for drilling diameter:								
	Diameter (mm)								
	<5	5	8	10	15	20	30	40	50
1	0,2	0,2	0,25	0,3	0,35	0,4	0,5	0,6	0,7
2	0,3	0,3	0,35	0,35	0,4	0,45	0,55	0,6	0,7
3	0,15	0,2	0,25	0,25	0,3	0,35	0,45	0,5	0,6
4	0,1	0,15	0,2	0,2	0,25	0,3	0,4	0,45	0,5
5	0,08	0,1	0,12	0,15	0,2	0,25	0,3	0,35	0,4
6	0,08	0,1	0,12	0,15	0,18	0,2	0,25	0,3	0,35
7	0,05	0,06	0,08	0,12	0,15	0,18	0,3	0,32	0,35
8			0,3	0,4	0,6	0,8	1,2		

Drilling dimensions for reaming

Series of over-measures a_R	Dimension a (mm) in drill hole with hole diameter:								
	Diameter (mm)								
	<5	5	8	10	15	20	30	40	50
1	0,1	0,1	0,15	0,2	0,25	0,25	0,3	0,3	0,4
2	0,15	0,15	0,2	0,25	0,25	0,3	0,35	0,4	0,45
3	0,15	0,2	0,25	0,25	0,3	0,35	0,4	0,45	0,5
4	0,08	0,1	0,12	0,15	0,2	0,25	0,25	0,3	0,35



The advantages of coatings on tools

HSS-tools are usually coated with TiN. In the case of HM-tools, other varieties of coatings are possible as a result of PVD and CVD processes. Several coatings and their respective advantages are listed below.

TiN-coating:

Increases a tool's endurance by approx. 200%; reduced tendency to form built-up edges; suitable for precision work. May be applied to HSS and HM-tools. A coating of silver-TiN has shown to give more protection against wear and to reduce the formation of built-up edges than coatings with gold-TiN.

TiCN-coating:

Higher resistance to wear than TiN, therefore longer service life. Especially suitable for use on high-alloy steels.

TiAlN-coating:

Higher resistance to wear than TiN; therefore longer service life. Especially suitable for use on hard steels and cast iron.

Carbide-coating:

This coating has good gliding properties and therefore forms fewer built-up edges. Especially suitable for HM-reamers for use on stainless steel and high-temperature steel.

Diamond-coating:

HM-tools attain a high resistance to wear. Only suitable for Fe- and TiN-free materials. Also suitable for the high-speed machining of Al, Cu and plastics; Alternative to tools tipped with PCD-plates.

Advantage: considerably lower price

Disadvantage: slightly reduced service life

Further information can be found in the table on coatings on Page 139.

Coating recommendations

for HSS and carbide-tipped reamers and core drills



Material group	No.	Gold-TiN	Silver-TiN	TiCN	TiAlN	Icer Tool	Carboride	Carboride Special
Soft plastics	0		HM			HSS		HM
			HM			HSS		HM
Hard plastics	1		HSS/HM		HM			
			HSS/HM		HM			
Machining steel	2	HSS/HM					HM	
		HSS/HM					HM	
Constructional steel	3			HSS		HSS/HM	HM	
		HSS/HM					HM	
Low-alloy steel	4			HSS		HSS/HM	HM	
		HSS/HM		HSS			HM	
Tempering steel	5			HSS		HSS/HM	HM	
		HSS/HM		HSS			HM	
Tool steel	6			HSS	HM	HSS	HM	
				HSS	HM	HSS	HM	
High tensile steel	7				HM	HM		
					HM	HM		
Stainless steel	8		HSS/HM			HSS	HM	
			HSS/HM				HM	
Ditto with Mo-content	9		HSS/HM			HSS	HM	
			HSS/HM				HM	
Ditto austenitic	10		HSS/HM			HSS	HM	
			HSS/HM				HM	
Low-hardness cast iron	11		HSS/HM		HM			
			HSS/HM		HSS/HM			
Low-alloy cast iron	12		HSS/HM		HM			
			HSS		HSS/HM			
Alloyed cast iron med. hardness	13		HSS/HM		HM			
			HSS		HSS/HM			
High-alloy cast iron	14		HSS/HM		HM			
			HSS		HSS/HM			
Al, Mg, Zn	15		HSS/HM			HSS/HM		HSS/HM
			HSS/HM			HSS/HM		HSS/HM
Al, Cu, Bronze	16		HSS/HM					HSS/HM
			HSS/HM					HSS/HM
Inconel, Monel < 30 HRC	17						HSS/HM	HM
							HSS/HM	HM
Inconel, Monel > 30 HRC	18						HSS/HM	HM
							HSS/HM	HM
Ti, Ti-alloys	19						HSS/HM	HM
							HSS/HM	HM

 Recommendations for reamers
 Recommendations for drills and core drills



Cooling and cutting oils for reaming

Material to machine	Reaming
Tool steels	Diluted soluble oil
Alloyed steels	Diluted soluble oil, cutting oil
Stainless and heat resistant steels	Bore oil, cutting oil
Cast iron steels	Diluted soluble oil
Grey cast iron	Dry
Chilled cast iron	Diluted soluble oil
Malleable cast iron	Dry, diluted soluble oil
Brass	Dry, diluted soluble oil
Bronze	Dry, diluted soluble oil
Copper	Diluted soluble oil
Red cast iron	Dry, Diluted soluble oil
Aluminium	Diluted soluble oil, petroleum
Plastic	Dry

Fault analysis of reaming



Influencing factors and sources of error	Relevant measures to remedy the situation
------------------------------------------	-------------------------------------------

1. Diameter of the reamed bore hole too large (excessive width = rejects!)

1.1 Material "widens" as result of lower density or non-rigid structure	1.1.1 Reduce reamer diameter
1.2 Concentricity of tool or machine spindle inadequate	1.1.2 Avoid widening working (see below)
1.3 Chamfer too short or highly uneven	1.2.1 Track or clamp reamers centrally; Use floating tool holder
1.4 Chip removal too high	1.3.1 Extend chamfer or reduce effective cutting angle
1.5 Lubricating agent used contains too little grease dry-reaming performed	1.3.2 Grind chamfer exactly cylindrically
1.6 Cutting velocity too high	1.4.1 Reduce machining allowance
1.7 Excessive feed	1.5.1 Use lubricants
	1.6.1 Reduce cutting velocity
	1.7.1 Decrease feed

2. Diameter of the reamed bore hole too small

2.1 Highly dense material or rigid structure	2.1.1 Increase reamer diameter
2.2 Material causing increased wear	2.1.2 Avoid constricting working conditions as follows:
2.3 Tool blunt	2.2.1 Use hard metal reamers
2.4 Chamfer too long	2.2.2 Lubricate and cool carefully
2.5 Insufficient chip removal	2.3.1 Check cylindrical grinding process
2.6 Lubricant too effective	2.3.2 Remove cutting waste caused by abrasion of the face
2.7 Cutting velocity too low	
2.8 Inadequate feed	

3. Reduced width at the hole exit

3.1 Feed too high where reamer emerges	3.1.1 Reduce feed just before pass
	3.1.2 Use even, controlled feed

4. Cross-section of the bore hole uneven, not centered

4.1 Concentricity of tool inadequate	4.1.1 Chuck reamers centrally
4.2 Lead angle too wide	4.1.2 Guide (use reamers with pilot guide)
4.3 Chip removal too high	4.1.3 Use floating tool holder
4.4 Chamfer irregular (untrue)	4.1.4 Ensure cylindrical running of work spindle
4.5 Insufficient guidance	4.2.1 Reduce lead angle on repointing
	4.3.1 Reduce machining allowance
	4.4.1 Always grind chamfer sharp and cylindrically
	4.5.1 Accurate guidance (use reamers with pilot guide)

5. Not precisely cylindrical (conical widening)

5.1 Tool-chucking not truly aligned	5.1.1 Align (spindle and tool) axis with machining with axis of spindle and work piece (bore hole) axis
5.2 Concentricity of spindle and tool inadequate	5.1.2 Use guide with lining
5.3 Chamfer inappropriate	5.2.1 Align axis
5.4 Tool-holding too strong	5.3.1 Use front reamers (90° chamfer)
	5.4.1 Use floating tool holder



Influencing factors and sources of error	Relevant measures to remedy the situation
------------------------------------------	-------------------------------------------

6. Surface quality not smooth enough or uneven (striation)

6.1 Tool tends to jam (formation of built-up edges)	6.1.1 Increase lead angle 6.1.2 Increase effective cutting angle 6.1.3 increase cutting velocity 6.1.4 Use suitable lubricant with low viscosity 6.1.5 Ensure good chip removal by using wide chip grooves and powerful rinsing
6.2 Reamer tooth-profile blunt (cutting waste)	6.2.1 Remove cutting waste by grinding the chipping surfaces
6.3 Chamfer defective, polished surface imperfect, transition to guide section sharp-edged	6.3.1 Precision-grind or lap chamfer 6.3.2 Rounden transition to guide section and smooth
6.4 Cutting run-out sharp-edged	6.4.1 Rounden and smooth cutting run-out
6.5 Lubricating agent used contains too little grease or dry-reaming performed	6.5.1 Use lubricants with high grease content
6.6 Uneven cutting depth (the chipping work is only performed by a few cutting edges. Often immediately gauge in recognizable due to varying chip hangings)	6.6.1 Grind chamfer and guide section evenly rounded or taper. Adjust knife-edged reamers evenly and check using setting ring accordance with DIN 369. Ensure close fit of the knives in the grooves

7. Chatter marks in bore hole

7.1 Lead angle too high especially at chamfer level	7.1.1 On regrinding, reduce lead angle
7.2 Chamfer unsuitable	7.1.2 Select smaller lead angle
7.3 Chucking of tool or work piece inadequate well-fitting tap wrench or secure chuck)	7.2.1 Use front reamer (90° chamfer) 7.3.1 Chuck tightly (reliable slaving using
7.4 Guide inadequate	7.4.1 Use floating tool holder or pilot-guided reamer
7.5 Inadequate concentricity	7.5.1 Ensure accurate spindle-running, chuck reamer cylindrically 7.5.2 Use reamers with pilot guides 7.5.3 Use floating tool holder
7.6 Chip removal insufficient or irregular	7.6.1 Increase machining allowance
7.7 Cutting velocity too high	7.7.1 Reduce cutting velocity
7.8 Feed too small	7.8.1 Increase feed
7.9 Feed irregular or interrupted	7.9.1 Imperative that rotational and feed movements are executed evenly and simultaneously, especially when hand-reaming

2. Technical information about countersinks and core drills

Countersink tools are supplementary to drilling tools. The area of application of counterbores ranges from de-burring bore holes to carrying out both the superficial and deep countersinking of bore holes. Depending on the machining task and the set-up, a clear differentiation is made between spot facers, counterbores, countersinks, progressive sinks and de-burrers.

The cutting section of a core drill is usually longer than that of a sink. Core drills are used for enlarging existing bore holes with the objective of improving the quality of the bore hole (surface, roundness and cylindricity). To achieve this objective, core drills are designed with three cutting edges having wide chip grooves and a strong core.

Generally-speaking, only part of the bore hole is made using a core drill. The cutting geometry of de-burring tools is designed in such a way that only the burr is removed and a small land is produced around the circumference of the bore hole. Deep countersinks should not be performed using a de-burrer. De-burrers would wear prematurely as a result.

Countersinks and core drills have a cutting geometry specially designed for this purpose. They have a wider axial and radial lead angle. The mechanical workload of a countersink is much higher than that of a de-burrer. Compared with countersinks, core drills usually have a considerably more stable shaft and are thus more capable of higher chipping performances.

The tools made by **FROMM-Präzision** are optimally designed for the intended use, both as far as their cutting geometry and their robustness are concerned. **FROMM-Präzision** countersinks and core drills are also characterized by their high degree of concentricity, minimum cutting offset and large chip grooves.

If you have any questions concerning tool geometry, don't hesitate to contact our technicians or send us the enclosed questionnaire (see page 143) and a work piece sketch.

Selecting cutting materials for countersinks and core drills

At **FROMM-Präzision**, countersinks and core drills are fabricated using HSS or HM with and without coatings. The construction is less dependent upon the cutting parameters and more associated with increasing the service life of the tool.

For this reason, two types of coating are available for selection:

- TiN-coating:** Universal coating, considerable increase in service life (approx. 200-300%), reduction of built-up edges in machining
- TiAlN-coating:** High-performance coating, considerably increased service life even compared with the TiN-coating, reduction of built-up edges



Machining guidelines for HSS countersinks and HSS core drills

Material group	Nr	V_C (m/min) f_R (mm/U)	Countersinks and core drills
Soft plastics	0	V_C f_R	20-30 3
Hard plastics	1	V_C f_R	15-25 2
Machining steel	2	V_C f_R	25-28 3
Constructional steel	3	V_C f_R	26-30 3
Low-alloy steels	4	V_C f_R	25-28 3
Tempering steel	5	V_C f_R	6-10 1
Tool steel	6	V_C f_R	2-5 1
Stainless steel	8	V_C f_R	4-10 1
Ditto with Mo-content	9	V_C f_R	4-10 1
Ditto austenitic	10	V_C f_R	3-6 1
Low-hardness cast iron	11	V_C f_R	15-24 3
Low-alloy cast iron	12	V_C f_R	10-18 3
Alloyed cast iron Med. hardness	13	V_C f_R	9-13 2
Al, Mg, Zn	15	V_C f_R	25-40 3
Al, Cu, Bronze	16	V_C f_R	10-30 3

V_C - cutting velocity (m/min)
 f_R - series of feeds (mm/U), see table of feeds

Table of feeds

Series of feeds f_R	Feed f (mm/U) for drilling diameter:							
	Diameter (mm)							
	3,0-5,0	5,0-8,0	8,0-11,0	11,0-14,0	14,0-17,0	17,0-20,0	20,0-25,0	25,0-40,0
1	0,03	0,045	0,06	0,07	0,08	0,09	0,1	0,12
2	0,05	0,08	0,10	0,12	0,15	0,16	0,18	0,2
3	0,07	0,10	0,12	0,15	0,18	0,20	0,22	0,25

Recommendations for cooling lubricants for countersinks and core drills



In principle, countersinks can be used dry. However, wet machining does result in a considerably extended service life. In the case of deeper countersinking and core drilling, a lubricant should always be used. This does not only increase the service life of the tools but also improves the quality of the bore hole surface. In addition, the transport of chips away from the bore hole is also improved. Emulsions with concentrations of 5-10% or cutting oils may be used as lubricants.

Countersink and core drill fault analysis

Fault	Possible causes /remedies
Flank wear too high	Check stability of machine, work piece and chucking Increase concentration of cooling agent Reduce cutting velocity
Wear of land	Check concentricity; concentricity < 0.04mm?“ Increase concentration of cooling agent Reduce cutting velocity
Cutting edges defect	Check concentricity Check stability of machine and chucking, vibrations? Reduce feed Increase pressure of cooling agent Resharpen tool punctually
Built-up edges	Increase concentration of cooling agent Increase cutting velocity Resharpen
Tool breakage	Check concentricity Reduce feed, tool is overloaded Check stability of machine and chucking
Tool chatters, jams	Check concentricity Check stability of machine and chucking, vibrations?

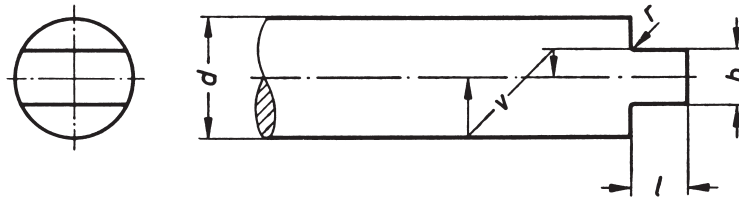


Flat tang

DIN 1809

At tools with straight shank

size in mm



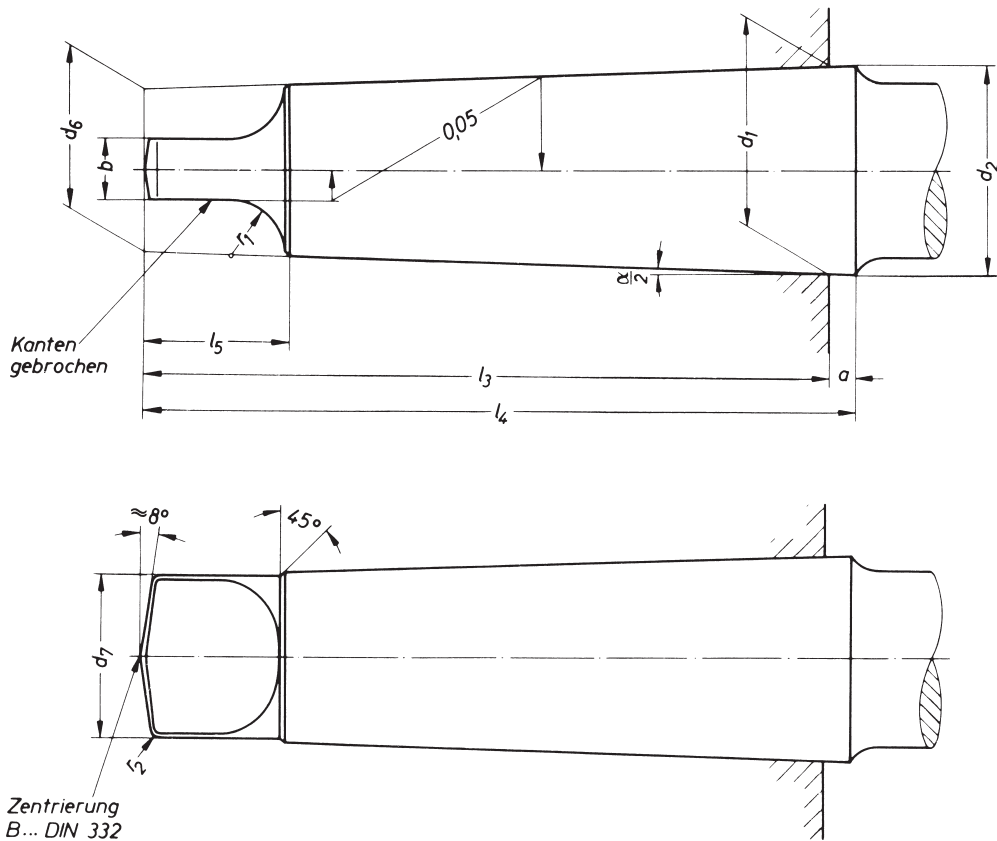
<i>d</i>	<i>b</i> h12	<i>l</i> ± IT16 1)	<i>r</i>	<i>v</i>
3 bis 3,5	1,6	2,2	0,2	0,05
über 3,5 bis 4	2	2,2	0,2	
über 4 bis 4,5	2,2	2,5	0,2	
über 4,5 bis 5,5	2,5	2,5	0,2	
über 5,5 bis 6,5	3	3	0,2	0,06
über 6,5 bis 8	3,5	3,5	0,2	
über 8 bis 9,5	4,5	4,5	0,4	
über 9,5 bis 11	5	5	0,4	
über 11 bis 13	6	6	0,4	0,08
über 13 bis 15	7	7	0,4	
über 15 bis 18	8	8	0,4	
über 18 bis 21	10	10	0,4	0,10
über 21 bis 24	11	11	0,6	
über 24 bis 27	13	13	0,6	
über 27 bis 30	14	14	0,6	
über 30 bis 34	16	16	0,6	
über 34 bis 38	18	18	0,6	0,15
über 38 bis 42	20	19	0,6	
über 42 bis 46	22	20	1	
über 46 bis 50	24	22	1	

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Taper shank

Morse taper and metric taper, taper shanks

DIN 228



Größenbezeichnung	Verjüngung	$\frac{\alpha}{2}$	a	b h13	d ₁	d ₂ ²⁾ ≈	d ₆ ²⁾ ≈	d ₇ Größtmaß	l ₃ -1	l ₄ Größtmaß	l ₅ Größtmaß	r ₁	r ₂	
Morse-Kegel	0	1:19,212 = 0,05205	1° 29' 27"	3	3,9	9,045	9,2	6,1	6	56,5	59,5	10,5	4	1
	1	1:20,047 = 0,04988	1° 25' 43"	3,5	5,2	12,065	12,2	9	8,7	62	65,5	13,5	5	1,2
	2	1:20,020 = 0,04995	1° 25' 50"	5	6,3	17,780	18	14	13,5	75	80	16	6	1,6
	3	1:19,922 = 0,05020	1° 26' 16"	5	7,9	23,825	24,1	19,1	18,5	94	99	20	7	2
	4	1:19,254 = 0,05194	1° 29' 15"	6,5	11,9	31,267	31,6	25,2	24,5	117,5	124	24	8	2,5
	5	1:19,002 = 0,05263	1° 30' 26"	6,5	15,9	44,399	44,7	36,5	35,7	149,5	156	29	10	3
	6	1:19,180 = 0,05214	1° 29' 36"	8	19	63,348	63,8	52,4	51	210	218	40	13	4
Metr. Kegel	80	1:20 = 0,05	1° 25' 56"	8	26	80	80,4	69	67	220	228	48	24	5
	100			10	32	100	100,5	87	85	260	270	58	30	5
	120			12	38	120	120,6	105	102	300	312	68	36	6
	(140)			14	44	140	140,7	123	120	340	354	78	42	8
	160			16	50	160	160,8	141	138	380	396	88	48	8
	(180)			18	56	180	180,9	159	156	420	438	98	54	10
	200			20	62	200	201	177	174	460	480	108	60	10

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Measurement conversion table

1" = 25,4 mm

Teile des inch		inches (Zoll)					
		0	1	2	3	4	5
		Millimeter					
0	0	0	25,400 0	50,800 0	76,200 0	101,600 0	127,000 0
1/64	0,015 625	0,396 9	25,796 9	51,196 9	76,596 9	101,996 9	127,396 9
1/32	0,031 25	0,793 8	26,193 8	51,593 8	76,993 8	102,393 8	127,793 8
3/64	0,046 875	1,190 6	26,590 6	51,990 6	77,390 6	102,790 6	128,190 6
1/16	0,062 5	1,587 5	26,987 5	52,387 5	77,787 5	103,187 5	128,587 5
5/64	0,078 125	1,984 4	27,384 4	52,784 4	78,184 4	103,584 4	128,984 4
3/32	0,093 75	2,381 2	27,781 2	53,181 2	78,581 2	103,981 2	129,381 2
7/64	0,109 375	2,778 1	28,178 1	53,578 1	78,978 1	104,378 1	129,778 1
1/8	0,125	3,175 0	28,575 0	53,975 0	79,375 0	104,775 0	130,175 0
9/64	0,140 625	3,571 9	28,971 9	54,371 9	79,771 9	105,171 9	130,571 9
5/32	0,156 25	3,968 8	29,368 8	54,768 8	80,168 8	105,568 8	130,968 8
11/64	0,171 875	4,365 6	29,765 6	55,165 6	80,565 6	105,965 6	131,365 6
3/16	0,187 5	4,762 5	30,162 5	55,562 5	80,962 5	106,362 5	131,762 5
13/64	0,203 125	5,159 4	30,559 4	55,959 4	81,359 4	106,759 4	132,159 4
7/32	0,218 75	5,556 2	30,956 2	56,356 2	81,756 2	107,156 2	132,556 2
15/64	0,234 375	5,953 1	31,353 1	56,753 1	82,153 1	107,553 1	132,953 1
1/4	0,25	6,350 0	31,750 0	57,150 0	82,550 0	107,950 0	133,350 0
17/64	0,265 625	6,746 9	32,146 9	57,546 9	82,946 9	108,346 9	133,746 9
9/32	0,281 25	7,143 8	32,543 8	57,943 8	83,343 8	108,743 8	134,143 8
19/64	0,296 875	7,540 6	32,940 6	58,340 6	83,740 6	109,140 6	134,540 6
5/16	0,312 5	7,937 5	33,337 5	58,737 5	84,137 5	109,537 5	134,937 5
21/64	0,328 125	8,334 4	33,734 4	59,134 4	84,534 4	109,934 4	135,334 4
11/32	0,343 75	8,731 2	34,131 2	59,531 2	84,931 2	110,331 2	135,731 2
23/64	0,359 375	9,128 1	34,528 1	59,928 1	85,328 1	110,728 1	136,128 1
3/8	0,375	9,525 0	34,925 0	60,325 0	85,725 0	111,125 0	136,525 0
25/64	0,390 625	9,921 9	35,321 9	60,721 9	86,121 9	111,521 9	136,921 9
13/32	0,406 25	10,318 8	35,718 8	61,118 8	86,518 8	111,918 8	137,318 8
27/64	0,421 875	10,715 6	36,115 6	61,515 6	86,915 6	112,315 6	137,715 6
7/16	0,437 5	11,112 5	36,512 5	61,912 5	87,312 5	112,712 5	138,112 5
29/64	0,453 125	11,509 4	36,909 4	62,309 4	87,709 4	113,109 4	138,509 4
15/32	0,468 75	11,906 2	37,306 2	62,706 2	88,106 2	113,506 2	138,906 2
31/64	0,484 375	12,303 1	37,703 1	63,103 1	88,503 1	113,903 1	139,303 1
1/2	0,5	12,700 0	38,100 0	63,500 0	88,900 0	114,300 0	139,700 0
33/64	0,515 625	13,096 9	38,496 9	63,896 9	89,296 9	114,696 9	140,096 9
17/32	0,531 25	13,493 8	38,893 8	64,293 8	89,693 8	115,093 8	140,493 8
35/64	0,546 875	13,890 6	39,290 6	64,690 6	90,090 6	115,490 6	140,890 6
9/16	0,562 5	14,287 5	39,687 5	65,087 5	90,487 5	115,887 5	141,287 5
37/64	0,578 125	14,684 4	40,084 4	65,484 4	90,884 4	116,284 4	141,684 4
19/32	0,593 75	15,081 2	40,481 2	65,881 2	91,281 2	116,681 2	142,081 2
39/64	0,609 375	15,478 1	40,878 1	66,278 1	91,678 1	117,078 1	142,478 1
5/8	0,625	15,875 0	41,275 0	66,675 0	92,075 0	117,475 0	142,875 0
41/64	0,640 625	16,271 9	41,671 9	67,071 9	92,471 9	117,871 9	143,271 9
21/32	0,656 25	16,668 8	42,068 8	67,468 8	92,868 8	118,268 8	143,668 8
43/64	0,671 875	17,065 6	42,465 6	67,865 6	93,265 6	118,665 6	144,065 6
11/16	0,687 5	17,462 5	42,862 5	68,262 5	93,662 5	119,062 5	144,462 5
45/64	0,703 125	17,859 4	43,259 4	68,659 4	94,059 4	119,459 4	144,859 4
23/32	0,718 75	18,256 2	43,656 2	69,056 2	94,456 2	119,856 2	145,256 2
47/64	0,734 375	18,653 1	44,053 1	69,453 1	94,853 1	120,253 1	145,653 1
3/4	0,75	19,050 0	44,450 0	69,850 0	95,250 0	120,650 0	146,050 0
49/64	0,765 625	19,446 9	44,846 9	70,246 9	95,646 9	121,046 9	146,446 9
25/32	0,781 25	19,843 8	45,243 8	70,643 8	96,043 8	121,443 8	146,843 8
51/64	0,796 875	20,240 6	45,640 6	71,040 6	96,440 6	121,840 6	147,240 6
13/16	0,812 5	20,637 5	46,037 5	71,437 5	96,837 5	122,237 5	147,637 5
53/64	0,828 125	21,034 4	46,434 4	71,834 4	97,234 4	122,634 4	148,034 4
27/32	0,843 75	21,431 2	46,831 2	72,231 2	97,631 2	123,031 2	148,431 2
55/64	0,859 375	21,828 1	47,228 1	72,628 1	98,028 1	123,428 1	148,828 1
7/8	0,875	22,225 0	47,625 0	73,025 0	98,425 0	123,825 0	149,225 0
57/64	0,890 625	22,621 9	48,021 9	73,421 9	98,821 9	124,221 9	149,621 9
29/32	0,906 25	23,018 8	48,418 8	73,818 8	99,218 8	124,618 8	150,018 8
59/64	0,921 875	23,415 6	48,815 6	74,215 6	99,615 6	125,015 6	150,415 6
15/16	0,937 5	23,812 5	49,212 5	74,612 5	100,012 5	125,412 5	150,812 5
61/64	0,953 125	24,209 4	49,609 4	75,009 4	100,409 4	125,809 4	151,209 4
31/32	0,968 75	24,606 2	50,006 2	75,406 2	100,806 2	126,206 2	151,606 2
63/64	0,984 375	25,003 1	50,403 1	75,803 1	101,203 1	126,603 1	152,003 1

Questionnaire for processing your order



Please fill in completely so that we can give you a correct proposal for the processing or offer.

<p>1. Handed in by</p> <p>firm: street: postcode/place: telephone: telefax: clerk in charge: department: date: your responsible agent:</p>	<p>4. Machine</p> <p>type of machine: power/KW: velocity of cutting: feed s=mm/U: min/max XS-dim: admission of spindle: morse taper: cylinder shank: steep taper: ABS: HSK: <input type="checkbox"/> A <input type="checkbox"/> B further admissions: precision of rotation: processing: <input type="checkbox"/> horizontal <input type="checkbox"/> vertical tool: <input type="checkbox"/> stopped <input type="checkbox"/> rotating</p>
<p>2. Workpiece</p> <p>marking: number of sketch: material/standard code: heat treatment: tensile strength hardness-HB: :</p>	<p>5. Cooling-lubricant-supply</p> <p>through the tool: <input type="checkbox"/> Yes <input type="checkbox"/> No striking the blade: out of the center: coolant: <input type="checkbox"/> emulsion <input type="checkbox"/> oil colling-product/naming: mixing ratio:</p>
<p>3. Demands for processing</p> <p>diameter: tolerance: diameter of pre-treatment: kind of pre-treatment: length of drilling: drilling passage: blind hole drilling: process ground too? <input type="checkbox"/> Yes <input type="checkbox"/> No cutting break? <input type="checkbox"/> Yes <input type="checkbox"/> No length of cutting break: quality of surface $R_a/R_v/R_z$: permissible circular defect: form of cylinder: ability of duration:</p>	<p>6. Production amount</p> <p>amount pieces a year: amount of drillings a piece: number of pieces a order:</p> <p>please add: - draft or sketch - stretchplan or sketch</p>
<p>Description of present state:</p>	
<p> </p>	
<p> </p>	
<p> </p>	
<p>Criteria for test-tools payable after your o.k., give priorities:</p>	
<p>tool-proposal:</p>	<p>produced by: date:</p>
<p>type:</p>	<p>blade-material:</p>
<p>measurement:</p>	<p>cutting-facts:</p>
<p>shank:</p>	<p>coolant-leaving:</p>

Germany

We manufacture exclusively in Germany with qualified and experienced employees and have the most modern manufacturing machines with high production capacity. But still flexible for small series and also for special productions. Our own salt bath hardening with material testing laboratory stand for highest consistent quality.



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