MAGNA 395 AC-DC

Magna 395 is a special alloy engineered for the welding and repair of Duplex Stainless Steels. The deposits provided by Magna 395 are stress corrosion crack-resistant, resistant to general crevice and pitting corrosion and virtually immune to intergranular corrosion. Magna 395 also features good saltwater corrosion resistance in addition to high tensile strength and good weldability.

BACKGROUND

Duplex stainless steels' microstructures are part austenite and part ferrite. In wrought or cast duplex stainless steels, the miscrostructure is usually the result of heat treatment in the range 1900° to 2100°F (1037° to 1148°C))

As cast, they contain approximately 80%-plus ferrite, a small amount of austenite and intermetallic compounds of the "sigma" and/or "chi" phases. Under rapid cooling (e.g. water quench) from its heat treatment temperature, new intermetallic compound formation is prevented and a room temperature microstructure of between 40-60% ferrite and the balance being austenite is obtained.

Duplex stainless steels, during slow cooling or holding in the temperature range 1000° to 1700°F (537° to 926°C) undergo metallurgical damage known as "885°F (475°C) embrittlement". This is caused by precipitation of chromium-rich ferrite (alpha prime) within the iron-rich ferrite. Even properly heat-treated duplex stainless lose toughness below -45°F (-50°C) due to the ferrite phase undergoing a ductile-to-brittle fracture transition with declining temperature.

Therefore, duplex stainless steels generally have a useful service temperature of -50°F to 500°F (-45°C to 260°C). They are also often alloyed with nitrogen and molybdenum to improve pitting and crevice corrosion resistance.

ADVANTAGES OF DUPLEX S.S.

Duplex stainless steels combine some of the better features of austenitic and ferritic stainless steels, such as higher strength (usually more than twice the

yield strength) and dramatically better resistance to stress corrosion cracking in chloride solutions.

Due to these advantages, Duplex S.S. is extensively used in heat exchanger tubings, oil equipment tubing and piping, on off-shore platforms, gas wells, line pipe, cast pump and valve bodies and fittings used for handling seawater and sour gas or oil.

They are also used in the chemical processing industry since Duplex S.S. offers chloride pitting and crevice resistance as good as grade 317L stainless, coupled with better stress corrosion cracking than 304L or 316L stainless.

Magna 395 has been engineered to effectively weld and repair Duplex Stainless Steels rapidly and with weld integrity superior to virtually any other alloy for such specialised base metals.

Magna 395 will successfully weld and repair the following Duplex S.S. types:

Standard No.	**DIN Abbreviation**	
1.4417	X2 CrNiMoSi	19 5
1.4460	X3 CrNiMo	26 5
1.4462	X2 CrNiMoN	22 5
1.4463	GX6 CrNiMo	24 8 2
1.4582	X4 CrNiMoNb	25 7

plus the following UNS Specification Duplex S.S.:

S31200
S31500
S31803
S32900

MECHANICAL PROPERTIES:

Tensile Strength	**:**	**110,000 p.s.i. (75kg/mm^2)**
Yield Strength	**:**	**80,000 p.s.i. (55kg/mm^2)**
Elongation	**:**	**25%**
Impact	**:**	**41 ft - lbs (56 joules) at 68^{0}F(65^{0}C)**

APPLICATION

Magna 395 can be applied using either AC current or DC reverse polarity. Surfaces should be cleaned and properly degreased.

Weldability with Magna 395 is good and it is suggested adopting procedures that ensure an acceptable phase balance in both the weld metal and the Heat Affected Zone (HAZ). In general, higher heat input is recommended.

Pre-Heating, although not generally considered necessary, can assist in achieving the desired HAZ microstructure.

RECOMMENDED AMPERAGES:

Metric	Imperial	Gauge	Welding Machine Setting
3.2mm	**1/8"**	**10**	**105-115 amps**

SAFETY DATA SHEET

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

1.1. Product identifier

Product name: Magna 395

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

Supplier: EU importer:

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.

Manufacturer: ITW PP & F Korea Limited.
13th Fl., Unit B, PAX Tower
609 Eonju-ro, Gangnam-gu
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info@trustengineering-eg.com
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Further information can be obtained from: 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: Carc. 2;H351
STOT RE 1;H372
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.
H372a	Causes 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 eye protection and gloves.
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: Risk of sensitisation to nickel. 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

3.2. Mixtures

The product contains: metal and fillers.

CLP:

%:	CAS-No.:	EC No.:	REACH Reg. No:	Chemical name:	Hazard classification:	Notes:
10-20	7440-47-3	231-157-5	-	Chromium	-	#
35-45	7439-89-6	231-096-4	-	Iron	-	#
5-15	13463-67-7	236-675-5	-	Titanium dioxide	-	#
1-10	7440-02-0	231-111-4	-	Nickel	Carc. 2;H351 STOT RE 1;H372 Skin Sens. 1;H317	S; 7
1-10	1312-76-1	215-199-1	-	Silicic acid, potassium salt	Met. Corr. 1;H290 Skin Corr. 1B;H314 Eye Dam. 1;H318 STOT SE 3;H335	SCL
1-10	7789-75-5	232-188-7	-	Calcium fluoride	-	#
1-10	1317-65-3	215-279-6	-	Limestone	-	#
1-10	7439-96-5	231-105-1	-	Manganese	-	#
1-5	7439-98-7	231-107-2	-	Molybdenum	-	#

Notes: SCL: Specific Concentration Limit
#: 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. 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: Exposure to dust and fumes of some metal oxides may result in metal fume fever with flu-like symptoms occurring in 4-12 hours. 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 in containers and seal securely.

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
-	Iron oxide, fume	Fe	5 mg/m3	TWA	-	EH40
		-	10 mg/m3	STEL	15min	
-	Molybdenum insoluble compounds	Mo	10 mg/m3	TWA	-	EH40
		-	20 mg/m3	STEL	15min	
-	Molybdenum soluble compounds	Mo	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
-	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
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

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:	Wire with a flux coating.
Odour:	Not available.
Odour threshold:	Not available.
pH:	Not available.
Melting point / freezing point:	850 - 1100° C
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:	6-9
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: None known.

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:	Causes 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. Toxic: 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.

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

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: 2, 8, 9, 11, 13, 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:

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H372a	Causes 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.