

## MATERIAL INFORMATION

# DURACON<sup>®</sup> 45M

## FOR MOULD AND DIE PRODUCTION

- High hardness of 48 HRC
- High tensile strength of 1300 MPa
- Very high thermal conductivity of 82 W/(m·K)
- Thermal expansion coefficient similar to that of typical tool steels ( $11 \cdot 10^{-6} \text{ K}^{-1}$ )
- Free of Beryllium



The recently developed Iron-Cobalt-Nickel alloy DURACON 45M combines high hardness and high tensile strength with an excellent thermal conductivity. This unique combination of properties makes the material attractive for the production of moulds and dies. The very high thermal conductivity allows a significant reduction of the cycle time and enhances the surface quality and the dimensional accuracy of the produced plastic parts. Furthermore, DURACON 45M has a thermal expansion coefficient close to that of typical tool steels, which reduces thermal stress in composite moulds. Additionally, DURACON 45M is free of Beryllium.

## Properties of DURACON® 45M (typical values)

Property			Unit	Basic condition (martensitic)	Age hardened state (500 °C / 2 h)
Hardness	HRC	25 °C		28	48
		200 °C			44
		300 °C			42
		400 °C			40
Thermal conductivity	$\lambda$	25 °C	W/(m·K)	72	82
		200 °C	W/(m·K)	64	72
		400 °C	W/(m·K)	58	60
Specific heat capacity	$c_p$	25 °C	J/(g·K)	0.43	0.43
Tensile strength	$R_m$	25 °C	MPa [=N/mm <sup>2</sup> ]	900	1300 *
Yield strength	$R_{p0.2}$	25 °C	MPa [=N/mm <sup>2</sup> ]	700	1300 *
Young's modulus	E	25 °C	GPa [=kN/mm <sup>2</sup> ]	170	180
Notch impact energy **	KV <sub>2</sub> 50/10	25 °C	J	> 50 ***	2.5
Maximum application temperature			°C		approx. 350 ****
Thermal expansion coefficient	$\alpha$	20–100 °C	10 <sup>-6</sup> K <sup>-1</sup>	11.1	10.6
		20–400 °C	10 <sup>-6</sup> K <sup>-1</sup>	12.1	11.3
Density	$\rho$	25 °C	g/cm <sup>3</sup>	8.3	8.3
Ferromagnetism				yes	yes

\* In the age hardened condition the material is brittle. Due to the very low ultimate strain, the tensile strength and the yield strength cannot be determined reproducibly.

\*\* Notch impact energy according to DIN EN ISO 148-1 with Charpy V Notch

\*\*\* Samples not fractured by a 50 J pendulum impact testing machine.

\*\*\*\* Extrapolated from measurements at 400, 450 and 500 °C up to 1000 hours

## Composition

Cobalt	45 wt. %
Nickel	15 wt. %
Iron	Balance

## Delivery condition

Basic condition, age hardened on request

## Form of delivery

Hot rolled and hot forged rods, bars and bulk material