

Quality	42CrMo4	<i>Technical card</i>
According to standards	EN 10083-3: 2006	<i>Lucefin Group</i>
Number	1.7225	

Chemical composition

C%	Si%	Mn%	P%	S	Cr%	Mo%	
	max		max	max			
0,38-0,45	0,40	0,60-0,90	0,025	0,035	0,90-1,20	0,15-0,30	Product deviations are allowed
± 0.02	+ 0.03	± 0.04	+ 0.005	+ 0.005	± 0.05	± 0.03	

For 42CrMoS4 n° 1.7227, S% 0.020-0.040 product deviations ± 0.005
On request, it may be supplied Calcium (Ca) treated

Temperature °C

Hot-forming	Normalizing	Quenching	Quenching	Tempering	Stress-relieving		
1100-850	870 air (HB ~ 190)	860 oil or polymer	850 water	550-650 air	50° under the temperature of tempering		
Soft annealing	Isothermal annealing	Spheroidizing	End quench hardenability test	Pre-heating welding	Stress-relieving after welding		
720 cooling 15 °C/h to 600, then air (HB max 241)	820 furnace cooling to 670, then air (HB 180-240)	730-740 furnace cooling	840 water	300	550 furnace cooling		
				Ac1 745	Ac3 790	Ms 335	Mf 120

Mechanical and physical properties

Hot-rolled mechanical properties in **quenched and tempered** condition EN 10083-3: 2006

size d / t mm		Testing at room temperature (longitudinal)						
from	to	R	Rp 0.2	A%	C%	Kv	HB	
		N/mm ²	N/mm ² min.	min.	min.	J min.	for information	
	16/8	1100-1300	900	10	40		331-380	
16/8	40/20	1000-1200	750	11	45	35	298-359	
40/20	100/60	900-1100	650	12	50	35	271-331	
100/60	160/100	800-950	550	13	50	35	240-286	
160/100	250/160	750-900	500	14	55	35	225-271	

d = diameter t = thickness

Table of tempering values obtained at room temperature on rounds of Ø 10 mm after quenching at 850 °C in oil

HB		595	586	550	518	496	468	442	421	390	362	336	294	264
HRC		57	56.5	54.5	52.5	51	49	47	45	42	39	36	31	27
R	N/mm ²	2200	2180	2030	1910	1800	1700	1590	1480	1350	1220	1100	980	880
Rp 0.2	N/mm ²	1520	1600	1620	1590	1560	1510	1440	1340	1230	1110	1000	870	710
A	%		7.0	9.5	10.0	10.0	10.0	10.4	11.0	12.0	13.5	15.8	19.0	21.5
Kv	J		24	27	28	27	26	26	27	31	42	75	114	135
Tempering at °C		100	150	200	250	300	350	400	450	500	550	600	650	700

Data under fatigue +20 °C

+N	328	Cyclic yield strength, σ_y'
+QT	716	N/mm ² low cycle number
+N	0.12	Cyclic strength exponent, n'
+QT	0.10	low cycle number
+N	673	Cyclic strength coefficient, K'
+QT	1367	N/mm ² low cycle number

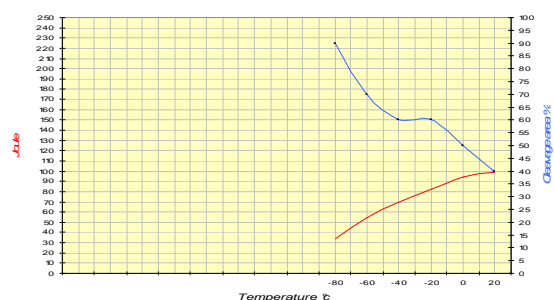
Data under fatigue +20 °C

+N	1000	Fatigue strength coefficient, σ_f'
+QT	1454	N/mm ² low cycle number
+N	-0.11	Fatigue strength exponent, b
+QT	-0.08	low cycle number
+N	-1.00	Fatigue ductility exponent, c
+QT	-0.72	low cycle number

Transition curve; LUCEFIN experience

Kv values obtained on hot-rolled 130 mm round
+QT induction for R 930 N/mm² - Rp 766 N/mm² A% 18 C% 62

°C	J	Lat. Exp. mm	Shear %
+20	97 - 101 - 99	1,10 - 1,10 - 1,17	40
0	94 - 96 - 93	0,97 - 0,99 - 1,00	50
-20	63 - 91 - 92	0,56 - 0,52 - 0,93	60
-40	66 - 58 - 86	0,73 - 0,77 - 0,94	60
-60	50 - 55 - 58	0,54 - 0,72 - 0,78	70
-80	38 - 29 - 35	0,27 - 0,35 - 0,26	90



42CrMoS4 1.7227 EN 10277-5: 2008

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Cold-drawn + quenching and tempering +C +QT ^{e)}						Hot-rolled annealed + peeled-reeled +A +SH				
size		Testing at room temperature (longitudinal)								
mm		R	Rp 0.2	A%	HB	R	Rp 0.2	A%	HB	
from	to	N/mm ²	N/mm ² min	min	for inform.	N/mm ²	N/mm ² min	min	min	max
5 ^{b)}	10									
10	16									
16	40	1000-1200	750	11	298-359					241
40	63	900-1100	650	12	271-331					241
63	100	900-1100	650	12	271-331					241

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

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

Hot-rolled, quenched and tempered, cold-drawn +QT+C ^{c) e)}						Hot-rolled anneal + cold-drawn +A +C				
size		Testing at room temperature (longitudinal)								
mm		R	Rp 0.2	A%	HB	R	Rp 0.2	A%	HB	
from	to	N/mm ²	N/mm ² min	min	for inform.	N/mm ² min	N/mm ² min	min	min	max
5 ^{b)}	10	1000-1200	770	8	298-359					300
10	16	1000-1200	750	8	298-359					290
16	40	1000-1200	720	9	298-359					285
40	63	900-1100	650	10	271-331					280
63	100	900-1100	650	10	271-331					280

^{c)} for flats and special sections, tensile strength (R) may differ by ± 10% ^{e)} values valid also for +QT+C+SL

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

Forged quenched and tempered EN 10250-3: 2001

size d / t		Testing at room temperature								
mm		R	Rp 0.2	A%	A%	A%	Kv +20 °C	Kv +20 °C	HB	
from	to	N/mm ² min	N/mm ² min	min L	min T	min Q	J min L	J min T	min	
	250/160	750	500	14	10		30	16	225	
250/160	500/330	700	460	15	11		27	14	213	
500/330	750/500	600	390	16	12		22	12	178	

L = longitudinal T = tangential Q = radial d = diameter t = thickness

 Hardness after tempering; **Lucefin** experience

size mm	Tempering to 530 °C			Tempering at 620 °C		
	≤ 200	> 200 ≤ 400	> 400	≤ 200	> 200 ≤ 400	> 400
HB	320	300	290	260	250	230

 EN 10083-3: 2006 **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	53	53	52	51	49	43	40	37	34	32	31	30	30	29	29	normal
max	61	61	61	60	60	59	59	58	56	53	51	48	47	46	45	

Temperature	Mod. of elasticity E long.	Thermal expansion	Specific heat capacity	Specific electric resistivity	Thermal conductivity
Testing at °C	GPa	10 ⁻⁶ · K ⁻¹	J/(Kg·K)	Ohm·mm ² /m	W/(m·K)
-100	217	10.5	423		
0	213	11.4	456		
20	230	11.5	461	0.231	45.1
100	207	12.1	479	0.284	45.1
200	199	12.7	499	0.358	44.1
300	192	13.2	517	0.448	41.9
400	184	13.6	536	0.552	39.4
500	175	14.0	558	0.671	36.9
600	164	14.4	587	0.806	34.4

Density +20 °C

 Kg/dm³

7.85

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

EUROPE EN	ITALY UNI	CHINA GB	GERMANY DIN	FRANCE AFNOR	U.K. B.S.	RUSSIA GOST	USA AISI/SAE
42CrMo4	42CrMo4	ML42CrMo	42CrMo4	42CD4	708M40	38ChM	4140