

1. Identification of the technical production and information on manufacturer and/or supplier**1.1. Chemical production identifiers**

1.1.1. Technical name:	Sodiumcyanidetechnical
1.1.2. Brief recommendations for use: (i.a. restrictions concerning usage)	For cyanidation of steel, electroplating, hydrometallurgy of noble metals, floatation at beneficiation of metallic ores and other areas (1, 15)

1.2. Information on manufacturer and/or supplier

1.2.1. Full official name of the company:	Closed Joint-Stock Company «Korund-CN»
1.2.2. Address (postal):	1st May st., 1, Dzerzhinsk, Nizhny Novgorod region 606000
Only representative	PROCHEMICAL GROUP s.r.o. NabrezieSv. Cyrila 47, Prievidza 97101, Slovakia Sales department: tel.: +421 911 993183 mail: sales@prochemical.eu web: www.prochemical.eu

2. Hazard (hazards) identification

2.1. General hazard level of the product: (data about hazard classification according to the legislation of the RF (GOST 12.1.007) and State standards system (after approval))	Sodium cyanide by degree of impact on human organism belongs to extremely hazardous substances – 1 st class of hazard under GOST 12.1.007.
2.2. General hygienic normatives for the production in the air of the working area: (MAC _{w.a.} or ASIL w.a.)	MAC _{w.a.} – 0.3 mg/m ³ (calculated as HCN) *, ** * hydrocyanide of salt (in conversion to hydrocyanide); ** TWA (time-weighted average of substance, specified for 8-hour working day and 40-hour working week, which daily impact does not cause any unfavorable reactions in most of the employees), approved at the following level: 0.3 mg (CN ⁻)/m ³ (Poland); 5 mg (CN ⁻)/m ³ (Australian, Mexico); 5 mg (CN ⁻)/m ³ with remark «skin» (Great Britain, Hungary, Korea, New Zealand); Class of hazard – 1 (2; 5; 6; 7).

2.3. Label elements (under GOST 31340-07)

2.3.1. Hazard statement(s):	Symbol – skull and cross-bones; dry wood and dead fish. Signal word - Danger (Danger). Brief hazard characteristic: Fatal if swallowed (Fatal if swallowed (oral)); Extremely toxic to aquatic (Extremely toxic to aquatic) (1)
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2.3.2. Precautionary statement(s):	Measures for safe handling: - Do not smoke, drink, eat, while using the product; - Wash hands thoroughly after handling; - If you feel unwell, seek medical advice
	immediately; - Avoid release to the environment. Accidental release measures: - If swallowed, rinse mouth and seek medical advice immediately; - At spillages pick up the spilled sodium cyanide in a dry container and close hermetically, handle the spillage area with decontaminating solutions (mixture of 10% solution of ferric sulphate and 10% solution of caustic lime in the ratio 2:1 or solution of sodium hypochloride). Conditions for safe storage: - Keep closed, do not allow product to get in contact with water and carbon dioxide. (1)

3. Composition (information on ingredients)

3.1. General information on product

3.1.1. Chemical name: (under IUPAC)	Sodium cyanide
3.1.2. Formula:	NaCN(Na-C≡ N)
3.1.3. General characteristic of the composition: (taking into account the brand assortment and indicating foreign substances and functional additives, influencing the product hazard; production process)	Sodium cyanide represents white or slightly colored briquettes with average dimensions 38x36x20. (1) Sodium cyanide is produced in Top grade and First grade. The production process based on production of sodium cyanide solution by means of neutralization of hydrogen cyanide with caustic soda with further crystallization of the solution, centrifugation, drying and briquetting of the product. (13)

3.2. Ingredients

(name, CAS and EU numbers (if any), mass content, MAC w.a. or ASIL w.a., hazard classes, references to sources of data)

Ingredients (name, CAS and EU numbers)	Mass content, %	MAC w.a., mg/m ³	Hazard class	Sources of data
Sodium cyanide CAS No. 143-33-9 EU No. 205-559-4	not less than 90	0.3 (hydrocyanide of salt in conversion to hydrocyanide)	1	1,2
Caustic soda	no more than 1.0	0.5	2	1,2
Sodium formiate	no more than 0.5	10	3	1,2
Sodium carbonate	no more than 0.8	2	3	1,2

4.1.1. In case of intoxication via inhalation (if inhaled):	Burning mouth, nasopharynx, metallic aftertaste, sickness, vomiting, general weakness (1, 3, 5)
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4. Firstaidmeasures

4.1. Symptoms

4.1.2. In case of skin contact:	Rubeosis, xerodermia, amycytic, subacute or chronical eczema, sometimes deep ulcerations on fingers. (3)
4.1.3. In case of eye contact:	Tearing, smarting eyes. Chemical burn is possible. (3)
4.1.4. In case of peroral intoxication (if swallowed):	Clinical picture of acute intoxication: headache, dizziness, burning mouth nasopharynx, bitter taste in mouth, vomiting, sickliness, dyspnoea, general weakness, asphyxia, eye redness; in severe cases - convulsions, faintness, fatal case due to respiratory standstill is possible. (5)

4.2. Descriptionoffirstaidmeasures

4.2.1. Ifinhaled:	Call an ambulance. Persons, who give first aid, must use individual means of respiratory and skin protection. Fresh air, rest, heat, clean clothes. In case of irregular breathing - oxygen inhalation, in case of respiratory standstill - mouth-to-mouth resuscitation. (3, 5)
4.2.2. In case of skin contact:	If sodium cyanide contacts with skin, it is necessary to shake it off, wash the affected area with solution of sodium bicarbonate with mass content 2% or with flowing water with soap, then with a large amount of water and apply wet bandage with boric acid or boric ointment. (1, 3, 5)
4.2.3. In case of eye contact:	Wash eye with a large amount of flowing water with widely opened eye fissure. Urgent hospitalization! (5)
4.2.4. In case of peroral intoxication:	If swallowed - plentiful water drinking, solution of sodium chloride (1 tablespoon for glass of water) or solution of ferric sulphate and calcinated magnesia (1 teaspoon for glass of water) 1 tablespoon each 15 minutes; activated carbon; induce vomiting. Urgent hospitalization! (5)
4.2.5. Contra-indications:	The poisonous effect of cyanides strongly increases under the influence of alcohol, even in small quantities. (1, 3)

4.2.6. First-aid equipment (first-aid kit):	3 % solution of H ₂ O ₂ (hydrogen peroxide). 0,2 % solution of KMnO ₄ . Activated carbon. Boric acid or boric ointment. Cotton. Antidotes: - Cyanocobalamin (Vitaminum B12); - Natriithiosulfas; - Cytochromum C; - 4 - DMAP .(3,5)
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5. Measures and means to ensure fire and explosion safety

5.1. General description of fire and explosion hazard:	Non-flammable, fire- and explosion-safe. In the presence of water, acids, carbon dioxide can exhale vapors of hydrogen cyanide, which are explosive in mixture with air. (1, 5, 15)
5.2. Indicators of fire and explosion hazard: (set of indicators under GOST 12.1.044 and GOST R 51330.0)	Flammability range of hydrogen cyanide – 5,6 – 40 % (volume ratio). Lower temperature limit of flammability – minus 31°C, upper limit – 3°C. Ignition temperature – 538°C. Flash temperature – minus 18°C
5.3. Danger, caused by combustion products and/or thermal destruction products:	No thermal destruction capability. (5)
5.4. Recommended fire extinguishing mediums:	Extinguish with powder alkaline fire-extinguisher, sand, felting. (1, 5, 15)
5.5. Forbidden fire extinguishing mediums:	Extinguishing with water is forbidden. (1, 5, 15)
5.6. Individual protection equipment for fire extinguishing: (PPE for firefighters)	Suit (jacket and slacks) or fire-protection suit, gauntlet gloves, helmet, helmet liner. Use oxygen breathing protective mask DOT-600, as well as self-contained breathing apparatus with compressed air PTS, AIR, «Dräger». (8, 28)
5.7. Fire extinguishing particularity:	It is necessary to extinguish the occurring vapors of hydrogen cyanide, because the product itself is nonflammable and fire- and explosion-safe. To extinguish with water spray, foam and powders from maximal distance. The hydrogen cyanide, occurring at decomposition, is to be allayed with water spray. Do not allow the liquids from fire extinguishing to enter the water supply and sewage system. (13)

6. Accidental release measures

6.1. Measures to prevent negative effects on persons, environment, buildings, facilities etc. in accidental and emergency situations

6.1.1. Necessary general activities:	Take the railway car in a safe place. Isolate the hazard zone in a radius not less than 50 m. Adjust the distance according to the results of the chemical detection. Take away the third persons. Enter the hazard zone in protection equipment. Observe the fire safety measures. Do not smoke. Remove the fire sources. Apply first aid to injured persons. Send persons from the damage center for medical supervision. (19)
6.1.2. Individual protection equipment: (for emergency response team and personnel)	For chemical detection and activity manager – portable breathing device (PDU-3) (within 20 min.). For emergency response teams – isolating protection suit (KIH –5) with isolating gas mask (IP – 4 M). (19)

6.2. Procedures at elimination of accidental and emergency situations

6.2.1. Activities at leakage, spill, spillage: (including precautions, providing environmental protection)	Spillages are to be gathered, without using moisture, in a metal container under observing the precautions, after that the container is to be closed hermetically. Isolate the spillage area with sand. Cut
	the topsoil with contamination, gather and take away for disposal. Bury the areas of cut-offs with a fresh soil layer, wash with water for check (provocative) purposes. Treat the area surface (certain areas) with the mixture from two volumes of 10% ferric sulfate solution and one volume of 10% caustic lime solution (20% sodium hydroxide solution). Wash the surfaces of the rolling stock with water, detergents. (19)
6.2.2. At fire action:	At fire extinguish with sand, felting. (1, 15) At fire in railway transport extinguish with water spray, foams and powders from maximal distance. Suppress vapors of hydrogen cyanide, occurring at decomposition, with water spray. (19)

7. Handling and storage

7.1. Precautions at handling chemical products

<p>7.1.1. Precautions and collective protection equipment: (including fire-explosion safety measures)</p>	<p>Production areas must meet the requirements of sanitary regulations dd. 12.12.88 No. 4783-88. (1) Control of working conditions of the employees is to be organized according to SP 1.1.1058-01, GOST 12.1.005 and other regulatory documents. Norms of processing method are to be observed according to the approved regulations. Work only on properly functioning equipment, with properly functioning forced-air-exhaust ventilation, upon availability of properly functioning control and measuring instruments, security devices, lightaudible signaling system, fire-extinguishing means, wearing special clothing, shoes and protection equipment, meeting the requirements of the Common industry sector codes. (13, 1) Automatic monitoring of the content of harmful substances in working zone area is compulsory. (2) Persons, admitted to work with sodium cyanide, must be trained and informed about potential hazard of the substance. (13)</p>
<p>7.1.2. Environmental protection measures:</p>	<p>Thermal destruction of the off-gases by means of incineration. Processed off-gases are injected into the atmosphere with the cyanide content, which does not exceed MPE. (1,13) Solid wastes, occurring at production and applying of sodium cyanide, are to be gathered in special containers, neutralized and disposed. Waste waters are to be purified on local treatment facilities by means of neutralization with hydrogen peroxide. After treatment the waste waters are to be discharged in industrial sewage. For emergency discharge of the waste waters control-accumulation tanks are to be used. Containers from sodium cyanide must not be reused. It is to be neutralized with decontamination</p>
	<p>solution and washed with water. Decontamination is to execute in specially allotted areas outside of production areas. After that barrels and drums must be broken in order to eliminate re-use, intermediate bulk containers after washing can be disposed by means of incineration. (1,13)</p>

<p>7.1.3. Recommendations for safe moving and transportation:</p>	<p>Sodium cyanide is to be transported by railway and automobile transport in covered vehicles according to Dangerous goods regulations applied for these means of transport. (1, 15,24) Sodium cyanide is transported by railway transport by means of car freights in specialized covered railway cars of the consignor (consignee) under escort of the team of the consignor's (consignee's) specialists according to Art. 2.2.45 of the Regulations concerning carriage of dangerous goods by rail.</p> <p>Disposition and securing of barrels, steel drums, polyethylene drums with the product in railway cars is performed according to the technical specifications for disposition and tightening of cargo in cars and containers, approved by Traffic Ministry of Russia on May 27, 2003 No. IJM - 943. (1,24)</p>
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7.2. Storage regulations for chemical products

<p>7.2.1. Conditions and terms of safe storage: (including guaranteed storage life, shelf life)</p>	<p>Sodium cyanide is stored in hermetically closed containers (steel barrels, drums, polyethylene drums with special locks). Barrels, steel drums, polyethylene drums are to be stored upright with neck upwards in closed, dry, well ventilated warehouses, arranged in one, two and three tiers with board stripping between the tiers. (1,5) Guaranteed storage life of sodium cyanide is 12 months from the manufacture date.</p> <p>Upon the expiry of the guaranteed storage life the product before use must be examined for conformance to the requirements of the technical conditions. (1)</p>
<p>7.2.2. Substances and materials, incompatible for storage:</p>	<p>Oxidation agents, acids, alkalies. (5)</p>
<p>7.2.3. Materials, recommended for containers and packaging:</p>	<p>Steel, polyethylene.</p> <p>Sodium cyanide technical is to be packed in steel barrels with capacity up to 100 dm³ under GOST 5044, steel conic barrels of type 1A2 with capacity of 65 dm³ under TU 1415-55802815-2006; polyethylene drums with removable lid without drainage holes with capacity up to 100 dm³ under TU 2297-001-54011141-01 or rolled-on steel drums of type 1A2 with capacity up to 100 dm³ under GOST 13950.</p>

Steel barrels, polyethylene and steel drums must be leak-tight and meet the requirements of GOST 26319 for packaging group 1.

Polyethylene drums and steel drums are to be used with polyethylene liner bags, made from film with thickness not less than 0.08 mm under GOST 10354. It is allowed to use imported polyethylene liner bags made from film with thickness not less than 0.08 mm.

It is allowed upon consultation with the customer to use polyethylene drums without polyethylene liner bag in case of sending the product by automobile transport.

Net weight no more than 100 kg in steel barrels and drums. Allowed deviation from the nominal net weight ± 0.2 kg.

The liner neck is to be turned under, knot in "Topknot" with twine under GOST 17308 or under other regulatory documents, or use a locking ring. Filling holes of polyethylene drums must be closed with lids without drainage holes, which must be gasketed with rubber cords, tightened with binding clips and sealed or closed with lids by means of bayonet locks and sealed.

Filling holes of steel barrels are to be closed with lids, which must be rolled-on or canted, or welded; and sealed.

Filling holes of the steel drums must be closed with removable lids with attached gaskets and tightened with locking rings or locking devices and sealed. In case of shipment under export contracts or under consultation with the customer, in case of transportation "under special condition" by railway transport (according to the "Regulations concerning cargo transportation by railway transport under special conditions") it is allowed to package the sodium cyanide:

- in plastic drums (barrels) of type 1H1 or 1H2; - in intermediate bulk containers (IBC) for dangerous goods of packaging group I type 11D in combination with pallet and inner liner.

Drums (barrels) and intermediate bulk containers (IBC) must have certificate, issued by international accredited authority for certification and meet the requirements of the UN Recommendation for Transportation of Dangerous Goods, International Maritime Dangerous Goods Code (IMDG Code), European Agreement concerning the International carriage of Dangerous Goods by Road (ADR), International Regulations concerning the International Carriage of Dangerous Goods by Rail (RID).(1)

7.3. Security and storage precautions in household use:	Not applicable in household use.
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8. Means for monitoring of harmful exposure and individual protection equipment

8.1. Parameters of the working area, which are to be obligatory monitored (MACw.a. or ASILw.a.):	<p>1. Sodium cyanide MACw.a. = 0,3 mg/m³ (calculated as HCN) *, O, + 1st class of hazard * Salt of hydrocyanide (in conversion to hydrocyanide); O – substances with highly-directional mode, which require automatic monitoring of their content in the air; + special skin and eye protection is required.</p> <p>2. Caustic soda MACw.a. = 0,5 mg/m³ (aerosol), class of hazard 2. + special skin and eye protection is required. (5)</p>
8.2. Measures to ensure content of harmful substances in admissible concentrations:	<p>It is necessary to use leak-tight equipment, utility systems, storage vessels and containers. All production areas should be equipped with forced air - exhaust ventilation according to the requirements of SNiP 41-01, areas of maximal dusting – with local exhaust ventilation. (1) Automatic monitoring of content of the harmful substances in the air of the working area. (2) Monitoring of the injection into atmosphere, discharges. (13)</p> <p>In order to control the mass concentration of hydrogen cyanide in production areas the gas analyzer of type MX42A and MX48 is applied. Mode for monitoring of hydrogen cyanide emissions – titrimetric with nickel nitrate solution with molar concentration with $[1/2 \text{ Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}] = 0,01 \text{ mol/dm}^3$ (0,01 H).</p> <p>Mode for control of cyanides in discharges – photolorimetric with barbituric acid and pyridine according to Environment-oriented normative documents federative (PND F) 14.1:2.56-96. (1)</p>

8.3. Individual protection equipment for the staff

8.3.1. General recommendations:	At work with sodium cyanide it is necessary to avoid direct contact with the product and use individual protection equipment according to GOST 12.4.011 and Common industry sector codes. Production areas must comply with the requirements of the sanitary regulations dd. 12.12.88 No. 4783-88. (1) It is not recommended to perform wet cleaning of floors and equipment. It is prohibited to store food, eat, drink and smoke at working places.
	Working clothing (special clothing) must be stored separately and cleaned centrally. (4) The engaged staff must undergo a medical examination according to the order of the Health and Social Development Ministry dd. 16.08.04 No. 83. (1)
8.3.2. Respiratory protection (types of RPE):	Filter protective mask trademark DOT-600, respirator «3M», Art. res037. (1)
8.3.3. Protective clothing (material, type):	Exchangeable special clothing according to GOST 12.4.101, special shoes according to GOST 12.4.137 or rubber boots according to GOST 5375, protective eyeglasses 3H11 PANORAMA, gloves TECHNIK KP, Art. per601 according to GOST 12.4.246-2008 (1)
8.3.4. Individual protection equipment in household use:	Not used.

9. Physicochemical characteristics

9.1. Physical state: (aggregative state, color, odor)	White or slightly colored briquettes with of average size 38x36x20. (1,15)
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<p>9.2. Parameters, characterizing the basic properties of the chemical product, first of all hazardous: (temperature factors, pH, solubility, index n-octanol/water and others)</p>	<p>Slight odor of «bitter almond». (3) 9.2. Parameters, characterizing the basic properties of the chemical product, first of all hazardous: (temperature factors, pH, solubility, index noctanol/water and others) Boiling point (1496-1497) °C Melting point 563,7 °C Vapor pressure of the substance at 20 °C - 0 mm of mercury Density at 20 °C - (1,55 -1,60) g/cm³ Bulk density of the substance ~ 0,9 g/cm³ pH ~ 11,7 (5) Solubility in water (mg/l) at 20 °C - 368000 The substance is soluble in ethanol, methanol, formamid, dimethylformamide. It is not soluble in hydrocarbons. Higher than 600 °C in absence of air sublimes without decomposing. In presence of air decomposes to form carbonate, formiate and HCN. (11) Metals: zinc, ferrum, cobalt, argentum, copper and gold – dissolve in aqueous solution of the salt. (12)</p>
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10. Stability and reactive capability

<p>10.1. Chemical stability: (for unstable products indicate the decomposition products)</p>	<p>In hermetical container NaCN is stable, but in air in presence of moisture the solid sodium cyanide deliquesces as a result of the reaction with carbon dioxide, thereat hydrogen cyanide is evolved. (3,11,13) When heated sodium cyanide melts (melting point 563.7 °C.</p>
	<p>Aqueous solution of sodium cyanide decomposes in presence of air to form carbonate and formiate. (12) When boiling ammonia is formed, and the solution contains the salt of the formylic acid. In aqueous solution (at pH10-11) sodium cyanide oxidizes with oxidizing agents to elemental nitrogen and carbon dioxide. (14)</p>
<p>10.2. Reactive capacity:</p>	<p>Hydrolyzes, oxidizes, reacts with acids, alkali, salts, ammonia. (5)</p>
<p>10.3. Conditions to avoid: (including hazardous occurrences at contact with incompatible substances and materials)</p>	<p>At presence of water, acids, carbon dioxide sodium cyanide can form hydrogen cyanide, which is a flammable, explosive and poisonous compound. (1)</p>

11. Toxicological information

<p>11.1. General exposure characteristic: (estimation of hazard (toxicological) effect on the human body)</p>	<p>Sodium cyanide concerning effect on the human body is classified as extremely hazardous substances – 1st class of hazard according to GOST GOCT 12.1.007 (1)</p>		
<p>11.2. Routes of exposure: (inhalation, peroral, in case of contact with skin and eyes)</p>	<p>Sodium cyanide can enter the organism through respiration organs, gastrointestinal tract, unbroken skin, conjunctivas.</p>		
<p>11.3. Target organs, tissues and systems of human body:</p>	<p>Central nervous, cardiovascular, respiratory and urogenital systems, thyroid body, hemic system, nephros, lien, skin, eyes. (5)</p>		
<p>11.4. Information about hazardous for health exposures at direct contact with the substance, consequences: (irritation of upper respiratory airway, eyes, skin, including absorption through skin; sensibilization)</p>	<p>Irritates the upper respiratory airway, provokes strong irritation of eyes and skin. Determined: absorption through skin, sensitization. No data about occupational illnesses at long-term contact with sodium cyanide are available. (5)</p>		
<p>11.5. Information about hazardous long-term effects on the human body: (influence on reproduction, carcinogenicity, cumulativeness etc.)</p>	<p>Determined: embryotrophic, gonadotrophic, tetratogenic, mutagenic effects. Carcinogenic effect on human health and animal – is not investigated. Cumulativeness – low.</p>		
<p>11.6. Acute toxicity factors: (DL₅₀ (LD₅₀), route of exposure (intra gastric, cutaneous), animal species; CL₅₀ (JK₅₀), exposure time (h), animal species)</p>	DL ₅₀ (mg/kg)	Route of exposure	Animal species
	4,7 - 6,4	intra gastric	rats
	4,3 - 4,7	intra bronchial	rats
	4,9 - 5,9	intra bronchial	mice
	1,66	intra muscular	rabbits
	3,6	subcutaneous	mice
	5,8	subcutaneous	Guinea pigs
	5,36 - 6	subcutaneous	dogs
	10,4 - 300	cutaneous	rabbits
<p>11.7. Doses (concentrations) with minimal toxicity:</p>	<p>oral route - 2,2 ÷ 2,8 mg/kg.</p>		
<p>11.7. Doses (concentrations) with minimal toxicity:</p>	<p>0,71 mg/kg, intra gastric, one time, human being (hallucinations, muscle weakness); 50 - 100 mg/kg, intra bronchial, 10 days, rats (acidosis, reduction of pH of cerebral tissues, creatinine P level, increase of glucose level in cerebrospinal fluid). (5)</p>		

12. Ecological information

<p>12.1. General characteristic of environmental impact: (atmospheric air, water bodies, soil)</p>	<p>The substance is highly stable under abiotic conditions ($t_{1/2}$) - within 7 - 30 days. Transformed in environment. (5) Transformation of cyanides in environment is connected with their chemical and biological oxidation. Transformation products: hydrogen cyanide, sodium cyanate, sodium carbonate. (5) Hydrogen cyanide - is the substance, which is extremely hazardous for environment: air, water bodies, soil. (9)</p>
<p>12.2. Routes of exposure on environment:</p>	<p>Pollution of water bodies and soils is possible as a result of leakages of solution, spillages, discharges, improper storage and transportation, accidental situations, unorganized disposal and dumping of wastes.</p>
<p>12.3. Observed signs of exposure:</p>	<p>Following signs of exposure can be observed: occurrence of characteristic odor, changes in sanitary conditions of water bodies, organoleptic properties of water etc.</p>

12.4. Most important characteristics of environmental exposure

<p>12.4.1. Hygienic normatives: (admissible concentrations in atmospheric air, water, including fishery water bodies, soil)</p>	<p>According to the classification of water contamination hazard (WGK, Germany) the substance belongs to class 3 (highly waterhazardous contaminating substances). (5) Threshold concentrations concerning impact on: organoleptic water properties - 0,1 mg/l (calculated as CN), sanitary conditions of water bodies - 0,01 mg/l (calculated as CN-). (5)</p>
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Components	MAC _{atm.a.} or ASIL _{atm. a.} , mg/m ³ (LNV1, class of hazard)	MAC _{water2} or APL _{water} , mg/l, (LNV, class of hazard)	MAC _{fishery3} or ASIL _{fishery} , mg/l (LNV, class of hazard)	MAC or APC of soil, mg/kg (LNV)	Data sources
Cyanides simple and complex excluding cyanoferrats) in reliance to cyanide - ion	not established	0,07 (s-t, 2 nd class of hazard)	0,05 (tox, 3 rd class of hazard)	not established	5,29,30
Caustic soda	not available	Monitor the pH value must not exceed the limits	Monitor the sodium value MAC _{fishery} 50 mg/l (san-tox. 4	not established	5,29,30
		6,5- 8,5	ecological); 10 mg/l for water bodies with mineralization up to 100 mg/l for seas or their particular parts 390 mg/l at 13-18% tox. Monitor the pH value must not exceed the limits 6,5- 8,5.		

<p>12.4.2. Ecotoxicity factors: (CL, EC for fish, Daphnia magna, algae etc.)</p>	<p>Acute toxicity Species Exposure for fish CL50 (mg/l) time (h) 0,083 - 0,365 Lepomis macrochirus 96 0,12 - 0,16 Pimephales promelas 96 0,1 Micropterus salmoides 960,1 Micropterus salmoides 96 0,09 - 0,39 Perca flavescens 96 (5)</p>
<p>12.4.3. Migration and transformation in environment due to biodeterioration and other processes (oxidation, hydrolysis etc):</p>	<p>Transformed in environment. Transformation products: hydrogen cyanide, sodium cyanate, sodium carbonate. (5)</p>

13. Recommendations for disposal of wastes

<p>13.1. Precautions when handling the wastes from use, storage, transportation etc.</p>	<p>All production areas must be equipped with forced air exhaust ventilation, areas of maximal dusting – with local exhaust ventilation. Use PPE. Do not touch the spillage. Gather spillages in dry containers close hermetically, handle the spillage area with mixture of two volumes of 10 % ferric sulphate solution and one volume of 10 % caustic lime solution. (19)</p>
<p>13.2. Information about places and methods of decontamination, handling or disposal of wastes, including container (package):</p>	<p>The product with expired storage period (if does not correspond with TU) must be recycled. Spillages must be handled with decontaminating mixture: mixture of ferric sulphate solution and caustic lime solution in the ratio 2:1. Decontaminated wastes must be buried. Discharge and disposal of wastes must be performed in accordance with the requirements of the ecological legislative and regulatory enactments of Russia and taking into account the technology based standards. (18) Waste water for decontamination of cyanides to nontoxic compounds are directed to the wastewater recovery plant and disinfected with hydrogen peroxide. After that the wastes are directed to the plant-wide canalization flow of clean-contaminated run-off. (13) Waste water free from cyanides can be directed in sewage collectors or surface waters. Containers cannot be recycled. Containers from</p>
	<p>cyanide salts must be decontaminated compulsory (with copperas solution), wash with water and junked. Deactivation is to be performed on dedicated grounds outside the production areas. Responsibility for waste disposal (use, disinfection, disposal, burial) rests with the owner.</p>

13.3. Recommendations for disposal of wastes from household use:	Not used in household.
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14. Transport information

14.1. UN number: (according to UN recommendations for carriage of dangerous goods (standard regulations), latest edition)	UN number – 1689 (24)
14.2. Proper shipping name:	Sodium cyanide solid Sodium cyanide technical top, first grade (1, 15)
14.3. Applied transport means:	Sodium cyanide is transported by railway and automobile transport in covered vehicles according to Regulations for carriage of dangerous goods, applied by these means of transport. Disposition and securing of barrels, steel drums, polyethylene drums with product in railway cars is performed according to the Technical regulations for disposition and securing of cargo in railway cars and containers, approved by the Traffic Ministry of Russia on 27.05.2003 No ZM - 943. (1, 24)
14.4. Hazard classification of cargo: (according to GOST 19433 and UN recommendations for carriage of dangerous goods)	Class of hazard 6.1, classification code – 6111 (5, 16)
14.5. Transport label: (manipulation signs; main, additional and explanatory texts)	«Top», «Keep dry», «Tight packing» according to GOST 14192, warning sign fig.6a (skull and cross bones) according to GOST 19433, additional symbol «dry wood and dead fish» (1, 15)
14.6. Packing group: (according to UN recommendations for carriage of dangerous goods)	Packing group - I (23-25)
14.7. Hazard information at transportation by road:	If transported by means of automobile transport the vehicle should be equipped with orange label with indication of: - at the top - danger code 66, - at the bottom – UN number 1689 (10)
14.8. Emergency cards: (if transported by railway, sea etc.)	Railway transport: No. 619; (23) Sea shipping: F-A; S-A. (25)
14.9. Hazard information in case of international traffic: (according to the Agreement on International Goods Transport by Rail, ADR, RID, IMDG Code, ICAO/IATA etc., including environmental hazard information, including about “marine pollutants”)	according to the Agreement on International Goods Transport by Rail (23) Class: 6.1 Classification code: T5 Packing group: I Warning signs: 6.1 UN-number: 1689 Hazard code: 66 Emergency card number: 619 Cargo name: sodium cyanide

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	<p>according to ADR (24) Class: 6.1 Classification code: T5 Packing group: I Warning signs: 6.1 UN-number: 1689 Identification hazard number: 66 Cargo name: sodium cyanide</p> <p>according to IMDG code (25) Class or subclass: 6.1 Additional hazard: P (marine pollutant)</p> <p>Packing group: I Emergency card: F-A, S-A UN-number: 1689 Shipping name: sodium cyanide solid</p>
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