1. Identification of the Substance/Preparation and Company

Product name: ***Magnesium ferrosilicon alloy***

Application of MgFeSi: Additive to metal in iron foundries.

Address/Phone No:

Elkem AS
Foundry Products Division
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Contact person: Ove Opedal (ove.opedal@elkem.no)

Emergency Phone No.: Not applicable

2. Hazards Identification

The product does not represent a hazard to health, safety or environment when handled and stored as advised. See section 7.
Flammable and noxious gases may be formed in contact with moisture, acids or bases. See section 10 and 11.
MgFeSi-dust suspended in air may under certain conditions cause dust explosions. See section 10.

3. Composition/Information on Ingredients

Synonyms/Trade names: MgFeSi, Ferrosilicon magnesium, Elmag®, Lamet®, CompactMag™
IUPAC-name: Ferrosilicon magnesium
CAS No.: 8049-17-0

R- and S-phrases: None
Symbols: None

Constituents (analysis):	Weight%
Silicon (Si)	44 – 49
Magnesium (Mg)	2 – 11
RE[1)] (Ce, La) total:	0 – 7
Barium (Ba)	0 - 2
Calcium (Ca)	0,1 – 5
Aluminium (Al)	0,1 – 1,5
Manganese (Mn)	0,1 – 0,6
Iron (Fe)	Rest

[1)] Rare-earth elements, Misch metal

4. First Aid Measures

Inhalation:	Irritation caused by dust: Fresh air. See a physician on persistent feeling of discomfort. Phosphine/arsine intoxication: Seek medical attention. See section 11.
Skin contact:	Wash skin with water and/or a mild detergent.
Eye contact:	Rinse eyes with water/saline solution. See a physician on persistent feeling of discomfort.
Ingestion:	Remove the person affected from dust-exposed area. See inhalation.

5. Fire Fighting Measures

Extinguishing media: Dry sand, CO_2 or dry powder.

Dry MgFeSi in the form of lumps or granules is not combustible.
MgFeSi-dust suspended in air may under certain conditions cause dust explosions. See section 10.

6. Accidental Release Measures

Material in the form of dust should be collected in suitable containers. Damp product must be kept away from dry, and must not be collected and stored in closed containers. Dry dust can be vacuumed or swept up.

7. Handling and Storage

Handling:	Avoid handling that generates dust build-up. Avoid inhalation of dust. See section 8. Avoid ignition sources (e.g. welding) in areas with high dust concentrations. Apply inert atmosphere (e.g. N_2) during crushing of MgFeSi.
Storage:	MgFeSi must be kept in a dry and well-ventilated place, and away from acids and bases.

8. Exposure Controls/Personal Protection

A. Occupational exposure controls

Eye protection, eye flushing facilities and protective gloves. Ensure good ventilation. Wear a particulate respirator according to EN 149 FFP 2S in areas of inadequate ventilation. If exposure to phosphine and arsine is suspected (see section 10) in areas of poor ventilation (e.g. storage holds, bunkers etc.), a self-contained breathing apparatus or an air fed respirator should be worn.

Occupational Exposure Limits (HSE, EH40/2005):

	CAS-number	**8 hr TWA**		**10 minute STEL**	
		ppm	**mg/m^3**	**ppm**	**mg/m^3**
Total inhalable dust		-	10	-	-
Respirable dust		-	4	-	-
Phosphine gas (PH_3)	7803-51-2	-	-	0.3	0.42
Arsine gas (AsH_3)	7784-42-1	0.05	0.16	-	-

Elkem has devised a procedure (1994) for sampling and measuring of the workplace atmosphere.
The low occupational exposure limit for arsine gas is due to the evidence for carcinogenicity in humans of inorganic arsenic compounds in general (IARC).
The OEL for dust does not cover possible arsine/phosphine absorption from dust deposited on mucous membranes.

B. Environmental exposure controls

See Sections 6, 7 and 12.

Limit values in ambient air (Council Directive 1999/30/EC)

	Averaging period	Limit value
PM_{10}★	24 hours	50 μg/m^3
PM_{10}	Calendar year	40 μg/m^3

★ Not to be exceeded more than 35 times a calendar year.

9. Physical and Chemical Properties

Form	: Lump material. Sieve fractions
Colour	: Silvery grey, metallic surface.
Odour	: Odourless.
Solubility (Water)	: Insoluble/ slightly soluble.
Melting Point (°C)	: Approx 1300
Specific Gravity (water = 1):	: Aprox 4.3

10. Stability and Reactivity

Conditions to avoid:

Avoid generating sparks and other ignition sources (e.g. welding) in areas with high dust concentrations. MgFeSi-particles suspended in air at concentrations above 100 g/m^3 can cause dust explosions. Deposits of MgFeSi-dust can propagate flame.

Crushing of MgFeSi in air may cause powerful sparks that can initiate power fires and dust explosions.

For a given Si/Fe ratio and particle size, ignition sensitivity and the violence of the explosion increase with increasing content of Mg. Dust from MgFeSi alloys with Si/Fe ratio $\leq$ 1.25 where up to 30 % of the dust has a particle diameter < 50 μm, the Mg content has to exceed 10 % (w/w) if the dust is to be explosive.

Finer dust has a lower limit for the critical content of Mg with regard to danger of explosion.

Addition of wet material to molten metal may cause explosions.

Materials to avoid:

Water/humidity, acids and bases.

Hazardous decomposition products:

Highly flammable hydrogen gas (H_2) and the highly flammable and very toxic gases phosphine and arsine (garlic-like smell), both heavier than air, may be formed if MgFeSi gets in contact with moisture, acids or bases. A reaction with hydrofluoric acid (HF) or nitric acid (HNO_3) leads to the formation of toxic gases such as silicon tetrafluoride (SiF_4) or nitrous gases (NOx).

Wet product will form highly flammable hydrogen gas if added to molten metal, due to decomposition of water.

11. Toxicological Information

Acute effects:

Inhalation:	Finely divided dust may irritate and dehydrate mucous membranes. Phosphine/arsine may be absorbed from dust deposited on mucous membranes. The toxic mechanism for phosphine is not clear. Phosphine irritates exposed mucous membranes, depresses the central nervous system (CNS) and can cause edema of the lungs. Acute, non-fatal poisoning with phosphine gives temporary effects, among others headache, malaise, vomiting, stomach pains, cough, and difficulty in breathing.
Skin contact:	Dust may irritate the skin.
Eye contact:	Dust may irritate and lead to dryness.
Ingestion:	Dust may irritate and dehydrate mucous membranes. Possible phosphine/arsine absorption.

Chronic effects:

No adverse chronic effects expected, based on both practical experience and review of available scientific literature. Historic, epidemiological studies covering cohorts of workers in the Norwegian ferro-alloy industry have been carried out.

12. Ecological Information

The product is not characterised as dangerous for the environment.

MOBILITY:	The alloy has poor mobility under normal environmental conditions.
PERSISTENCE:	Not relevant for the elements in the alloy.
BIOACCUMULATION:	Not relevant, due to low mobility and non-dispersive use.
ECO-TOXICITY:	LC_{50}/LD_{50}: Not determined. Hardly relevant for inorganic, insoluble substances.

13. Disposal Considerations

The material should be recovered for recycling where possible.
This material is not classified as hazardous waste according to Commission Decisions 2000/532/EC and 2001/118/EC. Prior to disposal of large quantities of this material advice should be sought from the nearest Environment Agency. Residues from the product are subject to Commission Decision 2001/118/EC, waste code 10 09 99 (wastes not otherwise specified).

14. Transport Information

UN no.	1408
IMO/BC-Code[2), 3)]:	(30-90)% Si, Class 4.3
BC-no.:	022
IMO/BC-Code[2), 3)]:	(25-30) and >90)% Si, Class MHB
IMDG-code[1)]	Not assigned to class 4.3
ICAO/IATA[1)]	Not assigned to class 4.3
ADR/RID[1)]	Not assigned to class 4.3

1) Consignments of ferrosilicon with a chemical analysis as described in section 2 has been tested according to "United Nations Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria Part III - 33.4.1.4" and has passed the test. Consequently, the product is not classified as a Class 4.3 product.
2) The shipment must be stored under cover, but in open air, in the particle size in which it is to be shipped, for no less than three days prior to shipment.
3) IMO's "Code of Safe Practice for Solid Bulk Cargoes".

15. Regulatory Information

Product classification and labelling:

Symbol:	Not subject to classification.
R-phrases:	None.
S-phrases:	None.

The text of this Safety Data Sheet is prepared in compliance with:

- Directives 2001/58/EC and 1999/45/EC

- 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).

16. Other Information

Literature references are available upon application to the manufacturer.