Quality	**42CrMo4**	*Technical card*
According to standards	**EN 10083-3: 2006**	*Lucefin Group*
Number	**1.7225**	

Chemical composition

C%	**Si%** max	**Mn%**	**P%** max	**S** max	**Cr%**	**Mo%**	
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	
				Ac_1	**Ac_3**	**Ms**	**Mf**
				745	790	335	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)					
		R	**Rp** 0.2	**A%**	**C%**	**Kv**	***HB***
from	to	N/mm²	N/mm² 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

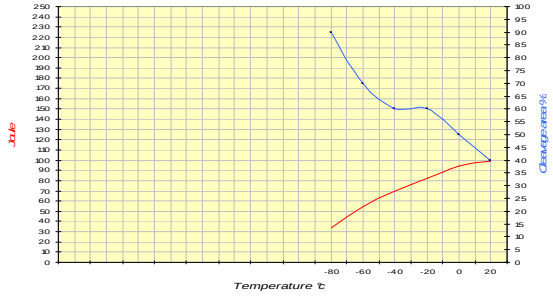
HB		595	586	550	518	496	468	442	421	390	362	336	294	264
HRC		57	56.5	54.5	52.5	51	49	47	45	42	39	36	31	27
R	N/mm²	2200	2180	2030	1910	1800	1700	1590	1480	1350	1220	1100	980	880
Rp 0.2	N/mm²	1520	1600	1620	1590	1560	1510	1440	1340	1230	1110	1000	870	710
A	%		7.0	9.5	10.0	10.0	10.0	10.4	11.0	12.0	13.5	15.8	19.0	21.5
Kv	J	24	27	28	27	26	26	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/mm² 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/mm² low cycle number

Data under fatigue +20 °C		
+N	1000	Fatigue strength coefficient, **σ_f'**
+QT	1454	N/mm² 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 *Lucefin Group*

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/mm²	N/mm² min	min	*for inform.*	N/mm²	N/mm² 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/mm²	N/mm² min	min	*for inform.*	N/mm² min	N/mm² 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/mm² min	N/mm² 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

	Tempering to **530** °C			Tempering at **620** °C		
size mm	≤ 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	$10^{-6} \cdot K^{-1}$	J/(Kg•K)	Ohm•mm²/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	Physical properties according to DIN SEW 310 (08/1992) standard
7.85	

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