

Quality	34CrNiMo6	Quenching and Tempering Steel	<i>Technical card</i> Lucefin Group rev. 2024
According to standards	ISO 683-2 : 2018		
Number	1.6582		

Chemical composition

C%	Si% <small>a)</small>	Mn%	P% max	S% max	Cr%	Mo%	Ni%	Cu% max	Product deviations are allowed
0,30-0,38 ± 0.03	0,10-0,40 ± 0.03	0,50-0,80 ± 0.04	0,025 + 0.005	0,035 ± 0.005	1,30-1,70 ± 0.05	0,15-0,30 ± 0.03	1,30-1,70 ± 0.05	0,40 + 0.05	

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

Temperature °C

Hot-forming	Normalizing +N	Quenching +Q	Quenching +Q	Tempering +T	Stress-relieving +SR
1100-900	860-870 air	860 oil or polymer	830 water	540-660 air	50° under the temperature of tempering
Soft annealing +A	Isothermal annealing +I	Full annealing	End quench hardenability test	Pre-heating welding	Stress-relieving after welding
650-680 air (HB max 248)	850-900 cooling furnace to 500 then air	830-900 cooling furn. to 300	845 water	300 Ac1 715	600 furnace cooling Ac3 770 Ms 320 Mf 100

Mechanical properties

34NiCrMo6 Hot-rolled mechanical properties in 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 <i>for information</i>
	16/8	1200-1400	1000	9	40	-	359-404
16/8	40/20	1100-1300	900	10	45	45	331-380
40/20	100/60	1000-1200	800	11	50	45	298-359
100/60	160/100	900-1100	700	12	55	45	271-331
160/100	250/160	800-950	600	13	55	45	240-286

d = diameter t = thickness

Table of tempering values obtained at room temperature on rounds of Ø 60 mm after quenching at 850 °C in oil

HB	525	500	468	450	371	344	319	271	240
HRC	53	51.5	49	46.5	40	37	34	28	22
R N/mm ²	1950	1850	1700	1500	1260	1150	1050	900	800
Rp 0.2 N/mm ²	1450	1480	1450	1350	1180	980	950	700	680
A %	10	10	10	12	13	13.4	18	20	22
Z %	48	50	52	58	62	62	68	68	70
Kv J	18	18	18	18	45	70	90	110	120
Tempering at °C	100	200	300	400	500	550	600	650	700

LUCEFIN experience: Forged round 520 mm quenched at 870 °C in water, tempered at 630 °C air

Depth from heat treated surface	Longitudinal Testing							HB
	R N/mm ²	Rp 0.2 N/mm ²	A %	Z %	Kv +20 °C J	Kv -40 °C J		
25 mm	930	828	18,6	64,0	-	110-118-118	279	
1/3 radius	900	750	15,4	60,0	-	48-44-45	271	
1/2 diameter	860	730	12,6	46,0	70-74-70	25-28-25	264	

FATT (fracture appearance transition temperature)

°C	-70	-60	-40	-20	0	+20	+50	+80	+18
% fibrosity	3	6	11	15	24	53	100	100	FATT 50
Kv average J	22	24	27	42	51	70	142	150	68

Chemical composition %

															ppm		
C	Si	Mn	P	S	Cr	Mo	Ni	V	Cu	Sn	As	Sb	Al	H ₂	O ₂	N ₂	
0.36	0.23	0.64	0.006	0.003	1.62	0.28	1.60	0.05	0.16	0.006	0.007	0.004	0.018	1.30	34	70	

34CrNiMo6 1.6582 EN ISO 683-7:24

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Hot-rolled, annealed and Cold-drawn +A+C						hot-rolled annealed and 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 min	min	max	max
5 ^{b)}	10	-	-	-	308	-	-	-	-
10	16	-	-	-	298	-	-	-	-
16	40	-	-	-	293	-	-	-	248
40	63	-	-	-	288	-	-	-	248
63	100	-	-	-	288	-	-	-	248

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

Hot-rolled, quenched and tempered and Cold-drawn +QT+C						Hot-rolled, quenched and tempered and Peeled +QT+SH			
size mm		Testing at room temperature (longitudinal)				Testing at room temperature (longitudinal) ^{a)}			
from	to	R	Rp 0.2	A%	Kv ₂ +20 °C	R	Rp 0.2	A%	Kv ₂ +20 °C
		N/mm ²	N/mm ² min	min	J min	N/mm ²	N/mm ² min	min	J min
5 ^{b)}	10	1000-1200	770	8	-	-	-	-	-
10	16	1000-1200	750	8	-	-	-	-	-
16	40	1000-1200	720	9	-	1100-1300	900	10	40
40	63	1000-1200	650	10	-	1000-1200	800	11	45
63	100	1000-1200	650	10	-	1000-1200	800	11	45

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

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

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

34CrNiMo6 1.6582 **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
	250/160	800	600	13	9	45	22	240
250/160	500/330	750	540	14	10	45	22	225
500/330	990/660	700	490	15	11	40	20	213

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

ISO 683-2: 2018 **Jominy test HRC** grain size 5 min.

mm distance from quenched end															H
	1.5	3	5	7	9	11	13	15	20	25	30	35	40	45	
min	50	50	50	50	49	48	48	48	48	47	47	47	46	45	44
max	58	58	58	58	57	57	57	57	57	57	57	57	57	57	57

Thermal Expansion	10 ⁻⁶ • K ⁻¹	▶	11.1	12.1	12.9	13.5	13.9	14.1	
Mod. of Elasticity long.	MPa		220	205	195				
Mod. of Elasticity tang.	MPa		88	78	75	185	175		
Specific Heat Capacity	J/(Kg•K)		460		70	67			
Thermal Conductivity	W/(m•K)		38						
Density	Kg/dm ³		7.85						
Specific Electric Resist.	Ohm•mm ² /m		0.19						
Electrical Conductivity	Siemens•m/mm ²								
°C			20	100	200	300	400	500	600

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

Minimum service temperature	from -40°C to max -70°C	Maximum service temperature	from +600 °C to max +650 °C
Corrosion resistance	Poor corrosion resistance; it is suggested to use protective coating	Cold-working	Easily cold-workable in its annealed condition; it has good ductility

EUROPE	ITALY	CHINA	GERMANY	FRANCE	U.K.	RUSSIA	USA
EN	UNI	GB	DIN	AFNOR	B.S.	GOST	AISI/SAE
34CrNiMo6	35NiCrMo6		34CrNiMo6	35NCD6	817M40	38Ch2N2MA	4340