

<b>Quality</b>	<b>18NiCrMo5</b>	<i>Technical card</i>
According to standards	<b>UNI 7846: 1978</b>	<i>Lucefin Group</i>
Number		

### Chemical composition

C%	Si%	Mn%	P% max	S% max	Cr%	Mo%	Ni%	
0,15-0,21 ± 0.02	0,15-0,40 ± 0.03	0,60-0,90 ± 0.04	0,035 + 0.005	0,035 + 0.005	0,70-1,00 ± 0.05	0,15-0,25 ± 0.03	1,20-1,50 ± 0.05	Product deviations are allowed
On request, this steel grade may be supplied with addition of lead (Pb) 0.15-0.35% or sulphur (S) 0.020-0.035%; it can also be supplied Calcium (Ca) treated								

### Temperature °C

Hot-forming	Normalizing	Core hardening	Carbonitriding	Carburizing	Hardening carburizing surface	Tempering	
1100-900	880 air	840-870 oil-polymer salt bath		880-930	800-830 oil-polymer salt bath	150-180	
Soft annealing	Isothermal annealing	Annealing +FP	End quench Hardenability	Pre-heating welding		Stress-relieving after welding	
700 cooling 15 °C/h until 600, then air (HB max 240)	850 furnace cooling to 650, then air (HB 150-220)	950-1000 quick cooling	850 water	welding must be carried out on the annealed state and before carburizing		600 furnace cooling	
				150-350			
				<b>Ac1</b>	<b>Ac3</b>	<b>Mf</b>	<b>Ms</b> * core ** carburizing surface
				730	815	140	360* 180**

### Mechanical and physical properties

**Hot-rolled** values obtained on test blanks after core hardening + stress-relieving UNI 7846: 1978. Use only as reference

size mm test blanks	Testing at room temperature (longitudinal)					
	<b>R</b> N/mm <sup>2</sup>	<b>Rp 0.2</b> N/mm <sup>2</sup> min.	<b>A%</b> min.	<b>C%</b> min.	<b>Kcu</b> J min.	<b>HB</b>
11	1230-1520	980	8		30	363-432
30	980-1270	735	9		32.5	295-373 for information only
63	830-1130	635	10		35	249-339 for information only

**Table of tempering** values obtained at room temperature on rounds Ø 10 mm after quenching at 850 °C in oil

		50	100	150	200	250	300	350	400	450	500	550	600	650	700
<b>HB</b>		415	415	415	409	404	395	381	362	344	327	301	271	237	218
<b>HRC</b>		44.5	44.5	44.5	44	43.5	42.5	41	39	37	35	32	28	22	
<b>R</b>	N/mm <sup>2</sup>	1460	1460	1450	1430	1400	1360	1300	1230	1150	1080	1000	900	790	710
<b>Rp 0.2</b>	N/mm <sup>2</sup>	1070	1120	1170	1210	1210	1190	1150	1100	1040	960	860	790	700	610
<b>A</b>	%	13.5	13.6	13.5	13.2	13.0	12.8	12.8	12.9	13.8	15.0	17.0	19.5	22.0	24.0
<b>C</b>	%	57.0	58.0	59.0	60.0	60.0	60.0	60.0	60.0	61.0	63.0	65.0	68.0	72.0	74.0
<b>Kv</b>	J	64	64	62	62	64	46	46	46	75	94	125	148	166	180
<b>HRC carburized layer</b>		64	63.5	62	60	59	56								
<b>Tempering at °C</b>		<b>50</b>	<b>100</b>	<b>150</b>	<b>200</b>	<b>250</b>	<b>300</b>	<b>350</b>	<b>400</b>	<b>450</b>	<b>500</b>	<b>550</b>	<b>600</b>	<b>650</b>	<b>700</b>

**18NiCrMo5**

Lucefin Group

**Cold-drawn** +C (815M17) BS 970-3: 1991. Use only as reference

size		Testing at room temperature (longitudinal)				
mm		<b>R</b>	<b>Rp 0.2</b>	<b>A%</b>	<b>Kv</b>	<b>HB</b>
from	to	N/mm <sup>2</sup> min	N/mm <sup>2</sup> min	min	J min	min
	19	1080		8	22	327

Mechanical properties tested after quenching, carburized layer, quenching at 830 °C oil, tempering 200 °C air

**Forged** UNI 8550: 1984. Use only as reference

size		Testing at room temperature (longitudinal)								
mm		<b>R</b>	<b>Rp 0.2</b>	<b>A% L</b>	<b>A% T</b>	<b>A% Q</b>	<b>Kcu L</b>	<b>Kcu T</b>	<b>Kv L</b>	<b>HB</b>
from	to	N/mm <sup>2</sup>	N/mm <sup>2</sup> min	min	min	min	J min	J min	J min	for inform.
	11	1225-1520	980	8			30			361-432
11	25	1030-1325	785	9			32.5			311-384
25	40	930-1230	735	9			32.5			278-363
40	100	785-1080	590	10			35			234-327

Mechanical properties obtained on test blanks after core hardening + stress-relieving

L = longitudinal T = tangential Q = radial

UNI 7846:1978 **Jominy test HRC** grain size 5 min.

mm distance from quenched extremity

	1.5	3	5	7	9	11	13	15	20	25	30	35	40	45	50
<b>min</b>	39	38	36	34	31	29	27	25.5	23	21	20.5	20			
<b>max</b>	49	48.5	48	46.5	45	43.5	41	40	37	35.5	34.5	33.5	33	32.5	32

Temperature Testing at °C	Mod. of elasticity GPa		Thermal expansion	
	<b>E</b> long.	<b>G</b> tang.	10 <sup>-6</sup> · K <sup>-1</sup>	
20	240	96		

Specific heat capacity J/(Kg·K)	Density Kg/dm <sup>3</sup>	Thermal conductivity W/(m·K)	Specific electric resist. Ohm·mm <sup>2</sup> /m	Electrical conductivity Siemens·m/mm <sup>2</sup>
460	7.85	41	0.16	6.25

EUROPE EN	ITALY UNI	CHINA GB	GERMANY DIN	FRANCE AFNOR	U.K. B.S.	RUSSIA GOST	USA AISI/SAE
17NiCrMo6-4	18NiCrMo5			18NCD6	815M17	19HNM	4317