

Quality	40NiCrMo7	Quenching and Tempering Steel	<i>Technical card</i>			
According to standards	UNI 7845: 1978		<i>Lucefin Group</i>			
Number	-		<i>rev. 2018</i>			

Chemical composition

C%	Si%	Mn%	P% max	S% max	Cr%	Mo%	Ni%	Permissible deviations on the product
0,37-0,44 ± 0.02	0,15-0,40 ± 0.03	0,50-0,80 ± 0.04	0,035 + 0.005	0,035 + 0.005	0,60-0,90 ± 0.05	0,20-0,30 ± 0.03	1,60-1,90 ± 0.05	

Temperature in °C

Hot forming	Normalizing	Quenching	Quenching	Tempering	Stress relieving
1100-900	860 air (HB 560 ~)	850 oil or polymer	830 water	550-650 air	50 under the temperature of tempering
Soft annealing	Isothermal annealing	Full annealing	End quench hardening test	Preheating welding	Stress relieving after welding
680 air	800 furnace cooling to 640 after, air (HB 230-250)	800-830 furnace cooling (HB max 250)	850 water	300 Ac1 725	550 furnace cooling Ac3 770 Ms 300 Mf 80

Untreated material HB 520 ~, slow cooling in soaking pit HB 285 ~

Mechanical and physical properties

Hot rolled Mechanical properties on test blank after **quenching and tempering** (valid for products with no heat treatment)
For execution 5 (quenched and tempered material), values must be granted on the product UNI 7845:1978 Only reference.

dimension mm		Testing at room temperature (longitudinal)					<i>HB for information</i>
over	to	R N/mm ²	Rp 0.2 N/mm ²	A% min.	Kcu J min.		
	16	1030-1230	835	11	30	311-363	
16	40	980-1180	785	11	30	295-354	
40	100	930-1130	735	12	30	278-339	
100	160	850-1030	665	13	30	253-311	
160	250	780-980	635	12	30	232-295	

Table of tempering values at room temperature for round Ø 10 mm after quenching oil at 830°C

HB	504	482	455	432	415	400	381	348	319	294
HRC	51.5	50	48	46	44.5	43	41	37.5	34	31
R N/mm ²	1850	1750	1640	1520	1450	1380	1300	1160	1050	980
Rp 0.2 N/mm ²	1450	1400	1300	1230	1210	1210	1180	1050	940	880
A %	11.6	11.8	12.0	12.2	12.5	14.0	15.8	18.0	20.0	20.0
Z %	45	51	52	50	51	53	57	59	63	63
Kv J	32	27	26	27	34	43	90	124	135	155
Tempering at °C	250	300	350	400	450	500	550	600	650	700

Thermal Expansion	10 ⁻⁶ • K ⁻¹ ▶	11.1	12.1	12.9	13.5	13.9	14.1	
Mod. of Elasticity long.	GPa	210						
Mod. of Elasticity tang.	GPa	80						
Specific Heat Capacity	J/(Kg•K)	460						
Thermal Conductivity	W/(m•K)	42						
Density	Kg/dm ³	7.85						
Specific Electric Resistivity	Ohm•mm ² /m	0.19						
Electrical Conductivity	Siemens•m/mm ²	5.26						
°C		20	100	200	300	400	500	600

40NiCrMo7

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Hot rolled quenched and tempered after **Cold drawn** +QT +C 817M40 BS 970 pt.3: 1991 Only reference.

dimension		Testing at room temperature (longitudinal)			
mm		R	Rp 0.2	A%	HBW
over	to	N/mm ²	N/mm ² min	min	<i>for inform.</i>
13	63	1000-1150	850	9	298-347
63	150	850-1000	680	9	253-298

Cold-drawn + quenching and tempering

dimension		Testing at room temperature (longitudinal)			
mm		R	Rp 0.2	A%	HBW
over	to	N/mm ²	N/mm ² min	min	

No indications are shown in the reference standards

40NiCrMo7 Forged quenched and tempered UNI 7874: 1979 Only reference.

dimension		Testing at room temperature								
mm		R	Rp 0.2	A%	A%	A%	Kv	Kv	Kv	HB
over	to	N/mm ² min	N/mm ² min	min (L)	min (T)	min (Q)	J min (L)	J min (T)	J min (Q)	<i>for inform.</i>
	100	930-1080	735	12			30			278-327
100	250	880-1010	735	13	12	10	40	30	25	263-300
250	500	835-955	685	14	13	11	40	30	25	250-288
500	800	735-885	590	14	12	10	30	25	25	224-265
800	1200	685-835	540	13	11	10	25	-	-	209-250
1200	1550	635-785	490	12	10	9	-	-	-	195-234

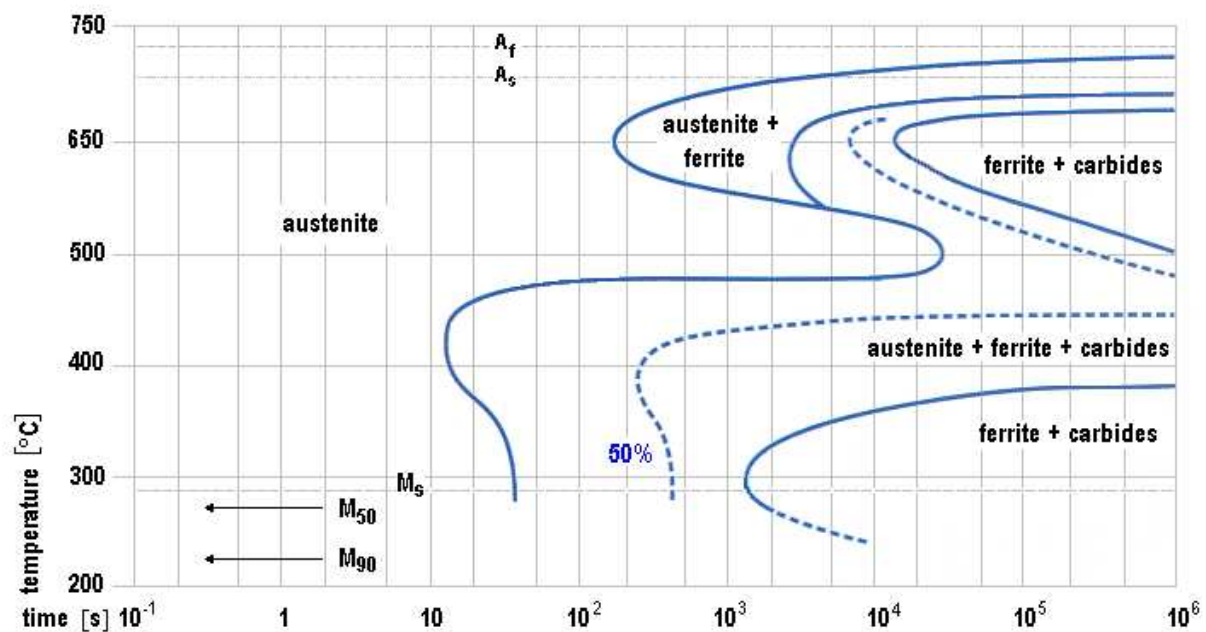
L = longitudinal T = tangential Q = radial

UNI 7845: 1978 Jominy test HRC grain size 5 min.

distance in mm from quenched end

	1.5	3	5	7	9	11	13	15	20	25	30	35	40	45	50
min	52	52	52	52	52	52	52	52	51	50	49	48	47	45	44
max	60	60	60	60	60	60	60	60	59	58	58	58	57	56	56

Time – temperature – transformation diagram for isothermal cooling



EUROPE	ITALY	CHINA	GERMANY	FRANCE	U.K.	RUSSIA	USA
EN	UNI	GB	DIN	AFNOR	B.S.	GOST	AISI/SAE
40NiCrMo7	40NiCrMo7		40NiCrMo8		817M40	40HN2M	4340