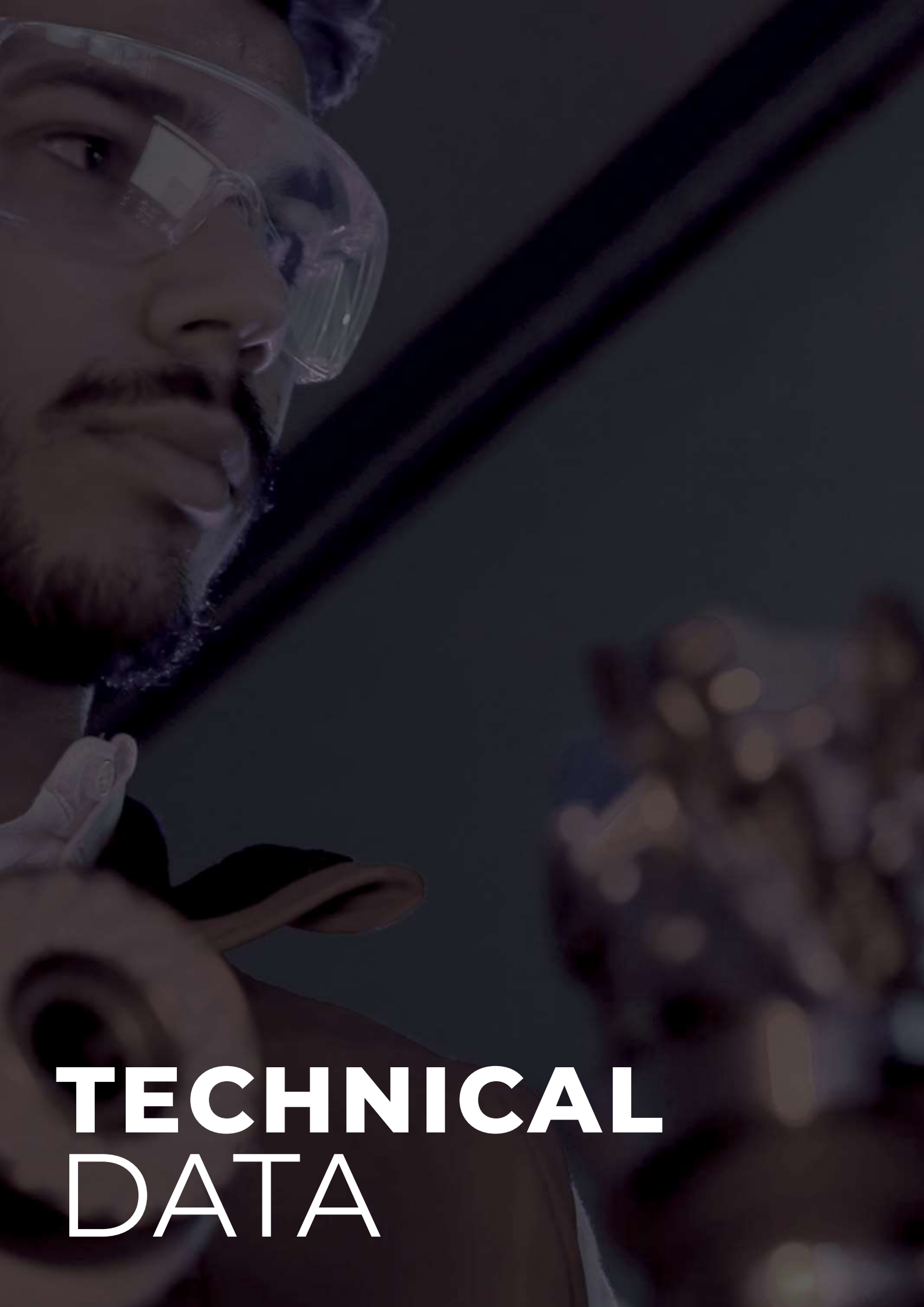


TECHNICAL DATA

1 HOLEMAKING GRADES

> See page B - 442

2 TDS AND TDC DRILL TYPE

> See page B - 445

3 SCS AND SCC DRILL TYPE

> See page B - 448

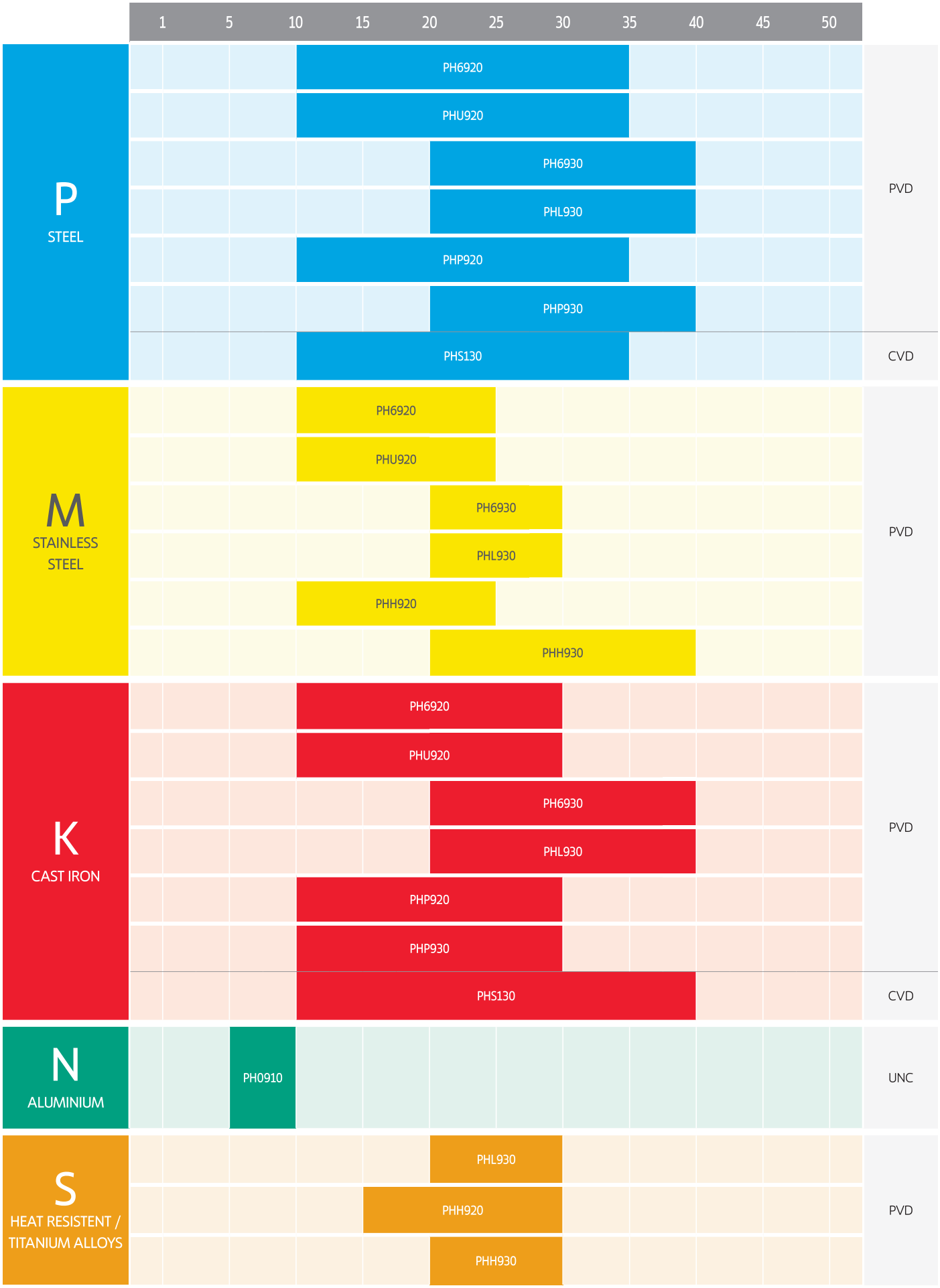
4 DHS, DHC AND TFD DRILL TYPE

> See page B - 449

5 VORTEX DRILL - CUTTING PARAMETERS AND ADJUSTMENTS

> See page B - 450

TECHNICAL DATA Dados técnicos | Datos técnicos



palbit

PVD GRADES

PH6920
P10-P35
M10-M25
K10-K30

Coated grade over a tough wear resistance substrate for general purpose machining.

PHU920
P10-P35
M10-M25
K10-K30

With high thermal shock resistance and suitable for dry and wet machining, the PHU920 grade is recommended for steels, stainless steels and cast iron.

PH6930
P20-P40
M20-M30
K20-K40

Grade suitable for applications with instability conditions. Excellent solution for medium cutting speed applications.

PHL930
P20-P40
M20-M30
K20-K40
S20-S30

Grade suitable for applications with instability conditions. Excellent solution for medium cutting speed applications. Coated in Yellow to be visually distinguishable.

PHP930
P20-P40
K10-K30

PHH930
M20-M40
S20-S30

Due to the reduced cutting speed in the central area of the drill, a tougher grade is recommended for the inner insert.
(Inner Insert)

PHP920
P10-P35
K10-K30

PHH920
M10-M25
S15-S30

First choice for stable machining and improved surface finish. Recommended for outer edge if chattering occurs.
(Outer Insert)

PH0910
N05-N10

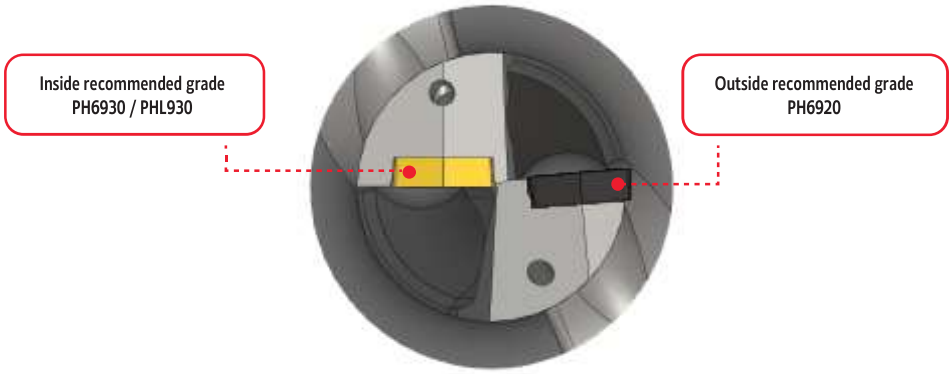
Uncoated carbide micro-grain grade combining a good abrasive wear resistance and toughness. Suitable for rough to finish operations of aluminum alloys.

CVD GRADE

PHS130
P10-P35
K20-K40

First choice for high speeds and high efficiency machining, abrasion resistance and longer tool life.
(Outer Insert)

GRADES RECOMMENDATION FOR HOLEMAKING SYSTEMS



Note: This recommendation should be applied on High Alloy Steels, Stainless Steels and HRSA materials.

PHU920

Combining both excellent thermal resistance and excellent surface quality, the PHU920 grade is recommended for steels ,stainless steels and cast iron.

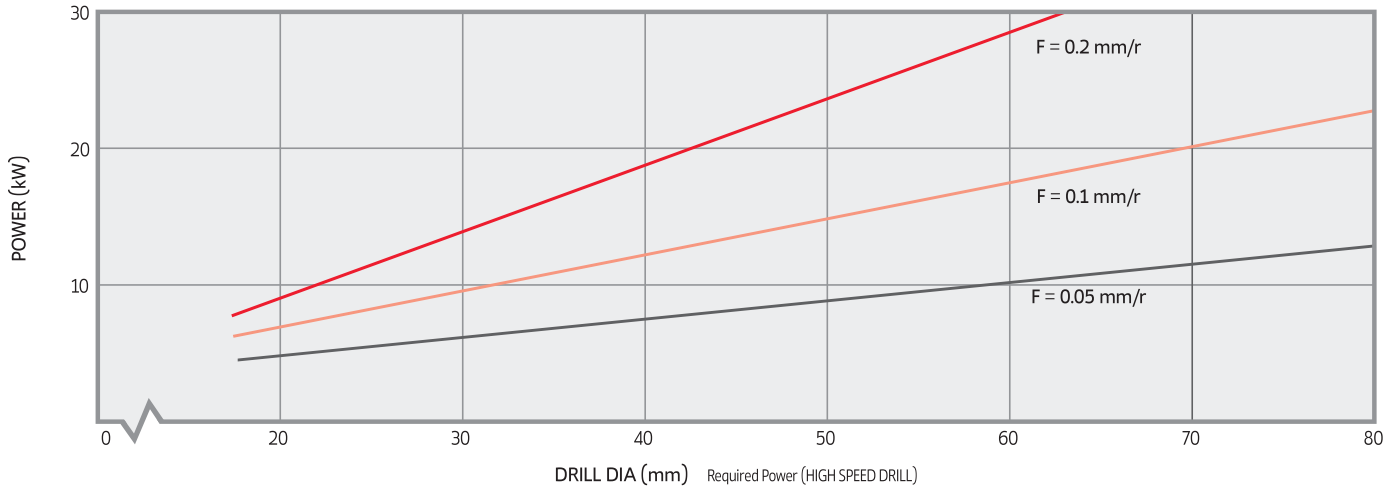
Because of its surface quality and thermal resistance it is able to prevent built-up-edge in both low-alloy steels and stainless steels, making it a very versatile grade.

- **High thermal shock resistance**
- **Carefully engineered surface quality**
- **Suitable for dry and wet machining**
- **Color: Grey**

RECOMMENDED SPEEDS AND FEEDS

ISO	Material Group Grupo Materiais Grupo Materiales	Vc (m/min)	f (mm/rev)						
			Ø13~15,5	Ø16~20	Ø20,5~25	Ø25,5~30	Ø31~41	Ø42~58	Ø59~80
P	Unalloyed steel (-0,25%)	180-260	0,05-0,08	0,06-0,10	0,07-0,12	0,09-0,15	0,11-0,18	0,15-0,28	0,11-0,18
	Low-alloy steel (0,25%-)	150-240	0,05-0,08	0,06-0,10	0,07-0,12	0,09-0,15	0,11-0,18	0,15-0,28	0,11-0,18
	Low-alloy steel	120-240	0,05-0,08	0,06-0,10	0,07-0,12	0,09-0,15	0,11-0,18	0,15-0,28	0,11-0,18
	High-alloy steel	130-220	0,05-0,08	0,06-0,10	0,07-0,12	0,09-0,15	0,11-0,18	0,15-0,28	0,11-0,18
M	Stainless steel	150-220	0,04-0,08	0,05-0,09	0,06-0,12	0,07-0,13	0,08-0,16	0,10-0,20	0,08-0,16
K	Grey cast iron	150-250	0,05-0,11	0,07-0,13	0,08-0,12	0,10-0,18	0,14-0,26	0,18-0,35	0,14-0,26
	Cast iron with nodular cast	120-200	0,05-0,11	0,06-0,13	0,07-0,12	0,08-0,18	0,14-0,26	0,18-0,35	0,14-0,26
N	Aluminium forging alloys	180-280	0,04-0,06	0,07-0,12	0,08-0,13	0,09-0,15	0,12-0,20	0,08-0,13	0,09-0,15
	Aluminium cast alloys	120-270	0,04-0,06	0,06-0,12	0,08-0,13	0,09-0,15	0,12-0,20	0,08-0,13	0,09-0,15

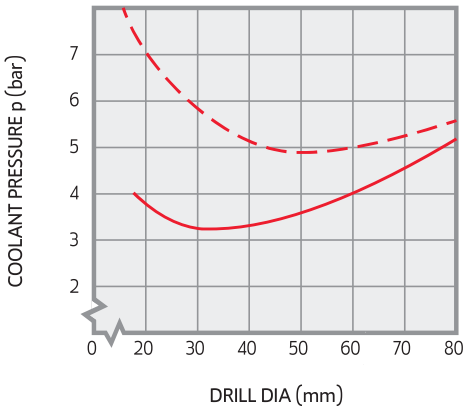
POWER REQUIREMENTS



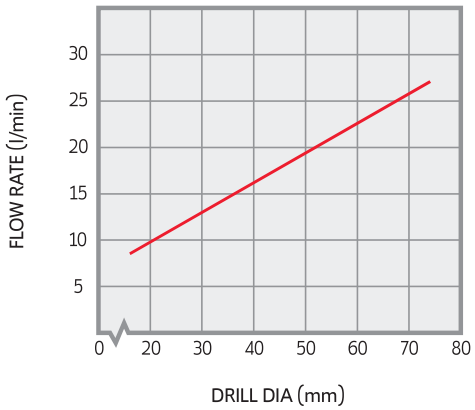
• These chart is based on machining experiences using steels with a hardness of 200-250HB and cutting speed of 100m/min.
• For cast iron the effective power requirement is around 30% lower.

COOLANT APPLICATION CHART

Coolant pressure



Flow rate



HOLE TOLERANCE AND MAXIMUM HOLE SIZE WITH RADIAL ADJUSTMENT

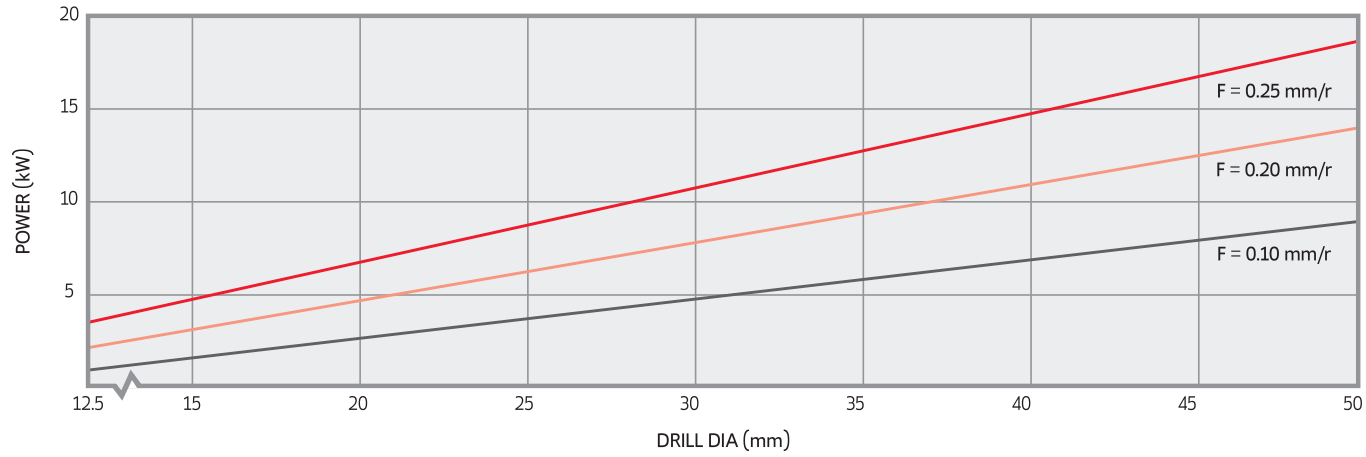
Drill D	Radial Adjust	Max Hole D
13.00	1.50	16.00
13.50	1.50	16.50
14.00	1.50	17.00
14.50	1.50	17.50
15.00	1.50	18.00
15.50	1.50	18.50
16.00	1.50	19.00
16.50	1.50	19.50
17.00	1.50	20.00
17.50	1.50	20.50
18.00	1.40	20.80
18.50	1.30	21.10
19.00	1.20	21.40
20.00	1.00	22.00
21.00	1.60	24.20
22.00	1.50	25.00
23.00	1.25	25.50
24.00	1.00	26.00
25.00	0.80	26.60
26.00	2.50	31.00
27.00	2.20	31.40
28.00	2.10	32.20
29.00	1.80	32.60
30.00	1.50	33.00
31.00	3.50	38.00
32.00	3.20	38.40

Drill D	Radial Adjust	Max Hole D
33.00	3.00	39.00
34.00	2.80	39.60
35.00	2.50	40.00
36.00	2.30	40.60
37.00	2.00	41.00
38.00	1.80	41.60
39.00	1.50	42.00
40.00	1.20	42.40
41.00	1.00	43.00
42.00	4.20	50.40
43.00	4.00	51.00
44.00	3.70	51.40
45.00	3.50	52.00
46.00	3.30	52.60
47.00	3.00	53.00
48.00	2.70	53.40
49.00	2.50	54.00
50.00	2.20	54.40
51.00	2.00	55.00
52.00	1.80	55.60
53.00	1.50	56.00
54.00	1.20	56.40
55.00	0.80	56.60
56.00	0.60	57.20
58.00	0.40	58.80

RECOMMENDED SPEEDS AND FEEDS

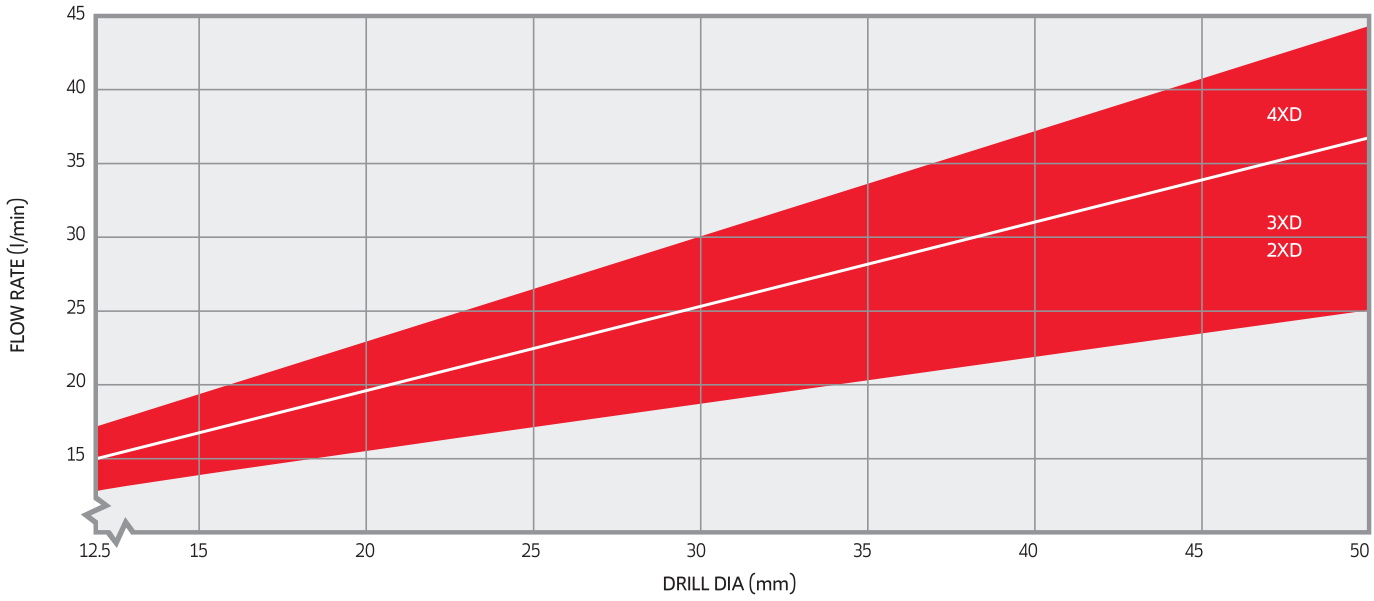
ISO	Material Group Grupo Materiais Grupo Materiales	Vc (m/min)	f (mm/rev)								
			Ø12,5~15	Ø15,5~21,5	Ø22~27,5	Ø28~33	Ø34~41	Ø42~50	Ø50~60	Ø60~75	Ø75~80
P	Unalloyed steel (-0,25%)	180-250	0,05-0,08	0,06-0,10	0,06-0,12	0,07-0,13	0,08-0,15	0,08-0,16	0,06-0,12	0,08-0,12	0,08-0,12
	Low-alloy steel (0,25%-)	160-220	0,06-0,12	0,08-0,15	0,10-0,18	0,12-0,22	0,12-0,24	0,13-0,25	0,10-0,14	0,12-0,18	0,11-0,18
	Low-alloy steel	150-220	0,06-0,12	0,08-0,14	0,10-0,18	0,12-0,22	0,12-0,23	0,13-0,24	0,08-0,15	0,10-0,18	0,10-0,18
	High-alloy steel	130-180	0,06-0,10	0,08-0,15	0,10-0,20	0,12-0,23	0,12-0,24	0,13-0,25	0,08-0,14	0,09-0,15	0,09-0,14
M	Stainless steel	170-240	0,05-0,10	0,06-0,12	0,08-0,15	0,09-0,16	0,10-0,17	0,11-0,19	0,06-0,13	0,08-0,15	0,08-0,14
K	Grey cast iron	180-250	0,06-0,12	0,08-0,16	0,12-0,20	0,15-0,25	0,16-0,28	0,18-0,30	0,12-0,20	0,15-0,20	0,15-0,20
	Cast iron with nodular cast	130-200	0,06-0,10	0,08-0,15	0,10-0,18	0,12-0,20	0,15-0,23	0,16-0,25	0,10-0,15	0,09-0,18	0,10-0,18

POWER REQUIREMENTS



- These chart is based on machining experiences using steels with a hardness of 200-250HB and cutting speed of 100m/min.
- For cast iron the effective power requirement is around 30% lower.

COOLANT APPLICATION CHART



JET DRILLS SCS & SCC DRILL TYPE

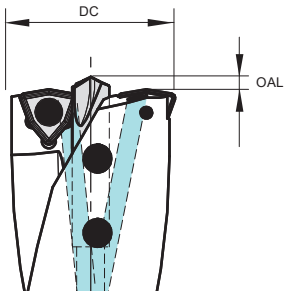
HOLE TOLERANCE AND MAXIMUM HOLE SIZE WITH RADIAL ADJUSTMENT

Drill D	3xD		
	Normal	Radial Adjust	Max. Hole D
13	13.16	0.50	14.0
14	14.10	0.50	15.0
15	15.10	0.50	16.0
16	16.07	0.50	17.0
17	17.08	0.50	18.0
18	18.05	0.50	19.0
19	19.08	0.50	20.0
20	20.06	0.50	21.0
21	20.97	0.25	21.5
22	21.94	0.50	23.0
23	23.10	0.50	24.0
24	24.10	0.50	25.0
25	25.06	0.50	26.0
26	26.03	0.25	26.5
27	27.05	0.25	27.5
28	28.11	0.50	29.0
29	28.54	0.50	30.0
30	30.23	0.50	31.0
31	31.07	0.25	31.5
32	32.06	0.25	32.5
33	33.12	0.25	33.5
34	34.10	0.50	35.0
35	35.07	0.50	36.0
36	36.03	0.50	37.0
37	37.14	0.50	38.0
38	38.05	0.50	39.0
39	39.03	0.50	40.0
40	40.00	0.25	40.5
41	40.99	0.25	41.5
42	42.03	0.50	43.0
43	42.99	0.50	44.0
44	44.17	0.50	45.0
45	45.21	0.50	46.0
46	46.17	0.50	47.0
47	47.15	0.50	48.0
48	48.12	0.25	48.5
49	49.00	0.25	49.5
50	50.02	0.25	50.5

Drill D	4xD		
	Normal	Radial Adjust	Max. Hole D
13	13.22	0.50	14.0
14	14.15	0.50	15.0
15	15.17	0.50	16.0
16	16.09	0.50	17.0
17	17.13	0.50	18.0
18	18.20	0.50	19.0
19	19.18	0.50	20.0
20	20.05	0.50	21.0
21	21.00	0.25	21.5
22	22.01	0.50	23.0
23	23.10	0.50	24.0
24	24.15	0.50	25.0
25	25.13	0.50	26.0
26	26.09	0.25	26.5
27	26.96	0.25	27.5
28	27.97	0.50	29.0
29	29.07	0.50	30.0
30	30.13	0.50	31.0
31	31.12	0.25	31.5
32	32.11	0.25	32.5
33	33.17	0.25	33.5
34	34.15	0.50	35.0
35	35.12	0.50	36.0
36	36.08	0.50	37.0
37	37.19	0.50	38.0
38	38.08	0.50	39.0
39	39.08	0.50	40.0
40	40.05	0.25	40.5
41	41.04	0.25	41.5
42	42.08	0.50	43.0
43	43.04	0.50	44.0
44	44.22	0.50	45.0
45	45.26	0.50	46.0
46	46.23	0.50	47.0
47	47.20	0.50	48.0
48	48.17	0.25	48.5
49	49.05	0.25	49.5
50	50.07	0.25	50.5

INTEGREX DRILLS DHS, DHC, TFD DRILL TYPE

PILOT DRILL ADJUSTEMENT

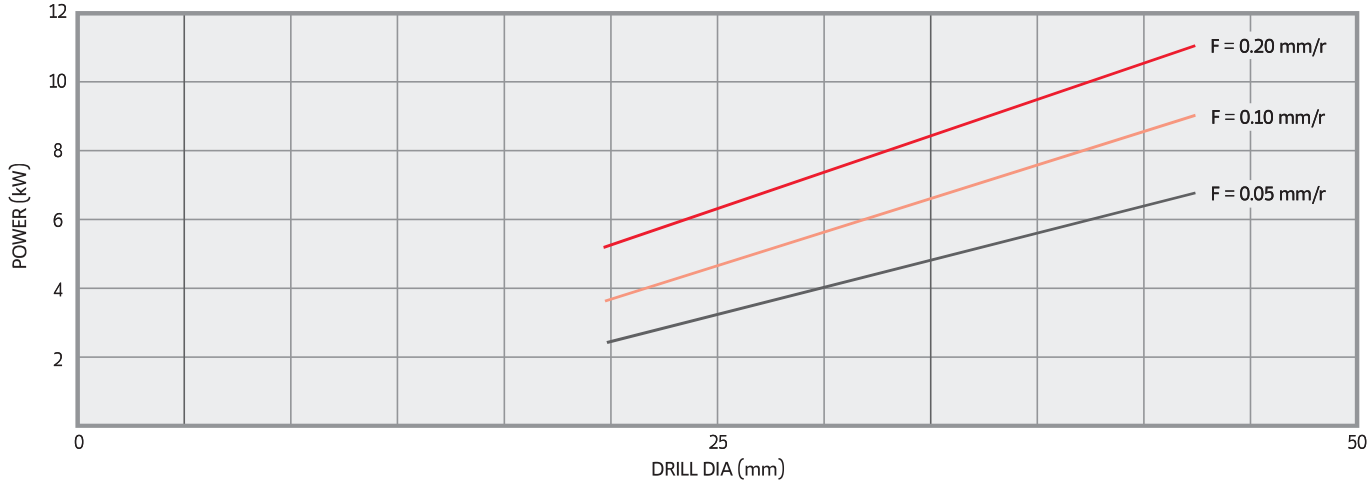


DC	OAL
18-24	2,5
25-30	3,0
31-39	4,0
40-59	4,5
60-80	5,0

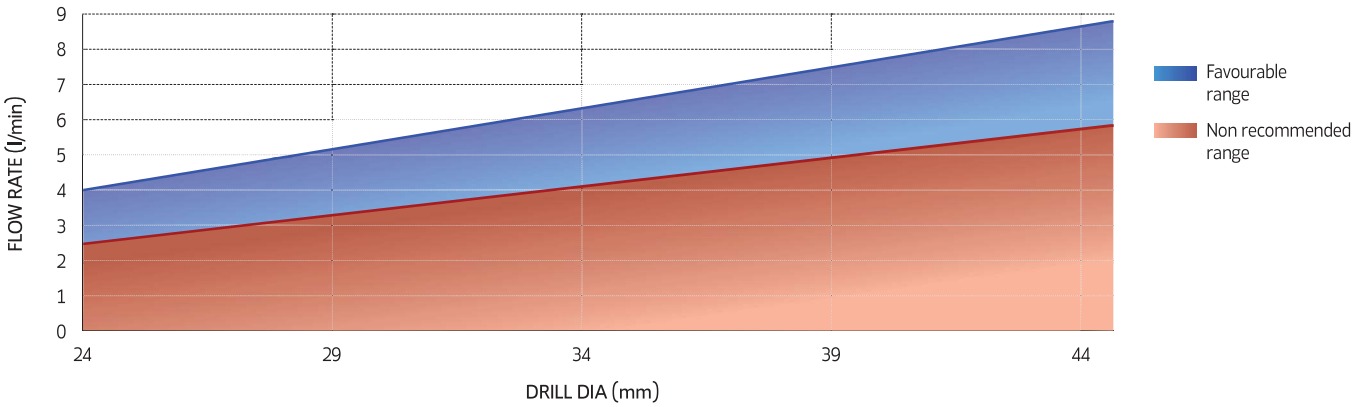
RECOMMENDED SPEEDS AND FEEDS

ISO	Material Group Grupo Materiais Grupo Materiales	Vc (m/min)	f (mm/rev)						
			Ø25	Ø26~30	Ø31~40	Ø41~50	Ø51~59	Ø60~75	Ø75~80
P	Unalloyed steel (-0,25%)	130-190	0,06-0,10	0,07-0,11	0,08-0,12	0,10-0,14	0,14-0,20	0,08-0,12	0,10-0,14
	Low-alloy steel (0,25%-)	130-190	0,06-0,10	0,07-0,11	0,08-0,12	0,10-0,14	0,12-0,18	0,08-0,12	0,10-0,14
	Low-alloy steel (-HB300)	100-140	0,06-0,10	0,07-0,11	0,08-0,12	0,10-0,14	0,12-0,18	0,08-0,12	0,10-0,14
	High-alloy steel (HB300-)	60-100	0,05-0,07	0,05-0,07	0,06-0,08	0,06-0,10	0,09-0,13	0,06-0,08	0,06-0,10
M	Stainless steel	60-110	0,04-0,07	0,04-0,11	0,06-0,12	0,08-0,14	0,10-0,18	0,06-0,12	0,08-0,14
K	Grey cast iron	130-190	0,07-0,13	0,07-0,15	0,08-0,16	0,10-0,18	0,12-0,22	0,08-0,16	0,10-0,18
	Cast iron with nodular cast	110-190	0,04-0,13	0,07-0,15	0,08-0,16	0,10-0,25	0,12-0,26	0,08-0,16	0,10-0,25

POWER REQUIREMENTS



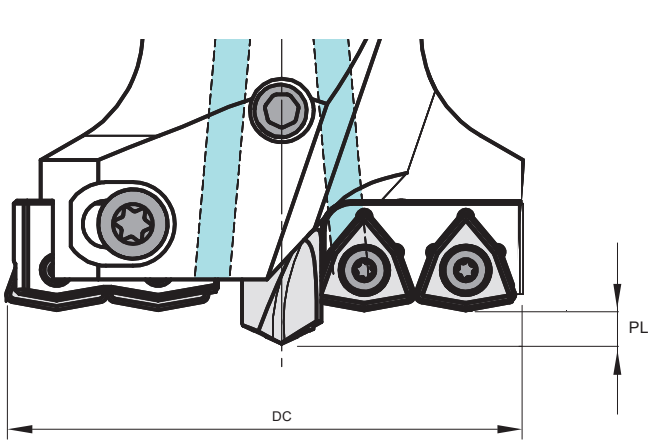
COOLANT APPLICATION CHART

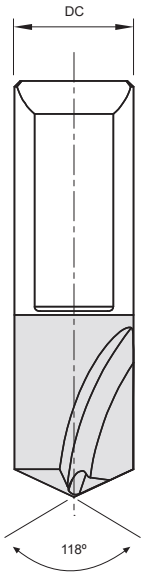


VORTEX DRILLS CUTTING PARAMETERS AND ADJUSTMENTS

Parâmetros de corte e ajustes | Condiciones de corte y ajustes

PILOT DRILL ADJUSTEMENT



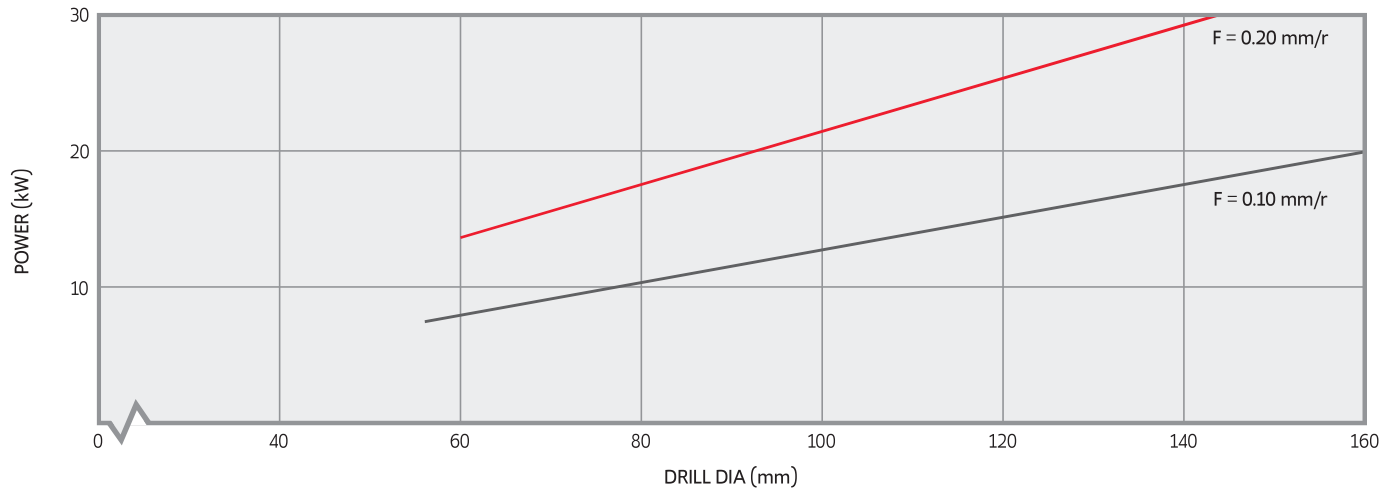


DC (mm)	2D to 4D	4D to 6D	> 6D
	PL	PL	PL
45-55	4,0	4,2	4,4
55-75	5,4	5,6	5,8
75-100	6,5	6,8	7,1
100-120	7,7	8,1	8,5
120-170	9,9	10,3	10,7
170-180	12,2	12,6	13,0

RECOMMENDED SPEEDS AND FEEDS

ISO	Material Group Grupo Materiais Grupo Materiales	Vc (m/min)	f (mm/rev)						
			Ø45~55	Ø55~60	Ø60~75	Ø75~100	Ø100~105	Ø105~150	Ø150~180
P	Unalloyed steel (-0,25%)	120-180	0,06-0,10	0,07-0,11	0,08-0,12	0,10-0,14	0,14-0,20	0,08-0,12	0,10-0,14
	Low-alloy steel (0,25%-)	110-170	0,06-0,10	0,07-0,11	0,08-0,12	0,10-0,14	0,12-0,18	0,08-0,12	0,10-0,14
	Low-alloy steel (-HB300)	90-130	0,06-0,10	0,07-0,11	0,08-0,12	0,10-0,14	0,12-0,18	0,08-0,12	0,10-0,14
	High-alloy steel (HB300-)	60-100	0,05-0,07	0,05-0,07	0,06-0,08	0,06-0,10	0,09-0,13	0,06-0,08	0,06-0,10
M	Stainless steel	60-110	0,04-0,07	0,04-0,11	0,06-0,12	0,08-0,14	0,10-0,18	0,06-0,12	0,08-0,14
K	Grey cast iron	120-180	0,07-0,13	0,07-0,15	0,08-0,16	0,10-0,18	0,12-0,22	0,08-0,16	0,10-0,18
	Cast iron with nodular cast	100-180	0,04-0,13	0,07-0,15	0,08-0,16	0,10-0,25	0,12-0,26	0,08-0,16	0,10-0,25

POWER REQUIREMENTS



• These chart is based on machining experiences using steels with a hardness of 200-250HB and cutting speed of 100m/min.

COOLANT APPLICATION CHART