

# NIMET

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INNOVATION  
LIVES



**INCT**

## INDUCTION HARDENED AND NICKEL-CHROME PLATED STEEL TUBES

# NiCro

INDUCTION HARDENED AND  
NICKEL-CHROME PLATED STEEL TUBES



NiCro INCT - E355+SR  
NiCro INCT - P460N+N  
NiCro INCT - C45E+N  
NiCro INCT - 20MnV6

Extensively used for those applications requiring a high surface hardness and excellent resistance to surface impact (eg. mining equipment).

The surface does not withstand though a high, direct and continuous pressure, but only the one of hydraulic seals.

## STEEL GRADES CORRESPONDENTS

EN	Werkstoff	DIN	B.S.	UNI	JIS	GOST	AISI / SAE / ASTM
E355	1.0580	St52	CFS5	Fe510	STKM19A	St6sp	1524 / 1024
P460N	1.8905	StE460	55C	FeE460KG	-	18G2AF	-
C45E	1.1191	Ck45	080M46	C45	S45C	45	1045
-	1.5217	20MnV6	55M	-	-	-	A572

## CHEMICAL COMPOSITION - IN % BY WEIGHT

Steel grade	C	Si	Mn	P	S	Cr	Mo	Ni	V	Cu	N
E355	max. 0.22	max. 0.55	max. 1.60	max. 0.025	max. 0.025	-	-	-	-	-	-
P460N	max. 0.20	max. 0.60	1.00 ÷ 1.70	max. 0.025	max. 0.020	max. 0.30	max. 0.10	max. 0.80	max. 0.20	max. 0.70	max. 0.020
C45E*	0.42 ÷ 0.50	max. 0.40	0.50 ÷ 0.80	max. 0.030	max. 0.035	max. 0.40	max. 0.10	-	-	-	-
20MnV6	0.16 ÷ 0.22	0.10 ÷ 0.50	1.30 ÷ 1.70	max. 0.035	max. 0.035	-	-	-	0.08 ÷ 0.20	-	-

\*Cr+Mo+Ni = max. 0.63

## MECHANICAL PROPERTIES

Steel grade	Tensile strength	Yield point	Elongation (longitudinal)	Impact energy (longitudinal direction)	Hardness ***	Norm
	R <sub>m</sub> N/mm <sup>2</sup>	R <sub>p0.2</sub> N/mm <sup>2</sup>	A <sub>5</sub> %	KV <sub>2</sub> J	Brinell N/mm <sup>2</sup>	
E355+SR	min. 580	min. 450	min. 10	(min. 27J / -20°C)**	min. 175	EN 10305-1
P460N+N	560 - 730	min. 460 *	min. 19	min. 40J / -20°C	170 - 220	EN 10216-3
C45E+N	min. 540	min. 340	min. 18	-	min. 163	EN 10305-1
20MnV6+N	550 - 800	min. 450	min. 22	min. 27J / -20°C	165 - 240	Technical data according to internal norm

SR = stress-relieved, N = normalized

\* Wall thickness ≤ 12 mm

\*\* On request

\*\*\* The hardness values is for information only

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- Outside diameter - OD Ø40 - 125 mm
  - Inside diameter - ID see standard dimensions range
  - Outside tolerance - OD ISO f7 / ISO f8 / other, on request
  - Roundness - OD 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 - OD 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. 0.25 mm / 1000 mm |            |            |

## TABLE OF DIMENSIONS OD TOLERANCE

Diameter mm	ISO f7 µm	ISO f8 µm
30 < Ø ≤ 50	-25 / -50	-25 / -64
50 < Ø ≤ 80	-30 / -60	-30 / -76
80 < Ø ≤ 120	-36 / -71	-36 / -90
120 < Ø ≤ 140	-43 / -83	-43 / -106

## STANDARD DIMENSIONS RANGE

Outside diameter mm	40	45	50	55	60	63	70	75	80	85	90	100	110	120	125
Inside diameter mm	20	25	30	35	45	43	50	55	50	65	70	80	90	100	100
Wall thickness mm	10	10	10	10	7.5	10	10	10	15	10	10	10	10	10	12.5
	7.5	7.5	7.5	7.5	5	6.5	7.5	-	-	-	-	-	-	-	-

## CORRESPONDENCE BETWEEN STEEL GRADE AND SURFACE HARDNESS

	NiCro INCT E355+SR / P460N+N / 20MnV6	NiCro INCT C45E+N
Surface hardness beneath the chrome layer	42±4 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 the steel core hardness, depending on the steel grade. Generally, the hardening depth is between 1.0 - 1.8 mm, depending on diameter and steel grade.

## CORROSION RESISTANCE LEVELS

Diameter mm	NiCro 150		NiCro 350		NiCro 500	
	NSS	AASS	NSS	AASS	NSS	AASS
Ø40 - 125	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.

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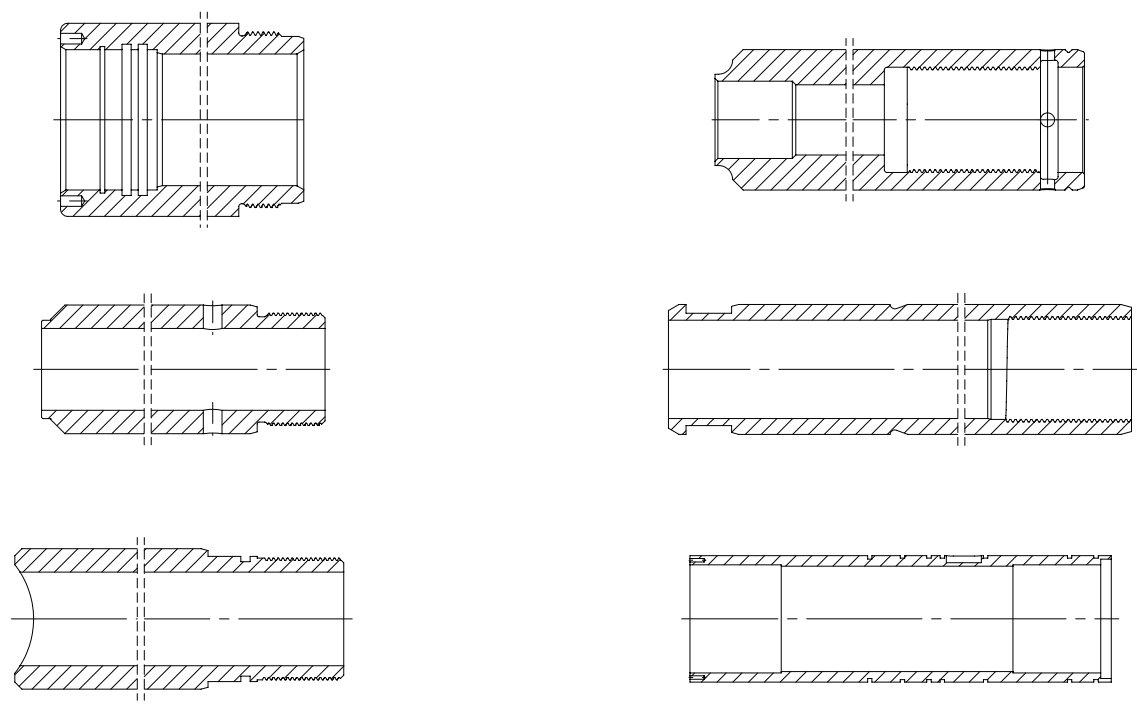


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## CUSTOMIZED MACHINING



## 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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