

ALLOY DATA SHEET



L'esprit industriel

C25

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



C25

Generality

Carbon-manganese steel with low manganese to be a soft magnetic steel. Good weldability.

Market : this alloy can be used in all markets.



Chemical Composition

C (%)	Si (%)	Mn (%)	P (%)	S (%)
0,18 – 0,23	0,30-0,60	0,50-0,80	< 0,02	< 0,015

Main characteristics

C25

Family : Versatile

Weldability



Machining



Impact test values



Cost



Mechanical resistance



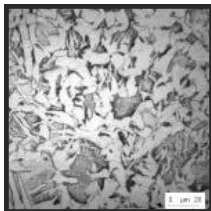
Mechanical characteristics & Heat treatment

Designation			Heat Treatment		Thickness	Mechanical properties									
Reference	Name	Number	Symbol	Normalizing or austenitizing °C		Tempering °C	Tensile test at room temperature			Impact test					
					R _{p0.2} MPa min.		R _m Mpa min.	A% min.	KV J min.	Temp. °C					
					Safe Metal possibilities according to norms :										
							GS-C25	Not in EN 10293:2015 standard							
Safe Metal other possibilities :															
Safe Metal	GS-C25		+N	TN1		t ≤ 30	260	440	26	20	-20				
Safe Metal	GS-C25		+QT HR		High Rm	t ≤ 30	350 to 380	480 to 530	22	40	-20				
Safe Metal	GS-C25		+QT HD		High Kv	t ≤ 30	300 to 350	420 to 480	24	45	-20				

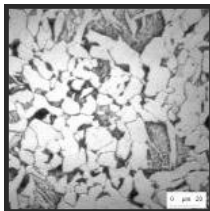
RT : Room temperature HR : High resistance N : Normalized
 QT : Liquid quenched and tempered HD : High ductility

Microstructures

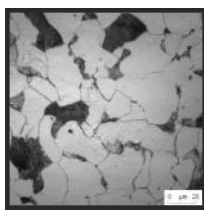
QUENCHING + TEMPERED AT 500° C



QUENCHING + TEMPERED AT 600° C



NORMALIZED



Machining

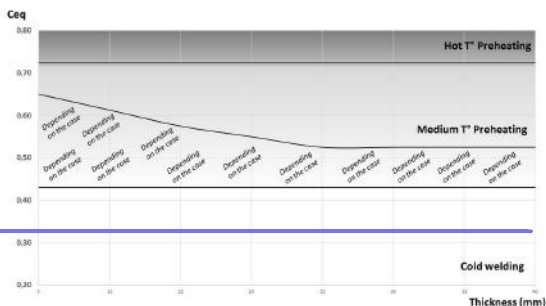
			HB*	Microstructure
Safe Metal	GS-C25	N	120	Ferrite + Pearlite
Safe Metal	GS-C25	QT HR	175	Bainite + Ferrite + Pearlite
Safe Metal	GS-C25	QT HD	125	Bainite + Ferrite + Pearlite

HB : Brinell hardness

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)	Fillar 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	
G34Mn6	3.1	ER110T5	SR	240-300	750-800	
		ER110T5	QT	280-340	780-860	
G28Mn6	3.1	ER80S02	SD			
G30MnV6	3.1	ER80S02	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-Mn						
G15CrMo4	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	6.2	E13018G	SR	280-350	800-1000	111
Others						
G10MnV6V6	3.1	ER80 S-G	SR	200-260	620-660	135
		FR80 S-G	QT	160-220	580-640	
G20NiCrMo4	4.2	ER120 S-G	SR	300-350	900-960	
		ER120 S-G	QT	280-350	920-1020	

131 : Electrode welding
135 : MAG

SR : Stress relieving
QT : Quenched and Tempered

N : Normalized

Comparative Table of Safe Metal grades

C-Mn	Chemical composition								N			QT (Q190°C)			
	C (%)	Mn (%)	Si (%)	Cr (%)	Mo (%)	V (%)	Ni (%)	Ceq (%)	Rm	AK	Kv (-20°C)	Rm	AK	Kv (-20°C)	
C25	0,2	0,7	0,45					0,32	440	25	22	420-520	20-25	40-50	
GE280	0,23	0,9	0,5					0,4	480	25	12	520-600	25-30	60-70	
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	500-550	20-22	18-46	
G20Mn5 (high)	0,23	1,4	0,5					0,5				600-880	dec 25	25-30	
G20MnV6	0,23	1,55	0,5			0,05		0,54	580	25	10				
G24Mn5 (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	ext 25	15-35	
G28Mn6	0,3	1,4	0,5					0,53	650	17	10	650-840	ext 15	30-60	
G30MnV6	0,3	1,4	0,5			0,1		0,55	650	12	30	700-950	08-dec	30-45	
Chemical composition										N			QT (Q190°C)		
Cr-Mo	C (%)	Mn (%)	Si (%)	Cr (%)	Mo (%)	V (%)	Ni (%)	Ceq (%)	Rm	AK	Kv (-20°C)	Rm	AK	Kv (-20°C)	
G18CrMo4	0,18	0,6	0,4	1	0,2			0,55	450	18	10	560-720	dec 22	30-80	
G15CrMo4	0,25	0,8	0,4	1	0,2			0,62	460	11	12	600-950	ext 18	20-90	
G18CrMo4	0,3	0,8	0,4	1	0,2			0,67	840	5	10	650-1050	ext 18	20-90	
G21CrMoV5-11	0,2	0,7	0,5	1,15	1	0,3		0,82	980	5	5	900-1200	05-dec	5	
Chemical composition										N			QT (Q190°C)		
Others	C (%)	Mn (%)	Si (%)	Cr (%)	Mo (%)	V (%)	Ni (%)	Ceq (%)	Rm	AK	Kv (-20°C)	Rm	AK	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		0,5	0,62	750	5	10	600-950	dec 20	35-100	

