1. Identification of chemical products and information on the manufacturer and/or supplier

1.1 Identification of chemical products

1.1.1 Technical name	Cenospheres [1]
1.1.2 Brief application recommendations (including application limitation)	Used as an additive to drilling fluids for drilling of various holes. [1]

1.2 Information on the manufacturer and/or supplier

1.2.1 Full official company name	OOO Ecosfera
1.2.2 Address (postal and legal)	630007, Novosibirsk, ul. Sovetskaya 5, Building B, Suite 703.
1.2.3 Telephone, including urgent calls and time limits	8 (383) 289-26-23
1.2.4 Fax	8 (383) 289-26-23
1.2.5 E-mail	ecosfera_zhogova@mail.ru

2. Identification of hazard (hazards)

2.1 Hazard level of chemical products in general (information on classification of hazards according to the legislation of the Russian Federation (GOST 12.1.007-76) and GHS (GOST 32419-2013, GOST 32423-2013, GOST 32424-2013, GOST 32425-2013)

As to the health effect, the substance is hazard category 4 according to GOST 12.1.007 [1, 2].

According to GHS the product is classified as: [3,4,5]

The product causes lesions (necrosis)/irritation of skin, class 2.
The product causes severe lesions/irritation of eyes, class 2A.
The product is selectively toxic for target organs and/or systems in case of single exposure, class 3.
The product is selectively toxic for target organs and/or systems in case of multiple /prolonged exposure, class 2.

2.2 Information on safety marking according to GOST 31340-2013

2.2.1 Signal word: **Hazard** [6]

2.2.2 Hazard symbols: 'Health hazard', 'Exclamation mark'

[6]

2.2.3 Hazard statement (H-sentences)

H 315: Causes skin irritations;

H 319: Causes strong irritations of eyes;

H 335: May cause irritations of upper respiratory airways;

H 373: May cause lesions of organs (lungs) in case of multiple or prolonged exposure. [6]

3 Composition (information on components)

3.1 Product information in general

3.1.1 Chemical name (according to IUPAC)	No. Mixture of substances [1]
3.1.2 Chemical formula	No. Mixture of substances [1]

3.1.3 Composition general characteristics (with account of brand assortment; production method) — Cenospheres are produced by means of fly ash processing formed during hardcoal combustion at heat power plants. [1]

3.2 Components

(designation, CAS and EC numbers, mass concentration (the total should be 100%), work area TLV or work area SRLI, hazard classes, references)

Table 1 [1,7, 8]

Components (designation)	Mass concentration, %	Hygienic rating for work area air		№ CAS	№ EC
		work area TLV mg/m3	Hazard class		
Aluminum silicate, $Al_2(SiO_3)_3$	78-95	-/6, a, F	4	1302-76-7	215-106-4
Diiron trioxide (II, III), Fe_2O_3	1.74	-/6, a, F	4	1309-37-1	215-168-2
Ferric oxide (II, III), Fe_3O_4	0.61	No	No	1317-61-9	215-277-5
Titanium dioxide	0.5-1.5	-/10, a, F	4	13463-67-7	236-675-5
Calcium oxide+, CaO	0.5-7	1, a	2	1305-78-8	215-138-9
Magnesium oxide	1.5-2.5	4, a	4	1309-48-4	215-171-9
Note: a - aerosol, F - mostly fibrogenic aerosols					

4 First Aid

4.1 Observed symptoms

4.1.1 In case of inhalation poisoning (aspiration) — Inhalation of high dust concentrations may cause throat irritation, coughing, headache, weakness, dizziness. [1, 7].

4.1.2 Skin exposure — Causes irritation, reddening, may cause edema. [1, 7].

4.1.3 Eyes exposure — Causes irritation, reddening, may cause edema. [1, 7].

4.1.4 In case of oral poisoning (swallowing) — Nausea, vomiting, possible diarrhoea. [1, 7].

4.2 First aid measures

4.2.1 In case of inhalation poisoning (aspiration) — Fresh air, bed rest, warmth, horizontal position, free from tight clothes. [1, 7].

4.2.2 In case of skin exposure — Rinse with running water [1, 7]

4.2.3 In case of eyes exposure — Rinse widely open eyes with running water. [1, 7].

4.2.4 In case of oral poisoning (swallowing) — In case of not feeling well contact the toxicological center or your health care professional. [1, 7].

4.2.5 Contraindications. — No.

5 Fire-fighting measures

5.1 General fire-fighting characteristics (according to GOST 12.1.044-89) — Fire and explosion safe [1.9]

5.2 Fire and explosion safety values (set of parameters according to GOST 12.1.044-89 and GOST 30852.0-2002) — Not reachable [1]

5.3 Combustion products and/or thermodestruction products and resulting hazards — The product is fire safe. [1]

5.4 Recommended fire fighting aids. — In the fire seat use all fire fighting aids for the principal ignition source, including felt mats, sand, water sprays,

	acid fire extinguishers. [1, 10].
5.5 Prohibited fire fighting aids.	No. [1]
5.6 Personal protection equipment for fire-fighting (PPE for firemen)	Fire-protection suit with a self-rescue device SPI-20 [23]
5.7 Specifics of extinguishing	The product is fire safe. However, package can be exposed to combustion. [1]

6 Accidental release measures

6.1 Precautions against adverse effects on people, environment, buildings, constructions. etc. in case of emergency

6.1.1 Required general precautions in case of emergency	Send away unauthorized persons. Enter the hazardous area only with personal protection equipment. Follow fire safety regulations. No smoking. Eliminate the source of fire and sparks. Provide first aid to the injured persons. All emergencies should be reported to the local authorities of the Federal Oversight Service for Consumers' Rights and Human Welfare, the regional committee of the Civil defense and emergency situations [23]
6.1.2 Personal protection equipment in emergency (PPE for emergency teams)	In case of fire - fire-protection suit with a self-rescue device SPI-20 [23]

6.2 Accidental release measures order

6.2.1 Actions in case of leakage, spillage, scattering (including measures for utilization and safety measures ensuring environmental protection)	Enclose scattered products with earthwork, collect into dry containers and seal. Prevent from getting into waterways, basements, sewer systems. [23]
6.2.2 Actions in case of fire	Extinguish from the largest possible distance with sprayed water with penetrating agent, air-filled foam, other agents. Cool containers with water from the largest possible distance. [23]

7 Rules of storage of chemical products and handling it during loading and unloading

7.1 Safety precautions during handling chemical products

7.1.1 Engineering safety precautions systems	The principal hygienic measures should be aimed at localization of dust release sources and dust elimination. [1] Centralized supply and exhaust ventilation of industrial premises. Replacement of dusty processes by humid ones; sealing of industrial machines and storage containers. [1] Inspection of air environment in industrial rooms. Provision of people with PPE, special clothing and shoes, trainings and medical examinations of workers. [1]
7.1.2 Environmental protection measures	Measures preventing the cenospheres from getting into the drainage systems, as well as into open waterways and soil. [1]

7.1.3 Recommendations on safe transportation	Transport in sealed containers by all kinds of closed vehicles in accordance with cargo transportation regulations for the corresponding vehicle. Nonhazardous goods. [1]

7.2 Rules of chemical products storage

7.2.1 Conditions and periods of safe storage (including guaranteed shelf life, useful time, incompatible for storage substances and materials).	The cenospheres should be stored in intact manufacturer's package on pallets in closed storage rooms of the consignor (consignee). the guaranteed shelf life after loading is one year. [1]
7.2.2 Tare and package (including materials of tare and package)	The cenospheres should be packaged in paper and PE bags manufactured abroad, the strength properties of which correspond to GOST 2226 and GOST 17811. Weight (20±0.5) kg, (30±0.5) kg, (40±0.5) kg, (50±0.5) kg, (500±1.0) kg. [1]
7.3 Safety precautions and storage precautions in everyday life	Not used in everyday life. [1]

8 Exposure controls/personal protection

8.1 Work area parameters to be inspected (work area TLV or work area SRLI)	Air in the work area is controlled in accordance with GOST 12.1.005 and according to the standards stated in GN 2.2.5.1313-03 [2]. Air in the work area is controlled in relation to components (oxides and primitive components) included into the cenospheres composition: Aluminum silicate work area TLV = -/6, aerosol, hazard class 4. Diiron trioxide work area TLV = -/6, aerosol, hazard class 4. Calcium oxide+ work area TLV = 1, aerosol, hazard class 2. [1, 2].
8.2 Exposure controls	Work area environment control as to the dust contents. Equipping of work areas with balanced and local ventilation. [1]

8.3 Personal protection equipment for the staff

8.3.1 General recommendations	Preliminary periodical medical examinations of the staff including clinical blood test. Trainings for the staff in industrial safety rules. Disqualification of persons with allergic, lung, liver, skin and endocrine diseases, pregnant and lactating women. Exclusion of direct contacts with the products, PPE use. Personal care: no eating, drinking and smoking at work; take shower after work; don't take work clothes home, regular change of special working clothes. [1]
8.3.2 Respiratory organs protection (RPE types)	Respiratory protection equipment: Filter gas mask, brands B or Small Box Respirator according to GOST 12.4.121 or respirator SB-1 Lepestok-40 according to GOST 12.4.028. [1.11]
8.3.3 Protection equipment (material,	Persons related to the production of cenospheres should

type) (special clothing, special shoes, hands protection, eye protection)	have special clothing. We recommend protection materials with PVC, PE, teflon coating. Shoes according to GOST 12.4.011 and protection for hands, eyes, respiratory organs according to GOST 12.4.103. [1]
8.3.4 Personal protection equipment for everyday use	Not used in everyday life. [1]

9 Physical and chemical properties

9.1 Physical condition (state of aggregation, color, odor)	MCenospheres are light-grey fine-dispersed powder. [1]
9.2 Parameters characterizing main properties of the product (temperature values, pH, solubility, coefficient n-octanol/water and other parameters typical for products of this type)	Dense loaded density, not exceeding, kg/m3: 450 Humidity, %, not exceeding: 0.5 Thermal conductivity, W/(m*K), not exceeding: 0.12 Hydrostatic strength at pressure of 10 Mpa, %, not exceeding: 10 [1]

10 Stability and reaction ability

10.1 Chemical stability (for unstable products indicate decomposition products)	Cenochperes are stable under standard conditions. [1]
10.2 Reaction ability	MCenospheres do not interact with water, alkaline solutions, carboxylic acid solutions; with diluted mineral acids they interact slowly. [7]
10.3 Conditions to be avoided (including hazardous effects at contacts with incompatible substances and materials)	No. [7.8]

11. Toxicity data

11.1 General impact characteristics (evaluation of the hazard level (toxicity) impact on the human body and the most evident hazard effects)	According to GOST 12.1.007, cenospheres are included into the group of low hazardous products for humans [1, 2].
11.2 Impact ways (inhalation, swallowing, skin or eyes exposure)	Inhalation - inhaling of dust; swallowing - getting into digestive organs (for example, violation of labour hygiene). Getting onto the skin and mucous membranes of eyes (for example, pyrite dust cynders) [1,7,8]
11.3 Exposed organs, tissues and systems.	Nervous and respiratory systems, liver, kidneys, blood, gastrointestinal tract, mineral metabolism [7,8]
11.4 Information on hazardous impacts in case of direct contact with products, as well as consequences of such impact (irritating impact on upper respiratory ways, eyes, skin; skin-resorption and sensibilizing action)	*Product in general:* Dust can cause mechanical and chemical irritating impact on mucous membranes of eyes and the skin, it can irritate mucous membranes of upper respiratory ways. It is mostly fibrogenic (aluminum silicat, ferric oxide, titanium oxid). It does not penetrate through undamaged skin. It has no sensibilizing action. [7.8]
11.5 Information on distant hazardous consequences of the product impact on the human body (impact on reproductive function, carcinogenic	Aluminium compounds: According to the conclusions of the International Agency of the Research of Cancer (IARC), compounds of

effect, mutagenicity, cumulative action and other chronic impacts)

aluminium production can cause carcinogenic effects in working population and other people, expressed as the increased number of cancer patients, mostly respiratory organs cancer. Accompanying diseases: pulmonary emphysema, lung aluminosis.

Silicon compounds:

According to the conclusions of the International Agency of the Research of Cancer (IARC), components of amorphous silicon dioxide do not cause tumours.

Calcium, magnesium, titanium, and ferric oxides:

Embryotropic, gonadotropic, teratogenic, carcinogenic and mutagenic effects have not been studied.

Cumulative properties are expressed weakly, which is explained by low contents of calcium oxide. [7,8,12,13,14]

11.6 Acute toxicity
(DL_{50} (LD_{50}), administration way (intragastrically, epicutaneous), animal; CL_{50} (LC_{50}), exposure time (h), animal)

Aluminum silica:

LD_{50} > 5000 mg/kg; rat, intragastrically.

LD_{50} not reached, epicutaneous.

LC_{50} not reached, inhaled.

Ferric oxide (II, III):

LD_{50} > 10000 mg/kg; rat, intragastrically.

LD_{50} not reached, rat, epicutaneous.

LC_{50} not reached, inhaled.

Calcium oxide:

LD_{50} > 2000 mg/kg; rat, intragastrically.

LD_{50} not reached, rat, epicutaneous.

LC_{50} = 2500 mg/m3, inhaled.

Titanium dioxide:

LD_{50} > 5000 mg/kg; rats, intragastrically

LD_{50} > 5000 mg/kg; rat, epicutaneous.

LC_{50} = 2300 mg/m3, inhaled. 4 h, rat [8].

Product in general: (calculation)

LD_{50} > 5000 mg/kg; rat, intragastrically.

LD_{50} > 5000 mg/kg; rat, epicutaneous.

LC_{50} = 5000 mg/m3, inhaled [4,8]

12 Information on environmental influence

12.1 General characteristics of environmental influence
(atmospheric air, waterways, soil, including the observed impact signs)

The product forms no toxic substances in air and sewer water in presence of other substances or factors at ambient temperature, the surface remains passive. But under the influence of aggressive substances (acids, alkali) leaching of aluminium with formation of aluminates toxic for flora and fauna is possible. [12.13]

12.2 Environmental influence

In case of violation of storage, transportation rules, unorganized allocation and deposition; unauthorized use;

as results of emergency and extraordinary situations. [12.13]

12.3 The most significant characteristics of environmental impact

12.3.1 Hygienic norms

(admissible concentrations in atmospheric air, water, including fisheries, soil)

Table 2 [1,15-18]

Components	TLV atm.air or SRLI atm.air, mg/m^3 (LC[1], hazard class)	TLV water[2] or APL water, mg/l, (LHI, hazard class)	TLV fisheries[3] or SRLI fisheries, mg/l (LHI, hazard class)	TLV or APC soil, mg/kg (LHI)
Aluminum silica	0,01 (SRLI)	0,5 (SRLI)	0,03 (tox.; hazard class 4) kaolinic fiber	not stated
Ferric oxide (II, III)	— /0.04 res. (ferrum), class 3	0.3 org. env. (ferrum), class 3	0.1 toxv. (ferrum), class 4	not stated
Pigmentary titanium dioxide	0,5 (SRLI)	0,1 (Ti, gen., hazard class 3)	1 (Tio2) and 0.6 (Ti), tox.class 4	not stated
Calcium oxide	0,3 (SRLI)	not standardized.	180, san.-tox. (hazard class 4) (Ca, all water-soluble forms) 610 for seas at 13-18+ (*)	not standardized.

12.3.2 Ecotoxicity values
(CL, EC, NOEC for fish, Daphnia magna, seaweed, etc.)

Product in general: (calculation)
LC50 > 100 mg/l fish, 96 h
LC50 > 100 mg/l Daphnia magna, 48 h, [4,8]

12.3.3 Migration and transformation in environment due to biological decomposition and other processes (oxidation, hydrolysis, etc.)

Not transformed in the environment. Able to migrate with water, nonmobile in soil. [1, 13].

13 Recommendations on waste (remains) utilization

13.1 Safety precautions when handling wastes after use, storage, transportation.

The safety precautions are the same as those for work with the principal product (see Sections 7 and 8).

13.2 Information on place and methods of decontamination, utilization or liquidation of wastes, including tare (package)

Use and processing of off-quality products: utilization at the premises of the manufacturer or by means of the corresponding industrial processes.

Wastes, which are not subject to recycling, consumer and transportation packages are sent for disposal to refuse dumps for toxic industrial wastes or to the places coordinated with the local sanitary and/or nature conservation authorities. [1, 19]

13.3 Recommendations on utilization of wastes formed after everyday use.

Not used in everyday life. [1]

14 Information on shipping (transportation)

[1] LHI - limiting harmful index (tox. - toxicological; s.-t. (san.-tox.) - sanitary toxicological; org. - organoleptic with explanation of the change of organoleptic water properties (od. - changes water odor; turb. - increases turbidity of water; col. - adds color; foam - causes foam formation; film - forms film on water surface; taste - adds taste to water; op. - causes opalescence); refl. - reflexive; res. - resorption; refl.-res. - reflexive - resorption; fish. - fisheries (changes of properties of field water organisms); gen. – general sanitary).

[2] Ambient waters of drinking and household and cultural and general use

[3] Fishery water (including sea)

14.1 UN number (in accordance with UN Recommendations on transportation of hazardous goods)	This product is not hazardous [20].
14.2 Corresponding shipment and transportation designations	Corresponding UN shipment name: not applicable [20] Transportation name: Aluminosilicate porous aggregates (cenospheres) [1]
14.3 Applied transportation vehicles	The product can be transported by all kinds of vehicles in accordance with the rules of transportation for this vehicle. [1]
14.4 Classification of the good hazard according to GOST 19433-88:	Not classified as hazardous goods.
- class	No. [21]
- subclass	No. [21]
- classification code (according to GOST 19433-88 and in case of railway transportation)	No. [21]
- number (numbers) of drawing (drawings) of hazard sign (signs)	No. [21]
14.5 Classification of hazards according to the UN Recommendations for transportation of hazardous goods:	Not classified as hazardous goods.
- class or subclass	No. [20]
- additional danger	No. [20]
- UN package group	No. [20]
14.6 Transportation marking (manipulation signs according to GOST 14192-96)	No manufacturer's transportation labelling according to GOST 14192 available. [22]
15.7 Emergency cards (in case of railway, sea and other transportations)	Not applicable. [23]

15 Information on national and international legislation

15.1 National legislation

15.1.1 Laws of the Russian Federation	'On technical regulation'. 'On environmental protection'. 'On sanitary and epidemiological welfare of population'
15.1.2 Information on regulating documents on human and environmental protection	Not regulated
15.2 International conventions and agreements (whether the product is regulated by Montreal Convention, Stockholm Convention, etc.)	Not regulated by Montreal Convention and Stockholm Convention [24, 25]

16 Additional information

16.1 Information on revision (new edition) of Safety Certificate (should be given: 'The Safety Certificate has been published for the first time' or 'The Safety Certificate has been reregistered upon the expiration. Previous Safety Certificate No...' or	The Safety Certificate has been published for the first time according to GOST **30333 [26, 27]**

'Sections... have been revised as of ...')

16.2. List of references used for execution of the safety certificate[4]

1. TR 5717-580-39124899-2015 Cenospheres
2. GOST 12.1.007 Occupational safety standards system Hazardous substances. Classification and general safety requirements
3. GOST 32419-2013 Classification of chemical products hazards. (GHS).
4. GOST 32423-2013 Hazard classification of mixed chemical products according to the influence on the human body (GHS).
5. GOST 32425-2013 Hazard classification of mixed chemical products according to the influence on the environment.
6. GOST 31340-2013 Warning labelling of chemical products. General requirements'.
7. Online database of hazardous substances Automated Distributed Information Data System Access: http://www.rpohv.ru/
8. Data from ECHA (European Chemicals Agency) [digital: Access – http://echa.europa.eu/
9. GOST 12.1.044 system of standards of labor safety. Fire-explosion hazard of substances and materials. Nomenclature of values and methods of their statement.
10. Korolchenko A.Ya. **Fire-explosion hazard of substances and materials and extinguishing methods.** Reference book. Part 2.M. Ass. Pozhnauka, rev. 2004
11. GOST 12.4.028-76 Occupational safety standards system. Respirators SB-1
12. Hazardous chemical substances. Non-organic compounds, element groups IV-VIII Reference book /A.L.Bandman, N V. Volkova. publishing house Chemistry, 1998
13. Grushko Ya.M. Hazardous non-organic compounds in industrial sewer water. Chemistry, 1979
14. International Agency for Research on Cancer (digital): Access – http://www.iarc.fr/
15. GN 2.1.5.1315-03. Threshold limit values (TLV) of chemical substances in ambient waters of drinking and household and cultural and general use
16. Standards of water quality of fisheries, including standards of threshold limit values of hazardous substances in fisheries water (approved by the Order of the Federal Agency on fishery as of January 18, 2010 No.20).
17. GN 2.1.7.2041-06. Threshold limit values (TLV) of chemical substances in soil.
18. GN 2.1.6.2309-07. Reference safe level of influence of contaminating substances in atmosphere of settlements.
19. SanPiN 2.1.7.1322- Hygienic requirements to allocation and decontamination of industrial and consumption wastes (approved by the Chief State Sanitary Doctor of the Russian Federation as of April 30, 2003)
20. UN recommendations on transportation of hazardous goods. Typical regulations in two volumes. Edition 18, revised. UN New York and Geneva, 2013
21. GOST 19433 Hazardous goods, classification and marking.
22. GOST 14192-96. Good marking.
23. Emergency cards for hazardous goods transported by rail roads of the CIS, Latvia, Lithuania, Estonia (M.: Transport 2000).
24. Montreal convention on substances damaging the ozone layer as of 16.09.1987
25. Stockholm convention on stable organic contaminants as of 22.05.2001.
26. Methodical recommendations on execution of safety certificates for substances (materials). –M.: All-Russian Research Center of Standardization of Information and Certification of Raw Materials and Substances of the State Standard of the Russian Federation, 1995
27. . GOST 30333-2007 Safety certificate for chemical products. General requirements'.

[4] Numbers of the information sources are given in each section of the safety certificate as links.