

<b>Quality</b>	<b>42CrMo4</b>
According to standards	<b>EN 10269 (AC: 2008)</b>
Number	<b>1.7225</b>

### Chemical composition

C%	Si% max	Mn%	P% max	S% max	Cr%	Mo%	
0,38-0,45 ± 0.02	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	Product deviations are allowed

### Temperature °C

Hot-forming	Normalizing +N	Quenching +Q	Quenching +Q	Tempering +T	Stress-relieving +SR		
1100-850	870 air	860 oil or polymer	850 water	540-680 air	50° under the temperature of tempering		
Soft annealing +A	Isothermal annealing +I	Spheroidizing annealing +AC	End quench hardability test	Pre-heating welding	Stress-relieving after welding		
720 air (HB max 241)	820 furnace cooling to 670, then air (HB 180-240)	730-740 furnace cooling (HB max 200)	840 water	300	550 furnace cooling		
				<b>Ac1</b> 745	<b>Ac3</b> 790	<b>Ms</b> 335	<b>Mf</b> 120

### Mechanical properties

Hot-rolled +QT EN 10269 (AC: 2008)

size mm		Kv and traction test at room temperature in longitudinal							
from	to	R	Rp 0.2	A%	C%	Kv +20 °C	Kv -40 °C	Kv -100 °C	HB
		N/mm <sup>2</sup>	N/mm <sup>2</sup> min.	min.	min.	J min.	J min.	J min.	
	60	860-1060	730	14	50	50	40	27	258-322

+QT = quenched and tempered

Min. proof strength 0.2 % at high temperatures					Rp 0.2 N/mm <sup>2</sup> - EN 10269: 2001							
d. max	60 mm	720	702	677	640	602	562	518	475	420	375	
°C		50	100	150	200	250	300	350	400	450	500	550

Plastic deformations and creep rupture resistance

°C	$\sigma_1(1\%)$ N/mm <sup>2</sup>		$\sigma_R$ N/mm <sup>2</sup>	
	10.000 h	100.000 h	10.000 h	100.000 h
450	190	137	320	240
500	88	49	137	96
550	29	15	29	15

$\sigma_1$  = permanent creep strain strength 1%

$\sigma_R$  = creep rupture strength

Thermal Expansion	10 <sup>-6</sup> • K <sup>-1</sup>	▶	12.1	12.7	13.2	13.6	14.0	14.4	
Mod. of Elasticity long.	GPa	210	205	195	185	175	155		
Mod. of Elasticity tang.	GPa	80	78	75	70	67	59		
Specific Heat Capacity	J/(Kg•K)	460							
Thermal Conductivity	W/(m•K)	33.5		34.0			34.2		
Density	Kg/dm <sup>3</sup>	7.85							
Specific Electric Resist.	Ohm•mm <sup>2</sup> /m	0.19							
Electrical Conductivity	Siemens•m/mm <sup>2</sup>	5.26							
°C		20	100	200	250	300	400	500	600

The symbol ▶ indicates temperature between 20 °C and 100 °C, 20 °C and 200 °C ...

Kv and traction test at room temperature in longitudinal on hot-rolled +QT material. Lucefin experience

diameter	grain	R	Rp 0.2	Rp/R	A%	C%	Kv +20 °C	Kv -20 °C
mm	size	N/mm <sup>2</sup>	N/mm <sup>2</sup>		min.	min.	J min.	J min.
40	6	995	845	0,85	15,2	58	90-90-92	60-58-58
60	5-6	947	767	0,81	16.0	60	84-78-80	50-50-56

## 42CrMo4 1.7225

### Data under fatigue +20 °C

+N	328	Cyclic yield strength, $\sigma_y'$
+QT	716	N/mm <sup>2</sup> 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 <sup>2</sup> low cycle number
+N	1000	Fatigue strength coefficient, $\sigma_f'$
+QT	1454	N/mm <sup>2</sup> 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

+N = normalization +QT = quenching and tempering

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

T.T.T. curve

