

Quality	16NiCr4	Case-hardening	<i>Technical card</i>
According to standard	ISO 683-3 : 2018	Steel	Lucefin Group
Number	1.5714		rev. 2024

Chemical composition

C%	Si%	Mn%	P% max	S% max	Ni%	Cr%	Cu% max	Product deviations are allowed
0,13-0,19 ± 0.02	0,15-0,40 ± 0.03	0,70-1,00 ± 0.04	0,025 + 0.005	0,035 ± 0.005	0,80-1,10 ± 0.05	0,60-1,00 ± 0.05	0,40 +0.05	

On request, this steel grade may be supplied with addition of Lead (Pb) 0.15-0.35%

16NiCrS4 n° 1.5715 Sulphur (S) 0.020-0.040%

It can be also supplied Calcium (Ca) treated or Bismuth (Bi) 0,030-0,080%

Copper (Cu) max 0.40%

Temperature °C

Hot-forming	Normalizing +N	Core hardening	Carbonitriding	Carburizing	Hardening carburizing surf.	Str-reliev. +SR
1150-900	870 air	840 -880 oil-polymer salt bath	750-930 gas	870-950	810-840 oil-polymer salt bath	150 200
Soft annealing +A	Isothermal annealing +I	Spheroidizing +AC	End quench hardenability test	Pre-heating welding	Stress-relieving after welding	
700 air (HB max 217)	860-880 rapid cooling to 650, then air (HB 166-217)	700 soaking 4 h / inch after air (HB 156-207)	870 water	welding must be carried out on the annealed state and before carburizing	550 furnace cooling	
				250 Ac1	Ac3	Ms * core ** carburizing surface
				735	825	380* 180**

Mechanical properties

16NiCr4 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%	Z%	Kcu	HB
11	N/mm ²	N/mm ² min.	min.	min.	J min.	
11	1080-1470	835	9	-	30	327-417
30	830-1130	590	10	-	32.5	249-339 for information only

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

HB	400	395	395	395	390	381	371	353	336	301	271	240	224	210
HRC	43	42.5	42.5	42.5	42	41	40	38	36	32	28	22.5	-	-
R N/mm ²	1380	1370	1370	1360	1340	1310	1250	1180	1100	1010	900	800	730	690
Rp 0.2 N/mm ²	1020	1070	1100	1200	1200	1100	1070	1020	940	850	770	690	620	520
A %	13.0	13.0	13.2	13.2	13.4	13.6	13.8	14.2	15.5	17.0	19.2	22.0	24.0	25.0
Z %	55	58	59	60	62	63	63	63	64	65	67	70	73	74
Kv J	66	66	66	64	64	46	45	46	75	110	135	170	196	-
HRC carburizing	64	63	62	60	59	57	-	-	-	-	-	-	-	-
Tempering at °C	50	100	150	200	250	300	350	400	450	500	550	600	650	700

16NiCr4 1.5714 - 16NiCrS4 1.5715 EN ISO 683-7:24						<i>Lucefin Group</i>	
size mm		Soft annealing +A+SH Peeled, Ground +G	Soft annealing +A+C Cold-drawn	Heat treatment for pearlite / ferrite +FP+SH, +G Peeled, Ground	Heat treatment for pearlite / ferrite +FP+C Cold-drawn		
from	to	HBW max	HBW max	HBW	HBW ^{b)}		
5 ^{a)}	10	-	270	-	-		
10	16	-	260	-	-		
16	40	217	255	156-207	156-245		
40	63	217	255	156-207	156-240		
63	100	217	255	156-207	156-240		

^{a)} for thickness < 5 mm, mechanical properties should be agreed before order placement
^{b)} te hardness values for flats may deviate by ± 10%

16NiCr4 Forged UNI 8550: 1984. Use only as reference						
size mm		Testing at room temperature				
from	to	R	R _{p 0.2}	A%	K _{cu}	HB
		N/mm ²	N/mm ² min	min (L)	J min (L)	<i>for inform.</i>
	11	1080-1470	835	9	30	327-417
11	25	880-1195	640	10	32.5	263-356
25	40	785-1080	590	10	32.5	234-327
40	60	735-980	540	11	32.5	224-295

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

ISO 683-3: 2018 Jominy test HRC grain size 5 min.																
mm distance from quenched end																
	1.5	3	5	7	9	11	13	15	20	25	30	35	40	45	50	H
min	39	36	33	29	27	25	23	22	20	-	-	-	-	-	-	
max	47	46	44	42	40	38	36	34	32	30	29	28	28	-	-	
min	42	39	37	33	31	29	27	26	24	22	21	20	20	-	-	HH
max	47	46	44	42	40	38	36	34	32	30	29	28	28	-	-	
min	39	36	33	29	27	25	23	22	20	-	-	-	-	-	-	HL
max	44	43	40	38	36	34	32	30	28	26	25	24	24	-	-	

Thermal Expansion	10 ⁻⁶ • K ⁻¹	▶	11.1	12.1	12.9	13.5	14.1
Mod. of Elasticity long.	GPa		210				
Mod. of Elasticity tang.	GPa		80				
Specific Heat Capacity	J/(Kg•K)		460				
Thermal Conductivity	W/(m•K)		38				
Density	Kg/dm ³		7.85				
Specific Electric Resist.	Ohm•mm ² /m		0.18				
Electrical Conductivity	Siemens•m/mm ²		5.56				
°C			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
16NiCr4	16CrNi4		15CrNi6	16NC4	637M17	16HGN	3215 appr.