SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY /UNDERTAKING

1.1 Product identifier:

Trade name:	NANOFER 25P
Substance name:	Iron
EC No.:	231-096-4
R EACH Registration No.:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS No.:	7439-89-6

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: Metal powder for industrial usage, it is highly applicable in the reduction technologies of ground-water remediation and waste water treatment.

1.3 Details of the supplier of the Safety Data Sheet:

Supplier:	NANO IRON, s.r.o.
Street address:	Štefánikova 116
Country ID/Postcode/Place:	(CZ) Czech Republic/66461/Rajhrad
Telephone number/Fax:	+420 513 033 633/ +420 547 230 212
E-mail address:	info@nanoiron.cz
National contact:	+420 513 033 633
Identification number:	28298055

1.4 Emergency telephone number: +420 224 919 293 or +420 224 915 402 (non-stop medical service), TIS Praha, Na Bojišti 1, 128 08 Prague 2. Czech Republic.

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

2.1.1 Classification according to Regulation (EC) No 1272/2008 [CLP]

Pyrophoric solids, category 1, H250.

2.1.2 Additional information:

For full text of R-phrases and Hazard- and EU Hazard-statements: see SECTION 16.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 [CLP]

Hazard pictogram(s):

Signal word:
Danger
Hazard statement(s), H and EUH:
H250 Catches fire spontaneously if exposed to air. Full text of the R-phrase mentioned in this Section, see Section 16.
Precautionary statement(s), P, in full
P210 Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
P231 Handle under inert gas
P233 Keep container tightly closed
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/protective clothing/eye protection/ face protection.
P305+P351+P338IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Supplemental Hazards
None

2.3 Other hazards

None

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances:

Ferrous powder of nonvalent chain with average particle size to 50nm.

Formula:	Fe
Molecular weight:	55,85 g/mol
CAS No.:	7439-89-6
EC No.:	231-096-4

Name	Weight % content	ES number (EINECS, ELINCS	CAS No.	Classification according to Regulation (EC) No 1278/2008 (CLP).
Iron (Fe)	≥ 80%	231-096-4	7439-89-6	Pyr. Sol. 1
Iron oxide (Fe_3O_4)	≤ 20 %	215-721-8	1345-25-1	Iron oxide not classified as dangerous

3.2 Mixture

Not applicable

3.3 More information

The full text of R-phrases and H-statements is contained within section 16, paragraph 16.1.

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

- general notes
Remove stained clothing. In case of any uncertainty or any symptoms, to seek medical advice immediately and show this safety data sheet or product label. Take care to protect own health. In case of burns, it is necessary to proceed in accordance with first aid for burns.

- following inhalation
Immediately move affected person to fresh air. Immediately, respective based on affecting symptoms, call a medical care.

- following skin contact
Affected skin wash with soap and water, rinse thoroughly and eventually apply a protective cosmetic cream. Not use any solvents. In case of skin irritation or other difficulties, consult next steps with a specialist.

- following eye contact
Open eyelid, or remove the contact lens and flush the eye continuously with running water for at least 15 minutes. Consult next steps consult with an ophthalmologist.

- following ingestion
Thoroughly rinse the mouth. Do not induce vomiting. Keep the affected person in warm and quiet environment. Immediately notify the doctor.

- self-protection of the first aider
No data available

4.2 Most important symptoms and effects, both acute and delayed
See section 2.2 and section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing media
Suitable extinguishing media: Extinguishing powder, or sand.
Unsuitable extinguishing media: Water, CO_2, halogen extinguishing products.

5.2 Special hazards arising from the substance or mixture
When burning, the combustion gases and steam can be produced. The inhalation of decomposition combustion products may result in health damage.

5.3 Advice for firefighters
Warning! Use black glasses during firefighting – the danger of blindness. The metals burn with a dazzling light which can damage the retina. The eye protection is required. The protective equipments must be chosen according to the fire greatness. Appropriate protective breathing mask with independent air supply and possibly full protective clothing.

5.5 Additional information
Cool by water the products in sealed containers which are near the fire. If possible, remove the products within undamaged containers from danger area. Contaminated extinguishing water must be stored separately, do not discharge it into the drains. The fire extinguishing water or used firefighting media with combustion residues must be disposed in accordance with relevant regulations.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Respect the guidelines specified within points 7 and 8. Avoid contact with eyes, skin and clothing. The area must be sufficiently ventilated. Prohibition of entry by unauthorized persons. Do not smoke. In case of possible negative impact due vapors use breathing apparatus.

6.2 Environmental precautions
To avoid the increase of leaking amount. Do not allow the product get into the drains, surface and ground waters and soils. In case of greater leaks into the environment, to proceed according to local regulations (Water Act, point 16.3) and to contact the relevant departments of local authorities, environmental department and the Czech Environment Inspection.

6.3 Methods and material for containment and cleaning up

After the burnout, the spilled product must be pick up and collect within suitable labeled containers. Next steps of disposal process are governed by rules within the section 13. To protect health from exposure by substances contained in air, see the hygienic limit values of exposure, as specified in section 8, paragraph 8.1 Thoroughly wash the affected area and used tools with suitable detergent. Do not use solvents.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling
Before usage, it is necessary to become familiar with the content of sections 2, 6, 8 and 11. It is necessary to respect the health and safety regulations for chemical handling. Keep product containers tightly closed. Ensure adequate ventilation or appropriate local workspace exhaustion. Avoid dust creation. Avoid product contact with eyes and skin. Respect the guidelines and instructions for usage on the product packaging label. Process material only under the protection of inert gas.
Do not eat, drink or smoke during work. Before break and after work, wash your hands and take off contaminated clothing. Store this clothing separately.

7.2 Conditions for safe storage, including any incompatibilities
Technical measures and storage conditions:
Keep containers tightly closed. Prohibit smoking. Prevent access by unauthorized persons. Pay attention to instructions on the product packaging. Store in a dry, cool and well ventilated place. Protect from direct sunlight and heat exposure. Keep away from foodstuffs, beverages and feeds. Store separately from oxidizing agents, acids, alkalis, acetylene, ammonia.
Store under inert gas!
Packaging materials:
Store in original packaging.
Requirements for storage rooms and vessels:
Store in a dry, cool and well ventilated place. Store in original packaging (fireproof container).

7.3 Specific end use(s)
Product usage is specified by its manufacturer within the instruction manual, which is on the package label or in attached documentation.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Chemical name	CAS number	PEL value [mg/m^3]	NPK-P value [mg/m^3]
There are no exposure limits	-	-	-

8.2 Exposure controls

8.2.1 Appropriate engineering controls
Ensure adequate ventilation. This can be secured by local exhaust from the workplace, or by a total air handling system.
8.2.2 Individual protection measures, such as personal protective equipment

a) Eye/face protection: Use tightly fitted safety goggles (EN 166). During a fire, use black glasses in addition (due risk of retina damage).

b) Skin protection: Use protective clothing with long sleeves, respectively safety protective footwear (EN 344).

Hand protection: Very appropriate is to use hand protective cream.
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique

(without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices.
Wash and dry hands. Very appropriate is to use hand protective cream.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm

Break through time: 480 min

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min

c) Respiratory protection: Under normal conditions is not respiration protection required. In case of insufficient ventilation and dust production use a respirator with appropriate filter for solid particles with a size < 50 nm.

8.2.3 Control of environmental exposure: Do not let product enter drains.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance:	solid - powder (nanomaterial)
- Color:	black
- Granulometry:	d50 < 50nm
- Specific surface:	> 25m^2/g
- Specific gravity:	1.15 – 1.25 g/cm^3 (20°C)
- Surface charge:	zero (0)
- Zeta potential:	-
b) Odour:	no odour
c) Odour threshold:	no odour
d) pH:	11 -12
e) Melting point/feezing point:	not applicable
f) Boiling point and boiling range:	not applicable
g) Flash point:	not applicable
h) Evaporation rate:	not applicable
(i) Flammability (solid, gas):	not applicable
(j) Upper/lower flammability or explosive limits:	not applicable
(k) Vapour pressure:	not applicable
(l) Vapour density:	not applicable
(m) Relative density:	not applicable
(n) Solubility(ies):	substance is possible to thin in water
(o) Partition coefficient: n-octanol/water:	not applicable
(p) Auto-ignition temperature:	not applicable
(q) Decomposition temperature:	not applicable
(r) Viscosity:	not applicable
(s) Explosive properties:	not applicable
(t) Oxidizing properties:	not applicable

9.2 Other information

No data available

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

With water - a small volume of hydrogen is generated in water reaction (less than 1l/1kg·hr);

10.2 Chemical stability

Stable under recommended storage conditions;

10.3 Possibility of hazardous reactions:

Not applicable

10.4 Conditions to avoid:

Avoid air, elevated temperatures, ignition sources;

10.5 Incompatible materials:

Oxidizing agents, acids, acetylene, ammonia;

10.6 Hazardous decomposition products

At high temperatures, the product can produce hazardous decomposition products. See section 5, paragraph 5.3.
In case of fire: see Section 5.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

• Acute toxicity:

Acute toxicity of the product components				
LD_{50}, oral, sewer rat:	30 000 mg/kg	-	-	-
LD_{50}, dermal, sewer rat or rabbit:	Not tested	-	-	-
LC_{50}, inhalation, sewer rat, for aerosols or particles for 4 hours:	Not tested	-	-	-

LC_{50}, inhalation, sewer rat, for gases and vapours for 4 hours:	Not tested	-	-	-

- **Skin corrosion/irritation:** Can irritate skin.
- **Serious eye damage/irritation:** Can cause eye irritation.
- **Respiratory or skin sensitization:** Not determined for the product. Product components have no sensitizing effect.
- **Germ cell mutagenicity:** Not determined for the product. Product components have no mutagenic effect.
- **Carcinogenicity:** Not determined for the product. Product components have no carcinogenic effect.
- **Reproductive toxicity:** Not determined for the product. Product components have no teratogenic effect.
- **Summary of evaluation of the CMR properties:** No data available
- **STOT-single exposure;** No data available.
- **STOT-repeated exposure:** No data available.
- **Aspiration hazard:** Dust inhalation can irritate the respiratory system.
- **Additional Information:** RTECS: No data available.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Acute toxicity of the product components	**g/l**			
LC_{50} (96 hours, fishes):	3,17			
EC_{50} (48 hours, daphnia):	13,8			
IC_{50} (72 hours, algaes):	1,2			

12.2 Persistence and degradability
No data are available.

12.3 Bioaccumulative potential
No data are available.

12.4 Mobility in soil
No data are available.

12.5 Results of PBT and vPvB assessment
No data are available.

12.6 Other adverse effects
Substance is not classified as dangerous for the environment.

12.7 Additional information

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

13.1.1 Safe handling of surplus or waste from expected usage
The substance and its surpluses must be put only to specified area for waste and must be dispose together with the sorted waste, e.g. in waste incinerators.

13.1.2 Suitable methods for disposing of the product and any contaminated packaging
Empty containers completely. Hand empty containers over to authorized company that has permissions for their removal. Dispose waste in accordance with relevant local regulations with suitable devices. Sort and put other waste according to type of material into containers for recycling or to places specified by local authorities.

13.1.3 Sewage disposal-relevant information:

	Catalogue No.	**Waste type name**	**Waste classification**
Preparation	06 03 99	Wastes not otherwise specified	Hazardous waste
Burned preparation	06 03 16	Metallic oxides other than those mentioned under No. 06 03 15	Other waste
Container	15 01 04	Metal packaging	Other waste

13.1.4 Other disposal recommendations:
Waste Catalogue (according to section 16.3).
Determined waste catalogue numbers are recommended based on probable usage of this product. Based on special usage and its real disposal by user, the other waste catalogue numbers can be used as well.

SECTION 14: TRANSPORT INFORMATION

14.1 UN number: ADR/RID: 1383 IMDG: 1383 ICAO/IATA: 1383

14.2 UN proper shipping name:
ADR/RID: METAL POWDER, FLAMMABLE, N.O.S. (iron powder)
IMDG: METAL POWDER, FLAMMABLE, N.O.S. (iron powder)
IATA: Metal powder, flammable, n.o.s. (iron powder)

14.3 Transport hazard class(es): ADR/RID: 4.2 IMDG: 4.2 ICAO/IATA: 4.2

14.4 Packing group: ADR/RID: I IMDG: I ICAO/IATA: I

14.5 Environmental hazards: ADR/RID: no IMDG Marine Pollutant: no ICAO/IATA: no

14.6 Special precautions for user:
Transport category: 0
Packing instructions: P404, MP13

SECTION 15: REGULATORY INFORMATION

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment:

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

SECTION 16: OTHER INFORMATION

The full text of H-Statements:

H250 Pyrophoric solids. H250 Catches fire spontaneously if exposed to air.

The full text of R-phrases:

R17 Spontaneously flammable in air.

16.1 Explanatory notes

Ecotoxicological and toxicological data were obtained from ESIS (European Chemical Substances Information System), specifically from IUCLID (International Uniform Chemical Information Data Base). The database lists the properties of substances that are classified in Annex I of Directive 67/548/EEC, as well as substances for substances without this classification. For additional information was also used the chemical database of Merck company.

Material safety data sheet contains necessary data for ensuring of health protection at work and environmental protection. These data correspond to the current state of knowledge and experience and are in compliance with applicable laws and regulations. They cannot be considered as a guarantee for appropriateness and usability for particular application.

The basis for the development of Czech MSDS were product information from NANO IRON, s.r.o. company. In addition following sources: THE METHODS OF FIREFIGHTING IN THE PRESENCE OF ALKALI AND POWDER METALS (Ing. Michal Miškanič, MV - GENERÁLNÍ ŘEDITELSTVÍ HZS ČR ODBORNÁ PŘÍPRAVA JEDNOTEK POŽÁRNÍ OCHRANY).

16.2 Legislation

- The European Parliament and Council Regulation (EC) No. 1907/2006 REACH
- Act No. 371/2008 Coll., which amend Act No. 356/2003 Coll., on chemical substances and chemical preparations as amended
- Public notice No. 369/2005 Coll., which amend Public notice No. 232/2004 Coll., which implement certain provisions of the Act on chemical substances and chemical preparations and on certain acts amending relate to the classification, packaging and to labeling of hazardous chemicals and chemical preparations
- Government decree No. 178/2001 Coll., which set the health protection conditions of workers at work
- Act No. 185/2001 Coll., on waste and on certain other acts amending, as amended
- Ministry of Environment public notice No. 381/2001 Coll., which establish the Waste Catalogue.
- Act No. 94/2004 Coll., which amend Act No. 477/2001 Coll., on packaging and on some acts amending (Act on packaging), as amended
- Act No. 254/2001 Coll., on waters and on certain other acts amending (Water Act)
- Act No. 258/2000 Coll., on the public health protection and on some related acts amending, as amended
- European Agreement about international transport of dangerous goods (ADR), announced under No. 64/1987 Coll., As amended
- Convention on International Transport (COTIF), announced under No. 8 / 1985 Coll., As amended
- Act No. 49/1997 Coll., on civil aviation and on amending and supplementing of Act No. 455/1991 Coll.
- Act No. 61/2000 Coll., on nautical navigation, as amended
- Act No. 86/2002 Coll., on Air protection, as amended
- Public notice No. 355/2002 Coll., which set emission limits and other operation conditions for other stationary sources of air pollution, which emit volatile organic compounds from processes employing organic solvents and from petrol storage and distribution

Czech MSDS prepared by:
EKO-ADR, s.r.o. (www.ekoadr.cz)

Translation into English by:
AMEC s.r.o., 28. 7. 2011 (www.amec.cz)
1st revision of MSDS made by:
AMEC, s.r.o. dne 28. 7. 2011 (www.amec.cz)
Date of 2nd revision of MSDS: 5. 1. 2012
Date of 3rd revision of MSDS: 10. 1. 2014
Date of 4th revision of MSDS: 22. 4. 2014
Date of 5th revision of MSDS: 31. 8. 2015
Date of 6th revision of MSDS: 8. 4. 2016