

Arnokrome™ 3 Rod & Wire

Arnokrome™ 3 is a proprietary ductile permanent magnet alloy developed by Arnold Magnetic Technologies and based on the Fe-Cr-Co alloy system. Since the cobalt content is relatively low compared to alternative magnetic alloys, Arnokrome 3 may offer a significant advantage in replacement situations in terms of price stability.

The alloy has good ductility which permits the manufacture of a wide variety of products formed from round stock, Arnokrome 3 may be drawn, machined, cold headed, and formed prior to magnetic heat treating. By adjusting the heat treatment, the alloy's magnetic properties can be tailored to specific permanent magnet applications. Arnokrome 3 is isotropic and supplied in the heat treated form, with applications primarily being in sensor systems. By controlled heat treatment, coercive force is varied to specific levels between 50 and 300 oersteds to optimize the performance of the material for the customer's application. Arnold Magnetic Technologies' application personnel are available to provide technical assistance to potential customers in their evaluation of Arnokrome 3.

Chemistry

| | | |
|----------------------------|------------------------|----------------------|
| Chromium: 26 to 30% | Cobalt: 7 – 10% | Iron: Balance |
|----------------------------|------------------------|----------------------|

Mechanical Properties

| | Annealed | Heat Treated |
|------------------|------------|--------------|
| Tensile Strength | 75,000 psi | 120,000 psi |
| Yield Strength | 50,000 psi | 115,000 psi |
| % Elongation | 25 | 6 |
| Hardness | Rb 75 | Rc 25 |

Magnetic Properties

| | |
|-------------------------|----------------------|
| Magnetic Remanence (Br) | 9,000 - 12,000 Gauss |
| Coercivity (Hc) | 50 - 300 Oersteds |
| Energy Product (BHmax) | 0.4 – 1.2 MGOe |
| Curie Temperature | 625°C |
| Orientation | Isotropic |

Physical Properties

| | |
|----------------------------------|--|
| Density | 0.277 lbs/cu in (7.6 g/cc) |
| Diameters Available | 0.010" (0.25mm) to 1.250" (31.75mm) |
| Electrical Resistivity (25°C) | 69 x 10 ⁻⁶ ohm-cm |
| Thermal Conductivity (100°C) | 0.05 cal / (cm · sec · °C) |
| Thermal Expansion (30° to 100°C) | 8.67 x 10 ⁻⁴ cm / (cm · °C) |
| Temperature Range: 30° to 400°C | 10.4 x 10 ⁻⁶ |
| 30° to 300°C | 10.2 x 10 ⁻⁶ |
| 30° to 200°C | 9.84 x 10 ⁻⁶ |
| 30° to 100°C | 8.67 x 10 ⁻⁶ |

FAST FACTS

When choosing Arnokrome 3, the following factors should be considered:

Magnetic Characteristics:

Arnokrome 3 is best suited for low coercivity applications. Br = 11.0 kGauss Hc = 50 - 300 Oe.

Ductility:

Arnokrome 3 is cold drawable to 0.010" (0.25mm) diameter, and can be supplied in coils up to 0.250" (6.35mm) in diameter and in cut lengths of up to 4 feet (1219.20mm).

Cost:

Due to the nature of the heat treat cycle required to develop magnetic characteristics, lower coercivities are less expensive. As the coercivity increases, so does the time required for the heat treat cycle.

With more than four decades of precision rolling experience, Arnold Magnetic Technologies is intimately familiar with the potential magnetic properties of a broad range of magnetic materials. Our knowledge of the most efficient and effective means of maximizing the potential of various materials has led to the development of numerous alloy innovations, including Arnokrome 3.

If needed, Arnold engineers can help you customize the properties of Arnokrome 3 to satisfy a wide spectrum of magnetic rod, wire, strip, and foil applications.