SAFETY DATA SHEET OF CHEMICAL PRODUCT

Entered in Safety Data Sheet Register

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Valid until 31st January, 2025

Association Non-commercial Partnership
Coordination and Information Centre of CIS member-states
for alignment of regulatory practices

Deputy Director *signature* /O.Yu. Chechevatova/
stamp

NAME

technical (as per regulatory document)	Oversized Beach Iron 26A
chemical (as per IUPAC)	Not available
commercial	Oversized Beach Iron 26A
synonyms	Not available

OKPD 2 Code 38.32.22.130

TN VED Code 7204499000

Reference designation and name of the regulatory, technical or information document for the product (GOST, TU, OST, STO, (M)SDS)

Industry Standard STO 13657842-13-2018 «By-products of Steelmaking Industry. Oversized Beach Iron 26A (for Processing)»

HAZARD STATEMENT

Signal word: **Hazardous**

Brief description (in words): The product is marginally hazardous with low impact on human body in accordance with GOST 12.1.007. In contact with skin and eyes it causes chemical burns. May impair fertility or may cause harm to the unborn child, may cause irritation of the upper respiratory tract, or cause damage to respiratory organs through repeated exposure. It is a flammable substance. May pollute the environment.

Detailed description: in 16 sections of the enclosed Safety Data Sheet

MAIN HAZARDOUS COMPONENTS	MPC w.z., mg/m^3	Hazard class	No. CAS	No. EC
Iron (Fe)	-/10	4	7439-89-6	231-096-4

APPLICANT Joint Stock Company Ural Steel (name of organization) Novotroitsk (city)

Applicant type manufacturer, ~~supplier, seller, exporter, importer~~ (strike out whichever is not applicable)

OKPO Code 13657842 **Emergency telephone** (3537) 66-65-88

Managing Director _____ (signature) / E.V. Maslov / (full name)

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Safety Data Sheet (SDS) complies with 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 Labelling of Chemicals
OKPD 2	–	Russian Classification of Products by Economic Activities
OKPO	–	Russian Classifier of Enterprises and Organizations
TN VED	–	Commodity Nomenclature of Foreign Economic Activities
No. CAS	–	substance number in the Register of Chemical Abstracts Service
No. EC	–	substance number in the Register of European Chemicals Agency
MPC w.z.	–	maximum permissible concentration of chemical substance in the air of working zone, mg/m^3
Signal word	–	a word used for drawing attention to the hazardous level of the chemical product and chosen in accordance with GOST 31340-2013

1 Identification of the chemical product and information about manufacturer and/or supplier

1.1 Identification of chemical product

1.1.1 Technical name	Oversized beach iron 26A [1]
1.1.2 Brief application recommendations (including limitations on application)	It is an additional product that is produced during the production of the main products and that is suitable as raw material in another production or for consumption as finished products, for processing [1].

1.2 Information about the manufacturer and/or supplier

1.2.1 Full legal company name	Joint Stock Company Ural Steel (JSC Ural Steel)
1.2.2 Address (postal and legal)	1, Zavodskaya str., Novotroitsk, Orenburg region, 462353
1.2.3 Telephone, including for emergency consultations and hours of work	(3537) 66-65-88, 66-20-66, 66-65-82 from 06-15 a.m. to 15-15 p.m. (Moscow time)
1.2.4 Fax	(3537) 66-25-27 (round-the-clock)
1.2.1 Full legal company name	m.mishchenko@uralsteel.com

2 Hazard(s) identification

2.1 Hazard class of chemical product in general:
(information on hazard classification in accordance with RF legislation (GOST 12.1.007-76) and GHS)

In accordance with GOST 12.1.007 it is marginally hazardous substance with low impact on human body, substance hazard category 4 [1,2].

Classification according to GHS:

Chemical product causing skin damage (necrosis)/irritation, category 1.

Chemical product causing serious eye damage/irritation, category 1.

Chemical product toxic to reproduction, category 1A.

Chemical product with specific target organ and/or system toxicity (single exposure), category 3.

Chemical product with specific target organ and/or system toxicity (prolonged/repeated exposure), category 2 [3,4,5,6,7].

2.2 Information on the warning marking as per GOST 31340-2013

2.2.1 Signal word

Danger [7]

2.2.2 Hazard pictograms

		
«Exclamation mark»	*«Health Hazard»*	*«Liquids pouring out of two test tubes and damaging metal and hand»*

2.2.3 Hazard statement(s) (and codes)

H314: Causes severe chemical skin burns and eye damage.
H360: May damage fertility or the unborn child
H335: May cause respiratory irritation

H373: May cause damage to respiratory organs through prolonged or repeated exposure [7].

3 Composition (information on ingredients)

3.1 Information on the product in general

3.1.1 Chemical name (as per IUPAC) — Not available [1,4]

3.1.2 Chemical formula — Not available [1]

3.1.3 General description of composition (taking into account the grade range; production method) — The product contains at least 80 % of metallic part and 20 % of non-metallic part (slag); enameled and galvanized lump scrap and waste rusted, exposed to long-term temperature or acid effects; slagged scrap [1].

3.2 Ingredients

(name, CAS and EC numbers, mass fraction (must be 100% in total), MPC w.z. or ASLI w.z., hazard classes, references to information sources)

Table 1 [1,3,8]

Ingredients (name)	Mass fraction, %	Hygienic standards in the air of working zone		CAS No.	EC No.
		MPC w.z., mg/m^3	Hazard class		
Oversized beach iron, including:	**100***	**not identified**	**4**	**none**	**none**
Iron (Fe)	68 – 74,6 and more	-/10 (a)	4 (F)	7439-89-6	231-096-4
Carbon (C), max.	4,00	not identified	not identified	7440-44-0	931-328-0
Phosphorus (P), max.	0,064	not identified	not identified	7723-14-0	231-768-7
Sulphur (S), max.	0,164	-/6 (a)	4	7704-34-9	231-722-6
Manganese (Mn), max.	0,4	0,6/0,2 (a)	2	7439-96-5	231-105-1
Chrome (Cr), max.	0,032	not identified	not identified	7440-47-3	231-157-5
Titanium (Ti), max.	0,04	-/10 (a)	4 (F)	7440-32-6	231-142-3
Silicon (Si), max.	0,8	not identified	not identified	7440-21-3	231-130-8
CaO	~ 9,2	1 (a)	2	1305-78-8	215-138-9
SiO_2	~ 8,4	not identified	not identified	7631-86-9	231-545-4
MgO	~ 0,8	4 (a)	4	1309-48-4	215-171-9
Al_2O_3	~ 1,5	-/6 (a)	4 (F)	1344-28-1	215-691-6

(a) – aerosol;
(F) – aerosols of mainly fibrogenic action

* - based on the mass fraction of 100%, the mixture is given as ingredients of the metal and slag parts in the ratio of 80 : 20.

4 First aid measures

4.1 Symptoms

4.1.1 In case of inhalation — Itchy throat, burning sensation, cough, weakness, bronchitis, dry pleurisy, pneumoconiosis [3,9,10,11].

4.1.2 In case of skin contact — Redness, pain, burning, chemical burns [3,9,10,11].

4.1.3 In case of eye contact — Conjunctival redness, blurring of vision, chemical burns [3,9,10,11].

4.1.4 In case of ingestion — Dizziness, gastrointestinal upset, pain, nausea, vomit, burning sensation, burn of the mucous membrane of the mouth, esophagus, stomach [3,9,10,11].

4.2 First aid measures for the injured persons

4.2.1 In case of inhalation	Help the injured people go out into fresh air, loosen tight clothing, ensure rest and warmth. Seek medical attention [9,10].
4.2.2 In case of skin contact	Remove contaminated clothes and rinse the affected area with large amounts of water [9,10].
4.2.3 In case of eye contact	Immediately rinse with large amounts of water (remove contact lenses, if it is easy to do) keeping the eyelids wide open. Urgently seek medical attention [9,10].
4.2.4 In case of ingestion	Rinse mouth with water. Drink a lot of water. Take activated charcoal, saline purgative. Hospital admission [9,10].
4.2.5 Contraindications	In case of thermal burn, do not try to separate clothes from the affected area, this may affect living tissue [9,10].

5 Measures and media for fire and explosion safety

5.1 General characteristic of fire and explosion hazards (as per GOST 12.1.044-2018)	Flammable substance [12,13].
5.2 Indices of fire and explosion hazards (list of indices as per GOST 12.1.044-2018 and GOST 30852.0-2002)	Not available [1,3,12,13,14].
5.3 Hazards caused by combustion products and/or thermal decomposition and the danger they cause	Smoke. Body surface burns. When burning, toxic products are released which cause poisoning (carbon and sulphur oxides; hydrogen). In case of poisoning: headache, pounding in the temples, dizziness, dry cough, chest pain, nausea, vomit; possible excitement accompanied by visual and auditory hallucinations. Skin redness [3,11].
5.4 Recommended fire-fighting media	Extinguish from a maximum distance using powders, dry sand; in case of total flooding, use carbon dioxide, argon [13].
5.5 Prohibited fire-fighting media	Solid streams of water [13,15].
5.6 Personal protective equipment for fire-fighting (PPE of fire-fighters)	General service uniform (jacket and pants with removable heat-insulating lining) complete with a fire-fighting lifebelt, gauntlets or gloves, a fire hat, special protective footwear [16].
5.7 Specific methods of extinguishing	Do not use water for extinguishing molten product, it can cause an explosion [13].

6 Emergency prevention and response

6.1 Measures to be undertaken to prevent harmful effect on people, environment, buildings, constructions, etc. in emergency situations

6.1.1 General measures to be taken in accidental and emergency situations	Isolate the hazardous zone in a radius of no less than 50 m. Correct the above distance based on the results of chemical monitoring. Keep unauthorized people away. Enter the hazardous zone using protective means. Follow the fire safety measures. No smoking. Eliminate flame and spark sources. Give first aid to the injured. Send the people from the affected area for medical check-up [17].

6.1.2 Personal protective equipment in emergency situations (PPE of emergency response teams)	For emergency teams insulating protective suit KIH-5 complete with insulating gas mask IP-4M. In the absence of these models: an all-service protective suit L-1 or L-2 complete with an industrial gas mask and filter box B, gloves made of butyl rubber dispersion, special footwear. In case of low concentrations in the air (exceeding the MPC up to 100 times) – workwear, an autonomous protective individual equipment with forced supply of purified air to the breathing zone with filter boxes PZU, PZ-2, air purifying respirator FORT-P, universal respirator Snezhok-KU-M [17].
6.2 Emergency response procedures	
6.2.1 Response to spillage, leakage, overflow (including response measures and precautions for environment protection)	**At the production sites:** collect the product into a container using dry means and return to the process cycle. Wash the area with water; send the contaminated water to the water treatment plant. Collect the spilled product in dry, corrosion resistant containers, close tightly, following the safety measures and using PPE. **Outside production sites:** report to regional Rospotrebnadzor offices and environmental authorities. Do not touch the spillage without using PPE. Avoid spillage getting into surface waters. Prevent contact with flammable materials. [9,17]
6.2.2 Response to fire	Extinguish using water mist with wetting agent, air-mechanical and chemical foams and powders. Occurring fumes and vapors shall be settled with water mist. Remove people from nearby buildings taking into account the direction of movement of toxic products of combustion. Enter the emergency area in protective clothes and breathing apparatus. After fire suppression, make MPC measurements, then people access can be permitted. [9,17]

7 Rules for handling and storage of chemical product

7.1 Safety measures for chemical product handling	
7.1.1 Systems of engineering safety measures	General extract and input ventilation ensuring content of harmful substances in concentrations not higher than MPC. Air tightening of the production equipment. In case of emergency (accidental) shutdowns of ventilation and impossibility of stopping the production process, automatic switch on of backup fans. Use of dust suppression and dust catching means, mechanized removal of product spills, automation of processes. Regularly clean production areas of dust using pneumatic cleaning, water wash or other methods. Control dust content in the air. Use personal protective equipment during work (see section 8) [18,19].
7.1.2 Environmental precautions	Monitoring of established MPCs, waste disposal regulation. Arrangement of ventilation exhausts with further air purification in the places of possible product dust generation. Prevent product spills.

	Follow the regulations for sewage water treatment and discharge. In case of emergency sewage water discharge, use collecting tanks. Arrangement of a zero-discharge water system, environmental control systems with the use of modern equipment. Prevent sewage water from entering the drainage system. Landscaping and infrastructure development of the company premises. [19]
7.1.3 Recommendations on safe handling and transportation	Installation of air-tight dust suppression systems, automatic stop of transport process line. Regular function checks of safety interlocks, alarm systems and fire protection system. All communications should undergo annual inspection by a committee. Trackless mechanized transport (battery-driven trucks, autotrucks, electric forklifts) should be equipped with brakes, audio alarm, lighting devices. Mechanized handling. Handling should be mechanized as much as possible. [18,19,20,21,22,36]
7.2 Rules for chemical products storage	
7.2.1 Safe storage life and conditions: (including guaranteed storage life, expiry date; substances and materials incompatible for storing)	The product is incompatible for storage with alkalis and acids (may form a combustible gas - hydrogen) Stored indoors. Guaranteed storage life of the product is not limited [1].
7.2.2 Containers and packing (including materials from which they are made)	The product has no packing. Transported and stored in bulk [1].
7.3 Safety measures and storage rules for household use	It is not used in the household [1].

8 Exposure controls and personal protection

8.1 Working zone parameters subject to obligatory control (MPC w.z. or ASLI w.z.)	MPCw.z.: -/10 mg/m^3 (aerosol) [8].
8.2 Measures on keeping hazardous agents within permissible concentrations	Monitoring of content of harmful substances in the working zone air. General extract and input ventilation. Automation of processes. Air-tightness of equipment and units. Cleaning of rooms every shift. Following the rules for disposal and storage of wastes [18,19].
8.3 Personal protective equipment for personnel	
8.3.1 General recommendations	Training personnel in safe handling, including first aid measures. Organization and furnishing of first aid centres. Having timely preliminary (when employed) and regular medical examinations. Provision of information to employees and newly employed people about hazardous product properties, use of PPE. Follow personal hygiene rules. It is prohibited to use labour of pregnant and breast-feeding women [18,19].
8.3.2 Respiratory protection (types of respiratory protective equipment)	Respirators designed for protection of respiratory organs from different kinds of dust type. In emergency situations and in case of exceeding MPC more than 100 times, use compressed air self-contained breathing apparatuses (ASV-2, Dräger VDA, Spiromatic QS, etc.) [23].

8.3.3 Protective means (material, type) (working clothes, special footwear, hand protection, eye protection)	**Working clothes:** cotton or cloth suit, apron or robe. **Special footwear:** leather boots, or rubber boots, tarpaulin boot covers. **Hand and skin protection:** tarpaulin gauntlets or gloves with polymer covering. Protective cream, pastes. **Eye protection**: protective glasses of grades ZN 5, ZN 18 (V, G), ZN 9-F and others. In order to avoid misting on the glasses use washers made of NP film (inserted inside protective glasses), GE-ZhE type pencil or PK-10 type liquid. [24,25,26,27,28]
8.3.4 Personal protective equipment in household use	Beach iron is not used in the household. [1]

9 Physical and chemical properties

9.1 Physical state (aggregative state, colour, odour)	Lumps of the size not exceeding 800 mm. Minimum lump size is 10 mm [1,3]
9.2 Parameters characterizing the product basic properties (temperature parameters, pH, solubility, coefficient n-octanol/water and other parameters specific to the type of the product)	Insoluble in water [3,13].

10 Stability and reactivity

10.1 Chemical stability (for unstable products specify decomposition products)	Stable when handling and storage rules are observed. [1,3]
10.2 Reactivity	Thermal oxidizing breakdown can cause generation of vapours containing iron oxides, and other alloying elements. In contact with water, release of hydrogen is possible. Product dust explosion is possible. [11,29]
10.3 Conditions to avoid (including those which may cause dangerous reactions upon contact with incompatible substances and materials)	Humidity exposure [9,11,29].

11 Toxicological information

11.1 General description of effects (assessment of a level of hazardous (toxic) effects on a human body and the most typical hazardous consequences)	Low-hazard product by effect on human body. Has burning effect, selective toxicity which targets certain organs in case of prolonged or repeated exposure [1,2].
11.2 Routes of exposure (inhalation, ingestion, skin and eye contact)	Inhalation, ingestion, skin and eye contact. [3,11]
11.3 Affected organs, tissues and systems	Central nervous, cardiovascular and respiratory systems, gastrointestinal tract, liver, kidneys, spleen, hemic system, skin, conjunctivas. [9,10]
11.4 Information on dangerous to health effects from direct exposure to the product, as well as consequences of this exposure: (irritation of upper respiratory tract, eyes, skin, including skin resorptive and sensitizing effects)	In case of long-term or repeated exposure causes irritation of upper respiratory tract. Has burning effect on conjunctivas and skin. Has skin resorptive effect, sensitizing effect not found. [1,3,9,10,40]

11.5 Information on long-term dangerous to health effects from exposure to the product
(influence on reproduction function, carcinogenicity, mutagenicity, cumulative and other long-lasting effects)

Mutagenic and carcinogenic effect is not identified for the product in general.
Manganese affects reproductive function (embryotropic, gonadotropic effects). Slight cumulative effect. [30,37]

11.6 Values of acute toxicity
(DL_{50} (LD_{50}), route of receipt (injected into stomach, external contact), type of an animal; CL_{50} (LC_{50}), exposure time (h), type of animal)

Experimental data about acute toxicity of product in general is absent.

Table 2 [3,40]

Substance	Effect	Value, mg/l	Exposure time, h.
Phosphorus	CL_{50}	> 5,75	4
CaO	CL_{50}	> 6,04	4
SiO_2	CL_{50}	> 5,01 (no mortality)	4

Table 3 [3,40]

Substance	Effect	Value, mg/l	Route of entry	Type of animal
Iron	DL_{50}	5000	intragastric	rats
Titanium	DL_{50}	> 5 000	intragastric	rats
CaO	DL_{50}	> 2 000 (no mortality)	intragastric	rats
	DL_{50}	> 2 500 (no mortality)	epidermal	rabbit
SiO_2	DL_{50}	> 5 000	intragastric	rat
	DL_{50}	> 5 000	epidermal	rabbit

12 Ecological information

12.1 General description of effects on environment
(air, water, soil, including observable signs of exposure)

Can affect the environment only when handling rules are not observed. Product dust can be present in the air in the form of particles. If dust gets into atmospheric air, it can settle on leaves of plants inhibiting their growth. After dust catching, small amounts get into the air. The product is not dangerous for soils. In case of getting into water bodies can form a film on the water surface, make water turbid, cause changing of sanitary conditions of water bodies [11,29]

12.2 Environmental impact routes

Spills, violation of handling, storage and transportation rules, in case of unorganized disposal or incineration of wastes, as a result of emergency situations. [10]

12.3 The most important characteristics of impact on environment

12.3.1 Hygienic regulations
(permissible concentrations in atmospheric air , water, incl. fishponds, soil)

Table 4 [31,32,33,34,42,43]

Ingredients	MPC in atm. air or SRLI in atm. air, mg/m^3 (LHI [1], hazard category)	MPC in water[2] or target concentration level in water, mg/l (LHI, hazard category)	MPC in fishery[3] or SRLI in fishery, mg/l (LHI, hazard category)	MPC or approximate permissible concentration in soil, mg/kg (LHI)
CaO	0,3	not specified	Discharge into a water body is forbidden until hydrolysis is complete	not specified
SiO_2	not specified	10 (s.-t., 2)	not specified	not specified
MgO	0,4/0,05 (3)	50 (org. taste, 4)	not specified	not specified
Al_2O_3	0,01 (res. 2)	0,2 (0,5) (org. tur., 3)	not specified	not specified
Phosphorus	not specified	0,0001 (s.-t., 1)	0,00001 (san., 1)	not specified
Sulphur	0,07	not specified	10 (tox., 4)	160 (gen.)
Iron	not specified	0,3 (org.col., 3)	0,1 (tox., 4)	not specified

12.3.2 Ecotoxicity values (CL, EC, NOEC for fish, daphnia magna, algae, etc.)
Ecotoxicity values for product in general are absent [3].

Table 5 [3,40]

Substance	Effect	Value, mg/l	Type	Exposure time, h.
Silicon	EC_{50}	250	Green alga	72
Phosphorus	CL_{50}	> 100	Salmon	96
Titanium	CL_{50}	> 10 000	Fish	96
Sulphur	CL_{50}	866	Fish	96
Al_2O_3	NOEC	> 50	Fish (catfish)	96
CaO	CL_{50}	50,6	Fish (trout)	96

12.3.3 Migration and transformation in the environment due to biodegradation and other processes (oxidation, hydrolysis or similar) — Slowly transforms in the environment [3]

13 Waste (remains) disposal recommendations

13.1 Safety measures for handling of waste generated as a result of use, storage, transportation — Similar to those used for handling the main product and given in sections 7 and 8 of SDS. Use of PPE, minimum use of manual labour, exclusion of waste accumulation in the work places, observing limits of accumulation and criterion of maximum permissible waste accumulation. Use of mechanized motor transport. [35]

13.2 Information on locations and methods of neutralization, utilization or disposal of waste, including containers (packing) — Places of waste disposal should be agreed with sanitary and environmental protection services.
Wastes from spills of product mixed with absorbents should be collected in a sealed container, delivered to the waste collection site and temporary stored on site, then it is stored outside the site in the industrial waste landfill or in a sludge dump.[3]

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[1] LHI – limiting hazard index (tox. – toxicological; s.-t. – sanitary - toxicological; org. – organoleptic with indication of changes in organoleptic properties of water (od. – changes water odour, tur. – increases water turbidity, col. – colours water, foam – causes foaming, film – creates film on the water surface, taste – changes water flavour, op. – causes opalescence); refl. – reflective; res. - resorptive; refl.-res. - reflective-resorptive, fishery – fish industry (change of commercial qualities of aquatic organisms) ; gen. – general sanitary).
[2] Water of water bodies for household and community use
[3] Water of water bodies for fish industry (including seas)

13.3 Recommendations on removal of waste formed in household use	Beach iron is not used in the household. [1]

14 Transport information

14.1 UN number: (according to UN recommendations on hazardous goods transportation)	1759 [20,22]
14.2 Proper shipping name and name while in shipment	Shipping name: Oversized beach iron 26A Proper name: CORROSIVE SOLID, N.O.S. [1,22]
14.3 Modes of transport used	By rail, truck [1]
14.4 Cargo hazard classification according to GOST 19433-88: [38,22]	
- class	8
- subclass	8.2
- classification code (according to GOST 19433-88 and for railway transportation)	8213 (according to GOST 19433) 8013 (for railway transportation)
- hazard pictogram(s) drawing(s) number(s)	8
14.5 Hazardous goods classification according to UN Recommendations on hazardous goods transportation: [20,22]	
- class or subclass	8
- extra hazard	none
- UN packing group	III
14.6 Transport marking: (handling signs according to GOST 14192-96)	Handling sign KEEP DRY [39]
14.7 Emergency cards: (rail-, sea- and others types of transport)	822 [1,17]

15 National and international legislation information

15.1 National legislation

15.1.1 Russian Federation laws	On Environmental Protection, On Protection of Atmospheric Air, On Sanitary and Epidemiological Well-Being of Population, On Technical Regulation, On Production and Consumption Wastes.
15.1.2 Documentation regulating man safety and environmental protection requirements	Not required [1]
15.2 International conventions and agreements: (whether the product is regulated by Montreal Protocol, Stockholm Convention and others)	Not regulated by international conventions and agreements

16 Additional information

16.1 Information on SDS revision (re-edition) (the following is specified: "SDS is drawn up for the first time" or "SDS is re-registered upon expiry. Previous SDS registration number..." or "Amendments made in clauses..., amendment date...")	SDS is drawn up for the first time

16.2. List of information sources used to draw up the SDS [4]

1. STO 13657842-13-2018 By-products of steelmaking industry. Oversized beach iron 26A (for processing);
2. GOST 12.1.007-76 Occupational safety standards system. Noxious substances. Classification and general safety requirements. – M. : Standard Publishing. 1976;
3. Data from information system ECHA (European Chemicals Agency). [Electronic resource]: Access – http://echa.europa.eu/;
4. GOST 32419-2013. Classification of chemicals. General requirements. – M. : Standartinform. 2014;
5. GOST 32423-2013. Mixtures classification of hazard for health. – M. : Standartinform. 2014;
6. GOST 32425-2013. Classification of chemicals for environmental hazards. – M. : Standartinform. 2014;
7. GOST 31340-2013 Labelling of chemicals. General requirements – M., : Standartinform. 2014;
8. GN 2.2.5.3532-18 MPC of harmful substances in working zone air Approved by decision No. 25 of Chief State Sanitary Doctor of the Russian Federation dated February 13, 2018;
9. International Chemical Safety Cards (ICSC):
   Manganese. ICSC: 0174 of March, 1995;
   Chrome. ICSC: 0029 of October, 1994;
   Sulphur. ICSC: 1166 of April, 2000;
   Phosphorus. ICSC: 0628 of November, 1998;
   Calcium oxide. ICSC: 0409 of April, 1997;
   Aluminum oxide. ICSC: 0351 of October, 2000;
   Magnesium oxide. ICSC: 0504 of April, 1997.
10. Information card of potentially hazardous chemical biological substance.
    Sulphur. Certificate of registration AT No. 000001.– M., : RPOKhBV, 1993;
    Iron. Certificate of registration AT No. 000534.– M., : RPOKhBV, 1995;
    Silicon. Certificate of registration AT No. 002015.– M., : RPOKhBV, 2001;
11. Hazardous substances in industry. Inorganic and elementorganic compounds. Guide for chemists, engineers and doctors. 7th edition revised under the editorship of N. V. Lazarev and I.D. Gadaskina. T. 3. – L.: Chemistry. 1977;
12. GOST 12.1.044-89 Occupational Safety Standards System. Fire and Explosion Hazards of Substances and Materials. List of Values and Methods Used to Determine Them. – M. : Standard Publishing. 2019;
13. Korolchenko A. Ya. Fire and explosion hazard of substances and materials and means of their extinguishing. M,: Association Pozhnauka. 2000;
14. GOST 30852.0-2002 (МЭК 60079-0:1998) Explosion-proof electrical equipment. Part 0. General requirements. – M. : Standartinform. 2014;
15. Medvedeva V.S. Occupational safety and fire safety in chemical industry. 2nd edition updated and revised. – M.: Chemistry. 1989;
16. GOST R 53264-2009 Fire equipment. Special clothing for fire-fighter. General technical requirements. Test methods. – M. : Standartinform. 2009;
17. Transport emergency cards for goods transported via railways of CIS, Latvia, Lithuania, Estonia (by CIS Council on Railway Transport MoM of 30.05.2008 No. 48 (edition of 19.10.2018));
18. Federal Industrial Safety Regulations and Rules "Safety Rules for the Receipt, Transportation, Use of Melts of Ferrous and Non-ferrous Metals and Alloys Based on These Melts" of 30 December, 2013 No. 656;
19. Sanitary rules for ferrous metallurgy companies No. 2527-82 Approved by Chief State Medical Officer of the USSR on 22.06.82;

[4] Ordinal numbers of data sources are given in each SDS clause in the form of references

20. UN Recommendations on the Transport of Dangerous Goods. Orange book. Model Regulations on the Transport of Dangerous Goods;
21. Regulations on the Transport of Dangerous Goods by Motor Vehicles approved by order of RF transport Minister of 08.08.95 No. 73 (edition of 1999) – Ekaterinburg : PH Uralyurizdat, 2010;
22. Regulations on the Transport of Dangerous Goods by Railway approved by CIS Council on Railway Transport. Edition of 22.10.2014 amended of 21.05.15;
23. GOST 12.4.034-2001 (EH 133-90) Occupational safety standards system. Respiratory protective equipment. Classification and marking;
24. Personal Protective Equipment. Reference Book under the editorship of S.L. Kaminsky M., : Chemistry, 1989;
25. GOST 12.4.103-80 Special protective clothes, personal means of hands and legs protection. Classification. – M.: Standard Publishing. 1981;
26. GOST 12.4.246-2008 Personal protective means of hands. Gloves. General technical requirements. Test methods – M. : Standartinform, 2008;
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