

Quality	50CrMo4
According to standards	EN 10083-3: 2006
Number	1.7228

Chemical composition

C%	Si% max	Mn%	P% max	S% max	Cr%	Mo%	Deviations allowed for analysis product
0,46-0,54 ± 0.02	0,40 + 0.03	0,50-0,80 ± 0.04	0,025 + 0.005	0,035 + 0.005	0,90-1,20 ± 0.05	0,15-0,30 ± 0.03	

Temperature °C

Hot-forming	Normalizing	Quenching	Quenching	Tempering	Stress-relieving	
1100-850	860 air (HB ~ 321)	860 oil or polymer	840 water	540-680 air	50° under the temperature of tempering	
Soft annealing	Isothermal annealing	Spheroidizing	End quench hardening test	Pre-heating welding		Stress-relieving after welding
720 air (HB max 248)	790 furnace cooling to 660, then air (HB max ~ 222)		850 water	300 Ac1 Ac3		550 furnace cooling Ms Mf
				720	760	320 100

Mechanical and physical properties

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

size d / t		Testing at room temperature (longitudinal)					
mm		R	R _{p 0.2}	A%	C%	Kv	HB
from	to	N/mm ²	N/mm ² min.	min.	min.	J min.	for information
	16/8	1100-1300	900	9	40		331-380
16/8	40/20	1000-1200	780	10	45	30	298-359
40/20	100/60	900-1100	700	12	50	30	271-331
100/60	160/100	850-1000	650	13	50	30	253-298
160/100	250/160	800-950	550	13	50	30	240-286

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	448	421	390	353	327	294	264
HRC	47.5	45	42	38	35	31	27
R N/mm ²	1620	1490	1350	1185	1070	960	880
R_{p 0.2} N/mm ²	1370	1270	1165	1060	930	840	785
A %	7.0	10.0	12.0	13.0	13.5	15.5	20.0
C %		30	40	49	57	60	60
Kv J	26	28	28	38	94	146	166
Tempering at °C	400	450	500	550	600	650	700

Data under fatigue +20 °C

+N		Cyclic yield strength, σ_y'
+QT	700	N/mm ² low cycle number
+N	-	Cyclic strength exponent, n'
+QT	0.13	low cycle number
+N		Cyclic strength coefficient, K'
+QT	1568	N/mm ² low cycle number

Fatigue data +20 °C

+N		Fatigue strength coefficient, σ_f'
+QT	1642	N/mm ² low cycle number
+N		Fatigue strength exponent, b
+QT	-0.09	low cycle number
+N		Fatigue ductility exponent, c
+QT	-0.71	low cycle number

Data under fatigue +20 °C

+N		Fatigue strength coefficient, σ_f'
+QT	490	N/mm ² high cycle number