Quality	**40CrMoV4-6**	**Creep-resisting Steel**	*Technical card*
According to standard	**EN 10269: 2013**		***Lucefin Group***
Number	**1.7711**		*rev. 2018*

Chemical composition

C%	**Si%** max	**Mn%**	**P%** max	**S%** max	**Cr%**	**Mo%**	**V%**	**Al** tot max	
0,36-0,44	0,40	0,45-0,85	0,025	0,030	0,90-1,20	0,50-0,65	0,25-0,35	0,015	Product deviations are allowed
± 0.02	± 0.03	± 0.04	+ 0.005	+ 0.005	± 0.05	± 0.03	± 0.03	± 0.05	

Temperature °C

Hot-forming	**Normalizing +N**	**Quenching +Q**	**Tempering +T**	**Stress-relieving +SR**	**Natural state +U**
1100-950	880-900 air	900-970 oil or polymer	650-720 air	50 under the temp. of tempering	- (HB max 350)

Soft annealing +A	**Isothermal annealing +I**	**Spheroidized annealed +AC**	**Quenching and stress-relieving**	**Pre-heating welding**		**Stress-relieving after welding**	
680-730 air (HB max 241)	880 furnace cooling to 730, then air	830 slow furnace cooling (HB 220)	930 oil 200 air (HRC ~ 54)	300		560 furnace cooling	
				Ac_1	**Ac_3**	**Ms**	**Mf**
				760	870	340	120

Mechanical properties

40CrMoV4-6 1.7711 **Hot-rolled** +QT EN 10269: 2013

size mm		Kv and traction test at room temperature in longitudinal					
		R	**Rp** 0.2	**A**%	**Z**%	**Kv_2**	***HBW***
from	to	N/mm²	N/mm² min.	min.	min.	J min.	*for information*
	100	850-1000	700	14	45	30	*253-298*
100	160	850-1000	640	14	45	25	*253-298*

+QT = quenched and tempered

Min. prof strength 0.2 % at high temperatures **Rp 0.2** N/mm² - EN 10269: 2013

Ø	≤ 100	687	670	647	631	608	593	577	554	523	470	400	293
100	160	631	612	591	577	556	542	528	507	479	429	366	268
	°C	**50**	**100**	**150**	**200**	**250**	**300**	**350**	**400**	**450**	**500**	**550**	**600**

Table of tempering values obtained at room temperature on rounds of Ø 40 mm after quenching at 925 °C in oil

HB			525	520	510	485	460	438	430	409	390	360	271
HRC			53	52.5	52	50.5	48.5	46.5	46	44	42	39	28
R	N/mm²		1950	1920	1860	1780	1660	1550	1500	1430	1360	1200	900
Rp 0.2	N/mm²		1600	1600	1580	1580	1550	1480	1360	1300	1260	1050	800
A	%		8	8	8	8	8	8.5	9	10	11	13	16
Kv	J		30	30	30	30	30	32	35	40	80	100	150
Tempering at		**°C**	**200**	**250**	**300**	**350**	**400**	**450**	**500**	**550**	**600**	**650**	**700**

Plastic deformations and **creep** rupture resistance EN 10269: 2013

	σ_1 (1%) N/mm²		**σ_R** N/mm²		
°C	10.000 h	100.000 h	10.000 h	100.000 h	200.000 h
450	-	-	513	463	446
460	-	-	483	422	400
470	-	-	451	374	347
480	-	-	413	319	286
490	-	-	371	259	229
500	-	-	321	210	187
510	-	-	269	174	155
520	-	-	223	146	130
530	-	-	187	122	103
540	-	-	160	-	-

σ_1 = permanent creep strain 1% **σ_R** = creep rupture strength

40CrMoV4-6 1.7711

Lucefin Group

Thermal Expansion	$10^{-6} \bullet K^{-1}$	►	11.1	12.1	12.9	13.5	13.9	14.1	14.5
Mod. of Elasticity long.	GPa	211	204	196	186	177	164	127	
Mod. of Elasticity tang.	GPa	81	78	75	71	68	63	49	
Specific Heat Capacity	J/(Kg•K)	460							
Thermal Conductivity	W/(m•K)	33.3							
Density	Kg/dm^3	7.85							
Specific Electric Resist.	$Ohm \bullet mm^2/m$								
Electrical Conductivity	$Siemens \bullet m/mm^2$								
°C		**20**	**100**	**200**	**300**	**400**	**500**	**600**	**700**

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
40CrMoV4-6	40CrMoV4-6		40CrMoV4-6	40CrMoV4-6	670-860		A193B16