

Quality	41CrAlMo7-10	Nitriding Steel	<i>Technical card</i>
According to standard	UNI EN 10085: 2003		Lucefin Group
Number	1.8509		<i>rev. 2018</i>

Chemical composition

C%	Si% max	Mn%	P% max	S% max	Cr%	Mo%	Al%	
0,38-0,45	0,40	0,40-0,70	0,025	0,035	1,50-1,80	0,20-0,35	0,80-1,20	Product deviations are allowed
± 0.02	+ 0.03	± 0.04	+ 0.005	+ 0.005	± 0.05	± 0.04	± 0.10	

Temperature °C

Hot-forming	Stress-relieving after machining	Quenching +Q	Tempering +T	Nitrocarburizing	Final stress-relieving +SR
1050-950	550-570 air	870-930 oil or polymer	580-700 air	570-580	50° under the temperature of tempering
Soft annealing +A	Sferoidizing +BG	Nitriding	End quench hardability test	Pre-heating welding	Stress-relieving after welding
650-750 air (HB max 248)	1)	480-570 controlled atm. (HV 1150)	900 water	300	550 furnace cooling
				Ac1 790	Ac3 920
				Ms 320	Mf 100

1) Heat to 730 pause, increase to 760 pause; furnace cool to 690 pause, furnace cool to 650 pause, air cool

Mechanical properties

Hot-rolled mechanical properties in **quenched and tempered** condition UNI EN 10085: 2003

size mm		Testing at room temperature (longitudinal)					Surface hardness in quenched and tempered and nitrided condition HV 1
from	to	R N/mm ²	Rp 0.2 N/mm ² min.	A% min.	Kv J min.	HB <i>for inform.</i>	
16	40	950-1150	750	11	25	286-347	
40	100	900-1100	720	13	25	271-331	
100	160	850-1050	670	14	30	253-319	
160	250	800-1000	625	15	30	240-298	

Table of tempering values obtained at room temperature on rounds of Ø 10 mm after quenching at 930°C in oil

HB		568	560	550	525	518	496	475	455	432	400	376	336	294	253
HRC		55.5	55	54.5	53	52.5	51	49.5	48	46	43	40.5	36	31	25
R	N/mm ²	2100	2060	2030	1950	1900	1820	1740	1630	1530	1400	1280	1110	980	850
Rp 0.2	N/mm ²	1300	1350	1480	1520	1510	1490	1450	1380	1300	1190	1080	940	800	700
A	%	7.5	8.0	8.0	8.0	8.0	8.0	8.0	8.2	9.0	10.5	12.0	14.2	17.5	19.5
Z	%	28	28	35	38	39	39	38	37	39	44	51	56	60	64
Kv	J	28	38	46	64	64	64	64	54	64	80	96	116	126	132
Tempering at °C		50	100	150	200	250	300	350	400	450	500	550	600	650	700

High-temperature testing

R	N/mm ²	1010	960	900	880	830	700	500
Rp 0.2	N/mm ²	860	800	740	700	620	580	300
A	%	18	16	14	14	20	26	48
C	%	58	58	52	56	74	80	90
Kv	J	76	78	110	110	118	110	80
Test temperature °C		20	100	200	300	400	500	600

Hardness HV, at different depths and stays, in nitriding environment

stay time h.	30	960	580	420	350	330	330	330
	90	980	820	690	480	360	350	330
	120	980	820	700	500	460	400	330
	180	1004	850	760	720	620	500	330
depth	mm	0,15	0,25	0,35	0,45	0,55	0,65	1,0

41CrAlMo7-10

Lucefin Group

Cold-drawn					Hot-rolled + Peeled				
size mm		Testing at room temperature (longitudinal)				Testing at room temperature (longitudinal)			
from	to	R	Rp 0.2	A%	HB	R	Rp 0.2	A%	HB
		N/mm ²	N/mm ² min	min		N/mm ²	N/mm ² min	min	
No indications from reference standards					No indications from reference standards				

Forged quenched and tempered UNI 8552: 1984. Use only as reference

size mm		Testing at room temperature (longitudinal)				
from	to	R	Rp 0.2	A%	Kcu	HB
		N/mm ²	N/mm ² min	min (L)	J min (L)	for information
100	100	930-1130	735	12	19.5	278-339
100	160	835-980	640	14	22.5	250-295

L = longitudinal Mechanical properties obtained on test blanks

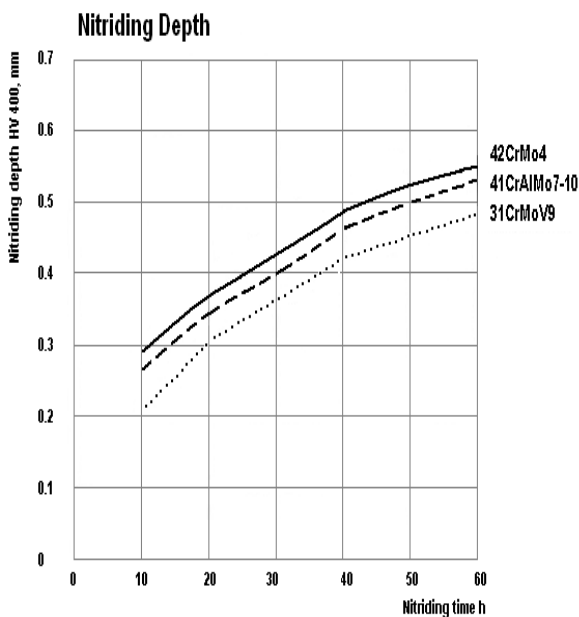
Jominy test HRC 41CrAlMo7 UNI 8552

mm distance from quenched end	1.5	3	5	7	9	11	13	15	20	25	30	35	40	45	50
min	53	52	51	50	49	48	47.5	47	44.5	41	39.5	37.5	36	35	33
max	60	60	59.5	59.5	59	59	58.5	58	57	56.5	55	53	51	49	47

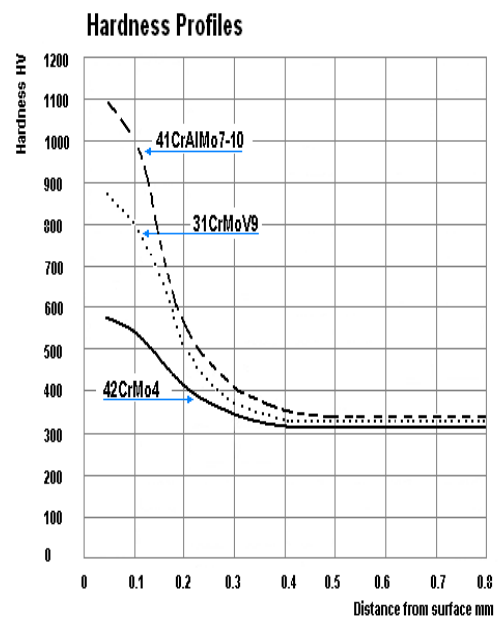
Thermal Expansion	10 ⁻⁶ · K ⁻¹	9.1	►	11.1	12.1	12.9	13.5	13.9	
Mod. of Elasticity long.	GPa	210							
Mod. of Elasticity tang.	GPa	80							
Density	Kg/dm ³	7.73							
°C		-190	+16	20	100	200	300	400	500

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
41CrAlMo7-10	41CrAlMo7	38CrMoAl	41CrAlMo7	40CAD6.12	905M39	40X2MI-O	J24056 – E71400



Nitriding depth 400 HV as function of the nitriding time.
Plasma nitriding 510°C



Variation of Hardness with distance from surface.
Plasma nitriding 510°C