ALLOY DATA SHEET

Safe Metal
L'esprit industriel

G28Mn6

Visit our website
www.safe-metal.com

WHO ARE WE ?

Safe Metal is the world leader in steel components made by green sand casting. Our teams operate as part of an international network that stretches across Europe, America and Asia, and partner their sales and project management skills with those of their customers.

MAKING WORLD CLASS

Thanks to the expert skills of our R&D department, we are able to improve our industry knowledge and hence our products, our production process and metalworking by choosing the most appropriate methods for the product

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Generality

Carbon-manganese steel with high manganese and carbon for high mechanical characteristics at treated condition. Good hardenability and medium weldability.

Market : this alloy can be used in all markets.

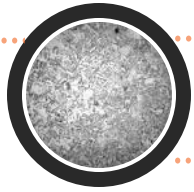
Chemical Composition

C (%)	Si (%)	Mn (%)	P (%)	S (%)
0,25 – 0,32	< 0,6	1,2– 1,8	< 0,035	< 0,03

Main characteristics

G28Mn6

Family : Versatile



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Mechanical characteristics & Heat treatment

	Designation		Heat Treatment			Thickness	Mechanical properties				
							Tensile test at room temperature			Impact test	
Reference	Name	Number	Symbol	Normalizing or austenitizing °C	Tempering °C	t mm	$Rp_{0.2}$ MPa min.	R_m Mpa min.	A% min.	KV J min.	Temp. °C
Safe Metal possibilities according to norms :											
EN 10293:2015	G28Mn6	1.1165	+N	880 to 950		t ≤ 250	260	520 to 670	18	27	RT
			+QT1	880 to 950	630 to 680	t ≤ 100	450	600 to 750	14	35	RT
			+QT2	880 to 950	580 to 630	t ≤ 50	550	700 to 850	10	31	RT
Safe Metal other possibilities :											
Safe Metal	G28Mn6		+N			t ≤ 30	370	650	17	11	-20
Safe Metal	G28Mn6		+QT HR		High Rm	t ≤ 30	650 to 700	780 to 830	9	32	-20
Safe Metal	G28Mn6		+QT M		Balanced Rm/Kv	t ≤ 30	600 to 650	700 to 780	13	50	-20
Safe Metal	G28Mn6		+QT HD		High Kv	t ≤ 30	550 to 600	650 to 700	15	60	-20

RT : Room temperature HR : High resistance N : Normalized
QT : Liquid quenched and tempered HD : High ductility

Microstructures

QUENCHING + TEMPERED AT 500°C

QUENCHING + TEMPERED AT 600°C

NORMALIZED

Machining

			HB*	Microstucture
EN 10293:2015	G28Mn6	+N	150-200	Ferrite + Pearlite
EN 10293:2015	G28Mn6	+QT1	180-230	Tempered Martensite
EN 10293:2015	G28Mn6	+QT2	210-260	Tempered Martensite
Safe Metal	G28Mn6	N	170	Ferrite + Pearlite
Safe Metal	G28Mn6	QT HR	255	Tempered Martensite
Safe Metal	G28Mn6	QT M	225	Tempered Martensite
Safe Metal	G28Mn6	QT HD	180	Tempered Martensite

HB : Brinell hardness

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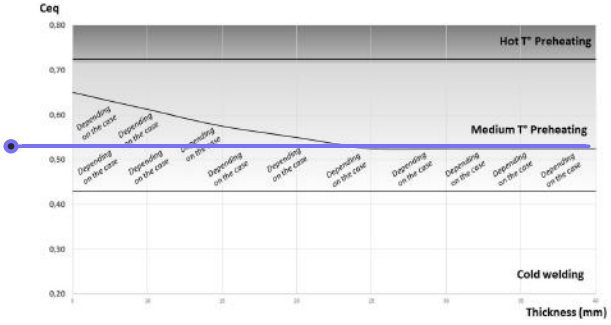
Welding

Preheating conditions according to thickness and equivalent carbon. A specific zone is defined where preheating is not absolutely necessary and depends on the case.



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Welding comparative table

Grade	Group (ISO TR 15608)	Filler Metal	Post-Welding HT	Hardness of melted area (Hv10)	Rm (MPa)	Process (acc. NFEN ISO 15614)
C steel						
C25	1.2	E71T5	SR/N	130-170	450-550	111/135
		E71T5	QT	150-200	550-650	
G20Mn5	1.2	E70C6 M H4	SR/N	150-200	500-550	
		E70C6 M H4	QT	160-220	540-580	
G24Mn6	3.1	ER110T5	SR	240-300	750-800	
		ER110T5	QT	280-340	780-860	
G28Mn6	3.1	ER80SD2	SD			
G30MnV6	3.1	ER80SD2	SD			
GE230	1.1	E71T5	SR/N	130-170	450-550	
		E71T5	QT	150-200	550-650	
GE280	1.2	E70C6 M H4	SR/N	150-200	500-550	
		E70C6 M H4	QT	160-220	540-580	
G20MnV6	3.1	ER110T5	SR	240-300	750-800	
		ER110T5	QT	280-340	780-860	
Cr-Mo						
G18CrMo4	5.1	E9018B3	SR	180-250	620-680	111/135
G25CrMo4	5.1	E9018G	QT	200-260	630-720	111/135
G30CrMo4	5.1	E12018G	QT	300-350	950-1150	111
G21CrMoV5-11	5.2	E13018G	SR	280-350	800-1000	111
Others						
G10MnMoV6	3.1	ER90 S-G	SR	200-280	620-660	135
		ER90 S-G	QT	160-220	580-640	
G20NiCrMo4	4.2	ER120 S-G	SR	300-360	900-960	
		ER120 S-G	QT	280-360	920-1020	

111 : Electrode welding
135 : MAG

SR : Stress releaving
QT : Quenched and Tempered

N : Normalized

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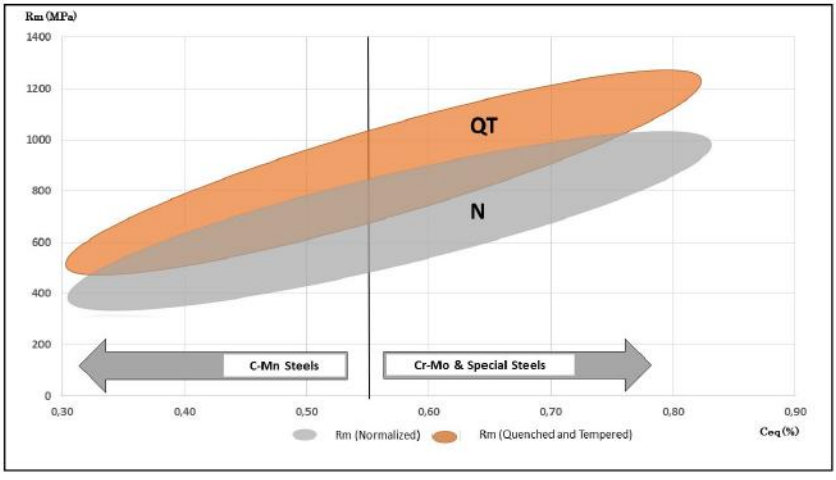
Comparative Table of Safe Metal grades

	Chemical composition								N			QT (Q920°C)		
C-Mn	C (%)	Mn (%)	Si (%)	Cr (%)	Mo (%)	V (%)	Ni (%)	Ceq (%)	Rm	A%	Kv (-20°C)	Rm	A%	Kv (-20°C)
C25	0,2	0,7	0,45					0,32	440	25	22	420-520	20-25	40-50
GE240	0,23	0,9	0,5					0,4	480	25	12	520-600	25-30	oct-20
GE280	0,24	1,2	0,5	0,15				0,47	530	20	10	600-800	15-25	20-40
G20Mn5 (low)	0,2	1,1	0,4					0,38	470	28	40	500-590	20-22	38-46
G20Mn5 (high)	0,23	1,4	0,5					0,5				600-880	déc-25	25-30
G20MnV6	0,23	1,55	0,5			0,05		0,54	580	25	10			
G24Mn6 (low)	0,23	1,65	0,5					0,52	590	18	10	550-670	20-25	40-75
G24Mn6 (high)	0,25	1,8	0,5					0,6	630	32	10	620-900	oct-25	15-35
G28Mn6	0,3	1,4	0,5					0,53	650	17	10	650-840	oct-15	30-60
G30MnV6	0,3	1,4	0,5			0,1		0,55	650	12	30	700-950	08-déc	30-45
	Chemical composition								N			QT (Q920°C)		
Cr-Mo	C (%)	Mn (%)	Si (%)	Cr (%)	Mo (%)	V (%)	Ni (%)	Ceqv (%)	Rm	A%	Kv (-20°C)	Rm	A%	Kv (-20°C)
G18CrMo4	0,18	0,8	0,4	1	0,2			0,55	450	18	10	560-720	déc-22	30-80
G25CrMo4	0,25	0,8	0,4	1	0,2			0,62	660	11	12	800-950	oct-18	20-90
G30CrMo4	0,3	0,8	0,4	1	0,2			0,67	840	5	10	650-1050	oct-18	20-90
G21CrMoV5-11	0,2	0,7	0,5	1,15	1	0,3		0,82	980	5	5	900-1200	05-oct	5
	Chemical composition								N			QT (Q920°C)		
Others	C (%)	Mn (%)	Si (%)	Cr (%)	Mo (%)	V (%)	Ni (%)	Ceqv (%)	Rm	A%	Kv (-20°C)	Rm	A%	Kv (-20°C)
G10MnMoV6	0,12	1,35	0,5		0,3	0,08		0,42	460	17	10	580-750	14-16	20-50
G20NiMoCr4	0,18	1	0,4	0,4	0,6		0,9	0,62	750	5	10	600-950	déc-20	35-100



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C25

Family : Versatile

GE240

Family : Versatile

GE280

Family : Versatile

G20Mn5

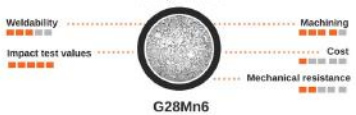
Family : Versatile

G20MnV6

Family : Versatile

G24Mn6

Family : Versatile



G28Mn6

Family : Versatile

G30MnV6

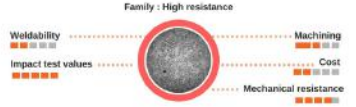
Family : Versatile

G18CrMo4

Family : High resistance

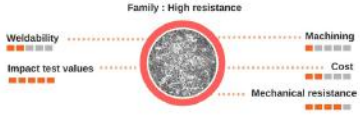
G25CrMo4

Family : High resistance



G30CrMo4

Family : High resistance



G21CrMoV5-11

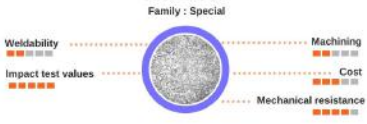
Family : High resistance

G10MnMoV6

Family : Special

G20NiMoCr4

Family : Special



GS400-18 LT

Family : Cast iron

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