

ASTM A848

Type 1 – Soft Magnetic Iron

Soft Magnetic Alloys



Description

This product has an Iron content of 99.85% min, without the addition of alloy elements. All natural impurities have been largely removed. Pure iron undergoes pacification after melting by means of vacuum degassing following solidification. It therefore has a homogenous composition with regard to distribution of the accompanying elements, a very low oxygen content, and due to the low Carbon content, the micro structure consists of pure ferrite. This material supports excellent magnetic properties and resistance against corrosion and oxidation. It has good cold forming capabilities and is well suited to welding.

AKA: Remko, Armco, Maximag.

Applications

Aviation construction, nuclear technology, magnet production, automotive construction, power station construction, gaskets in the chemical and petrochemical industries, magnetic shielding, welding rods and fuse wire, an anti-corrosion anode.

PHYSICAL PROPERTIES	
Density	7.86 g/cm ³
Melting point	1532°C
Electrical Resistivity	10.7 microhm-cm
Thermal conductivity	0.73 W/mK
Specific heat	0.45 J/g°C
Coefficient of thermal expansion (20°C to 399°C)	12.6 ppm/°C

MECHANICAL PROPERTIES	
Tensile strength	290 MPa
Yield strength	186 MPa
Elongation	38%
Hardness	40-50 HRB
Modulus of elasticity	207 GPa

ELECTRICAL RESISTIVITY AT ELEVATED TEMPERATURES	
Temperature °C	Resistivity, μΩ·cm
0	9.6
100	15.0
200	22.6
300	31.4
400	43.1
500	55.3
600	69.8
700	87.0
800	105.5

REPRESENTATIVE MAGNETIC PROPERTIES			
	As received	SAR recrystallisation anneal	Normalisation and special anneals
Relative permeability at 8 A/m (0.1 Oe), μ ₈	50-100	250-5000	1500-2500
Maximum relative permeability, μ _{max}	1000-2500	5000-19000	10000-16000
Coercive force, H _c at H = 2.4 kA/m (30 Oe)	95-200 A/m	16-120 A/m	24-45 A/m
B at H = 40 A/m (0.5 Oe)	0.006 – 0.02 T	0.03-0.85 T	0.63-0.76 T
B at H = 1.2 kA/m (15 Oe)	1.45 – 1.57 T	1.60-1.68 T	1.61-1.62T
B at H = 24 kA/m (300 Oe)	2.05 – 2.10 T	2.05-2.10 T	2.05-2.10 T

FORMS AVAILABLE:



Coil



Plate



Rod



Bar



Wire

CHEMISTRY



–



0.005%



99.85%

C

0.01%

Mn

0.1%

S

0.008%

N

0.006%

Cu

0.03%

P

0.01%

Sn

0.01%

28 Nickel Ni 58.6934	27 Cobalt Co 58.933	26 Iron Fe 55.847
--------------------------------------	-------------------------------------	-----------------------------------

More than just metal

We're one of Europe's leading suppliers of premium quality refractory metals and alloys, soft magnetic alloys, and controlled expansion alloys. We hold a large stock of UK-certified, materials, all with full chain custody. With a deep technical understanding, comprehensive workshop facilities, and top accreditations, we help our customers get more from their materials.

Knowledge and advice

Our team understands exactly how our products are made, how they will behave in different situations, and how they should perform. Their knowledge and expertise helps save time, effort and cost by ensuring that all materials are sourced, processed and tested to perform in the most effective way.

We partner with leading academic institutions and scientific organisations that add value to our service and help develop solutions to the challenges impacting our customers. We're keen to share these unique insights in order to deliver practical operational improvements.

Workshop and machining

Our purpose-built facilities are centred around a fully equipped workshop designed to address almost any customer request:

- CNC Proturn RLX 1630 lathe for high precision rod and bar processing
- Saws to cut bars, plate and billets from Ø 2mm to Ø 270mm
- Guillotines for sheet and coil
- Grinding machinery
- De-coiler to check for imperfections before shipping
- Coil handling equipment to inspect product before dispatch
- Water jet and laser cutting
- Heat treatments

Quality control

All orders are fully tested before shipping.

Our state-of-the-art metrology lab features:

- Micrometers, verniers and gauges for all applications
- Surface roughness tester
- Straightness and roundness testing apparatus
- Magnetometers for measuring inductance, coercive and saturation
- Capabilities for evaluating properties such as CTE, tensile and elongation.

Best practice

We are committed to continuous improvement, reflected in our achievement of internationally-recognised industry accreditations. These are the foundation of best practice and provide you with solid assurances of competence and integrity:

- **AS9120** certified – a top aerospace industry award.
- **Green Mark level 1** accreditation – an environmental certification that supports greater sustainability.
- **JOSCAR** (the Joint Supply Chain Accreditation Register) accredited – an award that helps to streamline procurement processes.
- **Cyber Essentials** certified – a government-backed programme that provides security assurance of a supplier's digital infrastructure.



Discover how we can **optimise** operational performance

Contact chris@nicofe.com



Nicofe Materials

Unit 8D, Torr View, Torr Quarry Industrial Estate, East Allington, Totnes TQ9 7QQ

01548 858770 | sales@nicofe.com | www.nicofe.com