



42CrMo4

QUENCHED AND TEMPERED STEELS

Reference standard: EN ISO 683-2:2018

W.n°	1.7225	AFNOR	42CD4
AISI	4140	BS	708M40
UNI	42CrMo4	JIS	-
DIN	42CrMo4	Other	UNE F1252

CHEMICAL COMPOSITION

C	Si	Mn	P	S	Cr	Mo	Cu
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	0.15-0.30 ±0.03	0.40 + 0.05

Average chemical composition in % | Product deviation ±0.005%

Also available with a Pb addition of 0.15% to 0.35% on request.

TEMPERATURE IN °C

Hot working	Normalising +N	Hardening +Q	Hardening +Q	Tempering +T	Stress relieving +SR
1,100-850 °C	870 °C in air (~ 190 HB)	860 °C in oil or polymer	820 °C in water	540-680 °C in air	50 °C below the tempering temperature

Machinability annealing +A	Isothermal annealing +I	Spheroidizing annealing +AC	Jominy test-piece hardening	Preheating for welding	Post-weld stress relieving
720 °C, cooling 15 °C/h down to 600 °C then air (max 241 HB)	820 °C, furnace cooling down to 670 °C then air (180-240 HB)	760-775 °C, slow furnace cooling (max 200 HB)	840 °C in water	300 °C	550 °C, furnace cooling

MECHANICAL PROPERTIES

HOT-ROLLED - Longitudinal tensile test at 20 °C Mechanical properties in the quenched and tempered condition, EN ISO 683-2:2018							
Diameter/thick. (in mm)		R N/mm²	Rp 0.2 N/mm² min	A% min	Z% min	Kv J min	HB
Over	Up to						
-	16/8	1,100-1,300	900	10	40	-	331-380
16/8	40/20	1,000-1,200	750	11	45	35	298-359
40/20	100/60	900-1,100	650	12	50	35	271-331
100/60	160/100	800-950	550	13	50	35	240-286
160/100	250/160	750-900	500	14	55	35	225-271

TEMPERING TABLE Values at room temperature on Ø 10 mm round bar after quenching in oil at 850 °C													
R N/mm²	2,200	2,180	2,030	1,910	1,800	1,700	1,590	1,480	1,350	1,220	1,100	980	880
Rp 0.2 N/mm²	1,520	1,600	1,620	1,590	1,560	1,510	1,440	1,340	1,230	1,110	1,000	870	710
HB	595	586	550	518	496	468	442	421	390	362	336	294	264
A %	-	7.0	9.5	10.0	10.0	10.0	10.4	11.0	12.0	13.5	15.8	19.0	21.5
Kv J	24	27	28	27	26	26	26	27	31	42	75	114	135
°C	100	150	200	250	300	350	400	450	500	550	600	650	700

ANNEALED AND COLD-DRAWN +A+C - Longitudinal tensile test at 20 °C EN ISO 683-7:2024					
Diameter (in mm)		R N/mm ²	Rp 0.2 N/mm ² min	A% min	HB
Over	Up to				
5	10	-	-	-	300
10	16	-	-	-	290
16	40	-	-	-	285
40	63	-	-	-	280
63	100	-	-	-	280

HOT-ROLLED, ANNEALED, PEELED AND ROLLER-BURNISHED EN ISO 683-7:2024 - Longitudinal tensile test			
R N/mm ²	Rp 0.2 N/mm ² min	A% min	HB
-	-	-	241
-	-	-	241
-	-	-	241

QUENCHED AND TEMPERED, COLD-DRAWN +QT+C - Longitudinal tensile test 20 °C EN ISO 683-7:2024*					
Diameter (in mm)		R N/mm ²	Rp 0.2 N/mm ² min	A% min	HB
Over	Up to				
5	10	1,100-1,200	770	8	300
10	16	1,100-1,200	750	8	290
16	40	1,100-1,200	720	9	285
40	63	900-1,100	650	10	280
63	100	900-1,100	650	10	280

QUENCHED AND TEMPERED, PEELED EN ISO 683-7:2024 - Longitudinal tensile test			
R N/mm ²	Rp 0.2 N/mm ² min	A% min	HB
-	-	-	-
-	-	-	-
1,000-1,200	750	11	35
900-1,100	650	12	35
900-1,100	650	12	35

FORGED QUENCHED AND TEMPERED - Longitudinal tensile and impact test at 20 °C UNI EN 10250-3:2022								
Diameter/thick. (in mm)		R N/mm ²	Rp 0.2 N/mm ² min	A% L min	A% T min	Kv L J min	Kv T min	HB min
Over	Up to							
	250/160	750	500	14	10	30	16	225
250/160	500/330	700	460	15	11	27	14	213
500/330	750/500	600	390	16	12	22	12	178

L = longitudinal | T = tangential | * For flats and special sections the tensile strength may differ by ±10% | ** Value also valid for +C +QT

HARDENABILITY VALUES Jominy in HRC EN ISO 683-2:2018 (minimum grain size G5 per UNI 3245), distance from the quenched end in mm															
	1.5	3	5	7	9	11	13	15	20	25	30	35	40	45	50
Min	53	53	52	51	49	43	40	37	34	32	31	30	30	29	29
Max	61	61	61	60	60	59	59	58	56	53	51	48	47	46	45

Temperature	Elastic modulus GPa		Thermal expansion
° C	E long	G tang	(m/m * K) * 10 ⁻⁶ °C
-100	217		10.5
0	213		11.4
20	230	88	11.5
100	207	79	12.1
200	199	76	12.7
300	192	73	13.2
400	184	70	13.6
500	175	67	14.0