

ALLOY DATA SHEET



**GE280**

Visit our website  
[www.safe-metal.com](http://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



# GE280

## Generality

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

**Market :** this alloy can be used in all markets.



## Chemical Composition

C (%)	Si (%)	Mn (%)	P (%)	S (%)
0,18-0,25	0,3-0,6	1-1,3	<0,025	<0,025

## Main characteristics

### GE280

Family : Versatile

Weldability



Machining



Impact test values



Cost



Mechanical resistance



## Mechanical characteristics & Heat treatment

Designation			Heat Treatment		Thickness  t mm	Mechanical properties					
Reference	Name	Number	Symbol	Normalizing or austenitizing °C		Tempering °C	Tensile test at room temperature			Impact test	
					R <sub>p0.2</sub> MPa min.		R <sub>m</sub> MPa min.	A% min.	KV J min.	Temp. °C	
Safe Metal possibilities according to norms :											
EN 10293-2015	GE270	1.0454	+NT	880 to 960	560 to 620	t < 300	270	480	22	29	RT
Safe Metal other possibilities :											
Safe Metal	GE280		+N			t ≤ 30	340	575	26	46	RT
Safe Metal	GE280		+QT HR		High Rm	t ≤ 30	550 to 700	720 to 850	24	60	RT
Safe Metal	GE280		+QT HD		High Kv	t ≤ 30	500 to 550	650 to 720	28	75	RT

RT : Room temperature

HR : High resistance

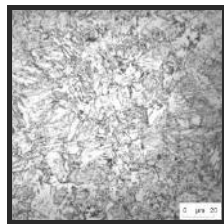
N : Normalized

QT : Liquid quenched and tempered

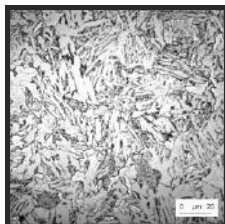
HD : High ductility

## Microstructures

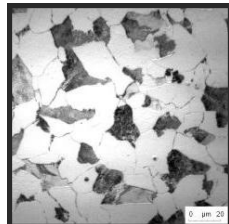
QUENCHING + TEMPERED AT 500 °C



QUENCHING + TEMPERED AT 600 °C



NORMALIZED



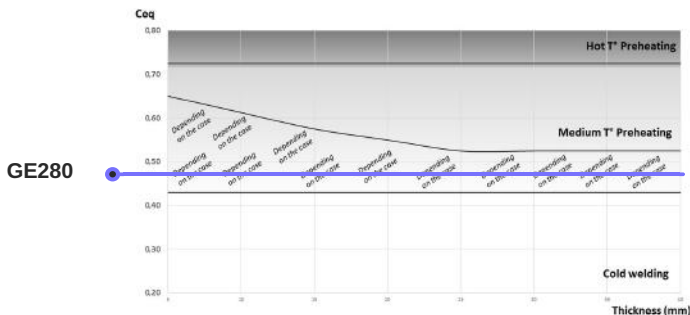
## Machining

			HB*	Microstructure
Safe Metal	GE280	N	170	Ferrite + Pearlite
Safe Metal	GE280	QTHR	210-260	Tempered Martensite + Bainite
Safe Metal	GE280	QTHD	190-220	Tempered Martensite + Bainite

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.



## 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)
<b>C steel</b>						
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	
G24Mn5	3.1	ER110T5	SR	240-300	750-800	
		ER110T5	QT	280-340	780-860	
G28Mn6	3.1	ER80S02	SR			
G30MnV6	3.1	ER80S02	SR			
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	111/135
		ER110T5	QT	280-340	780-860	
<b>Cr-Mn</b>						
G18CrMn4	5.1	E301B93	SR	180-250	620-680	
G25CrMn4	5.1	E991B93	QT	200-280	680-720	111/135
G30CrMn4	5.1	E1201B93	QT	300-350	900-1150	111
G21CrMnV5-11	6.2	E1301B93	SR	280-350	800-1000	111
<b>Others</b>						
G10MnMoV6	3.1	ER90 S-G	SR	200-280	620-660	135
		ER90 S-G	QT	160-220	580-640	
G20NiCrMn4	4.2	ER120 S-G	SR	300-350	900-960	
		ER120 S-G	QT	280-350	920-1020	

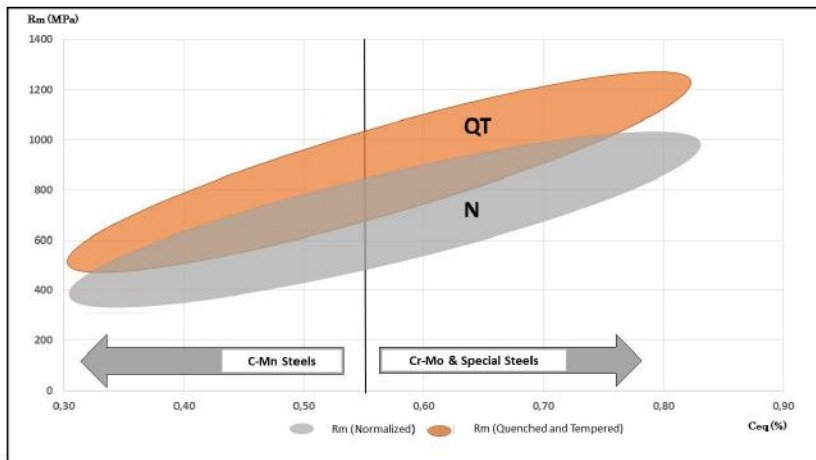
111 : Electrode welding  
135 : MIG

SR : Stress relieving  
QT : Quenched and Tempered

N : Normalized

## Comparative Table of Safe Metal grades

	Chemical composition								N			QT (10-20°C)		
C-Mn	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	23	22	420-520	20-25	40-50
GE280	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
G20MnS (low)	0,2	1,1	0,4					0,38	470	28	40	500-590	20-22	38-46
G20MnS (E-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			
G24Mn6 (low)	0,23	1,65	0,5					0,52	590	18	10	550-670	20-25	40-75
G24Mn6 (E-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	DB-dec	30-45
	Chemical composition								N			QT (10-20°C)		
Cr-Mo	C [%]	Mn [%]	Si [%]	Cr [%]	Mo [%]	V [%]	Ni [%]	Ceq [%]	Rm	AK	Kv (20°C)	Rm	AK	Kv (20°C)
G18CrMod	0,18	0,8	0,4	1	0,2			0,55	450	18	10	560-720	dec-22	30-80
G25CrMod	0,25	0,8	0,4	1	0,2			0,62	660	11	12	600-950	oct-18	20-90
G30CrMod	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 (10-20°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		0,9	0,62	750	5	10	600-950	dec-20	35-100



**Family : Versatile**



Family : Versatile



### Family: Monotilidae



**Family : Vagrestile**



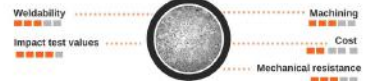
Family : Versatile



**Family : Versatile**



**Family : Versatile**



Family : Versatile



Family : High resistance



Family : High resistance



Family : High resistance



Family : High resistance



Family : Special



Family : Special



Family : Cast iron



