

# MAGNA 403 AC-DC

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Magna 403 is designed to resist both extreme high stress and low stress abrasion. It has the following features:

Combination of good toughness and crack resistance resulting from a dense matrix of a super work hardening austenite with spine-like crystals of chromium and titanium carbides. These extremely hard carbides provide resistance to gouging and high stress abrasion and the highly alloyed matrix provides resistance to low stress abrasion and scouring. The matrix is so tough that loss of carbides only occurs over a prolonged period of wear.

With some ordinary hard facing electrodes there is little or no protection against carbide precipitation in the transition zone. Often there is little or no control of penetration and there is a great deal of dilution of the weld metal into the base metal. This creates a heat affected zone at the interface of the deposit as a result of carbon migration and grain coarsening. There is a tempering effect, which although brief, can often produce carbide precipitation and embrittlement in the areas heated to 400 - 700 deg. C. particularly in maintenance of steel parts which have been severely cold-worked. Worn parts have certainly received cold work and partial metallurgical transformation will have occurred in the surface layers. The heat input and uncontrolled deposit structure of ordinary hard facing rods will carry this decomposition further.

Heat affected zone cracks are extremely dangerous, since they can result in the entire deposit spalling off. Longitudinal cracks are of relatively frequent occurrence with some hardfacing electrodes. These cracks (true hot cracks) are also very dangerous since they cannot be closed up so readily by cold working as can transverse cracks (cooling cracks) which are also common.

Magna 403 provides a metallurgical advantage over most hard surfacing electrodes because the carbides that are formed are balanced and completely stable and occur uniformly throughout the deposit. The alloy has an even dispersement of carbides which gives uniform resistance to wear. Some hard facing electrodes that are based on carbide formation have non-uniform dispersement of carbides usually due to precipitation of elements and this allows premature wear in some areas and soon deterioration of the entire

surfaced part breaks down. Magna 403 employs special additives and stabilizers that control the carbides and eliminates carbide precipitation.

#### **SPECIAL FEATURES: -**

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1. High deposition rate
2. Deposits are smooth
3. Hardness is 55 to 60 Rockwell C as applied
4. Has shallow penetration which prevents dilution
5. Easy application with no spatter, no pin holes and easy slag removal.

#### **MAGNA APPLICATION PROCEDURE - MAGNA 403**

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Prepare base metal by cleaning and degreasing as far as possible. Sand or file weld area to achieve a smooth working surface.

Either AC or DC reverse polarity welding machines may be used to apply Magna 403. The electrode has a balanced arc transfer, a fast deposition rate and achieves neat smooth deposits free from spatter and porosity. It is very simple to apply and requires no special techniques or procedures.

When using Magna 403 to overlay large areas, it is beneficial to make initial passes, and build up with Magna 303 and then make final three passes with Magna 403.

For cast iron applications, optimum results will be achieved by making an all over base coverage of Magna 770 before applying Magna 403.

#### **Recommended Amperages:**

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<b>Metric</b>	<b>Inches</b>	<b>Gauge</b>	<b>Setting</b>
3.2 mm.	1/8	10	125 - 175 amps
4.0 mm.	5/32	8	175 - 250 amps
4.8 mm.	3/16	6	225 - 300 amps

#### **A variety of Overlaying Applications with other Magna Welding Alloys**

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- Impact resistance overlays - Magna 402
- High strength joining with oxyacetylene - Magna 33F
- Gas welding overlay applications - Magna 44
- Machinable overlays - Magna 405

PIM 403.3	Version 2.0	Revision 1.0	Rev. Date: 1 January, 2016	Reference: CKL
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# SAFETY DATA SHEET



Product name: Magna 403 Page: 1/8  
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Product No.: SDS-ID: GB-EN/1.0

## SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

### 1.1. Product identifier

Product name: Magna 403  
Container size: 2 kg, 4 kg

### 1.2. Relevant identified uses of the substance or mixture and uses advised against

Application: Manual metal arc welding electrode.

### 1.3. Details of the supplier of the safety data sheet

<u>Supplier:</u>	EU importer:	<u>Distributed by:</u>	Trust Engineering Company 9 Abdel Hamid El Deeb Street Alexandria, 21613 Egypt T: +(20)3 5822779 T: +(20)10 1223554
<u>Manufacturer:</u>	ITW PP & F Korea Limited. 13th Fl., Unit B, PAX Tower 609 Eonju-ro, Gangnam-gu Seoul, Korea 06108 Tel:+82-2-2088-3560 Fax:+82-2-513-3567 magna@magnagroup.com www.magnagroup.com		5 Ahmed Shaker Street Fourth Zone Nasr City, 11586 Egypt T: +(20)2 26909965 T: +(20)10 1223553  info@trustengineering-eg.com www.trustengineering-eg.com
<u>Further information can be obtained from:</u>	magna@magnagroup.com		

### 1.4. Emergency telephone number

Emergency telephone: NHS: 111

## SECTION 2: HAZARDS IDENTIFICATION

### 2.1. Classification of the substance or mixture

CLP: Not classified.

### 2.2. Label elements

Solid metals and alloys do not require a hazard label if they do not present a danger to human health or the environment in the form in which they are placed on the market. The information which would have appeared on the label is shown here.

Safety data sheet available on request.

### 2.3. Other hazards

PBT/vPvB: This product does not contain any PBT or vPvB substances.

Other: Prolonged or repeated exposure to welding fumes may cause damage to the lungs and respiratory system. Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain.

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

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## 3.2. Mixtures

All substances in the product are either registered or exempt from registration under REACH. Only classified substances above threshold limits or substances with an exposure limit are shown.

CLP:

<u>%:</u>	<u>CAS-No.:</u>	<u>EC No.:</u>	<u>REACH Reg. No:</u>	<u>Chemical name:</u>	<u>Hazard classification:</u>	<u>Notes:</u>
35-95	7439-89-6	231-096-4	-	Iron	-	#
0-40	7440-47-3	231-157-5	-	Chromium	-	#
5-25	7439-96-5	231-105-1	-	Manganese	-	#
0-10	13463-67-7	236-675-5	-	Titanium dioxide	-	#
0-8	7440-67-7	231-176-9	-	Zirconium	Flam. Sol. 1;H228	
0-8	7439-98-7	231-107-2	-	Molybdenum	Flam. Sol. 1;H228	
0-5	1317-65-3	215-279-6	-	Limestone	-	#
0-5	1309-48-4	215-171-9	-	Magnesium oxide	-	
0-3	7440-21-3	231-130-8	-	Silicon	-	#
0-3	7782-42-5	231-955-3	-	Graphite	-	#
0-2	7789-75-5	232-188-7	-	Calcium fluoride	-	#

Notes: #: The substance has been assigned an exposure limit.

References: The full text for all hazard statements is displayed in section 16.

## SECTION 4: FIRST AID MEASURES

### 4.1. Description of first aid measures

Inhalation: Inhalation of welding fumes: Move into fresh air and keep at rest. In case of persistent throat irritation or coughing: Seek medical attention and bring these instructions.

Skin contact: Remove contaminated clothes and rinse skin thoroughly with water.

Eye contact: Do not rub eye. If irritation occurs during dust-raising work, flush with plenty of water for at least 15 minutes.

Ingestion: Not likely, due to the form of the product.

### 4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects: See section 11 for more detailed information on health effects and symptoms.

### 4.3. Indication of any immediate medical attention and special treatment needed

Medical attention/treatments: Treat symptomatically.

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## SECTION 5: FIREFIGHTING MEASURES

### **5.1. Extinguishing media**

Extinguishing media: Use fire-extinguishing media appropriate for surrounding materials.

### **5.2. Special hazards arising from the substance or mixture**

Specific hazards: During fire, gases hazardous to health may be formed.

### **5.3. Advice for firefighters**

Protective equipment for fire-fighters: Selection of respiratory protection for fire fighting: follow the general fire precautions indicated in the workplace.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

### **6.1. Personal precautions, protective equipment and emergency procedures**

Personal precautions: Follow precautions for safe handling described in this safety data sheet.

### **6.2. Environmental precautions**

Environmental precautions: The product should not be dumped in nature but collected and delivered according to agreement with the local authorities.

### **6.3. Methods and material for containment and cleaning up**

Methods for cleaning up: Not relevant.

### **6.4. Reference to other sections**

References: For personal protection, see section 8.  
For waste disposal, see section 13.

## SECTION 7: HANDLING AND STORAGE

### **7.1. Precautions for safe handling**

Safe handling advice: When welding: Do not breathe fumes. Observe good chemical hygiene practices.

Technical measures: No special precautions.

Technical precautions: When welding: Mechanical ventilation may be required.

### **7.2. Conditions for safe storage, including any incompatibilities**

Technical measures for safe storage: No special precautions.

Storage conditions: Store in closed original container in a dry place.

### **7.3. Specific end use(s)**

Specific use(s): Welding material

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## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Control parameters

Occupational exposure limits:

<u>CAS-No.:</u>	<u>Chemical name:</u>	<u>As:</u>	<u>Exposure limits:</u>	<u>Type:</u>	<u>Notes:</u>	<u>References:</u>
7440-47-3	Chromium	-	0.5 mg/m <sup>3</sup>	TWA	-	EH40
-	Iron oxide, fume	Fe	5 mg/m <sup>3</sup>	TWA	-	EH40
		-	10 mg/m <sup>3</sup>	STEL	15min	
1309-48-4	Magnesium oxide, fume and respirable dust	Mg	4 mg/m <sup>3</sup>	TWA	-	EH40
7439-96-5	Manganese and its inorganic compounds	Mn	0.5 mg/m <sup>3</sup>	TWA	-	EH40
13463-67-7	Titanium dioxide, total inhalable dust	-	10 mg/m <sup>3</sup>	TWA	-	EH40
13463-67-7	Titanium dioxide, respirable dust	-	4 mg/m <sup>3</sup>	TWA	-	EH40
1317-65-3	Limestone, total inhalable dust	-	10 mg/m <sup>3</sup>	TWA	-	EH40
1317-65-3	Limestone, respirable dust	-	4 mg/m <sup>3</sup>	TWA	-	EH40
-	Fluoride (inorganic)	F	2.5 mg/m <sup>3</sup>	TWA	-	EH40
-	Zirconium compounds	Zr	5 mg/m <sup>3</sup>	TWA	-	EH40
		-	10 mg/m <sup>3</sup>	STEL	15min	
7782-42-5	Graphite, inhalable dust	-	10 mg/m <sup>3</sup>	TWA	-	EH40
7782-42-5	Graphite, respirable dust	-	4 mg/m <sup>3</sup>	TWA	-	EH40
1309-48-4	Magnesium oxide, inhalable dust	Mg	10 mg/m <sup>3</sup>	TWA	-	EH40
7440-21-3	Silicon, respirable dust	-	4 mg/m <sup>3</sup>	TWA	-	EH40
7440-21-3	Silicon, inhalable dust	-	10 mg/m <sup>3</sup>	TWA	-	EH40

Notes: EH40: EH40/2005.

### 8.2. Exposure controls

Engineering measures: When welding: Provide adequate ventilation. Observe Occupational Exposure Limits and minimise the risk of inhalation of dust and fumes.

Personal protection: Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment.  
When welding: Use special welding equipment for protection of eyes, skin and respiratory system.

Hygiene measures: Wash hands after handling. Change contaminated clothing.

Environmental Exposure Controls: Not available.

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## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### 9.1. Information on basic physical and chemical properties

Appearance: Welding material Solid rod.

Odour: Not available.

Odour threshold: Not available.

pH: Not available.

Melting point / freezing point: Not available.

Boiling point: Not available.

Flash point: Not available.

Evaporation rate: Not available.

Explosive limits Not available.

Vapour pressure: Not available.

Vapour density: Not available.

Relative density: Not available.

Solubility: Insoluble in water

Partition coefficient (n-octanol/water): Not available.

Auto-ignition temperature (°C): Not available.

Decomposition temperature (°C): Not available.

Viscosity: Not available.

Oxidising properties: Not available.

### 9.2. Other information

Other data: Not available.

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## SECTION 10: STABILITY AND REACTIVITY

### **10.1. Reactivity**

Reactivity: Not reactive.

### **10.2. Chemical stability**

Stability: Stable under normal temperature conditions and recommended use.

### **10.3. Possibility of hazardous reactions**

Hazardous Reactions: None known.

### **10.4. Conditions to avoid**

Conditions to avoid None specific.

### **10.5. Incompatible materials**

Incompatible materials: Water, moisture. Avoid contact with acids.

### **10.6. Hazardous decomposition products**

Hazardous decomposition products: None under normal conditions.

## SECTION 11: TOXICOLOGICAL INFORMATION

### **11.1. Information on toxicological effects**

Inhalation: Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain.

Skin contact: The molten product can cause serious burns.

Eye contact: Particles/fumes in the eyes may cause discomfort/irritation.

Ingestion: Not likely, due to the form of the product.

Specific effects: Prolonged or repeated exposure to welding fumes may cause damage to the lungs and respiratory system.

Additional information: IARC Cancer Review: Group 2B for Titanium dioxide.  
IARC Cancer Review: Group 3 for Chromium metal

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## SECTION 12: ECOLOGICAL INFORMATION

### **12.1. Toxicity**

Ecotoxicity: Not regarded as dangerous for the environment.

### **12.2. Persistence and degradability**

Degradability: The product solely consists of inorganic compounds which are not biodegradable.

### **12.3. Bioaccumulative potential**

Bioaccumulative potential: No data available on bioaccumulation.

### **12.4. Mobility in soil**

Mobility: The product is insoluble in water.

### **12.5. Results of PBT and vPvB assessment**

PBT/vPvB: Not Classified as PBT/vPvB by current EU criteria.

### **12.6. Other adverse effects**

Other adverse effects: None known.

## SECTION 13: DISPOSAL CONSIDERATIONS

### **13.1. Waste treatment methods**

Dispose of waste and residues in accordance with local authority requirements.

Waste from residues: EWC-code: 12 01 13

## SECTION 14: TRANSPORT INFORMATION

The product is not covered by international regulation on the transport of dangerous goods (IMDG, IATA, ADR/RID).

### **14.1. UN number**

UN-No: -

### **14.2. UN proper shipping name**

Proper Shipping Name: -

### **14.3. Transport hazard class(es)**

Class: -

### **14.4. Packing group**

PG: -

### **14.5. Environmental hazards**

Marine pollutant: -

Environmentally Hazardous substance: -

### **14.6. Special precautions for user**

Special precautions: Not relevant.

### **14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code**

Transport in bulk: Not relevant.

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## SECTION 15: REGULATORY INFORMATION

### **15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

National regulation: Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC, with amendments.  
Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 with amendments.  
The Control of Substances Hazardous to Health Regulations 2002 (S.I 2002 No. 2677) with amendments.  
EH40/2005, Workplace exposure limits 2005, with amendments.  
The List of Wastes (England) (Amendment) Regulations 2005. (SI 2005 No. 895).

### **15.2. Chemical Safety Assessment**

CSA status: No chemical safety assessment has been carried out.

## SECTION 16: OTHER INFORMATION

The user must be instructed in the proper work procedure and be familiar with the contents of these instructions. The following sections contain revisions or new statements: 2, 3, 8, 9, 11, 12, 13, 14, 15, 16.

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609, Eonju-Ro, Gangnam-Gu, Korea 06108  
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Web site : [www.magnagroup.com](http://www.magnagroup.com)

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Abbreviations and acronyms PBT = Persistent, Bioaccumulative and Toxic.  
used in the safety data sheet: vPvB = very Persistent and very Bioaccumulative.

Additional information: Classification according to Regulation (EC) No. 1272/2008: Calculation method.

### Wording of H-statements:

H228 Flammable solid.

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The information on this data sheet represents our current data and is reliable provided that the product is used under the prescribed conditions and in accordance with the application specified on the packaging and/or in the technical guidance literature. Any other use of the product which involves using the product in combination with any other product or any other process is the responsibility of the user.

Made by DHI - Environment and Toxicology, Agern Allé 5, DK-2970 Hørsholm, Denmark.  
[www.dhigroup.com](http://www.dhigroup.com).

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