

EVO®



...THE WAY TO THE FUTURE!

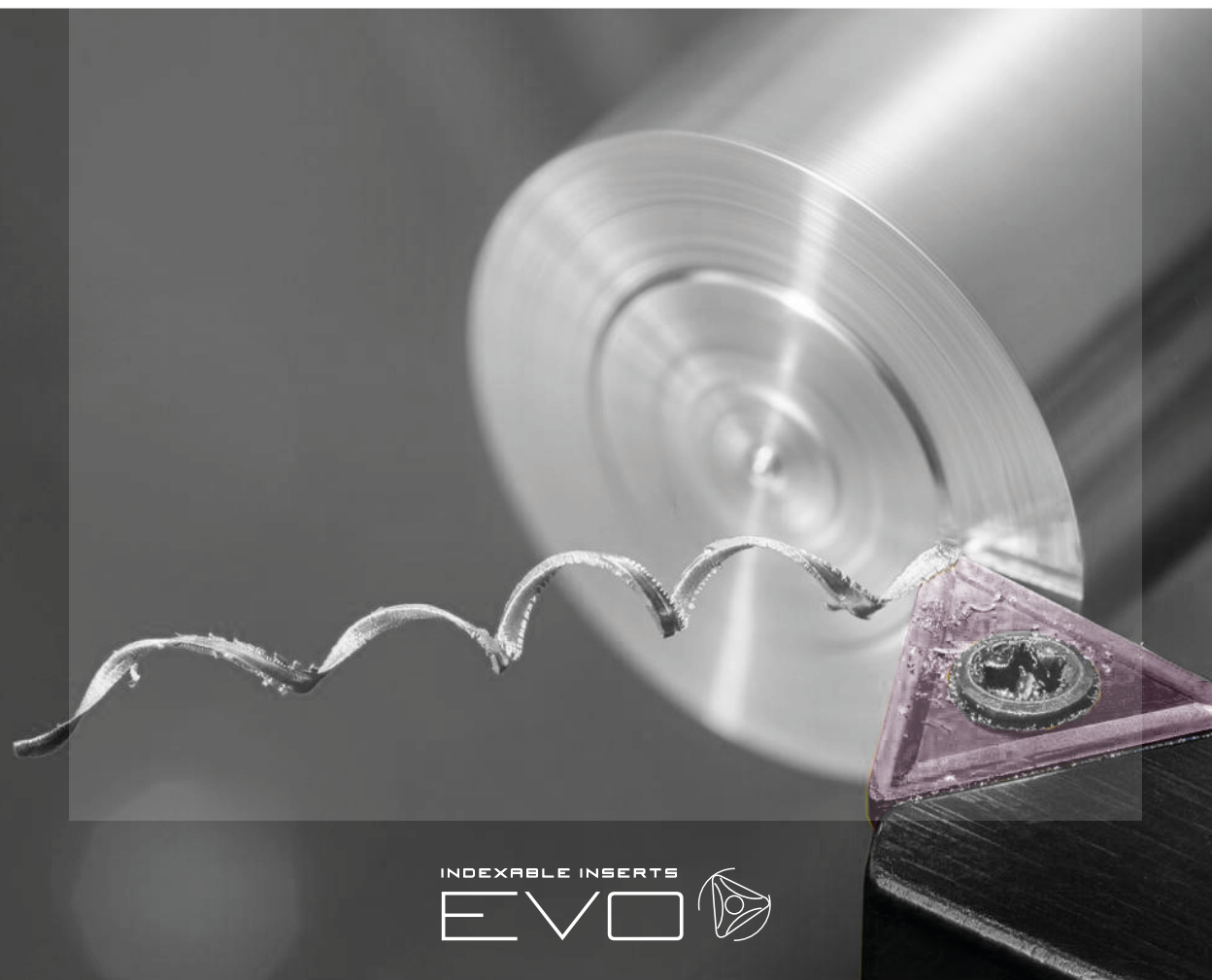


INOX & SUPERALLOYS SERIES

Stainless steel and superalloys turning

M S

NEW Turning inserts carbide grade available for stainless steel and superalloys turning positive and negative geometries



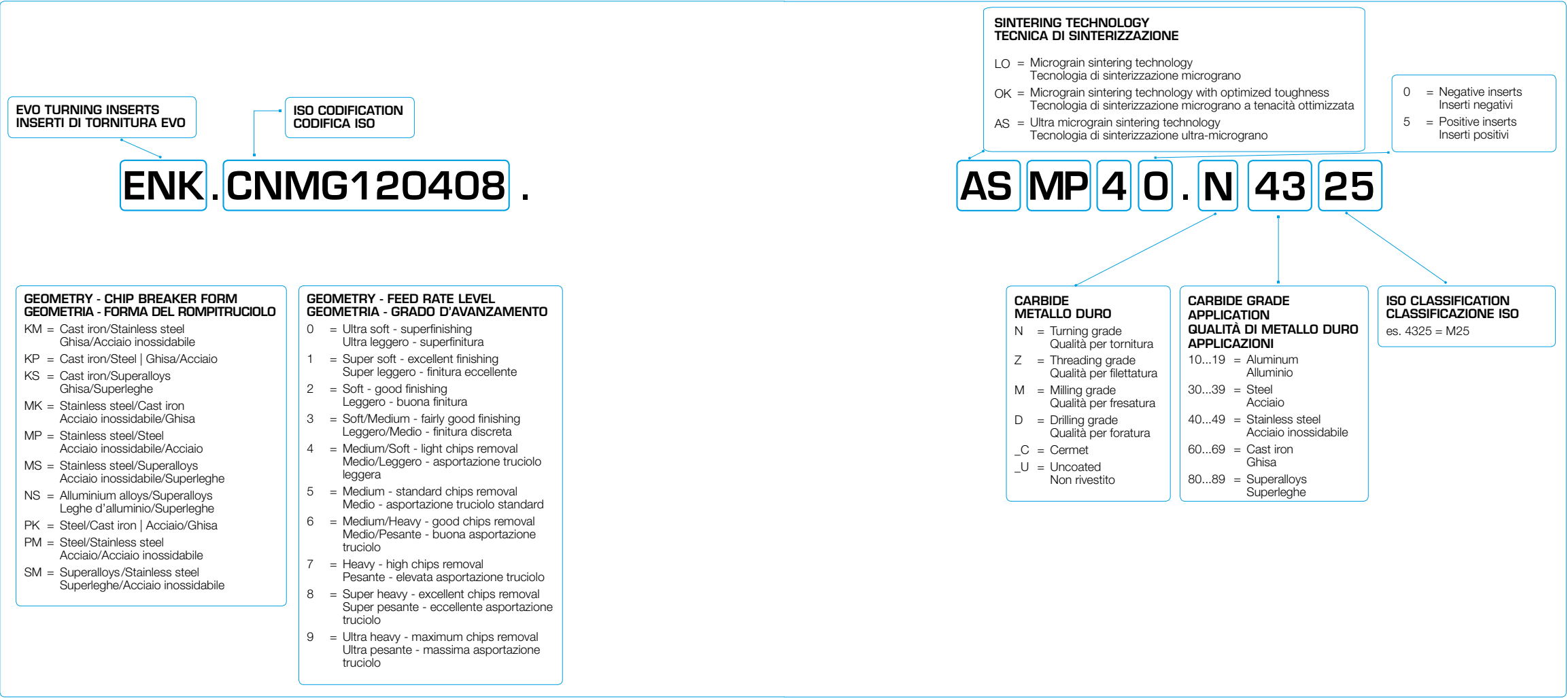
INDEXABLE INSERTS

EVO





EVO CODIFICATION for turning inserts





ISO CODIFICATION for turning inserts

INSERT SHAPE | FORMA DELL'INSERTO

A 	B 	C 	D
E 	H 	K 	L
M 	R 	S 	T
V 	W 		

TOLERANCE (+/- mm) | TOLLERANZA (+/- mm)

	m	s	d
A	+/-0,005	+/-0,025	+/-0,025
C	+/-0,013	+/-0,025	+/-0,025
E	+/-0,025	+/-0,025	+/-0,025
F	+/-0,005	+/-0,025	+/-0,013
G	+/-0,025	+/-0,05 +/-0,13	+/-0,025
H	+/-0,013	+/-0,025	+/-0,013
J	+/-0,005	+/-0,025	+/-0,05 +/-0,13
K	+/-0,013	+/-0,025	+/-0,05 +/-0,13
L	+/-0,05	+/-0,013	+/-0,025
M	+/-0,08 +/-0,18	+/-0,13	+/-0,05 +/-0,18
N	+/-0,08 +/-0,18	+/-0,025	+/-0,05 +/-0,13
U	+/-0,13 +/-0,38	+/-0,05 +/-0,13	+/-0,08 +/-0,32

THICKNESS | SPESSORE

S	mm
01	1.59
T1	1.97
02	2.38
T2	2.78
03	3.18
T3	3.97
04	4.76
05	5.56
06	6.35
07	7.94
09	9.52

RADIUS | RAGGIO

R	MO (mm)
02	r=0.2
04	r=0.4
05	r=0.5
06	r=0.6
08	r=0.8
10	r=1.0
12	r=1.2
16	r=1.6

CNMG 12 04 08

**RELIEF ANGLES
ANGOLI DI SPOGLIA INFERIORE**

A 	B 	C
D 	E 	F
G 	N 	P

INSERT TYPE | TIPO DI INSERTO

A 	B 70°-90° 	C 70°-90° 	F 	G
H 70°-90° 	J 70°-90° 	M 	N 	Q 40°-60°
R 	T 40°-60° 	U 40°-60° 	W 40°-60° 	X SPECIAL

CUTTING EDGE LENGTH LUNGHEZZA TAGLIANTE												
Ø d inscribed circle cerchio inscritto	A	C	D	E	K	L	M	R	S	T	V	W
3,97												02
4,76										08		02-03
5,56		05								09		
6,00												03
6,35		06	07	06			06		06	11	11	04
6,70	10											
7,94									07			
8,00				08								05
9,45	16											
9,52	15-16	09	11	09	16	15	09		09	16	16	06
10,00								10				06
11,00									11			
11,50						12						
12,00								12				07
12,62						18						
12,70		12	15	12		15-20			12	22		08
15,87		16							15			
19,05		19							19			



The Inox & SuperAlloys series offers chipbreaker geometries and different grades for turning

A new surface treatment technology is applied, making Inox & Alloys series hard to break

Lapped surface



New CVD generation

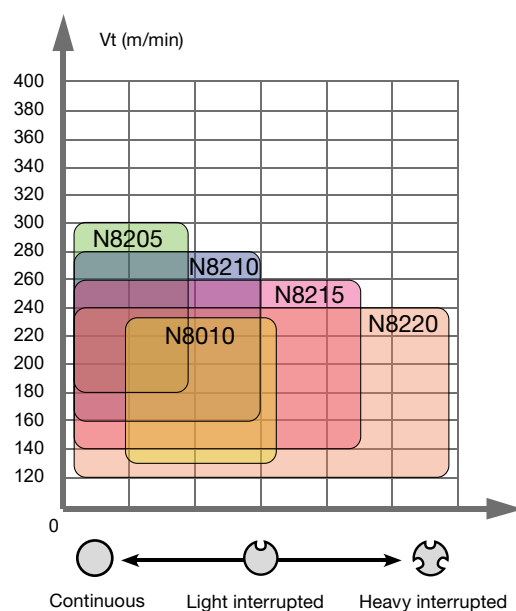
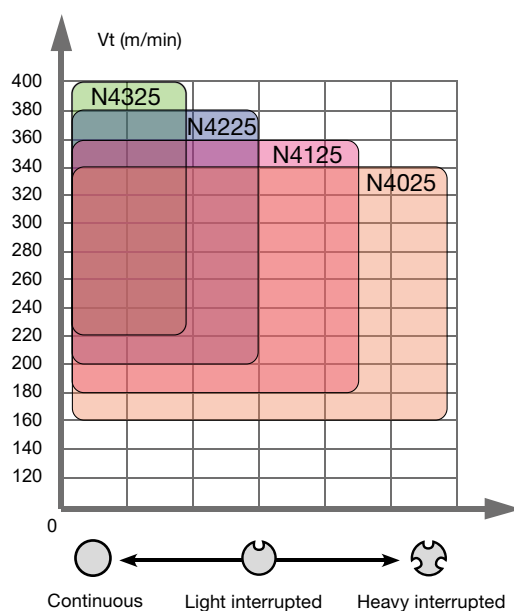
High tool life

Edge preparation

APPLICATION AREAS

M25

S05 - S20



Best chipbreaker geometries for stainless steel & super alloys turning

Negative inserts | Inserti negativi

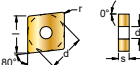
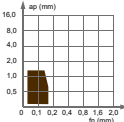
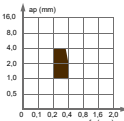
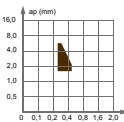
EVO	Material Materiale	Machining Lavorazione	Strenght Robustezza	ap/f	Application Applicazione
MP40	P M S				Sharp geometry with main application on medium-light machining on stainless steel. It can also be used on steel. Geometria affilata con principale applicazione nell'asportazione medio-leggera di acciaio inossidabile. Può essere impiegata anche su acciaio.
SM40	P M S				Geometry for medium machining mainly on superalloys and secondarily on stainless steel. It can also be used for light machining. Geometria adatta all'asportazione media principalmente su superleghe e secondariamente su acciaio inossidabile. Può anche essere impiegata per asportazioni leggere.
MP70	P M S				Geometry mainly for heavy machining on stainless steel. It can also be used for heavy machining on steel. Geometria adatta principalmente all'asportazione pesante su acciaio inossidabile. Può anche essere impiegata per asportazioni pesanti su acciaio.

Positive inserts | Inserti positivi

EVO	Material Materiale	Machining Lavorazione	Strenght Robustezza	ap/f	Application Applicazione
PM35	P M S				Geometry for finishing mainly on steel and stainless steel and secondarily on superalloys. Geometria adatta alla finitura principalmente su acciaio e acciaio inossidabile e secondariamente su superleghe.
MP35	P M S				Geometry for light machining mainly on stainless steel and secondarily on steel and superalloys. Geometria adatta all'asportazione leggera principalmente su acciaio inossidabile e secondariamente su acciaio e superleghe.
PM45	P M S				Geometry mainly for medium machining and secondarily for finishing on steel. Geometria adatta principalmente all'asportazione media e secondariamente alla finitura di acciaio.



Negative Inserts

CNMG										 Rhombic, 80° with hole																																																									
		<table border="1"><tr><td>P</td><td>Steel</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>M</td><td>Stainless</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>K</td><td>Cast iron</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>N</td><td>Non-ferrous</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>S</td><td>Superalloys</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>H</td><td>Hard material</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>		P	Steel									M	Stainless									K	Cast iron									N	Non-ferrous									S	Superalloys									H	Hard material												
P	Steel																																																																		
M	Stainless																																																																		
K	Cast iron																																																																		
N	Non-ferrous																																																																		
S	Superalloys																																																																		
H	Hard material																																																																		
Application	Chipbreaker	art.	Coated							ap/f	Dimensions (mm)																																																								
			N4025	N4125	N4225	N4325	N8010	N8205	N8210		N8215	N8220	r	l	d	s	d1																																																		
Light - Medium	MP30	ENK.CNMG 090308.MP30	●										0,8	9,7	9,5	3,18	3,81																																																		
		ENK.CNMG 120408.MP30		●	●								0,8	12,9	12,7	4,76	5,16																																																		
		ENK.CNMG 120412.MP30	●											1,2	12,9	12,7	4,76	5,16																																																	
Medium	MP40	ENK.CNMG 120404.MP40				●							0,4	12,9	12,7	4,76	5,16																																																		
		ENK.CNMG 120408.MP40	●			●							0,8	12,9	12,7	4,76	5,16																																																		
		ENK.CNMG 160612.MP40	●											1,2	16,1	15,8	6,35	6,35																																																	
		ENK.CNMG 190616.MP40				●								1,6	19,3	19,0	6,35	7,94																																																	
Heavy - Medium	MP70	ENK.CNMG 160612.MP70			●								1,2	16,1	15,8	6,35	6,35																																																		
		ENK.CNMG 160616.MP70			●								1,6	16,1	15,8	6,35	6,35																																																		
		ENK.CNMG 190616.MP70			●		●							1,6	19,3	19,0	6,35	7,94																																																	
						●	●																																																												



Negative Inserts

Application		Chipbreaker	art.	Coated								ap/f	Dimensions (mm)						
				N4025	N4125	N4225	N4325	N8010	N8205	N8210	N8215		N8220	r	l	d	s	d1	
Medium		MP40	ENK.SNMG 120408.MP40	●															
			ENK.SNMG 120412.MP40	●	●														
			ENK.SNMG 190612.MP40			●													
			ENK.SNMG 190616.MP40			●													
Medium		SM40	ENK.SNMG 150612.SM40									●							
			ENK.SNMG 190612.SM40										●						
			ENK.SNMG 190616.SM40											●					

●:OK technology sintering

●:AS technology sintering



Negative Inserts

Application		Chipbreaker	art.	Coated								ap/f	Dimensions (mm)					
				N4025	N4125	N4225	N4325	N8010	N8205	N8210	N8215		N8220	r	l	d	s	d1
Medium		MP40	ENK.TNMG 160404.MP40	●														
			ENK.TNMG 160408.MP40	●	●	●												

●:OK technology sintering

●:AS technology sintering



Negative Inserts

WNMG											
		P	Steel								
		M	Stainless								
		K	Cast iron								
		N	Non-ferrous								
		S	Superalloys								
		H	Hard material								
								</			



Positive Inserts

CCMT

P Steel

M Stainless

K Cast iron

N Non-ferrous

S Superalloys

H Hard material

Rhombic, 80° with hole

Application	Chipbreaker	art.	Coated						ap/f	Dimensions (mm)				
			N4025	N4125	N4225	N4325	N8010	N8205		r	l	d	s	d1
Medium - Light		ENK.CCMT 060202.PM35	●							0,2	6,5	6,35	2,38	2,80
		ENK.CCMT 09T308.PM35	●							0,8	9,7	9,52	3,97	4,40
Medium		ENK.CCMT 060204.PM45	●							0,4	6,5	6,35	2,38	2,80
		ENK.CCMT 060208.PM45	●							0,8	6,5	6,35	2,38	2,80
		ENK.CCMT 09T304.PM45	●							0,4	9,7	9,52	3,97	4,40
		ENK.CCMT 09T308.PM45	●							0,8	9,7	9,52	3,97	4,40
		ENK.CCMT 120404.PM45	●							0,4	12,9	12,7	4,76	5,16
		ENK.CCMT 120408.PM45	●							0,8	12,9	12,7	4,76	5,16

●:OK technology sintering ●:AS technology sintering

INOX & SUPERALLOYS SERIES

Positive Inserts

DCMT

P Steel

M Stainless

K Cast iron

N Non-ferrous

S Superalloys

H Hard material

Rhombic, 55° with hole

Application	Chipbreaker	art.	Coated						ap/f	Dimensions (mm)				
			N4025	N4125	N4225	N4325	N8010	N8205		r	l	d	s	d1
Medium - Light		ENK.DCMT 11T302.MP35	●				●	●		0,2	11,6	9,52	3,97	4,40
Medium		ENK.DCMT 11T304.PM45	●							0,4	11,6	9,52	3,97	4,40
		ENK.DCMT 11T308.PM45	●							0,8	11,6	9,52	3,97	4,40

●:OK technology sintering ●:AS technology sintering

14 | EVO®

EVO® | 15



Positive Inserts

- ☼: Continuous cutting
- ☼: Light interrupted cutting
- : Heavy interrupted cutting

SCMT

P	Steel								
M	Stainless								
K	Cast iron								
N	Non-ferrous								
S	Superalloys								
H	Hard material								



Square, 90°
with hole

[illegible]

●: OK technology sintering ●: AS technology sintering



Positive Inserts

☼: Continuous cutting
☼: Light interrupted cutting
○: Heavy interrupted cutting

TCMT

P	Steel								
M	Stainless	☞	☞	☞	☞				
K	Cast iron								
N	Non-ferrous								
S	Superalloys					☉	☞	☞	☞
H	Hard material								



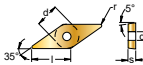
Triangular, 60°
with hole

[illegible]

●: OK technology sintering ●: AS technology sintering



Positive Inserts

VBMT												 Rhombic, 35° with hole									
		P Steel																			
		M Stainless																			
		K Cast iron																			
		N Non-ferrous																			
		S Superalloys																			
		H Hard material																			
Application	Chipbreaker	art.	Coated								ap/f	Dimensions (mm)									
			N4025	N4125	N4225	N4325	N8010	N8205	N8210	N8215		N8220	r	l	d	s	d1				
Medium - Light	MP35	ENK.VBMT 110302.MP35	●		●												0,2	11,1	6,35	3,18	2,90
																					
																					
Medium	PM45	ENK.VBMT 110302.PM45			●												0,2	11,1	6,35	3,18	2,90
		ENK.VBMT 110304.PM45	●														0,4	11,1	6,35	3,18	2,90
		ENK.VBMT 160404.PM45	●					●									0,4	16,5	9,52	4,60	4,40
		ENK.VBMT 160408.PM45	●														0,8	16,5	9,52	4,60	4,40

● :OK technology sintering ● :AS technology sintering



STANDARD CUTTING CONDITIONS

ISO	Operation	Chipbreaker	Grade	Depth of cut ap (mm)	Feed fn (mm/rev)	Cutting speed: Vt (m/min)		
						M 2.1	M 1.3	M 1.2
M	Medium cutting	MP40	N4025	0.8 - 4.0	0.12 - 0.38	90 - 180	100 - 220	80 - 180
			N4125	0.8 - 4.0	0.12 - 0.38	90 - 180	100 - 220	80 - 180
			N4225	0.8 - 4.0	0.12 - 0.38	120 - 220	130 - 240	100 - 200
			N4325	0.8 - 4.0	0.12 - 0.38	150 - 300	180 - 370	120 - 250

ISO	Operation	Chipbreaker	Grade	Depth of cut ap (mm)	Feed fn (mm/rev)	Cutting speed: Vt (m/min)		
						S 1.3	S 2.2	S 2.3
S	Medium cutting	MP40	N8010	0.8 - 4.0	0.12 - 0.38	90 - 140	35 - 80	30 - 50
			N8205	0.8 - 4.0	0.12 - 0.38	60 - 150	35 - 80	30 - 60
			N8210	0.8 - 4.0	0.12 - 0.38	60 - 130	30 - 70	28 - 45
			N8215	0.8 - 4.0	0.12 - 0.38	60 - 120	28 - 70	25 - 42
			N8220	0.8 - 4.0	0.12 - 0.38	40 - 100	25 - 60	22 - 40

ISO	Operation	Chipbreaker	Grade	Depth of cut ap (mm)	Feed fn (mm/rev)	Cutting speed: Vt (m/min)		
						M 2.1	M 1.3	M 1.2
M	Medium cutting	SM40	N4025	0.6 - 3.5	0.08 - 0.30	90 - 180	100 - 220	80 - 180
			N4125	0.6 - 3.5	0.08 - 0.30	90 - 180	100 - 220	80 - 180
			N4225	0.6 - 3.5	0.08 - 0.30	120 - 220	130 - 240	100 - 200
			N4325	0.6 - 3.5	0.08 - 0.30	150 - 300	180 - 370	120 - 250

ISO	Operation	Chipbreaker	Grade	Depth of cut ap (mm)	Feed fn (mm/rev)	Cutting speed: Vt (m/min)		
						S 1.3	S 2.2	S 2.3
S	Medium cutting	SM40	N8010	0.6 - 3.5	0.08 - 0.30	90 - 140	35 - 80	30 - 50
			N8205	0.6 - 3.5	0.08 - 0.30	60 - 150	35 - 80	30 - 60
			N8210	0.6 - 3.5	0.08 - 0.30	60 - 130	30 - 70	28 - 45
			N8215	0.6 - 3.5	0.08 - 0.30	60 - 120	28 - 70	25 - 42
			N8220	0.6 - 3.5	0.08 - 0.30	40 - 100	25 - 60	22 - 40

ISO	Operation	Chipbreaker	Grade	Depth of cut ap (mm)	Feed fn (mm/rev)	Cutting speed: Vt (m/min)		
						M 2.1	M 1.3	M 1.2
M	Heavy cutting	MP70	N4025	1.0 - 5.0	0.25 - 0.50	90 - 180	100 - 220	80 - 180
			N4125	1.0 - 5.0	0.25 - 0.50	90 - 180	100 - 220	80 - 180
			N4225	1.0 - 5.0	0.25 - 0.50	120 - 220	130 - 240	100 - 200
			N4325	1.0 - 5.0	0.25 - 0.50	150 - 300	180 - 370	120 - 250

ISO	Operation	Chipbreaker	Grade	Depth of cut ap (mm)	Feed fn (mm/rev)	Cutting speed: Vt (m/min)		
						S 1.3	S 2.2	S 2.3
S	Heavy cutting	MP70	N8010	1.0 - 5.0	0.25 - 0.50	90 - 140	35 - 80	30 - 50
			N8205	1.0 - 5.0	0.25 - 0.50	60 - 150	35 - 80	30 - 60
			N8210	1.0 - 5.0	0.25 - 0.50	60 - 130	30 - 70	28 - 45
			N8215	1.0 - 5.0	0.25 - 0.50	60 - 120	28 - 70	25 - 42
			N8220	1.0 - 5.0	0.25 - 0.50	40 - 100	25 - 60	22 - 40

M 2.1 Austenitic stainless steels M 1.3 Hardened stainless steels M 1.2 Martensitic stainless steels

S 1.3 Titanium alloys | TiAl6V4/Ti Gr.5 S 2.2 Nickel/Cobalt alloys | Inconel 625 S 2.3 Nickel/Cobalt alloys | Inconel 718



STANDARD CUTTING CONDITIONS

ISO	Operation	Chipbreaker	Grade	Depth of cut ap (mm)	Feed fn (mm/rev)	Cutting speed: Vt (m/min)		
						M 2.1	M 1.3	M 1.2
M	Medium cutting	PM35	N4025	0.4 - 2.0	0.05 - 0.15	90 - 180	100 - 220	80 - 180
			N4125	0.4 - 2.0	0.12 - 0.15	90 - 180	100 - 220	80 - 180
			N4225	0.4 - 2.0	0.12 - 0.15	120 - 220	130 - 240	100 - 200
			N4325	0.4 - 2.0	0.12 - 0.15	150 - 300	180 - 370	120 - 250

ISO	Operation	Chipbreaker	Grade	Depth of cut ap (mm)	Feed fn (mm/rev)	Cutting speed: Vt (m/min)		
						S 1.3	S 2.2	S 2.3
S	Medium cutting	PM35	N8010	0.4 - 2.0	0.12 - 0.15	90 - 140	35 - 80	30 - 50
			N8205	0.4 - 2.0	0.12 - 0.15	60 - 150	35 - 80	30 - 60
			N8210	0.4 - 2.0	0.12 - 0.15	60 - 130	30 - 70	28 - 45
			N8215	0.4 - 2.0	0.12 - 0.15	60 - 120	28 - 70	25 - 42
			N8220	0.4 - 2.0	0.12 - 0.15	40 - 100	25 - 60	22 - 40

ISO	Operation	Chipbreaker	Grade	Depth of cut ap (mm)	Feed fn (mm/rev)	Cutting speed: Vt (m/min)		
						M 2.1	M 1.3	M 1.2
M	Medium cutting	MP35	N4025	0.2 - 2.0	0.05 - 0.20	90 - 180	100 - 220	80 - 180
			N4125	0.2 - 2.0	0.05 - 0.20	90 - 180	100 - 220	80 - 180
			N4225	0.2 - 2.0	0.05 - 0.20	120 - 220	130 - 240	100 - 200
			N4325	0.2 - 2.0	0.05 - 0.20	150 - 300	180 - 370	120 - 250

ISO	Operation	Chipbreaker	Grade	Depth of cut ap (mm)	Feed fn (mm/rev)	Cutting speed: Vt (m/min)		
						S 1.3	S 2.2	S 2.3
S	Medium cutting	MP35	N8010	0.2 - 2.0	0.05 - 0.20	90 - 140	35 - 80	30 - 50
			N8205	0.2 - 2.0	0.05 - 0.20	60 - 150	35 - 80	30 - 60
			N8210	0.2 - 2.0	0.05 - 0.20	60 - 130	30 - 70	28 - 45
			N8215	0.2 - 2.0	0.05 - 0.20	60 - 120	28 - 70	25 - 42
			N8220	0.2 - 2.0	0.05 - 0.20	40 - 100	25 - 60	22 - 40

ISO	Operation	Chipbreaker	Grade	Depth of cut ap (mm)	Feed fn (mm/rev)	Cutting speed: Vt (m/min)		
						M 2.1	M 1.3	M 1.2
M	Heavy cutting	PM45	N4025	0.3 - 3.0	0.05 - 0.30	90 - 180	100 - 220	80 - 180
			N4125	0.3 - 3.0	0.05 - 0.30	90 - 180	100 - 220	80 - 180
			N4225	0.3 - 3.0	0.05 - 0.30	120 - 220	130 - 240	100 - 200
			N4325	0.3 - 3.0	0.05 - 0.30	150 - 300	180 - 370	120 - 250

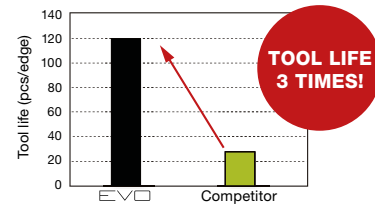
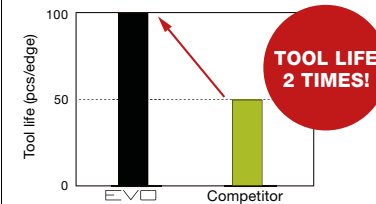
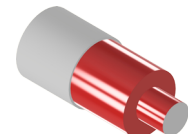
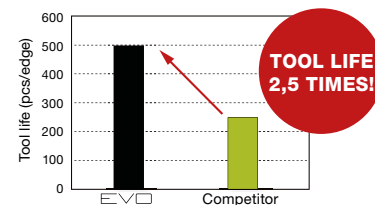
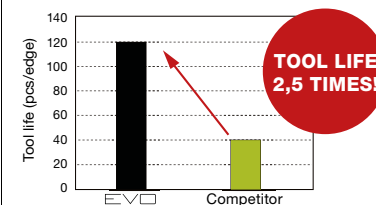
ISO	Operation	Chipbreaker	Grade	Depth of cut ap (mm)	Feed fn (mm/rev)	Cutting speed: Vt (m/min)		
						S 1.3	S 2.2	S 2.3
S	Heavy cutting	PM45	N8010	0.3 - 3.0	0.05 - 0.30	90 - 140	35 - 80	30 - 50
			N8205	0.3 - 3.0	0.05 - 0.30	60 - 150	35 - 80	30 - 60
			N8210	0.3 - 3.0	0.05 - 0.30	60 - 130	30 - 70	28 - 45
			N8215	0.3 - 3.0	0.05 - 0.30	60 - 120	28 - 70	25 - 42
			N8220	0.3 - 3.0	0.05 - 0.30	40 - 100	25 - 60	22 - 40

M 2.1 Austenitic stainless steels M 1.3 Hardened stainless steels M 1.2 Martensitic stainless steels

S 1.3 Titanium alloys | TiAl6V4/Ti Gr.5 S 2.2 Nickel/Cobalt alloys | Inconel 625 S 2.3 Nickel/Cobalt alloys | Inconel 718



CASE HISTORY

Workpiece type		Pin		Joint	
Insert		CNMG 160616		CNMG 190616	
Grade		OKMP40.N4225		OKMP40.N4225	
Workpiece material		S 2.2 Inconel 625 		M 1.2 AISI 410 	
		EVO	Competitor	EVO	Competitor
Cutting conditions	Cutting speed: Vt (m/min)	40	40	170	170
	Feed : fz(mm/rev)	0,3	0,3	0,8	0,8
	Depth of cut : ap (mm)	8	8	10	10
	Machining	External turning	External turning	External and face turning	External and face turning
Coolant		Yes	Yes	Yes	Yes
Results		 EVO insert eliminated insert fracture that caused part surface deterioration and provided long, predictable tool life.		 EVO insert eliminated insert fracture that caused part surface deterioration and provided long, predictable tool life.	
		Flange		Pin	
Insert		CNMG 190616		DCMT 11T304	
Grade		OKMP70.N4325		OKPM45.N4225	
Workpiece material		M 3.1 F53 		M 2.1 AISI 316 	
		EVO	Competitor	EVO	Competitor
Cutting conditions	Cutting speed: Vt (m/min)	120	100	120	120
	Feed : fz(mm/rev)	0,5	0,4	0,3	0,3
	Depth of cut : ap (mm)	2,5	2,5	0,8	0,8
	Machining	External and face turning	External and face turning	External and face turning	External and face turning
Coolant		Yes	Yes	Yes	Yes
Results		 EVO insert provided slower flank wear progression and eliminated part surface deterioration.		 EVO insert significantly prolonged tool life over the competitor grade with no part scraps.	



HARDNESS TABLE

R _m [N/mm ²]	HV 10	HB	HRC
255	80	76	
270	85	81	
285	90	86	
305	95	90	
320	100	95	
335	105	100	
350	110	105	
370	115	109	
385	120	114	
400	125	119	
415	130	124	
430	135	128	
450	140	133	
465	145	138	
480	150	143	
495	155	147	
510	160	152	
530	165	157	
545	170	162	
560	175	166	
575	180	171	
595	185	176	
610	190	181	
625	195	185	
640	200	190	
660	205	195	
675	210	199	
690	215	204	
705	220	209	
720	225	214	
740	230	219	
755	235	223	
770	240	228	
785	245	233	
800	250	238	22
820	255	242	23
835	260	247	24
860	268	255	25
870	272	258	26
900	280	266	27

R _m [N/mm ²]	HV 10	HB	HRC
920	287	273	28
940	293	278	29
970	302	287	30
995	310	295	31
1020	317	301	32
1050	327	311	33
1080	336	319	34
1110	345	328	35
1140	355	337	36
1170	364	346	37
1200	373	354	38
1230	382	363	39
1260	392	372	40
1300	403	383	41
1330	413	393	42
1360	423	402	43
1400	434	413	44
1440	446	424	45
1480	458	435	46
1530	473	449	47
1570	484	460	48
1620	497	472	49
1680	514	488	50
1730	527	501	51
1790	544	517	52
1845	560	532	53
1910	578	549	54
1980	596	567	55
2050	615	584	56
2140	639	607	57
	655	622	58
	675		59
	698		60
	720		61
	745		62
	773		63
	800		64
	829		65
	864		66
900			67



EVO code	Rm N/mm²	A5 %	HRC	HB	Mat. - Nr.	DIN	AFNOR	
M	Stainless steels - ferritic Acciai inox ferritici							
1.1	400-600	17			1.4002	X 6 CrAl 13	Z 6 CA 13	
	380-560	25			1.4512	X 5 CrTi 12	Z 6 CT 12	
	400-600	19			1.4000	X 6 Cr 13	Z 6 C 13	
	450-600	18			1.4016	X 6 Cr 17	Z 8 C 17	
	500-700	12			1.4742	X 10 CrAlSi 18	Z 10 CAS 18	
	450-630	18			1.4113	X 6 CrMo 17	Z 8 CD 17.01	
	420-600	23			1.4510	X 3 CrTi 17	Z 8 CT 17	
	400-600	20			1.4521	X 2 CrMoTi 18-2	Z 3 CDT 18-02	
	450-650	15			1.4724	X 10 CrAlSi 13	Z 13 C 13	
	520-720	15			1.4762	X 10 CrAl 24	Z 10 CAS 24	
M	Stainless steels - austenitic Acciai inox austenitici							
2.1	750-950	40			1.4372	X 12 CrMnNiN 17-7-5	Z 12 CMN 17-07 Az	
	680-880	35			1.4373	X 12 CrMnNiN 18-9-5	-	
	600-950	40			1.4310	X 10 CrNi 18-8; X 12 CrNi 17 7	Z 11 CN 17-08	
	630-850	35			1.4318	X 2 CrNiN 18-7	Z 3 CN 18-07 Az	
	500-700	35			1.4305	X 10 CrNiS 18 9	Z 10 CNF 18.09	
	600-951	36			1.4350	X 5 CrNi18 9	Z 6 CN 18.09	
	520-720	45			1.4301	X 5 CrNi 18 9	Z 6 CN 18.09	
	460-680	45			1.4306	X 2 CrNi 19 11	Z 2 CN 18.10	
	550-750	40			1.4311	X 2 CrNiN 18 10	Z 2 CN 18.10	
	510-710	45			1.4948	X 6 CrNi 18-11	-	
	520-700	45			1.4307	X 2 CrNi 18-9	Z 2 CN 19-09	
	500-750	40			1.4315	X 5 CrNiN 19-9	-	
	500-650	45			1.4303	X 5 CrNi 18 12	Z 8 CN 18.12	
	500-700	33			1.4833	X 12 CrNi 23-13	Z 15 CN 23-13	
	500-700	33			1.4845	X 8 CrNi 25-21	Z 8 CN 25-20	



	BS	EN	UNI	UNE	JIS	SIS	AISI/SAE/ASTM
	405 S 17	-	X 6 CrAl 13	-	SUS 405	2302	405
	409 S 19	-	X 6 CrTi 12	-	SUH 409	-	409
	403 S 17	-	X 6 Cr 13	F.3110	SUS 403	2301	403
	430 S 15	960	X 8 Cr 17	F.3113	SUS 430	2320	430
	430 S 15	60	X 8 Cr 17	F-3153	SUS 430; SUH 21	-	430
	434 S 17	-	X 8 CrMo 17	F.3116	SUS 434	2325	434
	-	-	X 6 CrTi 17	-	SUS 430 LX	-	XM 8; 430 Ti
	-	-	-	F-3123	SUS 444	2326	444
	-	-	-	F-3152	-	-	-
	-	-	X 16 Cr 26	F.3154	SUH 446	-	446
	-	-	-	-	-	-	201
	284 S 16	-	-	-	-	-	202
	301 S 21	-	X10CrNi18-8	F-3517	SUS 301	2331	301
	-	-	-	-	-	-	301LN
	303 S 21	58M	X 10 CrNi 18 9	F.3508	SUS 303	2346	303
	304 S 31	58E	X 5 CrNi 18 10	F.3551	SUS 302	-	304
	304 S 15	58E	X 5 CrNi 18 10	F.3551	SUS 304	2332; 2333	304; 304 H
	304 S 12	-	X 2 CrNi 18 11	F.3503	SCS 19	2352; 2333	304 L
	304 S 62	-	X 2 CrNiN 18 11	-	SUS 304 LN	2371	304 LN
	304 S 50	-	-	-	-	-	304H
	-	-	-	-	-	-	304 L
	-	-	-	-	-	-	304 N
	305 S 19	-	X 8 CrNi 19 10	-	SUS 305	-	308; 305
	309 S 24	-	X 6 CrNi 23 14	-	SUS 309S	-	309 S
	310 S 24	-	X 6 CrNi 25 20	F.331	SUS 310S	2361	310 S



EVO code	Rm N/mm²	A5 %	HRC	HB				
					Mat. - Nr.	DIN	AFNOR	
M	Stainless steels - austenitic Acciai inox austenitici							
2.1	550-750	30			1.4841	X 15 CrNiSi 25-21	Z 15 CNS 25-20	
	520-680	40			1.4401	X 5 CrNiMo 18 10	Z 6 CND 17.11	
	530-730	40			1.4436	X 5 CrNiMo 17 13 3	Z 6 CND 17.12	
	520-680	40			1.4404	X 2 CrNiMo 17 13 2	Z 2 CND 17.12	
	520-700	40			1.4435	X 2 CrNiMo 18 14 3	Z 2 CND 17.13	
	520-700	40			1.4432	X 2 CrNiMo 17-12-3	Z 3 CND 17-02-03	
	580-780	40			1.4406	X 2 CrNiMoN 17 12 2	Z 2 CND 17.12 AZ	
	580-780	35			1.4429	X 2 CrNiMoN 17 13 3	Z 2 CND 17.13 AZ	
	490-740	40			1.4573	X 10 CrNiMoTi 18 12	-	
	520-690	40			1.4571	X 6 CrNiMoTi 17 12 2	Z 6 CNT 17.12	
	520-720	40			1.4580	X 6 CrNiMoNb 17 12 2	Z 6 CNDNb 17.12	
	550-700	35			1.4438	X 2 CrNiMo 18 16 4	Z 2 CND 19.15	
	580-780	35			1.4439	X 2 CrNiMoN 17-13-5	Z 3 CND 18-14-05 Az	
	490-740	40			1.4583	X 10 CrNiMoNb 18 12	-	
	500-720	40			1.4541	X 6 CrNiTi 18 10	Z 6 CNT 18.10	
	500-720	40			1.4878	X 8 CrNiTi 18-10	Z 6 CNT 18-10	
	500-720	40			1.4550	X 6 CrNiNb 18 10	Z 6 CNNb 18.10	
	500-700	40			1.4563	X 1 NiCrMoCu 31-27-4	Z 2 NCDU 31-27	
	520-730	35			1.4539	X 1 NiCrMoCu 25-20-5	Z 2 NCDU 25-20	
	550-750	30			1.4864	X12NiCrSi35-16	Z 20 NCS 33-16	
620-880	20			1.4460	X 8 CrNiMo 27 5	Z 5 CND 27-05		
500-740	30			1.4546	X 5 CrNiNb 18 10	Z 6 CNNb 18.10		
M	Stainless steels - DUPLEX Acciai inox DUPLEX							
3.1	340-950	20			1.4462	X 2 CrNiMoN 22-5-3	Z 3 CND 22-05 Az	
	630-850	20			1.4362	X 2 CrNiN 23-4	Z 3 CN 23-04 Az	
	730-1000	15			1.4410	X 2 CrNiMoN 25-7-4	Z 3 CND 25-06	
	730-1000	17			1.4507	X 2 CrNiMoCuN 25-6-3	Z 3 CNDU 25-06	
	730-1000	17			1.4507	X 2 CrNiMoCuN 25-6-3	Z 3 CNDU 25-06	
M	Stainless steels - martensitic Acciai inox martensitici							
1.2	>600	20			1.4006	X 10 Cr 13	Z 12 C 13	
	650-850	12			1.4005	X 12 CrS 13	Z 12 CF 13	
	>700	15			1.4021	X 20 Cr 13	Z 20 C 13	
	>740	15			1.4028	X 30 Cr 13	Z 30 C 13	
	>760	12			1.4031	X 38 Cr 13	Z 40 C 14	
	>780	12			1.4034	X 46 Cr 13	Z 40 CM	
	>850	12			1.4116	X 50 CrMoV 15	Z 50 CD 15	
	>900	12			1.4122	X 39 CrMo 17-1	Z 38 CD 16-01	
	780-1100	11			1.4313	X 5 CrNi 13 4	Z 5 CN 13.4	
	840-1100	14			1.4418	X 4 CrNiMo 6-5-1	Z 6 CND 16-05-01	
	>650	14			1.4024	X15Cr13	Z 12 C 13 M	
	640-840	11			1.4104	X 14 CrMoS 17	Z 13 CF 17	
	750-950	14			1.4057	X 17 CrNi 16 2	Z 15 CN 16.02	
					1.4747	X 80 CrNiSi 20	Z 80 CSN 20.02	
	<900				1.4125	X 105 CrMo 17	Z 100 CD 17	
M	Stainless steels - hardened Acciai inox induriti							
1.3	>1275	5			1.4542	X5CrNiCuNb16-4	Z 7 CNU 15-05	
	>1030	19			1.4568	X7CrNiAl17-7	Z 9 CNA 17-07	



	 BS		EN	 UNI		 UNE		 JIS		 SIS		 AISI/SAE/ASTM	
	314 S 25	-		-		F.3310		SUH 310		-		314	
	316 S 16	58J		X 5 CrNiMo 17 12		F.3543		SUS 316		2347		316	
	316 S 16	-		X 5 CrNiMo 17 13		F.3538		SUS 316		2343		316	
	316 S 11	-		X 2 CrNiMo 17 12		F.3533		SUS 316 L		2348		316 L	
	317 S 12	-		X 2 CrNiMo 17 13		-		SCS 16; SUS 316 L		2353		316 L	
	316 S 13	-		X 2 CrNiMo 17-12-3		F-3537		-		-		316 L	
	316 S 61	58C		X 2 CrNiMoN 17 12		F-3542		SUS 316 LN		-		316 LN	
	316 S 62	-		X 2 CrNiMoN 17 13		F-3543		SUS 316 LN		2375		316 LN	
	320 S 33	-		X 6 CrNiMoTi 17 13		-		SUS 316 Ti		-		316 Ti	
	320 S 31	58J		X 6 CrNiMoTi 17 12		F.3535		SUS 316 Ti		2350		316 Ti	
	318 S 17	-		X 6 CrNiMoNb 17 12		F.3536		-		-		316 Cb	
	317 S 12	-		X 2 CrNiMo 18 15		F-3539		SUS 317 L		2367		317 L	
	-	-		-		F-3544		-		-		317 LMN	
	-	-		X 6 CrNiMoNb 17 13		-		-		-		318	
	321 S 12	58B		X 6 CrNiTi 18 11		F.3553; F.3523		SUS 321		2337		321	
	321 S 31	-		-		-		SUS 321		-		321 H	
	347 S 17	58F		X 6 CrNiNb 18 11		F.3552; F.3524		SUS 347		2338		347	
	-	-		-		-		-		2584		B 668	
	904 S 13	-		-		-		-		2562		904 L	
	NA 17	-		-		F.3313		SUH 330		-		330	
	-	-		-		F-35552		SUS 329 J 1		2324		329	
	347 S 18	58F		X 6 CrNiNb 18 11		F-3524		SUS 347		2338		348	
	318 S 13	-		-		-		SUS 329J3L		2377		2205	
	-	-		-		-		-		2327		2304	
	-	-		-		-		SCS 14A		2328		2507	
	-	-		-		-		-		-		255	
	-	-		-		-		-		-		255	
	410 S 21	56A		X 12 Cr 13		F.3401		SUS 410		2302		410; CA-15	
	416 S 21	-		X 12 CrS 13		-		SUS 416		2380		416	
	420 S 37	-		X 20 Cr 13		-		SUS 420 J 1		2303		420	
	420 S 45	-		X 30 Cr 13		-		SUS 420 J 2		2304		420	
		-		X 40 Cr 14		-		SUS 420 J 2		2304		420	
	420 S 45	56D		X 40 Cr 14		F.3405		SUS 420 J 2		2304		420	
	-	-		-		F-3422		-		-		-	
	-	-		-		-		-		-		-	
	425 C 11	-		X 6 CrNi 13 04		-		SCS 5		2385		CA 6-NM	
	-	-		-		-		-		2387		-	
	420 S 29	56B		-		-		SUS 410J1		-		420	
	-	-		X 14 CrS 17		F-3431		SUS 430 F		2383		430 F	
	431 S 29	57		X 16 CrNi 16		F-3427		SUS 431		2321		431	
	443 S 65	59		X 80 CrSiNi 20		F.320.B		SUH 4		-		HNv 6	
	-	-		X 105 CrMo 17		-		SUS 440 C		-		440 C	
	-	-		-		-		SCS 630		-		630	
	301 S 81	-		-		-		SUS 631		2388		631	



EVO code	Rm N/mm ²	A5 %	HRC	HB	Mat. - Nr.	DIN	AFNOR
S Nickel- /Cobalt- alloys Leghe nichel/cobalto resistenti al calore							
2.1	900-1100	14			1.4718	X 45 CrSi 9 3	Z 45 CS 9
	500-750	30			1.4828	X 15 CrNiSi 20 12	Z 15 CNS 20.12
	550-800	30			1.4841	X 15 CrNiSi 25 20	Z 15 CNS 25.20
	500-750	35			1.4845	X 12 CrNi 25 21	Z 12 CN 25.20
	550-800	30			1.4864	X 12 NiCrSi 36 16	Z 12 NCS 37.18
	950-1200	8			1.4871	X 53 CrMnNiN 21 9	Z 52 CMN 21.09
	500-750	30			1.4876	X 10 NiCrAlTi 33 20	Z 8 NC 32.21
	500-750	40			1.4878	X 12 CrNiTi 18 9	Z 6 CNT 18.12 (B)
	500-700	35			2.4360	NiCu30Fe	Nu 30
	620-850	17			2.4375	NiCu30Al	Nu 30 AT
	>690	40			2.4685	G-NiMo28	-
	>740	42			2.4610	NiMo16Cr16Ti	-
	>760	40			2.4617	G-NiMo30	-
	700-800	26			2.4630, 2.4951	NiCr20Ti	NC 20 T
	800-1000	12			2.4631	NiCr20TiAl	-
2.2	1200	17			2.4632	NiCr20Co18Ti	-
	1180	25			2.4634	NiCo20Cr15MoAlTi	-
	<770	15			2.4662	NiCr13Mo6Ti3	-
	900-1200				2.4670	-	-
	900-1200				2.4674	-	-
	1270	23			2.6554	-	-
2.3	890	50			2.4856	NiCr22Mo9Nb	NC 22 FeDNb
	<1400	25			2.4668	NiCr19FeNbMo	NC 19Fe Nb
S Pure titanium, Titanium alloys Titanio puro, Leghe di titanio							
1.1	290-410	30			3.7025	Ti99.5 / Ti Gr.1	-
1.2	380-540	20			3.7035	Ti99.4 / Ti Gr.2	-
	460-590	18			3.7055	Ti99.3 / Ti Gr.3	-
	540-740	16			3.7065	Ti99.2 / Ti Gr.4	-
1.3	390-540	20			3.7235	Ti 2 Pd / Ti Gr.2Pd	-
	>890	>10			3.7165	TiAl6V4 / Ti Gr. 5	T-A6V
	>1000	9			3.7185	TiAl 4 Mo 4 Sn 2	-



	BS	EN	UNI	UNE	JIS	SIS	AISI/SAE/ASTM
	401 S 45	52	X 45 CrSi 8	-	SUH 1	-	HNv 3
	309 S 24	-	-	-	SUH 309	-	309
	-	-	X 16 CrNiSi 25 20	-	SUH 310	-	314; 310
	310 S 24	-	X 6 CrNi 26 20	F.331	SUH 310; SUS 310 S	-	310 S
	NA 17	-	-	-	SUH 330	-	330
	349 S 54	-	X 53 CrMnNiN 21 9	-	SUH 35; SUH 36	-	EV 8
	NA 15 (H)	-	-	-	NCF 800	-	B 163
	321 S 20	-	X 6 CrNiTi 18 11	-	SUS 321	2337	321
	NA 13	-	-	-	-	-	Monel 400
	NA 18	-	-	-	-	-	Monel K-500
	-	-	-	-	-	-	Hastelloy B
	-	-	-	-	-	-	Hastelloy C-4
	-	-	-	-	-	-	Hastelloy B-2
	HR 5	-	-	-	-	-	Nimonic 75
	HR 401; 601	-	-	-	NCF 80 A	-	Nimonic 80 A
	-	-	-	-	-	-	Nimonic 90
	-	-	-	-	-	-	Nimonic 105
	HR 53	-	-	-	-	-	Nimonic 901
	-	-	-	-	-	-	Nimocast 713
	-	-	-	-	-	-	Nimocast PK 24
	-	-	-	-	-	-	Waspaloy
	NA 21	-	-	-	-	-	Inconel 625
	-	-	-	-	-	-	Inconel 718
	-	-	-	-	-	-	-
	TA 1	-	-	-	-	-	-
	TA 2	-	-	-	-	-	-
	TA 3	-	-	-	-	-	-
	-	-	-	-	-	-	-
	TA 28	-	-	-	-	-	R56400
	-	-	-	-	-	-	-

