

ALLOY DATA SHEET



**G20NiMoCr4**

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## 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



# G20NiMoCr4

## Generality

Medium alloy steel nickel-chromium-molybdenum for high mechanical characteristics at treated condition, especially low temperature toughness. Good hardenability and medium weldability.

**Market :** this alloy is often used in the mining market and could be used in railway and construction equipment market.



## Chemical Composition

C (%)	Si (%)	Mn (%)	P (%)	S (%)	Cr (%)	Mo (%)	Ni (%)
0,17 – 0,23	< 0,60	0,80 – 1,20	< 0,025	< 0,015	0,30 – 0,50	0,40 – 0,80	0,80 – 1,20

## Main characteristics

### G20NiMoCr4

Family : Special

**Weldability**



**Machining**



**Impact test values**



**Cost**



**Mechanical resistance**



# G20NiMoCr4

## Mechanical characteristics & Heat treatment

Reference	Designation		Heat Treatment			Thickness t mm	Mechanical properties				
	Name	Number	Symbol	Normalizing or austenitizing °C	Tempering °C		Tensile test at room temperature			Impact test	
							R <sub>m</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	G20NiMoCr4	1.6750	+QT1	880 to 930	650 to 700	t ≤ 150	410	570 to 720	16	27 40 27 30 60 85 100	-45 RT -50 -40 -20 0 -20 RT
SEW 685	G20NiMoCr3-7* (*other's content possibility)	1.6750	+QT	880 to 930	650 to 700	t ≤ 150	410	570 to 720	16		
Safe Metal other possibilities :											
Safe Metal	G20NiMoCr4		+N			t ≤ 30	490	750	5	10	-20
Safe Metal	G20NiMoCr4		+QT HR		High R <sub>m</sub>	t ≤ 30	750-800	850-950	12	27	-50
Safe Metal	G20NiMoCr4		+QT M		Balanced R <sub>m</sub> /Kv	t ≤ 30	650	750	14	40 80	-50 -20
Safe Metal	G20NiMoCr4		+QT HD		High Kv	t ≤ 30	400-550	550-650	16	50	-50

RT : Room temperature

QT : Liquid quenched and tempered

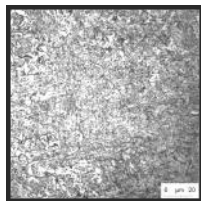
HR : High resistance

HD : High ductility

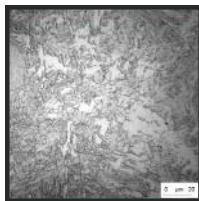
N : Normalized

## Microstructures

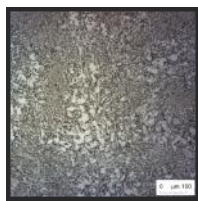
QUENCHING + TEMPERED AT 500°C



QUENCHING + TEMPERED AT 600°C



NORMALIZED



## Machining

			HB	Microstructure
EN 10293:2015	G20NiMoCr4	+QT1	170 - 220	Tempered Martensite
SEW 685	G20NiMoCr3-7	+QT	170 - 220	Tempered Martensite
Safe Metal	G20NiMoCr4	N	225	Ferrite + Pearlite + Bainite
Safe Metal	G20NiMoCr4	QT	200-330	Tempered Martensite

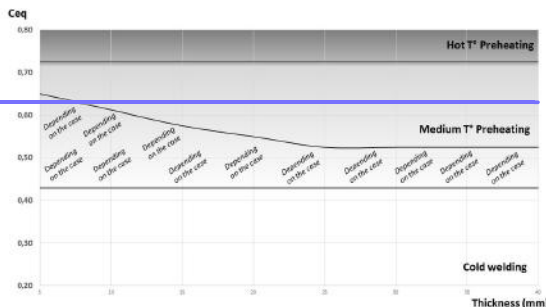
HB : Brinell hardness

# G20NiMoCr4

## 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.

G20NiMoCr4



## Welding comparative table

Grade	Group (ISO TR 15608)	Filler Metal	Post-Welding HT	Hardness of melted area (HV10)	Rm (MPa)	Process (acc. NIPEN ISO 15614)
<b>C steel</b>						
C25	1.2	E71T5	SR/N	130-170	450-550	111/135
		E71T5	QT	150-200	550-650	
G20Mn3	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	260-340	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	260-340	780-860	
<b>Cr-Mo</b>						
Q18CrMo4	5.1	E9018B3	SR	190-250	620-680	111/135
Q25CrMo4	5.1	E9018G	QT	200-260	630-720	111/135
Q30CrMo4	5.1	E12019G	QT	300-350	850-1150	111
G21CrMoV-11	6.2	E13018G	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	150-220	560-640	
G20NiCrMo4	4.2	ER120 S-G	SR	300-360	900-960	
		ER120 S-G	QT	280-360	920-1020	

111 : Electrode welding  
135 : MAG

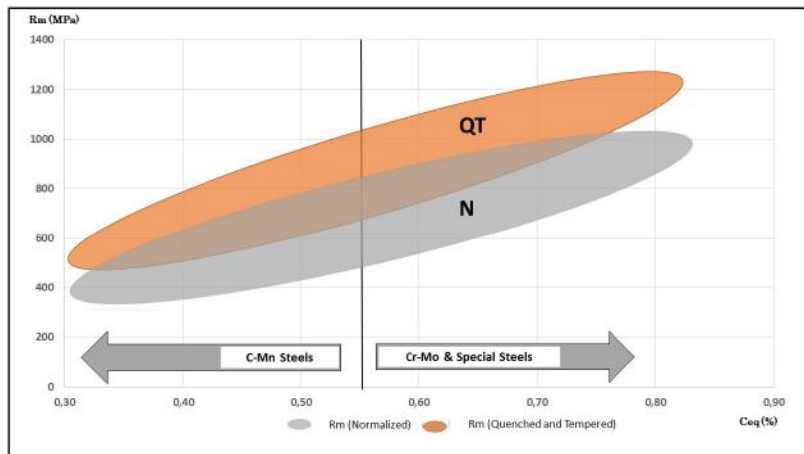
SR : Stressrelieving  
QT : Quenched and Tempered

N : Normalized

# G20NiMoCr4

## Comparative Table of Safe Metal grades

Chemical composition										N			QT (QT20°C)		
C-Mn	C [%]	Mn [%]	Si [%]	Cr [%]	Mo [%]	V [%]	Ni [%]	Co [%]	Rm	AS	Kv (-20°C)	Rm	AS	Kv (-20°C)	
C25	0,2	0,7	0,05					0,32	440	25	22	420-520	20-25	40-50	
GT240	0,23	0,9	0,5					0,4	480	23	12	520-600	25-30	oct-20	
GT280	0,24	1,2	0,5	0,15				0,47	530	20	10	800-800	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				800-880	dec-25	25-30	
G20MnV6	0,23	1,55	0,5			0,05		0,54	560	25	10				
G24Mn6 (low)	0,23	1,05	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	850-840	oct-15	30-40	
G30MnV6	0,3	1,4	0,5			0,1		0,55	650	12	30	700-950	08-dec	30-45	
Chemical composition										N			QT (QT20°C)		
Cr-Mo	C [%]	Mo [%]	Si [%]	Cr [%]	Mo [%]	V [%]	Ni [%]	Co [%]	Rm	AS	Kv (-20°C)	Rm	AS	Kv (-20°C)	
G18CrMo4	0,18	0,8	0,4	1	0,2			0,55	450	18	10	560-720	dec-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	
G23CrMoV-11	0,2	0,7	0,5	1,15	1	0,3		0,82	980	9	9	900-1200	05-oct	5	
Chemical composition										N			QT (QT20°C)		
Others	C [%]	Mo [%]	Si [%]	Cr [%]	Mo [%]	V [%]	Ni [%]	Co [%]	Rm	AS	Kv (-20°C)	Rm	AS	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	9	10	800-950	dec-20	35-100	







L'esprit industriel

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