

 **OSAWA**
D R I L L S & E N D M I L L S

CATALOGUE 2011

G2 - General purpose



G2

🇬🇧 A new generation of general-purpose endmills, featuring new cutting geometries and innovative coatings for enhanced performance.

The answer given by Osawa to the market demand for higher performance tools.

An extremely competitive price, thanks to a fully optimized manufacturing process and to large production batches.

🇮🇹 Una nuova generazione di frese per uso generico, dotate di geometria di taglio e rivestimenti innovativi per garantirne prestazioni ancora più elevate.

La risposta forte di Osawa a un mercato che chiede utensili sempre più performanti.

Un prezzo estremamente competitivo, grazie all'ottimizzazione del processo produttivo e agli alti volumi di produzione.

🇩🇪 Eine neue Generation von Fräsern für allgemeine Anwendung, mit neuer Schnittgeometrie und innovativen Beschichtungen für noch höheren Leistungen

Die starke Entgegnung von Osawa zu einem Markt, der immer leistungs-fähigere Werkzeuge erfordert.

Extrem konkurrenzfähiger Preis durch optimale Produktionsprozesse und große Produktionsumfänge

🇫🇷 Une nouvelle génération de fraises passe-partout, caractérisées par une géométrie de coupe innovante et des nouveaux revêtements, qui garantissent des performance encore plus hautes.

La réponse de Osawa à un marché qui demande des outils de plus en plus performants.

Un prix extrêmement compétitif, grâce à l'optimisation du procès d'affûtage et à des volumes de production très importants.



G2
PV200 COATING
MICROGRAIN

GENERAL PURPOSE · USO GENERICO
ALLGEMEINE ANWENDUNGEN · APPLICATIONS GÉNÉRIQUES

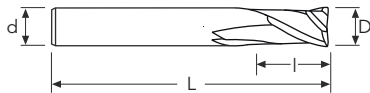


GB205 - G2CS2

Ø mm	-6	6.5~12	13~20
tol. D μ	0 / -20	0 / -25	0 / -30

G2210 - G2211 - G2212 - G2213

Ø mm	-6	6.5~12	13~20
tol. D μ	0 / -30	0 / -35	0 / -40



MG	MG	MG	MG	MG	MG
BR	PV200	PV200	PV200	PV200	PV200
N	N	N	N	N	N

D	d	l	L	Stock	Stock	Stock	Stock	Stock	Stock
mm 1	4	3	50	●	●				
1.5	4	4.5	50	●	●				
2	4	6	50	●	●				
2	4	9	75			●			
2.5	4	7	50		●				
3	4	8	50	●	●				
3	4	15	75			●			
3.5	4	10	50		●				
4	4	11	50	●	●				
4	4	20	75			●			
4.5	6	13	50		●				
5	6	13	50	●	●				
5	6	25	75			●			
5	6	30	100				●		
5.5	6	13	50		●				
6	6	15	50	●	●				
6	6	25	75			●			
6	6	30	100				●		
6.5	8	17	60		●				
7	8	17	60		●				
7	8	35	100				○		
7.5	8	17	60		●				
8	8	20	60	●	●				
8	8	35	100				●		
8	8	40	150					●	
8.5	10	23	75		●				
9	10	23	75		●				
9	10	40	100				○		
10	10	25	75	●	●				
10	10	40	100				●		
10	10	50	150					●	
10.5	12	25	75		●				
11	12	28	75		●				
11	12	45	100				○		
12	12	30	75	●	●				
12	12	45	100				●		

● stock standard ○ non-standard stock EX stock exhaustion

n **Vf**
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**OSAWA
NORM**

GB205 - G2CS2

Ø mm	-6	6.5~12	13~20
tol. D µ	0 / -20	0 / -25	0 / -30

G2210 - G2211 - G2212 - G2213

Ø mm	-6	6.5~12	13~20
tol. D µ	0 / -30	0 / -35	0 / -40



				MG BR	MG PV200	MG PV200	MG PV200	MG PV200	MG PV200
				N	N	N	N	N	N
D	d	l	L	Stock	Stock	Stock	Stock	Stock	Stock
mm 12	12	50	150					●	
14	14	26	83		●				
16	16	32	92		●				
16	16	70	150					●	
16	16	40	200						○
18	20	40	100		●				
18	20	80	150					○	
20	20	40	100		●				
20	20	80	150					○	
20	20	40	200						○

● stock standard ○ non-standard stock EX stock exhaustion

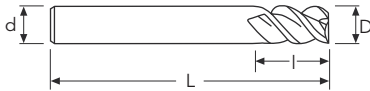


GB305 - G2CSH3

Ø mm	-6	6.5~12	13~20
tol. D µ	0 / -20	0 / -25	0 / -30

G2310 - G2311 - G2312

Ø mm	-6	6.5~12	13~20
tol. D µ	0 / -30	0 / -35	0 / -40



MG	MG	MG	MG	MG
BR	PV200	PV200	PV200	PV200
N	N	N	N	N

D	d	l	L	Stock	Stock	Stock	Stock	Stock
mm 1	4	3	50	●	●			
1.5	4	4.5	50	●	●			
2	4	6	50	●	●			
2	4	9	75			●		
2.5	4	7	50		●			
3	4	8	50	●	●			
3	4	15	75			●		
3.5	4	10	50		●			
4	4	11	50	●	●			
4	4	20	75			●		
4.5	6	13	50		●			
5	6	13	50	●	●			
5	6	25	75			●		
5	6	30	100				●	
5.5	6	13	50		●			
6	6	15	50	●	●			
6	6	25	75			●		
6	6	30	100				●	
6.5	8	17	60		●			
7	8	17	60		●			
7	8	35	100				○	
7.5	8	17	60		○			
8	8	20	60	●	●			
8	8	35	100				●	
8	8	40	150					●
8.5	10	23	75		○			
9	10	23	75		●			
9	10	40	100				○	
10	10	25	75	●	●			
10	10	40	100				●	
10	10	50	150					●
10.5	12	25	75		○			
11	12	28	75		●			
11	12	45	100				○	
12	12	30	75	●	●			
12	12	45	100				●	

● stock standard ○ non-standard stock EX stock exhaustion



OSAWA
NORM

GB305 - G2CSH3

Ø mm	-6	6.5~12	13~20
tol. D µ	0 / -20	0 / -25	0 / -30

G2310 - G2311 - G2312

Ø mm	-6	6.5~12	13~20
tol. D µ	0 / -30	0 / -35	0 / -40



				MG BR	MG PV200	MG PV200	MG PV200	MG PV200
				N	N	N	N	N
D	d	l	L	Stock	Stock	Stock	Stock	Stock
mm 12	12	50	150					●
14	13	26	83		●			
16	16	32	92		●			
16	16	70	150					●
18	20	40	100		○			
18	20	80	150					●
20	20	40	100		●			
20	20	80	150					●

● stock standard ○ non-standard stock EX stock exhaustion

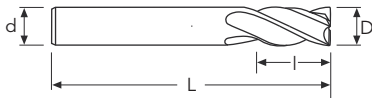


GB405 - G2CS4

Ø mm	-6	6.5~12	13~20
tol. D µ	0 / -20	0 / -25	0 / -30

G2410 - G2411 - G2412 - G2413

Ø mm	-6	6.5~12	13~20
tol. D µ	0 / -30	0 / -35	0 / -40



MG	MG	MG	MG	MG	MG
BR	PV200	PV200	PV200	PV200	PV200
N	N	N	N	N	N

D	d	l	L	Stock	Stock	Stock	Stock	Stock	Stock
mm 1	4	3	50	●	●				
1.5	4	4.5	50	●	●				
2	4	6	50	●	●				
2	4	9	75			●			
2.5	4	7	50		●				
3	4	8	50	●	●				
3	4	15	75			●			
3.5	4	10	50		●				
4	4	11	50	●	●				
4	4	20	75			●			
4.5	6	13	50		●				
5	6	13	50	●	●				
5	6	25	75			●			
5	6	30	100				●		
5.5	6	13	50		●				
6	6	15	50	●	●				
6	6	25	75			●			
6	6	30	100				●		
6.5	8	17	60		●				
7	8	17	60		●				
7	8	35	100				○		
7.5	8	17	60		○				
8	8	20	60	●	●				
8	8	35	100				●		
8	8	40	150					●	
8.5	10	23	75		○				
9	10	23	75		●				
9	10	40	100				○		
10	10	25	75	●	●				
10	10	40	100				●		
10	10	50	150					●	
10.5	12	25	75		○				
11	12	28	75		●				
11	12	45	100				○		
12	12	30	75	●	●				
12	12	45	100				●		

● stock standard ○ non-standard stock EX stock exhaustion

n **Vf**
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**OSAWA
NORM**

GB405 - G2CS4

Ø mm	-6	6.5~12	13~20
tol. D µ	0 / -20	0 / -25	0 / -30

G2410 - G2411 - G2412 - G2413

Ø mm	-6	6.5~12	13~20
tol. D µ	0 / -30	0 / -35	0 / -40



				MG BR	MG PV200	MG PV200	MG PV200	MG PV200	MG PV200	
				N	N	N	N	N	N	
D	d	l	L	Stock	Stock	Stock	Stock	Stock	Stock	
mm 12	12	50	150					●		
14	14	26	83		●					
16	16	32	92		●					
16	16	70	150					●		
16	16	40	200						●	
18	20	40	100		●					
18	20	80	150					○		
20	20	40	100		●					
20	20	80	150					●		
20	20	40	200						●	

● stock standard ○ non-standard stock EX stock exhaustion

n **Vf**
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**OSAWA
NORM**

G2CSFR

Ø mm	~20
tol. D µ	0 / -50

NEW

G2CSFR



D	d	l	L	Z	Stock
mm 6	6	15	50	3	●
8	8	20	60	3	●
10	10	25	75	4	●
12	12	30	75	4	●
14	14	30	82	4	●
16	16	35	92	4	●
20	20	40	100	4	●

● stock standard ○ non-standard stock EX stock exhaustion


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OSAWA
NORM

G2CSHM

Ø mm	~6	6.5~12	13~20
tol. D µ	0 / -20	0 / -25	0 / -30

NEW

G2CSHM



D	d	l	L	Stock
mm 6	6	15	50	●
8	8	20	60	●
10	10	25	75	●
12	12	30	75	●
14	14	30	82	●
16	16	35	92	●
20	20	40	100	●

● stock standard ○ non-standard stock EX stock exhaustion

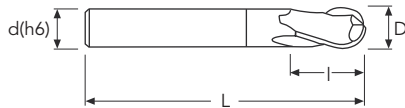


GB255 - G2CSB2 - G2CSB4

Ø mm	~6	7~12	14~20
tol. D µ	0 / -20	0 / -25	0 / -30
tol. R µ	±15	±15	0 / -30

G2250 - G2251

Ø mm	~6	7~12	14~20
tol. D µ	0 / -25	0 / -30	0 / -35
tol. R µ	±15	±15	0 / -30



				Z2 BALL	Z2 BALL	Z2 BALL	Z2 BALL	Z4 BALL
				MG	MG	MG	MG	MG
				BR	PV200	PV200	PV200	PV200
				N BALL NOSE	N BALL NOSE	N BALL NOSE	N BALL NOSE	N BALL NOSE
				30°	30°	30°	30°	30°
D	d	l	L	Stock	Stock	Stock	Stock	Stock
mm 1	4	2	50	●	●			○
1	4	2	75			●		
1.5	4	3	50	●	●			○
1.5	4	3	75			●		
2	4	4	50	●	●			●
2	4	4	75			●		
2.5	4	5	50		●			○
3	4	6	50	●	●			●
3	4	6	75			●		
4	4	8	50	●	●			●
4	4	8	75			●		
5	6	10	50	●	●			●
5	5	10	75			●		
6	6	12	50	●	●			●
6	6	12	100			●		
6	6	12	150				○	
7	8	14	60		○			○
8	8	16	60	●	●			●
8	8	16	100			●		
8	8	16	150				○	
9	10	18	75		○			○
10	10	20	75	●	●			●
10	10	20	100			●		
10	10	20	150				○	
12	12	24	75	●	●			●
12	12	24	100			●		
12	12	24	150				○	
16	16	30	92		●			○
16	16	30	150				○	
20	20	30	100		●			○
20	20	30	150				○	

● stock standard ○ non-standard stock EX stock exhaustion

HF400 - HF410R													
GROUP GRUPPO GRUPPE GROUPE	1	2	3	6		9		10 11		22		26	
Vc [m/min]	140~160		90~110		110~130		90~100		27~33		85~95		
HRC	~30		30~40										
N/mm ²	~1000		~1250										
Ø mm.	n	Vf	n	Vf	n	Vf	n	Vf	n	Vf	n	Vf	
3	15950	320	10600	210	13800	200	10100	190	3200	60	9550	190	
4	12000	390	7950	260	10350	250	7560	250	2400	65	7200	240	
5	9550	435	6400	300	8300	300	6050	300	1900	95	5730	280	
6	8000	510	5300	340	6900	360	5000	350	1600	110	4780	330	
8	6000	650	4000	430	5250	460	3800	460	1200	130	3580	430	
10	4800	780	3200	500	4150	580	3000	570	950	180	2860	530	
12	4000	800	2650	490	3450	570	2530	550	800	170	2400	530	
14	3450	700	2300	450	2950	520	2160	510	680	165	2050	480	
16	3000	660	1990	420	2600	480	1890	480	600	150	1790	450	
18	2650	660	1770	415	2300	470	1680	465	530	140	1600	440	
20	2400	650	1600	410	2070	450	1500	460	480	140	1430	440	
25	1950	530	1280	310	1660	380	1200	390	380	130	1150	360	
S ap x ae	DxD		DxD		DxD		DxD		Dx0.5D		DxD		
SM ap x ae	1.5Dx0.5D		1.5Dx0.5D		1.5Dx0.5D		1.5Dx0.5D		Dx0.25D		Dx0.25D		

↓ Z axis : Vf = -50%

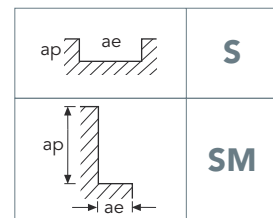
G2 - MDTA 2FL													
GROUP GRUPPO GRUPPE GROUPE	1	2	5 6		9 10 11		13 14		16		17 18 19		
Vc [m/min]	70~85		60~75		30~40		55~65		140~150		120~140		
HRC	~25		25~40										
N/mm ²	~850		850~1250										
Ø mm.	n	Vf	n	Vf	n	Vf	n	Vf	n	Vf	n	Vf	
1	24850	250	21650	170	11150	70	19100	190	47750	480	41400	330	
1.5	16550	265	14450	200	7450	75	12750	200	31850	510	27600	390	
2	12400	300	10850	220	5550	90	9550	230	23900	580	20700	420	
3	8300	330	7200	220	3700	110	6350	250	15900	640	13800	420	
4	6200	430	5400	270	2800	120	4800	340	11950	840	10350	520	
5	4950	450	4350	290	2250	125	3800	340	9550	860	8300	550	
6	4150	500	3600	330	1850	125	3200	380	7950	950	6900	620	
8	3100	500	2700	330	1400	130	2400	380	5950	950	5200	620	
10	2500	500	2150	330	1100	130	1900	380	4800	960	4150	620	
12	2050	450	1800	330	930	120	1600	350	4000	880	3450	620	
14	1750	420	1550	280	800	110	1350	325	3400	820	2950	530	
16	1550	400	1350	270	700	100	1200	315	3000	780	2600	520	
20	1250	350	1100	240	560	90	960	270	2400	680	2050	450	
S ap x ae	0.5DxD		0.3DxD		0.5DxD		0.5DxD		0.5DxD		0.5DxD		
SM ap x ae	1.5Dx0.1D		1.5Dx0.05D		1.5Dx0.1D		1.5Dx0.1D		1.5Dx0.1D		1.5Dx0.1D		

G2210 - G2211 - MDTA210 n & Vf = -30%

G2212 - G2213 - MDTACL2 n & Vf = -50%

GB205 - G2213 - MDCL2 n & Vf = -30%

↓ Z axis : Vf = -50%

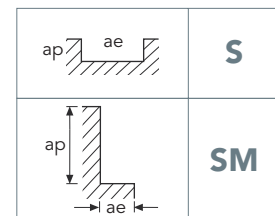


G2 - MDTA 3FL													
GROUP GRUPPO GRUPPE GROUPE	1 2		5 6		9 10 11		13 14		16		17 18 19		
	3 4												
Vc [m/min]	70~85		60~75		30~40		55~65		140~150		120~140		
HRC	~25		25~40										
N/mm ²	~850		850~1250										
Ø mm.	n	Vf	n	Vf	n	Vf	n	Vf	n	Vf	n	Vf	
1	24850	370	21650	260	11150	100	19100	290	47750	720	41400	500	
1.5	16550	400	14450	260	7450	110	12750	300	31850	760	27600	500	
2	12400	450	10850	260	5550	120	9550	340	23900	860	20700	500	
3	8300	500	7200	320	3700	130	6350	380	15900	950	13800	620	
4	6200	650	5400	410	2800	150	4800	500	11950	1250	10350	780	
5	4950	670	4350	430	2250	150	3800	510	9550	1290	8300	820	
6	4150	690	3600	430	1850	150	3200	530	7950	1320	6900	830	
8	3100	700	2700	450	1400	160	2400	540	5950	1340	5200	860	
10	2500	680	2150	430	1100	150	1900	530	4800	1310	4150	840	
12	2050	680	1800	430	930	150	1600	530	4000	1300	3450	830	
14	1750	630	1550	400	800	140	1350	490	3400	1230	2950	750	
16	1550	610	1350	370	700	130	1200	470	3000	1170	2600	700	
20	1250	530	1100	330	560	120	960	410	2400	1000	2050	620	
S ap x ae	0.5DxD		0.2DxD		0.3DxD		0.5DxD		0.5DxD		0.5DxD		
SM ap x ae	1.5Dx0.1D		1.5Dx0.05D		1.5Dx0.1D		1.5Dx0.1D		1.5Dx0.1D		1.5Dx0.1D		

G2310 - G2311 n & Vf = -30%
 G2312 n & Vf = -50%
 GB305 n & Vf = -30%
 ↓ Z axis : Vf = -50%

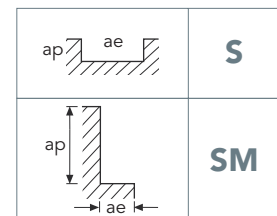
G2 - MDTA 4FL													
GROUP GRUPPO GRUPPE GROUPE	1 2		5 6		9 10 11		13 14		16		17 18 19		
	3 4												
Vc [m/min]	70~85		60~75		30~40		55~65		140~150		120~140		
HRC	~25		25~40										
N/mm ²	~850		850~1250										
Ø mm.	n	Vf	n	Vf	n	Vf	n	Vf	n	Vf	n	Vf	
1	24850	500	21650	340	11150	130	19100	380	47750	950	41400	660	
1.5	16550	530	14450	400	7450	150	12750	410	31850	1000	27600	660	
2	12400	600	10850	430	5550	180	9550	460	23900	1150	20700	660	
3	8300	670	7200	430	3700	220	6350	510	15900	1280	13800	830	
4	6200	860	5400	540	2800	250	4800	670	11950	1670	10350	1030	
5	4950	890	4350	570	2250	250	3800	680	9550	1720	8300	1100	
6	4150	1000	3600	650	1850	250	3200	700	7950	1750	6900	1100	
8	3100	1000	2700	650	1400	260	2400	720	5950	1790	5200	1150	
10	2500	1000	2150	650	1100	260	1900	700	4800	1730	4150	1120	
12	2050	900	1800	650	930	240	1600	700	4000	1750	3450	1100	
14	1750	840	1550	560	800	220	1350	650	3400	1640	2950	1000	
16	1550	810	1350	540	700	200	1200	630	3000	1560	2600	940	
20	1250	700	1100	500	560	170	960	550	2400	1350	2050	820	
SM ap x ae	1.5Dx0.1D		1.5Dx0.05D		1.5Dx0.1D		1.5Dx0.1D		1.5Dx0.1D		1.5Dx0.1D		

G2410 - G2411 - MDTA410 n & Vf = -30%
 G2412 - G2413 - MDTA414 n & Vf = -50%
 GB405 - G2213 - MDCL4 n & Vf = -30%



G2 HR - MDTA NR									
GROUP GRUPPO GRUPPE GROUPE	2 3 4		5 6		9 10 11		13 14		
Vc [m/min]	70~90		75~50		45~55		70~90		
HRC	~25		25~40						
N/mm ²	~850		850~1250						
Ø mm.	n	Vf	n	Vf	n	Vf	n	Vf	
6	4250	540	3600	330	2650	240	4250	540	
8	3200	540	2700	430	2000	320	3200	540	
10	2550	730	2150	450	1600	330	2550	730	
12	2100	700	1800	440	1350	330	2100	700	
14	1800	650	1550	400	1150	300	1800	650	
16	1600	640	1350	390	1000	290	1600	640	
18	1400	620	1200	370	880	270	1400	620	
20	1250	620	1100	370	800	270	1250	620	
25	1000	600	870	320	640	230	1000	600	
S ap x ae	0.7DxD		0.5DxD		0.3DxD		0.7DxD		

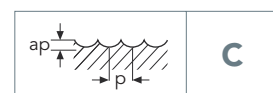
G2 HR - MDTA NR									
GROUP GRUPPO GRUPPE GROUPE	2 3 4		5 6		9 10 11		13 14		
Vc [m/min]	80~100		70~85		55~65		80~100		
HRC	~25		25~40						
N/mm ²	~850		850~1250						
Ø mm.	n	Vf	n	Vf	n	Vf	n	Vf	
6	4800	600	4250	380	3200	290	4800	600	
8	3600	600	3200	390	2400	290	3600	600	
10	2850	810	2550	530	1900	400	2850	810	
12	2400	800	2100	510	1600	390	2400	800	
14	2050	740	1800	470	1350	350	2050	740	
16	1800	720	1600	460	1200	350	1800	720	
18	1600	720	1400	420	1050	320	1600	720	
20	1450	720	1250	410	960	320	1450	720	
25	1150	700	1000	360	760	280	1150	700	
SM ap x ae	1.5Dx0.3D		1.5Dx0.2D		1.5Dx0.2D		1.5Dx0.3D		



G2 - MDTA SFL BALL													
GROUP GRUPPO GRUPPE GROUPE	1 2		5 6		7		9 10 11		13 14		16 17		
	3 4										18 19		
Vc [m/min]	90~110		85~105		75~85		55~65		90~110		140~160		
HRC	~25		25~40		40~45								
N/mm ²	~850		850~1250		1250~1500								
Ø mm.	n	Vf	n	Vf	n	Vf	n	Vf	n	Vf	n	Vf	
1	31850	320	30250	240	25500	150	19100	230	31850	320	47750	380	
1.5	21250	340	20150	280	17000	170	12750	250	21250	340	31850	320	
2	15900	380	15150	300	12750	200	9550	290	15900	380	23900	290	
3	10600	420	10100	300	8500	250	6350	240	10600	420	15900	320	
4	7950	560	7550	380	6350	280	4800	200	7950	560	11950	360	
5	6350	570	6050	400	5100	290	3800	180	6350	570	9550	380	
6	5300	640	5050	450	4250	290	3200	190	5300	640	7950	350	
8	4000	640	3800	460	3200	300	2400	220	4000	640	5950	400	
10	3200	640	3050	460	2550	300	1900	220	3200	640	4800	420	
12	2650	580	2500	450	2100	270	1600	220	2650	580	4000	480	
14	2250	540	2150	390	1800	250	1350	220	2250	540	3400	470	
16	2000	520	1900	380	1600	230	1200	210	2000	520	3000	470	
20	1600	450	1500	330	1250	190	960	210	1600	450	2400	440	
Ø<1	C ap x p 0.2Dx0.05D		0.2Dx0.05D		0.2Dx0.05D		0.2Dx0.05D		0.2Dx0.05D		0.5Dx0.2D		
Ø>1	C ap x p 0.2Dx0.1D		0.2Dx0.1D		0.2Dx0.1D		0.2Dx0.1D		0.2Dx0.1D		0.7Dx0.3D		

G2250 - MDTA250 n & Vf = -30%
 G2251 n & Vf = -50%
 GB255 n & Vf = -30%

G2CSB4													
GROUP GRUPPO GRUPPE GROUPE	1 2		5 6		7		9 10 11		13 14				
	3 4												
Vc [m/min]	90~110		85~105		75~85		55~65		90~110				
HRC	~25		25~40		40~45								
N/mm ²	~850		850~1250		1200~1500								
Ø mm.	n	Vf	n	Vf	n	Vf	n	Vf	n	Vf			
2	15900	1270	15150	1000	12750	760	9550	760	15900	1270			
3	10600	1060	10100	850	8500	620	6350	620	10600	1060			
4	7950	1100	7550	900	6350	530	4800	530	7950	1100			
5	6350	1150	6050	950	5100	490	3800	490	6350	1150			
6	5300	1270	5050	970	4250	510	3200	510	5300	1270			
8	4000	1440	3800	1000	3200	570	2400	570	4000	1440			
10	3200	1400	3050	1150	2550	540	1900	540	3200	1400			
12	2650	1380	2500	1100	2100	590	1600	590	2650	1380			
14	2250	1260	2150	1070	1800	580	1350	580	2250	1260			
16	2000	1400	1900	1070	1600	560	1200	560	2000	1400			
20	1600	1220	1500	950	1250	550	960	550	1600	1220			
Ø<1	C ap x p 0.2Dx0.05D		0.2Dx0.05D		0.2Dx0.05D		0.2Dx0.05D		0.2Dx0.05D				
Ø>1	C ap x p 0.2Dx0.1D		0.2Dx0.1D		0.2Dx0.1D		0.2Dx0.1D		0.2Dx0.1D				

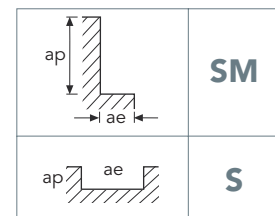


C

G2CSHM											
GROUP GRUPPO GRUPPE GROUPE	1 2 3 4		5 6		7		9 10 11		13 14		
Vc [m/min]	90~110		65~90		45~65		35~50		90~110		
HRC	~25		25~45		40~45						
N/mm ²	~850		850~1250		1250~1500						
Ø mm.	n	Vf	n	Vf	n	Vf	n	Vf	n	Vf	
2	15900	1270	15150	1000	12750	760	9550	760	15900	1270	
3	10600	1060	10100	850	8500	620	6350	620	10600	1060	
4	7950	1100	7550	900	6350	530	4800	530	7950	1100	
5	6350	1150	6050	950	5100	490	3800	490	6350	1150	
6	5300	1270	5050	970	4250	510	3200	510	5300	1270	
8	4000	1440	3800	1000	3200	570	2400	570	4000	1440	
10	3200	1400	3050	1150	2550	540	1900	540	3200	1400	
12	2650	1380	2500	1100	2100	590	1600	590	2650	1380	
14	2250	1260	2150	1070	1800	580	1350	580	2250	1260	
16	2000	1400	1900	1070	1600	560	1200	560	2000	1400	
20	1600	1220	1500	950	1250	550	960	550	1600	1220	
SM ap x ae	1.5Dx0.1D		1.5Dx0.1D		1.5Dx0.1D		1.5Dx0.1D		1.5Dx0.1D		

UMWS2											
GROUP GRUPPO GRUPPE GROUPE	1 2		2 3 4 13 14		4 5		6		9 10		
Vc [m/min]	45~60		35~50		30~40		20~28		12~20		
HRC			~20		20~30		30~35				
N/mm ²	~500		500~800		800~1000		1000~1100				
Ø mm.	n	Vf	n	Vf	n	Vf	n	Vf	n	Vf	
2	7000	120	5900	90	4900	80	3200	70	2000	40	
3	5000	160	4100	140	3400	120	2300	80	1800	65	
4	4300	230	3600	180	3200	160	2000	95	1600	80	
5	3900	260	3300	200	2600	190	1700	100	1400	80	
6	3500	270	2900	210	2300	190	1500	110	1200	90	
8	2600	280	2200	240	1800	200	1200	120	900	90	
10	2100	300	1800	270	1500	230	900	130	700	100	
12	1800	280	1500	240	1200	200	750	120	600	90	
14	1600	270	1300	200	1000	200	650	110	500	80	
16	1400	270	1200	200	900	180	550	100	450	80	
18	1200	240	1000	200	800	160	500	100	400	80	
20	1000	220	800	170	700	150	450	90	360	70	
22	850	190	700	150	600	130	400	80	320	60	
25	750	160	650	140	500	120	350	70	250	50	
S ap x ae	0.5DxD		0.5DxD		0.5DxD		0.5DxD		0.5DxD		

↓ Z axis : Vf = -50%



Parameters

GROUPS / GRUPPI / GRUPPE / GROUPES	AISI	W-stoff	DIN	BS	SS
1 <450 N/mm² LOW CARBON AND FREE CUTTING STEEL ACCIAI A BASSO TENORE DI CARBONIO ED AUTOMATICI KOHLENSTOFFARME STÄHLE ACIERS BAS CARBONE ET POUR DÉCOLLETAGE	A570-36	1.0038	RSt 37-2	4360 40 C	1311
	A36	1.0044	St 44-2	4360 43 A	1411
	A573-81 65	1.0116	St 37-3	4360 40 B	1312
	1006	1.0201	St 36	-	1160
	A515-65	1.0345	H I	1501 161	1330
	1015	1.0401	C 15	080 M 15	1350
	1020	1.0402	C22	050 A 20	1450
	-	1.0425	H II	-	1432
	1213	1.0715	9 SMn 28	230 M 07	1912
	(12L13)	1.0718	9 SMnPb 28	-	1914
	-	1.0723	15 S 20	210 A 15	1922
	1140	1.0726	35 S 20	212 M 36	1957
	1146	1.0727	45 S 20	212 M 44	1973
	1215	1.0736	9 SMn 36	240 M 07	-
	-	1.0765	-	-	-
	1010	1.1121	Ck 10	045 M 10	1265
	-	1.1121	St 37-1	4360 40 A	1300
	1022	1.1133	GS-20Mn 5	120 M 19	1410
	1015	1.1141	Ck 15	080 M 15	1370
	1025	1.1158	Ck 25	070 M 26	1450
1018	-	-	-	-	
2 450-700 N/mm² MEDIUM CARBON STEEL ACCIAI A MEDIO TENORE DI CARBONIO MITTELGEKOHLTE FLUSSTÄHLE ACIERS MOYEN CARBONE	A662 C	1.0436	ASt 45	1501 224	2103
	1035	1.0501	C 35	060 A 35	1550
	1035	1.0501	C 35	080 M 36	1550
	1045	1.0503	C 45	080 M 46	1650
	1040	1.0511	C 40	080 M 40	-
	1055	1.0535	C 55	070 M 55	1655
	-	1.0570	St 52-3	4360 50 B	2132
	A738	1.0577	ASt 52	1501 224	2107
	1039	1.1157	40Mn4	150 M 36	-
	1035	1.1181	Ck 35	060 A 35	1572
	1035	1.1183	Cf 35	080 M 36	1572
	1045	1.1191	Ck 45	808 M 46	1672
	1055	1.1203	Ck55	070 M 55	-
	1050	1.1213	Cf 53	060 A 52	1674
	1045	1.1730	C45W	En 43 B	1672
	A572-60	1.8900	StE 380	4360 55 E	2145
	-	1.8905	StE 460	HP 6	-
3 550-850 N/mm² HIGH CARBON STEEL ACCIAI AD ELEVATO TENORE DI CARBONIO KOHLENSTOFFREICHE STÄHLE ACIERS HAUT CARBONE	1060	1.0601	C60	060 A 62	-
	1064	1.1221	Ck 60	060 A 62	1678
	1070	1.1231	Ck 67	070 A 72	1770
	1080	1.1248	Ck 75	060 A 78	1774
	1095	1.1274	Ck 101	060 A 96	1870
4 600-900 N/mm² LOW ALLOY STEEL ACCIAI DEBOLMENTE LEGATI NIEDRIGLEGIERTE STÄHLE ACIERS FAIBLEMENT ALLIÉS	9255	1.0904	55 Si 7	250 A 53	2090
	1335	1.1167	36 Mn 5	150 M 36	2120
	1330	1.1170	28 Mn 6	150 M 28	-
	P4	1.2341	X6 CrMo 4	-	-
	52100	1.3505	100 Cr 6	534 A 99	2258
	A204A	1.5415	15 Mo 3	1501 240	2912
	8620	1.6523	21 NiCrMo 2	805 M 20	2506
	8740	1.6546	40NiCrMo22	311-Type 7	-
	-	1.6587	17CrNiMo6	820 A 16	-
	5132	1.7033	34 Cr 4	530 A 32	-
	5140	1.7035	41 Cr 4	530 A 40	-
	5140	1.7035	41 Cr 4	530 A 40	-
	5140	1.7045	42 Cr 4	530 A 40	2245
	5115	1.7131	16 MnCr 5	(527 M 20)	2511
	5155	1.7176	55 Cr 3	527 A 60	2253
	4130	1.7218	25 CrMo 4	1717CDS 110	2225
	4135 (4137)	1.7220	35 CrMo 4	708 A 37	2234
	4142	1.7223	41 CrMo 4	708 M 40	2244
	4140	1.7225	42 CrMo 4	708 M 40	2244
	4137	1.7225	42 CrMo 4	708 M 40	2244
	A387 12-2	1.7337	16 CrMo 4 4	1501 620	2216
	-	1.7361	32CrMo12	722 M 24	2240
	A182 F-22	1.7380	10 CrMo9 10	1501 622	2218
	6150	1.8159	50 CrV 4	735 A 50	2230
	-	1.8515	31 CrMo 12	722 M 24	2240
	-	-	-	-	-

AFNOR	U.N.E. / I.H.A.	JIS	UNI	EN	ISO	TRADE MARK
E 24-2 Ne	-	SS 34	Fe 360B FN	-	-	-
NFA 35-501 E 28	-	-	-	-	-	-
E 24-U	-	-	Fe37-3	-	-	-
Fd 5	-	-	-	-	-	-
A 37 CP	F.1110	SGV 410	-	-	-	-
CC 12	F.111	S 15 C	080 M 15	-	-	-
CC20	F.112	-	C20C21	-	-	-
A 42 CP	A42 RCI	SGV 410	Fe 410 1KW	-	-	-
S 250	11SMn28	SUM 22	CF9SMn28	-	-	AVP
S 250 Pb	11SMnPb28	SUM 22 L	CF9SMnPb28	-	-	-
-	F.210.F	SUM 32	-	-	-	-
35 MF 6	F.210.G	-	-	-	-	-
45 MF 4	-	-	-	-	-	-
S 300	12 SMn 35	SUM 25	CF 9 SMn 36	-	-	AVZ
-	-	-	36SMnPb14	-	-	PR 80
XC 10	F.1510	S 10 C	C10	-	-	-
-	-	S 10 C	-	-	-	-
20 M 5	F.1515	SMnC 420	G22Mn3	-	-	-
XC 18	F.1511	S 15 Ck	080 M 15	-	-	-
XC 25	F.1120	S 25 C	C25	-	-	-
-	-	SS400	Fe 360 B	-	-	-
A 48 FP	-	-	-	-	-	-
CC 35	F.113	S 35 C	C35	-	-	-
CC 35	F.113	S 35 C	C35	-	-	-
CC45	F.114	S 45 C	C45	-	-	-
AF 60 C 40	F.114.A	-	C40	-	-	-
AF 70 C 55	F.115	S 55 C	C55	-	-	-
E 36-3	-	SM 490 A, B, C	Fe 510	-	-	-
A 52 FP	-	-	-	-	-	-
35 M 5	-	-	-	-	-	-
XC 38	F.1130	S 35 C	C35	-	-	-
XC 38 TS	-	S 35 C	C36	-	-	-
XC 45	F.1140	S 45 C	C45	-	-	-
XC 55	F.1203	S55 C	C50	-	-	-
XC 48 TS	-	S 50 C	C53	-	-	-
Y342	F.1140	-	-	-	-	-
-	-	-	FeE390KG	-	-	-
-	-	-	-	-	-	-
CC55	-	-	C60	-	-	-
XC 65	F.1150	S 58 C	C60	-	-	-
XC 68	F.5103	-	C70	-	-	-
XC 75	F.5107	-	-	-	-	-
XC 100	F.5117	SUP 4	-	-	-	-
55 S 7	56Si7	-	55Si8	-	-	-
40 M 5	36Mn5	SMn 438(H)	-	-	-	-
20 M 5	-	SCMn1	C28MN	-	-	-
-	-	-	-	-	-	-
100 C 6	F.131	SUJ 2	100Cr6	-	-	-
15 D 3	16 Mo3	STBA 12	16Mo3 KW	-	-	-
20 NCD 2	F.1522	SNCM 220(H)	20NiCrMo2	-	-	-
40 NCD 2	F.129	SNCM 240	40NiCrMo2(KB)	-	-	-
18 NCD 6	14NiCrMo13	-	-	-	-	-
32 C 4	35Cr4	SCr430(H)	34Cr4(KB)	-	-	-
42 C 2	42 Cr 4	SCr 440 (H)	40Cr4	-	-	-
42 C 2	42 Cr 4	SCr 440 (H)	41Cr4 KB	-	-	-
42 C 4 TS	F.1207	SCr 440	-	-	-	-
16 MC 5	F.1516	-	16MnCr5	-	-	-
55 C 3	-	SUP 9(A)	55Cr3	-	-	-
25 CD 4	F.1251/55Cr3	SCM 420 / SCM430	25CrMo4(KB)	-	-	-
35 CD 4	34 CrMo 4	SCM 432	34CrMo4KB	-	-	-
42 CD 4 TS	42 CrMo 4	SCM 440	41 CrMo 4	-	-	-
40 CD 4	F.1252	SCM 440	40CrMo4	-	-	-
42 CD 4	F.1252	SCM 440	42CrMo4	-	-	-
15 CD 4.5	-	-	12CrMo910	-	-	-
30 CD 12	F.124.A	-	30CrMo12	-	-	-
12 CD 9, 10	F.155 / TU.H	-	12CrMo9 10	-	-	-
50 CV 4	F.143	SUP 10	50CrV4	-	-	-
30 CD 12	F.1712	-	30CrMo12	-	-	-
-	-	-	-	-	-	Weldox 500

GROUPS / GRUPPI / GRUPPE / GROUPES	AISI	W-stoff	DIN	BS	SS
5 700-1000 N/mm ² ALLOY STEEL ACCIAI LEGATI LEGIERTE STÄHLE ACIERS ALLIÉS	W1	1.1545	C105W1	BW1A	1880
	L3	1.2067	100Cr6	BL 3	(2140)
	L2	1.2210	115 CrV 3	-	-
	P20 + S	1.2312	40 CrMnMoS 8 6	-	-
	-	1.2419	105WCr6	-	2140
	O1	1.2510	100 MnCrW 4	BO1	-
	S1	1.2542	45 WCrV 7	BS1	2710
	4340	1.6582	34 CrNiMo 6	817 M 40	2541
	5120	1.7147	20 MnCr 5	-	-
	-	-	-	-	-
6 900-1200 N/mm ² TOOL AND HIGH ALLOY STEEL ACCIAI DA UTENSILI E ALTO LEGATI WERKZEUG- UND HOCHLEGIERTE STÄHLE ACIERS POUR OUTILS ET FORTEMENT ALLIÉS	D3	1.2080	X210 Cr 12	BD3	2710
	P20	1.2311	40 CrMnMo 7	-	-
	H13	1.2344	X40CrMoV 5 1	BH13	2242
	A2	1.2363	X100 CrMoV 5 1	BA2	2260
	D2	1.2379	X155 CrMoV 12 1	BD2	2310
	D4 (D6)	1.2436	X210 CrW 12	BD6	2312
	H21	1.2581	X30WCrV9 3	BH21	-
	L6	1.2713	55NiCrMoV 6	-	-
	M 35	1.3243	S6/5/2/5	BM 35	2723
	M 2	1.3343	S6/5/2	BM2	2722
	M 7	1.3348	S2/9/2	-	2782
	HW 3	1.4718	X45CrSi 9 3	401 S 45	-
	-	1.7321	20 MoCr 4	-	2625
7 1200-1500 N/mm ² (35-45HRC) HIGH TENSILE STRENGTH STEEL ACCIAI AD ELEVATA RESISTENZA HOCHFESTE STÄHLE ACIERS HAUTE RÉSIDANCE	A128 (A)	1.3401	G-X120 Mn 12	BW10	2183
8 45-63HRC HARDENED STEEL ACCIAI TEMPRATI GEHÄRTETE STÄHLE ACIERS TREMPÉS	-	-	-	-	-
9 MARTENSITIC AND FERRITIC STAINLESS STEEL ACCIAI INOSSIDABILI MARTENSITICI E FERRITICI MARTENSITISCHE UND FERRITISCHE ROSTFREIE STÄHLE ACIERS INOXYDABLES MARTENSITIQUE ET FERRITIQUE	420 C	1.4034	X43Cr16	-	-
	440 B/1	1.4112	X90 Cr Mo V18	-	-
	-	1.2083	X42 Cr 13	-	2314
	403	1.4000	X6Cr13	403 S 17	2301
	(410S)	1.4001	X7 Cr 14	(403 S17)	2301
	405	1.4002	X6 CrAl 13	405 S 17	-
	416	1.4005	X12 CrS 13	416 S 21	2380
	410	1.4006	X 10 Cr 13	410 S21	2302
	430	1.4016	X6 Cr 17	430 S 17	2320
	420	1.4021	X20 Cr 13	420 S 37	2303
	420F	1.4028	X30 Cr 13	420 S 45	(2304)
	(420)	1.4031	X39Cr13	420 S 45	(2304)
	431	1.4057	X20 CrNi 17 2	431 S 29	2321
	430F	1.4104	X12 CrMoS 17	-	2383
	434	1.4113	X6 CrMo 17	434 S 17	2325
	430Ti	1.4510	X6 CrTi 17	-	-
	409	1.4512	X5 CrTi 12	409 S 17	-
10 AUSTENITIC STAINLESS STEEL (V2A) ACCIAI INOSSIDABILI AUSTENITICI (V2A) AUSTENITISCHE ROSTFREIE STÄHLE (V2A) ACIERS INOXYDABLES AUSTENITIQUE (V2A)	304	1.4301	X5 CrNi 18 9	304 S 15	2332
	305	1.4303	X5 CrNi 18 12	305 S 19	-
	303	1.4305	X12 CrNiS 18 8	303 S 21	2346
	304L	1.4306	X2 CrNiS 18 9	304 S 12	2352
	301	1.4310	X12 CrNi 17 7	-	2331
	304	1.4350	X5 CrNi 18 9	304 S 31	2332
	304	1.4350	X5 CrNi 18 9	304 S 31	2333
11 AUSTENITIC STAINLESS STEEL (V4A) ACCIAI INOSSIDABILI AUSTENITICI (V4A) AUSTENITISCHE ROSTFREIE STÄHLE (V4A) ACIERS INOXYDABLES AUSTENITIQUE (V4A)	304LN	1.4311	X2 CrNiN 18 10	304 S 62	2371
	316	1.4401	X5 CrNiMo 18 10	316 S 16	2347
	316L	1.4404	-	316 S 12/13/14/22/24	2348
	316LN	1.4429	X2 CrNiMoN 18 13	-	2375
	316L	1.4435	X2 CrNiMo 18 12	316 S 12/13/14/22/24	2353
	316	1.4436	-	316 S 33	2343
	317L	1.4438	X2 CrNiMo 18 16	317 S 12	2367
	329	1.4460	X3 CrNiMoN 27 5 2	-	2324
	321	1.4541	X10 CrNiTi 18 9	321 S 12	2337
	347	1.4550	X10 CrNiNb 18 9	347 S 17	2338
	316Ti	1.4571	X10 CrNiMoTi 18 10	320 S 17	2350
	309	1.4828	X15 CrNiSi 20 12	309 S 24	-
	330	1.4864	X12 NiCrSi 36 16	-	-

AFNOR	U.N.E. / I.H.A.	JIS	UNI	EN	ISO	TRADE MARK
Y 105	F.5118	SK 3	C100 KU	-	-	-
Y 100 C 6	F.520 L	-	-	-	-	-
-	-	-	-	-	-	-
40 CMD 8 +S	X210CrW12	-	-	-	-	Holdax
105W C 13	F.5233	SKS 31	107WCr5KU	-	-	-
90MnWCrV5	F.5220	(SK53)	95MnWCr5KU	-	-	-
55W20	F.5241	-	45WCrV8KU	-	-	-
35 NCD 6	F.1280	SNCM 447	35NiCrMo6KB	-	-	-
20 MC 5	-	-	-	-	-	-
-	-	-	-	-	-	Weldox 700
Z200 C 12	F.5212	SKD 1	X210Cr13KU	-	-	K 100
40 CMD 8	F.5263	-	-	-	-	-
Z 40 CDV 5	F.5318	SKD 61	X40CrMoV511KU	-	-	-
Z 100 CDV 5	F.5227	SKD 12	X100CrMoV51KU	-	-	-
Z 160 CDV 12	F.520.A	SKD11	X155CrVMo121KU	-	-	K 110
Z 200 CD 12	F.5213	SKD 2	X215CrW121KU	-	-	-
Z 30 WCV 9	F.526	SKD5	X30WCrV 9 3 KU	-	-	-
55 NCDV 7	F.520.S	SKT4	-	-	-	-
6-5-2-5	F.5613	SKH 55	HS6-5-5	-	-	-
Z 85 WDCV	F.5603	SKH 51	HS6-5-2-2	-	-	-
2 9 2	-	-	HS2-9-2	-	-	-
Z 45 CS 9	F.3220	SUH1	X45CrSi8	-	-	-
-	F.1523	-	30CrMo4	-	-	-
Z 120 M 12	F.8251	SCMnH 1	GX120Mn12	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	WRB WRA
Z 40 C 14	F.5263	SUS 420 J1	-	-	-	-
Z 6 C 13	F.3110	SUS 403	X6Cr13	-	-	-
Z 8 C 13	F.3110	SUS 410 S	X6Cr13	-	-	-
Z 8 CA 12	F.3111	SUS 405	X6 CrAl 13	-	-	-
Z 11 CF 13	F.3411	SUS 416	X12CrS13	-	-	-
Z 10 C 14	F.3401	SUS 410	X12Cr13	-	-	-
Z 8 C 17	F.3113	SUS 430	X8Cr17	-	-	-
Z 20 C 13	F.3402	SUS 420 J1	X20Cr13	-	-	-
Z 30 C 13	F.3403	SUS 420 J2	X30Cr13	-	-	-
Z 40 C 14	F.3404	(SUS 420 J1)	-	-	-	-
Z 15 CNi 16.02	F.3427	SUS 431	X16CrNi16	-	-	-
Z 10 CF 17	F.3117	SUS 430 F	X10CrS17	-	-	-
Z 8 CD 17.01	-	SUS 434	X8CrMo17	-	-	-
Z 4 CT 17	-	SUS 430 LX	X6CrTi17	-	-	-
Z 6 CT 12	-	SUH 409	X6CrTi12	-	-	-
Z 6 CN 18.09	F.3551	SUS 304	X5CrNi18 10	-	-	-
Z 8 CN 18.12	-	SUS 305	X8CrNi19 10	-	-	-
Z 10 CNF 18.09	F.3508	SUS 303	X10CrNiS 18 09	-	-	-
Z 2 CN 18.10	F.3503	SUS 304L	X2CrNi18 11	-	-	-
Z 12 CN 17.07	F.3517	SUS 301	X12CrNi17 07	-	-	-
Z 6 CN 18.09	F.3551	SUS 304	X5CrNi18 10	-	-	-
Z 6 CN 18.09	F.3551	SUS 304	X5CrNi18 10	-	-	-
Z 2 CN 18.10	-	SUS 304 LN	-	-	-	-
Z 6 CND 17.11	F.3543	SUS 316	X5CrNiMo17 12	-	-	-
Z 2 CND 17.13	-	SUS316L	X2CrNiMo17 12	-	-	-
Z 2 CND 17.13	-	SUS 316 LN	-	-	-	-
Z 2 CND 17.13	-	SUS316L	X2CrNiMo17 12	-	-	-
Z 6 CND18-12-03	-	-	X8CrNiMo 17 13	-	-	-
Z 2 CND 19.15	-	SUS 317 L	X2CrNiMo18 16	-	-	-
Z5 CND 27.05.Az	F.3309	SUS 329 J1	-	-	-	-
Z 6 CND 18.10	F.3553	SUS 321	X6CrNiTi18 11	-	-	-
Z 6 CNNb 18.10	F.3552	SUS 347	X6CrNiNb18 11	-	-	-
Z 6 CNDT 17.12	F.3535	-	X6CrNiMoTi 17 12	-	-	-
Z 15 CNS 20.12	-	SUH 309	X16 CrNi 24 14	-	-	-
Z 12 NCS 35.16	-	SUH 330	-	-	-	-

GROUPS / GRUPPI / GRUPPE / GROUPES	AISI	W-stoff	DIN	BS	SS
12 DUPLEX	S32750	1.4410	X 2 CrNiMoN 25 7 4	-	2328
	S31500	1.4417	X 2 CrNiMoSi 19 5	-	2376
	S31803	1.4462	X 2 CrNiMoN 22 5 3	-	2377
	S32760	1.4501	X 3 CrNiMoN 25 7	-	-
	630	1.4542	X5CrNiCNb16-4	-	-
	A564/630	-	-	-	-
13 GREY CAST IRON GHISA GRIGIA GRAUGUSS FONTE GRISE	A48-20B	0.6010	GG-10	Grade 100	0110-00
	A48-25B	0.6015	GG-15	Grade 150	0115-00
	A48-30B	0.6020	GG-20	Grade 200	0120-00
	A48-40B	0.6025	GG-25	Grade 250	0125-00
	A48-45B	0.6030	GG-30	Grade 300	0130-00
	A48-50B	0.6035	GG-35	Grade 350	0135-00
	A48-60B	0.6040	GG-40	Grade 400	0140-00
	32510	-	GTS-35	B340/12	0815-00
	A220-40010	0.8145	GTS-45	P440/7	0852-00
	A220-50005	0.8155	GTS-55-04	P510/4	0854-00
	A220-70003	0.8165	GTS-65-02	P570/3	0856-00
	A220-70003	-	GTS-65	P570/3	0858
A220-80002	0.8170	GTS-70-02	P690/2	0862-00	
14 NODULAR CAST IRON GHISA SFEROIDALE SPHÄROGUSS FONTE NODULAIRE	-	0.7033	GGG-35.3	350/22L40	0717-15
	60/40/18	0.7040	GGG-40	420/12	0717-02
	(60/40/18)	0.7043	GGG-40.3	370/17	0717-12
	65/45/12	0.7050	GGG-50	500/7	0727-02
	80/55/06	0.7060	GGG-60	600/3	0727-03
	100/70/03	0.7070	GGG-70	700/2	0737-01
	120/90/02	0.7080	GGG-80	800/2	-
15 WROUGHT (ROLLED) ALUMINIUM ALLUMINIO LAMINATO GEWALZTES ALUMINIUM ALUMINIUM LAMINÉ	1200	3.0205	Al 99	1C	4010
	1050	3.0255	Al 99,5	1B	4007
	1350	3.0257	E-Al	E1E	-
	1070	3.0275	Al 99,7	-	-
	1080	3.0285	Al 99,8	1A	-
	1099	3.0385	AL99,98R	1	-
	3105	3.0505	AlMn0,5Mg0,5	N31	-
	3103	3.0515	AlMn1	N3	4054
	3003	3.0517	AlMn	N3	-
	3005	3.0525	AlMn1Mg0,5	-	-
	3004	3.0526	AlMn1Mg1	-	-
	6012	3.0615	AlMgSiPb	-	-
	2014	3.1255	AlCuSiMn	H15	4338
	2117	3.1305	AlCuMg0,5	L86	-
	2017	3.1325	AlCuMg 1	(H14)	-
	2024	3.1355	AlCuMg 2	DTD5090	-
	2030	3.1645	AlCuMgPb	-	4335
	2011	3.1655	AlCuBiPb	FC1	4355
	6082	3.2315	AlMgSi 1	H30	4212
	6060	3.3206	AlMgSi0,5	H9	4103/4104
	6005	3.3210	AlMgSi0,7	-	-
	6061	3.3211	AlMg1SiCu	H20	-
	5005	3.3315	AlMg1	N41	4106
	5050	3.3316	AlMg1,5	-	-
	5052	3.3523	AlMg2,5	-	4120
	5251	3.3525	AlMg2Mn0,3	N4	-
	5154	3.3535	AlMg3	N5/N56	-
	5454	3.3537	AlMg2,7Mn	N51	-
	5086	3.3545	AlMg4Mn	-	-
	5083	3.3547	AlMg4,5Mn	N8	4140
	5056	3.3555	AlMg5	N6	-
	7020	3.4335	AlZn4,5Mg1	H17	4425
7075	3.4365	AlZnMgCu1,5	2L95	-	
3304	-	AlMgMn	-	-	
7010	-	AlZn6MgCu	DTD5130	-	
16 DIE-CAST ALUMINIUM (SI<12%) ALLUMINIO PRESSOFUSO (SI<12%) AL-GUSSLEGIERUNGEN (SI<12%) ALUMINIUM MOULÉ SOUS PRESSION (SI<12%)	A356	3.2371	G-AlSi7Mg	LM25	4244
	-	3.2373	G-AlSi9Mg	-	-
	A360	3.2381	G-AlSi10Mg	LM9	4253
	A413.2	3.2581	G-AlSi12	LM6	4261
	A413.0	3.2582	GD-AlSi12	-	4247
	A413.1	3.2583	G-AlSi12(Cu)	LM20	4260
	-	3.3561	G-AlMg5	LM5	4252
	-	3.5101	G-MgZn4SE1Zr1	MAG5	-
	-	3.5103	MgSE3Zn2Zr1	MAG6	-
	-	3.5106	G-MgAg3SE2Zr1	MAG 12	-

AFNOR	U.N.E. / I.H.A.	JIS	UNI	EN	ISO	TRADE MARK
Z3 CND 25.06 Az	-	-	-	-	-	-
Z2 CND 18.05.03	-	-	-	-	-	-
Z 3 CND 22.05 (Az)	-	-	-	-	-	-
Z 3 CND 25.06 Az	-	-	-	-	-	ZERON 100
-	-	-	-	-	-	-
-	-	-	-	-	-	17/4 PH
-	-	FC 100	G 10	-	-	-
Ft 15 D	FG 15	FC 150	G 15	-	-	-
Ft 20 D	FG 20	FC 200	G 20	-	-	-
Ft 25 D	FG 25	FC 250	G 25	-	-	-
Ft 30 D	FG 30	FC 300	G 30	-	-	-
Ft 35 D	FG 35	FC 350	G 35	-	-	-
Ft 40 D	-	FC 40	-	-	-	-
MN 35-10	-	FCMW 330	-	-	-	-
MN 450	-	FCMP 440/490	GMN 45	-	-	-
MP 50-5	-	FCMP 490	GMN 55	-	-	-
MN 650-3	-	FCMP 590	GMN 65	-	-	-
MN 60-3	-	FCMP 540	-	-	-	-
MN 700-2	-	FCMP 690	GMN 70	-	-	-
FGS 370/17	-	-	-	-	-	-
FGS 400/12	FGE 38-17	FCD 400	GS 400-12	-	-	-
FGS 370/17	-	-	GSO 42-12	-	-	-
FGS 500/7	FGE 50-7	FCD 500	GS 500-7	-	-	-
FGS 600/3	FGE 60-2	FCD 600	GS 600-3	-	-	-
FGS 700/2	FGS 70-2	FCD 700	GS 700-2	-	-	-
FGS 800/2	-	-	GS-800/2	-	-	-
A4	L-3001	A1x3	9001/1	-	-	-
A5	L-3051	A1x1	9001/2	-	-	-
-	-	-	-	-	-	-
A7	-	-	-	-	-	-
A8	-	-	-	-	-	-
A99	-	-	-	-	-	-
-	-	-	-	-	-	-
-	L-3811	-	9003/3	-	-	-
AM1	L-3810	A2x3	9003/1	-	-	Aluman 100
AMG0,5	-	-	9003/4	-	-	-
AM1G	L-3820	-	9003/2	-	-	-
ASGPB	-	-	-	-	-	-
AU4SG	L-3130	A3x1	9002/3	-	-	Avional 660
AU2G	-	-	9002/1	-	-	Avional 050
AU4G	L-3120	A3x2	9002/2	-	-	Avional 100
AU4G1	L-3140	A3x4	9002/4	-	-	Avional 150
AU4Pb	L-3121	-	9002/8	-	-	-
AU5PbBi	L-3192	-	9002/5	-	-	Recidal 11
ASGM 0,7	L-3451	-	9006/4	-	-	Anticorodal 100
AGS	L-3441	A2x5	9006/1	-	-	Anticorodal 063
ASG0,5	L-3454	A6NO1	9006/6	-	-	-
AGSUC	L-3420	A2x4	9006/2	-	-	Anticorodal 061
AG0,6	L-3350	A2x8	9005/1	-	-	Peraluman 080
-	-	-	9005/7	-	-	Peraluman 150
AG2,5C	L-3360	A2x1	9005/2	-	-	Peraluman 250
AG2M	L-3361	-	-	-	-	-
AG3	-	-	9005/8	-	-	Peraluman 350
AG2,5MC	L-3391	A2x9	9005/3	-	-	-
AG4MC	L-3322	-	9005/4	-	-	-
AG4,5MC	L-3321	A2x7	9005/5	-	-	Peraluman 440
A-G5	-	-	-	-	-	Peraluman 500
AZ5G	L-3741	-	9007/1	-	-	-
AZ5GU	L-3710	A34x6	9007/2	-	-	Ergal 55
AM1G	-	-	-	-	-	-
-	-	-	9007/4	-	-	-
A-S7G	-	AC4C	-	42000	AlSi7Mg	-
-	-	-	-	-	-	-
A-S10G	-	-	-	43100	Al Si 10 Mg	-
A-S12U	-	AC3A	-	44100	Al Si 12	-
-	-	-	-	-	-	-
A-S12	-	-	-	47000	Al Si 12 (Cu)	-
A-SU12	-	AC4A	-	51300	ALMg 6	-
G-Z4TR	-	-	-	-	-	-
G-TR3Z2	-	-	-	-	-	-
G-Ag22,5	-	-	-	-	-	-

GROUPS / GRUPPI / GRUPPE / GROUPES	AISI	W-stoff	DIN	BS	SS
16 DIE-CAST ALUMINIUM (SI<12%) ALLUMINIO PRESSOFUSO (SI<12%) AL-GUSSLEGIERUNGEN (SI<12%) ALUMINIUM MOULÉ SOUS PRESSION (SI<12%)	-	3.5812	G-MgAl8Zn1	MAG1	-
	-	3.5912	G-MgAl9Zn1	MAG7	-
	355.1	-	G-AISi5	LM16	-
	A380	-	G-AISi8Cu3	LM24	4250
	319	-	G-AISi6Cu4	LM21	-
	319.2	-	G-AISi6Cu4	LM22	-
17 COPPER RAME KUPFER CUIVRE	C10200	2.0040	OF Cu	C103	-
	C11000	2.0060	E-Cu57	C101	-
	-	2.0065	E-Cu58	-	-
	C10300	2.0070	SE Cu	-	-
	C12200	2.0090	SF Cu	C106	-
	C12500	-	Cu-FRTP	C104	-
	C70320	2.0857	-	-	-
	C14200	2.1202	SB Cu	C107	-
	-	2.1356	Cu Mn 3	-	-
	-	2.1522	Cu Si2 Mn	-	-
	C16200	-	-	C108	-
	C18200	-	-	CC101	-
	C191010	-	-	-	-
	C70250	-	-	CC102	-
	C17200	-	-	CB101	-
	C17300	-	-	-	-
	C17510	-	-	-	-
	C17500	-	-	C112	-
	C15000	-	-	-	-
	C65100	-	-	-	-
C65500	-	-	CS101	-	
C14500	-	-	C109	-	
C14700	-	-	C111	-	
C18700	-	-	-	-	
18 BRASS OTTONE MESSING LAITON	C21000	2.0220	CuZn5	CZ125	-
	C22000	2.0230	CuZn10	Cz101	-
	C23000	2.0240	CuZn15	CZ102	-
	C24000	2.0250	CuZn20	CZ103	-
	C25600	-	CuZn28	-	-
	C26000	2.0265	CuZn30	CZ106	-
	C26800	2.0280	CuZn33	-	-
	C27200	-	CuZn36	-	-
	C27200	2.0321	CuZn37	CZ108	-
	C27000	2.0335	CuZn36	CZ107	-
C28000	2.0360	CuZn40	CZ109	-	
19 DIE-CAST BRASS OTTONE DA FUSIONE GUSSMESSING LAITON MOULÉ SOUS PRESSION	C33500	-	CuZn37Pb0.5	-	-
	C34000	-	CuZn35Pb1	CZ118	-
	C34500	2.0331	CuZn36Pb1,5	CZ119	-
	C34000	2.0331	CuZn36Pb1,5	CZ119	-
	C35300	2.0371	CuZn38Pb1,5	CZ128	-
	C36500	2.0372	CuZn39Pb0,5	CZ123	-
	C36000	2.0375	CuZn36Pb3	CZ124	-
	C37700	2.0380	CuZn39Pb2	CZ 131 / (CZ128)	-
	C38500	2.0401	CuZn39Pb3	CZ121	-
	C38000	2.0402	CuZn40Pb2	CZ122	-
	-	2.0410	CuZn44Pb2	CZ130	-
	C68700	2.0460	CuZn20Al2	CZ110	-
	C44300	2.0470	CuZn28Sn1	CZ111	-
	-	2.0530	CuZn38Sn1	-	-
	-	2.0550	CuZn40Al2	-	-
	-	2.0561	CuZn40Al1	-	-
	-	2.0572	CuZn40Mn2	CZ136	-
C61400	2.0932	CuAl8Fe3	-	-	
C63000	2.0966	CuAl10Ni5Fe4	CA104	-	
20 BRONZE BRONZO BRONZE BRONZE	C50700	2.1010	CuSn2	-	-
	C51100	2.1016	CuSn4	PB101	-
	C51000	-	CuSn5	PB102	-
	C51900	2.1020	CuSn6	PB103	-
	C52100	2.1030	CuSn8	PB104	-
	-	-	CuSn10	-	-
	-	-	CUSn11	-	-
21 AMPCO	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-

AFNOR	U.N.E. / I.H.A.	JIS	UNI	EN	ISO	TRADE MARK
G-A9	-	-	-	-	-	-
G-A9Z1	-	-	-	-	-	-
AS4GU	-	-	-	45300	ALSi5Cu 1	-
A-S9U3	-	AC4B	-	46500	Al Si9 Cu3 (Fe) (Zn)	-
A-S5UZ	-	AC2A	-	45000	Al Si 6 Cu 4	-
A-S5U	-	AC2A	-	45400	Al Si 5 Cu 3	-
Cu/c1	-	C1020	-	CW008A	Cu-OF	-
Cu/a1	-	C1100	E-Cu57	CW004A	Cu-ETP	-
-	-	-	-	-	-	-
-	-	-	-	CW021A	-	-
Cu/b	-	C1220	-	CW024A	Cu-DHP	-
Cu/A3	-	-	-	CR006A	-	-
-	-	-	-	CW112C	CuNi3Si	-
-	-	-	-	-	Cu-AsP	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	CuCd1	-
-	-	-	-	CW105C	CuCr1	-
-	-	-	-	CW109C	CuNi1Si	-
-	-	-	-	CW111C	CuNi2Si	-
-	-	-	-	CW101C	CuBe2	-
-	-	-	-	CW102C	CuBe2Pb	-
-	-	-	-	CW110C	CuNi2Be	-
-	-	-	-	CW104C	CuCo2Be	-
-	-	-	-	CW120C	CuZr	-
-	-	-	-	CW115C	CuSi2Mn	-
-	-	-	-	CW116C	CuSi3Mn1	-
-	-	-	-	CW118C	CuTeP	-
-	-	-	-	CW114C	CuSP	-
-	-	-	-	CW113C	CuPb1P	-
-	-	C2100	-	CW500L	-	-
-	-	C2200	-	CW501L	-	-
-	-	C2300	-	CW502L	-	-
-	-	C2400	-	CW503L	-	-
-	-	-	CuZn28	-	-	-
-	-	C2600	-	CW505L	-	-
-	-	C2680	-	CW506L	-	-
-	-	-	-	-	-	-
-	-	C2700	-	CW508L	-	-
-	-	C2700	-	CW507L	-	-
-	-	C2800	-	CW509L	-	-
-	-	-	-	-	-	-
-	-	C3501	-	-	-	-
-	-	-	-	CW601N	-	-
-	-	C3501	-	CW600N	-	-
-	-	-	-	-	-	-
-	-	-	-	CW610N	-	-
-	-	C3601	-	CW603N	-	-
-	-	C3771	-	CW612N	-	-
-	-	C3603	-	CW614N	-	-
-	-	-	-	CW617N	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	CW723R	-	-
-	-	-	-	CW303G	-	-
-	-	-	-	CW307G	-	-
-	-	-	-	-	-	-
-	-	C5111	-	CW450K	-	-
-	-	C5102	-	CW451K	-	-
-	-	C5191	-	CW452K	-	-
-	-	C5212	-	CW453K	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	AMPCO 18
-	-	-	-	-	-	AMPCO 21
-	-	-	-	-	-	AMPCO 22

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GROUPS / GRUPPI / GRUPPE / GROUPES	AISI	W-stoff	DIN	BS	SS
22 <30HRC NICKEL-BASE ALLOYS LEGHE DI NICKEL NICKELLEGIERUNGEN ALLIAGES DE NICKEL	N08800	1.4876	X10NiCrAlTi32-21	3075(NA15)	-
	N06075	2.4630	NiCr20Ti	HR5,203-4	-
	N07080	2.4631	NiCr20TiAl	HR401,601	-
	N06617	2.4663	-	-	-
	N06002	2.4665	NiCr22FeMo	HR6,204	-
	N06600	2.4816	-	-	-
	N06601	2.4851	NiCr23Fe	-	-
	N06625	2.4856	NiCr22Mo9Nb	-	-
	N08825	2.4858	NiCr21Mo	3072-76	-
23 >30HRC NICKEL-BASE ALLOYS LEGHE DI NICKEL NICKELLEGIERUNGEN ALLIAGES DE NICKEL	N10665	2.4617	NiMo28	-	-
	N10002	-	NiCr17Mo17FeW	-	-
	N10003	-	-	-	-
	-	2.4642	-	-	-
	-	-	NiCo29Cr15MOAlTi	-	-
	N07718	2.4668	NiCr19Fe19NbMo	Hr8	-
	-	-	NiCr16FeTi	-	-
	N07725	-	-	-	-
	N07750	2.4669	NiCr 15 Fe 7 TiAl	HR505	-
N07751	2.4694	-	-	-	
24 HARDOX 400, STAVAX, RAMAX	-	-	-	-	-
	-	1.2365	-	-	-
	-	-	-	-	-
25 HARDOX 500	-	-	-	-	-
	-	-	-	-	-
26 TITANIUM ALLOYS LEGHE DI TITANIO TITAN-LEGIERUNGEN ALLIAGES DE TITANE	-	3.7025	Ti 99,8	-	-
	-	3.7035	Ti 99,7a	-	-
	-	3.7055	Ti 99,6	-	-
	-	3.7065	Ti 99,5	-	-
	-	3.7115	TiAl5Sn2.5	TA14/17	-
	-	3.7164	TiAl6V4	TA10-13/TA29	-
	-	3.7175	TiAl6V6Sn2	-	-
-	3.7185	TiAl4Mo4Sn2	-	-	

AFNOR	U.N.E. / I.H.A.	JIS	UNI	EN	ISO	TRADE MARK
-	-	-	-	-	-	Incoloy 800
NC20T	-	-	-	-	-	Nimonic 75
NC20TA	-	-	-	-	-	Nimonic 80A
-	-	-	-	-	-	Inconel 617
NC22FeD	-	-	-	-	-	Hastelloy X
NC15Fe	-	-	-	-	-	Inconel 600
-	-	-	-	-	-	Inconel 601
NC22DNb	-	-	-	-	-	Inconel 625
NC21FeDU	-	-	-	-	-	Incoloy 825
-	-	-	-	-	-	Hastelloy B
NC17DWY	-	-	-	-	-	Hastelloy C
-	-	-	-	-	-	Hastelloy N
-	-	-	-	-	-	Inconel 690
NK27CADT	-	-	-	-	-	Inconel 700
Nc19FeNb	-	-	-	-	-	Inconel 718
Nc16FeTi	-	-	-	-	-	Inconel 722
-	-	-	-	-	-	Inconel 725
NC19FeNB	-	-	-	-	-	Inconel 750-X
-	-	-	-	-	-	Inconel 751
-	-	-	-	-	-	Hardox 400
-	-	-	-	-	-	Ramax
-	-	-	-	-	-	Stavax
-	-	-	-	-	-	Hardox 500
TA 1	-	-	-	-	-	-
TA 2-5	-	-	-	-	-	-
-	-	-	-	-	-	-
TA 6	-	-	-	-	-	-
-A6V	-	-	-	-	-	-
T-A5E	-	-	-	-	-	-
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-	-	-	-	-	-	-

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