

Quality	20NiCrMo2-2
According to standards	EN 10084: 2008
Number	1.6523

Chemical composition

C%	Si% max	Mn%	P% max	S% max	Cr%	Mo%	Ni%	Deviations allowed for analysis product
0,17-0,23 ± 0.02	0,40 + 0.03	0,65-0,95 ± 0.04	0,025 + 0.005	0,035 + 0.005	0,35-0,70 ± 0.05	0,15-0,25 ± 0.03	0,40-0,70 ± 0.05	

20NiCrMoS2-2 n° 1.6526 S% 0.020-0.040 product deviation ± 0.005%
On request, this steel grade may be supplied with addition of lead (Pb) 0.15-0.35%

Temperature °C

Hot-forming	Natural state	Normalizing	Core hardening	Carburizing	Hardening carburizing surf.	Tempering
1100-900	(HB max 230)	860-880 air	860-900 oil-polymer salt bath	880-980	800-830 oil-polymer salt bath	150 200
Soft annealing +A	Isothermal annealing	Annealing +FP	End quench hardenability test	Pre-heating welding	Stress-relieving after welding	
700 furnace cooling 10 °C/h to 600, then air (HB max 212)	850 furnace cooling to 650, then air (HB 161-212)	950-1000 quick cooling (HB 149-194)	870 water	150-350 Ac1 735	welding must be carried out on the annealed state and before carburizing Ac3 820	600 furnace cooling Ms * core ** carburizing surface 380* 200**

Mechanical and physical properties

Hot-rolled values obtained on test blanks after core hardening + stress-relieving UNI 7846: 1978. Use only as reference

size mm test blanks	Testing at room temperature (longitudinal)					
	R N/mm ²	Rp 0.2 N/mm ² min.	A% min.	C% min.	Kcu J min.	HB
11	1180-1570	930	7		27.5	354-438
30	830-1130	590	10		30	249-339 for information only
63	690-980	490	11		30	210-295 for information only

Table of tempering values obtained at room temperature on rounds of Ø 10 mm after quenching at 860 °C in oil

HB	415	409	409	404	390	385	376	357	344	319	294	264	240	213
HRC	44.5	44	44	43.5	42	41.5	40.5	38.5	37	34	31	27	22.5	
R N/mm ²	1440	1430	1425	1410	1340	1335	1270	1200	1140	1050	975	885	800	700
Rp 0.2 N/mm ²	1060	1110	1160	1180	1180	1170	1135	1080	1025	950	870	785	700	600
A %	11.2	11.8	12.0	12.0	11.8	11.2	11.4	12.0	13.5	15.2	17.0	19.0	22.0	24.5
C %	51	52	53	54	55	56	60	61	62	63	65	67	72	74
Kv J	46	46	46	46	45	46	64	62	86	100	126	146	170	194
HRC carburized layer	64	63.5	62	60.5	59	57.5								
Tempering at °C	50	100	150	200	250	300	350	400	450	500	550	600	650	700

Depth of case- hardened layer

Depth	mm	0.25	0.30	0.40	0.50	0.60	0.65
HRC					50		
Time of case-hardening h.		1	2	3	4	6	8

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size mm		Soft annealing +A +SH Peeled-reeled, ground +SL	Soft annealing +A +C Cold-drawn	Heat treatment for pearlite / ferrite +FP +SH Peeled-reeled, ground	Heat treatment for pearlite / ferrite +FP +C Cold-drawn
from	to	HB max	HB max	HB	HB
5 a)	10		270		
10	16		260		
16	40	212	255	149-194	149-240
40	63	212	255	149-194	149-235
63	100	212	255	149-194	149-235

a) for thickness < 5 mm, mechanical properties should be agreed before order placement

Forged 20NiCrMo2 UNI 8550: 1984. Use only as reference

size mm		Testing at room temperature (longitudinal)								HB
from	to	R N/mm ²	Rp 0.2 N/mm ² min	A% L min	A% T min	A% Q min	Kcu L J min	Kcu T J min	Kv L J min	for inform.
	11	1175-1570	930	9			27.5			352-438
11	25	885-1225	640	10			30			265-361
25	40	785-1080	590	10			30			234-327
40	60	685-980	490	11			32			209-295

Mechanical properties obtained on test blanks after core hardening + stress-relieving
L = longitudinal T = tangential Q = radial

EN 10084: 2008 Jominy test HRC grain size 5 min.

mm distance from quenched extremity

	1.5	3	5	7	9	11	13	15	20	25	30	35	40	45	50	H
min	41	37	31	25	22	20										normal
max	49	48	45	42	36	33	31	30	27	25	24	24	23			

Temperature	Mod. of elasticity GPa		Thermal expansion				Density
Testing at °C	E long.	G tang.	10 ⁻⁶ • K ⁻¹				Kg/dm ³
20	210	80					7.86

EUROPE EN	ITALY UNI	CHINA GB	GERMANY DIN	FRANCE AFNOR	U.K. B.S.	RUSSIA GOST	USA AISI/SAE
20NiCrMo2-2	20NiCrMo2	20CrNiMo	21NiCrMo2	20NCD2	805M20	20HGNM	8620 appr.

Time - temperature - transformation diagram for isothermal cooling

