Штоки никелированные и хромированные закаленные током высокой частоты (ТВЧ) NIMET

NICRO INCB, NICRO INCBM

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INDUCTION HARDENED AND
NICKEL-CHROME PLATED STEEL BARS

INCB

NiCro INCB - C45E / C35E
NiCro INCBM - 20MnV6 / 38MnVS6

In choosing the right product for an application, there are certain aspects to be taken into consideration. Both the properties of the base material and those of the finished surface are of crucial importance in delivering the optimal solution. The questions to be answered in making the correct decision are:

- What is the product that best fits the application's function and its technical requirements?
- What is the most effective cost-wise solution?
- Which is the product with the less long term impact on the environment?

STEEL GRADES CORRESPONDENTS

EN	Werkstoff	DIN	B.S.	UNI	JIS	GOST	AISI / SAE / ASTM
C45E	1.1191	Ck45	080M46	C45	S45C	45	1045
C35E	1.1181	Ck35	080M36	C35	S35C	35	1035
-	1.5217	20MnV6	55M	-	-	-	A572
38MnVS6	1.1303	38MnSiVS5	-	-	-	-	(15V41) *
46MnVS6	1.1304	44MnSiVS6	-	-	-	-	(10V45) *

* Equivalent

CHEMICAL COMPOSITION - IN % BY WEIGHT

Steel grade	C	Si	Mn	P	S	Cr	Mo	Ni	Cu	V	N
C45E *	0.42 ÷ 0.50	0.10 ÷ 0.40	0.50 ÷ 0.80	max. 0.025	max. 0.035	max. 0.40	max. 0.10	max. 0.40	max. 0.30	-	-
C35E *	0.32 ÷ 0.39	0.10 ÷ 0.40	0.50 ÷ 0.80	max. 0.025	max. 0.035	max. 0.40	max. 0.10	max. 0.40	max. 0.30	-	-
20MnV6	0.16 ÷ 0.22	0.10 ÷ 0.50	1.30 ÷ 1.70	max. 0.035	max. 0.035	-	-	-	-	0.08 ÷ 0.20	-
38MnVS6	0.34 ÷ 0.41	0.15 ÷ 0.80	1.20 ÷ 1.60	max. 0.025	0.020 ÷ 0.060	max. 0.30	max. 0.08	-	-	0.08 ÷ 0.20	0.010 ÷ 0.020
46MnVS6	0.42 ÷ 0.49	0.15 ÷ 0.80	1.20 ÷ 1.60	max. 0.025	0.020 ÷ 0.060	max. 0.30	max. 0.08	-	-	0.08 ÷ 0.20	0.010 ÷ 0.020

* Cr+Mo+Ni = max. 0.63

20MnV6 steel grade offers good weldability, enhanced mechanical characteristics, impact resistance at lower temperatures (-20°C).

38MnVS6 has excellent machinability, good weldability and it is widely used in civil, mechanical and chemical engineering applications.

MECHANICAL PROPERTIES

Steel grade	Diameter Ø mm	Tensile strength R_m N/mm²	Yield point $R_{p0.2}$ N/mm²	Elongation A_5 %	Impact energy KV_2 J	Hardness * Brinell N/mm²	Norm
C45E	6 < Ø ≤ 10	750 - 1050	min. 565	min. 5	-	225 - 320	EN 10277
	10 < Ø ≤ 16	710 - 1030	min. 500	min. 6		210 - 315	
	16 < Ø ≤ 40	650 - 1000	min. 410	min. 7		200 - 298	
	18 ≤ Ø ≤ 100	min. 580	min. 305	min. 16		172 - 242	EN ISO 683-1
	100 < Ø ≤ 200	min. 560	min. 275	min. 16		172 - 242	
C45E+QT	20 ≤ Ø ≤ 40	650 - 800	min. 430	min. 16	-	195 - 240	EN ISO 683-1
	40 < Ø ≤ 100	630 - 780	min. 370	min. 17		190 - 270	
	100 < Ø ≤ 160	The values of R_m, $R_{p0.2}$ and A_5 must be agreed				-	
C35E	6 < Ø ≤ 10	650 - 1000	min. 510	min. 6	-	190 - 298	EN 10277
	10 < Ø ≤ 16	600 - 950	min. 420	min. 7		180 - 285	
	16 < Ø ≤ 40	580 - 880	min. 320	min. 8		172 - 263	
	18 ≤ Ø ≤ 100	min. 520	min. 270	min. 19		154 - 207	EN ISO 683-1
	100 < Ø ≤ 200	min. 500	min. 245	min. 19		154 - 207	
20MnV6	6 < Ø ≤ 25	min. 700	min. 620	min. 10	min. 27J / - 20°C	213 - 260	Technical data according to internal norm
	19 < Ø ≤ 80	min. 600	min. 460	min. 18		159 - 220	
	80 < Ø ≤ 200	min. 550	min. 420	min. 18		155- 220	
20MnV6 M	20 < Ø ≤ 90	min. 600	min. 520	min. 19	min. 27J / - 20°C	165 - 225	Technical data according to internal norm
38MnVS6	20 < Ø ≤ 120	800 - 950	min. 520	min. 12	-	240 - 290	EN 10267
	120 < Ø ≤ 200	The values of R_m, $R_{p0.2}$ and A_5 must be agreed			-	-	EN 10267
38MnV6X	20 < Ø ≤ 90	850 - 1000	min. 580	min. 14	-	240 - 290	EN 10267
46MnVS6	20 < Ø ≤ 160	900 - 1050	min. 585	min. 10	-	240 - 290	EN 10267

* The hardness values are for information only

INDUCTION HARDENED AND NICKEL-CHROME PLATED STEEL BARS

INCB

NiCro INCB - C45E / C35E
NiCro INCBM - 20MnV6 / 38MnVS6

Dimensions	Ø20 - 160 mm / Ø1" - 6"		
Diameter tolerance	ISO f7 / other, on request		
Roundness	max. 1/2 from diameter tolerance		
Standard lengths	5.000 - 6.400 mm		
Special lengths	On request we can offer cut to fix lengths pieces and special lengths up to max. 6.400 mm		
Surface roughness	Ra: max. 0.20 µm		
	NiCro 150	NiCro 350	NiCro 500
Nickel layer thickness	min. 10 µm	min. 30 µm	min. 35 µm
Chrome layer thickness	min. 20 µm	min. 20 µm	min. 25 µm
Nickel layer microhardness	min. 300 HV0.1		
Chrome layer microhardness	min. 900 HV0.1		
Straightness	max. 0.2 mm/1000 mm		

TABLE OF DIMENSIONS TOLERANCE

Diameter mm	ISO f7 µm
20 ≤ Ø ≤ 30	-20 / -41
30 < Ø ≤ 50	-25 / -50
50 < Ø ≤ 80	-30 / -60
80 < Ø ≤ 120	-36 / -71
120 < Ø ≤ 160	-43 / -83

CORROSION RESISTANCE LEVELS

Diameter mm	NiCro 150		NiCro 350		NiCro 500	
	NSS	AASS	NSS	AASS	NSS	AASS
Ø20 - 160	rating 10 after 500 h	rating 10 after 150h	rating 10 after 1000 h	rating 10 after 350h	rating 10 after 1500h	rating 10 after 500h

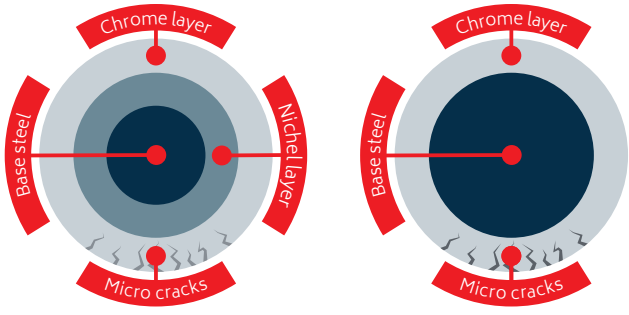
Tested in our own laboratory according to ISO 9227, evaluated according to ISO 10289.

CORRESPONDENCE BETWEEN STEEL GRADE AND SURFACE HARDNESS

	NiCro INCB C35E / C45E	NiCro INCBM 20MnV6	NiCro INCBM 38MnVS6
Surface hardness beneath the chrome layer	54±3 HRC	44±3 HRC	54±3 HRC

The hardening depth is defined as the distance from the surface, beneath the chrome layer up to the point where the hardness value has dropped to the value of 513 HV1 for C35E, C45E and 38MnVS6 steel grades, respectively 360HV1 for 20MnV6 steel grade.
The hardening depth is between 1.0 - 1.8 mm, depending on diameter and steel grade.

The nickel layer is completely free of cracks, pores and by this, the base material is isolated from the atmospheric corrosion, while the chrome layer ensures a very good wear resistance.



INDUCTION HARDENED AND
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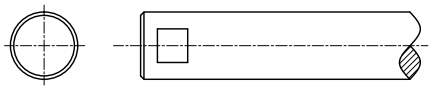
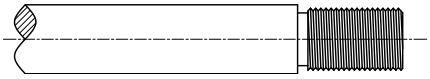
CUSTOMIZED MACHINING

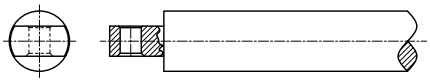
CROSSWISE GROOVE



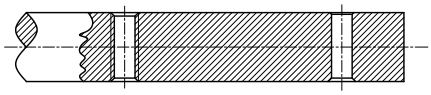
OUTSIDE DIAMETER THREAD



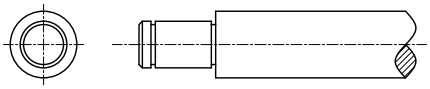
END FOR MOUNT WITH CLEVIS CLAMP



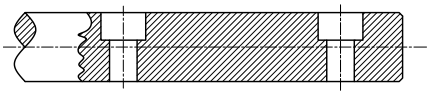
TAPPED OR DRILLED HOLES RADIALLY THROUGH SHAFT



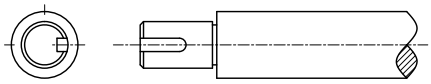
GROOVES FOR SNAP RING



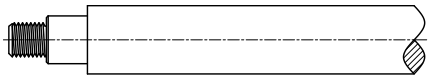
RADIAL DRILLING HOLES, BORED



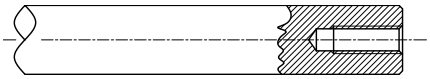
REDUCED DIAMETER WITH/ WITHOUT FEATHER KEYWAY



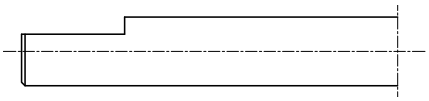
REDUCED DIAMETER WITH THREADED END



AXIAL DRILLED AND THREADED TO ENDS



D-CUT SHAPE



STORAGE AND HANDLING RECOMMENDATIONS

- Keep the products stored in dry and covered spaces.
- Do not expose for a long time the bars or tubes to the sunlight or to very low temperatures.
- For storage, preferable to use rubber supports or wood lined supports; direct contact with the floor and steel supports that are not lined with soft materials must be avoided.
- Whenever possible, please use the crane to load or unload the bundles; when you use the fork lifts please avoid the direct contact of the forks with the products.
- Always lift the bundles using textile slings.
  Don't use metal slings during handling of bundles.
- Always keep dry the cardboard tubes that protect the chromed products.

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