PRODUCT SAFETY DATA SHEET

for

Ferromanganese

(Prepared according to Annex II of the EP and Council Regulation 1907/2006/EC and Commission Regulation (EU) 2020/878)

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Name of the preparation:	High-carbon ferromanganese
Synonyms:	HC FeMn, FeMnC, FeMn HC
Trade name:	Carbon ferromanganese

1.2 Relevant identified uses of the substance/mixture and uses advised against

Manufacturing of metals, including alloys

Used for steel production

Additive

Used in the production of metal castings

Uses not recommended: None

1.3 Details of the supplier of the safety data sheet

Name:	OFZ, a.s.
Address:	Široká 381, 027 41 Oravský Podzámok, Slovakia
Phone number:	+421/43/5804 111
Fax number:	+421/43/5804 320
E-mail:	ofz@ofz.sk

1.4 Emergency telephone number

European emergency tel. number: 112

Emergency phone number company: +421/43/5804 111

National toxicological information center: +421 2 5477 4166

2. HAZARDS IDENTIFICATION

2.1 Classification of substance or mixture

2.1.1 Classification of the substance according to the CLP / GHS regulation

The substance does not meet the criteria for inclusion in accordance with Regulation EC 1272/2008.

2.2 Label elements

2.2.1 Labeling according to the CLP / GHS regulation

The substance does not meet the criteria for inclusion in accordance with Regulation EC 1272/2008.

Signal word: None

2.3 Other hazards

The substance does not meet the criteria for classification as a PBT or vPvB substance.

If the substance is dispersed, it can form explosive mixtures of dust and air.

Although the substance does not meet the EU CLP classification criteria, the available literature on long-term exposure at high concentrations reports neurotoxic effects. The substance is not considered an endocrine disruptor.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Constituents

Ferromanganese is not considered a substance. HC FeMn is an alloy of iron and manganese.

3.2 Admixtures

Ferromanganese alloy is considered a special preparation according to EU REACH and a mixture according to EU CLP. Its impurities are negligible and do not affect the classification.

Constituents	Concentration in % (w/w)	REACH registration number
Mn (manganese) CAS: 7439-96-5 EINECS: 231-105-1	70-80%	01-2119449803-34-0033
Fe (iron) CAS: 7439-89-6 EINECS: 231-096-4	16% +/- 3% (weight)	01-2119462838-24-0093

4. FIRST AID MEASURES

4.1 Description of first aid measures

General information: In case of accidental exposure and symptoms of illness, seek medical attention immediately.

Inhalation: Mechanical irritation caused by dust in the respiratory tract: Move the person out of the dusty area.

Skin contact: Wash the skin with water or mild soap.

Eye contact: Flush the eyes with water or saline solution. In case of persistent discomfort, consult a doctor.

Ingestion: Not likely. However, if swallowed, do not induce vomiting and seek medical attention immediately.

4.2 Most important symptoms and effects, both acute and delayed

Dust particles can cause physical effects on the eyes and lungs and lead to itching and coughing.

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable:

FeMnC is not flammable and its dust does not pose an explosion threat.

Unsuitable:

Do not extinguish HC FeMn in the molten state with water.
Wet material added to molten HC FeMn can cause an explosion.

5.2 Special hazards arising from the substance or mixture

The product does not decompose naturally.

However, during combustion, vapors of metal oxides and a mixture of carbon monoxide and carbon dioxide are formed.

5.3 Advice for firefighters

Allow the fire caused by the molten HC FeMn to self-extinguish. Do not touch hot metal when extinguishing.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel

a) Use personal protective equipment such as dust masks to minimize product inhalation. Contact with eyes and skin is not recommended, so use safety glasses and protective clothing.

b) Dust extraction and sufficient ventilation must be ensured at the workplace. Avoid all sources of ignition.

c) In case of accidental release, leave the workplace and contact trained personnel

6.1.2 For emergency personnel

Get people to safety. Isolate the hazardous area and prevent entry.

Avoid dust formation.

Wear appropriate protective equipment. (See section 8)

Avoid inhalation: make sure the area is well ventilated or wear suitable respirators, wear suitable protective equipment. (See section 8)

6.2 Environmental precautions

Based on the available studies, the given substance does not endanger the environment. However, large amounts of material can clog drains, so disposing of it in this way is not recommended.

6.3 Methods and material for containment and cleaning up

Material in the form of dust must be collected in suitable containers or containers to prevent inhalation of dust particles, reused in the production process or disposed of as other waste. Use appropriate respiratory protection. Thoroughly clean contaminated objects and areas according to environmental regulations.

6.4 Reference to other sections

For more detailed information regarding exposure controls and personal protective equipment, see section 8.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

7.1.1 Protective measures

a) Handle HC FeMn only in well-ventilated areas. Avoid dust generation. Wear personal protective clothing (see section 8).

b) Avoid handling incompatible substances / mixtures. Wet material added to molten HC FeMn poses a risk of explosion.

c) Avoid dust swirling and wear appropriate PPE.

d) Collect dust an pelletize to mitigate the impact on the environment. Process the material according to the company`s procedures.

7.1.2 Advice on general hygiene at work

a) Do not eat, drink or smoke at the workplace

b) Wash your hands before and after use and keep them dry

c) Take off contaminated clothing and PPE before entering the dining areas.

7.2 Conditions for safe storage, including any incompatibilities

7.2.1 Technical measures and storage conditions

a) Risk associated with physical and chemical properties

i) Explosive atmosphere: The substance is not explosive, but must be stored away from potentially explosive materials

ii) Corrosive conditions: Therefore, the substance have no corrosive properties on the metals, no adverse corrosive effects are expected.

iii) Flammability hazard: The substance is not flammable, but keep away from flammable materials

iv) Incompatible materials or mixtures: the information on the company`s procedure will be provided.

v) Evaporation conditions: Avoid storage along with organic evaporating materials/substances

vi) Potential sources of ignition: Keep away from sources of ignition

b) Control of the effects of weather conditions: Weather conditions, ambient pressure, different temperatures, sunlight and vibrations do not affect the integrity of the product. Do not store in the humid environment.

c) Preserving the integrity of the substance: The substance is very stable under normal conditions of use. It does not decompose and does not fall apart. Stabilizers and antioxidants are not necessary

d) Others:

i) Ventilation requirements: Provide adequate ventilation and store at room temperature

ii) Specific storage patterns: Keep / store only in original packaging / Store in big bags, containers or covered warehouses.

iii) Quantitative limits under storage conditions: There is no limitation as the substance does not pose any physical and chemical risk.

iv) Packaging compatibility: Store in original / similar packaging. Protect packaging / packaging from damage - adjust according to company procedure

7.3 Specific end use(s)

Dry the wetted material before use and follow the instructions for its use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Exposure limit values

8.1.1 Workplace exposure limits

EU SCOEL OEL values for manganese and its inorganic compounds 0.2 mg/m3 - inhalable and 0.05 mg/m3 respirable

8.1.1.1 National limits Highest permissible exposure limits (NPEL)

For manganese and its inorganic compounds (such as manganese - CAS 7439-96-5), the highest value is set at 0.2 mg/m3 as the inhalable fraction and 0.05 mg/m3 as the respirable fraction.

8.1.1.2 EU limits

0.2 mg/m^3 inhalable fraction and 0.05 mg/m^3 respirable fraction.

8.1.1.3 EU biological limit values

There are no biological limit values for inorganic manganese.

8.1.2 Monitoring Procedures

To control possible exposure, it is necessary to prevent the formation and stirring of dust. The use of suitable protective equipment is recommended. If FeMnC dust is visible, take occupational safety measures preventing fine dust above 0.2 mg/m³ in the workplace.

8.1.3 Creation of air contaminants

Under normal conditions of use, the substance does not produce contaminants into the air. OEL / BLV are not provided.

8.1.4 Derived No Effect Limits (DNELs)

Predicted No-Effect Concentrations (PNEC):

DNEL for workers:

The road	Effect type	Danger limit	The most sensitive endpoint
Inhalation	Systemic effects - long-term	DNEL (Derived No Effect Limit) 0.27mg/m³	developmental toxicity / teratogenicity (oral)
Inhalation	Systemic effects - short-term	no danger detected	
Inhalation	Local effects - long-term	no danger detected	
Inhalation	Local effects - short-term	no danger detected	
Skin contact	Systemic effects - long-term	DNEL (Derived No Effect Limit) 0.08mg/kg of body weight/day	developmental toxicity / teratogenicity (oral)
Skin contact	Systemic effects - short-term	no danger detected	
Skin contact	Local effects - long-term	no danger detected	
Skin contact	Local effects - short-term	no danger detected	
Eye contact	Local effects	no danger detected	

Environmental limits (PNEC):

Category	Conclusion about danger	Justification
Sweet water	PNEC water (freshwater): 0.064mg/L Intermittent releases: 0.32mg/L	Rating factor: 50 Extrapolation method: Evaluation factor PNEC water (fresh water) Two chronic NOEC values for algae and daphnia. NOEC = 3.2 mg/l **Conclusion of the PNEC intermittent release hazard assessment**: PNEC aqua (intermittent release) **PNEC factor for intermittent release assessment**: 100.0 **Intermittent release extrapolation method PNEC**: evaluation factor **Rationale for Intermittent Release PNEC**: Lowest L(E)C50 value from fish, daphnia and algae studies EyC50 = 32 mg/L
Sea water	PNEC aqua (seawater): 0.006mg/l Intermittent release:	Rating factor: 500 Extrapolation method: evaluation factor PNEC aqua (sea water) Two chronic NOEC values in algae and daphnia with an additional 10x factor for freshwater to marine animals. NOEC = 3.2 mg/l
Sediments (fresh water)	PNEC sediment (freshwater): 6.38mg/kg sediment dw	Rating factor: 500 Extrapolation method: evaluation factor PNEC sediment (freshwater) Equilibrium partitioning based on freshwater aquatic PNECs and a Kd value of 994 ml/ha using an additional safety factor for ingestion of sediment-bound material
Sediments (seawater)	PNEC sediment seawater): 0.64mg/kg sediment dw	Rating factor: 5000 Extrapolation method: evaluation factor PNEC sediment (freshwater)

		Equilibrium partitioning based on a marine water PNEC and a Kd value of 994 ml/ha using an additional safety factor for ingestion of sediment-bound material
Waste water treatment plant	PNEC STP: 100mg/L	Evaluation factor: 10 Extrapolation method: evaluation factor PNEC STP Activated sludge respiration/inhibition test. NOEC = 1000mg/l
Soil	PNEC soil: 6.36mg/kg soil dw	Rating factor: 50 Extrapolation method: evaluation factor PNEC land Equilibrium partitioning based on an aquatic PNEC and a Kd value of 994 ml/ha using an additional safety factor for ingestion of sediment-bound material
The atmosphere	no danger was detected:	
Secondary poisoning	no potential for bioaccumulation:	Bioaccumulation is not expected due to the inorganic nature of the substance.

8.1.5 Access control zone

The control zone approach is not used to reduce the level of risk management during the use of this substance for the uses listed in section 1.2.

8.2 Exposure controls

See Exposure scenarios in Annex 1

8.2.1 Workplace exposure control

Collect dust from the animals. Clean or recycle waste water.

8.2.2 Personal protective equipment

Wear protective clothing, safety glasses and a suitable respirator.

8.2.2.1 Other non-personal protection

Proper industrial hygiene is a must. Store and use in a well-ventilated place. See Section 5 for more information. Dust emissions from the ventilation system or workplace must be checked to see if they meet the requirements of environmental protection legislation. A concentration below 0.2 mg/m^3 does not endanger the environment.

8.2.2.2 CEN requirements for personal protective equipment

a) Eye / face protection: safety glasses

b) Skin protection: Protective clothing, gloves and boots are mandatory, as the substance irritates the skin (indicate the type of overalls, gloves and boots, including the thickness of the material.)

c) Respiratory protection: Respirator FFP 2 / N95

d) Thermal hazard: Not specified

8.2.3 Environmental exposure controls

The substance is not harmful to the environment

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance:	gray-silver substance in solid state in lump form
Odor:	none
Odor threshold:	none, the substance is odorless
pH:	not determined
Boiling point:	not determined (substance in solid state with melting point > 300°C)
Melting/solidification temperature:	>450°C, Regulation (EC) no. 440/2008, Annex, A1
Flash point:	not determined (substance is inorganic)
Flammability:	not very flammable, Regulation (EC) no. 440/2008, Method A10
Explosive properties:	not explosive
Oxidizing properties:	does not oxidize
Vapor pressure:	not determined (melting temperature > 300°C)
Relative density	5.86 at 21 °C, regulation (EC) no. 440/2008, annex, A3
Bulk weight:	approx. 3,700 kg/m^3
Solubility:	It is believed to be insoluble
Partition coefficient n-octanol/water (log. value):	not determined (substance is inorganic)
Viscosity:	not determined (at normal ambient temperature, the substance is solid and not liquid)

Auto-ignition temperature:	none
Dissociation constant:	the substance does not decompose due to the lack of appropriate functional groups
Surface tension:	the substance is not active on the surface
Stability in organic solvents:	not determined (substance is inorganic)

9.2 Other information

No further information is available regarding the safe use of the substance.

9.2.1 Physical hazard classes

Explosive properties	Not expected to be explosive
Flammable gases	Not applicable because the substance is a solid
Aerosols	Not applicable under normal conditions of use
Oxidizing gases	Not applicable because the substance is solid
Gases under pressure	Not applicable because the substance is solid
Flammability of liquids/solids	Non-flammable
Self-reactive substances and mixtures	Not self-reactive
Self-igniting liquids	Not applicable because the substance is a solid
Self-igniting solids	Does not have self-igniting properties
Self-heating substances and mixtures	Self-ignition does not occur
Substances and mixtures which release flammable gases in contact with water	Not expected to release flammable gases in contact with water
Oxidizing liquids/solids	Non-oxidizing substance (method A17)
Organic peroxides	Does not apply to inorganic substances
Corrosive to metals	The substance is not corrosive to metals
Desensitized explosives	Not applicable

10. STABILITY AND REACTIVITY

10.1 Reactivity

No specific reactivity test data are available for this substance.

10.1.1 Danger of substance reactivity

Does not apply to inorganic substances

10.1.2 Danger of reactivity of the mixture

Not applicable because the substance is not a mixture

10.2 Chemical stability

The substance is chemically stable under the recommended conditions of storage and use.

10.3 Possibility of hazardous reactions

If the material is handled and stored according to the instructions, there is no risk of dangerous reactions.

10.4 Conditions to avoid

Avoid contact of melt with water. A violent explosion may occur when molten material comes into contact with water.

10.5 Incompatible Materials

Water.

10.6 Hazardous decomposition products

They are not, if the preparation is used in accordance with the intended use.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

End points	The result of the impact assessment
Acute toxicity	No worries: All acute studies performed on the individual components of the preparation/mixture produced negative results. Therefore, no acute effects were expected for this mixture.
Skin corrosion/Skin irritation	Rabbits are assumed to be non-irritant based on available studies (according to OECD Guideline No. 404 and EU Method B.4, GLP) using the individual component(s).
Serious eye damage/Eye irritation	Based on available studies (according to OECD guideline No. 405 and EU method B. 5, GLP) using individual components/components, it is assumed not to be irritating to the rabbit eye.
Respiratory or skin sensitization	Based on available studies (according to OECD Guideline No. 429 and EU Method B.42, local lymph node test, SLP) using the individual component(s), it is assumed that no skin sensitizer will occur in mice. No information is available on respiratory sensitization. However, it is not believed to be a respiratory sensitiser.
Germ cell mutagenicity	Negative in all tests performed using $MnCl_2$ - a very soluble salt considered a worse case assessment: • Ames test with S. typhimurium TA 98, TA 100, TA 1535, TA 1537, E coli WP2 uvrA (Met. act.: sa bez) (OECD TG 471, EU method B13 and GLP); No toxicity was observed at a concentration of 5000 g/plate. • mammalian cell gene mutation test with mouse lymphoma L5178Y cells (met. act.: sa bez) (OECD 476 and SLP); Negative for mouse lymphoma, Cytotoxicity: Yes, induced toxicity was not at the highest dose • In vitro mammalian chromosome aberration test with human lymphocytes (Met. act.: sa bez) (OECD guideline 473 and GLP). Negative for lymphocytes. Cytotoxicity: Yes.
Carcinogenicity	No carcinogenicity studies are available for this substance. However, since all in-vitro genotoxicity tests of the more biologically widespread manganese salt were negative and an expert report (Jenkinson, 2009) as well as a review of the professional literature on the carcinogenicity of Mn and its inorganic compounds (Assem et al. 2011) do not speak of any concerns, the carcinogenicity of the substance not expected in humans.
Reproductive toxicity	Two-generation reprotoxicity study in male/female rats using $MnCl_2$ by inhalation (OECD Guideline 416, SLP): conclusion: No effects related to the indication of 20 mg/m³ air in the F0, F1 and F2 generations (Jardine L, 2013 and McGough & Jardine, 2017) - It is not toxic for reproduction. Prenatal toxicity study using MnCl2 via inhalation (OECD 414, SLP): No fetal abnormalities confirmed at unspecified dose of 15 mg/m3 (Dettwiler M, 2016) NOEL: 1000mg/kg/bw - Prenatal development study (PND) in rats at SLP. NOAEL: less than 100mg/kg/day - Prenatal development study (PND) in rabbits on SLP

Specific target organ toxicity (STOT) - single exposure	Based on the available data, the classification criteria are not met.
Specific target organ toxicity (STOT) - repeated exposure	Based on the available data, the substance does not meet the criteria for inclusion. However, epidemiological studies from some metallurgical companies have demonstrated the possibility of an adverse impact on human health through repeated, long-term inhalation of dust exceeding the exposure limit values.
Risk of aspiration	Lack of data.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No environmental concerns.

Acute (short-term) toxicity:

Current OECD and GLP studies on the ecotoxicity of the ingredients/ingredients have shown negative results. An acute daphnia study (OECD guideline 202, EU method C2 and SLP. EC50/LC50 (48h) for freshwater invertebrates) on the preparation (FeMn) resulted in an EC50 >42mg alloy/l.

Environmental Limits: Predicted No Effect Concentrations (PNEC) and Predicted Effects Concentrations for the environment are not derived for this special preparation/mixture as it is not mandatory.

12.2 Persistence and degradation

No potential for persistence - no data

12.3 Bioaccumulative potential

No potential for bioaccumulation - no data

12.4 Mobility in soil

There is no potential for transfer to groundwater - no data

12.5 Results of PBT and vPvB assessment

It is assumed that the product will not be PBT and vPvB

12.6 Endocrine disrupting properties

The mixture/special preparation is not considered to be an endocrine disruptor based on the available literature - Missing data

12.7 Other adverse effects

None known

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Disposal of HC FeMn must be in accordance with local and national legislation. Unconsumed HC FeMn content should be consumed by the user or recycled according to national legislation in the R4 way (recovery of metals). The unused product is not hazardous waste.

14. TRANSPORT INFORMATION

It is transported in bulk or in big bags in tippers with tarpaulin, trucks with tarpaulin, open/closed wagons, containers.

In sea transport, it is transported in bulk or in containers.

14.1 UN number

Not applicable.

14.2 UN proper shipping name

Not applicable

14.3 Transport hazard class

She is not dangerous

14.4 Packaging group

It is not applicable

14.5 Danger to the environment

It is not dangerous for the environment

14.6 Special safety measures for users

none

14.7 Bulk transport according to Annex II to MARPOL73/78 and the ISBC code

Not applicable.

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legal regulations concerning the substance:

UN GHS – UN Globally Harmonized System of Classification and Labeling of Chemical Substances (GHS):

"According to Chapter 1.5.2 of the Globally Harmonized System of Classification and Labeling of Chemicals (SDS), UN Safety Data Sheets (SDS) are required only for substances and mixtures that meet the harmonized criteria for physical, health or environmental hazards. This product does not meet these criteria.

EU CLP - CLP Regulation on classification, labeling and packaging of chemical substances and mixtures:
According to Article 59(2)(b) EC no. 1272/2008 (CLP), regulating Article 31(1) of the REACH regulation, safety data sheets (SDS) are required only for substances and mixtures/special preparations that meet the criteria for threats to safety, health and the environment. Since this product does not meet the given criteria, a safety data sheet according to EC 453/2010 will not be issued. To provide information related to safety and health and environmental protection, product safety information will be provided instead.

EU REACH - Registration, evaluation and authorization of chemical substances:

According to Article 31(7) of the REACH Regulation, exposure scenarios resulting from the Chemical Safety Report (CSR) are required to be documented as an annex to the Safety Data Sheet. However, according to the REACH regulation Annex I, part 0. (Introduction), subsection 0.6. no. 4 and 5 such exposure scenarios are required only for substances and mixtures that are classified as dangerous. As this product is not classified as hazardous in the sense of CLP, the provision of exposure scenarios is not required." A chemical safety assessment was carried out for the main components of this substance. According to the REACH regulation, this substance does not require authorization.

There are no special regulations, restrictions and prohibitions.

15.2 Chemical safety assessment

A chemical safety assessment has not been performed for this substance

16. FURTHER INFORMATION

These data are based on our current knowledge, but do not represent any guarantee of any particular product properties and do not establish any legally binding contractual relationships.

16.1 List of abbreviations used

DNEL:	derived no effect limit
EC_{50}:	mean value of the effective concentration

LC_{50}:	median value of the lethal concentration
NOEC:	no observed effect concentration
OEL:	workplace exposure limit value
PBT:	persistent, bioaccumulative and toxic substances
vPvB:	persistent, very bioaccumulative substances

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