

# ICRA

*Indefinite Chill*

## Chemical composition

	C	Si	Mn	Mo	Cr	Ni	W, V, Nb
<b>ICRA</b>	<u>3.0</u> <u>4.0</u>	<u>0.5</u> <u>1.5</u>	<u>0.5</u> <u>1.6</u>	<u>0.2</u> <u>0.8</u>	<u>1.0</u> <u>2.0</u>	<u>3.0</u> <u>4.0</u>	<u>&lt;0.5</u>
MICRA	<u>3.0</u> <u>4.0</u>	<u>0.5</u> <u>1.5</u>	<u>0.5</u> <u>1.6</u>	<u>0.2</u> <u>0.8</u>	<u>1.0</u> <u>2.0</u>	<u>3.0</u> <u>4.0</u>	<u>1-4</u>
CRONA	<u>2.3</u> <u>3.0</u>	<u>0.6</u> <u>1.0</u>	<u>0.8</u> <u>1.2</u>	<u>1.0</u> <u>1.5</u>	<u>15.0</u> <u>20.0</u>	<u>1.0</u> <u>1.5</u>	<u>0.2</u> <u>0.6</u>
CICRA	<u>2.2</u> <u>2.9</u>	<u>0.7</u> <u>0.8</u>	<u>1.0</u> <u>1.2</u>	<u>1.0</u> <u>1.5</u>	<u>15.0</u> <u>20.0</u>	<u>1.0</u> <u>1.5</u>	<u>1-2</u>
URMA	<u>1.0</u> <u>2.0</u>	<u>0.7</u> <u>0.8</u>	<u>0.5</u> <u>1.5</u>	<u>0.2</u> <u>0.8</u>	<u>10.0</u> <u>14.0</u>	<u>0.5</u> <u>1.5</u>	<u>0.2</u> <u>0.6</u>

## Properties

Hardness	Ld (ShC)	710-765 (65-75)
Tensile strength	(MPa)	350
Thermal conductivity	(W/m x K)	21
Thermal exp. coeff. (20-100C)	(1/Kx10-6)	12
Young's modulus	(GPa)	180
Poisson's ratio	-	0,31
Density	(kg/m <sup>3</sup> )	7500
Specific heat	(J/kg x K)	500

## Comparative properties

	Wear resistance	Fire crack resistance	Toughness	Product surface
<b>ICRA</b>	—	—	—	—
MICRA	—	—	—	—
CRONA	—	—	—	—
CICRA	—	—	—	—
URMA	—	—	—	—

## Description

Double poured indefinite chill iron produced by the vertical spin casting process.

The microstructure consists of a bainitic/martensitic matrix with Fe<sub>3</sub>C-carbides and free graphite flakes.

The roll is heat treated at low temperatures to obtain favourable stress levels and the required hardness range.

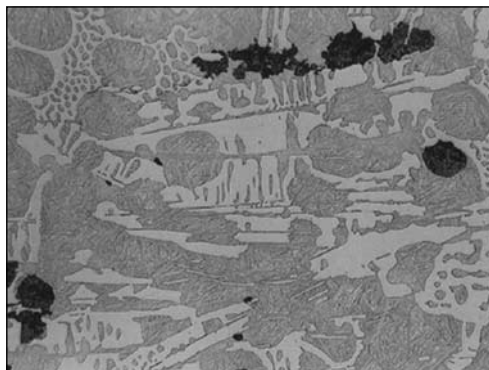
### CORE MATERIAL

High strength flake iron (HS) or nodular iron (SG).

(Properties displayed in a separate product data sheet.)

## Applications

Work rolls for single or double stand plate mills.



Microstructure ICRA.

## Features & Benefits

- The material properties provide a good resistance against thermal and mechanical impacts due to rolling incidents.
- The characteristic hardness drop of Indefinite Chill rolls is minimized by the manufacturing process.