

# SDS/MSDS - Alnico Magnets

## Aluminium Nickel Cobalt Magnets



### Safety Data Sheet (SDS) Material Safety Data Sheet (MSDS) for Alnico (Aluminium Nickel Cobalt) magnets

The information contained herein is, to the best of our knowledge and belief, accurate.

All materials may present unknown health hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these hazards are the only hazards which exist.

Since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability or responsibility whatsoever for damages incurred by the use of this material or this information.

Final determinant of suitability of this material is the sole responsibility of the user.



## Document Date

Document issue date	29th June 2023
Document Revision number	2

## Section 1 - Product and Company Identification

<b>Product Name:</b>	<b>Alnico magnet</b> / <b>Aluminium Nickel Cobalt magnet</b> / <b>AlNiCo magnet</b>
<b>Supplier name:</b>	<b>Eclipse Magnetics Limited</b>
Supplier address:	Atlas Way Atlas North Sheffield S4 7QQ England
Supplier VAT number:	172 401 984
Supplier D-U-N-S© number:	228270872
Supplier EORI number:	172 4019 84 001
ISO 9001:	ISO 9001:2015 certificate number FM 31278
ISO 14001:	ISO 14001:2015 certificate number EMS 616377
Supplier phone number:	+44 (0)114 225 0600
Supplier email:	info@eclipsemagnetics.com
Supplier web page:	www.eclipsemagnetics.com

## Section 2 - Hazards Identification

Signal Word:		Danger
Chemical hazard(s):		N/A for magnets themselves in normal use
Health hazard(s): H317, H332, H302, P314, P301+P315, P333+P313, P260, P342+P315, P305+P315		Clean, unmagnetised Alnico magnets cause no hazards - hazards arise when the magnets are ground, cut, broken or magnetised. Prolonged skin contact may cause irritation or allergic dermatitis. Keep away from eyes at all times - broken magnets can have sharp chips and shards. Ingesting magnetic materials may cause severe health risks (possible risk of death) that can only be resolved at a hospital by surgical intervention (e.g. magnets magnetically trapping intestines). Do not breath in any dust or powder (should not exist in finished magnets)
Unusual fire and explosion hazard(s):		N/A for magnets themselves in normal use (finished goods are solid product). There is no flash point of Alnico magnets.
Physical hazard(s): P201, P202, P280, P281		Risk of injury during handling of magnets due to possible very strong magnetic forces from magnet. We are not medical experts so we always suggest that people with medical implants such as pacemakers, implantable defibrillators, etc should never handle magnets, magnetic assemblies or electromagnets and should always seek medical advice from their doctor before going anywhere near a magnet, magnetic assembly or electromagnet. Magnets are brittle and may break and chip if they collide against a another solid object if they are mis-handled. Some chips and shards can be very sharp and give a risk of cutting skin. Magnets can create strong attraction forces to other magnets and ferrous objects - these forces can clamp though skin with high force (e.g. finger pinch or worse) - handle magnets with care
Environmental hazard(s):		N/A for magnets themselves in normal use
Precaution(s): P202, P280, P281, P101, P102, P270		Do not use magnets until all safety precautions have been read and understood. Wear and use appropriate PPE (gloves, eye protection, face protection, etc). Keep out of reach of children

## Section 3 - Composition / Information on Ingredients

Element	CAS number	Percentage (%) by weight (typical)
Aluminium (Al)	7429-90-5	6-13
Nickel (Ni)	7440-02-0	13-27
Cobalt (Co)	7440-48-4	0-42
Iron (Fe)	7439-89-6	30-70
Copper (Cu)	7440-50-8	0-6
Titanium (Ti)	7440-32-6	0-9
Niobium (Nb)	7440-03-1	0-3

*Typical composition given - grade type, size and coating type may alter this composition. Some specialist grades may contain other elements*

*The Technical Datasheet showing the Magnetic Properties (Br, Hc, Hci, BHmax, etc) of the grades and plating options is available as a pdf upon request*

*All our products are Conflict Mineral compliant - confirming pdf statement available upon request*

*All our products are REACH compliant - confirming pdf statement available upon request*

*Alnico magnet materials contain no SVHC (Substances of Very High Concern) either in ingredients or in preparation*

## Section 4 - First Aid Measures

Eye contact:	Flush well with running water until irritation clears then seek medical attention
Skin contact:	Small allergy risk for magnets themselves unless Nickel plated (irritation or allergenic dermatitis or individuals who may have Nickel allergy). Note that there is Nickel content in the Alnico material itself. Otherwise brush off any powders and wash well with soap and water. Seek medical attention if any symptoms persist
Inhalation:	N/A for magnets themselves. When fine powders or dust inhaled, move to a fresh air area then rinse nasal cavity and throat with warm water then seek medical attention
If swallowed:	If a magnet is swallowed, seek immediate medical attention. If multiple magnets are ingested, the magnets can stick together through intestinal walls, causing serious infections and risk of death - seek immediate medical attention.

## Section 5 - Fire Fighting Measures

Flammable properties:	Not Applicable
Hazardous combustion products:	Not Applicable
Extinguishing media:	Dry chemicals without oxygen compounds, or dry sand. Water may be ineffective.
Special fire fighting procedures:	Isolate smouldering, burning powders. In case of fire, cover with dried sand and, if safe to do so, move any combustible material away from fire areas. Do not use halogen / halon. Use and wear appropriate protective equipment
Unusual fire and explosion hazards:	Fine powders may oxidize, smoulder, and burn rapidly in the presence of air or oxygen.

## Section 6 - Accidental Release Measures

Magnets:	In a solid state no special attention is recommended other than to take standard safety measures for handling magnets which can include safely handling to collect into a closed container for safe storage
Powders:	Sweep up released powders or dust with a mop or broom and store in sealed containers. Do not collect powders with a vacuum cleaner. Maintain adequate ventilation
Special fire fighting procedures:	Information for firefighters - we are not medical experts so we always suggest that people with medical implants such as pacemakers, implantable defibrillators, etc should never handle magnets, magnetic assemblies or electromagnets and should always seek medical advice from their doctor before going anywhere near a magnet, magnetic assembly or electromagnet
Environmental precaution:	Contain any spills with absorbents to prevent entry into sewers or waterways (e.g.streams)

## Section 7 - Handling and Storage

Wear protective gloves during long duration of handling. Wear safety glasses or goggles to protect eyes. Personal Protective Equipment (PPE) laws and regulations in your country (or workplace H&S) may require extra measures (e.g. respirators during machining operations)
Handle magnets with care at all times. Magnets are brittle and may break and chip if they collide against a another solid object if they are mis-handled. Some chips and shards can be very sharp and give a risk of cutting skin. Magnets can create strong attraction forces to other magnets and ferrous objects - these forces can clamp though skin with high force (e.g. finger pinch or worse)
Magnets have very strong magnetic forces which make them attract to other magnets, ferromagnetic materials such as iron, etc. Pay attention to hand or body injury (e.g. finger pinching) - magnets can create very strong clamping forces to each other and to ferrous parts
Keep magnets away from any floppy disk, magnetic card or electronic watch which may cause data loss or magnetic data change
We are not medical experts so we always suggest that people with medical implants such as pacemakers, implantable defibrillators, etc should never handle magnets, magnetic assemblies or electromagnets and should always seek medical advice from their doctor before going anywhere near a magnet, magnetic assembly or electromagnet
Do not swallow or ingest magnets or magnetic materials
Store in a dry place free from corrosive atmosphere. Keep away from any possible contact with water
With magnetized Alnico, consider storing in a closed protective container and consider labelling it clearly outside with 'strong magnet inside' for safety reference
Do not peel off or cut Alnico. If you do, damage could occur and any dust or small particles from cutting may risk injury
Store magnets in a cool, dry and ventilated warehouse, keep magnets away from humid and corrosive environments

## Section 8 - Exposure Controls / Personal Protection

Engineering/Machining measures:	When machining or grinding use a closed or ventilated machine because dust and particles are generated. When not engineering, machining or grinding (i.e. under normal use conditions), no engineering controls are necessary because this product is considered to be an article which does not release or otherwise result in exposure to a hazardous chemical under normal use conditions
Skin Protection:	Wear protective gloves (e.g. rubber or plastic) during handling especially if user has a known or suspected Nickel allergy (there is Nickel content in the Alnico material itself)
Eye Protection:	Wear safety glasses or goggles during handling
Respiratory Protection:	Wear mask or dust respirator during machining or grinding
Additional Precautions:	Smoking, eating and drinking are prohibited in the working area. We are not medical experts so we always suggest that people with medical implants such as pacemakers, implantable defibrillators, etc should never handle magnets, magnetic assemblies or electromagnets and should always seek medical advice from their doctor before going anywhere near a magnet, magnetic assembly or electromagnet. Magnets, magnetic assemblies and electromagnets can create strong magnetic fields which can produce strong pull forces or torques, etc - handle any such magnetic components with caution and care to prevent accidents

## Section 9 - Physical and Chemical Properties

Material Form:	Solid state
Appearance:	Metallic grey to bright metallic when freshly ground/cut, blackened surfaces on as-cast parts
Boiling Point:	Not Applicable
Melting Point:	1200-1450 degrees C
Density:	6.8-7.4 grams per cubic centimetre (6.9-7.3g/cm <sup>3</sup> typical)
Vapour Pressure:	Not Applicable
Vapour Density:	Not Applicable
Odour:	Odourless
Solubility:	Insoluble in water. Soluble in acids. Dipping into acid for a long time can cause corrosion / decomposition

*The Technical Datasheet showing further Physical and Magnetic Properties of the grades plus plating options is available as a pdf upon request*

## Section 10 - Stability and Reactivity

Stability:	Stable in normal air atmosphere. Reacts with strong acids / mineral acids and highly active oxidizing agents
Incompatibility (materials to avoid):	Strong acids and mineral acids. Corrosive substances. Highly active oxidizers. Radioactive rays exposures
Conditions to avoid:	In most applications there are few conditions that should be avoided. Longer term exposure to water can cause corrosion (due to iron content). Reaction with strong acid can cause hazardous fume and may produce flammable hydrogen gas. Very high temperature. Open flames. Corrosive environments. Strong oxidizers

## Section 11 - Toxicological Information

Irritation:	Repeated and prolonged skin contact may cause irritation or allergenic dermatitis (especially for users with known or suspected Nickel allergy)
Carcinogenity:	No specific information available for this product
Chronic toxicity:	No specific information available for this product, however: Aluminium - Inhalation of finely divided Aluminium powder may cause pulmonary fibrosis. Nickel - May cause a form of dermatitis known as Nickel itch and intestinal irritation, which may cause disorders, convulsions and asphyxia. Inhalation of Nickel compounds has been shown in studies to provide an increased incidence of cancer of the nasal cavity, lung and possibly larynx in Nickel refinery workers. Copper - Overexposure to Copper fumes may cause metal fume fever (chills, muscle aches, nausea, fever, dry throat, cough, weakness, lassitude); metallic or sweet taste; discolouration of skin and hair. Tissue damage of mucous membranes may follow chronic Copper dust exposure.
Acute toxicity:	Cobalt (Co): ATE - Oral 215.90 mg/kg body weight, ATE - Dust/Mist 0.01 mg/l/4h.
	No other specific information available for this product

## Section 12 - Ecological Information

Ecotoxicity:	No specific information available for this product
Bioaccumulation:	No specific information available for this product
Persistence and Degradability:	No specific information available for this product
Mobility in Soil:	No specific information available for this product

## Section 13 - Disposal Considerations

Waste Disposal Method:	Disposal must be in compliance with any applicable federal, state/provincial and local laws and regulations. Dispose in closed container made of non-magnetic material. Keep away from any possible contact with water. Do not dispose into watercourses. Avoid cutting or smashing magnet as sparks thereof may cause fire in the inflammable atmosphere. Use only licensed contractors for magnetic waste removal. In the UK, dispose in accordance with Special Waste Regulations 1996. Please contact us if you want to return to Eclipse Magnetics Limited for recycling
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## Section 14 - Transport Information

Magnets are brittle. Handle carefully to prevent magnets being damaged during packing.

Packaging shall be such to prevent product damage during normal transit

Avoid sunlight, rain, high humidity, high temperature, impact and friction.

Avoid assorted packing with acids and oxidizers

Not Classified as Hazardous for Transportation by Road or Sea

For transporting by Air please note that International Air Transport Association (IATA) Dangerous Goods Regulation Packing Instruction 953 applies (detailed below)

If the total measured magnetic field is less than 0.002 Gauss (0.2  $\mu$ Tesla or 200nT) at 7 feet from the package in any direction, the package can be accepted for air shipment and the magnet material in the package is classified as "not restricted".

An IATA accepted alternative test is to have less than 0.5 degrees deflection of a compass at 7 feet away

If Eclipse Magnetics Limited sends a magnet within the UK or abroad by Road or Sea, we will not necessarily have packed the magnets for IATA.

If Eclipse Magnetics Limited sends a magnet by air, we will pack the magnets as necessary to get to the end user (magnetic fields to be within 0.00525 Gauss at 15 feet, as legislation states)

This MSDS is needed to accompany our commercial invoice with freight

To ensure strong magnets pass the IATA tests, the magnets are usually packaged with ferromagnetic steel-lined containers (1mm thick or more typically).

The steel (e.g. ferromagnetic mild steel) blocks the magnetic fields from passing beyond the package (sometimes a second steel layer is required, separated by a spacer because extremely strong fields magnetically saturates the first layer and then passes through the first layer).

Thicker steel can provide better magnetic field shielding but sometimes a double layer is superior at blocking fields.

However adding mild steel lining plates to the inside of the packaging results in the weight of the package increasing making it more expensive to air freight – sea/road freight may then be a cheaper/easier method.

Sea/road freight requires less safety packaging and is cheaper but the delivery lead time is likely to be longer

Please note that Airlines have the right to refuse to accept magnets on board their flights (they can actually refuse any package).

Land couriers may also refuse to accept magnetic packages without relevant documentation (they may accept the package if you can provide documentation that proves the package passes the IATA tests)

Please note that if the Customer or End User sends a magnet onwards, any IATA compliance and any laws and regulations in the country/countries involved relating to transportation is their responsibility not Eclipse Magnetics Limited, regardless of how the magnets were first packed by Eclipse Magnetics Limited.

### PACKING INSTRUCTION 953

This instruction applies to UN 2807, **Magnetized material** on passenger aircraft and Cargo Aircraft Only.

Magnetized material will be accepted only when:

- devices such as magnetrons and light meters have been packed so that the polarities of the individual units oppose one another;
- permanent magnets, where possible, have keeper bars installed;
- the magnetic field strength at a distance of 4.6 m (15 ft) from any point on the surface of the assembled consignment:
  - does not exceed 0.418 A/m (0.00525 gauss), or
  - produces a magnetic compass deflection of 2 degrees or less.

Note: For loading instructions see 9.3.11.

#### Determination of shielding requirements

The magnetic field strength of magnetized materials must be measured using measuring devices having a sensitivity sufficient to measure magnetic fields greater than 0.0398 A/m (0.0005 gauss) within a tolerance of plus or minus 5%, or with a magnetic compass sensitive enough to read a two-degree variation, preferably in 1 degree increments or finer. Methods of determining if a magnetized article meets the definition of a magnetized material include:

Method 1— When an oersted meter is used, it is placed on one of two points positioned 4.6 m (15 ft) apart and located in an area that is free from magnetic interference other than the earth's magnetic field. The oersted meter is then aligned with the second point and "balanced" to a zero reading. The magnetic article is then placed on the other point and the magnetic field strength is measured by reading the meter while rotating the package 360 degrees in its horizontal plane. If the maximum field strength observed is 0.418 A/m (0.00525 gauss) or less, the article is acceptable for air transport. When the maximum field strength exceeds 0.418 A/m (0.00525 gauss) shielding should be applied until a reading of 0.418 A/m (0.00525 gauss) or less has been attained.

Method 2— When a magnetic compass is used as a sensing device, it should be placed on one of two points positioned 4.6 m (15 ft) apart which are aligned in an East/West direction and in an area that is free from any magnetic interference other than the earth's magnetic field. The packaged item to be tested is placed on the other point and rotated 360 degrees in its horizontal plane for indication of compass deflection. When the maximum compass deflection observed is two degrees or less, the article is acceptable for air transport. When the maximum compass deflection of an item exceeds 2 degrees, shielding must be applied until the maximum deflection is not more than 2 degrees.

If the maximum field strength observed at a distance of 2.1 m (7 ft) is less than 0.159 A/m (0.002 gauss) or there is no significant compass deflection (less than 0.5 degree), the article is not restricted as a magnetized material.



Source and more information is at: <https://www.iata.org/en/publications/dgr/>

## Section 15 - Regulatory Information

The magnet and its application must be in compliance with the laws and regulations for the country the magnet is in

In the UK, this includes:

Health & Safety at Work Act 1974;  
Environmental Protection Act 1990; and  
Special Waste Regulations 1996

The Customer / End User is responsible for ensuring compliance

## Section 16 - Other Information

The information given shall be used only as a general guide

Although we have made every attempt to provide accurate information, we do reserve the right to change any of the information in this document without notice. We cannot accept any responsibility or liability for any errors or problems caused by using any of the information provided

The information given may not be valid if the magnet is used in combination with any other material and/or if the application/environmental conditions causes the properties or details, etc to change in a way that are different to that stated

The information given shall not constitute any type of guarantee for any specific product features and shall not establish type of legally valid contractual relationship

No representation or warranties, either expressed or implied, or merchantability, fitness for a particular purpose or any other nature are made hereunder with respect to the information contained herein or the material to which the information refers

It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations

We reserve the right to amend, add or remove information in this document without giving any notice

If you have any more questions, require technical assistance and would like a quotation, simply contact us.

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