MATERIAL SAFETY DATA SHEET

Registered

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Rosstandard

Information Analytical Center
"Substance and Material Safety" Chief _____ / A.A. Toporkov /
Federal State Unitary Enterprise "VNITSMB" L.S.

NAME:

Technical (ND):	**Ferrochromium**
Chemical (IUPAC):	N/A
Trade:	**Ferrochromium of various grades**
Synonyms:	**Alloy of Iron and Chromium**

Code of All-Russian Classification of Product:
0 8 4 2 0 0
Code of Harmonized Commodity Description and Coding System:
7 2 0 2 4 0 0 0 0 0

Reference Identification and Name of Basic Normative, Technical or Informational Document for Products (GOST, Specifications, Industrial Standards, Proprietary Standard, (M)SDS, etc.)

GOST 4757-91 (ISO 5448-81). Ferrochromium. Specification Requirements and Terms of Delivery.

HAZARD IDENTIFICATION:

Signal Word: Warning

Brief (in words): Product is moderately hazardous for the organism. Dust/aerosol inhalation can cause fibrogenic effect. Dust can cause skin allergic reactions. It can have the long-term negative effect on for aquatic flora and fauna.

Detailed: in the 16 attached sections of MSDS.

BASIC HAZARDOUS COMPONENT	MPC_{wz}, mg/m^3	Class of Hazard	CAS No.	EC No.
Ferrochromium	6/2	3	11114-46-8	No

APPLICANT: "Chelyabinsk Electrometallurgical Integrated Plant joint-stock company", Chelyabinsk
(Organization Name) (City)

Type of Applicant: manufacturer, supplier, seller, exporter, ~~importer~~
(Strike out unnecessary item)

Code of All-Russian Classifier of Enterprises and Organization: 00186507 **Hotline:** **(351) 772-66-01**

Production Manager: _____ / V.N. Ivanchenko /
Signature L.S. (Clarification of signature)

Material Safety Data Sheet (MSDS) corresponds to UN recommendations ST/SG/AC.10/30 (GHS)

IUPAC	International Union of Pure and Applied Chemistry
GHS	UN recommendations ST/SG/AC.10/30 Globally Harmonized System of Classification and Labeling of Chemicals
ARCP	All-Russian Classification of Products
ARCEO	All-Russian Classifier of Enterprises and Organization
HCDCS	Harmonized Commodity Description and Coding System
CAS No.	Number of the Chemical Abstract Services
EC No.	Number of the European Chemical Agency
MPC_{wz}	Maximum Permissible Concentration of Chemical Substance in Working Zone Air, mg/m^3 (maximum one-time/average for shift)
Safety Data Sheet	Material Safety Data Sheet is used for the Russian Title: “Passport of Chemical Products’ Safety” (substance, mixture, material, waste of industrial production)
Signal Word	a word used to focus attention on chemical product exposure value assigned according to GOST 31340-2013

1. Chemical Product Identification and Information on Manufacturer and/or Supplier

1.1 Chemical Product Identification

1.1.1 Product Name:	Ferrochromium [1].
1.1.2 Brief Recommendations for Use: (including the restrictions for use)	It is used in metallurgical and foundry industry [1].

1.2 Information on Manufacturer and/or Supplier

1.2.1 Full Legal Name of Organization:	"Chelyabinsk Electrometallurgical Integrated Plant joint-stock company" (OAO "ChEMK")
1.2.2 Address (Postal and Legal):	454081, Chelyabinsk, Geroev Tankograda Street, 80-P, Bld. 80.
1.2.3 Telephone, including phone for special consultation and convenient time:	(351) 772-66-01
1.2.4 Fax:	(351) 772-96-19
1.2.5 E-mail:	info@chemk. ru

2. Hazard (hazards) Identification

2.1 Level of chemical product hazard as whole: (Information about classification of hazard according to the RF legislation (GOST 12.1.007) and GHS (GOST 32419-2013, GOST 32423-2013, GOST 32424-2013, GOST 32425-2013))	According to GOST 12.1.007-76 it is moderately dangerous substance concerning the extent of ferrochromium aerosol effects on the human organism (the class of hazard – 3) [1, 2, 13]. GHS classification. Ferrochromium dust/aerosol is referred to the following hazard classes: - chemical product having sensitizing effect at skin contact, class 1; - chemical product with specific target organs and/or systems toxicity at multiple/continuous exposure, class 2. - chemical product causing hazard for water environment at long-term impact (chronic toxicity), class 4 [17, 25].

2.2 Safety marking information according to GOST 31340-2013

2.2.1 Signal word	**WARNING**
2.2.2 Symbols (signs) of hazard	
2.2.3 Brief hazard characteristics (H-phrase)	H317: contact with skin may cause skin allergic reaction. H373: Can affect respiratory organs after multiple or continuous exposure; H413: Can cause continuous hazardous effect on aquatic life [17].

3. Content (Information about Components)

3.1 General Information about Product

3.1.1 Chemical name: (IUPAC)	No, this is an alloy of given composition [1].
3.1.2 Chemical formula:	No, this is an alloy of given composition [1].
3.1.3 General characteristics of composition: (considering the grade assortment; production process)	Alloy of iron and chromium with minimum content of chromium 45.0% of mass and maximum content – 95% of mass, which is produced by reduction of the relevant raw materials or their concentrates [1].

Ferrochromium is supplied as lumps having mass not more than 20 kg or as crushed and screened particles. The high-carbon ferrochromium is permitted to be produced as pigs with mass not more than 30 kg. When ferrochromium is manufactured as lumps or pigs, the amount of small material, screened through screen openings 20 x 20 mm, shall not exceed 10% of the batch mass for the high-carbon ferrochromium, and 5% - for the low-carbon nitrogenized ferrochromium and medium-carbon ferrochromium [1].

3.2 Ingredients

(name, CAS No., EC No. (if available), weight percent (must be 100% in total), MPCwz or SRLIwz, classes of hazard, references for data sources)

Ingredients [1]	Weight percent, % [1]	MPCwz, mg/m^3 [1, 2]	Class of hazard [1, 2]	CAS No. [5]	EC No. [5]
Ferrochromium, including:	100	6/2	3	11114-46-8	No
- chromium	45-95	Not determined	No	7440-47-3	231-157-5
- iron	Rest*	-/10	4	7439-89-6	231-096-4
Note: Depending from the grade, ferrochromium contains the controlled impurities: 0.8-12.0% silicon, 0.01-9.0% carbon, 0.02-0.08% sulphur, 0.02-0.05% phosphorus, 0.2% aluminum [1].					

4. First Aid Measures

4.1 Observed symptoms:

4.1.1 Inhalation poisoning: Dyspnea, chest pain, cough, dust bronchitis, disorder of breathing regulation, complaints about weakness, rapid fatigability, hyperhidrosis, and lymphadenopathy [12].

4.1.2 Skin exposure: Dust has the irritating action [12].

4.1.3 Eye exposure: Dust has the irritating action [12].

4.1.4 Per oral poisoning (ingestion): Poisoning is highly unlikely. Under the accidental ingestion, symptoms are as the same ones as the inhalation poisoning has [12].

4.2 First aid measure for exposed one

4.2.1 For inhalation poisoning: Fresh air, full rest. Acute poisoning by the ferrochromium dust does not arise [12, 17].

4.2.2 For skin exposure: Wash with running water, dub skin with liquid petrolatum. If there is symptom of skin irritation or redness, appeal for medical aid. [12, 17].

4.2.3 For eye exposure: Wash the eyes with the large amount of running water for 15 minutes, while the palpebral fissure is widely open. If there is steady reddening or pain, appeal for medical aid [12, 17].

4.2.4 For per oral poisoning: While the ferrochromium is being used as intended, the acute poisoning is impossible [12].

4.2.5 Contraindications: There is no data [1, 12].

5. Fire and explosion fighting measures and equipment

5.1 General characteristics of fire and explosion risks (according to GOST 12.1.044-89): Ferrochromium as lumps, prills, and crushed one is incombustible, fire- and explosion-safe [1].

5.2 Characteristics of fire and explosion risk: (List of characteristics according to GOST 12.1.044-89 and GOST 30852.0-2002)

Self-ignition temperature in air – 670°C (when particle sizes are less than 74 μm) [13].

Minimum explosive oxygen concentration in mixture diluted with CO_2 – 19 volume percent. [13].

Ignition of powders with fineness less than 50 μm is at the temperature more than 1000°C. Explosive concentration of powder is more than 5000 g/m^3 [9].

5.3 Hazard of combustion products and/or thermodestruction: Ignition of dust/powders may cause the formation of the iron and chromium oxides.

5.4 Recommended fire extinguishing means: Powder mixes for fine powder ignition [15, 20].

5.5 Prohibited extinguishing means: There is no data [15, 20].

5.6 Personal protective gear for extinguishing the fire: (Personal protective gear of fire-fighters)	Fire-protection suit with escape hood SPI-20 [16].
5.7 Specific character of fire-extinguishing:	N/A.

6. Activities to prevent and eliminate accidents, emergencies, and their consequences.

6.1 Activities to prevent the hazardous effects on human beings, environment, buildings, constructions, etc, during accidents and emergencies.

6.1.1 General required activities:	Isolate the danger zone. Evacuate unauthorized persons. Enter the danger zone only in the protective gears. Perform the first aid measures for injured persons [16].
6.1.2 Personal protective gears: (emergency crew and staff)	When the dust content in the air is high, apply the dust mask RU 60. Overalls made of the dust-protective cloth, moleskin, gauntlet, special shoes, and protective spectacles PO-2 [18].

6.2 Procedures for activities to eliminate accidents and emergencies

6.2.1 Activities for leak, overflow, and spill: (including measures for elimination and measures and precautions providing the protection of environment)	Cleaning the working premises from dust shall be made with the vacuum cleaners. The products spilled on the ground shall be collected in the special vessels and transported for reprocessing or for eliminating at the industrial disposal or places coordinated with the local sanitary services and environmental protection bodies [3, 16].
6.2.2 Fire-fighting measures:	Product is incombustible. Extinguish according to the recommendations for a basic ignition source.

7. Storage and handling rules for chemical products during handling operations

7.1 Safety measures while handling the chemical products

7.1.1 Engineering safety measures	The production facilities shall have the general, combined forced and exhaust or natural ventilation. Following fire safety procedures, equipping of workplaces with primary firefighting equipment and use of individual protection gear [12].
7.1.2 Environment protection measures:	Periodical monitoring of harmful substances content in work zone air. Prevention of ferrochromium dust getting into environment.
7.1.3 Recommendations for transportation safety:	Ferrochromium is transported without package in clear transport or in specialized containers. When several batches of unpacked ferrochromium is shipped in one transport vehicle, it should be provided the separation of the batches by partitions that exclude the possibility of their mixing [1]. Under the transportation in bulk, the angle of natural slope is about 40-45° [1, 16, 22, 23].

7.2 Chemical product storage regulations:

7.2.1 Conditions and safe storage life: (including guaranteed storage life, expiration time, incompatible materials)	The packed ferrochromium is stored in the closed premises in stacks according to alloy type, grades, size grades, and year of manufacture. The ferrochromium transported in bulk as well as in specialized containers, are stored on the areas under the shelter or in the self-ventilated closed premises in stacks, bins, or bowls according to grades and years of manufacture. The premises may be of any construction with the concrete or asphalt-concrete floors and the natural ventilation. The areas shall have the hard coverage and be even with small slope to the edges (1:100) [6]. Water drainage channels shall be provided around the floors perimeter. Storage life: - under shelter 5 years - in closed premises – 10 years [1, 6, 10]

	Incompatible for storage with acids, alkalis [3].
7.2.2 Tare and package (including materials for their manufacturing):	If the lump size is less than 5 mm apply steel drums or special containers. If the lump size is more than 5 mm apply steel drums, tight wooden boxes manufactured as per reference documents or special containers. It is possible not to pack ferrochromium with lump size more than 5 mm [1, 6].
7.3 Safety measures and storage regulations in private life:	It is not used in the private life conditions.

8. Monitoring means for hazardous effects and individual protection gears

8.1 Working zone criteria, that shall necessarily be monitored (MPCwz or Safe Reference Levels of Impact in Working Zone (SRLIwz)):	MPCwz = 6/2 mg/m^3 for ferrochromium metal [1, 2].
8.2 Safety measures to keep the hazardous substance contents in the permissible concentrations:	Dust- and gas-purifying facilities. Forced and exhaust ventilation. Monitoring of MPCwz [1, 12].
8.3 Individual protection gears for personnel:	
8.3.1 General recommendations:	Avoid inhalation of gas/vapor/dust/aerosol. Use protection gloves, overall, eye and face protection. Observe the personal hygiene regulations. Contaminated work clothing should not be allowed out of the workplace. Do not smoke and do not eat at the workplace. Take shower after work [17]. All staff working with ferrochromium shall have the preliminary medical examination before taking on job and the periodical medical examinations according to the Orders of the RF Ministries of Health and Social Development, which are approved in the established procedures [12].
8.3.2 Protection of respiratory apparatus: (types of Individual Protection Gears of Respiratory Apparatus)	Aerosol respiratory protective equipment. [12, 18].
8.3.3 Protection means (material and type): (overall, shoes, hand protection, eye protection)	Protection overall made of dustproof tissue, protective spectacles closely fitting the face, e.g., protective spectacles of hermetic type G, or protective faceshield, tarpaulin gauntlet or gloves, special shoes [12, 18].
8.3.4 Individual protection gear in private life	It is not use in the private life conditions [1].

9. Physicochemical properties:

9.1 Physical state: (aggregate state, color, odor)	Solid substance of grey color, and temper colors at fracture and dark green surface. Oxide film and traces of parting materials on lumps surfaces are admissible. There is no odor [1, 9].

9.2 Criteria defining the basic properties of the product (temperatures, pH, miscibility, n-octanol/water ratio and other parameters typical for this kind of product)

Melting temperature, °C:	1460 - 1600 °C [9].
Density, g/cm^3:	
Apparent:	6.43 – 7.28 g/cm3
Real:	6,61 – 7,68 г/см3 [9]
Solubility:	Insoluble in water and fats [9].

10. Stability and chemical reactivity

10.1 Chemical stability (for unstable product decomposition products should be specified):	Ferrochromium is stable under the normal conditions, there is no hazardous polymerization.
10.2 Chemical reactivity:	It reacts with strong acids [9].
10.3 Conditions that shall be avoided: (including dangerous behavior under the contact with the incompatible substances and materials)	Grinding and transporting the grinded products may cause dusting in the air.

11. Toxicity information

11.1 General effect characteristics: (evaluation of hazard (toxicity) extent for the organism effects and most typical signs of hazard)	Product is moderately hazardous substance concerning the effects on human organism. Dust has predominantly moderate fibrogenic action [1, 9].
11.2 Routes of entry (inhalation, peroral way, skin and eyes)	Dust inhalation, skin and conjunctiva contact with dust, ingestion [12].
11.3 Affected human organs, tissues, and systems:	Upper air passages, lungs, skin, conjunctiva [12].
11.4 Information on the hazardous effects of direct contact with substance on health, as well as consequences of such exposures: (irritating action for upper air passages, eyes, skin, including percutaneous action; sensibilization)	The ferrochromium dust has the irritating action when it intakes the upper air passages, and it can cause high sensitivity and the fibrogenic action. The long-term inhalation may cause fibrosis and/or silicosis of lungs [1, 2, 12]. Ferrochromium contaminants (slag, oxide film) can contain trivalent chromium compounds causing allergic diseases. The contact of dust with skin integument may cause high sensitivity and dermatitis, allergic reaction [1, 12].
11.5 Information on long-term harmful effects for human organism: (Effects on reproduction function, carcinogenicity, mutagenity, cumulativeness, etc.)	Cumulativeness is moderate. Ferrochromium condensate aerosol may contain hexavalent chromium compounds which are cancerogenics. [12].
11.6 Criteria of acute toxicity: (DL_{50}, entry routes (internal, external), animal species; CL_{50}, exposure time (h), animal species)	There is no data.

12. Information about effects on environment

12.1 General characteristic of effects on environment objects: (atmospheric air, water bodies, soil, including observed features of impact)	When concentrations are large, it can contaminate various objects of environment, i.e., give an extraneous odor to the atmospheric air; change the organoleptic properties of water; have fatal effects on living organism of a water body; cause the inhibition of biochemical consumption of oxygen; and delay the plant growth [10].
12.2 Environment impact ways:	Violation of storage and transportation regulations, unorganized waste treatment, throwing out on relief or in water bodies.

12.3 Most important characteristics of effects on environment

12.3.1 Hygiene regulations: (permissible concentrations in atmospheric air, water, including fishery waters, and in soil) — N/A for products as whole [1, 17].

Ingredient	$MPC_{atm.air}$ or $SRLI_{atm.air}$, mg/m^3 (LHI[1], class of hazard) [4]	MPC_{water}[2], mg/l, (LHI, class of hazard) [5]	$MPC_{fishery}$[3], mg/l (LHI, class of hazard) [7]	MPC or Approximate Permissible Concentration for soil, mg/kg (LHI) [23]
Iron	Safe Reference Levels of $Impact_{atm.air}$ = 0.02 for ferroalloys' dust /for iron/	MPC_{water} =0.3 (iron) (organoleptic, 3)	MPC = 0.1 (iron) toxicological, 4 class of hazard, For sea waters: 0.05 (toxicological, 2)	Unknown
Chromium	$SRLI_{atm.air}$ -/0.0015 (recalculation for chromium VI oxide) (resorptive, 1) $SRLI_{atm.air}$ = 0.01 trivalent chromium compounds (recalculation for Cr^{3+})	0.5 (Cr^{3+}) 0.05 (Cr^{6+}) (sanitary-toxicological, 3)	0.07 (Cr^{3+}) (sanitary-toxicological, 3) For sea waters: 0.02 (Cr^{6+}) (toxicological, 2)	0.05 (Cr^{6+}) (general sanitary)

[1]LHI – Limiting Harmful Index (toxicological, sanitary-toxicological, organoleptic, sanitary-toxicological, resorptive)
[2]Water of water bodies for household and community water consumption.
[3]Water of water bodies having the fishery significance (including the marine ones).

12.3.2 Criteria of ecotoxicity: (CL, EC, NOEC for fishes (96 h), daphnia (48 h), algae (72 or — N/A

96 h) etc.)

12.3.3 Migration and conversion in environment due to biodegradation or other processes (oxidation, hydrolysis, etc.):	There is no conversion in environment [10].

13. Recommendations for waste treatment

13.1 Safety measures for handling waste obtained during use, storage, and transportation, etc.	Safety measures for handling waste are analogical as those used for working with ferrochromium (see Section 7 and 8).
13.2. Information about places and ways to decontaminate, utilize, or eliminate the product waste, including tares (packages):	Wastes and non-returnable tares shall be destroyed at the landfill for industrial toxic wastes or at the places coordinated with the sanitary inspection and environmental organizations [11].
13.3 Recommendations for treatment of wastes obtained during use in the private life conditions:	There is no use in the private life conditions.

14. Transportation information

14.1 UN No.: (according to the UN recommendations for transportation of danger cargoes)	N/A [1, 14, 22]
14.2 Appropriate shipping and transportation name:	Shipping and transportation name: Ferrochromium [1].
14.3 Types of used transports:	It is transported by all the types of transports according to the regulations and relevant agreements valid at that type of transport [1, 6].
14.4 Danger classification of cargo: (GOST 19433-88 - class - subclass - classification code (according to GOST 19433-88 and for railway transportation) -hazard sign drawing number(s)	According to GOST 19433 it is not classified as the dangerous cargo [1, 8].
14.5 UN recommendations for transportation of danger goods) - Class or subclass - additional hazard - UN packing group	It is not classified as the dangerous cargo [1, 14].
14.6 Shipping marking: (handling marks according to GOST 14192-96)	Shipping marking can be applied (handling marks and informational notices) according to GOST 14192 [1].
14.7 Emergency cards: (For transportation by rail, sea, etc.)	They are not applied as the cargo is not classified as dangerous [1].

15. Information about National and International Legislation

15.1 National Legislation

15.1.1 Russian Federation Laws:	“Environment Preservation”. “Sanitary-epidemiological Welfare of Population”.
15.1.2 Documents, regulating the requirements for the population and environment preservation:	N/A
15.2. International Conventions and Agreements: (Is product regulated by Montreal Protocol, Stockholm Convention, etc.?)	It is not covered by the actions of any international conventions and regulations.

16. Additional information

16.1 Information about revision (republication) of MSDS:	The MSDS has been re-registered because of the expiration of its period of validity. Previous MSDS registration number is 00186507.08.25755

16.2 List of date sources used for compilation of MSDS

1. GOST 4757-91 (ISO 5448-81). Ferrochromium. Specifications and Conditions of Delivery.

2. MPC/SRLI for dangerous substances in the working zone air: Hygiene Regulations. GN 2.2.5.1313-03/ GN 2.2.5.2308-07. M.: Russian potentially hazardous chemical and biological substances register of the Russian Ministry of Health, 2003/2007.
3. Regulations for transportation of dangerous goods by road - S-Pt.: “DEAN” Publishing House, 2002.
4. MPC/SRLI for polluting substances in atmospheric air of populated areas: Hygiene Regulations. GN 2.1.6.1338-03/ GN 2.1.6.2309-07. M.: Russian potentially hazardous chemical and biological substances register of the Russian Ministry of Health, 2003/2007
5. MPC/API of chemical substances in water of water bodies of household and community water consumption: Hygiene Regulations. GN 2.1.5.1315-03/ GN 2.1.5.2307-07. M.: Russian potentially hazardous chemical and biological substances register of the Russian Ministry of Health, 2003/2007
6. GOST 26590-85. Ferroalloys. Packaging, Transportation, and Storage. With Amendment No. 1, 2, 3. M.: Standard Publisher.
7. List of Fishery Standards: Maximum Permissible Concentrations (MPC) and Approximate Safe Reference Levels of Impact (ASRLI) of dangerous substances for water of the water bodies having the fishery significance. M.: “VNIRO” Publishing House, 1999.
8. GOST 19433-88 with Amendment No.1. Dangerous goods. Classification and Marking. M.: Standard Publisher.
9. Ferroalloys. Handbook. M.: Metallurgy, 1992.
10. Ya. M. Grushko. Hazardous inorganic compounds in industrial sewerage. Handbook. L.: Chemistry, 1979.
11. SanPiN 2.1.7.1322-03. Hygiene requirements for disposal and sterilization of the industrial and consumption wastes.
12. Hazardous substances in industry. Handbook for chemists, engineers, and physicians. Under the editorship of N. V. Lazarev, etc. Volume 3. Inorganic and element-organic compounds. L.: Chemistry, 1977.
13. Criteria for hazard of substances and materials. V.1 / A. K. Chernyshev, B. A. Lubis, V. K. Gusev, and others. M.: Fund named after I. D. Sytin, 1999.
14. Regulations for transportation of dangerous goods (Attachments 1 and 2) to the Agreement on International Goods Transport by Rail (SMGS), 2009.
15. A. Ya. Korolchenko, D. A. Korolchenko. Fire and explosion risk of substances and material and means to extinguish them. Handbook in two parts. M.: Ass. “Pozhnauka”, 2004.
16. Emergency cards for dangerous cargoes transported by railways of CIS, Latvian Republic, Lithuanian Republic, and Estonian Republic (M Transport 2000).
17. GOST 31340-2013. Labeling of chemicals. General requirements. M.: Standard Publisher.
18. Collective and individual protection gears. Monitoring of Protection Means. Encyclopedia “Ecometry”, the series of handbook publications on ecological and medical measurements. M.: FID “Delovoy ekspress”, 2002.
19. ecb.jrc.ec.europa.eu/esis/. ECIS (European Chemical Information Substances).
20. Fire risk of substances and material used in chemical industry. Handbook. / Under the editorship of I. V. Ryabov; M.: “Chemistry”, 1970.
21. M. I. Gasik, etc. Theory and technology of ferroalloys’ production. M.: Metallurgy, 1988.
22. Transportation features and characteristics of goods (Attachment to the Maritime transportation regulations for general, dangerous, food, and bulked goods). Handbook of Ship Surveyor. Book 3. 2nd Edition. S-Pt.: CJSC “TsNIIMF”, 2002.
23. MPC/SRLI for dangerous substances in soil: GN 2.1.7.2042-06/ GN 2.1.7.2041-06. Hygiene Regulations. Resolution of Chief State Physician of Russia dated 23.01.2006 No.1 - M.: Rospotrebnadzor Federal Center of Hygiene and Epidemiology, 2006.
24. GOST 32419-2013 Classification of chemicals. General requirements.
25. ST/SG/AC.10/30/Rev.5 Globally Harmonized System of Classification and Labelling of Chemicals (GHS). UN, 2013.

This document is prepared by the translator of Engineering Department of AO “CHEMK” A.Morash on the basis of personal authentic translation of Safety Data Sheet РПБ №00186507.08.42744 d/d July 11, 2016

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