MAGNA 402 AC-DC

An electrode which is austenitic in structure and non-cracking, which rapidly work hardens to great depth and resists extreme shock and impact. It has the following features:

1. **High Restitution Co-efficient.** Will take extreme impact. Has a controlled combination of high yield strength, high resilience, high compressive strength and high work hardening ability. The work hardening of ordinary manganese steel is, for comparison, approximately 3 mm thick. Magna 402 can work harden to a much greater depth when used in severe conditions. Magna 402 retains a tough ductile core with a super hard outer shell. This enables great impact resistance without cracking.

2. **High Crack Resistance.** The ordinary manganese steel, nickel manganese steel and molymanganese steel electrodes tend to crack under a variety of conditions, such as those following:-

    1. When welded in cold weather.
    2. On re-welding when more weld metal is deposited over previously deposited metal.
    3. When making large build ups.
    4. When joining cracks or bevels.

The reason ordinary manganese steel electrodes crack is because of 6 specific causes:

1. Some ordinary manganese steel electrodes contain a high percentage of phosphorous. Magna 402 has a careful control that keeps the phosphorous level to the very minimum.

2. Some are either not stabilized or inadequately stabilized. These type of manganese steel electrodes will become embrittled when a second pass is applied over the first pass because the welding heat causes transformation of the metastable austenite to bainite and the grain boundaries thicken and cracking follows. Magna 402 has additives and stabilizers which prevent transformation.

3. Some manganese steel electrodes have low yield strength. Magna 402 has a high yield strength.

4. Often manganese steel electrodes flow rapidly and slipping occurs on one or more planes with each crystal. Interdendritic areas of segregation occur and cracking follows. The stabilizers in Magna 402 prevent this condition.

5. Magna 402 contains 50% more manganese than ordinary manganese steel along with other high alloys. Magna 402 can be used to join manganese steel to mild steel.

6. Magna 402 can be cut readily with an oxyacetylene torch.

3. Physical Properties of Magna 402.

Hardness before cold working: 187 Brinell Hardness (BHN).

Work hardens to approximately 473 Brinell Hardness (BHN).

Wet quartz resistance when work hardened: 1100 times better than SAE 1020 steel.

Tensile strength: Before cold working approximately 120,000 p.s.i. (84 kg/mm^2)

Elongation: 47%

Completely immune to hydrogen contamination.

MAGNA APPLICATION PROCEDURE - MAGNA 402

Prepare weld area by grinding or chipping away fatigued metal. May be applied over previous weld deposits.

AC or DC reverse polarity welding machines may be used. Manganese steel applications require lowest possible amperage.

Preheating is only required in instances of extremely cold outdoor temperatures.

Magna 402 can be applied using either stringer bead or weave techniques.

Where large build up of deposits are required, peening between passes is advisable.

On Cast Iron applications apply an initial coating of Magna 770 over entire area.

Special Note:

Welds of Magna 402 are machinable, however, due to its extremely high work hardening characteristics, machining is best effected by decreasing the cutting speed and rate of feed.

Recommended Amperages:

Metric	Inches	Gauge	Setting
4.0 mm	5/32	8	130 - 180 amps

SAFETY DATA SHEET

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

1.1. Product identifier

Product name: Magna 402

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

Application: Impact-Resistant Alloy for Manganese Steel.

1.3. Details of the supplier of the safety data sheet

Supplier: EU importer:

.
.

Manufacturer: Manufacturer:
Magna Welding Alloys
(The Magna Trade Mark is the property of ITW Inc., and is used under license by ITW PP & F Korea Limited.)

Further information can be obtained from: magna@magnagroup.com

1.4. Emergency telephone number

Emergency telephone: NHS: 111

Distributed by: Trust Engineering Company

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SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

CLP: Carc. 2;H351
STOT RE 2;H373
Skin Sens. 1;H317

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.

Danger

Contains:	Nickel
H317	May cause an allergic skin reaction.
H351	Suspected of causing cancer.
H373	May cause damage to organs through prolonged or repeated exposure.
P280	Wear protective clothing, gloves, eye and face protection.
P284	In case of inadequate ventilation wear respiratory protection.
P308 + P313	IF exposed or concerned: Get medical advice/attention.
P501	Dispose of contents/container as hazardous waste.

2.3. Other hazards

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

Other: 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

3.2. Mixtures

The product contains: metal and Coating.

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

CLP:

%:	CAS-No.:	EC No.:	REACH Reg. No:	Chemical name:	Hazard classification:	Notes:
30-60	7439-89-6	231-096-4	-	Iron	-	#
15-25	7439-96-5	231-105-1	-	Manganese	-	#
10-20	13463-67-7	236-675-5	-	Titanium dioxide	-	#
10-15	1317-65-3	215-279-6	-	Limestone	-	#
5-10	1332-58-7	310-194-1	-	Kaolin	-	#
5-10	7440-47-3	231-157-5	-	Chromium	-	#
1-10	7440-02-0	231-111-4	-	Nickel	Carc. 2;H351 STOT RE 1;H372 Skin Sens. 1;H317	S; 7
<4	7439-98-7	231-107-2	-	Molybdenum	-	#
0.1-1	7789-75-5	232-188-7	-	Calcium fluoride	-	#
0.5-1	65996-74-9	266-007-8	-	Mill scale (ferrous metal)	-	
<1	14808-60-7	238-878-4	-	Quartz	-	#

Notes: S: May not require a label.
7: Alloys containing nickel are classified for skin sensitisation, when the release rate of 0,5 µg Ni/cm2/week (EN 1811) is exceeded.
#: The substance has been assigned an exposure limit.

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. In case of eczema or other skin disorders: Seek medical attention and bring these instructions.

Eye contact: Do not rub eye. Rinse with water. Contact physician if discomfort continues.

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.

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: Avoid any exposure. When welding: 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: Collect spillage with shovel, broom or the like.

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: Avoid prolonged and repeated contact.
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

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Occupational exposure limits:

CAS-No.:	Chemical name:	As:	Exposure limits:	Type:	Notes:	References:
-	Iron oxide, fume	Fe	5 mg/m3	TWA	-	EH40
		-	10 mg/m3	STEL	15min	
-	Manganese and its inorganic compounds, inhalable fraction	Mn	0.2 mg/m3	TWA	-	EH40
-	Manganese and its inorganic compounds, respirable fraction	Mn	0.05 mg/m3	TWA	-	EH40
1317-65-3	Limestone, total inhalable dust	-	10 mg/m3	TWA	-	EH40
1317-65-3	Limestone, respirable dust	-	4 mg/m3	TWA	-	EH40
1332-58-7	Kaolin, respirable dust	-	2 mg/m3	TWA	-	EH40
13463-67-7	Titanium dioxide, respirable dust	-	4 mg/m3	TWA	-	EH40
13463-67-7	Titanium dioxide, total inhalable dust	-	10 mg/m3	TWA	-	EH40
-	Nickel and water-insoluble nickel inorganic compounds (except nickel tetracarbonyl)	Ni	0.5 mg/m3	TWA	Sk; Carc; Sen	EH40
-	Nickel water-soluble inorganic compounds (except nickel tetracarbonyl)	Ni	0.1 mg/m3	TWA	Sk; Carc; Sen	EH40
7440-47-3	Chromium	-	0.5 mg/m3	TWA	-	EH40
-	Chromium (VI) compounds	Cr	0.05 mg/m3	TWA	Carc; Sen	EH40
-	Chromium (III) compounds	Cr	0.5 mg/m3	TWA	-	EH40
-	Chromium (II) compounds	Cr	0.5 mg/m3	TWA	-	EH40
-	Molybdenum soluble compounds	Mo	5 mg/m3	TWA	-	EH40
		-	10 mg/m3	STEL	15min	
-	Molybdenum insoluble compounds	Mo	10 mg/m3	TWA	-	EH40
		-	20 mg/m3	STEL	15min	

Notes:
Sk: Can be absorbed through skin.
Carc: Capable of causing cancer and/or heritable genetic damage.
Sen: Capable of causing occupational asthma.
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.

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.

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 known.

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

Acute Toxicity (Oral):	Based on available data, the classification criteria are not met.
Acute Toxicity (Dermal):	Based on available data, the classification criteria are not met.
Acute Toxicity (Inhalation):	Based on available data, the classification criteria are not met.
Skin Corrosion/Irritation:	Based on available data, the classification criteria are not met.
Serious eye damage/irritation:	Based on available data, the classification criteria are not met.
Respiratory or skin sensitisation:	May cause an allergic skin reaction.
Germ cell mutagenicity:	Based on available data, the classification criteria are not met.
Carcinogenicity:	Suspected of causing cancer.
Reproductive Toxicity:	Based on available data, the classification criteria are not met.
STOT - Single exposure:	Based on available data, the classification criteria are not met.
STOT - Repeated exposure:	May cause damage to organs through prolonged or repeated exposure.
Aspiration hazard:	Based on available data, the classification criteria are not met.
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. Harmful: danger of serious damage to health by prolonged exposure through inhalation.
Skin contact:	May cause allergic skin disorders in sensitive individuals.
Eye contact:	Particles/fumes in the eyes may cause discomfort/irritation.
Ingestion:	Not likely, due to the form of the product.
Specific effects:	Risk of sensitisation to nickel. Prolonged or repeated exposure to welding fumes may cause damage to the lungs and respiratory system. Limited evidence of a carcinogenic effect.

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: Not relevant, due to the form of the product.

12.5. Results of PBT and vPvB assessment

PBT/vPvB: No data available.

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 is classified as hazardous waste.

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.

SECTION 15: REGULATORY INFORMATION

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

Special provisions: As a general rule, persons under 18 years of age are not allowed to work with this product. Users must be carefully instructed in the proper work procedure, the dangerous properties of the product and the necessary safety instructions.

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 Management of Health and Safety at Work Regulations 1999 (SI 1999 No. 3242), 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

For restrictions on use see section 15.

The following sections contain revisions or new statements: 2, 3, 8, 9, 11, 14, 15, 16.

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

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

Wording of H-statements:

H317	May cause an allergic skin reaction.
H351	Suspected of causing cancer.
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause damage to organs through prolonged or repeated exposure.

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.