

SAFETY DATA SHEET

Listed in the Register	
Safety Data Sheet registration number 00205423.24.42027	as of May 18, 2016 valid until May 18, 2021
Federal Agency on Technical Regulating and Metrology	
Research and information center "Safety of substances and Materials"	
Federal State Unitary Enterprise "All-Russian research center for standardization, information and certification of raw stock, materials and substances"	
Head /Signature//A.A. Toporkov/ Place of Seal Seal: FEDERAL STATE UNITARY ENTERPRISE Primary State Registration Number (OGRN) 1027700169144 MOSCOW	
All-Russian research center for standardization, information and certification of raw stock, materials and substances Federal Agency on Technical Regulating and Metrology RIC "SoSM" Federal State Unitary Enterprise (FGUP)	

NAME:

technical (under RD)
chemical (under IUPAC)
trade
synonyms

Emulsifiers Azol 1016 grades B, D	
not available	
Emulsifiers Azol 1016 grades B, D	
not available	
National product classification code (OKP): 249000	HS Code (TN VED): 1512191000

Symbols and names of the main regulatory, technical or information document for the product (GOST, TS, OST, STO, (M)SDS, etc.)

STO 00205423.010-2014. Emulsifiers Azol 1016 grades B, D. Technical Specification.

HAZARD DESCRIPTION:

Signal word: CAUTIOUS

Brief (word description): low health hazard products, flammable products. Irritating to eyes mucosa. Can contaminate water bodies and soil.

Full: see 16 Sections of the SDS below.

MAIN HAZARDOUS COMPONENTS	Occupational Exposure Limits, mg/m ³	Hazard class(es)	CAS No.	EC No.
Diethylenetriamine (DETA) (N-(2-aminoethyl)-1.2-ethanediamine)	0.3	2	111-40-0	203-865-4
Triethylenetetramine (TETA) (N,N-,bis(2- aminoethyl)-1.2-ethanediamine)	0.3	2	112-24-3	203-950-6

APPLICANT: AO Kotlas chemical plant (OJSC),

(Company name)

Koryazhma, Arkhangelsk Oblast.

(Town/city)

Type of the applicant: manufacturer, supplier, seller, exporter, importer

(Strike out whichever is not desired)

Russian National Classifier of Enterprises and Organizations (OKPO): 00205423

Emergency Phone: (81850) 3-11-88

Head of the applicant company:

/Signature/

/I.P. Dobrokhotova/

(Signature)

(Full name)

Place of Seal

Seal 2:

Open Joint Stock Company

Tax identification number (INN) 2905000843, Industrial Enterprise Classification Code (KPP) 290501001

Koryazhma, Arkhangelsk Oblast

OGRN 1022901140789

Kotlas chemical plant

Safety Data Sheet (SDS) complies with recommendations of UN ST/SG/AC.10/30 GHS

IUPAC	- International Union of Pure and Applied Chemistry
GHS	- recommendations of UN ST/SG/AC.10/30 “Globally Harmonized System of Classification and Labelling of Chemicals”
OKP	- All-Russian Classifier of Products
OKPO	- All-Russian Classifier of Enterprises and Organizations
FEACN	- Foreign Economic Activity Commodity Nomenclature
CAS No.	- a unique numerical identifier assigned by Chemical Abstracts Service
EC No.	- a unique seven-digit identifier assigned by the European Chemicals Agency
OELw.a.	- Occupational Exposure Limits, mg/m ³
Safety Data Sheet	- Safety Data Sheet of Chemicals (substance, mixture, material, wastes)
Signal word	- the word used to emphasize the degree of chemical products hazard and selected in accordance with GOST 31340-2013

1. Identification of the substance/mixture and of the company/supplier

1.1. Product identifier

- 1.1.1 Technical name: Emulsifiers Azol 1016 grades B, D
- 1.1.2 Relevant identified uses:
(including uses advised against) The product is intended for the bitumen emulsions preparation on batch-operated emulsion systems or continuously-operated emulsion systems under condition of pre-arranged soap supply into the colloid mill / 1 /.

1.2. Manufacturer/supplier information

- 1.2.1 Full company name: OAO Kotlas chemical plant (OJSC)
- 1.2.2 Address (postal and legal): Koryazhma, Arkhangelsk Oblast, 165653
- 1.2.3 Emergency telephone number (including time-limits): (81850) 4-07-21
- 1.2.4 Fax: (81850) 4-07-09
- 1.2.5 E-mail: office@k-h-z.ru

2. Hazard(s) identification

- 2.1 Classification of the product in general:
(information on the hazard classification in accordance with the legislation of the Russian Federation (GOST 12.1.007-76) and GHS) Low health hazard product (hazard class 4 under) /1, 2/.
Classification of the product's hazard under GHS / 8, 9 /.
Chemical products causing eyes irritation, hazard class 2B.

2.2 Information on warning marking under GOST 31340-2013

- 2.2.1 Signal word Cautiously
- 2.2.2 Hazard symbol Not applicable
- 2.2.3 Brief hazard description H320: In case of contact with eyes, the product causes irritation.

3. Composition/information on components

3.1 Information on products in general

- 3.1.1 Chemical name (under IUPAC): None / 36 /
- 3.1.2 Chemical formula: None, complex mixture / 33 /.
- 3.1.3 General characteristics of the composition (taking into account brand assortment; method for the production): It is a mixture consisting of alkyl imidazolines and alkyl diethanolamines of plant-based fatty acids of C₁₂-C₂₂ fraction) / 1, 33 /.
Grades are different in component ratio / 33 /.

3.2 Components

(name, CAS No. and EC No., weight percentage (in total should be 100 %), OELw.a. or SRLI, hazard class(es), references)

Table 1 [13]

Components (name)	weight percentage, %	Occupational exposure standard		CAS No.	EC No.
		OELw.a. mg/m ³	Hazard class		
A mixture of imidazolines and alkyl diethanolamines fatty acids of C ₁₂ -C ₂₂ fraction)	Main components	Not determined	No	No	No
Residual components – incl. polyethylenepolyamines	Up to 5				
Diethylenetriamine (DETA) (N-(2-aminoethyl)-1.2-ethanediamine)		0.3	2	111-40-0	203-865-4
Triethylenetetramine (TETA) (N,N-bis(2- aminoethyl)-1.2-ethanediamine)		0.3	2	112-24-3	203-950-6
- diethanolamine (di (2-hydroxyethyl) amine)		5	3	111-42-2	203-868-0

4. First aid measures

4.1 Symptoms:

- 4.1.1 If inhaled: Under normal conditions, it is not expected to present an inhalation hazard due its low volatility.
Long-term exposure to vapor of volatile compounds by inhalation (if heated up to 140°C - 200°C) can cause throat tickle, cough, and headache / 1 /.
- 4.1.2 Skin contact: Prolonged contact may cause redness and hyperemia of the skin / 1 /.
- 4.1.3 Eye contact: Redness, tearing, pain / 29 /.
- 4.1.4 Ingestion: Nausea, gastrointestinal irritation symptoms / 30-32 /.

4.2 First-aid measures to the affected

- 4.2.1 If inhaled: Remove casualty to fresh air. Get medical attention, if needed / 1, 30-32 /.
- 4.2.2 Skin contact: Remove contaminated clothing. Remove the product with cotton wool ball, flush contaminated skin with large amounts of water and soap / 1 /.
- 4.2.3 Eye contact: Immediately flush eyes with 0.5% solution of acetic acid with water, then, with plenty of water for several minutes and get medical attention if the irritation symptoms are persistent / 1 /.
- 4.2.4 Ingestion: In the case of necessity, a casualty should seek for medical aid / 1, 30-32/.
- 4.2.5 Counter-indications: No data available / 1, 30-32 /.

5. Fire-fighting measures

5.1. Characteristics of fire/explosion hazards: (under GOST 12.1.044-89)	Emulsifiers Azol 1016 are flammable / 1 /.
5.2. Indicators of fire/explosion hazards: (a list of indicators under GOST 12.1.044-89 and GOST 30852.0-2002)	Flash point in a closed cup: > 99°C / 1 /. Self-ignition temperature: 300°C / 1 /.
5.3. Hazards arising from combustion products and/or thermal decomposition:	Fire and thermal decomposition may produce toxic products: nitrogen oxides and carbon oxides harmful for human health /30-32/.
5.4. Suitable extinguishing media:	Air-filled foam, powder compositions, sand, fire blanket. Extensive fires should be extinguished with foam spray/ 1 /. No data available / 1, 21 /.
5.5. Not appropriate extinguishing media:	Fire-fighting suit with a self-rescuer apparatus
5.6. Personal protective equipment during fires extinguishing: (fire-fighters' PPE)	“СПИ-20” / 25 /.
5.7. Specific hazards:	Do not come to burning containers. Cool exposed containers with water from a protected position / 25 /.

6. Accidental release measures

6.1. Measures to prevent hazardous exposure to people, the environment, buildings, constructions, etc. in emergencies and accidents

6.1.1 Required general actions under alarm conditions and emergency situations:	Keep non-emergency personnel out of the affected area. Isolate the hazard area. Remove sources of fire, sparks, do not smoke. Use PPE. Provide first aid to the affected / 25 /.
6.1.2 Personal protective equipment under alarm conditions: (emergency response team and personnel)	Overalls, oil and petrol resistant gloves, butyl rubber gloves, safety goggles, and safety shoes / 25 /.

6.2. Response measures to emergencies and accidents

6.2.1 Spill, leak and releases procedure: (including precautions to protect the environment)	In the premises: Turn on the emergency ventilation. Contain the released material; prevent the product from entering drains. Cover a spillage area with sand or other absorbent material. When transporting: Take the vehicle to a safe place. Inform the territorial body of the Federal Service for Consumer Rights and Human Welfare Protection. Dike a spillage area; cover it with sand, soil, or other inert absorbent material. Prevent spillage from entering watercourse, basements, or sewers. Collect contaminated sand (soil or absorbent material) in separate containers, seal and remove to further disposal at a place agreed with the local authorities of the Federal Service for
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Consumer Rights and Human Welfare Protection.
Cover areas of cut-offs with fresh soil. Wash the vehicle surfaces with detergents. Replow the soil / 25 /.

6.2.2 Fire management:

In case of fire: avoid coming up to burning containers, cool exposed containers with water from a protected position. It is recommended to use foam spray, powder compositions and full protective clothing / 25 /.

7. Storage and handling of chemicals during loading-unloading operations

7.1. Safety measures when chemicals handling

7.1.1 Safety measures and collective protective equipment:

Supply and exhaust ventilation of the production premises.
Regular control over the exposure limits for product components in the air of the workplace.
Pressurization of equipment, containers, and pipelines.
Use of explosion-proof electric equipment and lighting, equipment and pipeline ground.
Equipping production premises with basic firefighting equipment.
Use of PPE.

7.1.2 Measures for protection of the environment:

Minimize formation and accumulation of waste and rags / 1 /.
Pressurization of equipment when handling the product.
The analysis of industrial emissions and effluents for the content of harmful substances in permissible concentrations.
Collection and regulated waste disposal /1 /.

7.1.3 Recommendations for safe displacement and transport:

Conditions for maintaining of the containers hermiticity should be observed.
To ensure the safety of the product, drums with the product are transported in the packaged form with the use of pallets and means of fastening.
Prevent containers from mechanical risk and moisture / 1 /.

7.2 Storage

7.2.1 Safe storage conditions and terms:

(including storage warranty period, period of validity; substances and materials incompatible with storage)

The product packed in drums shall be stored on pallets in closed warehouses or open areas under cover, preventing ingress of direct sunlight and moisture at ambient temperature / 1 /.
Storage warranty period is 3 years from the date of manufacturing / 1 /.
The product should not be stored with oxidizing agents and mineral acids / 1 /.

7.2.2 Recommended packing materials:

(including materials of which products are made)

Steel drums of capacity 100, 200, and 275 dm³.
Fullness coefficient of the container is 0.96 / 1 /.

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7.3 General safety rules and storage precautions in household use: Not used in household / 1 /.

8. Engineering controls and personal protective equipment

8.1 Occupational parameters subject to compulsory control (OELw.a. or SRLI): Diethylenetriamine - 0.3 mg/m³.
Triethylenetetramine 0.3 mg/m³

8.2 Measures to ensure the content of harmful substances in permissible concentrations: Forced-air-exhaust ventilation of the production premises.
Regular control of hazard components in the air of the operating area.
Pressurization of equipment.
Sealed containers / 1 /.

8.3 Personal protection equipment of the personnel

8.3.1 General advice: Avoid breathing of vapors (upon the application of heat), avoid direct eye and skin contact with the product; using of PPE.
Observe good personal hygiene measures, do not eat when using this product, wash hands after handling the material and before eating, drinking, and/or smoking.
Careful cleaning and washing of the protective clothing.
Undergo training in occupational safety, and periodical medical check-ups of the personnel engaged in production /1/.

8.3.2 Respiratory Protection (RPE types): Workplaces should be equipped with respirators "PY-60", "PY-60 my", "PII-67A", or of similar type / 1, 3 /.

8.3.3 Protective overalls (materials, type): (protective clothing, safe footwear, hand protection, eye protection) Overalls in accordance with typical industry norms, safety goggles, protective gloves, and leather shoes / 1, 4, 5, 6 /.

8.3.4 Personal protective equipment when using the product in household: Not used in household / 1 /.

9. Physical and chemical properties

Grade B

Grade D

9.1 Physical properties (physical form, color, odor) Dark brown viscous liquid with characteristic odor of amines

9.2 Parameters characterizing the basic properties of the product (temperature, pH, solubility, n-octanol/water coefficient, and other parameters typical for this type of product)

- relative viscosity according to the viscosity meter "BYB-1Φ", with the nozzle diameter of 5 mm at 40°C, sec., not more 150 plus 5

- temperature of hardening, °C, not higher than 100 minus 5

10. Stability and Reactivity

10.1 Chemical stability: (indicate decomposition products for unstable products)	The product is stable under the prescribed storage and transportation conditions.
10.2 Reactivity:	It is likely to react with oxidizers and mineral acids / 30-32 /.
10.3 Conditions to avoid: (including hazardous effects when contacting with incompatible substances and materials)	Strong heating Contact with oxidizers and mineral acids / 1, 30-32 /.

11. Toxicological information

11.1 General exposure characteristic: (assessment of health exposure risk (toxicity) and the most significant hazard exposure)	Low health hazard product. The product exhibits an irritating effect on the eye mucosa; the product slightly irritates skin in the case of prolonged and repeated contact. Vapors of volatile components released from the product when heated (at a temperature of 140 °C to 200 °C) exhibit an irritating effect to the respiratory passages mucosa / 1, 29 /. Toxic effects are given for the product in general and for residual components of its composition.
11.2 Routes of exposure: (respiratory, oral, skin and eye contact)	Inhalation, eye and skin contact, and ingestion.
11.3 Target organs, tissues and systems of a human:	Central nervous system, liver, kidneys, gastrointestinal tract, eye and respiratory passages mucosa, skin / 30-32 /.
11.4 Data on health hazards of the direct contact with the product, and delayed effects: (irritant effect on the upper respiratory airways, eyes, skin; including skin-resorptive effects and sensitization)	The product exhibits an irritating effect on the eye mucosa; the product slightly irritates skin in the case of prolonged and repeated contact. Vapors of volatile components released from the product when heated (at a temperature of 140 °C to 200 °C) exhibit an irritating effect to the respiratory passages mucosa / 1, 29 /. Skin-resorptive and sensitizing effects are not applicable / 29 /.
11.5 Information on delayed hazards: (effects on the reproductive function, carcinogenicity, mutagenicity, cumulativity, and other chronic effects)	No data available for the product. Residual components: diethylenetriamine and triethylenetetramine can affect on reproductive functions; mutagenic and carcinogenic effects have not been studied, moderate cumulativity / 30,31 /.
11.6 Indicators of acute toxicity: (DL ₅₀ , route of entry (oral, dermal), type of animal; CL ₅₀ , exposure time (hour), type of animal)	Emulsifiers Azol 1016 / 29 / DL ₅₀ > 5000 mg/kg oral rats CL ₅₀ is nor achieved

12. Ecological Information

- 12.1 General characteristics of environmental impact: (ambient air, watercourses, soil, including observed signs of exposure) Pollution of water bodies leading to changes in the sanitary conditions of watercourses. The contamination of soils and groundwater through spills, leaks, and unregulated waste disposal and landfill.
- 12.2 Environmental effects: In case of violation of handling, storage and transportation rules, unregulated waste disposal, and as a result of emergencies and accidents.

12.3 The most important characteristics of environmental effects

12.3.1 Hygienic standards: (exposure limits in air, water, including fishery waters, soil)

Table 2 [14, 15, 16, 19]

Components	OEL in the atmospheric air or SRLI in the atmospheric air, mg/m ³ (LNV ¹ , hazard class)	OEL water ² or APL water, mg/l, (LNV, hazard class)	OELs fish ³ . or SRLI fish., mg/l, (LNV, hazard class)	ELs or APL soil, mg/kg (LNV)
Diethylenetriamine	0.01/- (refl., hazard cl. 3)	0.2 (org.retr., hazard cl. 4)	0.1 (tox., hazard cl. 4)	-
Triethylenetetramine	0.01 (SRLI)	-	0.1 (tox., hazard cl. 3)	-
Diethanolamine	0.05 (SRLI)	0.8 (org. taste., hazard cl. 4)	0.01 (tox., hazard cl. 3)	-

12.3.2 Ecotoxicity:
(CL, EC for fish, Daphnia magna, algae, etc.)

No studies have generally been conducted for the product.

Diethylenetriamine / 30 /

Threshold concentration for the effect on the color of the water: 0.2 mg/l makes the water smell and taste.

Concentrations of 10-100 mg/l inhibit the BOD process.

Triethylenetetramine / 31 /

CL50 fish, 495 mg/l Pimephales promelas = 96 h

EC50 Daphnia magna, 31.1 mg/l, 48 h

12.3.3 Distribution and environmental fate through biodegradation and other processes (oxidation, hydrolysis, etc.):

Slowly transformed in the environment / 30-32 /.

13. Waste (residuals) disposal considerations

13.1. Safety measures when handling wastes from use, storage, transportation, etc.

Safety measures are similar to those recommended for handling the main product (see Sections 7 and 8 of the SDS).

¹ LNV means limiting nuisance value (tox. - toxicological; s.-t. (san.-tox.) - sanitary-toxicological; org. – organoleptic with description of the nature of changes in the organoleptic properties of water; (od. - changes the water odor, turbid. - increases the turbidity of the water, env. - gives the water a color, foam - causes the formation of foam, sk. - forms a skin on the surface of the water, taste. - gives a taste to the water, op. - causes opalescence); refl. - reflectory; res. - resorptive; refl.-res. - reflectory-resorptive; fish. - fishery (changes in commercial quality of fishery aquatic organisms); gen. - general sanitary).

² Water of utility and drinking water bodies and social-community water consumption.

³ Water of fishery-intended water bodies (including marine).

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13.2 Information on places and methods of neutralization, disposal, or removal of substances (material) wastes including containers (packing):

Product wastes and used containers are subject to be collected in appropriate containers and forwarded for disposal to waste treatment companies with a permit and license for waste recycling, or places agreed with the local authorities of the Federal Service for Consumer Rights and Human Welfare Protection / 23 /.

Disposal method is incineration / 1 /.

Not used in household / 1 /.

13.3 Recommendations for waste removal arising from use in household:

14. Transportation information

14.1 UN Number:
(in accordance with the UN recommendations on carriage of dangerous goods)

Not applicable / 27 /.

14.2 Proper shipping name and transportation name:

Proper shipping name is not available / 27 /

Transportation name: / 1 /

Emulsifiers Azol 1016 grade

14.3 Types of applicable transport vehicles:

The product is transported by rail and road in covered vehicles in accordance with transportation rules effective for that type of transport / 1 /.

14.4 Classification of dangerous goods according to GOST 19433-88:

Not classified as dangerous goods / 11 /.

14.5 Classification of dangerous goods according to the UN recommendations for dangerous goods transportation:

Not classified as dangerous goods / 27 /.

14.6 Transportation labeling
(manipulation signs in accordance with GOST 14192-96)

Manipulation signs: /1, 10 /

“Sealed packing”

“Protect from sunlight”

14.7 Emergency cards
(for rail, overseas and other type of transportation)

Not required / 24, 25 /.

15. State and international regulations

15.1 State regulations	
15.1.1 The RF laws:	Law On Technical Regulation Law On Sanitary Biological Welfare of the Population
15.1.2 Documents regulating requirements for protection of human and environment	Not subject to state registration / 35 /.
15.2 International Conventions and Agreements: (whether regulated by Montreal Protocol, Stockholm Convention, etc.)	Not regulated by Montreal Protocol and Stockholm Convention.

16. Other information

16.1 SDS review (new edition) (it is indicated as “SDS has been prepared for the first time” or “SDS has been re-registered upon expiration. Previous SDSR No. ...” or “Changes has been amended to the items ..., the date of amendment ...”)	SDS has been prepared in accordance with GOST 30333-2007.
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16.2 List of References Used while Comprising SDS

- 1 STO 00295423.010-2014. Emulsifiers Azol 1016 grades B, D. Technical Specification.
- 2 GOST 12.1.007-76. Occupational safety standards system. Harmful substances. Classification and general safety requirements.
- 3 GOST 12.4.011-89. Occupational safety standards system. Means of protection. Classification and general requirements.
- 4 GOST R 12.4.013-97. Occupational safety standards system. Safety glasses. General technical conditions.
- 5 GOST 12.4.068-79 Occupational safety standards system. Dermatologic personal safety means. Classification and general requirements.
- 6 GOST 12.4.103-88. Occupational safety standards system. Special protective clothes, personal means of hands and legs protection. Classification.
- 7 GOST 31340-2013. Labelling of chemicals. General requirements.
- 8 GOST 32419-2013. Dangerous Goods Classification. General requirements.
- 9 GOST 32423-2013. Hazard classification of mixed chemical products for human exposure.
- 10 GOST 14192-96. Marking of cargoes.
- 11 GOST 19433-88. Dangerous Goods. Classification and marking.
- 12 GOST 12.1.044-89. Occupational safety standards system. Fire and explosion hazard of substances and materials. Nomenclature of indicators and methods of it determination.
- 13 Occupational exposure limits (OELs) and safe reference levels of impact (SRLI) of harmful substances in air at workplace; Health Standards. HS 2.2.5.1313-03/ HS 2.2.5.2308-07 - M: Russian Register of Potentially Hazardous and Biological Substances of the Ministry of Health of the Russian Federation. 2003/2007.
- 14 Occupational exposure limits (OELs) and approximate permissible level (APL) of chemicals in water of utility and drinking water bodies and social-community water consumption HS 2.1.5.1315-03/ HS 2.1.5.2307-07. Health Standards. – M: the Russian Ministry of Health, 2003, 2008.
- 15 Occupational exposure limits (OELs) and safe reference levels of impact (SRLI) of airborne contaminant in the populated area. HS 2.1.6.1338-03/ 2.1.6.2309-07. Health Standards. – M: the Russian Ministry of Health, 2003, 2008.
- 16 “Water quality standards of fishery water bodies, including norms of maximum acceptable concentrations of harmful substances in waters of the fishery water bodies”, approved by the order No. 20 of the Federal Agency for Fisheries dated January 18, 2010.
- 17 HS 2.2.5.563-96. Occupational Exposure Limits (OELs) of skin contamination with harmful substances, the Russian Ministry of Health, Moscow, 1997.
- 18 SanPiN 1.2.2353-09. Sanitary and epidemiological rules and standards. Carcinogenic factors and basic requirements for the prevention of carcinogenic hazards.
- 19 Occupational exposure limits (OELs) and approximate permissible level (APL) of chemicals in soil. HS 2.1.7.2041-06/ HS 2.1.7.2511-09. Health Standards. - M.: the Russian Ministry of Health, 2006, 2009.
- 20 “Harmful substances in industry” Reference book, v. 1.2 edited by. N.V Lazareva., L-d, “Chemistry” Publishing House, 1976.
- 21 A.Ya.Korolchenko “Fire Hazard of Substances and Materials, and means of their extinguishing”, Moscow, Association Pozhnauka 2004.
- 22 Regulation of fire safety in the Russian Federation, St. Petersburg. DEAN publishing, 2001.
- 23 SanPiN 2.1.7.1322-03 “Hygienic requirements for neutralization and disposal of production and consumption wastes”.
- 24 Regulations on carriage of dangerous goods by road, Moscow, 2012.

⁴Ordinal numbers of data sources are given in each paragraph of SDS as links

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- 25 Reports :Transport emergency cards for dangerous goods transported by railways of the CIS countries, the Republic of Latvia, the Republic of Lithuania the Republic of Estonia (with amendments and additions as of May 21, 2015).
- 26 Regulation on transportation of hazardous cargoes to the Agreement on International Goods Transport by Rail (Annex 2 of the AIGT), the Ministry of Transport of the Russian Federation, 1998. ADR. European Agreement concerning the International Carriage of Dangerous Goods by Road. UN. New York and Geneva. 2002.
- 27 Dangerous Goods recommendations. Model Regulations. 19th revised edition. UN, New York and Geneva, 2015.
- 28 International Maritime Code for Dangerous Goods. IMDG Code, volume 1, 2. St. Petersburg: ZAO CNIIMF, 2007.
- 29 Expert opinion on the results of toxicological trials of the Emulsifier Azol 1016 grades B No. 0979-03 dated March 25, 2016, Federal State-Funded Healthcare Institution “Hygiene and Epidemiology Center in Moscow”.
- 30 Diethylenetriamine data card of Russian Register of Hazardous Chemical and Biological Substances series BT No. 000593.
- 31 Triethylenetetramine data card of Russian Register of Hazardous Chemical and Biological Substances series BT No. 002289.
- 32 Polyethylenetetramines data card of Russian Register of Hazardous Chemical and Biological Substances series BT No. 002113.
- 33 Information on the composition of the product provided by the manufacture.
- 34 Information Database of Registered Substances of the European Chemicals Agency (ECHA). Access mode: <http://echa.europa.eu/information-on-chemicals>. Regulation of the European Parliament and Council on the classification, labeling and packaging of the chemicals and mixtures No. 1272/2008 dated December 16, 2008.
- 35 The unified list of goods subject to sanitary and epidemiological supervision (control) at the customs border and customs territory of Customs Union dated November 22, 2010.
- 36 UPAC nomenclature- International Union of Pure and Applied Chemistry.
- 37 GOST 30333-2007. Safety Data Sheet of the chemical products. General requirements.