

## MATERIAL INFORMATION

# DURACON® 45M

## FOR MOULD AND DIE CONSTRUCTIONS

- High tensile strength up to 1500 MPa
- High hardness up to 480 HV / 48 HRC
- High thermal conductivity above 70 W/mK
- Thermal expansion coefficient close to tool steels ( $11,2 \times 10^{-6} \text{ K}^{-1}$ )
- Free of toxic elements like e.g. Beryllium



The recently developed Iron-Cobalt-Nickel-alloy DURACON® 45M combines high hardness with high thermal conductivity. This unique properties combination makes the material attractive for mould and die constructions. The high hardness reduces abrasive wear of moulds and dies. Furthermore DURACON® 45M has a thermal expansion coefficient close to tool steels, which reduces the risk of stress cracks in composite moulds and dies. Additionally DURACON® 45M is free of any toxic elements like e.g. Beryllium.

## Properties of DURACON 45M (typical values)

| Property                             |            | Unit                            | Base condition<br>(martensitic) | Age hardened state<br>(400°C/2h) |
|--------------------------------------|------------|---------------------------------|---------------------------------|----------------------------------|
| Tensile strength                     | $R_m$      | (MPa)                           | 950                             | 1500                             |
| Yield strength                       | $R_{p0.2}$ | (MPa)                           | 700                             | 1150                             |
| Young's Modulus                      | E          | (GPa)                           | 180                             | 200                              |
| Hardness                             | HV         |                                 | 310                             | 480                              |
|                                      | HRC        |                                 | 31                              | 48                               |
| Toughness at RT (Charpy Impact Test) |            | (J)                             | ca. 50                          | ca. 50                           |
| Maximum application temperature      |            | (°C)                            | 450                             | 450                              |
| Density                              | $\rho$     | (g/cm <sup>3</sup> )            | 8,1                             | 8,1                              |
| Thermal expansion coefficient        | $\alpha$   | (10 <sup>-6</sup> 1/K) RT       | 11,2                            | 11,2                             |
|                                      |            | (10 <sup>-6</sup> 1/K) RT-400°C | 12                              | 12                               |
| Electrical conductivity              | $\sigma$   | (m/Ωmm <sup>2</sup> )           | 10                              | 12                               |
| Thermal conductivity                 | $\lambda$  | (W/mK)                          | >50                             | >70                              |
| Specific heat capacity               | $c_p$      | (J/g K)                         | 0,40                            | 0,40                             |
| Ferromagnetism                       |            |                                 | Yes                             | Yes                              |

## Composition

|        |         |
|--------|---------|
| Kobalt | 45 wt.% |
| Nickel | 15 wt.% |
| Iron   | Balance |

## Form of delivery

- Hot rolled bars
- Bulk material on request

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