

Quality	41Cr4	Quenching and Tempering Steel	<i>Technical card</i> Lucefin Group rev. 2024
According to standard	ISO 683-2: 2018		
Number	1.7035		

Chemical composition

C%	Si% <small>a)</small>	Mn%	P% max	S% max	Cr%	Cu% max	Product deviations are allowed
0,38-0,45 ± 0.03	0,10-0,40 ± 0.03	0,60-0,90 ± 0.04	0,025 + 0.005	0,035 ± 0.005	0,90-1,20 ± 0.05	0,40 + 0.05	

For 41CrS4 n° 1.7039, S% 0.020-0.040 product deviations ± 0.005

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	Tempering +T	Stress-relieving +SR			
1100-850	860 air	820-860 oil, polymer or water	540-680 air	50° under the temperature of tempering			
Soft annealing +A	Isothermal annealing +I	Spheroidizing +AC	End quench hardability test	Pre-heating welding		Stress-relieving after welding	
680 air (HB max 241)	820 furnace cooling to 650, then air (HB 190-220)	720-740 furnace cooling	840 water	300		550 furnace cooling	
				Ac1	Ac3	Ms	Mf
				750	790	310	100

Mechanical properties

41Cr4 1.0735 – 41CrS4 1.7039 Hot-rolled mechanical properties in **quenched and tempered** condition ISO 683-2: 2018

size d / t		Testing at room temperature (longitudinal)					
from	to	R	Rp 0.2	A%	Z%	Kv ₂	HBW
		N/mm ²	N/mm ² min.	min.	min.	J min.	for information
	16/8	1000-1200	800	11	30	-	298-359
16/8	40/20	900-1100	660	12	35	35	271-331
40/20	100/60	800-950	560	14	40	35	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		568	560	525	496	468	442	409	376	340	301	264	237
HRC		55.5	55	53	51	49	47	44	40.5	36.5	32	27	22
R	N/mm ²	2130	2080	1950	1830	1700	1580	1420	1280	1120	1000	880	790
Rp 0.2	N/mm ²	1580	1590	1580	1530	1470	1380	1260	1140	1020	890	780	680
A	%	6.8	7.5	7.6	7.9	8.8	9.8	11.0	12.6	14.5	17.2	20.0	22.8
Z	%	28	35	38	41	44	46	48	52	56	60	64	67
Kv	J	16	24	24	15	15	26	30	38	46	90	124	132
Tempering at °C		150	200	250	300	350	400	450	500	550	600	650	700

41Cr4 1.7035 - 41CrS4 1.7039 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%	HB	
		N/mm ²	N/mm ²	min	max	N/mm ²	N/mm ²	min	min	max
5	10	-	-	-	295	-	-	-	-	-
10	16	-	-	-	285	-	-	-	-	-
16	40	-	-	-	280	-	-	-	-	241
40	63	-	-	-	270	-	-	-	-	241
63	100	-	-	-	270	-	-	-	-	241

Hot-rolled, quenched and tempered and Cold-drawn +QT+C						Hot-rolled quenched and tempered + Peeled +QT+SH				
size mm		Testing at room temperature (longitudinal) ^{c)}				Testing at room temperature (longitudinal) ^{e)}				
from	to	R	Rp 0.2	A%	Kv ₂	R	Rp 0.2	A%	Kv ₂	
		N/mm ²	N/mm ²	min	J min	N/mm ²	N/mm ²	min	J min	
5 ^{b)}	10	1000-1200	770	8	-	-	-	-	-	-
10	16	1000-1200	750	8	-	-	-	-	-	-
16	40	900-1100	670	9	-	900-1100	660	12	-	35
40	63	800-1000	570	10	-	800-950	560	14	-	35
63	100	800-1000	570	11	-	800-950	560	14	-	35

^{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

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

41Cr4 1.7035 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	N/mm ²	min	min (L)	J min (L)	J min (T)	min		
	100/70	800	560	14	14	35	35	240		

L = longitudinal T = tangential

d = diameter t = thickness

ISO 683-2: 2018 006 **Jominy test HRC** grain size 5 min.

mm distance from quenched end		1.5	3	5	7	9	11	13	15	20	25	30	35	40	45	50	H
min		53	52	50	47	41	37	34	32	29	26	23	21	-	-	-	
max		61	61	60	59	58	56	54	52	46	42	40	38	37	36	35	
min		56	55	53	51	47	43	41	39	35	31	29	27	26	25	24	HH
max		61	61	60	59	58	56	54	52	46	42	40	38	37	36	35	
min		53	52	50	47	41	37	34	32	29	26	23	21	-	-	-	HL
max		58	58	57	55	52	50	47	45	40	37	34	32	31	30	29	

Thermal Expansion	10 ⁻⁶ •K ⁻¹	▶	11.1	12.1	12.9	13.5	13.9	14.1	
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	452	473	519	561		
Thermal Conductivity	W/(m•K)		46	44.8	43.5	37.7	31.4		
Density	Kg/dm ³		7.85						
Specific Electric Resist.	Ohm•mm ² /m		0.22	0.28	0.35	0.53	0.78		
Electrical Conductivity	Siemens•m/mm ²		4.54	3.57	2.86	1.88	1.28		
°C			20	100	200	300	400	500	600

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

EUROPE	ITALY	CHINA	GERMANY	FRANCE	U.K.	RUSSIA	USA
EN	UNI	GB	DIN	AFNOR	B.S.	GOST	AISI/SAE
41Cr4	41Cr4	40Cr	41Cr4	42C4	530M40	41H	5140