Product Data

INDRA 3 Series

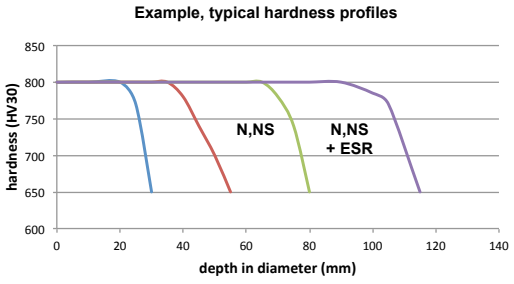
Forged Steel (EAF or ESR)

Chemical composition

	C	Mn	Si	Cr	Mo	Ni
INDRA 3	**0.7 – 0.9**	**0.1 – 0.8**	**0.1 – 1.0**	**2.7 – 3.9**	**0.1 – 0.7**	**0 – 0.9**
INDRA 2	0.7 – 0.9	0.1 – 0.5	0.1 – 1.0	1.6 – 2.7	0.1 – 0.7	0 – 0.9
INDRA 5	0.7 – 0.9	0.1 – 0.5	0.1 – 1.0	4.0 – 5.5	0.1 – 0.7	0 – 0.9

Properties

Max hardness	HV	900
Yield strength (Core)	(MPa)	500-700
Young's modulus	(GPa)	210



For high hardness depth, N grade is required.

For some applications and ultra high hardness depth, N grade with ESR is mandatory.

Comparative properties

	Wear resistance	Grindability	Roughness retention
INDRA 3			
INDRA 2			
INDRA 5			

Description

Forged steel with 3% chromium manufactured according to Union Electric Åkers specification. Tempered martensite with homogeneous distribution of fine carbides. Well deter-mined level of retained austenite. Com-pressive stresses in the working layer.

The steel is refined in an electric furnace (EAF) followed by ladle metallurgy and vacuum degassing. When required the EAF ingot can be further refined by ESR (Electro Slag Remelting).

The ingot is forged with high forging ratio. Preliminary heat treatments are applied on forged blank to obtain suitable mechanical properties in the core and necks.

The roll barrel is then induction hardened and tempered to obtain a hard and wear resistant surface layer, the depth of which can be varied according to requirements by careful selection of the hardening parameters.

Applications

Work rolls in 2-high, 4-high and 6-high mill configurations for cold rolling of ferrous and non ferrous products.

Intermediate rolls for 6-high mill configurations.

Back up rolls in narrow strip mills for cold rolling of ferrous and non ferrous products.

INDRA 3 Series

- INDRA 3
- INDRA 3N : higher hardness depth
- INDRA 3S : superior incident resistance
- INDRA 3NS : both the above benefits

Features & Benefits

- Good wear resistance.
- Good resistance to mill incidents.
- Well adapted for texturing.
- No axial bore required.

Union Electric Åkers
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