

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

1.1 Product identifier**1.1.1 Commercial Product Name**

Isobutyl alcohol

1.1.2 Product code

EC Name: 2-methylpropan-1-ol

IUPAC Name: 2-methylpropan-1-ol

CAS-No.: 78-83-1

EINECS-No.: 201-148-0

Common name(s), synonym(s) of the substance: isobutanol, technical isobutyl alcohol

REACH Registration Number

01-2119484609-23-0005

1.2 Relevant identified uses of the substance or mixture and uses advised against**1.2.1 Recommended use**

Industrial uses include: use as intermediate, formulation & (re)packaging of substances and mixtures, distribution of isobutanol, use in coatings (paints, ink, toners, adhesives), use in cleaning agents, use in lubricants, metal working fluids / rolling oils. (*)

Professional uses include: distribution of isobutanol, use in coatings (paints, ink, toners, adhesives), use in cleaning agents, use in lubricants, metal working fluids / rolling oils, use in laboratories.

Consumer uses include: use in coatings (paints, ink, toners, adhesives), use in cleaning agents.

Most common technical function of substance (what it does):

Solvents

Intermediate

Fuel

For more use information see section 7.3.

1.3 Details of the supplier of the safety data sheet**1.3.1 Supplier**

REACHLaw Ltd. (Only Representative)

Street address

Vänrikinkuja 3 JK 21

Postcode and post office

FI-02600 Espoo

Finland

Telephone

+358(0) 9 412 3055

Telefax

+358(0) 9 412 3049

Email

SDS@reachlaw.fi , webpage: www.reachlaw.fi

1.3.3 Identification of the non-community manufacturer

Gazprom neftekhim Salavat

30, Molodogvardeytsev st.

453256 Salavat

Republic of Bashkortostan, Russia

Telephone: +7 (3476) 39 21 09 (8.00-17.00 local time)

Telefax: +7 (3476) 39 21 03

Email: snos@snos.ru ; http://www.snos.ru

1.4 Emergency telephone number**1.4.1 Telephone number, name and address**

See SECTION 16.6 for the list of telephone numbers of poison centers in the European Economic Area.

SECTION 2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture****1272/2008 (CLP)**

Flam. Liq. 3, H226

Skin Irrit. 2, H315

Eye Dam. 1, H318

STOT SE 3, H335

STOT SE 3, H336

2.2 Label elements**1272/2008 (CLP)**

GHS07 - GHS05 - GHS02

Signal word **Danger****Hazard Statements**

H226 Flammable liquid and vapour.

H315 Causes skin irritation.

H318 Causes serious eye damage.

H335 May cause respiratory irritation.

H336 May cause drowsiness or dizziness.

Precautionary Statements

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P233 Keep container tightly closed.

P240 Ground/bond container and receiving equipment.

P241 Use explosion-proof electrical/ventilating/lighting equipment.

P242 Use only non-sparking tools.

P243 Take precautionary measures against static discharge.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P370+P378 In case of fire: Use water spray, dry extinguishing media, alcohol-resistant foam, carbon dioxide for extinction.

P403+P235 Store in a well-ventilated place. Keep cool.

P501 Dispose of absorbed material in accordance with regulations..

**2.3 Other hazards**

This substance is not hazardous to environment and does not meet PBT nor vPvB criteria.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**3.1 Substances**

This substance is registered as monoconstituent substance under REACH.

CAS	EINECS	Chemical name of the substance	Concentration	Classification
78-83-1	201-148-0	2-methylpropan-1-ol	99.8%	Flam. Liq. 3, H226; Skin Irrit. 2, H315; Eye Dam. 1, H318; STOT SE 3, H335; STOT SE 3, H336

3.3 Other information

No data available.

SECTION 4. FIRST AID MEASURES**4.1 Description of first aid measures**

Remove contaminated clothing and shoes. High concentration of vapours may induce unconsciousness. Oxygen or artificial respiration if needed. Remove victim from exposure and then have him lie down in the recovery position. Never give anything by mouth to an unconscious person. Show this safety data sheet to the doctor in attendance.

4.1.2 Inhalation

If inhaled, remove to fresh air. Get medical attention.

4.1.3 Skin contact

Wash off immediately with soap and plenty of water.

4.1.4 Eye contact

Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Get medical attention.

4.1.5 Ingestion

Rinse mouth with water. Drink plenty of water. Get medical attention.

4.2 Most important symptoms and effects, both acute and delayed

Acute effects: Irritation of skin and respiratory system as well as eye damage. Causes drowsiness or dizziness.

4.3 Indication of immediate medical attention and special treatment needed

Notes to physician: Treat symptomatically. There is no specific antidote available.

SECTION 5. FIREFIGHTING MEASURES

This substance is classified as a flammable substance. Evacuate personnel to safe areas. Vapours may form explosive mixture with air. Solvent vapours are heavier than air and may spread along floors. Flash back possible over considerable distance.

5.1 Extinguishing media**5.1.1 Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.1.2 Extinguishing media which must not be used for safety reasons

no data available

5.2 Special hazards arising from the substance or mixture

In case of fire hazardous decomposition products may be produced such as: COx.

5.3 Advice for firefighters

Personal protection through wearing a tightly closed chemical protection suit and a self-contained breathing apparatus. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Keep containers and surroundings cool with water spray.

5.4 Specific methods

Foam should be applied in large quantities as it is broken down to some extent by the product.

SECTION 6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Avoid inhalation, ingestion and contact with skin and eyes. Ensure all equipment is electrically grounded before beginning transfer operations.

6.2 Environmental precautions

Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Prevent further leakage or spillage if safe to do so.

Clean-up methods - large spillage: Large spills should be collected mechanically (remove by pumping) for disposal.

Clean-up methods - small spillage: adsorption in inert material (e.g. sand, kieselguhr, acid binder, universal binder, sawdust) Dispose of in accordance with local regulations.

6.4 Reference to other sections

For personal protection see section 8.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Ensure adequate ventilation, especially in confined areas. Wear personal protective equipment. Do not smoke. Do not burn, or use a cutting torch on, the empty drum. Do not puncture. Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and immediately after handling the product. Keep away from open flames, hot surfaces and sources of ignition.

7.2 Conditions for safe storage, including any incompatibilities

Keep containers tightly closed in a dry, cool and well-ventilated place.

Advice on protection against fire and explosion: Take measures to prevent the build up of electrostatic charge.

Remove all sources of ignition.

7.3 Specific end use(s)

Generally, exposure scenarios for workers have been assessed using the ECETOC TRA worker tool (v2.0) However (*) the use of ECETOC TRA is considered to be unsuitable for the assessment of exposure towards mists. Thus, for the assessment of PROC 7 and PROC 11 (industrial and professional spraying) Stoffenmanager v4.0 has been used to calculate the exposure estimates. The exposure scenarios for workers are displayed according to the format layed down in the latest version of the Cefic GES Worker CSA template. The substance is classified with Skin irritation Cat. 2. Thus, the exposure assessment and risk characterization regarding dermal exposure is based on a qualitative approach. Furthermore, the substance is classified with Eye damage Cat. 1. Effects on the eyes have also been assessed qualitatively.

Exposure to isobutanol is described for following:

Identified uses

ES2 Use as intermediate (Industrial)
 ES3 Formulation & (re)packaging of substances and mixtures (Industrial)
 ES4 Distribution of isobutanol (Industrial)
 ES4 Distribution of isobutanol (Professional)
 ES5 Use in coatings (paints, ink, toners, adhesives; Industrial)
 ES5 Use in coatings (paints, ink, toners, adhesives; Professional)
 ES5 Use in coatings (paints, ink, toners, adhesives; Consumer)
 ES6 Use in cleaning agents (Industrial)
 ES6 Use in cleaning agents (Professional)
 ES6 Use in cleaning agents (Consumer)
 ES7 Use in lubricants (Industrial)
 ES7 Use in lubricants (Professional)
 ES8 Metal working fluids / rolling oils (Industrial)
 ES8 Metal working fluids / rolling oils (Professional)
 ES10 Use in laboratories (Professional)

Environmental exposure

Environmental exposure is not considered relevant since this substance does not raise a concern for the environment, therefore no Exposure Scenarios have been developed for environmental exposure.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

2-methylpropan-1-ol : TLV-TWA (mg/m³) : 154 (Belgium); 310 (Germany); 150 (France, United Kingdom, Sweden, Finland, Switzerland, the Netherlands, Estonia); 100 (Poland); 310 (Slovakia); 154 (Spain); 75 (Norway); 300 (the Czech Republic)

2-methylpropan-1-ol : TLV-STEL (mg/m³) : 250 (Sweden); 225 (United Kingdom); 230 (Finland); 200 (Poland); 150 (Switzerland); 600 (the Czech Republic).

8.1.2 Other information on limit values

no data available

8.1.3 Limit values in other countries

See section 8.1 control parameters.

8.1.4 DNELs

Derivation of DNEL(s):

WORKERS

Long-term local exposure, inhalation: 310 mg/m³ (irritation/corrosion, eye/skin)

GENERAL POPULATION/CONSUMER

Long-term exposure systemic, oral: 25 mg/kg bw/day (repeated dose toxicity)

Long-term exposure local, inhalation: 55 mg/m³ (irritation/corrosion, eye/skin)

8.1.5 PNECs

(*)

PNEC water compartment

Acute studies are available on all three trophic levels. Furthermore long-term studies are available on two trophic levels. The PNEC derivation in water compartment is based on the lowest long-term result of invertebrates (*Daphnia magna*) 21 days reproduction with NOEC of 20 mg/L. PNEC for intermittent releases is derived based on the lowest short-term result of invertebrates (*Daphnia pulex*) with EC50(48h) of 1100 mg/L.

PNEC water compartment:

PNEC (freshwater) = 0.40 mg/l. Assessment factor (AF) 50.

PNEC (marine water) = 0.04 mg/l. Assessment factor (AF) 500.

PNEC (intermittent releases): 11 mg/L. Assessment factor (AF) 100.

PNEC sediment compartment:

PNEC in sediment compartment is calculated from PNEC water by using equilibrium partitioning method.

PNEC sediment (freshwater) = 1.52 mg/kg sediment dw

PNEC sediment (marine water) = 0.152 mg/kg sediment dw

PNEC Soil compartment:

PNEC in soil compartment is calculated from PNEC water by using equilibrium partitioning method.

PNEC soil: 0.0699 mg/kg soil dw

PNEC Sewage treatment plant:

PNEC for sewage treatment plant is derived based on the biodegradation study by using MITI 301C method. Under the test condition of 100 mg/L test concentration the substance was readily biodegradable.

PNEC STP = 10 mg/l. Assessment factor (AF) 10.

8.2 Exposure controls

8.2.1 Appropriate engineering controls

General hygiene considerations: Avoid contact with skin, eyes and clothing. Avoid breathing vapours, mist or gas. Apply technical measures to comply with the occupational exposure limits. Personal protection through wearing a tightly closed chemical protection suit and a self-contained breathing apparatus. Handle only in a place equipped with local exhaust (or other appropriate exhaust). Prevent the creation of flammable or explosive concentrations of vapour in air and avoid vapour concentration higher than the occupational exposure limits. The filter class for the respirator must be suitable for the maximum expected contaminant concentration (gas/vapour/aerosol/particulates) that may arise when handling the product. If this concentration is exceeded, self-contained breathing apparatus must be used.

8.2.2 Individual protection measures

8.2.2.1 Respiratory protection

In case of insufficient ventilation wear suitable respiratory equipment. This product should not be used under conditions of poor ventilation unless a protective mask with an appropriate gas filter (i.e. type A1 according to standard EN 14387) is used.

8.2.2.2 Hand protection

Protective gloves complying with EN 374. Be aware that in daily use the durability of a chemical resistant protective glove can be notably shorter than the break through time measured according to EN 374, due to the numerous outside influences (e.g. temperature).

Suitable materials also with prolonged, direct contact (Recommended: Protective index 6, corresponding > 480 minutes of permeation time according to EN 374):

chloroprene rubber (CR) - 0.5 mm coating thickness

Manufacturer's directions for use should be observed because of great diversity of types.

Supplementary note: The specifications are based on tests, literature data and information of glove manufacturers or are derived from similar substances by analogy. Due to many conditions (e.g. temperature) it must be considered, that the practical usage of a chemical-protective glove in practice may be much shorter than the permeation time determined through testing.

8.2.2.3 Eye/face protection

Safety glasses with side-shields conforming to EN166 Tightly fitting safety goggles

8.2.2.4 Skin protection

Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Chemical resistant apron, Solvent-resistant apron and boots, Complete suit protecting against chemicals. Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN ISO 13982 in case of dust).

8.2.3 Environmental exposure controls

No other information on environmental exposure controls than provided in section 6.

No special exposure controls are specified for the end uses of this substance in annexes since environmental exposure and risk characterization has not been assessed for this substance. See also section 7.3.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Important Health Safety and Environmental Information**9.1.1 Appearance**

Liquid

9.1.2 Odour

strong

9.1.3 Odour threshold

no data available

9.1.4 pH

no data available

9.1.5 Melting point/freezing point

< -90 °C

9.1.6 Initial boiling point and boiling range

108 °C (at 1013hPa)

9.1.7 Flash point

31 °C (at 1013 hPa)

9.1.8 Evaporation rate

no data available

9.1.9 Flammability (solid, gas)

Flammable (Flammable upon ignition. Flammability derived from flash point. The substance has no pyrophoric properties and does not liberate flammable gases on contact with water.)

9.1.10 Explosive properties**9.1.10.1 Lower explosion limit**

no data available

9.1.10.2 Upper explosion limit

no data available

9.1.11 Vapour pressure

< 16 hPa (20 °C)

9.1.12	Vapour density	no data available
9.1.13	Relative density	801.7 kg/m ³
9.1.14	Solubility(ies)	
9.1.14.1	Water solubility	70 g/L (20 °C)
9.1.14.2	Fat solubility (solvent - oil to be specified)	no data available
9.1.15	Partition coefficient: n-octanol/water	Log Kow = 1 (at 25 °C)
9.1.16	Auto-ignition temperature	400 °C (at 1007 hPa)
9.1.17	Decomposition temperature	Not applicable.
9.1.18	Viscosity	3.1028 mPas (dynamic, 20 °C)
9.1.19	Explosive properties	Not explosive, because there are no chemical groups associated with explosive properties in the molecule.
9.1.20	Oxidising properties	Not oxidising, because the substance is incapable of reacting exothermically with combustible materials on the basis of the chemical structure.
9.2	Other information	no data available

SECTION 10. STABILITY AND REACTIVITY

10.1	Reactivity	Incompatible with oxidizing agents.
10.2	Chemical stability	Stable under normal conditions.
10.3	Possibility of hazardous reactions	Incompatible with oxidizing agents.
10.4	Conditions to avoid	Remove all sources of ignition.
10.5	Incompatible materials	Strong oxidizing agents
10.6	Hazardous decomposition products	In case of fire hazardous decomposition products may be produced such as: Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke).

SECTION 11. TOXICOLOGICAL INFORMATION

11.1	Information on toxicological effects
-------------	---

Risk of serious damage to eyes. Causes skin irritation. Causes respiratory tract irritation. Vapours may cause drowsiness and dizziness.

Summary

Isobutanol is rapidly absorbed following oral administration and inhalation exposures. Isobutanol is metabolised to isobutyraldehyde and isobutyric acid in rats and humans, primarily by alcohol and aldehyde dehydrogenases.

Absorption

Rapid absorption after inhalative exposition in rats (measurable blood levels after 5 min; Poet 2003) and after oral exposition in rabbits (Saito et al. 1975).

Metabolism

Rapid metabolism to isobutyric acid in rats (blood level of the metabolite peaked 10 min after isobutanol; Poet 2003).

Class I Alcohol Dehydrogenase (ADH) isozymes appear to be the most active for isobutanol metabolism in animals and humans (Sinclair et al. 1990)

Isobutyric acid, isobutyraldehyde and a not fully characterized urinary metabolite coeluted with isovaleric acid were known metabolites of isobutanol (several authors, i. e. Røddell et al. 1983)

Excretion

Rapid excretion after inhalative exposition *in vivo* in rats (blood level peaked after 15 min; Poet 2003) and in rabbits (Saito et al. 1975) and *in situ/ in vitro* (Hedlund and Kiessling 1969) in rats.

11.1.1 Acute toxicity

Not classified due to data which are conclusive although insufficient for classification.

LD50/oral/rat = = >2830 mg/kg bw (males) / 3350 mg/kg bw (females; GLP, OECD 401; Union Carbide Corporation 1993)

LD50/dermal/rabbit = = > 2000 mg/kg bw (males); 2460 mg/kg bw (females; GLP, OECD 402; Union Carbide Corporation 1993)

LC50/inhalation/ 6 h/rat = >= 18.2 mg/L (GLP, neurotoxicity guideline, CMA 1994)

11.1.2 Irritation and corrosion

Skin irritation Category 2 (Rabbit, 4 h, occlusive: irritating (superficial necrosis in 2/6 animals; OECD 404, GLP; Union Carbide Corporation 1993))

Serious eye damage Category 1 (Rabbit: (irreversible corneal opacity and conjunctivae redness; OECD 405, GLP, Hoechst AG 1988))

Respiratory irritation Single Target Organ Toxicity, Category 3 (Acute inhalation study, rat: Irritating to the respiratory tract (Kushneva et al. 1983; Val. 4)).

11.1.3 Sensitisation

Not classified due to data which are conclusive although insufficient for classification.

Skin sensitisation

Did not cause sensitisation on laboratory animals. (value derived from propan-1-ol; similar OECD 406; Gad S.C. et al 1986)

Justification to use propan-1-ol for this endpoint: Regarding relevant physical-chemical properties (i. e. water solubility, lipophilicity), propan-1-ol possesses comparable characteristics as isobutanol. Additionally, according to their chemical structure both substances vary only in one -CH₂ group and owns the same (alcoholic) functional group. The available data for propan-1-ol is therefore suitable to use when evaluating isobutanol.

QSAR: OASIS TIMES MIX V2.25.3: **not sensitizing** (BASF SE 2008)

There is no data available for respiratory sensitisation.

11.1.4 Subacute, subchronic and prolonged toxicity

Repeated exposure may cause skin dryness or cracking.

Repeated dose toxicity**Oral**

NOAEL \geq ca. 1450 mg/kg bw/ day (= 16000 ppm; no effects observed; 90 d, rat, drinking water; OECD 408, GLP; BG Chemie 1990)

NOAEL \geq 1000 mg/kg bw/ day; NOEL = 316 mg/kg bw/day due to transient clinical signs and transient body weight gain reduction (GLP; 90 d, rat, gavage, US EPA 1985)

Dermal

4-6 times 0.3 mL for 24 h within 7 d, rabbit, occlusive: no systemic toxicity studied; local: highly irritant (TSCATS OTS 0510692, 1986; Val. 4)

Inhalation

NOAEL systemic \geq ca. 7.5 mg/L/day (2500 ppm); NOEL systemic = ca. 3.0 mg/L/day (due to slight hematologic effects with questionable biological significance, GLP, neurotoxicity guideline; 90 day, rat, 6 h/d, 5 d/wk, CMA 1996a)

NOAEL systemic \geq ca. 7.5 mg/L/day (2500 ppm, no effects observed; GLP, EPA OPPTS 870.3800, 2-generation study/ca. 17 wks for the parental generation, 6 h/d, 7 d/wk ; ACC 2003)

Mutagenicity

Not classified due to data which are conclusive although insufficient for classification.

Mutagenicity (Escherichia coli - reverse mutation assay) : negative

Mutagenicity (in vitro mammalian cytogenetic test): negative

Mutagenicity (micronucleus test): negative

Carcinogenicity

Not classified due to lack of data.

Reproductive toxicity

Fertility and developmental toxicity tests did not reveal any effect on reproduction.

NOAEL P/F1/F2 \geq ca. 7.5 mg/L (=2500 ppm; GLP, EPA guideline OPPTS 870.3800: inhalation, rat, 2-generation; ; WIL Res. Lab. Inc., 2003)

NOAEL maternal, teratogenicity and fetotoxicity \geq 10 mg/L (GLP; OECD 414: inhalation, rat, gestation day 6-15.; BG Chemie 1990).

NOAEL maternal = 2.5 mg/L (due to slight impairment of body weight gain); NOAEL teratogenicity and fetotoxicity = 10 mg/L (GLP; OECD 414: inhalation, rabbit, gestation day 7-19; BG Chemie 1990).

Neurological effects**Inhalation**

NOAEL neurotoxicity \geq 7.5 mg/L (2500 ppm; GLP, neurotoxicity guideline 82-7 F: 90 d, rat.; CMA 1996a).

NOAEL neurotoxicity/behaviour \geq 7.5 mg/L (2500 ppm; GLP, neurotoxicity guideline 85 F: 90 d, rat, CMA 1996b).

LOEL neurotoxicity = 4.5 mg/L (1500 ppm; slight hypoactivation during exposure; EPA guidelines 798.6050 & 789.6200: Acute, rat; CMA 1994)

11.1.5 STOT-single exposure

Causes neurotoxic effects.
STOT - single exposure Category 3 :
Central nervous system depression
Respiratory irritation

11.1.6 STOT-repeated exposure

Causes neurotoxic effects. STOT - single exposure Category 3:
Central nervous system depression

11.1.7 Aspiration hazard

Not classified due to lack of data.

11.1.8 Other information on acute toxicity

Causes respiratory tract irritation. Causes headache, drowsiness or other effects to the central nervous system.

SECTION 12. ECOLOGICAL INFORMATION**12.1 Toxicity****12.1.1 Aquatic toxicity**

This substance is considered to be non-hazardous for environment.

Acute aquatic toxicity

Toxicity to fish (*Pimeales promelas*) LC50 (96 h): 1430 mg/L; no OECD guideline followed; method according to Brooke LT et al. (1984).

Toxicity to invertebrates (*Daphnia pulex*) EC50 (48 h): 1100 mg/L; no OECD guideline followed; method ASTM Methods (1984)

Toxicity to algal growth (*Pseudokirchnerella subcapitata*): EC50 (72 h): 1799 mg/L; OECD Guideline 201 (Alga, Growth Inhibition Test).

Toxicity to aquatic micro-organisms:

Toxicity of this substance to micro-organisms is tested by using non OECD guideline method presented by Alsop, G.M., Waggy, G.T., Conway, R.A., (1980). Bacterial Growth Inhibition Test. Journal of Water Pollution Control Federation Vol 52, No. 10. The test material is evaluated at selected concentrations in a mixture containing buffer, nutrients, growth substrate and microorganisms. After 16 hours the turbidity of the solution is measured against control values.

IC50 (16 h): > 1000 mg/L; industrial activated sludge used as inoculum.

Chronic aquatic toxicity

Toxicity to invertebrates reproduction (*Daphnia magna*) NOEC (21 d): 20 mg/L; no OECD guideline followed, Federal method according to Environmental Agency (Umweltbundesamt, 1 Jan 1984).

12.1.2 Toxicity to other organisms**Toxicity to sediment compartment and terrestrial organisms**

The substance exhibits low potential for adsorption to soil, is not bioaccumulative and is readily biodegradable. This means that the substance will be rapidly mineralized by microorganisms in soil. Furthermore, results of aquatic tests revealed no harmful effects of the substance and by thereby suggesting low hazardous potential towards soil organisms.

12.2 Persistence and degradability**12.2.1 Biodegradation**

This substance is readily biodegradable.

Test type: ready biodegradability, seed (settled sewage-treated effluent, or commercial Polyseed BOD seed) OECD Guideline 301 D (Ready Biodegradability: Closed Bottle Test)(Waggy GT et al. (1994))

readily biodegradable

% Degradation of test substance:

70 - 80 after 28 d (O₂ consumption)

Test type: ready biodegradability. Activated sludge according to MITI guideline, OECD Guideline 301 C (Ready Biodegradability: Modified MITI Test (I))(Japan Chemical Industry Ecology-Toxicology & Information Center (JETOC))

readily biodegradable

% Degradation of test substance:

90 - 100 after 14 d (O₂ consumption)

12.2.2 Chemical degradation

Abiotic degradation

Hydrolysis is not relevant degradation pathway for this substance since it is readily biodegradable. After evaporation or exposure to the air, the product will be slowly degraded by photochemical processes.

Photodegradation

Based on a calculation according to AOPWIN v1.91, iso-butanol is indirectly photodegraded by reaction with hydroxyl radicals in the atmosphere with a half-life (t_{1/2}) of about 56 hours taking into account a 24-h day and a mean OH radical concentration of 0.5E06 radicals per cm³ [BASF SE 2006].

12.3 Bioaccumulative potential

Regarding the octanol/water partition coefficient (Log K_{ow} = 1) which is below 3, accumulation of the test substance in organisms is not to be expected. There are neither aquatic nor terrestrial studies for bioaccumulation of iso-butanol available.

12.4 Mobility in soil

This substance is not expected to partition to soil compartment, and therefore the mobility in soil is not expected to be relevant pathway of this substance. This evaluation is based on the following information:

Based on the distribution modeling using Mackay, Level I calculation this substance will preferentially distributed into the compartments water and air rather than soil.

Air (%): 32.02

Water (%): 67.92

Soil (%): 0.03

Sediment (%): 0.03

Also Henry's law constant of iso-butanol proves that this substance will slowly evaporate from the water surface into the atmosphere.

Henry's law constant (@25°C) estimated to be 9.99E-06 atm·m³/mole (= 1.012 Pa·m³/mole) by SRC HENRYWIN v3.10 [BASF AG 2006]

In addition, based on calculated log K_{oc} of 2.1 (corrected log K_{oc} = 0.31) adsorption to solid soil phase is not expected. Soil adsorption coefficient is calculated by using SRC PCKOCWIN v1.66 [BASF AG, 2006].

12.5 Results of PBT and vPvB assessment

Summary and overall Conclusions on PBT or vPvB Properties

Regarding all available data on biotic and abiotic degradation, bioaccumulation and toxicity to aquatic environment and human health it can be stated that the substance does not fulfil the PBT criteria (not PBT) and not the vPvB criteria (not vPvB).

12.6 Other adverse effects**Toxicity to atmospheric compartment**

The substance is not in Annex I of Regulation (EC) 2037/2000 on substances that deplete the ozone layer.

SECTION 13. DISPOSAL CONSIDERATIONS

Dispose of product residue in accordance with the instructions of the person responsible for waste disposal. Waste must be classified and labelled prior to recycling or disposal. Waste codes for the product wastes in accordance with European waste catalogue (EWC) should be assigned by the user.

13.1 Waste treatment methods

Dispose of in accordance with waste classification. Primary waste management option for the unused substance is hazardous waste incineration. Refer to local or national waste management regulations.

13.2 Waste from residues / unused products

Dispose of as hazardous waste. Proposed waste codes for organic chemical process residues and contaminated packing are the following:

07 01 08 * other still bottoms and reaction residues

15 01 10* packing containing residues of or contaminated by dangerous substances

Where possible recycling is preferred to disposal or incineration. Fully drained containers which are drop- and scrape-free can be treated as industrial waste, and can possibly be recycled.

SECTION 14. TRANSPORT INFORMATION

14.1 UN number	1212 (ADR/RID, IMDG, ICAO/IATA)
14.2 UN proper shipping name	ISOBUTANOL (ISOBUTYL ALCOHOL)
14.3 Transport hazard class(es)	3 (ADR/RID, IMDG) (EmS: F-E, S-D (IMDG))
14.4 Packing group	III (ADR/RID, IMDG, ICAO/IATA)
14.5 Environmental hazards	No special environmental precautions required. An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Discharge into the environment must be avoided.
14.6 Special precautions for users	Flammable liquid
14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	no data available

SECTION 15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture	No data available.
15.2 Chemical safety assessment	A Chemical Safety Assessment has been carried out for this substance.

SECTION 16. OTHER INFORMATION

16.1 Additions, Deletions, Revisions	
---	--

Version 4.0 OR details were updated. New OR.

Version 3.1 OR address details were updated.

Version 3.0. (Consumer uses in coatings and cleaning agents included to version 2, Classification according to directive 67/548/EEC removed from version 3.0.), all sections aligned with the REACH Chemical Safety Report.

This safety data sheet is drawn up to comply with the requirements of Regulation (EC) No. 1907/2006 (REACH), as amended by Annex I to Commission Regulation (EU) No. 2015/830 of 28 May 2015

16.2 Key or legend to abbreviations and acronyms

REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals

CLP - Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

DSD - Council Directive 67/548/EEC (Dangerous Substances Directive)

DNEL - Derived no-effect level

NOEL - No-observed effect level

NOAEL - No-observed adverse effect level

LOEL - Lowest observed effect level

LOAEL - Lowest observed adverse effect level

NOEC - No-observed effect concentration

NOAEC - No-observed adverse effect concentration

EC50 - Concentration of the substance that causes 50 percent reduction of a certain effect on test organism

LC50 - Concentration of the substance that causes 50 % mortality of the test organisms

LD50 - Lethal dose of the substance that causes 50 % mortality of the test population

PBT/vPvB - Persistent, bioaccumulative and toxic/ very persistent and very bioaccumulative

PNEC - Predicted no-effect concentration

TLV-TWA - "Threshold Limit Value-Time-Weighted Average" This term is used in the specification of Occupational Exposure Limits (OELs) to define the average concentration of a chemical to which it is permissible to expose a worker over a period of time, typically 8 hours.

TLV-STEL - "Threshold Limit Value, Short Term Exposure Limit", is the maximum concentration permitted for a continuous 15-minute exposure period. There may be a maximum of four such periods per day, with at least 60 minutes between exposure periods, and provided the daily TLV-TWA is not exceeded.

QSAR - Quantitative Structure-Activity Relationship

16.3 Key literature references and sources for data

REACH Chemical Safety Report, Isobutanol (CAS 78-83-1), 03.09.2010.

16.4 Classification procedure

The classification of this substance is the harmonized classification of CLP reg. in Annex VI. No self-classification is needed.

16.6 Emergency telephone number

Europe-wide emergency number: 112**(*)****Contact a poison control centre. List of Telephone Numbers :**

AUSTRIA (Vienna Wien) +43 1 406 43 43; **BELGIUM** (Brussels Bruxelles) +32 70 245 245; **BULGARIA** (Sofia) +359 2 9154 409; **CZECH REPUBLIC** (Prague Praha) +420 224 919 293; **CROATIA** +385 1 23 48 342, **DENMARK** (Copenhagen) 82 12 12 12; **ESTONIA** (Tallinn) 112, calling from abroad +372 626 93 93; **FINLAND** (Helsinki) +358 9 471 977; **FRANCE** (Paris) +33 (0)1 45 42 59 59; **GREECE** (Athens Athinai) +30 10 779 3777; **HUNGARY** (Budapest) +36 80 20 11 99; **ICELAND** (Reykjavik) +354 543 2222; **IRELAND** (Dublin) +353 1 8379964; **ITALY** (Rome) +39 06 305 4343; **LATVIA** (Riga) +371 67042473; **LITHUANIA** (Vilnius) +370 5 236 20 52 or +370 687 53378; **MALTA** (Valletta) 2545 0000; **NETHERLANDS** (Bilthoven) +31 30 274 88 88 (only for the purpose of informing medical personnel in cases of acute intoxication); **NORWAY** (Oslo) 22 591300; **POLAND** (Gdansk) +48 58301 65 16 or +48 58 349 2831; **PORTUGAL** (Lisbon Lisboa) 808 250 143; **ROMANIA** (Bucharest) +40 21 3183606 (8.00-15.00) **SLOVAKIA** (Bratislava) +421 2 54 77 4166; **SLOVENIA** (Ljubljana) + 386 41 650 500; **SPAIN** (Barcelona) +34 93 227 98 33 or +34 93 227 54 00 bleep 190; **SWEDEN** (Stockholm) 112 or +46 010 456 6700 (mon-fri 9.00-17.00); **UNITED KINGDOM** 112

16.7**Recommended restrictions**

DISCLAIMER OF LIABILITY The information in this SDS was obtained from recent Chemical Safety Report of this substance from REACH registration 2010. However, the information is provided without any warranty, express or implied, regarding its correctness. The conditions or methods of handling, storage, use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product. This SDS was prepared and is to be used only for this product. If the product is used as a component in another product, this SDS information may not be applicable.

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

ES2 – Use as intermediate (Industrial)

Section 1		Exposure Scenario Title
Title		Use as intermediate; CAS: 78-83-1
Use Descriptor		Sector of Use: Industrial (SU8, SU9) Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9 Environmental Release Categories: ERC6a
Processes, tasks, activities covered		Use as intermediate. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities
Section 2		Operational conditions and risk management measures
Section 2.1		Control of worker exposure
Product characteristics		
Physical form of product		Liquid, vapour pressure 0.5 - 10 kPa [OC4].
Concentration of substance in product		Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used		<i>Not applicable</i>
Frequency and duration of use		Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management		<i>Not applicable</i>
Other Operational Conditions affecting worker exposure		Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Operation is carried out at elevated temperature (> 20°C above ambient temperature) [OC7]. (PROC17, PROC18)
Contributing Scenarios	PROCs	Risk Management Measures
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	Minimization of manual phases.#1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	4	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82].	8a	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81].	8b	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 97%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Pouring from small containers [CS9]. Dedicated facility [CS81].	9	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1

#1 refers to qualitative assessment

Information on estimated exposure and DU guidance

Contributing Scenarios	PROCs	Inhalative Exposure (long term) Predicted Inhalative Exposure (mg/m3)	Risk Characterization Ratio (RCR)
Long-term – local / systemic effects DNEL for workers	310		
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	0.03	0.0001

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	30.88	0.0996
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	77.19	0.2490
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	4	61.75	0.1992
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82]	8a	15.44	0.0498
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81]	8b	4.63	0.0149
Pouring from small containers [CS9]. Dedicated facility [CS81]	9	15.44	0.0498

Guidance to DU to evaluate whether he works inside boundaries set by the ES:

Exposure scenarios for workers have been assessed using the ECETOC TRA worker tool (v2.0) However, the use of ECETOC TRA is considered to be unsuitable for the assessment of exposure towards mists. Thus, for the assessment of PROC 7 and PROC 11 (industrial and professional spraying) Stoffenmanager v4.0 has been used to calculate the exposure estimates. The substance is classified with R38 or Skin irritation Cat. 2. Thus, the exposure assessment and risk characterization regarding dermal exposure is based on a qualitative approach. Furthermore, the substance is classified with R41 Eye damage Cat. 1. Effects on the eyes have also been assessed qualitatively.

The RCRs regarding inhalation for the long term exposure estimates/values of the contributing scenarios are all below 1. Local effects have been considered using a qualitative assessment. Applying the OCs/RMMs described in ES the risk for local dermal effects is regarded to be controlled. If compliance with the exposure scenario cannot be confirmed, the RCR may also be determined by measurement or calculation of the exposure concentration and comparison to the DNELs for the substance provided above (section information on estimated exposure).

The environmental exposure assessment of this substance is not assessed since this substance is not classified as hazardous to aquatic environment. This substance indicates no severe toxicity with regard to possible exposure of men via the environment. The substance is not classified for being toxic, toxic after repeated exposure (R48, STOT Cat 1), carcinogenic (any category) or toxic to reproduction (DSD 1 or 2; EU GHS 1a/b). Furthermore, the low log kow implies that an exposure via the food is not likely. The readily biodegradability implies that the substance will rapidly disappear from water and soil via mineralization and therefore will not probably pose a risk for drinking water. In conclusion, the toxicological and ecotoxicological properties of the substance give no reason for concern regarding a hazard for men via the indirect exposure route. Thus, a quantitative assessment has not been performed.

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

ES3 – Formulation & (re)packing of substances and mixtures (Industrial)

Section 1		Exposure Scenario Title
Title		Formulation & (re)packing of substances and mixtures; CAS: 78-83-1
Use Descriptor		Sector of Use: Industrial (SU10)
		Process Categories: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15
		Environmental Release Categories: ERC 2
Processes, tasks, activities covered		Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, large and small scale packing, maintenance and associated laboratory activities
Section 2		Operational conditions and risk management measures
Section 2.1		Control of worker exposure
Product characteristics		
Physical form of product		Liquid, vapour pressure 0.5 - 10 kPa [OC4].
Concentration of substance in product		Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used		<i>Not applicable</i>
Frequency and duration of use		Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management		<i>Not applicable</i>
Other Operational Conditions affecting worker exposure		Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Operation is carried out at elevated temperature (> 20°C above ambient temperature) [OC7]. (PROC17, PROC18)
Contributing Scenarios	PROCs	Risk Management Measures
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}
General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	4	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Batch process [CS55]. Mixing operations (open systems) [CS30].	5	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82].	8a	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81].	8b	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 97%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Pouring from small containers [CS9]. Dedicated facility [CS81].	9	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Laboratory activities [CS36]. Small scale [CS61].	15	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1

#1 refers to qualitative assessment

Information on estimated exposure and DU guidance

Contributing Scenarios	PROCs	Inhalative Exposure (long term) Predicted Inhalative Exposure (mg/m3)	Risk Characterization Ratio (RCR)
Long-term – local / systemic effects DNEL for workers		310	
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	0.03	0.0001
General exposures (closed systems) [CS15]. ; Continuous process [CS54]. With sample collection [CS56]. ; Equipment cleaning and maintenance [CS39].	2	30.88	0.0995

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

General exposures (closed systems) [CS15]. Batch process [CS55]. ; With sample collection [CS56].	3	77.19	0.2490
General exposures (open systems) [CS16]. Batch process [CS55]. ; With sample collection [CS56].	4	61.75	0.1992
Batch process [CS55]. Mixing operations (open systems) [CS30].	5	15.44	0.0497
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82]	8a	15.44	0.0497
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81]	8b	4.63	0.0149
Pouring from small containers [CS9]. Dedicated facility [CS81]	9	15.44	0.0497
Laboratory activities [CS36]. Small scale [CS61].	15	30.88	0.0995

Guidance to DU to evaluate whether he works inside boundaries set by the ES:

Exposure scenarios for workers have been assessed using the ECETOC TRA worker tool (v2.0) However, the use of ECETOC TRA is considered to be unsuitable for the assessment of exposure towards mists. Thus, for the assessment of PROC 7 and PROC 11 (industrial and professional spraying) Stoffenmanager v4.0 has been used to calculate the exposure estimates. The substance is classified with R38 or Skin irritation Cat. 2. Thus, the exposure assessment and risk characterization regarding dermal exposure is based on a qualitative approach. Furthermore, the substance is classified with R41 Eye damage Cat. 1. Effects on the eyes have also been assessed qualitatively.

The RCRs regarding inhalation for the long term exposure estimates/values of the contributing scenarios are all below 1. Local effects have been considered using a qualitative assessment. Applying the OCs/RMMs described in ES the risk for local dermal effects is regarded to be controlled. If compliance with the exposure scenario cannot be confirmed, the RCR may also be determined by measurement or calculation of the exposure concentration and comparison to the DNELs for the substance provided above (section information on estimated exposure).

The environmental exposure assessment of this substance is not assessed since this substance is not classified as hazardous to aquatic environment. This substance indicates no severe toxicity with regard to possible exposure of men via the environment. The substance is not classified for being toxic, toxic after repeated exposure (R48, STOT Cat 1), carcinogenic (any category) or toxic to reproduction (DSD 1 or 2; EU GHS 1a/b). Furthermore, the low log kow implies that an exposure via the food is not likely. The readily biodegradability implies that the substance will rapidly disappear from water and soil via mineralization and therefore will not probably pose a risk for drinking water. In conclusion, the toxicological and ecotoxicological properties of the substance give no reason for concern regarding a hazard for men via the indirect exposure route. Thus, a quantitative assessment has not been performed.

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

ES4 – Distribution of substance (Industrial)

Section 1		Exposure Scenario Title
Title		Distribution of substance; CAS: 78-83-1
Use Descriptor		Sector of Use: Industrial (SU8, SU9)
		Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15
		Environmental Release Categories: ERC1, ERC2
Processes, tasks, activities covered		Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its distribution and associated laboratory activities
Section 2		Operational conditions and risk management measures
Section 2.1		Control of worker exposure
Product characteristics		
Physical form of product		Liquid, vapour pressure 0.5 - 10 kPa [OC4].
Concentration of substance in product		Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used		<i>Not applicable</i>
Frequency and duration of use		Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management		<i>Not applicable</i>
Other Operational Conditions affecting worker exposure		Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Operation is carried out at elevated temperature (> 20°C above ambient temperature) [OC7]. (PROC17, PROC18)
Contributing Scenarios	PROCs	Risk Management Measures
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
General exposures (closed systems) [CS15]. ; Continuous process [CS54]. With sample collection [CS56]. ; Equipment cleaning and maintenance [CS39].	2	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
General exposures (closed systems) [CS15]. Batch process [CS55]. ; With sample collection [CS56].	3	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
General exposures (open systems) [CS16]. Batch process [CS55]. ; With sample collection [CS56].	4	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82]	8a	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81]	8b	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 97%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Pouring from small containers [CS9]. Dedicated facility [CS81]	9	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Laboratory activities [CS36]. Small scale [CS61].	15	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1

#1 refers to qualitative assessment

Information on estimated exposure and DU guidance

Contributing Scenarios	PROCs	Inhalative Exposure (long term) Predicted Inhalative Exposure (mg/m3)	Risk Characterization Ratio (RCR)
Long-term – local / systemic effects DNEL for workers	310		
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	0.03	0.0001
General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	30.88	0.0996
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	77.19	0.2490
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	4	61.75	0.1992
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82].	8a	15.44	0.0498
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81].	8b	4.63	0.0149
Pouring from small containers [CS9]. Dedicated facility [CS81]	9	15.44	0.0498
Laboratory activities [CS36]. Small scale [CS61].	15	30.88	0.0996

Guidance to DU to evaluate whether he works inside boundaries set by the ES:

Exposure scenarios for workers have been assessed using the ECETOC TRA worker tool (v2.0) However, the use of ECETOC TRA is considered to be unsuitable for the assessment of exposure towards mists. Thus, for the assessment of PROC 7 and PROC 11 (industrial and professional spraying) Stoffenmanager v4.0 has been used to calculate the exposure estimates. The substance is classified with R38 or Skin irritation Cat. 2. Thus, the exposure assessment and risk characterization regarding dermal exposure is based on a qualitative approach. Furthermore, the substance is classified with R41 Eye damage Cat. 1. Effects on the eyes have also been assessed qualitatively.

The RCRs regarding inhalation for the long term exposure estimates/values of the contributing scenarios are all below 1. Local effects have been considered using a qualitative assessment. Applying the OCs/RMMs described in ES the risk for local dermal effects is regarded to be controlled. If compliance with the exposure scenario cannot be confirmed, the RCR may also be determined by measurement or calculation of the exposure concentration and comparison to the DNELs for the substance provided above (section information on estimated exposure).

The environmental exposure assessment of this substance is not assessed since this substance is not classified as hazardous to aquatic environment. This substance indicates no severe toxicity with regard to possible exposure of men via the environment. The substance is not classified for being toxic, toxic after repeated exposure (R48, STOT Cat 1), carcinogenic (any category) or toxic to reproduction (DSD 1 or 2; EU GHS 1a/b). Furthermore, the low log kow implies that an exposure via the food is not likely. The readily biodegradability implies that the substance will rapidly disappear from water and soil via mineralization and therefore will not probably pose a risk for drinking water. In conclusion, the toxicological and ecotoxicological properties of the substance give no reason for concern regarding a hazard for men via the indirect exposure route. Thus, a quantitative assessment has not been performed.

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

ES4 – Distribution of substance (Professional)

Section 1		Exposure Scenario Title
Title		Distribution of substance; CAS: 78-83-1
Use Descriptor		Sector of Use: Professional (SU22)
		Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15
		Environmental Release Categories: ERC1, ERC2
Processes, tasks, activities covered		Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its distribution and associated laboratory activities
Section 2		Operational conditions and risk management measures
Section 2.1		Control of worker exposure
Product characteristics		
Physical form of product		Liquid, vapour pressure 0.5 - 10 kPa [OC4].
Concentration of substance in product		Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used		<i>Not applicable</i>
Frequency and duration of use		Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management		<i>Not applicable</i>
Other Operational Conditions affecting worker exposure		Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Operation is carried out at elevated temperature (> 20°C above ambient temperature) [OC7]. (PROC17, PROC18)
Contributing Scenarios	PROCs	Risk Management Measures
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}
General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	4	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82].	8a	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81].	8b	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Pouring from small containers [CS9]. Dedicated facility [CS81].	9	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Laboratory activities [CS36]. Small scale [CS61].	15	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1

#1 refers to qualitative assessment

Information on estimated exposure and DU guidance

Contributing Scenarios	PROCs	Inhalative Exposure (long term) Predicted Inhalative Exposure (mg/m3)	Risk Characterization Ratio (RCR)
Long-term – local / systemic effects DNEL for workers	310		
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	0.03	0.0001
General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	61.75	0.1992
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	77.19	0.2490
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	4	154.38	0.4980
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82].	8a	185.25	0.5976
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81].	8b	92.63	0.2988
Pouring from small containers [CS9]. Dedicated facility [CS81].	9	185.25	0.5976
Laboratory activities [CS36]. Small scale [CS61].	15	30.88	0.0997

Guidance to DU to evaluate whether he works inside boundaries set by the ES:

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

Exposure scenarios for workers have been assessed using the ECETOC TRA worker tool (v2.0) However, the use of ECETOC TRA is considered to be unsuitable for the assessment of exposure towards mists. Thus, for the assessment of PROC 7 and PROC 11 (industrial and professional spraying) Stoffenmanager v4.0 has been used to calculate the exposure estimates. The substance is classified with R38 or Skin irritation Cat. 2. Thus, the exposure assessment and risk characterization regarding dermal exposure is based on a qualitative approach. Furthermore, the substance is classified with R41 Eye damage Cat. 1. Effects on the eyes have also been assessed qualitatively.

The RCRs regarding inhalation for the long term exposure estimates/values of the contributing scenarios are all below 1. Local effects have been considered using a qualitative assessment. Applying the OCs/RMMs described in ES the risk for local dermal effects is regarded to be controlled. If compliance with the exposure scenario cannot be confirmed, the RCR may also be determined by measurement or calculation of the exposure concentration and comparison to the DNELs for the substance provided above (section information on estimated exposure).

The environmental exposure assessment of this substance is not assessed since this substance is not classified as hazardous to aquatic environment. This substance indicates no severe toxicity with regard to possible exposure of men via the environment. The substance is not classified for being toxic, toxic after repeated exposure (R48, STOT Cat 1), carcinogenic (any category) or toxic to reproduction (DSD 1 or 2; EU GHS 1a/b). Furthermore, the low log kow implies that an exposure via the food is not likely. The readily biodegradability implies that the substance will rapidly disappear from water and soil via mineralization and therefore will not probably pose a risk for drinking water. In conclusion, the toxicological and ecotoxicological properties of the substance give no reason for concern regarding a hazard for men via the indirect exposure route. Thus, a quantitative assessment has not been performed.

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

ES5 – Use in coatings (paints, ink, toners, adhesives; Industrial)

Section 1		Exposure Scenario Title
Title		Use in coatings (paints, ink, toners, adhesives); CAS: 78-83-1
Use Descriptor		Sector of Use: Industrial (SU3)
		Process Categories: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC15;
		Environmental Release Categories: ERC4
Processes, tasks, activities covered		Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities.
Section 2		Operational conditions and risk management measures
Section 2.1		Control of worker exposure
Product characteristics		
Physical form of product		Liquid, vapour pressure 0.5 - 10 kPa [OC4].
Concentration of substance in product		Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used		<i>Not applicable</i>
Frequency and duration of use		Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management		<i>Not applicable</i>
Other Operational Conditions affecting worker exposure		Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Operation is carried out at elevated temperature (> 20°C above ambient temperature) [OC7]. (PROC17, PROC18)
Contributing Scenarios	PROCs	Risk Management Measures
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	4	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Batch process [CS55]. Mixing operations (open systems) [CS30].	5	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Spraying [CS10].	7#2	Use in a spraying booth. Minimization of manual phases. #1 Clean equipment and the work area every day [C&H3]. Regular inspection and maintenance of equipment and machines. Ensure that the task is being carried out outside the breathing zone of a worker. Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82].	8a	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

Transfer from/pouring from containers [CS22]. Dedicated facility [CS81].	8b	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 97%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Pouring from small containers [CS9]. Dedicated facility [CS81].	9	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Rolling, Brushing [CS51].	10	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Dipping, immersion and pouring [CS4].	13	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Laboratory activities [CS36]. Small scale [CS61].	15	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1

#1 refers to qualitative assessment

#2 other Tool used: Stoffenmanager (v. 4.0; 75th percentile for long term assessment)**Information on estimated exposure and DU guidance**

Contributing Scenarios	PROCs	Inhalative Exposure (long term) Predicted Inhalative Exposure (mg/m3)	Risk Characterization Ratio (RCR)
Long-term – local / systemic effects DNEL for workers			310

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

General exposures (closed systems) [CS15]. Continuous process [CS54].	1	0.03	0.0001
General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	30.88	0.0996
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	77.19	0.2490
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	4	61.75	0.1992
Batch process [CS55]. Mixing operations (open systems) [CS30].	5	15.44	0.0498
Spraying [CS10].	7 ^{#1}	0	0
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82].	8a	15.44	0.0498
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81].	8b	4.63	0.0149
Pouring from small containers [CS9]. Dedicated facility [CS81].	9	15.44	0.0498
Rolling, Brushing [CS51].	10	15.44	0.0498
Dipping, immersion and pouring [CS4].	13	15.44	0.0498
Laboratory activities [CS36]. Small scale [CS61].	15	30.88	0.0996

^{#1} other Tool used: Stoffenmanager (v. 4.0; 75th percentile for long term assessment)

Guidance to DU to evaluate whether he works inside boundaries set by the ES:

Exposure scenarios for workers have been assessed using the ECETOC TRA worker tool (v2.0) However, the use of ECETOC TRA is considered to be unsuitable for the assessment of exposure towards mists. Thus, for the assessment of PROC 7 and PROC 11 (industrial and professional spraying) Stoffenmanager v4.0 has been used to calculate the exposure estimates. The substance is classified with R38 or Skin irritation Cat. 2. Thus, the exposure assessment and risk characterization regarding dermal exposure is based on a qualitative approach. Furthermore, the substance is classified with R41 Eye damage Cat. 1. Effects on the eyes have also been assessed qualitatively.

The RCRs regarding inhalation for the long term exposure estimates/values of the contributing scenarios are all below 1. Local effects have been considered using a qualitative assessment. Applying the OCs/RMMs described in ES the risk for local dermal effects is regarded to be controlled. If compliance with the exposure scenario cannot be confirmed, the RCR may also be determined by measurement or calculation of the exposure concentration and comparison to the DNELs for the substance provided above (section information on estimated exposure).

The environmental exposure assessment of this substance is not assessed since this substance is not classified as hazardous to aquatic environment. This substance indicates no severe toxicity with regard to possible exposure of men via the environment. The substance is not classified for being toxic, toxic after repeated exposure (R48, STOT Cat 1), carcinogenic (any category) or toxic to reproduction (DSD 1 or 2; EU GHS 1a/b). Furthermore, the low log kow implies that an exposure via the food is not likely. The readily biodegradability implies that the substance will rapidly disappear from water and soil via mineralization and therefore will not probably pose a risk for drinking water. In conclusion, the toxicological and ecotoxicological properties of the substance give no reason for concern regarding a hazard for men via the indirect exposure route. Thus, a quantitative assessment has not been performed.

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

ES5 – Use in coatings (paints, ink, toners, adhesives; Professional)

Section 1		Exposure Scenario Title
Title		Use in coatings (paints, ink, toners, adhesives); CAS: 78-83-1
Use Descriptor		Sector of Use: Professional (SU22)
		Process Categories: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC 9, PROC10, PROC11, PROC13, PROC15, PROC19;
		Environmental Release Categories: ERC8a, ERC8c, ERC8d, ERC8f
Processes, tasks, activities covered		Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities.
Section 2		Operational conditions and risk management measures
Section 2.1		Control of worker exposure
Product characteristics		
Physical form of product		Liquid, vapour pressure 0.5 - 10 kPa [OC4].
Concentration of substance in product		Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used		<i>Not applicable</i>
Frequency and duration of use		Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management		<i>Not applicable</i>
Other Operational Conditions affecting worker exposure		Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Operation is carried out at elevated temperature (> 20°C above ambient temperature) [OC7]. (PROC17, PROC18)
Contributing Scenarios	PROCs	Risk Management Measures
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}
General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	4	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Batch process [CS55]. Mixing operations (open systems) [CS30].	5	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82].	8a	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81].	8b	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Pouring from small containers [CS9]. Dedicated facility [CS81].	9	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Rolling, Brushing [CS51].	10	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Spraying [CS10].	11 #2	Use in a spraying booth. Minimization of manual phases. #1 Clean equipment and the work area every day [C&H3]. Regular inspection and maintenance of equipment and machines. Ensure that the task is being carried out outside the breathing zone of a worker. Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1 Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 47%) Minimization of manual phases. #1 Clean equipment and the work area every day [C&H3]. Regular inspection and maintenance of equipment and machines. Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

		Provide enhanced mechanical ventilation by mechanical means [E48].(effectiveness general ventilation: 47%) Minimization of manual phases. #1 Clean equipment and the work area every day [C&H3]. Regular inspection and maintenance of equipment and machines. Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1 Wear a suitable respiratory protection (effectiveness: 80%). If no adequate respiratory protection is available, avoid carrying out operation for more than 2 hours.
Dipping, immersion and pouring [CS4].	13	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Laboratory activities [CS36]. Small scale [CS61].	15	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Hand-mixing with intimate contact. Only PPE.	19	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1

#1 refers to qualitative assessment

#2 other Tool used: Stoffenmanager (v. 4.0; 75th percentile for long term assessment)**Information on estimated exposure and DU guidance**

Contributing Scenarios	PROCs	Inhalative Exposure (long term) Predicted Inhalative Exposure (mg/m3)	Risk Characterization Ratio (RCR)
Long-term – local / systemic effects DNEL for workers		310	
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	0.03	0.0001
General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	61.75	0.1992
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	77.19	0.2490
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	4	154.38	0.4980
Batch process [CS55]. Mixing operations (open systems) [CS30].	5	185.25	0.5976
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82]	8a	185.25	0.5976

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

Transfer from/pouring from containers [CS22]. Dedicated facility [CS81]	8b	92.63	0.2988
Pouring from small containers [CS9]. Dedicated facility [CS81]	9	185.25	0.5976
Rolling, Brushing [CS51].	10	185.25	0.5976
Spraying [CS10].	11 ^{#1}	0 256.10 240.60	0
Dipping, immersion and pouring [CS4].	13	185.25	0.8261
Laboratory activities [CS36]. Small scale [CS61].	15	30.88	0.7761
Hand-mixing with intimate contact. Only PPE.	19	185.25	0.5976

^{#1} other Tool used: Stoffenmanager (v. 4.0; 75th percentile for long term assessment)

Guidance to DU to evaluate whether he works inside boundaries set by the ES:

Exposure scenarios for workers have been assessed using the ECETOC TRA worker tool (v2.0) However, the use of ECETOC TRA is considered to be unsuitable for the assessment of exposure towards mists. Thus, for the assessment of PROC 7 and PROC 11 (industrial and professional spraying) Stoffenmanager v4.0 has been used to calculate the exposure estimates. The substance is classified with R38 or Skin irritation Cat. 2. Thus, the exposure assessment and risk characterization regarding dermal exposure is based on a qualitative approach. Furthermore, the substance is classified with R41 Eye damage Cat. 1. Effects on the eyes have also been assessed qualitatively.

The RCRs regarding inhalation for the long term exposure estimates/values of the contributing scenarios are all below 1. Local effects have been considered using a qualitative assessment. Applying the OCs/RMMs described in ES the risk for local dermal effects is regarded to be controlled. If compliance with the exposure scenario cannot be confirmed, the RCR may also be determined by measurement or calculation of the exposure concentration and comparison to the DNELs for the substance provided above (section information on estimated exposure).

The environmental exposure assessment of this substance is not assessed since this substance is not classified as hazardous to aquatic environment. This substance indicates no severe toxicity with regard to possible exposure of men via the environment. The substance is not classified for being toxic, toxic after repeated exposure (R48, STOT Cat 1), carcinogenic (any category) or toxic to reproduction (DSD 1 or 2; EU GHS 1a/b). Furthermore, the low log kow implies that an exposure via the food is not likely. The readily biodegradability implies that the substance will rapidly disappear from water and soil via mineralization and therefore will not probably pose a risk for drinking water. In conclusion, the toxicological and ecotoxicological properties of the substance give no reason for concern regarding a hazard for men via the indirect exposure route. Thus, a quantitative assessment has not been performed.

Laboratory activities [CS36]. Small scale [CS61].

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

ES5 – Use in coatings (paints, ink, toners, adhesives; Consumer)

Section 1		Exposure Scenario Title
Title		Use in coatings (paints, ink, toners, adhesives)
Sector of Use (SU code)		21
Use Descriptor (PC codes)		PC1, PC4, PC9, PC15, PC18, PC23, PC24, PC31
Processes, tasks, activities covered		Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including product transfer and preparation, application by brush, spray by hand or similar methods) and equipment cleaning.
Environmental Release Category		ERC8a, ERC8c, ERC8d, ERC8f
Specific Environmental Release Category		
Section 2		Operational conditions and risk management measures
Section 2.1		Control of consumer exposure
Product characteristics		
Physical form of product		liquid
Vapour pressure (Pa)		1600
Concentration of substance in product		Unless otherwise stated, covers concentration up to 50% [ConsOC1]
Amounts used		Unless otherwise stated, covers use amounts up to 9000g [ConsOC2];
Frequency and duration of use/exposure		Unless otherwise stated, covers use frequency up to 1 times per day [ConsOC4]; covers exposure up to 6 hours per event [ConsOC14]
Other Operational Conditions affecting exposure		Unless otherwise stated, assumes use at ambient temperature [ConsOC15]; assumes use in rooms up to 58m ³ [ConsOC11]; assumes use with typical ventilation [ConsOC8];
Section 2.1.1		Product categories
PC1:Adhesives, sealants--Glues, hobby use	OC	Covers concentrations up to 30% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 9g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m ³ [ConsOC11]; for each use event, covers exposure up to 4.00hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. ^{#1} Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC1:Adhesives, sealants--Glues DIY-use (carpet glue, tile glue, wood parquet glue)	OC	Covers concentrations up to 0.2% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 6390g [ConsOC2]; covers use only in sufficiently ventilated rooms; covers use in room size of 20m ³ [ConsOC11]; for each use event, covers exposure up to 6.00hr/event[ConsOC14];
	RMM	No specific RMMs identified beyond those OCs stated
PC1:Adhesives, sealants--Glues DIY-use (carpet glue, tile glue, wood parquet glue); Tier 2: ConsExpo estimates (carpet glue as representative example)	OC	Covers concentrations up to 2% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 9000g [ConsOC2]; covers use only in sufficiently ventilated rooms; covers use in room size of 53m ³ [ConsOC11]; for each use event, covers exposure up to 1.25hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

PC1:Adhesives, sealants--Glue from spray; Tier 2: ConsExpo estimates (spray glue)	OC	Covers concentrations up to 30% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 4.00hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. ^{#1} Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC1:Adhesives, sealants--Sealants; Tier 2: ConsExpo estimates (assembly sealant as representative worst case)	OC	Covers concentrations up to 12% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 390g [ConsOC2]; covers use only in sufficiently ventilated rooms; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 4.00hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. ^{#1} Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC4_n:Anti-freeze and de-icing products--Washing car window	OC	Covers concentrations up to 1% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 0.5g [ConsOC2]; covers use in a one car garage (34 m3) under typical ventilation [ConsOC10]; covers use in room size of 34m3[ConsOC11]; for each use event, covers exposure up to 0.02hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC4_n:Anti-freeze and de-icing products--Pouring into radiator; Tier 2: ConsExpo estimates (all purpose cleaner (liquid), mixing and loading)	OC	Covers concentrations up to 10% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 2000g [ConsOC2]; covers use with open windows; for each use event, covers exposure up to 0.17 hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. ^{#1} Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC4_n:Anti-freeze and de-icing products--Lock de-icer	OC	Covers concentrations up to 50% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 4g [ConsOC2]; covers use in a one car garage (34 m3) under typical ventilation [ConsOC10]; covers use in room size of 34m3[ConsOC11]; for each use event, covers exposure up to 0.25hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. ^{#1} Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC9a:Coatings, paints, thinners,paint removers--Waterborne latex wall paint; Tier 2: ConsExpo estimates (waterborne wall paint)	OC	Covers concentrations up to 1.5% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 3750g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 2.20hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

PC9a:Coatings, paints, thinners,paint removers--Solvent rich, high solid, water borne paint; Tier 2: ConsExpo estimates (high solid paint as a representative worst case)	OC	Covers concentrations up to 4% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 1300g [ConsOC2]; covers use only in sufficiently ventilated rooms; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 2.20hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC9a:Coatings, paints, thinners,paint removers--Aerosol spray can; Tier 2: ConsExpo estimates (spray can)	OC	Covers concentrations up to 25% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 0.33hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. ^{#1} Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC9a:Coatings, paints, thinners,paint removers--Removers (paint-, glue-, wall paper-, sealant-remover); Tier 2: ConsExpo estimates (glue remover as a representative worst case)	OC	Covers concentrations up to 4% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 2000g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 30m3[ConsOC11]; for each use event, covers exposure up to 4.00hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC9c:Finger paints	OC	Covers concentrations up to 15% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, assumes swallowed amount of 1.35g [ConsOC13];
	RMM ^{#1}	Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC15_n: Non-metal surface treatment products--Waterborne latex wall paint; Tier 2: ConsExpo estimates (waterborne wall paint)	OC	Covers concentrations up to 1.5% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 3750g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 2.20hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC15_n: Non-metal surface treatment products--Solvent rich, high solid, water borne paint; Tier 2: ConsExpo estimates (high solid paint as a representative worst case)	OC	Covers concentrations up to 4% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 1300g [ConsOC2]; covers use only in sufficiently ventilated rooms; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 2.20hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC15_n: Non-metal surface treatment products--Aerosol spray can; Tier 2: ConsExpo estimates (spray can)	OC	Covers concentrations up to 25% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 0.33hr/event[ConsOC14];

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. ^{#1} Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC15_n: Non-metal surface treatment products--Removers (paint-, glue-, wall paper-, sealant-remover); Tier 2: ConsExpo estimates (glue remover as a representative worst case)	OC	Covers concentrations up to 4% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 2000g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 30m3[ConsOC11]; for each use event, covers exposure up to 4.00hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC18_n: Ink and toners--Inks and toners.	OC	Unless otherwise stated, covers concentrations up to 4% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 40g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 2.20hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC23_n: Leather tanning, dye, finishing, impregnation and care products--Polishes, wax / cream (floor, furniture, shoes); Tier 2: ConsExpo estimates (furniture polish as representative example)	OC	Covers concentrations up to 50% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 56g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 58m3[ConsOC11]; for each use event, covers exposure up to 4hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. ^{#1} Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC23_n: Leather tanning, dye, finishing, impregnation and care products--Polishes, spray (furniture, shoes); Tier 2: ConsExpo estimates (furniture leather spray as representative worst case)	OC	Covers concentrations up to 50% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 56g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 58m3[ConsOC11]; for each use event, covers exposure up to 4hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. ^{#1} Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC31:Polishes and wax blends--Polishes, wax / cream (floor, furniture, shoes); Tier 2: ConsExpo estimates (furniture polish as representative worst case)	OC	Unless otherwise stated, covers concentrations up to 20% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 550g [ConsOC2]; covers use in rooms with open windows; covers use in room size of 58m3[ConsOC11]; for each use event, covers exposure up to 4hr/event[ConsOC14];

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. ^{#1} Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC31:Polishes and wax blends-- Polishes, spray (furniture, shoes); Tier 2: ConsExpo estimates (furniture leather spray as representative worst case)	OC	Covers concentrations up to 50% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 58m3[ConsOC11]; for each use event, covers exposure up to 4hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. ^{#1} Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC24:Lubricants, greases, release products		A use by consumers which is related with intensive and direct handling of lubricants, greases (PC24) containing butan-1-ol has not been assumed.

^{#1} RMMs refer to qualitative assessment**Information on estimated exposure and DU guidance**

Product Category	Oral Exposure (long term) Predicted Oral Exposure (mg/kg)	Inhalative Exposure (long term) Predicted Inhalative Exposure (mg/m3)	Risk Characterization Ratio long term	
			oral	inhalative
Long-term – local / systemic effects DNEL for consumers	25	55		
PC1:Adhesives, sealants-- Glues, hobby use	NA	51.15	NA	0.93
PC1:Adhesives, sealants-- Glues DIY-use (carpet glue, tile glue, wood parquet glue)	NA	42.60	NA	0.77
PC1:Adhesives, sealants-- Glues DIY-use (carpet glue, tile glue, wood parquet glue); Tier 2: ConsExpo estimates (carpet glue as representative example)	NA	48.80	NA	0.89
PC1:Adhesives, sealants-- Glue from spray; Tier 2: ConsExpo estimates (spray glue)	1.23	0.09	0.05	0.002
PC1:Adhesives, sealants-- Sealants; Tier 2: ConsExpo estimates (assembly sealant as	NA	48.70	NA	0.89

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

representative worst case)				
PC4_n:Anti-freeze and de-icing products--Washing car window	NA	0.15	NA	0.003
PC4_n:Anti-freeze and de-icing products--Pouring into radiator; Tier 2: ConsExpo estimates (all purpose cleaner (liquid), mixing and loading)	NA	0.002	NA	0.00003
PC4_n:Anti-freeze and de-icing products--Lock de-icer	NA	49.05	NA	0.89
PC9a:Coatings, paints, thinners, paint removers--Waterborne latex wall paint; Tier 2: ConsExpo estimates (waterborne wall paint)	NA	42.60	NA	0.77
PC9a:Coatings, paints, thinners, paint removers--Solvent rich, high solid, water borne paint; Tier 2: ConsExpo estimates (high solid paint as a representative worst case)	NA	43.20	NA	0.79
PC9a:Coatings, paints, thinners, paint removers--Aerosol spray can; Tier 2: ConsExpo estimates (spray can)	0.65	1.30	0.03	0.02
PC9a:Coatings, paints, thinners, paint removers--Removers (paint-, glue-, wall paper-, sealant-remover); Tier 2: ConsExpo estimates (glue remover as a representative worst case)	NA	48.40	NA	0.88
PC9c:Finger paints	20.25	NA	0.81	NA
PC15_n: Non-metal surface treatment products--Waterborne latex wall paint; Tier 2: ConsExpo estimates (waterborne wall paint)	NA	42.60	NA	0.77
PC15_n: Non-metal surface treatment products--Solvent rich, high solid, water borne paint; Tier 2: ConsExpo estimates (high solid paint as a representative worst case)	NA	43.20	NA	0.79
PC15_n: Non-metal surface treatment products--Aerosol spray can; Tier 2: ConsExpo estimates (spray can)	0.65	1.30	0.03	0.02

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

PC15_n: Non-metal surface treatment products-- Removers (paint-, glue-, wall paper-, sealant-remover); Tier 2: ConsExpo estimates (glue remover as a representative worst case)	NA	48.40	NA	0.88
PC18_n: Ink and toners-- Inks and toners.	NA	44.42	NA	0.81
PC23_n: Leather tanning, dye, finishing, impregnation and care products--Polishes, wax / cream (floor, furniture, shoes); Tier 2: ConsExpo estimates (furniture polish as representative example)	NA	32.10	NA	0.58
PC23_n: Leather tanning, dye, finishing, impregnation and care products--Polishes, spray (furniture, shoes); Tier 2: ConsExpo estimates (furniture leather spray)	0.51	0.38	0.02	0.01
PC31:Polishes and wax blends--Polishes, wax / cream (floor, furniture, shoes); Tier 2: ConsExpo estimates (furniture polish as representative example)	NA	52.10	NA	0.95
PC31:Polishes and wax blends--Polishes, spray (furniture, shoes); Tier 2: ConsExpo estimates (furniture leather spray as representative worst case)	0.51	0.38	0.02	0.01
NA: not applicable				

Guidance to DU to evaluate whether he works inside boundaries set by the ES:

Exposure scenarios for consumers have been addressed using the latest version of the ESIG GES Consumer tool or ConsExpo 4.1. In case of uses calculated with ConsExpo 4.1 the exposure scenario considered is intended to represent a representative reasonable worst case scenario for the relevant product category (PC).

The substance is classified with R38 or Skin irritation Cat. 2. Thus, the exposure assessment and risk characterization regarding dermal exposure is based on a qualitative approach. Furthermore, the substance is classified with R41 Eye damage Cat. 1. Effects on the eyes have also been assessed qualitatively.

The RCRs regarding inhalation for the long term exposure estimates/values of the contributing scenarios are all below 1. Local effects have been considered using a qualitative assessment. Applying the OCs/RMMs described in ES the risk for local dermal effects is regarded to be controlled. If compliance with the exposure scenario cannot be confirmed, the RCR may also be determined by measurement or calculation of the exposure concentration and comparison to the DNELs for the substance provided above (section information on estimated exposure).

The environmental exposure assessment of this substance is not assessed since this substance is not classified as hazardous to aquatic environment. This substance indicates no severe toxicity with regard to possible exposure of men via the environment. The substance is not classified for being toxic, toxic after repeated exposure (R48, STOT Cat 1),

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

carcinogenic (any category) or toxic to reproduction (DSD 1 or 2; EU GHS 1a/b). Furthermore, the low log kow implies that an exposure via the food is not likely. The readily biodegradability implies that the substance will rapidly disappear from water and soil via mineralization and therefore will not probably pose a risk for drinking water. In conclusion, the toxicological and ecotoxicological properties of the substance give no reason for concern regarding a hazard for men via the indirect exposure route. Thus, a quantitative assessment has not been performed.

Laboratory activities [CS36]. Small scale [CS61].

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

ES6 – Use in cleaning agents (Industrial)

Section 1		Exposure Scenario Title
Title	Use in cleaning agents; CAS: 78-83-1	
Use Descriptor	Sector of Use: Industrial (SU3)	
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13	
	Environmental Release Categories: ERC4	
Processes, tasks, activities covered	Covers the use as a component of cleaning products including transfer from storage, pouring/unloading from drums or containers. Exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand), related equipment cleaning and maintenance.	
Section 2		Operational conditions and risk management measures
Section 2.1		Control of worker exposure
Product characteristics		
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].	
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].	
Amounts used	<i>Not applicable</i>	
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]	
Human factors not influenced by risk management	<i>Not applicable</i>	
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Operation is carried out at elevated temperature (> 20°C above ambient temperature) [OC7]. (PROC 17, PROC18)	
Contributing Scenarios	PROCs	Risk Management Measures
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	Minimization of manual phases.#1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	4	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Spraying [CS10].	7#2	Use in a spraying booth. Minimization of manual phases. #1 Clean equipment and the work area every day [C&H3]. Regular inspection and maintenance of equipment and machines. Ensure that the task is being carried out outside the breathing zone of a worker. Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82].	8a	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81].	8b	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 97%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Pouring from small containers [CS9]. Dedicated facility [CS81].	9	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Rolling, Brushing [CS51].	10	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases.#1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Dipping, immersion and pouring [CS4].	13	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1

#1 refers to qualitative assessment

#2 other Tool used: Stoffenmanager (v. 4.0; 75th percentile for long term assessment)**Information on estimated exposure and DU guidance**

Contributing Scenarios	PROCs	Inhalative Exposure (long term) Predicted Inhalative Exposure (mg/m3)	Risk Characterization Ratio (RCR)
-------------------------------	--------------	---	--

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

Long-term – local / systemic effects DNEL for workers	310		
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	0.03	0.0001
General exposures (closed systems) [CS15]. ; Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	30.88	0.0996
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	77.19	0.2490
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	4	61.75	0.1992
Spraying [CS10].	7 ^{#1}	0	0
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82].	8a	15.44	0.0498
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81].	8b	4.63	0.0149
Pouring from small containers [CS9]. Dedicated facility [CS81].	9	15.44	0.0498
Rolling, Brushing [CS51].	10	15.44	0.0498
Dipping, immersion and pouring [CS4].	13	15.44	0.0498
^{#1} other Tool used: Stoffenmanager (v. 4.0; 75 th percentile for long term assessment)			
Guidance to DU to evaluate whether he works inside boundaries set by the ES:			
<p>Exposure scenarios for workers have been assessed using the ECETOC TRA worker tool (v2.0) However, the use of ECETOC TRA is considered to be unsuitable for the assessment of exposure towards mists. Thus, for the assessment of PROC 7 and PROC 11 (industrial and professional spraying) Stoffenmanager v4.0 has been used to calculate the exposure estimates. The substance is classified with R38 or Skin irritation Cat. 2. Thus, the exposure assessment and risk characterization regarding dermal exposure is based on a qualitative approach. Furthermore, the substance is classified with R41 Eye damage Cat. 1. Effects on the eyes have also been assessed qualitatively.</p> <p>The RCRs regarding inhalation for the long term exposure estimates/values of the contributing scenarios are all below 1. Local effects have been considered using a qualitative assessment. Applying the OCs/RMMs described in ES the risk for local dermal effects is regarded to be controlled. If compliance with the exposure scenario cannot be confirmed, the RCR may also be determined by measurement or calculation of the exposure concentration and comparison to the DNELs for the substance provided above (section information on estimated exposure).</p> <p>The environmental exposure assessment of this substance is not assessed since this substance is not classified as hazardous to aquatic environment. This substance indicates no severe toxicity with regard to possible exposure of men via the environment. The substance is not classified for being toxic, toxic after repeated exposure (R48, STOT Cat 1), carcinogenic (any category) or toxic to reproduction (DSD 1 or 2; EU GHS 1a/b). Furthermore, the low log kow implies that an exposure via the food is not likely. The readily biodegradability implies that the substance will rapidly disappear from water and soil via mineralization and therefore will not probably pose a risk for drinking water. In conclusion, the toxicological and ecotoxicological properties of the substance give no reason for concern regarding a hazard for men via the indirect exposure route. Thus, a quantitative assessment has not been performed.</p> <p>Laboratory activities [CS36]. Small scale [CS61].</p>			

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

ES6 – Use in cleaning agents (Professional)

Section 1		Exposure Scenario Title
Title	Use in cleaning agents; CAS: 78-83-1	
Use Descriptor	Sector of Use: Professional (SU22)	
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13	
	Environmental Release Categories: ERC8a, ERC8d	
Processes, tasks, activities covered	Covers the use as a component of cleaning products including pouring/unloading from drums or containers; and exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping automated and by hand).	
Section 2		Operational conditions and risk management measures
Section 2.1		Control of worker exposure
Product characteristics		
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].	
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].	
Amounts used	<i>Not applicable</i>	
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]	
Human factors not influenced by risk management	<i>Not applicable</i>	
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Operation is carried out at elevated temperature (> 20°C above ambient temperature) [OC7]. (PROC 17, PROC18)	
Contributing Scenarios	PROCs	Risk Management Measures
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	4	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82].	8a	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81].	8b	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Pouring from small containers [CS9]. Dedicated facility [CS81].	9	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Rolling, Brushing [CS51].	10	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Spraying [CS10].	11 ^{#2}	Use in a spraying booth. Minimization of manual phases. #1 Clean equipment and the work area every day [C&H3]. Regular inspection and maintenance of equipment and machines. Ensure that the task is being carried out outside the breathing zone of a worker. Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1 Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 47%) Minimization of manual phases. #1 Clean equipment and the work area every day [C&H3]. Regular inspection and maintenance of equipment and machines. Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours Use suitable eye protection and gloves [PPE14]. #1

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

		<p>Provide enhanced mechanical ventilation by mechanical means [E48].(effectiveness general ventilation: 47%) Minimization of manual phases. #1 Clean equipment and the work area every day [C&H3]. Regular inspection and maintenance of equipment and machines. Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1 Wear a suitable respiratory protection (effectiveness: 80%). If no adequate respiratory protection is available, avoid carrying out operation for more than 2 hours.</p>
Dipping, immersion and pouring [CS4].	13	<p>Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1</p>

#1 refers to qualitative assessment

#2 other Tool used: Stoffenmanager (v. 4.0; 75th percentile for long term assessment)**Information on estimated exposure and DU guidance**

Contributing Scenarios	PROCs	Inhalative Exposure (long term) Predicted Inhalative Exposure (mg/m3)	Risk Characterization Ratio (RCR)
Long-term – local / systemic effects DNEL for workers	310		
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	0.03	0.0001
General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	61.75	0.1992
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	77.19	0.2490
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	4	154.38	0.4980
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82].	8a	185.25	0.5976
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81].	8b	92.63	0.2988
Pouring from small containers [CS9]. Dedicated facility [CS81].	9	185.25	0.5976
Rolling, Brushing [CS51].	10	185.25	0.5976

#1 other Tool used: Stoffenmanager (v. 4.0; 75th percentile for long term assessment)**Guidance to DU to evaluate whether he works inside boundaries set by the ES:**

Exposure scenarios for workers have been assessed using the ECETOC TRA worker tool (v2.0) However, the use of ECETOC TRA is considered to be unsuitable for the assessment of exposure towards mists. Thus, for the assessment of PROC 7 and PROC 11 (industrial and professional spraying) Stoffenmanager v4.0 has been used to calculate the exposure estimates. The substance is classified with R38 or Skin irritation Cat. 2. Thus, the exposure assessment and

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

risk characterization regarding dermal exposure is based on a qualitative approach. Furthermore, the substance is classified with R41 Eye damage Cat. 1. Effects on the eyes have also been assessed qualitatively.

The RCRs regarding inhalation for the long term exposure estimates/values of the contributing scenarios are all below 1. Local effects have been considered using a qualitative assessment. Applying the OCs/RMMs described in ES the risk for local dermal effects is regarded to be controlled. If compliance with the exposure scenario cannot be confirmed, the RCR may also be determined by measurement or calculation of the exposure concentration and comparison to the DNELs for the substance provided above (section information on estimated exposure).

The environmental exposure assessment of this substance is not assessed since this substance is not classified as hazardous to aquatic environment. This substance indicates no severe toxicity with regard to possible exposure of men via the environment. The substance is not classified for being toxic, toxic after repeated exposure (R48, STOT Cat 1), carcinogenic (any category) or toxic to reproduction (DSD 1 or 2; EU GHS 1a/b). Furthermore, the low log Kow implies that an exposure via the food is not likely. The readily biodegradability implies that the substance will rapidly disappear from water and soil via mineralization and therefore will not probably pose a risk for drinking water. In conclusion, the toxicological and ecotoxicological properties of the substance give no reason for concern regarding a hazard for men via the indirect exposure route. Thus, a quantitative assessment has not been performed.

Laboratory activities [CS36]. Small scale [CS61].

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

ES6 – Use in cleaning agents (Consumer)

Section 1		Exposure Scenario Title
Title		Use in Cleaning Agents
Sector of Use (SU code)		21
Use Descriptor (PC codes)		PC4, PC9, PC24, PC35, PC38
Processes, tasks, activities covered		Covers general exposures to consumers arising from the use of household products sold as washing and cleaning products, aerosols, coatings, de-icers, lubricants and air care products.
Environmental Release Category		ERC8a, ERC8d
Specific Environmental Release Category		
Section 2		Operational conditions and risk management measures
Section 2.1		Control of consumer exposure
Product characteristics		
Physical form of product		liquid
Vapour pressure (Pa)		1600
Concentration of substance in product		Unless otherwise stated, covers concentration up to 50% [ConsOC1]
Amounts used		Unless otherwise stated, covers use amounts up to 3750g [ConsOC2];
Frequency and duration of use/exposure		Unless otherwise stated, covers use frequency up to 1 times per day [ConsOC4]; covers exposure up to 4 hours per event [ConsOC14]
Other Operational Conditions affecting exposure		Unless otherwise stated, assumes use at ambient temperature [ConsOC15]; assumes use in rooms up to 58m ³ [ConsOC11]; assumes use with typical ventilation [ConsOC8];
Section 2.1.1		Product categories
PC4_n:Anti-freeze and de-icing products--Washing car window	OC	Covers concentrations up to 1% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 0.5g [ConsOC2]; covers use in a one car garage (34 m ³) under typical ventilation [ConsOC10]; covers use in room size of 34m ³ [ConsOC11]; for each use event, covers exposure up to 0.02hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC4_n:Anti-freeze and de-icing products--Pouring into radiator; Tier 2: ConsExpo estimates	OC	Covers concentrations up to 10% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 2000g [ConsOC2]; covers use with open windows; for each use event, covers exposure up to 0.17 hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. ^{#1} Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

PC4_n:Anti-freeze and de-icing products--Lock de-icer	OC	Covers concentrations up to 50% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 4g [ConsOC2]; covers use in a one car garage (34 m3) under typical ventilation [ConsOC10]; covers use in room size of 34m3[ConsOC11]; for each use event, covers exposure up to 0.25hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. ^{#1} Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC9a:Coatings, paints, thinners,paint removers--Waterborne latex wall paint; Tier 2: ConsExpo estimates (waterborne wall paint)	OC	Covers concentrations up to 1.5% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 3750g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 2.20hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC9a:Coatings, paints, thinners,paint removers--Solvent rich, high solid, water borne paint; Tier 2: ConsExpo estimates (high solid paint as a representative worst case)	OC	Covers concentrations up to 4% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 1300g [ConsOC2]; covers use only in sufficiently ventilated rooms; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 2.20hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC9a:Coatings, paints, thinners,paint removers--Aerosol spray can; Tier 2: ConsExpo estimates (spray can)	OC	Covers concentrations up to 25% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 0.33hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC9a:Coatings, paints, thinners,paint removers--Removers (paint-, glue-, wall paper-, sealant-remover); Tier 2: ConsExpo estimates (glue remover as a representative worst case)	OC	Covers concentrations up to 4% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 2000g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 30m3[ConsOC11]; for each use event, covers exposure up to 4.00hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

PC9c:Finger paints	OC	Covers concentrations up to 15% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, assumes swallowed amount of 1.35g [ConsOC13];
	RMM ^{#1}	Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC35:Washing and cleaning products (including solvent based products)-- Laundry and dish washing products	OC	Covers concentrations up to 5% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 15g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 0.50hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC35:Washing and cleaning products (including solvent based products)-- Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Tier 2: ConsExpo estimates (floor cleaner (liquid) as a representative worst case; Mixing and loading)	OC	Covers concentrations up to 50% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 500g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; for each use event, covers exposure up to 0.0125hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC35:Washing and cleaning products (including solvent based products)-- Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Tier 2: ConsExpo estimates (floor cleaner (liquid) as a representative worst case; Application)	OC	Covers concentrations up to 6% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 880g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 58m3[ConsOC11]; for each use event, covers exposure up to 4hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC35:Washing and cleaning products (including solvent based products)-- Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners) Tier 2: ConsExpo estimates (bathroom cleaning spray as a representative worst case; Application (spraying))	OC	Covers concentrations up to 20% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; covers use in room size of 10m3[ConsOC11]; for each use event, covers exposure up to 0.42hr/event[ConsOC14];

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. ^{#1} Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC35:Washing and cleaning products (including solvent based products)-- Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners) Tier 2: ConsExpo estimates (bathroom cleaning spray as a representative worst case; Application (leaving on and cleaning))	OC	Covers concentrations up to 20% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 30g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 10m3[ConsOC11]; for each use event, covers exposure up to 0.42hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. ^{#1} Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC38_n: Welding and soldering products, flux products	OC	Unless otherwise stated, covers concentrations up to 10% [ConsOC1]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 12g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 1.00hr/event[ConsOC14];
	RMM ^{#1}	Avoid contact with skin. After contact with skin, wash immediately with plenty of water. ^{#1} Avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water. ^{#1}
PC24:Lubricants, greases, release products		A use by consumers which is related with intensive and direct handling of lubricants, greases (PC24) containing butan-1-ol has not been assumed.
^{#1} RMMs refer to qualitative assessment		

Information on estimated exposure and DU guidance

Product Category	Oral Exposure (long term) Predicted Oral Exposure (mg/kg)	Inhalative Exposure (long term) Predicted Inhalative Exposure (mg/m3)	Risk Characterization Ratio long term	
			oral	inhalative
Long-term – local / systemic effects DNEL for consumers	25	55		
PC4_n:Anti-freeze and de-icing products--Washing car window	NA	0.15	NA	0.003
PC4_n:Anti-freeze and de-icing products--Pouring into radiator; Tier 2: ConsExpo	NA	0.002	NA	0.00003
PC4_n:Anti-freeze and de-icing products--Lock de-icer	NA	49.05	NA	0.89

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

PC9a:Coatings, paints, thinners,paint removers-- Waterborne latex wall paint; Tier 2: ConsExpo estimates (waterborne wall paint)	NA	42.60	NA	0.77
PC9a:Coatings, paints, thinners,paint removers-- Solvent rich, high solid, water borne paint; Tier 2: ConsExpo estimates (high solid paint as a representative worst case)	NA	43.20	NA	0.79
PC9a:Coatings, paints, thinners,paint removers-- Aerosol spray can; Tier 2: ConsExpo estimates (spray can)	0.65	1.30	0.03	0.02
PC9a:Coatings, paints, thinners,paint removers-- Removers (paint-, glue-, wall paper-, sealant- remover); Tier 2: ConsExpo estimates (glue remover as a representative worst case)	NA	48.40	NA	0.88
PC9c:Finger paints	20.25	NA	0.81	NA
PC35:Washing and cleaning products (including solvent based products)--Laundry and dish washing products	NA	32.40	NA	0.59
PC35:Washing and cleaning products (including solvent based products)--Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Tier 2: ConsExpo estimates (floor cleaner (liquid) as a representative worst case; Mixing and loading)	NA	0.001	NA	0.00002
PC35:Washing and cleaning products (including solvent based products)--Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners); Tier 2: ConsExpo estimates (floor cleaner (liquid) as a representative worst case; Application)	NA	42.40	NA	0.77
PC35:Washing and cleaning products (including solvent based products)--Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners) Tier 2: ConsExpo estimates (bathroom cleaning spray as a representative worst case; Application (spraying)	0.01	0.0001	0.0004	0.000002
PC35:Washing and cleaning products (including solvent based products)--Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners) Tier 2: ConsExpo estimates bathroom cleaning spray as a representative worst case; Application (leaving on and cleaning)	NA	6.62	NA	0.12
PC38_n: Welding and soldering products, flux products	NA	45.12	NA	0.82

NA: not applicable

Guidance to DU to evaluate whether he works inside boundaries set by the ES:

Exposure scenarios for consumers have been addressed using the latest version of the ESIG GES Consumer tool or ConsExpo 4.1. In case of uses calculated with ConsExpo 4.1 the exposure scenario considered is intended to represent a representative reasonable worst case scenario for the relevant product category (PC).

The substance is classified with R38 or Skin irritation Cat. 2. Thus, the exposure assessment and risk characterization regarding dermal exposure is based on a qualitative approach. Furthermore, the substance is classified with R41 Eye

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

damage Cat. 1. Effects on the eyes have also been assessed qualitatively.

The RCRs regarding inhalation for the long term exposure estimates/values of the contributing scenarios are all below 1. Local effects have been considered using a qualitative assessment. Applying the OCs/RMMs described in ES the risk for local dermal effects is regarded to be controlled. If compliance with the exposure scenario cannot be confirmed, the RCR may also be determined by measurement or calculation of the exposure concentration and comparison to the DNELs for the substance provided above (section information on estimated exposure).

The environmental exposure assessment of this substance is not assessed since this substance is not classified as hazardous to aquatic environment. This substance indicates no severe toxicity with regard to possible exposure of men via the environment. The substance is not classified for being toxic, toxic after repeated exposure (R48, STOT Cat 1), carcinogenic (any category) or toxic to reproduction (DSD 1 or 2; EU GHS 1a/b). Furthermore, the low log kow implies that an exposure via the food is not likely. The readily biodegradability implies that the substance will rapidly disappear from water and soil via mineralization and therefore will not probably pose a risk for drinking water. In conclusion, the toxicological and ecotoxicological properties of the substance give no reason for concern regarding a hazard for men via the indirect exposure route. Thus, a quantitative assessment has not been performed.

Laboratory activities [CS36]. Small scale [CS61].

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

ES7 – Use in lubricants (Industrial)

Section 1		Exposure Scenario Title
Title	Use in lubricants; CAS: 78-83-1	
Use Descriptor	Sector of Use: Industrial (SU3)	
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17, PROC18	
	Environmental Release Categories: ERC4, ERC7	
Processes, tasks, activities covered	Covers the use of formulated lubricants in closed and open systems including transfer operations, operation of machinery/engines and similar articles, reworking on reject articles, equipment maintenance and disposal of wastes.	
Section 2		Operational conditions and risk management measures
Section 2.1		Control of worker exposure
Product characteristics		
Physical form of product	Liquid, vapour pressure 0.5 - 10 kPa [OC4].	
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].	
Amounts used	<i>Not applicable</i>	
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]	
Human factors not influenced by risk management	<i>Not applicable</i>	
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Operation is carried out at elevated temperature (> 20°C above ambient temperature) [OC7]. (PROC17, PROC18)	
Contributing Scenarios	PROCs	Risk Management Measures
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	4	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

Spraying [CS10].	7 ^{#2}	<p>Use in a spraying booth. Minimization of manual phases. ^{#1} Clean equipment and the work area every day [C&H3]. Regular inspection and maintenance of equipment and machines. Ensure that the task is being carried out outside the breathing zone of a worker. Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}</p>
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82].	8a	<p>Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) ^{#1} Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}</p>
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81].	8b	<p>Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 97%) ^{#1} Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}</p>
Pouring from small containers [CS9]. Dedicated facility [CS81].	9	<p>Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) ^{#1} Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}</p>
Rolling, Brushing [CS51].	10	<p>Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) ^{#1} Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}</p>
Dipping, immersion and pouring [CS4].	13	<p>Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) ^{#1} Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}</p>
Operation and lubrication of high energy open equipment [CS17].	17	<p>Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}</p>
	17 ^{#3}	<p>Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 95%) ^{#1} Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}</p>

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

Greasing, high energy. General exposures [CS1].	18	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1	
	18#3	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 95%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1	
#1 refers to qualitative assessment #2 other Tool used: Stoffenmanager (v. 4.0; 75 th percentile for long term assessment) #3 assessment at higher temperature/higher vapor pressure (>= 100 hPa); ECTOC TRA: high fugacity			
Information on estimated exposure and DU guidance			
Contributing Scenarios	PROCs	Inhalative Exposure (long term) Predicted Inhalative Exposure (mg/m3)	Risk Characterization Ratio (RCR)
Long-term – local / systemic effects DNEL for workers	310		
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	0.03	0.0001
General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	30.88	0.0996
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	77.19	0.2490
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	4	61.75	0.1992
Spraying [CS10].	7#1	0	0
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82].	8a	15.44	0.0498
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81].	8b	4.63	0.0149
Pouring from small containers [CS9]. Dedicated facility [CS81].	9	15.44	0.0498
Rolling, Brushing [CS51].	10	15.44	0.0498
Dipping, immersion and pouring [CS4].	13	15.44	0.0498

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

Operation and lubrication of high energy open equipment [CS17].	17	154.38	0.4980
	17 ^{#2}	15.44	0.0498
General exposures [CS1].	18	154.38	0.4980
	18 ^{#2}	15.44	0.0498

^{#1} other Tool used: Stoffenmanager (v. 4.0; 75th percentile for long term assessment)

^{#2} assessment at higher temperature / higher vapor pressure (≥ 100 hPa); ECTOC TRA: high fugacity

Guidance to DU to evaluate whether he works inside boundaries set by the ES:

Exposure scenarios for workers have been assessed using the ECETOC TRA worker tool (v2.0) However, the use of ECETOC TRA is considered to be unsuitable for the assessment of exposure towards mists. Thus, for the assessment of PROC 7 and PROC 11 (industrial and professional spraying) Stoffenmanager v4.0 has been used to calculate the exposure estimates. The substance is classified with R38 or Skin irritation Cat. 2. Thus, the exposure assessment and risk characterization regarding dermal exposure is based on a qualitative approach.

Furthermore, the substance is classified with R41 Eye damage Cat. 1. Effects on the eyes have also been assessed qualitatively.

The RCRs regarding inhalation for the long term exposure estimates/values of the contributing scenarios are all below 1. Local effects have been considered using a qualitative assessment. Applying the OCs/RMMs described in ES the risk for local dermal effects is regarded to be controlled. If compliance with the exposure scenario cannot be confirmed, the RCR may also be determined by measurement or calculation of the exposure concentration and comparison to the DNELs for the substance provided above (section information on estimated exposure).

The environmental exposure assessment of this substance is not assessed since this substance is not classified as hazardous to aquatic environment. This substance indicates no severe toxicity with regard to possible exposure of men via the environment. The substance is not classified for being toxic, toxic after repeated exposure (R48, STOT Cat 1), carcinogenic (any category) or toxic to reproduction (DSD 1 or 2; EU GHS 1a/b). Furthermore, the low log Kow implies that an exposure via the food is not likely. The readily biodegradability implies that the substance will rapidly disappear from water and soil via mineralization and therefore will not probably pose a risk for drinking water. In conclusion, the toxicological and ecotoxicological properties of the substance give no reason for concern regarding a hazard for men via the indirect exposure route. Thus, a quantitative assessment has not been performed.

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

ES7 – Use in lubricants (Professional)

Section 1		Exposure Scenario Title
Title		Use in lubricants; CAS: 78-83-1
Use Descriptor		Sector of Use: Professional (SU22)
		Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20
		Environmental Release Categories: ERC8a, ERC8d, ERC9a, ERC9b
Processes, tasks, activities covered		Covers the use of formulated lubricants in closed and open systems including transfer operations, operation of engines and similar articles, reworking on reject articles, equipment maintenance and disposal of waste oil.
Section 2		Operational conditions and risk management measures
Section 2.1		Control of worker exposure
Product characteristics		
Physical form of product		Liquid, vapour pressure 0.5 - 10 kPa [OC4].
Concentration of substance in product		Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used		<i>Not applicable</i>
Frequency and duration of use		Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management		<i>Not applicable</i>
Other Operational Conditions affecting worker exposure		Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Operation is carried out at elevated temperature (> 20°C above ambient temperature) [OC7]. (PROC 17, PROC18)
Contributing Scenarios	PROCs	Risk Management Measures
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}
General exposures (closed systems) [CS15]. ; Continuous process [CS54]. With sample collection [CS56]. ; Equipment cleaning and maintenance [CS39].	2	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

General exposures (closed systems) [CS15]. Batch process [CS55]. ; With sample collection [CS56].	3	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
General exposures (open systems) [CS16]. Batch process [CS55]. ; With sample collection [CS56].	4	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82]	8a	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81]	8b	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Pouring from small containers [CS9]. Dedicated facility [CS81]	9	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Rolling, Brushing [CS51].	10	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Spraying [CS10].	11#2	Use in a spraying booth. Minimization of manual phases. #1 Clean equipment and the work area every day [C&H3]. Regular inspection and maintenance of equipment and machines. Ensure that the task is being carried out outside the breathing zone of a worker. Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol

Annex to extended safety data sheet (eSDS)

Date: 23/05/2017

Previous date: 20/09/2012

		<p>Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 47%) Minimization of manual phases. #1 Clean equipment and the work area every day [C&H3]. Regular inspection and maintenance of equipment and machines. Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1</p> <p>Provide enhanced mechanical ventilation by mechanical means [E48].(effectiveness general ventilation: 47%) Minimization of manual phases. #1 Clean equipment and the work area every day [C&H3]. Regular inspection and maintenance of equipment and machines. Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1 Wear a respirator with an effectiveness of 80%. If no adequate respirator is available, avoid carrying out operation for more than 2 hours.</p>
Dipping, immersion and pouring [CS4].	13	<p>Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1</p>
Operation and lubrication of high energy open equipment [CS17].	17	<p>Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1</p> <p>Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 1 hour [OC11] Use suitable eye protection and gloves [PPE14]. #1</p>
	17 ^{#3}	<p>Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1</p>

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol

Annex to extended safety data sheet (eSDS)

Date: 23/05/2017

Previous date: 20/09/2012

		<p>Minimization of manual phases. #1</p> <p>Avoid frequent and direct contact with substance. #1</p> <p>Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1</p> <p>Use suitable eye protection and gloves [PPE14]. #1</p> <p>Wear a suitable respiratory protection (Effectiveness:90%)</p>
Greasing, high energy. General exposures [CS1].	18	<p>Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%)</p> <p>Minimization of manual phases. #1</p> <p>Avoid frequent and direct contact with substance. #1</p> <p>Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1</p> <p>Use suitable eye protection and gloves [PPE14]. #1</p>
		<p>Minimization of manual phases. #1</p> <p>Avoid frequent and direct contact with substance. #1</p> <p>Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1</p> <p>Avoid carrying out operation for more than 1 hour [OC11]</p> <p>Use suitable eye protection and gloves [PPE14]. #1</p>
	18 ^{#3}	<p>Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%)</p> <p>Minimization of manual phases. #1</p> <p>Avoid frequent and direct contact with substance. #1</p> <p>Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1</p> <p>Use suitable eye protection and gloves [PPE14]. #1</p>
		<p>Minimization of manual phases. #1</p> <p>Avoid frequent and direct contact with substance. #1</p> <p>Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1</p> <p>Use suitable eye protection and gloves [PPE14]. #1</p> <p>Wear a suitable respiratory protection (Effectiveness:90%)</p>
Heat and pressure transfer (dispersive, closed system).	20	<p>Minimization of manual phases. #1</p> <p>Avoid frequent and direct contact with substance. #1</p> <p>Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1</p> <p>Use suitable eye protection and gloves [PPE14]. #1</p>

#1 refers to qualitative assessment

#2 other Tool used: Stoffenmanager (v. 4.0; 75th percentile for long term assessment)#3 assessment at higher temperature/higher vapor pressure (≥ 100 hPa); ECTOC TRA: high fugacity**Information on estimated exposure and DU guidance**

Contributing Scenarios	PROCs	Inhalative Exposure (long term) Predicted Inhalative Exposure (mg/m3)	Risk Characterization Ratio (RCR)
Long-term – local / systemic effects DNEL for workers			310

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

General exposures (closed systems) [CS15]. Continuous process [CS54].	1	0.03	0.0001
General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	61.75	0.1992
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	77.19	0.2490
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	4	154.38	0.4980
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82].	8a	185.25	0.5976
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81].	8b	92.63	0.2988
Pouring from small containers [CS9]. Dedicated facility [CS81].	9	185.25	0.5976
Rolling, Brushing [CS51].	10	185.25	0.5976
Spraying [CS10].	11 ^{#1}	0	0
		256.1	0.8261
		240.6	0.7761
Dipping, immersion and pouring [CS4].	13	185.25	0.5976
Operation and lubrication of high energy open equipment [CS17].	17	61.75	0.1992
		123.5	0.3984
	17 ^{#2}	154.38	0.4980
		154.38	0.4980
Greasing, high energy. General exposures [CS1].	18	61.75	0.1992
		123.5	0.3984
	18 ^{#2}	154.38	0.4980
		154.38	0.4980
Heat and pressure transfer (dispersive, closed system).	20	61.75	0.1992
^{#1} other Tool used: Stoffenmanager (v. 4.0; 75 th percentile for long term assessment); for details see 9.14.1. Exposure scenario			
^{#2} assessment at higher temperature / higher vapor pressure (>= 100 hPa); ECTOC TRA: high fugacity			

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

Guidance to DU to evaluate whether he works inside boundaries set by the ES:

Exposure scenarios for workers have been assessed using the ECETOC TRA worker tool (v2.0) However, the use of ECETOC TRA is considered to be unsuitable for the assessment of exposure towards mists. Thus, for the assessment of PROC 7 and PROC 11 (industrial and professional spraying) Stoffenmanager v4.0 has been used to calculate the exposure estimates. The substance is classified with R38 or Skin irritation Cat. 2. Thus, the exposure assessment and risk characterization regarding dermal exposure is based on a qualitative approach. Furthermore, the substance is classified with R41 Eye damage Cat. 1. Effects on the eyes have also been assessed qualitatively.

The RCRs regarding inhalation for the long term exposure estimates/values of the contributing scenarios are all below 1. Local effects have been considered using a qualitative assessment. Applying the OCs/RMMs described in ES the risk for local dermal effects is regarded to be controlled. If compliance with the exposure scenario cannot be confirmed, the RCR may also be determined by measurement or calculation of the exposure concentration and comparison to the DNELs for the substance provided above (section information on estimated exposure).

The environmental exposure assessment of this substance is not assessed since this substance is not classified as hazardous to aquatic environment. This substance indicates no severe toxicity with regard to possible exposure of men via the environment. The substance is not classified for being toxic, toxic after repeated exposure (R48, STOT Cat 1), carcinogenic (any category) or toxic to reproduction (DSD 1 or 2; EU GHS 1a/b). Furthermore, the low log Kow implies that an exposure via the food is not likely. The readily biodegradability implies that the substance will rapidly disappear from water and soil via mineralization and therefore will not probably pose a risk for drinking water. In conclusion, the toxicological and ecotoxicological properties of the substance give no reason for concern regarding a hazard for men via the indirect exposure route. Thus, a quantitative assessment has not been performed.

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

ES8 – Metal working fluids / rolling oils (Industrial)

Section 1		Exposure Scenario Title
Title		Metal working fluids / rolling oils; CAS: 78-83-1
Use Descriptor		Sector of Use: Industrial (SU3)
		Process Categories: PROC1, PROC2, PROC3, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17
		Environmental Release Categories: ERC4
Processes, tasks, activities covered		Covers the use in formulated MWFs/rolling oils including transfer operations, rolling and annealing activities, cutting/machining activities, automated and manual application of corrosion protections (including brushing, dipping and spraying), equipment maintenance, draining and disposal of waste oils.
Section 2		Operational conditions and risk management measures
Section 2.1		Control of worker exposure
Product characteristics		
Physical form of product		Liquid, vapour pressure 0.5 - 10 kPa [OC4].
Concentration of substance in product		Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used		<i>Not applicable</i>
Frequency and duration of use		Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management		<i>Not applicable</i>
Other Operational Conditions affecting worker exposure		Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Operation is carried out at elevated temperature (> 20°C above ambient temperature) [OC7]. (PROC17, PROC18)
Contributing Scenarios	PROCs	Risk Management Measures
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}
General exposures (closed systems) [CS15]. ; Continuous process [CS54]. With sample collection [CS56]. ; Equipment cleaning and maintenance [CS39].	2	Minimization of manual phases ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}
General exposures (closed systems) [CS15]. Batch process [CS55]. ; With sample collection [CS56].	3	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

Batch process [CS55]. Mixing operations (open systems) [CS30].	5	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Spraying [CS10].	7#2	Use in a spraying booth. #1 Minimization of manual phases. #1 Clean equipment and the work area every day [C&H3]. Regular inspection and maintenance of equipment and machines. Ensure that the task is being carried out outside the breathing zone of a worker. Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82]	8a	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81]	8b	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 97%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Pouring from small containers [CS9]. Dedicated facility [CS81]	9	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Rolling, Brushing [CS51].	10	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Dipping, immersion and pouring [CS4].	13	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
Operation and lubrication of high energy open equipment [CS17].	17	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

	17 ^{#3}	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 95%) Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}	
^{#1} refers to qualitative assessment ^{#2} other Tool used: Stoffenmanager (v. 4.0; 75 th percentile for long term assessment) ^{#3} assessment at higher temperature/higher vapor pressure (>= 100 hPa); ECTOC TRA: high fugacity			
Information on estimated exposure and DU guidance			
Contributing Scenarios	PROCs	Inhalative Exposure (long term) Predicted Inhalative Exposure (mg/m3)	Risk Characterization Ratio (RCR)
Long-term – local / systemic effects DNEL for workers	310		
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	0.03	0.0001
General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	30.88	0.0996
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	77.19	0.2490
Batch process [CS55]. Mixing operations (open systems) [CS30].	5	15.44	0.0498
Spraying [CS10].	7 ^{#1}	0	0
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82].	8a	15.44	0.0498
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81].	8b	4.63	0.0149
Pouring from small containers [CS9]. Dedicated facility [CS81].	9	15.44	0.0498
Rolling, Brushing [CS51].	10	15.44	0.0498
Dipping, immersion and pouring [CS4].	13	15.44	0.0498
Operation and lubrication of high energy open equipment [CS17].	17	154.38	0.4980
		15.44 ^{#2}	0.0498 ^{#2}
^{#1} other Tool used: Stoffenmanager (v. 4.0; 75 th percentile for long term assessment); for details see 9.14.1. Exposure scenario ^{#2} assessment at higher temperature / higher vapor pressure (>= 100 hPa); ECTOC TRA: high fugacity			
Guidance to DU to evaluate whether he works inside boundaries set by the ES:			
Exposure scenarios for workers have been assessed using the ECETOC TRA worker tool (v2.0) However, the use of ECETOC TRA is considered to be unsuitable for the assessment of exposure towards mists. Thus, for the assessment of PROC 7 and PROC 11 (industrial and professional spraying) Stoffenmanager v4.0 has been used to calculate the exposure estimates. The substance is classified with R38 or Skin irritation Cat. 2. Thus, the exposure assessment and risk characterization regarding dermal exposure is based on a qualitative approach. Furthermore, the substance is classified with R41 Eye damage Cat. 1. Effects on the eyes have also been assessed qualitatively.			

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

The RCRs regarding inhalation for the long term exposure estimates/values of the contributing scenarios are all below 1. Local effects have been considered using a qualitative assessment. Applying the OCs/RMMs described in ES the risk for local dermal effects is regarded to be controlled. If compliance with the exposure scenario cannot be confirmed, the RCR may also be determined by measurement or calculation of the exposure concentration and comparison to the DNELs for the substance provided above (section information on estimated exposure).

The environmental exposure assessment of this substance is not assessed since this substance is not classified as hazardous to aquatic environment. This substance indicates no severe toxicity with regard to possible exposure of men via the environment. The substance is not classified for being toxic, toxic after repeated exposure (R48, STOT Cat 1), carcinogenic (any category) or toxic to reproduction (DSD 1 or 2; EU GHS 1a/b). Furthermore, the low log Kow implies that an exposure via the food is not likely. The readily biodegradability implies that the substance will rapidly disappear from water and soil via mineralization and therefore will not probably pose a risk for drinking water. In conclusion, the toxicological and ecotoxicological properties of the substance give no reason for concern regarding a hazard for men via the indirect exposure route. Thus, a quantitative assessment has not been performed.

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

ES8 – Metal working fluids / rolling oils (Professional)

Section 1		Exposure Scenario Title
Title		Metal working fluids / rolling oils; CAS: 78-83-1
Use Descriptor		Professional (SU22)
		Process Categories: PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC17
		Environmental Release Categories: ERC8a
Processes, tasks, activities covered		Covers the use in formulated MWFs including transfer operations, open and contained cutting/machining activities, automated and manual application of corrosion protections, draining and working on contaminated/ reject articles, and disposal of waste oils.
Section 2		Operational conditions and risk management measures
Section 2.1		Control of worker exposure
Product characteristics		
Physical form of product		Liquid, vapour pressure 0.5 - 10 kPa [OC4].
Concentration of substance in product		Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used		<i>Not applicable</i>
Frequency and duration of use		Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management		<i>Not applicable</i>
Other Operational Conditions affecting worker exposure		Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Operation is carried out at elevated temperature (> 20°C above ambient temperature) [OC7]. (PROC 17, PROC18)
Contributing Scenarios	PROCs	Risk Management Measures
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}
General exposures (closed systems) [CS15]. Continuous process [CS54]. With sample collection [CS56]. Equipment cleaning and maintenance [CS39].	2	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

Batch process [CS55]. Mixing operations (open systems) [CS30].	5	<p>Minimization of manual phases. #1</p> <p>Avoid frequent and direct contact with substance. #1</p> <p>Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1</p> <p>Avoid carrying out operation for more than 4 hours [OC12]</p> <p>Use suitable eye protection and gloves [PPE14]. #1</p>
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82]	8a	<p>Minimization of manual phases. #1</p> <p>Avoid frequent and direct contact with substance. #1</p> <p>Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1</p> <p>Avoid carrying out operation for more than 4 hours [OC12]</p> <p>Use suitable eye protection and gloves [PPE14]. #1</p>
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81]	8b	<p>Minimization of manual phases. #1</p> <p>Avoid frequent and direct contact with substance. #1</p> <p>Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1</p> <p>Avoid carrying out operation for more than 4 hours [OC12]</p> <p>Use suitable eye protection and gloves [PPE14]. #1</p>
Rolling, Brushing [CS51].	10	<p>Minimization of manual phases. #1</p> <p>Avoid frequent and direct contact with substance. #1</p> <p>Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1</p> <p>Avoid carrying out operation for more than 4 hours [OC12]</p> <p>Use suitable eye protection and gloves [PPE14]. #1</p>
Spraying [CS10].	11 ^{#2}	<p>Use in a spraying booth.</p> <p>Minimization of manual phases. #1</p> <p>Clean equipment and the work area every day [C&H3]. Regular inspection and maintenance of equipment and machines.</p> <p>Ensure that the task is being carried out outside the breathing zone of a worker.</p> <p>Avoid frequent and direct contact with substance. #1</p> <p>Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1</p> <p>Use suitable eye protection and gloves [PPE14]. #1</p>
		<p>Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 47%)</p> <p>Minimization of manual phases. #1</p> <p>Clean equipment and the work area every day [C&H3]. Regular inspection and maintenance of equipment and machines.</p> <p>Avoid frequent and direct contact with substance. #1</p> <p>Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1</p> <p>Avoid carrying out operation for more than 4 hours [OC12]</p> <p>Use suitable eye protection and gloves [PPE14]. #1</p>
		<p>Provide enhanced mechanical ventilation by mechanical means [E48].(effectiveness general ventilation: 47%)</p> <p>Minimization of manual phases. #1</p> <p>Clean equipment and the work area every day [C&H3]. Regular inspection and maintenance of equipment and machines.</p> <p>Avoid frequent and direct contact with substance. #1</p> <p>Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1</p> <p>Use suitable eye protection and gloves [PPE14]. #1</p> <p>Wear a suitable respiratory protection (effectiveness: 80%). If no adequate respirator is available, avoid carrying out operation for more than 2 hours.</p>

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

Dipping, immersion and pouring [CS4].	13	Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. #1
Operation and lubrication of high energy open equipment [CS17].	17	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
		Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Avoid carrying out operation for more than 1 hour [OC11] Use suitable eye protection and gloves [PPE14]. #1
	17#3	Provide extract ventilation to points where emissions occur [E54]. (effectiveness LEV: 90%) Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1
		Minimization of manual phases. #1 Avoid frequent and direct contact with substance. #1 Supervision in place to check that the RMMs in place are being used correctly and OCs followed. #1 Use suitable eye protection and gloves [PPE14]. #1 Wear a suitable respiratory protection (Effectiveness:90%)

#1 other Tool used: Stoffenmanager (v. 4.0; 75th percentile for long term assessment)#2 assessment at higher temperature/higher vapor pressure (≥ 100 hPa); ECTOC TRA: high fugacity**Information on estimated exposure and DU guidance**

Contributing Scenarios	PROCs	Inhalative Exposure (long term) Predicted Inhalative Exposure (mg/m3)	Risk Characterization Ratio (RCR)
Long-term – local / systemic effects DNEL for workers	310		
General exposures (closed systems) [CS15]. Continuous process [CS54].	1	0.03	0.0001
General exposures (closed systems) [CS15]. ; Continuous process [CS54]. With sample collection [CS56]. ; Equipment cleaning and maintenance [CS39].	2	61.75	0.1992
General exposures (closed systems) [CS15]. Batch process [CS55]. With sample collection [CS56].	3	77.19	0.2490

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

Batch process [CS55]. Mixing operations (open systems) [CS30].	5	185.25	0.5976
Transfer from/pouring from containers [CS22]. Non-dedicated facility [CS82].	8a	185.25	0.5976
Transfer from/pouring from containers [CS22]. Dedicated facility [CS81].	8b	92.63	0.2988
Rolling, Brushing [CS51].	10	185.25	0.5976
Spraying [CS10].	11 ^{#1}	0	0
		256.10	0.8261
		240.60	0.7761
Dipping, immersion and pouring [CS4].	13	185.25	0.5976
Operation and lubrication of high energy open equipment [CS17].	17	61.75	0.1992
		123.50	0.3984
	17 ^{#2}	154.38	0.4980
		154.38	0.4980

^{#1} other Tool used: Stoffenmanager (v. 4.0; 75th percentile for long term assessment); for details see 9.14.1. Exposure scenario

^{#2} assessment at higher temperature / higher vapor pressure (≥ 100 hPa); ECTOC TRA: high fugacity

Guidance to DU to evaluate whether he works inside boundaries set by the ES:

Exposure scenarios for workers have been assessed using the ECETOC TRA worker tool (v2.0) However, the use of ECETOC TRA is considered to be unsuitable for the assessment of exposure towards mists. Thus, for the assessment of PROC 7 and PROC 11 (industrial and professional spraying) Stoffenmanager v4.0 has been used to calculate the exposure estimates. The substance is classified with R38 or Skin irritation Cat. 2. Thus, the exposure assessment and risk characterization regarding dermal exposure is based on a qualitative approach. Furthermore, the substance is classified with R41 Eye damage Cat. 1. Effects on the eyes have also been assessed qualitatively.

The RCRs regarding inhalation for the long term exposure estimates/values of the contributing scenarios are all below 1. Local effects have been considered using a qualitative assessment. Applying the OCs/RMMs described in ES the risk for local dermal effects is regarded to be controlled. If compliance with the exposure scenario cannot be confirmed, the RCR may also be determined by measurement or calculation of the exposure concentration and comparison to the DNELs for the substance provided above (section information on estimated exposure).

The environmental exposure assessment of this substance is not assessed since this substance is not classified as hazardous to aquatic environment. This substance indicates no severe toxicity with regard to possible exposure of men via the environment. The substance is not classified for being toxic, toxic after repeated exposure (R48, STOT Cat 1), carcinogenic (any category) or toxic to reproduction (DSD 1 or 2; EU GHS 1a/b). Furthermore, the low log Kow implies that an exposure via the food is not likely. The readily biodegradability implies that the substance will rapidly disappear from water and soil via mineralization and therefore will not probably pose a risk for drinking water. In conclusion, the toxicological and ecotoxicological properties of the substance give no reason for concern regarding a hazard for men via the indirect exposure route. Thus, a quantitative assessment has not been performed.

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

ES10 – Use in laboratories (Professional)

Section 1		Exposure Scenario Title	
Title		Use in laboratories; CAS: 78-83-1	
Use Descriptor		Sector of Use: Professional (SU22)	
		Process Categories: PROC10, PROC15	
		Environmental Release Categories: ERC8a	
Processes, tasks, activities covered		Use of small quantities within laboratory settings, including material transfers and equipment cleaning	
Section 2		Operational conditions and risk management measures	
Section 2.1		Control of worker exposure	
Product characteristics			
Physical form of product		Liquid, vapour pressure 0.5 - 10 kPa [OC4].	
Concentration of substance in product		Covers percentage substance in the product up to 100 % (unless stated differently) [G13].	
Amounts used		<i>Not applicable</i>	
Frequency and duration of use		Covers daily exposures up to 8 hours (unless stated differently) [G2]	
Human factors not influenced by risk management		<i>Not applicable</i>	
Other Operational Conditions affecting worker exposure		Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Operation is carried out at elevated temperature (> 20°C above ambient temperature) [OC7]. (PROC17, PROC18)	
Contributing Scenarios	PROCs	Risk Management Measures	
Rolling, Brushing [CS51].	10	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Avoid carrying out operation for more than 4 hours [OC12] Use suitable eye protection and gloves [PPE14]. ^{#1}	
Laboratory activities [CS36]. Small scale [CS61].	15	Minimization of manual phases. ^{#1} Avoid frequent and direct contact with substance. ^{#1} Supervision in place to check that the RMMs in place are being used correctly and OCs followed. ^{#1} Use suitable eye protection and gloves [PPE14]. ^{#1}	
^{#1} refers to qualitative assessment			
Information on estimated exposure and DU guidance			
Contributing Scenarios	PROCs	Inhalative Exposure (long term) Predicted Inhalative Exposure (mg/m3)	Risk Characterization Ratio (RCR)
Long-term – local / systemic effects DNEL for workers	310		
Rolling, Brushing [CS51].	10	185.25	0.5976
Laboratory activities [CS36]. Small scale [CS61].	15	30.88	0.0996

SAFETY DATA SHEET

Gazprom neftekhim Salavat

Isobutylalcohol**Annex to extended safety data sheet (eSDS)**

Date: 23/05/2017

Previous date: 20/09/2012

Guidance to DU to evaluate whether he works inside boundaries set by the ES:

Exposure scenarios for workers have been assessed using the ECETOC TRA worker tool (v2.0) However, the use of ECETOC TRA is considered to be unsuitable for the assessment of exposure towards mists. Thus, for the assessment of PROC 7 and PROC 11 (industrial and professional spraying) Stoffenmanager v4.0 has been used to calculate the exposure estimates. The substance is classified with R38 or Skin irritation Cat. 2. Thus, the exposure assessment and risk characterization regarding dermal exposure is based on a qualitative approach.

Furthermore, the substance is classified with R41 Eye damage Cat. 1. Effects on the eyes have also been assessed qualitatively.

The RCRs regarding inhalation for the long term exposure estimates/values of the contributing scenarios are all below 1. Local effects have been considered using a qualitative assessment. Applying the OCs/RMMs described in ES the risk for local dermal effects is regarded to be controlled. If compliance with the exposure scenario cannot be confirmed, the RCR may also be determined by measurement or calculation of the exposure concentration and comparison to the DNELs for the substance provided above (section information on estimated exposure).

The environmental exposure assessment of this substance is not assessed since this substance is not classified as hazardous to aquatic environment. This substance indicates no severe toxicity with regard to possible exposure of men via the environment. The substance is not classified for being toxic, toxic after repeated exposure (R48, STOT Cat 1), carcinogenic (any category) or toxic to reproduction (DSD 1 or 2; EU GHS 1a/b). Furthermore, the low log Kow implies that an exposure via the food is not likely. The readily biodegradability implies that the substance will rapidly disappear from water and soil via mineralization and therefore will not probably pose a risk for drinking water. In conclusion, the toxicological and ecotoxicological properties of the substance give no reason for concern regarding a hazard for men via the indirect exposure route. Thus, a quantitative assessment has not been performed.