Quality	**41CrAlMo7-10**	*Technical card*
According to standard	**UNI EN 10085: 2003**	*Lucefin Group*
Number	**1.8509**	

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**	**Tempering**	**Nitrocarburizing**	**Final stress-relieving**
1050-950	550-570 air	870-930 oil or polymer	580-700 air	570-580	50° under the temperature of tempering

Soft annealing	**Isothermal annealing**	**Nitriding**	**End quench hardenability test**	**Pre-heating welding**		**Stress-relieving after welding**	
650-750 air (HB max 248)		480-570 (HV 1150)	900 water	300		550 furnace cooling	
				Ac_1	**Ac_3**	**Ms**	**Mf**
				790	920	320	100

Mechanical and physical properties

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

size mm		Testing at room temperature (longitudinal)						
		R	**Rp** 0.2	**A**%	**C**%	**Kv**	***HB***	Surface hardness in quenched and tempered and nitrided condition **HV 1**
from	to	N/mm²	N/mm² min.	min.	min.	J min.	*for inform.*	
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*	950
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/mm²	2100	2060	2030	1950	1900	1820	1740	1630	1530	1400	1280	1110	980	850
Rp 0.2	N/mm²	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
C	%	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/mm²	1010	960	900	880	830	700	500
Rp 0.2	N/mm²	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**

Thermal expansion

$10^{-6} \bullet K^{-1}$	**11.1**	**12.1**	**12.9**	**135**	**13.9**
Temperature °C	20 - 100	20 - 200	20 - 300	20 - 400	20 - 500

41CrAlMo7-10

Lucefin Group

Cold-drawn						**Hot-rolled peeled-reeled**			
size		Testing at room temperature (longitudinal)				Testing at room temperature (longitudinal)			
mm		**R**	**Rp** 0.2	**A**%	**HB**	**R**	**Rp** 0.2	**A**%	**HB**
from	to	N/mm²	N/mm² min	min		N/mm²	N/mm² min	min	
No indications from reference standards									

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

size		Testing at room temperature (longitudinal							
mm		**R**	**Rp** 0.2	**A**% L	**A**% T	**A**% Q	**Kcu** L	**Kcu** T	***HB***
from	to	N/mm²	N/mm² min	min	min	min	J min	J min	*for information*
	100	930-1130	735	12			19.5		*278-339*
100	160	835-980	640	14			22.5		*250-295*

L = longitudinal T = tangential Q = radial Mechanical properties obtained on test blanks

Jominy test HRC 41CrAlMo7 UNI 8552

mm distance from quenched extremity

	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

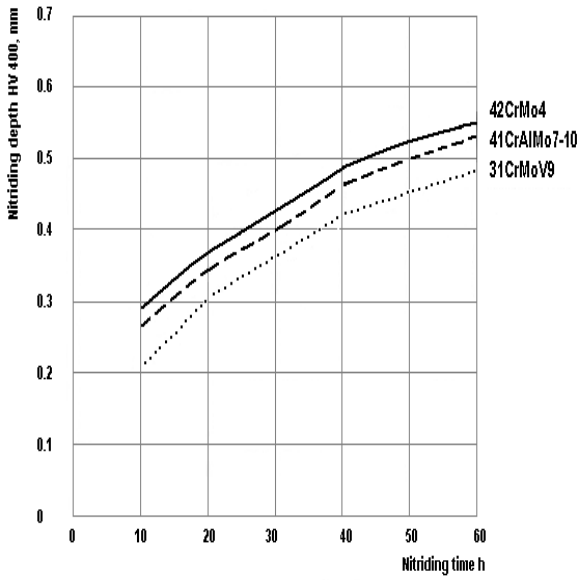
Temperature	**Mod. of elasticity** GPa		**Rp** 0.2	**R**	**A**	**Kv**
			heat treatment on 15 mm dia. round			
Testing at **°C**	**E** long.	**G** tang.	N/mm²	N/mm²	%	J
20	210	80	850	1000	18	85
100			800	990	16	90
200			750	980	16	110
300			700	960	17	120
400			620	880	19	122
500			550	750	22	110
600			280	500	38	85

Hardness **HV05** after nitriding at mm depth:

mm	**0.01**	**0.06**	**0.12**	**0.18**	**0.25**
HV min	950	950	930	850	800
HV max	1140	1140	1140	1110	1110
mm	**0.5**	**0.6**	**0.7**	**0.8**	**1**
HV min	210				
HV max	750	400	350	350	350

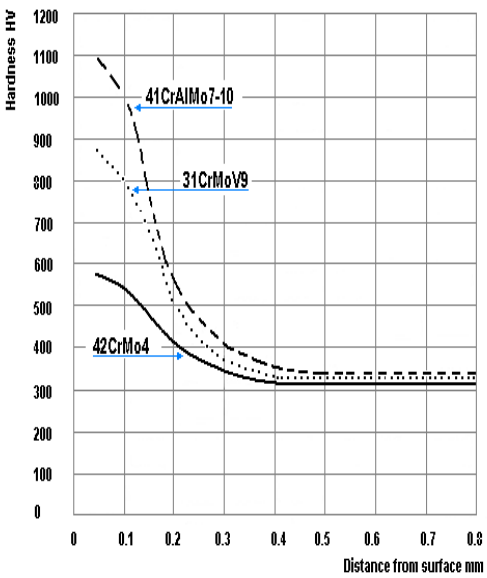
EUROPE EN	**ITALY** UNI	**CHINA** GB	**GERMANY** DIN	**FRANCE** AFNOR	**U.K.** B.S.	**RUSSIA** GOST	**USA** AISI/SAE
41CrAlMo7-10	41CrAlMo7	38CrMoAl	41CrAlMo7	40CAD6.12	905M39	40X2MI-O	J24056 – E71400

Nitriding Depth



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

Hardness Profiles



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