5727 Strickler Road, Clarence, NY 14031, 716-741-0400 Issued 12/1/2013

MATERIAL SAFETY DATA SHEET

1 . Product Identification

Product name : **Ferrosilicon alloys**

2 . Composition / Information on Ingredients

Trade names / synonyms : 50 % , 65 % , 75 % , 85 % Ferrosilicon
CAS No : 8049 - 17 - 0

3 . Hazard 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) .
Ferrosilicon dust suspended in air may , under certain conditions , cause dust explosions (see section 10) .

4 . First Aid Measures

Inhalation : Irritation caused by dust : move individual to fresh air . See a physician if persistent feeling of discomfort . Phosphine / arsine intoxication : seek medical attention (see section 11) .

Skin contact : Wash skin with water and / or mild detergent .

Eye contact : Rince 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 ferrosilicon in the form of lumps or granules is not combustible .
Ferrosilicon dust suspended in air may under certain conditions cause dust explosions (see section 10) .

6 . Accidental Release Measures

Avoid handling that generates dust build- up . Material in the form of dust should be collected in suitable containers . Damp product must be kept away from dry , and must 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 . Addition of wet product to molten metal may cause explosions (see section 10) .

Storage ; Ferrosilicon must be kept in a dry and well ventilated place , and away from acids and bases .

8 . Exposure Controls / Personal Protection

Eye protection , eye flushing facilities and protective gloves are recommended . Ensure adequate ventilation . Wear an appropriate particulate respirator in accordance with CSA Standard Z94.4 - M1982 for dust exposure that may exceed exposure limits .
If exposure to phosphine and arsine is suspected (see section 10) , or if adequate ventilation is not possible then a self contained breathing apparatus or an air supplied respirator is recommended .

Occupational exposure limits (OEL) :	8 hr TWA mg / m³	10 minute STEL mg / m³
Total inhalable dust	10	-
Respirable dust	4	-
Phosphine gas	-	0.42
Arsine gas	0.16	-

The low occupational exposure limit for arsine gas is due to the evidence for carcinogenicity in humans of inorganic arsenic compounds (IARC) . The OEL for dust does not cover possible arsine/phosphine absorption from dust deposited on mucous membranes.

9 . Physical and Chemical Properties

Physical state :	Solid granules , lump material , sieve fractions
Colour :	Silvery grey , metallic surface
Odour :	Odourless
Solubility (water) :	Insoluble to slightly soluble .
Melting point (° C)	1220 to 1350
Specific Gravity (water = 1)	2 to 5

10 . Stability and Reactivity

Conditions to avoid : Avoid generating sparks and other ignition sources (welding) in areas of high dust concentrations . Ferrosilicon particles suspended in air at concentrations above 100 - 300 g/m^3 can cause dust explosions . For a given particle size , the ignition sensitivity and the violence of explosion decrease with decreasing Si/Fe ratio . Dust with Si/Fe ratio < 2 and particle size > 10 µm, is considered not to represent any 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 ferrosilicon comes 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 headaches , malaise , vomiting , stomach pains , cough and difficulty in breathing .
Symptomatic teatment : Corticosteroids , prophylactic for edema of the lungs .

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 :

Prolonged exposure (years) to phosphine may lead to chronic effects such as difficulty in movement and speech problems . Epidemiological studies in the Norwegian ferroalloy industry , have neither shown an increased rate of mortality , nor an increased incidence of cancer (also see section 3) .

12 . Ecological Information

Ferrosilicon is not characterized as dangerous for the environment .

13 . Disposal Considerations

Avoid repacking wet material in sealed containers .
Dispose of in accordance with applicable local regulations .

14 . Transport Information

Consignment with a chemical analysis as described in section 2 , is not dangerous cargo .
UN no 1408 (30 - 90) % Si , Class 4.3

1) Ferrosilicon with content 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 has been 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 .

15 . Regulatory Information

WHMIS (Workplace Hazardous Material Information System)
Class B Flammable Solid and Class D - Div. 2 - B Toxic Material .

T D G (Transport of Dangerous Goods)
Ferrosilicon (30 - 90) % Si Class 4.3 Packing Group III (see section 14)
No transport label required .

16 . Other Information

Application of Ferrosilicon : Additive to metal in Steel plants and Iron Foundries .