

Quality	25CrMo4	Quenching and Tempering Steel	<i>Technical card</i>
According to standards	ISO 683-2: 2018		Lucefin Group
Number	1.7218		rev. 2024

Chemical composition

C%	Si% a)	Mn%	P% max	S% max	Cr%	Mo%	Cu% max	
0,22-0,29 ± 0.02	0,10-0,40 ± 0.03	0,60-0,90 ± 0.04	0,025 + 0.005	0,035 + 0.005	0,90-1,20 ± 0.05	0,15-0,30 ± 0.03	0,40 + 0.05	Product deviations are allowed

For 25CrMoS4 n° 1.7213, S% 0.020-0.040 product deviations ± 0.005

a) Steels may be supplied with a lower silicon content. In this case, alternative means of deoxidation shall be used

On request, it may be supplied lead Pb% 0,15-0,35 treated in order to improve the machinability

Temperature °C

Hot-forming	Normalizing +N	Quenching +Q	Quenching +Q	Tempering +T	Stress-relieving +SR		
1100-900	890 air	880 oil or polymer	840 water	540-680 air	50° under the temperature of tempering		
Soft annealing +A	Natural state +U	Spheroidize +BG	End quench hardening test	Pre-heating welding	Stress-relieving after welding		
680-720 cooling 15 °C/h to 600, then air (HB max 212)	(HB~ 270)	760-780 cool slowly	860 water	200-300	550 furnace cooling		
				Ac1 750	Ac3 800	Ms 380	Mf 165

Mechanical properties

25CrMo4 1.7218 – 25CrMoS4 1.7213 Hot-rolled mechanical properties for **quenched and tempered** condition ISO 683-2: 2018

size d / t mm		Testing at room temperature (longitudinal)					
from	to	R N/mm ²	Rp 0.2 N/mm ² min.	A% min.	Z% min.	Kv ₂ J min.	HBW for information
	16/8	900-1100	700	12	50	-	271-331
16/8	40/20	800-950	600	14	55	50	240-286
40/20	100/60	700-850	450	15	60	50	213-253
100/60	160/100	650-800	400	16	60	45	200-240

d = diameter t = thickness

Table of tempering values obtained at room temperature after quenching at 840 °C in water

HB		294	279		247	216
HRC		31	29		24	
R	N/mm ²	960	930		830	700
Rp 0.2	N/mm ²	770	680		600	540
A	%	14	14.5		16	20
Z	%	58	64		66	70
Tempering at °C		400	500	550	600	650

Mechanical properties at high temperatures on quenched and tempered material EN 10269: 2013

minimum 0.2 % proof strength at ... °C temperature

Ø ≤ 100 mm	435	428	420	412	392	363	333	304	275	235
100 - 150 mm	414	403	393	382	372	344	324	294	265	226
Temperature °C	50	100	150	200	250	300	350	400	450	500

25CrMoS4 1.7213 – 25CrMo4 1.7218 EN ISO 683-7:24
Lucefin Group

Cold-drawn + quenched and tempered +A+C						Hot-rolled annealed + Peeled +A+SH			
size mm		Testing at room temperature (longitudinal)				Testing at room temperature (longitudinal)			
from	to	R	Rp 0.2	A%	HBW	R	Rp 0.2	A%	HBW
		N/mm ²	N/mm ² min	min	max	N/mm ²	N/mm ² min	min	max
5 ^{b)}	10	-	-	-	270	-	-	-	-
10	16	-	-	-	260	-	-	-	-
16	40	-	-	-	255	-	-	-	212
40	63	-	-	-	250	-	-	-	212
63	100	-	-	-	250	-	-	-	212

^{b)} for thickness < 5 mm, mechanical properties should be agreed before order placement

Hot-rolled, quenched and tempered + Cold-drawn +QT+C						Hot-rolled quenched and tempered + Peeled +QT+SH			
size mm		Testing at room temperature (longitudinal) ^{c) e)}				Testing at room temperature (longitudinal) ^{a)}			
from	to	R	Rp 0.2	A%	Kv ₂	R	Rp 0.2	A%	Kv ₂
		N/mm ²	N/mm ² min	min	J min	N/mm ² min	N/mm ² min	min	J min
5 ^{b)}	10	900-1100	700	9	-	-	-	-	-
10	16	900-1100	700	9	-	-	-	-	-
16	40	800-1000	600	10	-	800-950	600	14	50
40	63	700-900	520	11	-	700-850	450	15	50
63	100	700-900	450	12	-	700-850	450	15	50

^{c)} for flats and special sections, tensile strength (R) may differ by ± 10%

^{e)} values valid also for +QT+C+G

^{b)} for thickness < 5 mm, mechanical properties should be agreed before order placement

^{a)} values valid also for +C+QT

25CrMo4 1.7218 Forged quenched and tempered UNI EN 10250-3: 2001

size d / t		Testing at room temperature						
from	to	R	Rp 0.2	A%	A%	Kv	Kv	HB
		N/mm ² min	N/mm ² min	min (L)	min (T)	J min (L)	J min (T)	min
	100/70	700	450	15	15	50	50	213
100/70	250/160	650	400	17	13	45	27	200
250/160	500/330	600	380	18	14	38	22	178

L = longitudinal T = tangential. d = diameter t = thickness

ISO 683-2: 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	
min	44	43	40	37	34	32	29	27	23	21	20	32	31	31	31	H
max	52	52	51	50	48	46	43	41	37	35	33					
min	47	46	44	41	39	37	34	32	28	26	24	23	22	22	22	HH
max	52	52	51	50	48	46	43	41	37	35	33	32	31	31	31	
min	44	43	40	37	34	32	29	27	23	21	20					HL
max	49	49	47	46	43	41	38	36	32	30	29	28	27	27	27	

Thermal Expansion	10 ⁻⁶ •K ⁻¹ ►	10.5	11.4	11.5	12.1	12.7	13.2	13.6	14.0	14.4	
Mod. of Elasticity long.	GPa	217	213	212	207	199	192	184	175	164	
Mod. of Elasticity tang.	GPa				81	79	76	73	70	62	
Specific Heat Capacity	J/(Kg•K)	423	456	461	479	499	517	536	558	587	
Thermal Conductivity	W/(m•K)				41.0	42.7	42.8	41.6	39.9	37.8	35.6
Density	Kg/dm ³				7.83						
Specific Electric Resistivity	Ohm•mm ² /m				0.254	0.300	0.369	0.451	0.545	0.654	0.778
Electrical Conductivity	Siemens•m/mm ²				3.94	3.33	2.71	2.22	1.83	1.53	1.28
°C		-100	0	20	100	200	300	400	500	600	

Physical properties according to DIN SEW 310 (08/1992) standard.

The symbol ► indicates temperature between -100 °C and 0 °C, -100 °C and 20 °C ...

EUROPE	ITALY	CHINA	GERMANY	FRANCE	U.K.	RUSSIA	USA
EN	UNI	GB	DIN	AFNOR	B.S.	GOST	AISI/SAE
25CrMo4	25CrMo4	30CrMo	25CrMo4	25CD4	708M25	20ChM	4130