

Quality	20NiCrMo2-2	Case-hardening Steel	<i>Technical card Lucefin Group rev. 2024</i>
According to standards	ISO 683-3 : 2018		
Number	1.6523		

Chemical composition

C%	Si%	Mn%	P% max	S% max	Cr%	Mo%	Ni%	Cu% max	Product deviations are allowed
0,17-0,23 ± 0.02	0,15-0,40 ± 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 ± 0.03	0,40 + 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 +U	Normalizing +N	Core hardening	Carburizing	Hardening carburizing surf.	Str-reliev. +SR
1100-900	(HB max 230)	880-900 air	860-900 oil-polymer salt bath	880-980	800-830 oil-polymer salt bath	150 200
Soft annealing +A	Isothermal annealing +I	Annealing +FP	End quench hardenability test	Pre-heating welding welding must be carried out on the annealed state and before carburizing		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)	900 water	150-350 Ac1	600 furnace cooling Ac3	600 furnace cooling Ms * core ** carburizing surface 380* 200**
				735	820	

Mechanical 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)					<i>HB</i>
	R	Rp 0.2	A%	Kcu		
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

	415	409	409	404	390	385	376	357	344	319	294	264	240	213
HB														
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
Z %	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 carburizing	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

20NiCrMo2 1.6523 - 220NiCrMoS2-2 1.6526 EN ISO 683-7:24						<i>Lucefin Group</i>	
size mm		Soft annealing +A+SH Peeled, Ground +G	Soft annealing +A+C Cold-drawn	Heat treatment for pearlite / ferrite +FP+SH Peeled, Ground	Heat treatment for pearlite / ferrite +FP+C Cold-drawn		
from	to	HBW max	HBW max	HBW	HBW ^{b)}		
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
^{b)} te hardness values for flats may deviate by ± 10%

20NiCrMo2 Forged UNI 8550: 1984. Use only as reference						
size mm		Testing at room temperature (longitudinal)				
from	to	R	Rp 0.2	A%	Kcu	HB
		N/mm ²	N/mm ² min	min (L)	J min (L)	<i>for inform.</i>
	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

ISO 683-3: 2018 Jominy test HRC grain size 5 min.																
mm distance from quenched end																
	1.5	3	5	7	9	11	13	15	20	25	30	35	40	45	50	H
min	41	37	31	25	22	20	-	-	-	-	-	-	-	-	-	
max	49	48	45	42	36	33	31	30	27	25	24	24	23			
min	44	41	36	31	27	24	22	21	-	-	-	-	-			HH
max	49	48	45	42	36	33	31	30	27	25	24	24	23			
min	41	37	31	25	22	20	-	-	-	-	-	-	-			HL
max	46	44	40	36	31	29	27	26	23	21	20	20	-			

Thermal Expansion	10 ⁻⁶ • K ⁻¹						
Mod. of Elasticity long.	GPa		210				
Mod. of Elasticity tang.	GPa		80				
Density	Kg/dm ³		7.86				
°C	20		100		200		300
EUROPE	ITALY	CHINA	GERMANY	FRANCE	U.K.	RUSSIA	USA
EN	UNI	GB	DIN	AFNOR	B.S.	GOST	AISI/SAE
20NiCrMo2-2	20NiCrMo2	20CrNiMo	21NiCrMo2	20NCD2	805M20	20HGNM	8620 appr.