

Quality	16NiCr4Bi	Case-hardening	<i>Technical card</i>
According to standard	ISO 683-3 : 2018	Steel	Trafilix Industries
Number			rev. 2025

Chemical composition

C%	Si%	Mn%	P% max	S% max	Ni%	Cr%	Cu% max	Bi%	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	0,03-0,2 0.005	

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 hardability test	Pre-heating welding	Stress-relieving after welding	
				welding must be carried out on the annealed state and before carburizing		
700 air	860-880 rapid cooling to 650, then air	700 soaking 4 h / inch after air	870 water	250	550 furnace cooling	
(HB max 217)	(HB 166-217)	(HB 156-207)		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	Testing at room temperature (longitudinal)					
test blanks	R	Rp 0.2	A%	Z%	Kcu	HB
	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														Trafifix Industries		
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														
		R		Rp 0.2		A%				Kcu				HB		
from	to	N/mm²		N/mm² min		min (L)				J min (L)				for inform.		
	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	-	-	-	-	-	-	H
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/dm³			7.85											
Specific Electric Resist.		Ohm.mm²/m			0.18											
Electrical Conductivity		Siemens.m/mm²			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.		