MAGNA 305

DESCRIPTION:

Magna 305 is the electrode designed for all steel fabricated. It is a high alloy electrode for joining the newer construction steels such as T-1, and for general maintenance use in welding heavy-duty steels.

EXTRAORDINARY MECHANICAL PROPERTIES:

Magna 305 provides the following physical properties:-

~ Up to 116,000 p.s.i. (81 kg/mm2) Tensile Strength

~ Up to 102,000 p.s.i. (73 kg/mm2) Yield Strength

~ Up to 24% Elongation

~ 63.2% Reduction of area

~ 237 Brinell Hardness

The high alloy content ensures the maximum toughness, strength, and other physical properties for ideal application on all steels where the weld will be used as welded without heat treatment.

NON-CRACKING FORMULA:

Magna 305 has high notch ductility and does not crack on problem steel applications, even including sulphur bearing and selenium bearing steels. The super – tough weld with moisture guard coating ensure elimination of cold cracking in the heat affected zone, even on air hardening steels. It is now possible for the maintenance welder to eliminate cracking and porosity, irrespective of the problem conditions such as hydrogen pick-up, improper rate of cooling and heating, stress and chemical composition of base metal.

PASS ON PASS WITHOUT SLAG REMOVAL – BUT NO SLAG INCLUSION:

Magna 305 has an advanced type of coating. It is all mineral containing no cellulose materials. The coating contains a high percentage of micronized and finely ground metals including ferro-alloy additions, and silicon derivatives as well as titanium derivatives. Most of the coating actually goes into the deposit increasing welding speed, reducing slag loss, and resulting in a slag blanket which has a light viscosity and floats completely to the top, leaving no slag inclusions. This slag is easily welded through.

This makes it possible for the welder to weld continuously in most instances without the usual time loss of chipping slag, which occurs with most ordinary electrodes.
Magna 305 was developed specially for the high yield strength steels.

SUPER MACHINABILITY:

In spite of providing a very high strength weld, Magna 305 produces a weld microstructure which is very easily machinable by normal tools. Magna 305 is ideal as an overlay on shafts and worn parts where good machinabilty is necessary.

EXCLUSIVE MAGNA MOISTURE GUARD COATING:

Ordinary electrodes such as mild steel, low hydrogen and other types, pick up moisture from atmosphere as soon as within 4 hours after opening of packets. This moisture dissociates at high temperature of the arc as free hydrogen. The free hydrogen enters the weld and creates problem of Hydrogen Induced Cracking (HIC) or Underbead cracking in welded structure. The hydrogen is also responsible for causing porosity in weld.
Magna 305 is specially formulated with a moisture guard coating which prevents such quick moisture pick up from atmosphere even the packet is open thereby greatly reducing the chance of cracking and makes it possible for the maintenance department personal to keep the electrodes under normal storage conditions for much longer period of time (without greatly affecting the quality of weld).

ANTI-POROSITY FORMULA:

Rust and scale act as a source of oxygen in welding and react with hydrogen to form water vapor (H2O) and with carbon to form carbon monoxide (CO) thus causing porosity. Grease and oil on steel cause hydrogen formation which in turn causes porosity. Magna 305 absolutely does not have start-up porosity which most ordinary electrodes have.

LOW TEMPERATURE STRENGTH:

Magna 305 is highly suitable where high- strength welds with excellent low-temperature impact properties are required.

APPLICATION:

Use DC reverse polarity or AC. In general, adjust the machine to the same amperage as is normally used with the same machine using ordinary electrodes of the same diameter.
In vertical up welding, the steady progression technique, as opposed to the whipping technique as used with ordinary electrodes, should be used. Do not draw the electrode from the molten puddle during upward progression. The correct weaving technique is not to lengthen the arc at the edges but to use a short uniform arc.

T-1 STEEL: Magna 305 was developed specially for the high yield strength steels such as T-1. Physical properties of Magna 305 will equal or exceed the physical properties of these high yield strength steels in either the “as welded” of “stress relieved” condition, thus giving 100% joint efficiency at all times.

In addition Magna 305 gives excellent performance for all fabrication and maintenance applications where high strength welds are required. The following ASTM steels are successfully welded with Magna 305:-

A148 - Gr. 120-95 A730 - Gr. N A469 - Class 5

A288 - Class 3,4 A291 - Class 4 A470 - Class 6

A471 - Gr. B2, B3 A354 - Gr. BC

A668-90 Classes A to F and AH to AF

A668-90 Classes G to N and GH to NH

Preheat is not required with Magna 305 in welding T-1 steel.

When Magna 305 is used to weld T-1 Steel, the weld metal is enriched by dilution from the T-1 base steel so that the yield and tensile strengths of the weld metal are higher. Joints welded under fully restrained conditions in T-1 with Magna 305 have shown the following mechanical properties:-

	Yield Point	**Tensile Strength**
Transverse Tensile Test as welded	103,000 p.s.i. (74.4 kg/mm2)	115,000p.s.i. (80.8kg/mm2)
Stress relieved 1 hr. @ 1025°F (552°C)	102,000 p.s.i. (73 kg/mm2)	116,000p.s.i. (81 kg/mm2)

(All Specimens tested broke in the base metal - not the Magna 305 weld)

WARNING:

Do not bevel T-1 steel, or groove it with a cutting torch. Use only Magna 100 (a cutting and chamfering electrode). For metal removal, use of a cutting torch on T-1 will cause cracking. Magna 100 is considered the only safe and economical tool for back chipping, beveling or metal preparation.

RECOMMENDED AMPERAGES:

		AC or DC Reverse	
Metric	**Inches**	**Gauge**	**Setting**
4.0 mm.	5/32	8	140 - 190 amps
3.2 mm.	1/8	10	90 - 140 amps

SAFETY DATA SHEET

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

1.1. Product identifier

Product name: Magna 305

Container size: Various.

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

Application: Welding material

1.3. Details of the supplier of the safety data sheet

Supplier: EU importer:

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Manufacturer: 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

Distributed by: Trust Engineering Company

9 Abdel Hamid El Deeb Street
Alexandria, 21613 Egypt
T: +(20)3 5822779 T: +(20)10 1223554

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

1.4. Emergency telephone number

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

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

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.

Warning

Contains: Nickel

H351	Suspected of causing cancer.
H317	May cause an allergic skin reaction.
H373a	May cause damage to organs through prolonged or repeated exposure if inhaled.
P201	Obtain special instructions before use.
P308 + P313	IF exposed or concerned: Get medical advice/attention.
P260	Do not breathe fume.
P280	Wear protective clothing and gloves.
P405	Store locked up.
P501	Dispose of contents/container in accordance with local regulations.

2.3. Other hazards

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

Other: Risk of sensitisation to nickel. 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: Metals.

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:
60-100	7439-89-6	231-096-4	-	Iron	-	#
5-10	1317-65-3	215-279-6	-	Limestone	-	#
5-10	7789-75-5	232-188-7	-	Calcium fluoride	-	#
1-5	1302-78-9	215-108-5	-	Bentonite	-	
1-5	7439-96-5	231-105-1	-	Manganese	-	#
0.5-1.5	13463-67-7	236-675-5	-	Titanium dioxide	-	#
0.5-1.5	7440-02-0	231-111-4	-	Nickel	Carc. 2;H351 STOT RE 1;H372 Skin Sens. 1;H317	S; 7

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. See section 8.

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

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: 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.

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:
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
-	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
-	Fluoride (inorganic)	F	2.5 mg/m3	TWA	-	EH40
-	Iron oxide, fume	Fe	5 mg/m3	TWA	-	EH40
		-	10 mg/m3	STEL	15min	
7440-47-3	Chromium	-	0.5 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
13463-67-7	Titanium dioxide, respirable dust	-	4 mg/m3	TWA	-	EH40

Notes: Sen: Capable of causing occupational asthma.
Carc: Capable of causing cancer and/or heritable genetic damage.
Sk: Can be absorbed through skin.
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 rod.
Colour:	Grey.
Odour:	Odourless.
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:	Not available.
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 relevant. 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 if inhaled.
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:	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

Waste is classified as hazardous waste. 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.

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: 1, 2, 3, 8, 9, 11, 12, 14, 15.

Magna Welding Alloys
13th Fl., Unit B, PAX Tower,
609, Eonju-Ro, Gangnam-Gu, Korea 06108
Tel : +82-2-2088-3560
Fax : +82-2-513-3567
Web site : www.magnagroup.com

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.
H373a	May cause damage to organs through prolonged or repeated exposure if inhaled.

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.