

Quality	18NiCrMo5
According to standards	UNI 7846: 1978
Number	

Chemical composition

C%	Si%	Mn%	P% max	S% max	Cr%	Mo%	Ni%	Deviations allowed for analysis product
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	

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	
				Ac1	Ac3	Mf	Ms * 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)					
	R	Rp 0.2	A%	C%	Kcu	HB
	N/mm ²	N/mm ² min.	min.	min.	J min.	
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

	415	415	415	409	404	395	381	362	344	327	301	271	237	218
HB														
HRC	44.5	44.5	44.5	44	43.5	42.5	41	39	37	35	32	28	22	
R N/mm ²	1460	1460	1450	1430	1400	1360	1300	1230	1150	1080	1000	900	790	710
Rp 0.2 N/mm ²	1070	1120	1170	1210	1210	1190	1150	1100	1040	960	860	790	700	610
A %	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
C %	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
Kv J	64	64	62	62	64	46	46	46	75	94	125	148	166	180
HRC carburized layer	64	63.5	62	60	59	56								
Tempering at °C	50	100	150	200	250	300	350	400	450	500	550	600	650	700

18NiCrMo5

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

size		Testing at room temperature (longitudinal)				
mm		R	Rp 0.2	A%	Kv	HB
from	to	N/mm ² min	N/mm ² 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		R	Rp 0.2	A% L	A% T	A% Q	Kcu L	Kcu T	Kv L	HB
from	to	N/mm ²	N/mm ² 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
min	39	38	36	34	31	29	27	25.5	23	21	20.5	20			
max	49	48.5	48	46.5	45	43.5	41	40	37	35.5	34.5	33.5	33	32.5	32

Temperature	Mod. of elasticity GPa		Thermal expansion		
Testing at °C	E long.	G tang.	10 ⁻⁶ · K ⁻¹		

20	240	96			
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Specific heat capacity	Density	Thermal conductivity	Specific electric resist.	Electrical conductivity
J/(Kg·K)	Kg/dm ³	W/(m·K)	Ohm·mm ² /m	Siemens·m/mm ²
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