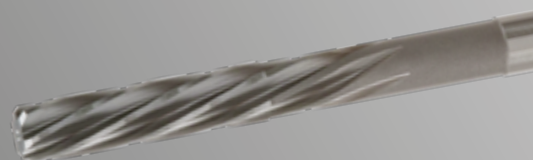
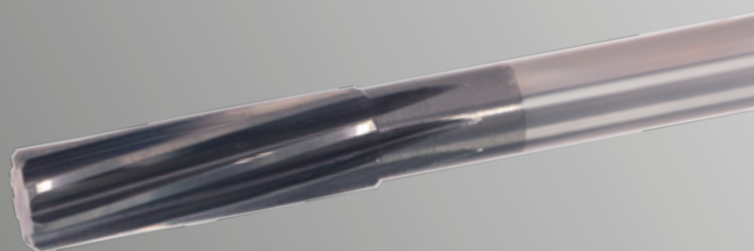
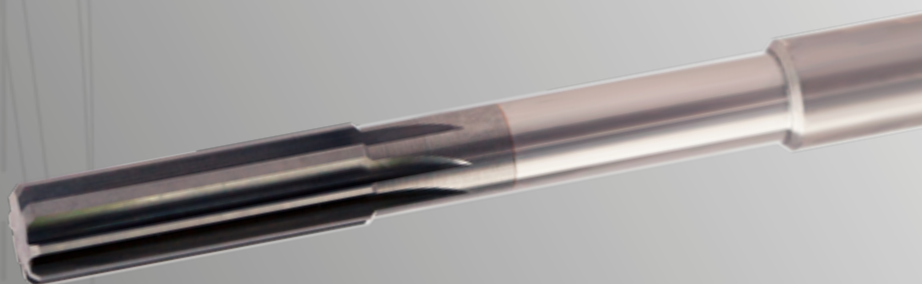
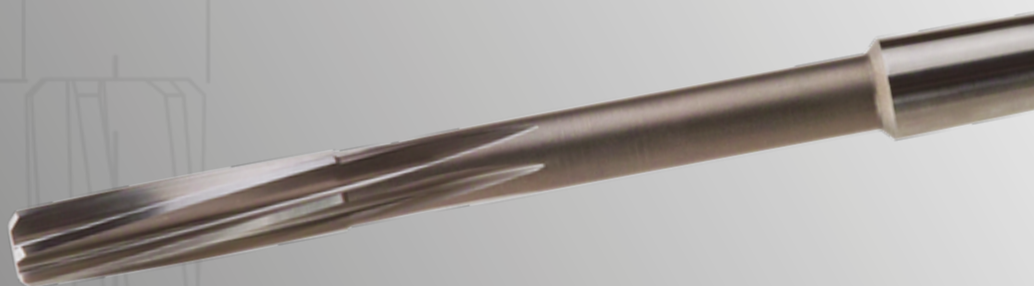
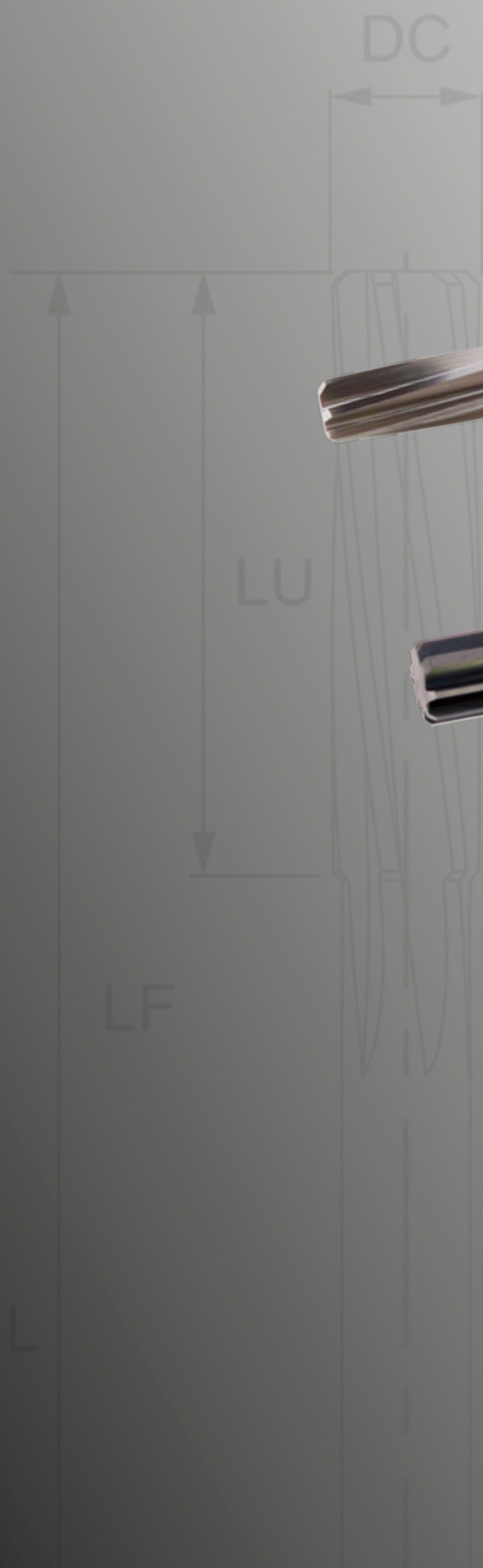


# REAMING




**CARBIDE MACHINE REAMERS**

Code	Item	Description	Page No.
452303		Straight Flute ø2.0mm - 20.0mm	P.3
453303		L/H Spiral Flute ø2.0mm - 20.0mm	P.4



**HSS-E CHUCKING REAMERS S/S**

452302		Straight Flute ø2.0mm - 20.0mm	P.5-6
453302 463302		L/H Spiral Flute ø2.0mm - 20.0mm	P.7-11
454302		L/H Quick Spiral Flute ø4.0mm - 20.0mm	P.12

**HSS-E CHUCKING REAMERS MTS**

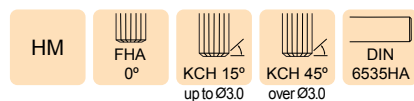
455302		Straight Flute ø10.0mm - 50.0mm	P.13
456302		L/H Spiral Flute ø10.0mm - 50.0mm	P.14

**HSS HAND REAMERS**

450301		Straight Flute ø2.0mm - 60.0mm	P.15
451301		L/H Spiral Flute ø2.0mm - 60.0mm	P.16
		Cutting Data	P.17-20



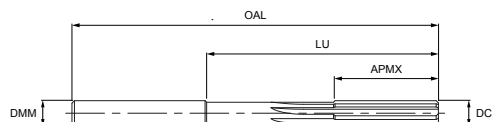
## CARBIDE MACHINE, STRAIGHT FLUTE



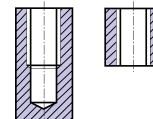
### Series No. 452303

► cutting conditions : p.18

Material - Up to 12.0 : Solid carbide  
 - Over 12.0 : Brazed carbide head  
 Straight Flute / Right Hand Cut  
 Unequal flute spacing  
 O.D. Tolerances : DIN 1420 for H7



Hole type



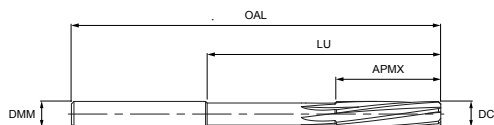
EUROPA CODE ORDCODE	NOMINAL DIA. DC	SHANK DIA. DMM	FL.LTH APMX	NECK LTH LU	O/ALL OAL	NO. OF FLUTES NOF
4523030200	2.0	4	11	20	50	4
4523030250	2.5	4	14	26	57	4
4523030300	3.0	4	15	31	61	6
4523030350	3.5	4	18	36	70	6
4523030400	4.0	4	19	42	75	6
4523030450	4.5	6	21	46	80	6
4523030500	5.0	6	23	51	86	6
4523030550	5.5	6	26	56	93	6
4523030600	6.0	6	26	56	93	6
4523030650	6.5	8	28	62	101	6
4523030700	7.0	8	31	68	109	6
4523230750	7.5	8	31	68	109	6
4523030800	8.0	8	33	74	117	6
4523030850	8.5	10	33	74	117	6
4523030900	9.0	10	36	80	125	6
4523030950	9.5	10	36	80	125	6
4523031000	10.0	10	38	86	133	6
4523031050	10.5	12	38	86	133	6
4523031100	11.0	12	41	95	142	6
4523031200	12.0	12	44	104	151	6
4523031300	13.0	16	44	104	151	6
4523031400	14.0	16	47	108	160	8
4523031500	15.0	16	50	110	162	8
4523031600	16.0	16	52	118	170	8
4523031700	17.0	20	54	121	175	8
4523031800	18.0	20	56	128	182	8
4523031900	19.0	20	58	129	189	8
4523032000	20.0	20	60	135	195	8

Dia. Tolerance TCDC	Shank Dia. Tolerance TCDMM
H7	h6

ISO	P		M		K		N					S		H		
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	●	●	●	●	●	●	●	●	●	●			●	●		
○ Secondary																



## CARBIDE MACHINE, L/H SPIRAL FLUTE



Hole type



Series No. 453303

► cutting conditions : p.18

Material - Up to 12.0 : Solid carbide  
 - Over 12.0 : Brazed carbide

head  
 L/H Spiral Flute / Right Hand Cut  
 Unequal flute spacing  
 O.D. Tolerances : DIN 1420 for H7

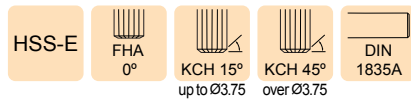
EUROPA CODE ORDCODE	NOMINAL DIA. DC	SHANK DIA. DMM	FL.LTH APMX	NECK LTH LU	O/ALL OAL	NO. OF FLUTES NOF
4533030200	2.0	4	11	20	50	4
4533030250	2.5	4	14	26	57	4
4533030300	3.0	4	15	31	61	6
4533030350	3.5	4	18	36	70	6
4533030400	4.0	4	19	42	75	6
4533030450	4.5	6	21	46	80	6
4533030500	5.0	6	23	51	86	6
4533030550	5.5	6	26	56	93	6
4533030600	6.0	6	26	56	93	6
4533030650	6.5	8	28	62	101	6
4533030700	7.0	8	31	68	109	6
4523230750	7.5	8	31	68	109	6
4533030800	8.0	8	33	74	117	6
4533030850	8.5	10	33	74	117	6
4533030900	9.0	10	36	80	125	6
4533030950	9.5	10	36	80	125	6
4533031000	10.0	10	38	86	133	6
4533031050	10.5	12	38	86	133	6
4533031100	11.0	12	41	95	142	6
4533031200	12.0	12	44	104	151	6
4533031300	13.0	16	44	104	151	6
4533031400	14.0	16	47	108	160	8
4533031500	15.0	16	50	110	162	8
4533031600	16.0	16	52	118	170	8
4533031700	17.0	20	54	121	175	8
4533031800	18.0	20	56	128	182	8
4533031900	19.0	20	58	129	189	8
4533032000	20.0	20	60	135	195	8

Dia. Tolerance TCDC	Shank Dia. Tolerance TCDMM
H7	h6

ISO	P		M		K		N					S		H		
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	●	●	●	●	●	●	●	●	●	●			●	●		
○ Secondary																



## HSS-E S/S CHUCKING, STRAIGHT FLUTE



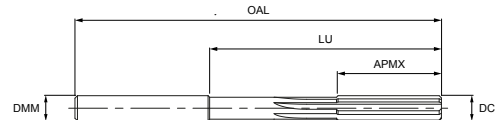
## Series No. 452302

► cutting conditions : p.19

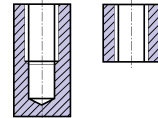
Chamfer angle - Up to 3.75 : 15° (DIN212-A)  
- Over 3.75 : 45° (DIN212-C)

Straight Flute / Right Hand Cut

O.D. Tolerances : DIN 1420 for H7



Hole type



EUROPA CODE ORDCODE	NOMINAL DIA. DC	SHANK DIA. DMM	FL.LTH APMX	NECK LTH LU	O/ALL OAL	NO. OF FLUTES NOF
4523020200	2.0	2	11	-	49	4
4523020220	2.2	2.2	12	-	53	4
4523020250	2.5	2.5	14	-	57	4
4523020260	2.6	2.6	14	-	57	4
4523020280	2.8	2.8	15	-	61	4
4523020300	3.0	3	15	-	61	6
4523020310	3.1	3.1	16	-	65	6
4523020320	3.2	3.2	16	-	65	6
4523020350	3.5	3.5	18	-	70	6
4523020360	3.6	3.6	18	-	70	6
4523020370	3.7	3.7	18	-	70	6
4523020400	4.0	4	19	42	75	6
4523020430	4.3	4.5	21	46	80	6
4523020450	4.5	4.5	21	46	80	6
4523020460	4.6	4.5	21	46	80	6
4523020500	5.0	5	23	51	86	6
4523020550	5.5	5.6	26	56	93	6
4523020560	5.6	5.6	26	56	93	6
4523020600	6.0	5.6	26	56	93	6
4523020650	6.5	6.3	28	62	101	6

Dia. Tolerance TCDC	Shank Dia. Tolerance TCDMM
H7	h8

ISO	P		M		K		N					S		H		
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary ○ Secondary	●	●	○	○		●	●	●	●	●						



# REAMING

## HSS-E S/S CHUCKING, STRAIGHT FLUTE



HSS-E
FHA 0°
KCH 15° up to Ø3.75
KCH 45° over Ø3.75
DIN 1835A

Series No. 452302

► cutting conditions : p.19

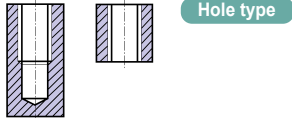
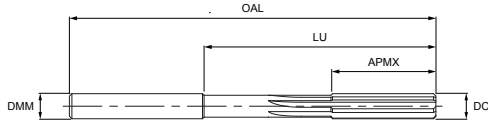
Chamfer angle - Up to 3.75 : 15°  
(DIN212-A)

- Over 3.75 : 45°

(DIN212-C)

Straight Flute / Right Hand Cut

O.D. Tolerances : DIN 1420 for H7



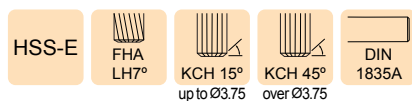
EUROPA CODE ORDCODE	NOMINAL DIA. DC	SHANK DIA. DMM	FL.LTH APMX	NECK LTH LU	O/ALL OAL	NO. OF FLUTES NOF
4523020700	7.0	7.1	31	68	109	6
4523230720	7.2	7.1	31	68	109	6
4523020800	8.0	8	33	74	117	6
4523020830	8.3	8	33	74	117	6
4523020850	8.5	8	33	74	117	6
4523020900	9.0	9	36	80	125	6
4523020950	9.5	9	36	80	125	6
4523021000	10.0	10	38	86	133	6
4523021050	10.5	10	38	86	133	6
4523021100	11.0	10	41	95	142	6
4523021200	12.0	10	44	104	151	6
4523021300	13.0	10	44	104	151	6
4523021400	14.0	12.5	47	108	160	8
4523021500	15.0	12.5	50	110	162	8
4523021600	16.0	12.5	52	118	170	8
4523021700	17.0	14	54	121	175	8
4523021800	18.0	14	56	128	182	8
4523021900	19.0	16	58	129	189	8
4523022000	20.0	16	60	135	195	8

Dia. Tolerance TCDC	Shank Dia. Tolerance TCDMM
H7	h8

ISO	P			M		K		N					S		H	
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary ○ Secondary	●	●	○	○		●	●	●	●	●						



## HSS-E S/S CHUCKING, L/H SPIRAL FLUTE



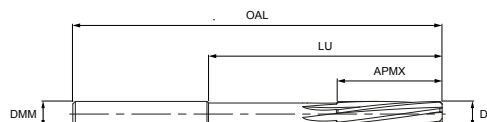
## Series No. 453302, 463302

► cutting conditions : p.19

Chamfer angle - Up to 3.75 : 15° (DIN212-B)  
- Over 3.75 : 45° (DIN212-D)

L/H Spiral Flute / Right Hand Cut

O.D. Tolerances : Whole and 0.1 size - DIN 1420 for H7  
0.01 size: Ø2.01 to Ø5.03 - +0.004/-0.000  
Ø5.97 to Ø12.03 - +0.005/-0.000



Hole type



EUROPA CODE ORDCODE	NOMINAL DIA. DC	SHANK DIA. DMM	FL.LTH APMX	NECK LTH LU	O/ALL OAL	NO. OF FLUTES NOF
4533020200	2.0	2	11	-	49	4
4633020201	2.01	2	11	26	49	4
4633020202	2.02	2	11	26	49	4
4633020203	2.03	2	11	26	49	4
4633020210	2.1	2	11	26	49	4
4533020220	2.2	2.2	12	-	53	4
4633020230	2.3	3	12	26	57	4
4633020240	2.4	3	14	27	57	4
4633020247	2.47	3	14	27	57	4
4633020248	2.48	3	14	27	57	4
4633020249	2.49	3	14	27	57	4
4533020250	2.5	2.5	14	-	57	4
4633020251	2.51	3	14	27	57	4
4633020252	2.52	3	14	27	57	4
4633020253	2.53	3	14	27	57	4
4533020260	2.6	2.6	14	-	57	4
4633020270	2.7	3	15	29	61	4
4533020280	2.8	2.8	15	-	61	4
4633020290	2.9	3	15	29	61	4
4633020297	2.97	3	15	29	61	4
4633020298	2.98	3	15	29	61	4
4633020299	2.99	3	15	29	61	4
4533020300	3.0	3	15	-	61	6
4633020301	3.01	4	16	32	65	6
4633020302	3.02	4	16	32	65	6
4633020303	3.03	4	16	32	65	6
4533020310	3.1	3.1	16	-	65	6
4533020320	3.2	3.2	16	-	65	6
4633020330	3.3	4	16	32	65	6
4633020340	3.4	4	18	34	70	6
4533020350	3.5	3.5	18	-	70	6

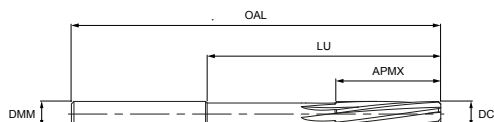
Shank Dia.  
Tolerance  
TC DMM

h8

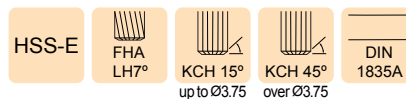
ISO	P		M		K		N			S		H				
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	●	●	○	○		●	●	●	●	●						
○ Secondary			○	○												



## HSS-E S/S CHUCKING, L/H SPIRAL FLUTE



Hole type



Series No. 453302, 463302

► cutting conditions : p.19

Chamfer angle - Up to 3.75 : 15° (DIN212-B)  
- Over 3.75 : 45° (DIN212-D)

L/H Spiral Flute / Right Hand Cut

O.D. Tolerances : Whole and 0.1 size - DIN 1420 for H7

0.01 size: Ø2.01 to Ø5.03 - +0.004/-0.000

Ø5.97 to Ø12.03 - +0.005/-0.000

EUROPA CODE ORDCODE	NOMINAL DIA. DC	SHANK DIA. DMM	FL.LTH APMX	NECK LTH LU	O/ALL OAL	NO. OF FLUTES NOF
4533020360	3.6	3.6	18	-	70	6
4533020370	3.7	3.7	18	-	70	6
4633020380	3.8	4	19	42	75	6
4633020390	3.9	4	19	42	75	6
4633020397	3.97	4	19	42	75	6
4633020398	3.98	4	19	42	75	6
4633020399	3.99	4	19	42	75	6
4533020400	4.0	4	19	42	75	6
4633020401	4.01	4	19	42	75	6
4633020402	4.02	4	19	42	75	6
4633020403	4.03	4	19	42	75	6
4633020410	4.1	4	19	42	75	6
4633020420	4.2	4	19	42	75	6
4533020430	4.3	4.5	21	46	80	6
4633020440	4.4	5	21	46	80	6
4533020450	4.5	4.5	21	46	80	6
4533020460	4.6	4.5	21	46	80	6
4633020470	4.7	5	21	46	80	6
4633020480	4.8	5	23	51	86	6
4633020490	4.9	5	23	51	86	6
4633020497	4.97	5	23	51	86	6
4633020498	4.98	5	23	51	86	6
4633020499	4.99	5	23	51	86	6
4533020500	5.0	5	23	51	86	6
4633020501	5.01	5	23	51	86	6
4633020502	5.02	5	23	51	86	6
4633020503	5.03	5	23	51	86	6
4633020510	5.1	5	23	51	86	6
4633020520	5.2	5	23	51	86	6
4633020530	5.3	5	23	51	86	6

Shank Dia.  
Tolerance  
TCDMM

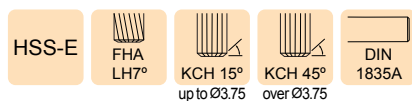
h8

ISO	P			M		K		N				S		H		
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	●	●	○	○		●	●	●	●	●						
○ Secondary			●	●												





## HSS-E S/S CHUCKING, L/H SPIRAL FLUTE



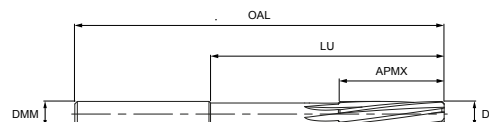
## Series No. 453302, 456302

► cutting conditions : p.19

Chamfer angle - Up to 3.75 : 15° (DIN212-B)  
- Over 3.75 : 45° (DIN212-D)

L/H Spiral Flute / Right Hand Cut

O.D. Tolerances : Whole and 0.1 size - DIN 1420 for H7  
0.01 size: Ø2.01 to Ø5.03 - +0.004/-0.000  
Ø5.97 to Ø12.03 - +0.005/-0.000



Hole type



EUROPA CODE ORDCODE	NOMINAL DIA. DC	SHANK DIA. DMM	FL.LTH APMX	NECK LTH LU	O/ALL OAL	NO. OF FLUTES NOF
4633020540	5.4	6	26	56	93	6
4533020550	5.5	5.6	26	56	93	6
4533020560	5.6	5.6	26	56	93	6
4633020570	5.7	6	26	56	93	6
4633020580	5.8	6	26	56	93	6
4633020590	5.9	6	26	56	93	6
4633020597	5.97	6	26	56	93	6
4633020598	5.98	6	26	56	93	6
4633020599	5.99	6	26	56	93	6
4533020600	6.0	5.6	26	56	93	6
4633020601	6.01	6	28	62	101	6
4633020602	6.02	6	28	62	101	6
4633020603	6.03	6	28	62	101	6
4633020610	6.1	6	28	62	101	6
4633020620	6.2	6	28	62	101	6
4633020630	6.3	6	28	62	101	6
4633020640	6.4	6	28	62	101	6
4533020650	6.5	6.3	28	62	101	6
4633020660	6.6	6	28	62	101	6
4633020670	6.7	6	28	62	101	6
4633020680	6.8	8	31	68	109	6
4633020690	6.9	8	31	68	109	6
4533020700	7.0	7.1	31	68	109	6
4633020710	7.1	8	31	68	109	6
4523230720	7.2	7.1	31	68	109	6
4633020730	7.3	8	31	68	109	6
4633020740	7.4	8	31	68	109	6
4633020750	7.5	8	31	68	109	6
4633020760	7.6	8	33	74	117	6
4633020770	7.7	8	33	74	117	6
4633020780	7.8	8	33	74	117	6

Shank Dia.  
Tolerance  
TCDMM

h8

ISO	P		M		K		N					S		H		
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	●	●	○	○		●	●	●	●	●						
○ Secondary																



# REAMING



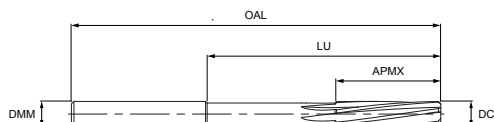
## HSS-E S/S CHUCKING, L/H SPIRAL FLUTE



HSS-E
FHA LH7°
KCH 15° up to Ø3.75
KCH 45° over Ø3.75
DIN 1835A

Series No. 453302, 456302

► cutting conditions : p.19



Hole type

Chamfer angle - Up to 3.75 : 15° (DIN212-B)  
 - Over 3.75 : 45° (DIN212-D)

L/H Spiral Flute / Right Hand Cut

O.D. Tolerances : Whole and 0.1 size - DIN 1420 for H7

0.01 size: Ø2.01 to Ø5.03 - +0.004/-0.000

Ø5.97 to Ø12.03 - +0.005/-0.000

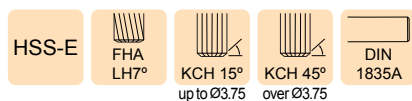
EUROPA CODE ORDCODE	NOMINAL DIA. DC	SHANK DIA. DMM	FL.LTH APMX	NECK LTH LU	O/ALL OAL	NO. OF FLUTES NOF
4633020790	7.9	8	33	74	117	6
4633020797	7.97	8	33	74	117	6
4633020798	7.98	8	33	74	117	6
4633020799	7.99	8	33	74	117	6
4533020800	8.0	8	33	74	117	6
4633020801	8.01	8	33	74	117	6
4633020802	8.02	8	33	74	117	6
4633020803	8.03	8	33	74	117	6
4633020810	8.1	8	33	74	117	6
4633020820	8.2	8	33	74	117	6
4533020830	8.3	8	33	74	117	6
4633020840	8.4	8	33	74	117	6
4533020850	8.5	8	33	74	117	6
4633020860	8.6	10	36	80	125	6
4633020870	8.7	10	36	80	125	6
4633020880	8.8	10	36	80	125	6
4633020890	8.9	10	36	80	125	6
4533020900	9.0	9	36	80	125	6
4633020901	9.01	10	36	80	125	6
4633020902	9.02	10	36	80	125	6
4633020903	9.03	10	36	80	125	6
4633020910	9.1	10	36	80	125	6
4633020920	9.2	10	36	80	125	6
4633020930	9.3	10	36	80	125	6
4633020940	9.4	10	36	80	125	6
4533020950	9.5	9	36	80	125	6
4633020960	9.6	10	38	86	133	6
4633020970	9.7	10	38	86	133	6
4633020980	9.8	10	38	86	133	6
4633020990	9.9	10	38	86	133	6

Shank Dia. Tolerance
<b>TCDMM</b>
h8

ISO	P			M		K		N				S		H		
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	●	●	○	○		●	●	●	●	●						
○ Secondary			●	●												



## HSS-E S/S CHUCKING, L/H SPIRAL FLUTE



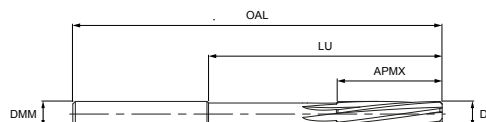
## Series No. 453302, 456302

► cutting conditions : p.19

Chamfer angle - Up to 3.75 : 15° (DIN212-B)  
- Over 3.75 : 45° (DIN212-D)

L/H Spiral Flute / Right Hand Cut

O.D. Tolerances : Whole and 0.1 size - DIN 1420 for H7  
0.01 size: Ø2.01 to Ø5.03 - +0.004/-0.000  
Ø5.97 to Ø12.03 - +0.005/-0.000



Hole type



EUROPA CODE ORDCODE	NOMINAL DIA. DC	SHANK DIA. DMM	FL.LTH APMX	NECK LTH LU	O/ALL OAL	NO. OF FLUTES NOF
4633020997	9.97	10	38	86	133	6
4633020998	9.98	10	38	86	133	6
4633020999	9.99	10	38	86	133	6
4533021000	10.0	10	38	86	133	6
4633021001	10.01	10	38	86	133	6
4633021002	10.02	10	38	86	133	6
4633021003	10.03	10	38	86	133	6
4533021050	10.5	10	38	86	133	6
4533021100	11.0	10	41	95	142	6
4633021197	11.97	10	41	107	151	6
4633021198	11.98	10	41	107	151	6
4633021199	11.99	10	41	107	151	6
4533021200	12.0	10	44	104	151	6
4633021201	12.01	10	44	104	151	6
4633021202	12.02	10	44	104	151	6
4633021203	12.03	10	44	104	151	6
4533021300	13.0	10	44	104	151	6
4533021400	14.0	12.5	47	108	160	8
4533021500	15.0	12.5	50	110	162	8
4533021600	16.0	12.5	52	118	170	8
4533021700	17.0	14	54	121	175	8
4533021800	18.0	14	56	128	182	8
4533021900	19.0	16	58	129	189	8
4533022000	20.0	16	60	135	195	8

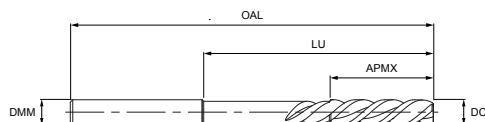
Shank Dia.  
Tolerance  
TCDMM

h8

ISO	P		M		K		N					S		H		
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	●	●	○	○		●	●	●	●	●						
○ Secondary																



## HSS-E S/S CHUCKING, QUICK SPIRAL



Hole type

HSS-E



Series No. 454302

► cutting conditions : p.20

Chamfer angle - 45° (DIN212-E)  
L/H Spiral Flute / Right Hand Cut  
O.D. Tolerances : DIN 1420 for H7

EUROPA CODE ORDCODE	NOMINAL DIA. DC	SHANK DIA. DMM	FL.LTH APMX	NECK LTH LU	O/ALL OAL	NO. OF FLUTES NOF
4543020400	4.0	4	19	42	75	3
4543020450	4.5	4.5	21	46	80	3
4543020500	5.0	5	23	51	86	3
4543020550	5.5	5.6	26	56	93	3
4543020600	6.0	5.6	26	56	93	3
4543020650	6.5	6.3	28	62	101	3
4543020700	7.0	7.1	31	68	109	3
4543020800	8.0	8	33	74	117	3
4543020850	8.5	8	33	74	117	3
4543020900	9.0	9	36	80	125	3
4543020950	9.5	9	36	80	125	3
4543021000	10.0	10	38	86	133	3
4543021100	11.0	10	41	95	142	3
4543021200	12.0	10	44	104	151	3
4543021300	13.0	10	44	104	151	3
4543021400	14.0	12.5	47	108	160	4
4543021500	15.0	12.5	50	110	162	4
4543021600	16.0	12.5	52	118	170	4
4543021700	17.0	14	54	121	175	4
4543021800	18.0	14	56	128	182	4
4543021900	19.0	16	58	129	189	4
4543022000	20.0	16	60	135	195	4

Dia. Tolerance TCDC	Shank Dia. Tolerance TCDMM
H7	h8

ISO	P		M		K		N					S		H		
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	●	●						●	●	●						
○ Secondary																



## HSS-E MTS CHUCKING, STRAIGHT FLUTE



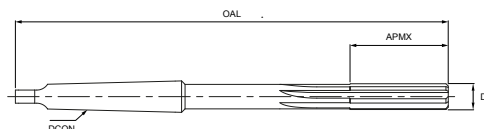
## Series No. 455302

► cutting conditions : p.19

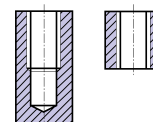
Chamfer angle 45° (DIN208-A)

Straight Flute / Right Hand Cut

O.D. Tolerances : DIN 1420 for H7



Hole type



EUROPA CODE ORDCODE	NOMINAL DIA. DC	MTS NO. DCON	FL.LTH APMX	O/ALL OAL	NO. OF FLUTES NOF
4553021000	10.0	1	38	168	6
4553021100	11.0	1	41	175	6
4553021200	12.0	1	44	182	6
4553021300	13.0	1	44	182	6
4553021400	14.0	1	47	189	8
4553021500	15.0	2	50	204	8
4553021600	16.0	2	52	210	8
4553021700	17.0	2	54	214	8
4553021800	18.0	2	56	219	8
4553021900	19.0	2	58	223	8
4553022000	20.0	2	60	228	8
4553022100	21.0	2	62	232	8
4553022200	22.0	2	64	237	8
4553022300	23.0	2	66	241	8
4553022400	24.0	3	68	268	8
4553022500	25.0	3	68	268	8
4553022600	26.0	3	70	273	8
4553022700	27.0	3	71	277	10
4553022800	28.0	3	71	277	10
4553022900	29.0	3	73	281	10
4553023000	30.0	3	73	281	10
4553023100	31.0	3	75	285	10
4553023200	32.0	4	77	317	10
4553023400	34.0	4	78	321	10
4553023500	35.0	4	78	321	10

► Sizes up to Ø50.0mm available to order

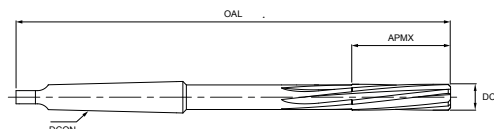
Dia.  
Tolerance  
**TDC**

H7

ISO	P		M		K		N					S		H		
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	●	●	○	○		●	●	●	●	●						
○ Secondary			●	●												



## HSS-E MTS CHUCKING, L/H SPIRAL FLUTE



Hole type



Series No. 456302

► cutting conditions : p.19

Chamfer angle 45° (DIN208-B)  
L/H Spiral Flute / Right Hand Cut  
O.D. Tolerances : DIN 1420 for H7

EUROPA CODE ORDCODE	NOMINAL DIA. DC	MTS NO. DCON	FL.LTH APMX	O/ALL OAL	NO. OF FLUTES NOF
4563021000	10.0	1	38	168	6
4563021100	11.0	1	41	175	6
4563021200	12.0	1	44	182	6
4563021300	13.0	1	44	182	6
4563021400	14.0	1	47	189	8
4563021500	15.0	2	50	204	8
4563021600	16.0	2	52	210	8
4563021700	17.0	2	54	214	8
4563021800	18.0	2	56	219	8
4563021900	19.0	2	58	223	8
4563022000	20.0	2	60	228	8
4563022100	21.0	2	62	232	8
4563022200	22.0	2	64	237	8
4563022300	23.0	2	66	241	8
4563022400	24.0	3	68	268	8
4563022500	25.0	3	68	268	8
4563022600	26.0	3	70	273	8
4563022700	27.0	3	71	277	10
4563022800	28.0	3	71	277	10
4563022900	29.0	3	73	281	10
4563023000	30.0	3	73	281	10
4563023100	31.0	3	75	285	10
4563023200	32.0	4	77	317	10
4563023400	34.0	4	78	321	10
4563023500	35.0	4	78	321	10

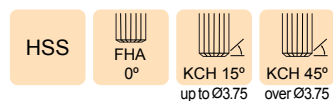
► Sizes up to Ø50.0mm available to order

Dia. Tolerance <b>TCDC</b>
H7

ISO	P		M		K		N					S		H		
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary ○ Secondary	●	●	○	○		●	●	●	●	●						



## HSS HAND, STRAIGHT FLUTE



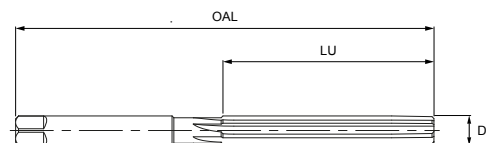
## Series No. 450301

Chamfer angle - Up to 3.75 : 15° (DIN212-A)  
- Over 3.75 : 45° (DIN212-C)

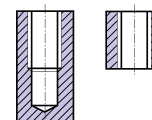
Straight Flute / Right Hand Cut

O.D. Tolerances : DIN 1420 for H7

Shank Diameter = Nominal Diameter



Hole type



EUROPA CODE ORCODE	NOMINAL DIA. DC	FL.LTH LU	O/ALL OAL	NO. OF FLUTES NOF
4503010200	2.0	25	50	4
4503010220	2.2	27	54	4
4503010250	2.5	29	58	4
4503010280	2.8	31	62	4
4503010300	3.0	31	62	6
4503010320	3.2	33	66	6
4503010350	3.5	35	71	6
4503010400	4.0	38	76	6
4503010450	4.5	41	81	6
4503010500	5.0	44	87	6
4503010550	5.5	47	93	6
4503010600	6.0	47	93	6
4503010700	7.0	54	107	6
4503010800	8.0	58	115	6
4503010900	9.0	62	124	6
4503011000	10.0	66	133	6
4503011100	11.0	71	142	6
4503011200	12.0	76	152	6
4503011300	13.0	76	152	6
4503011400	14.0	81	163	8
4503011500	15.0	81	163	8
4503011600	16.0	87	175	8
4503011700	17.0	87	175	8
4503011800	18.0	93	188	8
4503011900	19.0	93	188	8
4503012000	20.0	100	201	8
4503012200	22.0	107	215	8
4503012400	24.0	115	231	8
4503012500	25.0	115	231	8

► Sizes up to Ø60.0mm available to order

Dia.  
Tolerance  
**TCDC**  
H7

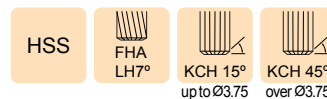
ISO	P		M		K		N					S		H		
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	●	●		○		○		●	●	●						
○ Secondary																



## HSS HAND, L/H SPIRAL FLUTE



Hole type



Series No. 451301

Chamfer angle - Up to 3.75 : 15° (DIN212-B)  
- Over 3.75 : 45° (DIN212-D)

L/H Spiral Flute / Right Hand Cut

O.D. Tolerances : DIN 1420 for H7

Shank Diameter = Nominal Diameter

EUROPA CODE ORDCODE	NOMINAL DIA. DC	FL.LTH LU	O/ALL OAL	NO. OF FLUTES NOF
4513010200	2.0	25	50	4
4513010220	2.2	27	54	4
4513010250	2.5	29	58	4
4513010280	2.8	31	62	4
4513010300	3.0	31	62	6
4513010320	3.2	33	66	6
4513010350	3.5	35	71	6
4513010400	4.0	38	76	6
4513010450	4.5	41	81	6
4513010500	5.0	44	87	6
4513010550	5.5	47	93	6
4513010600	6.0	47	93	6
4513010700	7.0	54	107	6
4513010800	8.0	58	115	6
4513010900	9.0	62	124	6
4513011000	10.0	66	133	6
4513011100	11.0	71	142	6
4513011200	12.0	76	152	6
4513011300	13.0	76	152	6
4513011400	14.0	81	163	8
4513011500	15.0	81	163	8
4513011600	16.0	87	175	8
4513011700	17.0	87	175	8
4513011800	18.0	93	188	8
4513011900	19.0	93	188	8
4513012000	20.0	100	201	8
4513012200	22.0	107	215	8
4513012400	24.0	115	231	8
4513012500	25.0	115	231	8

► Sizes up to Ø60.0mm available to order

Dia.  
Tolerance  
**TCDC**  
H7

ISO	P		M		K		N					S		H		
VDI GROUP	1-5	6-9	10-11	12, 13	14	15-16	17-20	21-25	26-28	29.1	29.2	30	31-35	36-37	38-39	40-41
● Primary	●	●		○		○		●	●	●						
○ Secondary																





# **REAMERS**

## **CUTTING DATA**



## CUTTING DATA

452303, 453303 (Carbide Chucking)									
VDI MATERIAL GROUP		HRc	vc (m/min)	fn (mm/rev)					
				ø2.0 - 4.9	ø5.0 - 8.9	ø9.0 - 12.9	ø13.0 - 19.9	ø20.0 - 30.0	
<b>P</b>	1-5	Non-alloy Steel	<25	<b>16</b> (14-18)	0.11 (0.10-0.12)	0.16 (0.12-0.20)	0.23 (0.20-0.25)	0.28 (0.25-0.30)	0.35 (0.30-0.40)
	6-9	Low alloy Steel	25-35	<b>13</b> (12-14)	0.09 (0.08-0.10)	0.13 (0.10-0.16)	0.18 (0.16-0.20)	0.23 (0.20-0.25)	0.28 (0.25-0.30)
	10-11	High alloy Steel, Tool Steel	35-45	<b>11</b> (10-12)	0.09 (0.08-0.10)	0.13 (0.10-0.16)	0.18 (0.16-0.20)	0.25 (0.20-0.30)	0.28 (0.25-0.30)
<b>M</b>	12-14	Stainless Steel		<b>7</b> (6-8)	0.09 (0.08-0.10)	0.13 (0.10-0.16)	0.18 (0.16-0.20)	0.25 (0.20-0.30)	0.28 (0.25-0.30)
<b>K</b>	15-16	Grey Cast Iron		<b>18</b> (15-20)	0.11 (0.10-0.12)	0.16 (0.12-0.20)	0.23 (0.20-0.25)	0.28 (0.25-0.30)	0.35 (0.30-0.40)
	17-20	Nodular/ Malleable Cast Iron		<b>13</b> (11-15)	0.11 (0.10-0.12)	0.16 (0.12-0.20)	0.23 (0.20-0.25)	0.28 (0.25-0.30)	0.35 (0.30-0.40)
<b>N</b>	21-24	Aluminium Si<12%		<b>50</b> (40-60)	0.14 (0.12-0.16)	0.20 (0.16-0.25)	0.28 (0.25-0.30)	0.35 (0.30-0.40)	0.45 (0.40-0.50)
	25	Aluminium Si>12%		<b>25</b> (20-30)	0.14 (0.12-0.16)	0.20 (0.16-0.25)	0.28 (0.25-0.30)	0.35 (0.30-0.40)	0.45 (0.40-0.50)
	26-28	Copper, Copper Alloys		<b>23</b> (20-25)	0.11 (0.10-0.12)	0.16 (0.12-0.20)	0.23 (0.20-0.25)	0.28 (0.25-0.30)	0.35 (0.30-0.40)
	29.1	Plastics, Acrylics		<b>18</b> (15-20)	0.14 (0.12-0.16)	0.20 (0.16-0.25)	0.28 (0.25-0.30)	0.35 (0.30-0.40)	0.45 (0.40-0.50)
<b>S</b>	31-35	HRSA Fe & Ni/Co Based		<b>10</b> (8-12)	0.09 (0.08-0.10)	0.13 (0.10-0.16)	0.18 (0.16-0.20)	0.23 (0.20-0.25)	0.28 (0.25-0.30)
	36-37	Titanium & Titanium Alloys		<b>14</b> (12-16)	0.11 (0.10-0.12)	0.16 (0.12-0.20)	0.23 (0.20-0.25)	0.28 (0.25-0.30)	0.35 (0.30-0.40)



## CUTTING DATA



452302, 453302, 463302, 455302, 456302 (HSS-E Chucking, HSS-E Morse Taper)

VDI MATERIAL GROUP	HRC	v <sub>c</sub> (m/min)	f <sub>n</sub> (mm/rev)						
			ø2.0 - 4.9	ø5.0 - 8.9	ø9.0 - 12.9	ø13.0 - 19.9	ø20.0 - 30.0	>ø30.0	
<b>P</b>	1-5 Non-alloy Steel	<25	<b>14</b> (12-16)	0.10 (0.05-0.15)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)	0.32 (0.25-0.40)	0.42 (0.35-0.50)
	6-9 Low alloy Steel	25-35	<b>11</b> (10-12)	0.08 (0.05-0.10)	0.12 (0.08-0.16)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)	0.35 (0.30-0.40)
	10-11 High alloy Steel, Tool Steel	35-45	<b>5</b> (4-6)	0.06 (0.03-0.08)	0.08 (0.06-0.10)	0.12 (0.08-0.15)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)
<b>M</b>	12-13 Stainless Steel		<b>5</b> (4-6)	0.06 (0.03-0.08)	0.08 (0.06-0.10)	0.12 (0.08-0.15)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)
<b>K</b>	15-16 Grey Cast Iron		<b>13</b> (12-14)	0.10 (0.05-0.15)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)	0.32 (0.25-0.40)	0.42 (0.35-0.50)
	17-20 Nodular/ Malleable Cast Iron		<b>11</b> (10-12)	0.08 (0.05-0.10)	0.12 (0.08-0.16)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)	0.35 (0.30-0.40)
<b>N</b>	21-24 Aluminium Si<12%		<b>18</b> (16-20)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)	0.32 (0.25-0.40)	0.42 (0.35-0.50)	0.50 (0.40-0.60)
	26-28 Copper, Copper Alloys		<b>17</b> (16-18)	0.15 (0.10-0.20)	0.20 (0.15-0.25)	0.25 (0.20-0.30)	0.32 (0.25-0.40)	0.42 (0.35-0.50)	0.50 (0.40-0.60)
	29.1 Plastics, Acrylics		<b>10</b> (8-12)	0.15 (0.10-0.20)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.45 (0.40-0.50)	0.55 (0.50-0.60)	0.70 (0.60-0.80)

v<sub>c</sub> - cutting speed (m/min)  
 n - RPM (rev/min)  
 f<sub>z</sub> - feed rate (mm/tooth)  
 f<sub>n</sub> - feed rate (mm/rev)  
 z - No. of teeth  
 a<sub>p</sub> - axial depth of cut  
 a<sub>e</sub> - radial depth of cut

$$\text{To calculate RPM from cutting speed: } n = \frac{v_c \cdot 1000}{\pi \cdot \phi}$$

$$\text{To calculate cutting speed from RPM: } v_c = \frac{n \cdot \pi \cdot \phi}{1000}$$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.



## CUTTING DATA



454302 (HSS-E Quick Spiral)									
VDI MATERIAL GROUP		HRc	v <sub>c</sub> (m/min)	f <sub>n</sub> (mm/rev)					
				ø2.0 - 4.9	ø5.0 - 8.9	ø9.0 - 12.9	ø13.0 - 19.9	ø20.0 - 30.0	
<b>P</b>	1-5	Non-alloy Steel	<25	<b>17</b> <b>(16-18)</b>	0.12 (0.08-0.16)	0.21 (0.16-0.25)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.35 (0.30-0.40)
	6-9	Low alloy Steel	25-35	<b>15</b> <b>(14-16)</b>	0.12 (0.08-0.16)	0.21 (0.16-0.25)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.35 (0.30-0.40)
<b>N</b>	21-24	Aluminium Si<12%		<b>20</b> <b>(18-22)</b>	0.15 (0.10-0.20)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.50 (0.40-0.60)	0.50 (0.40-0.60)
	26-28	Copper, Copper Alloys		<b>18</b> <b>(16-20)</b>	0.12 (0.08-0.16)	0.21 (0.16-0.25)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.35 (0.30-0.40)
	29.1	Plastics, Acrylics		<b>13</b> <b>(12-14)</b>	0.15 (0.10-0.20)	0.25 (0.20-0.30)	0.35 (0.30-0.40)	0.50 (0.40-0.60)	0.50 (0.40-0.60)

v<sub>c</sub> - cutting speed (m/min)  
 n - RPM (rev/min)  
 f<sub>z</sub> - feed rate (mm/tooth)  
 f<sub>n</sub> - feed rate (mm/rev)  
 z - No. of teeth  
 a<sub>p</sub> - axial depth of cut  
 a<sub>e</sub> - radial depth of cut

$$\text{To calculate RPM from cutting speed: } n = \frac{v_c * 1000}{\pi * \phi}$$

$$\text{To calculate cutting speed from RPM: } v_c = \frac{n * \pi * \phi}{1000}$$

All recommendations are based on ideal machining conditions. Adjustments may need to be made according to your set-up. The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.