Date: 30.04.2021

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2015/830



**FUEL OIL, RMK 700 HS** 

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

1.1 Product identifier

Product Name Fuel oil, residual

Product Description VB2033A-FUEL OIL RMK 700 CST - HS

 Trade Name
 RMK 700 HS

 Product code
 RMK 700 HS

 CAS No.
 68476-33-5

 EC No.
 270-675-6

1.2 Relevant identified uses of the substance or mixture

and uses advised against

Identified Use(s) **Exposure Scenario** Page: No. 1 Distribution of Fuel oil, residual 11 2 Formulation and (re)packing of Fuel oil, residual 15 3 Use of Fuel oil, residual as a Fuel (Industrial) 19 Use of Fuel oil, residual as a Fuel (Professional) 4 22

Uses Advised Against Anything other than the above.

1.3 Details of the supplier of the safety data sheet

Company Identification Vitol Bunkers B.V.
Weena 690, 18th Floor

3012 CN Rotterdam
The Netherlands

 Telephone
 +31 10 498 7200

 Fax
 +31 10 452 9545

 E-Mail (competent person)
 xrea ch@vitol.com

1.4 Emergency telephone number

Emergency Phone No. +44 (0) 1235 239 670, 24/7
Languages spoken All official European languages.

### **SECTION 2: HAZARDS IDENTIFICATION**

2.1 Classification of the substance or mixture

**2.1.1 Regulation (EC) No. 1272/2008 (CLP)** Asp. Tox. 1; H304

Acute Tox. 4; H332 Carc. 1B; H350 Repr. 2; H361d

STOT RE 2; H373 (Thymus, Liver, blood effects)

Aquatic Acute 1; H400 Aquatic Chronic 1; H410

2.2 Label elements According to Regulation (EC) No. 1272/2008 (CLP)

Product Description VB2033A-RMK 700 HS -Fuel oil, residual

Hazard Pictogram(s)



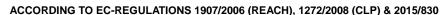




Signal Word(s) Danger

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### **FUEL OIL, RMK 700 HS**

Hazard Statement(s)

H304: May be fatal if swallowed and enters airways.

H332: Harmful if inhaled. H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H373: May cause damage to organs through prolonged or repeated exposure:

Thymus, Liver, blood effects

H410: Very toxic to aquatic life with long lasting effects.

Precautionary Statement(s) P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. P281: Use personal protective equipment as required.

P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or

doctor/physician.

P331: Do NOT induce vomiting. P273: Avoid release to the environment.

Supplemental information EUH066: Repeated exposure may cause skin dryness or cracking.

3

Product may release Hydrogen Sulphide: A specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local circumstances. Remove contaminated clothing and wash clothing before reuse. Vapour may create explosive atmosphere. The vapour is heavier than air;

beware of pits and confined spaces.

#### **SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS**

#### 3.1 Substances

Other hazards

2.3

SUBSTANCE	CAS No.	EC No.	%W/W
Fuel oil, residual	68476-33-5	270-675-6	100

#### SECTION 4: FIRST AID MEASURES



#### 4.1 Description of first aid measures

Self-protection of the first aider

H2S Warning:

Inhalation

Skin Contact

Eye Contact

Ingestion

The vapour is heavier than air, beware of pits and confined spaces. If it is suspected that fumes are still present, the responder should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Avoid all contact. Do not ingest. If swallowed then seek immediate medical assistance.

Hydrogen sulphide (H2S) can accumulate in the headspace of storage tanks and reach potentially hazardous concentrations.

If there is any suspicion of inhalation: A self contained breathing apparatus should be worn. Remove to fresh air immediately.

IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. If symptoms persist, obtain medical attention.

IF ON SKIN (or hair): Remove contaminated clothing immediately and drench affected skin with plenty of water, then wash with soap and water. If irritation (redness, rash, blistering) develops, get medical attention.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.

IF SWALLOWED: Do not induce vomiting because of risk of aspiration into the lungs. If vomiting occurs spontaneously, keep head below hips to prevent

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### **FUEL OIL, RMK 700 HS**

4.2 Most important symptoms and effects, both acute and delayed

aspiration into the lungs. If unconscious, place in recovery position and get medical attention immediately. Do not give anything by mouth to an unconscious person. Get medical attention immediately. Do not wait for symptoms to appear. Inhalation: Vapour may be irritant to the respiratory tract.

Skin Contact: Repeated and/or prolonged skin contact may cause irritation.

Eye Contact: May cause eye irritation.

the label where possible).

Ingestion: Aspiration hazard. Aspiration into the lungs may cause chemical

pneumonitis, which can be fatal.

If breathing is laboured, oxygen should be administered by qualified personnel.

In case of accident or if you feel unwell, seek medical advice immediately (show

IF INHALED: If unconscious, place in recovery position and get medical attention immediately. Administer oxygen if available and artificial respiration if necessary.

IF SWALLOWED: Do not induce vomiting because of risk of aspiration into the lungs. If aspiration is suspected obtain immediate medical attention. If vomiting occurs spontaneously, keep head below hips to prevent aspiration into the lungs.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to a physician:

#### **SECTION 5: FIREFIGHTING MEASURES**

5.1 Extinguishing media

Suitable Extinguishing media Unsuitable extinguishing media

5.2 Special hazards arising from the substance or mixture

5.3 Advice for fire-fighters

Foam, Carbon dioxide, Water fog or dry powder.

Do not use water jet. Direct water jet may spread the fire.

Not flammable but will support combustion. The vapour is heavier than air; beware of pits and confined spaces. Will float and can be reignited on surface water. Decomposes in a fire giving off toxic fumes: A mixture of solid and liquid particulates and gases including unidentified organic and inorganic compounds. If sulphur compounds are present in appreciable amounts, combustion products may include also H2S and SOx (sulfur oxides) or sulfuric acid

Fight fire with normal precautions from a reasonable distance. Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Keep containers cool by spraying with water if exposed to fire. Avoid release to the environment. Dike fire control water for later disposal.

### **SECTION 6: ACCIDENTAL RELEASE MEASURES**

6.1 Personal precautions, protective equipment and emergency procedures

H2S Warning:

Small spillages: Large spillages:

6.2 Environmental precautions

6.3 Methods and material for containment and cleaning up

Caution - spillages may be slippery. Ensure operatives are trained to minimise exposures. Ensure suitable personal protection during removal of spillages. Eliminate sources of ignition. Shut off leaks if without risk. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Avoid all contact with substance. Ensure adequate ventilation. Do not breathe vapour. Do not ingest. If swallowed then seek immediate medical assistance. Do not use sparking tools.

Product may release Hydrogen Sulphide. Exposure controls - These controls may include: Segregation of areas, Access only to authorised persons, Permit to work systems, Confined space working procedures, Area H2S alarms, Personal H2S alarms, Personal escape sets, H2S awareness training. Please see section 8 for appropriate personal protection equipment

Wear flame-resistant antistatic protective clothing.

Evacuate the area and keep personnel upwind. Drench contaminated clothing with water before removing to avoid risk of sparks from static electricity. Avoid all contact. Wear chemical protection suit and breathing apparatus. See Also Section: 8.

Avoid release to the environment. Do not allow to enter drains, sewers or watercourses. Spillages or uncontrolled discharges into watercourses must be alerted to the Environment Agency or other appropriate regulatory body. If necessary: Dike area to contain the spill and prevent releases to sewers, drains, or other waterways.

Provided it is safe to do so, isolate the source of the leak. The vapour is heavier than air; beware of pits and confined spaces. Ensure that the equipment is

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6.4

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2015/830



### **FUEL OIL, RMK 700 HS**

Spillages onto land:

adequately grounded. Allow small spillages to evaporate provided there is adequate ventilation.

In case of soil contamination, remove contaminated soil and treat in accordance with local regulations. Adsorb spillages onto sand, earth or any suitable adsorbent material. Transfer to a lidded container for disposal or recovery. Dispose of this material and its container as hazardous waste.

**Small spillages:** Allow small spillages to evaporate provided there is adequate ventilation. Wear flame-resistant antistatic protective clothing.

Large spillages: Cover spillage with foam to reduce evaporation. Do not use water jet.

Collect as much as possible in clean container for reuse or disposal.

**Small spillages:** Contain product with floating barriers or other equipment. Collect spilled product by absorbing with specific floating absorbents.

**Large spillages:** Open waters should be contained with floating barriers or other mechanical means and recovered, only if this is strictly necessary and if fire/explosion risks can be adequately prevented. Otherwise control the spreading of the spillage, and let the substance evaporate naturally.

See Section: 8.13

Spillages on water or at sea:

# SECTION 7: HANDLING AND STORAGE

Reference to other sections

7.1 Precautions for safe handling

H2S Warning:

7.2 Conditions for safe storage, including any incompatibilities

Storage temperature Storage measures

7.3 Incompatible materials
7.4 Specific end use(s)

Obtain special instructions before use. Keep away from sources of ignition - No smoking. Use only outdoors or in a well-ventilated area. Prevent vapour build up by providing adequate ventilation during and after use. Take action to prevent static discharges. Use non-sparking tools. All parts of the plant and equipment should be electrically bonded together and connected to earth. Electrical continuity should be checked at regular intervals. Antistatic clothing and footwear should be used. The vapour is heavier than air; beware of pits and confined spaces. Avoid all contact with substance. Do not ingest. If swallowed then seek immediate medical assistance. Do not breathe vapour. See Section: 8. Keep good industrial hygiene. Wash hands thoroughly after handling. Contaminated clothing should be thoroughly cleaned.

Product may release Hydrogen Sulphide: A specific assessment of inhalation risks from the presence of hydrogen sulphide in tank headspaces, confined spaces, product residue, tank waste and waste water, and unintentional releases should be made to help determine controls appropriate to local circumstances. These controls may include: Segregation of areas, Access only to authorised persons, Permit to work systems, Confined space working procedures, Area H2S alarms, Personal H2S alarms, Personal escape sets, H2S awareness training.

Light hydrocarbon vapours can build up in the headspace of containers. These can cause flammability / explosion hazards. Bund storage facilities to prevent soil and water pollution in the event of spillage. Keep only in original packaging. Keep containers properly sealed when not in use. Protect from sunlight. Containers of this material may be hazardous when empty since they retain product residue. Empty container may contain product residue which may result in flammable or explosive vapours inside the container.

Stable at ambient temperatures.

Suitable containers: Stainless steel, Mild steel Unsuitable containers: Synthetic materials

Keep away from oxidising agents.

See Section: 1.2 and/or Exposure Scenario.

#### **SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

8.1 Control parameters

8.1.1 Occupational Exposure Limits

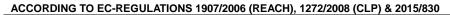
No Occupational Exposure Limit assigned. Users are advised to consider national Occupational Exposure Limits or other equivalent values.

8.1.2 Biological limit value

Not established.

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### **FUEL OIL, RMK 700 HS**

#### 8.1.3 PNECs and DNELs

PNEC: Fuel Oil, Residual is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore individual environmental compartments PNECs are not available for this product.

Fuel Oil, Residual Derived No Effect Level	Oral	Inhalation	Dermal
Worker - Long Term - Systemic effects	0.015 mg/kg bw/day	0.18 mg/m³	0.065 mg/kg bw/day
Worker - Short term - Systemic effects	-	4700 mg/m³	-

#### 8.2 Exposure controls

#### 8.2.1 Appropriate engineering controls

Provide adequate ventilation, including appropriate local extraction if dusts, fumes or vapours are likely to be evolved. Store in a cool/low-temperature, well-ventilated (dry) place away from heat and ignition sources. Guarantee that the eye flushing systems and safety showers are located close to the working place.

# 8.2.2 Individual protection measures, such as personal protective equipment (PPE)

Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled. The resistance of the protective clothing to chemicals should be ascertained with the respective supplier.

Fuels are typically used, transferred and transported in closed systems. If exposure is likely (i.e. during sampling) the following advice may be appropriate. Keep good industrial hygiene. Always wash hands before smoking, eating and drinking. Do not eat, drink or smoke at the work place.

Refer to annexes for exposure scenarios detailing use specific exposure controls

Eye/ face protection



Use eye protection according to EN 166, designed to protect against liquid

splashes.

Skin protection



**Hand protection:** Wear impervious gloves (EN374). Gloves should be changed regularly to avoid permeation problems. Breakthrough time of the glove material: refer to the information provided by the gloves' producer.

Recommended: Nitrile rubber.

Body protection: Wear anti-static clothing and shoes.

small scale: Wear suitable coveralls to prevent exposure to the skin.

large scale: Chemical protection suit.

Respiratory protection



Thermal hazards

When the product is heated /In case of inadequate ventilation wear respiratory protection. The use of a high efficiency filter (EN143) is recommended. Filter type A2

Closed system(s): Not normally required.

Not applicable.

8.2.3 Environmental Exposure Controls Avoid release to the environment.

#### SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

#### 9.1 Information on basic physical and chemical properties

Appearance
Odour

Odour threshold

рΗ

Melting point/freezing point

Liquid, Viscous, May be coloured.

Fuel oil-like Not established. Not established.

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< 30 °C

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**FUEL OIL, RMK 700 HS** 

Initial boiling point and boiling range

Flash point Evaporation rate Flammability (solid, gas)

Upper/lower flammability or explosive limits

Vapour pressure

Vapour density

Relative density

Solubility(ies) Partition coefficient: n-octanol/water

Auto-ignition temperature

**Decomposition Temperature** 

Viscosity

Explosive properties

Oxidising properties

Carcinogenicity

9.2 Other information Typical value 140 - 400 °C

> 60 °C

Not established. Not applicable - Liquid

Not established.

<= 0,4 kPa (38,0 °C)

Not established

0.980 - 1.0200 g/cm3 @ 15 °C

Water: 0.4 mg/l @ 22 °C Slightly soluble.

log Pow: 2 - 20

> 225 °C

Not established.

450 - 750 mm<sup>2</sup>/s @ 50 °C

Not explosive. (Vapour may create explosive atmosphere.)

Not oxidising.

None known.

#### **SECTION 10: STABILITY AND REACTIVITY**

10.1 Stability and reactivity Stable under normal conditions. Reacts with - Strong oxidising agents

Stable under normal conditions. Hazardous polymerisation will not occur. 10.2 Chemical stability

Product may release Hydrogen Sulphide.

10.3 Possibility of hazardous reactions Vapours are heavier than air and may travel considerable distances to a source

of ignition and flashback. Product may release Hydrogen Sulphide.

10.4 Conditions to avoid Elevated temperature: > 50 °C

Keep away from heat, sources of ignition and direct sunlight.

10.5 Incompatible materials Keep away from oxidising agents. Strong Acids and Alkalis.

10.6 Hazardous decomposition product(s) A mixture of solid and liquid particulates and gases including unidentified

organic and inorganic compounds. Decomposes in a fire giving off toxic fumes:

COx, H2S, SOx,

#### **SECTION 11: TOXICOLOGICAL INFORMATION**

11.1 Information on toxicological effects All test data taken from existing ECHA registrations for the substances

mentioned.

**Acute toxicity - Ingestion** Based upon the available data, the classification criteria are not met.

LD50 (oral,rat) mg/kg: >2000 (OECD 401) Acute Tox. 4; Harmful if inhaled.

**Acute toxicity - Inhalation** 

LC50 (inhalation,rat) mg/l/4h: 4.1 (EPA OTS 798.1150)

**Acute toxicity - Skin Contact** Based upon the available data, the classification criteria are not met.

LD50 (skin,rabbit) mg/kg: >2000 (OECD 434)

Skin corrosion/irritation Based upon the available data, the classification criteria are not met.

Not irritating to skin. (rabbit) (OECD 404)

EUH066: Repeated exposure may cause skin dryness or cracking. (rat) (OECD

410)

Based upon the available data, the classification criteria are not met. Serious eye damage/irritation

Not irritating to eyes. (rabbit) (EU Method B.5)

Respiratory or skin sensitization Based upon the available data, the classification criteria are not met.

Sensitisation (guinea pig) - Negative (OECD 406)

Germ cell mutagenicity Based upon the available data, the classification criteria are not met.

ECHA Registration Endpoint summary:

Not classified. Studies showed no consistent evidence of mutagenic activity.

Carc. 1B; May cause cancer.

ECHA Registration Endpoint summary:

Positive (mouse)

Reproductive toxicity Repr. 2; H361d: Suspected of damaging the unborn child.

ECHA Registration Endpoint summary:

Reproductive toxicity: Negative Developmental toxicity: Positive

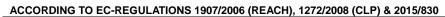
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12.3

12.4

12.5





### **FUEL OIL, RMK 700 HS**

STOT - single exposure Based upon the available data, the classification criteria are not met.

Weight of evidence approach

STOT - repeated exposure STOT RE 2; May cause damage to organs through prolonged or repeated

> exposure. Oral: No data

Inhalation: No data

Dermal: NOAEL 1.06 mg/kg bw/day (rat) (OECD 410)

Aspiration hazard Asp. Tox. 1; May be fatal if swallowed and enters airways.

Viscosity: 7 – 20.5 mm<sup>2</sup>/s @ 40 °C (<60 mm<sup>2</sup>/s @ 100 °C)

11.2 Other information None.

#### **SECTION 12: ECOLOGICAL INFORMATION**

12.1 **Toxicity** Aquatic Acute 1; Very toxic to aquatic life.

Aquatic Chronic 1; Very toxic to aquatic life with long lasting effects.

Short Term (acute): EL50 48hr (Daphnia magna) 0.22 mg/l (OECD 202) Long Term (Chronic):

The aquatic toxicity was estimated using the PETROTOX computer model.

Estimated: 0.1 mg/l (Fish)

12.2 Persistence and degradibility Substance is complex UVCB. Standard tests for this endpoint are intended for

single substances and are not appropriate for this complex substance.

Substance is complex UVCB. Standard tests for this endpoint are intended for single substances and are not appropriate for this complex substance.

Substance is complex UVCB. Standard tests for this endpoint are intended for

single substances and are not appropriate for this complex substance.

Not classified as PBT or vPvB.

12.6 Other adverse effects None known.

#### **SECTION 13: DISPOSAL CONSIDERATIONS**

Results of PBT and vPvB assessment

#### 13.1 Waste treatment methods

Mobility in soil

**Bioaccumulative potential** 

Do not empty into drains, dispose of this material and its container at hazardous or special waste collection point. Disposal should be in accordance with local, state or national legislation. Containers of this material may be hazardous when empty since they retain product residue. Containers must not be punctured or destroyed by burning, even when empty. Allocation of a waste code number, according to the European Waste Catalogue, should be carried out in agreement with the regional waste disposal company. Waste code: Fuel Oil (13 07 01)

IMDG/ADN

### **SECTION 14: TRANSPORT INFORMATION**

14.1	UN number	UN 3082	UN 3082
14.2	Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS	ENVIRONMENTALLY HAZARDOUS
		SUBSTANCE, LIQUID,	SUBSTANCE, LIQUID,
		FUEL OIL, RESIDUAL	FUEL OIL, RESIDUAL
14.3	Transport hazard class(es)	9	9 (N1, CMR, F)
14.4	Packing group	III	III
14.5	Environmental hazards	MILIEUGEVAARLIJK / ENVIRONMENT	TALLY HAZARDOUS/
		UMWELTGEFÄHREND /DANGEREUX	( POUR/ L'ENVIRONNEMENT
14.6	Special precautions for user	See Section: 2	
14.7	Transport in bulk according to Annex II of MARPOL	This product is being carried under the	ne scope of MARPOL Annex 1. Special
	73/78 and the IBC Code	Precautions: Refer to Chapter 7 'Hand	ling and Storage' for special precautions
		which a user needs to be aware of, or	needs to comply with, in connection with
		transport.	
14.8	Additional Information	ADR HIN: 90	EmS: F-A, S-F
		Tunnel Restriction Code: 3 E	Limited Quantity: 5L
		Limited Quantity: 5L	

ADR/RID

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**FUEL OIL, RMK 700 HS** 

#### **SECTION 15: REGULATORY INFORMATION**

15.1 Safety, health and environmental

regulations/legislation specific for the substance or

mixture

**15.1.1 EU regulations** Authorisations and/or Restrictions On Use

Annex XVII (Restrictions) In accordance with REACH Annex XVII entry 30 (c) this substance is exempt

from Entry 28 and 29 of REACH Annex XVII as it is to be sold as a fuel in a

closed system.

Upper Tier: 25000 tonnes

Lower Tier: 2500 tonnes

15.1.2 National regulations

Seveso

Germany

Wassergefährdungsklasse (Germany). WGK number: 3

15.2 Chemical Safety Assessment A REACH chemical safety assessment (CSA) has been carried out. Refer to

annexes for exposure scenarios detailing use specific exposure controls.

### **SECTION 16: OTHER INFORMATION**

#### Sections indicated with the following have been revised

Header and Section 1.3

Header and sections 1.1, 1.3, 2.2 and 3.1

Updated version and date. Please review SDS with care.

#### References:

Existing ECHA registration(s) for Fuel Oil, Residual (CAS No. 68476-33-5) and Chemical Safety Report.

This Safety Data Sheet was prepared in accordance with EC Regulation (EC) 1907/2006 (REACH), 1272/2008 (CLP) & 2015/830.

#### **LEGEND**

LTEL Long Term Exposure Limit
STEL Short Term Exposure Limit
DNEL Derived No Effect Level

PNEC Predicted No Effect Concentration

PBT PBT: Persistent, Bioaccumulative and Toxic vPvB very Persistent and very Bioaccumulative

OECD Organisation for Economic Cooperation and Development

Training advice: Consideration should be given to the work procedures involved and the potential extent of exposure as they may determine whether a higher level of protection is required.

#### **Disclaimers**

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#### Annex to the extended Safety Data Sheet (eSDS)

See below -

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**FUEL OIL, RMK 700 HS** 

# Fuel oil, residual

CAS No. 68476-33-5 EINECS No. 270-675-6

### **Summary of Parameters**

Physical parameters					
Vapour pressure (Pa)			Value used for exposure assessment = 2.0E+02		
Partition coefficient (log K <sub>ow</sub> )			1.99 – 18.02		
Aqueous solubility (mg	g/l)		2.7E-12 – 2.0E+03 Value used for environmental exposure assessment = 7.3E+00		
Molecular weight			Not applicable		
Biodegradability			Standard tests for this endpoint are intended for single substances and are not appropriate for this complex substance.		
Human Health (DNEL)					
	Short term	Inhalation (mg/m³)	4700		
Workers		Dermal (mg/kg bw/day)	Not defined		
VVOIKEIS	Long Torm	Inhalation (mg/m³)	0.18		
	Long Term	Dermal (mg/kg bw/day)	0.065		
		Inhalation (mg/m³)	Not defined		
Consumer		Dermal (mg/kg bw/day)	Not defined		
		Oral (mg/kg bw/day)	0.015		

### **Environmental Parameters (PNECs)**

Fuel oil, residual is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore individual environmental compartments PNECs are not available for this product.

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**FUEL OIL, RMK 700 HS** 

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Exposure scenario 2	Formulation and (re)packing of Fuel oil, residual	15
Exposure scenario 3	Use of Fuel oil, residual as a Fuel (Industrial)	19
Exposure scenario 4	Use of Fuel oil, residual as a Fuel (Professional)	22

### **Contributing Scenarios**

#### Workers

PROC1 Use in closed process, no likelihood of exposure

PROC2 Use in closed, continuous process with occasional controlled exposure

(Storage) Bulk product storage.

(Sampling) Product sampling.

(Fuel filtering) Operation of solids filtering equipment.

PROC3 Use in closed batch process (synthesis or formulation)

PROC8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

(Maintenance) Equipment cleaning and maintenance.

PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

(Marine) Marine vessel or barge loading.

(Road/Rail) Road tanker/rail car loading.

(Drum) Drum or batch transfers.

(Bulk) Bulk closed loading and unloading.

(Refuelling) Refuelling.

PROC15 Use as laboratory reagent.

PROC16 Using material as fuel sources, limited exposure to unburned product to be expected

#### Environment

**ERC2** Formulation of preparations

ERC4 Industrial use of processing aids in processes and products, not becoming part of articles

ERC5 Industrial use resulting in inclusion into or onto a matrix

ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)

ERC6b Industrial use of reactive processing aids

ERC6c Industrial use of monomers for manufacture of thermo-plastics

ERC6d Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers

ERC7 Industrial use of substances in closed systems

ERC9a Wide dispersive indoor use of substances in closed systems

ERC9b Wide dispersive outdoor use of substances in closed systems

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**FUEL OIL, RMK 700 HS** 

### Exposure Scenario 1 - Distribution of Fuel oil, residual

1.0 Contributing scenarios	
Sector of Use [SU]	SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites
	PROC1
	PROC2
	PROC2 (Storage)
	PROC2 (Sampling)
Process Category [PROC]	PROC3
	PROC8a (Maintenance)
	PROC8b (Marine)
	PROC8b (Road/Rail)
	PROC15
Chemical Product Category [PC]	Not applicable
Article Categories [AC]	Not applicable
	ERC4
	ERC5
	ERC6a
Environmental Release Categories [ERC]	ERC6b
	ERC6c
	ERC6d
	ERC7
Specific Environmental Release Categories [SPERC]	ESVOC SpERC 1.1b.v1

2.0 Operational conditions and risk management measures					
2.1 Control of worker exposure					
Product characteristics					
Physical form of product	Liquid				
Vapour pressure	<0.5 kPa @ STP				
Concentration of substance in product	Covers percentage substance	in the product up to 100 % (unless stated differently).			
Human factors not influenced by risk m	anagement				
Potential exposure area	Not defined				
Frequency and duration of use	<u> </u>				
Exposure duration per day	PROC1, PROC8a (Maintenance), PROC15	Covers daily exposures up to 8 hours (unless stated differently).			
	PROC2 (Storage), PROC3, PROC8b (Marine)	Covers exposure up to 1 - 4 hour(s)			
	PROC8b (Road/Rail)	Covers exposure up to 15 min - 1 hour(s)			
	PROC2, PROC2 (Sampling)	Covers exposure up to 15 min			
Emission days (days/year):	300				
Other operational conditions affecting v	worker exposure				
Area of use	PROC2 (Sampling)	Outdoor			
Alea Ul use	All other PROC's	Not defined (default = Indoor)			
Characteristics of the surroundings	Not defined	·			
General measures applicable to all activ	vities				

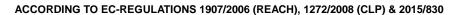
Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently).

#### General measures (carcinogens)

Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

need for new passa frount out comarios.	
Technical conditions of use	
PROC1, PROC2, PROC2 (Storage),	Handle substance within a closed system.

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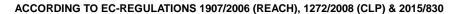


# **FUEL OIL, RMK 700 HS**

PROC3					
PROC8b (Road/Rail)	Ensure material tra	ansfers are	under containment or extract ventilation (Efficiency of at least 80%)		
PROC15	Handle in a fume	cupboard or	under extract ventilation. (Efficiency of at least 90 %).		
Organisational measures					
PROC2; PROC3					
PROC8b (Marine)	Transfer via enclosed lines. Clear transfer lines prior to de-coupling.				
PROC8a (Maintenance)	Drain down and flush system prior to equipment break-in or maintenance.				
PROC8a (Maintenance), PROC8b (Marine)					
PROC8b (Road/Rail)	ne) Retain drain downs in sealed storage pending disposal or for subsequent recycle.  Ensure material transfers are under containment or extract ventilation				
		ansiers are i	under containment of extract ventilation		
Risk management measures related to hu					
Respiratory protection	No special measu		ired.		
PROC1, PROC2, F (Storage), PROC2 (Sampling), PROC3 PROC8b (Marine), (Road/Rail)		2 03,	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.(Efficiency of at least 90 %).		
	PROC15		Wear suitable gloves tested to EN374. (Efficiency of at least 80 %).		
	PROC8a (Mainter	nance)	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency of at least 75%)		
Eye Protection	No special measu	res are requ	ired.		
2.2 Control of environmental exposure					
Amounts used					
Fraction of EU tonnage used in region:		0.1			
Regional use tonnage (tons/year):		9.3E+06			
Fraction of Regional tonnage used locally (to	ns/vear):	2.0E-03			
Annual site tonnage (tons/year):	io, your j.	1.9E+04			
Maximum daily site tonnage (kg/day):		6.2E+04			
Environment factors not influenced by risk	k managamant	6.2E+04			
	k management	N	1/1/ 1/ 1/ 10 000)		
Flow rate of receiving surface water (m³/d):		1	ed (default = 18,000)		
Local freshwater dilution factor:		10			
Local marine water dilution factor:		100			
Operational conditions		•			
Emission days (days/year):		300			
Release fraction to air from process (initial rel		1.0E-04			
Release fraction to wastewater from process to RMM):	•	1.0E-06			
Release fraction to soil from process (initial re RMM):	·	1.0E-05			
Technical conditions and measures at pro					
Common practices vary across sites thus con					
Technical onsite conditions and measures					
	•	t exposure (	primarily ingestion). No wastewater treatment required.		
Treat air emission to provide a typical remova		90			
Treat onsite wastewater (prior to receiving wa	0 ,	0			
provide the required removal efficiency of (%)		0			
If discharging to domestic sewage treatment		0			
required onsite wastewater removal efficiency	/ of (%):	<u> </u>			
Treat soil emission to provide a typical remov	al efficiency of (%):	Not define	ed		
Organisational measures to prevent/limit r	elease from site				
Do not apply industrial sludge to natural soils.	Sludge should be in	ncinerated, c	ontained or reclaimed.		
Conditions and measures related to munic					
Size of municipal sewage system/treatment p		2.0E+03			
Degradation effectiveness (%):	, ,	94.2			
Conditions and measures related to extern	nal treatment of was		osal		
External treatment and disposal of waste sho					
Conditions and measures related to extern			S. S. Cattorial regulations.		
External recovery and recycling of waste sho			and/or national regulations		
			and of Hational regulations.		
Substance release quantities after risk ma	nayement measure	Not define	nd .		
Release to waste water from process (mg/l):		I NOT GEILLE	su		

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**FUEL OIL, RMK 700 HS** 

Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):

8.0E+04

3. Exposure estimation and reference to its source	
3.1 Human exposure prediction	
Exposure assessment (method/calculation model)	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. (PROC1, PROC2, PROC2 (Sampling), PROC15)  The Advanced REACH Tool (ART) has been used to estimate workplace exposures unless otherwise indicated. (PROC2 (Storage), PROC3, PROC8a (Maintenance), PROC8b (Marine), PROC8b (Road/Rail)).

	Inh	alation	Der	Combined		
Process Category [PROC]	Inhalation exposure (mg/m³)			Risk characterisation ratio (RCR)		
PROC1	0.01	0.04	0.03	0.57	0.61	
PROC2	0.04	0.19	0.03	0.57	0.76	
PROC2 (Storage)	0.04	0.21	0.03	0.57	0.78	
PROC2 (Sampling)	0.04	0.19	0.03	0.57	0.76	
PROC3	0.04	0.21	0.03	0.57	0.78	
PROC8a (Maintenance)	0.00	0.01	0.05	0.83	0.85	
PROC8b (Marine)	0.06	0.35	0.03	0.57	0.92	
PROC8b (Road/Rail)	0.03	0.19	0.03	0.57	0.76	
PROC15	0.05	0.28	0.01	0.10	0.38	

#### 3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Fuel oil, residual is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore individual environmental compartments PNECs are not available for this product.

Environmental exposure	STP	Freshwater	Marine water	Soil	Freshwater sediment	Marine sediment
Predicted Environmental Exposure (PEC)	1.9E-03 mg/l	1.9E-04 mg/l	1.9E-05 mg/l	6.2E-02 mg/kg ww	1.4E+00 mg/kg ww	3.7E-02 mg/kg ww
Risk characterisation ratio (RCR)	2.0E-03	7.6E-03	7.6E-04	3.3E-05	1.3E-02	9.9E-04

Human exposure prediction:

Route of Exposure	Exposure (μg/kg/Day)	Risk characterisation ratio (RCR)
Oral	2.0E+01	7.7E-01
Inhalation	1.6E-01	3.2E-03

4. Evaluation guidance to downstream user				
For scaling see	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.  Available hazard data do not support the need for a DNEL to be established for other health effects.  Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).			
Exposure assessment instrument/tool/method	Worker	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. (PROC1, PROC2, PROC2 (Sampling), PROC15) The Advanced REACH Tool (ART) has been used to estimate workplace		

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FUEL OIL, RMK 700 HS

	exposures unless otherwise indicated. (PROC2 (Storage), PROC3, PROC8a (Maintenance), PROC8b (Marine), PROC8b (Road/Rail)).
Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

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**FUEL OIL, RMK 700 HS** 

### Exposure Scenario 2 - Formulation and (re)packing of Fuel oil, residual

1.0 Contributing scenarios			
Sector of Use [SU]	SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites SU10 Formulation [mixing] of preparations and/or re-packaging (excluding alloys)		
Process Category [PROC]	PROC1 PROC2 PROC2 (Storage) PROC2 (Sampling) PROC3 PROC8a (Maintenance) PROC8b (Marine) PROC8b (Road/Rail) PROC8b (Drum) PROC8b (Drum)		
Chemical Product Category [PC]	Not applicable		
Article Categories [AC]	Not applicable		
Environmental Release Categories [ERC]	ERC2		
Specific Environmental Release Categories [SPERC]	ESVOC SpERC 2.2.v1		

2.0 Operational conditions and risk mar	nagement measures		
2.1 Control of worker exposure			
Product characteristics			
Physical form of product	Liquid		
Vapour pressure	<0.5 kPa @ STP		
Concentration of substance in product	Covers percentage substance	in the product up to 100 % (unless stated differently).	
Human factors not influenced by risk m	anagement		
Potential exposure area	Not defined		
Frequency and duration of use	•		
	PROC1, PROC8a (Maintenance), PROC15	Covers daily exposures up to 8 hours (unless stated differently).	
Exposure duration per day	PROC2 (Storage), PROC3, PROC8b (Marine)	Covers exposure up to 1 - 4 hour(s)	
2.pocare datament per day	PROC8b (Road/Rail), PROC8b (Drum)	Covers exposure up to 15 min - 1 hour(s)	
	PROC2, PROC2 (Sampling)	Covers exposure up to 15 min	
Emission days (days/year):	300		
Other operational conditions affecting v	vorker exposure		
Area of use	All contributing scenarios	Not defined (default = Indoor)	
Characteristics of the surroundings	Not defined		
Canaval massaumas amplicable to all satis	dd		

#### General measures applicable to all activities

Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently).

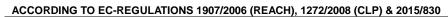
#### General measures (carcinogens)

Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Technical conditions of use	
PROC1, PROC2, PROC3	Handle substance within a closed system.
PROC8b (Drum)	Ensure material transfers are under containment or extract ventilation. (Efficiency of at least 97%).
PROC15	Handle in a fume cupboard or under extract ventilation. (Efficiency of at least 90 %).
Organisational measures	
PROC2, PROC2 (Sampling)	Minimise the volume and frequency of sampling. Ensure dedicated sample points are provided.
PROC8b (Marine)	Transfer via enclosed lines. Clear transfer lines prior to de-coupling.

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# **FUEL OIL, RMK 700 HS**

PROC8a (Maintenance)	Drain down and flush system prior to equipment break-in or maintenance.				
PROC8a (Maintenance), PROC8b (Marine)	Retain drain downs in sealed storage pending disposal or for subsequent recycle.				
PROC8b (Road/Rail), PROC8b (Drum)			under containment or extract ventilation		
Risk management measures related to hun	nan health				
Respiratory protection	No special measures are required.				
	PROC1, PROC2,				
	(Storage), PROC2	!			
	(Sampling), PROC	23,	Wear chemically resistant gloves (tested to EN374) in combination		
	PROC8b (Marine)		with 'basic' employee training.(Efficiency of at least 90 %).		
Hand and/or Skin protection	(Road/Rail), PRO	C8b			
	(Drum)				
	PROC8a (Mainten	ance)	Wear chemically resistant gloves (tested to EN374) in combination		
	,		with specific activity training. (Efficiency of at least 75%)		
	PROC15		Wear suitable gloves tested to EN374. (Efficiency of at least 80 %).		
Eye Protection	No special measu	res are requ	ired.		
2.2 Control of environmental exposure					
Amounts used					
Fraction of EU tonnage used in region:		0.1			
Regional use tonnage (tons/year):		7.5E+06			
Fraction of Regional tonnage used locally (ton	s/year):	4.0E-03			
Annual site tonnage (tons/year):		3.0E+04			
Maximum daily site tonnage (kg/day):		1.0E+05			
Environment factors not influenced by risk	management				
Flow rate of receiving surface water (m³/d):		Not define	d (default = 18,000)		
Local freshwater dilution factor:		10			
Local marine water dilution factor:		100			
Operational conditions					
Emission days (days/year):		300			
Release fraction to air from process (after typi		1.0E-03			
consistent with EU Solvent Emissions Directiv		1.02 00			
Release fraction to wastewater from process (initial release prior to RMM):		2.0E-05			
Release fraction to soil from process (initial re RMM):	•	1.0E-04			
Technical conditions and measures at prod					
Common practices vary across sites thus cons					
Technical onsite conditions and measures					
			primarily ingestion). No wastewater treatment required.		
Treat air emission to provide a typical remova		0			
Treat onsite wastewater (prior to receiving wa	• ,	81.3			
provide the required removal efficiency of (%).					
If discharging to domestic sewage treatment p		0			
required onsite wastewater removal efficiency	` '	Not defined			
Treat soil emission to provide a typical remova		Not defined			
Common practices vary across sites thus cons Organisational measures to prevent/limit ro		icase estima	nes useu.		
		cinerated a	ontained or reclaimed		
Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.  Conditions and measures related to municipal sewage treatment plant					
, ,			2.0E+03		
Degradation effectiveness (%):		94.2			
Conditions and measures related to external treatment of waste for d			osal		
External treatment and disposal of waste should comply with applicable local and/or national regulations.  Conditions and measures related to external recovery of waste			a		
External recovery and recycling of waste should comply with applicable local and/or national regulations.					
Substance release quantities after risk mai			ind/or riduorial regulations.		
Release to waste water from process (mg/l):	ragoment measure	Not defined			
Maximum allowable site tonnage (MSafe) based on release					
following total wastewater treatment removal (		1.1E+05			
3					

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#### 3. Exposure estimation and reference to its source

#### 3.1 Human exposure prediction

Exposure assessment (method/calculation model)

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. (PROC1, PROC2, PROC2 (Sampling), PROC8b (Drum), PROC15)

The Advanced REACH Tool (ART) has been used to estimate workplace exposures unless otherwise indicated. (PROC2 (Storage), PROC3, PROC8a (Maintenance), PROC8b (Marine), PROC8b (Road/Rail)).

	Inhalation		Dermal		Combined
Process Category [PROC]	Inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	Dermal exposure (mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.01	0.04	0.03	0.57	0.61
PROC2	0.04	0.19	0.03	0.57	0.76
PROC2 (Storage)	0.04	0.21	0.03	0.57	0.78
PROC2 (Sampling)	0.04	0.19	0.03	0.57	0.76
PROC3	0.04	0.21	0.03	0.57	0.78
PROC8a (Maintenance)	0.00	0.01	0.05	0.83	0.85
PROC8b (Marine)	0.06	0.36	0.03	0.57	0.92
PROC8b (Road/Rail)	0.03	0.20	0.03	0.57	0.76
PROC8b (Drum)	0.02	0.12	0.03	0.57	0.68
PROC15	0.05	0.28	0.01	0.10	0.38

#### 3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Fuel oil, residual is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore individual environmental compartments PNECs are not available for this product.

Environmental exposure	STP	Freshwater	Marine water	Soil	Freshwater sediment	Marine sediment
Predicted Environmental Exposure (PEC)	6.1E-02 mg/l	6.1E-03 mg/l	6.1E-04 mg/l	6.3E-02 mg/kg ww	1.5E+00 mg/kg ww	5.5E-02 mg/kg ww
Risk characterisation ratio (RCR)	6.4E-02	2.4E-01	2.4E-02	5.3E-04	3.1E-01	3.1E-02

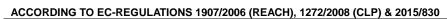
Human exposure prediction:

Route of Exposure	Exposure (µg/kg/Day)	Risk characterisation ratio (RCR)
Oral	2.1E+01	8.1E-01
Inhalation	6.6E+00	1.3E-01

4. Evaluation guidance to downstream user				
For scaling see	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.  Available hazard data do not support the need for a DNEL to be established for other health effects.  Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).			
Exposure assessment	Worker	The ECETOC TRA tool has been used to estimate workplace exposures unless		

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instrument/tool/method		otherwise indicated. (PROC1, PROC2, PROC2 (Sampling), PROC8b (Drum), PROC15) The Advanced REACH Tool (ART) has been used to estimate workplace exposures unless otherwise indicated. (PROC2 (Storage), PROC3, PROC8a
		(Maintenance), PROC8b (Marine), PROC8b (Road/Rail)).
	Environment	The Hydrocarbon Block Method has been used to calculate environmental
	Liviloriment	exposure with the Petrorisk model.

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**FUEL OIL, RMK 700 HS** 

#### Exposure Scenario 3 – Use of Fuel oil, residual as a Fuel (Industrial)

1.0 Contributing scenarios	
Sector of Use [SU]	SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites
	PROC1
	PROC2
	PROC2 (Fuel filtering)
	PROC2 (Storage)
Process Category [PROC]	PROC3
	PROC8a (Maintenance)
	PROC8b (Bulk)
	PROC8b (Drum)
	PROC16
Chemical Product Category [PC]	Not applicable
Article Categories [AC]	Not applicable
Environmental Release Categories [ERC]	ERC7
Specific Environmental Release Categories [SPERC]	ESVOC SpERC 7.12a.v1

2.0 Operational conditions and risk mar	nagement measures		
2.1 Control of worker exposure			
Product characteristics			
Physical form of product	Liquid		
Vapour pressure	<0.5 kPa @ STP		
Concentration of substance in product	Covers percentage substance	e in the product up to 100 % (unless stated differently).	
Human factors not influenced by risk m	anagement		
Potential exposure area	Not defined		
Frequency and duration of use			
Exposure duration per day	PROC1, PROC8a (Maintenance), PROC8b (Bulk), PROC16	Covers daily exposures up to 8 hours (unless stated differently).	
	PROC2 (Fuel filtering), PROC2 (Storage), PROC3	Covers exposure up to 1 - 4 hour(s)	
	PROC2, PROC8b (Drum)	Covers exposure up to 15 min - 1 hour(s)	
Emission days (days/year):	300		
Other operational conditions affecting v	vorker exposure		
Anna of was	PROC8b (Bulk)	Outdoor	
Area of use	All other PROC's	Not defined (default = Indoor)	
Characteristics of the surroundings	Not defined		

#### General measures applicable to all activities

Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently).

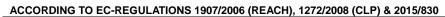
### General measures (carcinogens)

Consider technical advances and process upgrades (including automation) for the elimination of releases, minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Technical conditions of use	
PROC1, PROC2, PROC3	Handle substance within a closed system.
Organisational measures	
PROC2	Provide a good standard of controlled ventilation (10 to 15 air changes per hour).
PROC8b (Bulk)	Transfer via enclosed lines.
PROC8b (Drum), PROC2 (Fuel filtering),	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
PROC2 (Storage), PROC16	
PROC8a (Maintenance)	Retain drain downs in sealed storage pending disposal or for subsequent re

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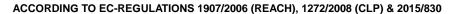
**FUEL OIL, RMK 700 HS** 

Respiratory protection	No special measu		red.	
PROC1, PROC2, (Fuel filtering), PF (Storage), PROC3, and and/or Skin protection (Bulk), PROC8b (PROC16		OC2 8, PROC8b	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training (Efficiency of at least 90 %).	
	PROC8a (Mainten	nance)	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training (Efficiency of at least 75 %).	
Eye Protection	No special measu	res are requi	red.	
2.2 Control of environmental exposure				
Amounts used				
Fraction of EU tonnage used in region:		0.1		
Regional use tonnage (tons/year):		5.9E+06		
Fraction of Regional tonnage used locally (to	ons/year):	2.6E-01		
Annual site tonnage (tons/year):		1.5E+06		
Maximum daily site tonnage (kg/day):		5.0E+06		
Environment factors not influenced by ris	sk management			
Flow rate of receiving surface water (m³/d):		Not define	d (default = 18,000)	
Local freshwater dilution factor:		10		
Local marine water dilution factor:		100		
Operational conditions				
Emission days (days/year):		300		
Release fraction to air from process (initial re	'	2.0E-04		
Release fraction to wastewater from process (initial release prior to RMM):		1.0E-06		
Release fraction to soil from process (initial release prior to RMM):		0		
Technical conditions and measures at pro-				
Common practices vary across sites thus co				
Technical onsite conditions and measure				
•	•	t exposure (	orimarily ingestion). No wastewater treatment required.	
Treat air emission to provide a typical remov		95		
Treat onsite wastewater (prior to receiving w provide the required removal efficiency of (%)	o):	92.5		
If discharging to domestic sewage treatment				
required onsite wastewater removal efficience		0		
Treat soil emission to provide a typical remo	• , ,	Not defined		
Common practices vary across sites thus co		lease estima	ites used.	
Organisational measures to prevent/limit				
Do not apply industrial sludge to natural soils			ontained or reclaimed.	
Conditions and measures related to mun	· •	ent plant 2.0E+03		
Size of municipal sewage system/treatment plant (m³/d)				
Degradation effectiveness (%)		94.2		
Conditions and measures related to exter		•		
			tion emissions considered in regional exposure assessment. Externa	
treatment and disposal of waste should com			tional regulations.	
Substance release quantities after risk m	anagement measure		J	
Release to waste water from process (mg/l)		Not define	a — — — — — — — — — — — — — — — — — — —	
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d):		5.4E+06		

3. Exposure estimation and reference to its source	
3.1 Human exposure prediction	
Exposure assessment (method/calculation model)	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. (PROC1, PROC2, PROC16)
	The Advanced REACH Tool (ART) has been used to estimate workplace

exposures unless otherwise indicated. (PROC2 (Storage), PROC2 (Fuel

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filtering), PROC3, PROC8a (Maintenance), PROC8b (Bulk), PROC8b (Drum))

	Inhalation		Dermal		Combined
Process Category [PROC]	Inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	Dermal exposure (mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.01	0.04	0.03	0.57	0.61
PROC2	0.03	0.17	0.03	0.57	0.73
PROC2 (Fuel filtering)	0.04	0.21	0.03	0.57	0.78
PROC2 (Storage)	0.04	0.21	0.03	0.57	0.78
PROC3	0.04	0.21	0.03	0.57	0.78
PROC8a (Maintenance)	0.00	0.01	0.05	0.83	0.85
PROC8b (Bulk)	0.06	0.36	0.03	0.57	0.92
PROC8b (Drum)	0.03	0.19	0.03	0.57	0.76
PROC16	0.01	0.06	0.03	0.57	0.62

#### 3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Fuel oil, residual is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore individual environmental compartments PNECs are not available for this product.

Environmental exposure	STP	Freshwater	Marine water	Soil	Freshwater sediment	Marine sediment
Predicted Environmental Exposure (PEC)	1.5E-01 mg/l	1.5E-02 mg/l	1.5E-03 mg/l	6.3E-02 mg/kg ww	1.8E+00 mg/kg ww	4.6E-02 mg/kg ww
Risk characterisation ratio (RCR)	1.6E-01	6.1E-01	6.1E-02	3.0E-04	7.7E-01	7.7E-02

#### Human exposure prediction:

Route of Exposure	Exposure (μg/kg/Day)	Risk characterisation ratio (RCR)
Oral	2.2E+01	8.7E-01
Inhalation	3.4E+00	6.6E-02

4. Evaluation guidance to downstream user			
For scaling see	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.  Available hazard data do not support the need for a DNEL to be established for other health effects.  Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).		
Exposure assessment instrument/tool/method	Worker	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. (PROC1, PROC2, PROC16)  The Advanced REACH Tool (ART) has been used to estimate workplace exposures unless otherwise indicated. (PROC2 (Storage), PROC2 (Fuel filtering), PROC3, PROC8a (Maintenance), PROC8b (Bulk), PROC8b (Drum))	
	Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.	

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#### Exposure Scenario 4 - Use of Fuel oil, residual as a Fuel (Professional)

1.0 Contributing scenarios	
Sector of Use [SU]	SU22 Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process Category [PROC]	PROC1 PROC2 PROC2 (Storage) PROC3 PROC8a (Maintenance) PROC8b (Bulk) PROC8b (Drum/batch transfers) PROC8b (Refuelling) PROC16
Chemical Product Category [PC]	Not applicable
Article Categories [AC]	Not applicable
Environmental Release Categories [ERC]	ERC9a ERC9b
Specific Environmental Release Categories [SPERC]	ESVOC SpERC 9.12b.v1

2.0 Operational conditions and risk management measures			
2.1 Control of worker exposure			
Product characteristics			
Physical form of product	Liquid		
Vapour pressure	<0.5 kPa @ STP		
Concentration of substance in product	Covers percentage substance	e in the product up to 100 % (unless stated differently).	
Human factors not influenced by risk m	anagement		
Potential exposure area	Not defined		
Frequency and duration of use			
	PROC1, PROC8a (Maintenance), PROC16	Covers daily exposures up to 8 hours (unless stated differently).	
	PROC2 (Storage)	Covers exposure up to 1 - 4 hour(s)	
Exposure duration per day	PROC2, PROC8b (Bulk), PROC8b (Drum), PROC8b (Refuelling)	Covers exposure up to 15 min - 1 hour(s)	
	PROC3	Covers exposure up to 15 min	
Exposure duration (days/year)	365		
Other operational conditions affecting v	vorker exposure		
Area of use	All PROC's	Not defined (default = Indoor)	
Characteristics of the surroundings	Not defined	•	
0	***		

#### General measures applicable to all activities

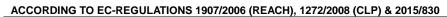
Assumes a good basic standard of occupational hygiene is implemented. Assumes activities are at ambient temperature (unless stated differently).

#### General measures (carcinogens)

Consider technical advances and process upgrades (including automation) for the elimination of releases. minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenario; clear up spills immediately and dispose of waste safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Technical conditions of use			
PROC1, PROC2, PROC3	Handle substance within a closed system.		
Organisational measures			
PROC2, PROC3, PROC8b (Bulk), PROC8b (Drum)	Provide a good standard of controlled ventilation (10 to 15 air changes per hour).		
PROC2 (Storage), PROC8a (Maintenance), PROC16	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).		
PROC8b (Bulk), PROC8b (Drum)	Ensure material transfers are under containment or extract ventilation. Clear transfer lines prior to		

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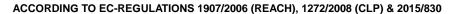


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	de-coupling.			
PROC8b (Bulk), PROC8b (Drum), PROC8a (Maintenance)	Retain drain downs in sealed storage pending disposal or for subsequent recycle.			
Risk management measures related to hur	nan health			
Respiratory protection	No special measures are required.			
PROC1, PROC2 PROC3, PROC8b PROC8b (Drum), (Refuelling),		(Bulk),	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training (Efficiency of at least 90 %).	
	PROC2, PROC8a (Maintenance)		Wear chemically resistant gloves (tested to EN374) in combinati- with specific activity training (Efficiency of at least 95 %).	
Eye Protection	No special measu	res are requ		
2.2 Control of environmental exposure				
Amounts used				
Fraction of EU tonnage used in region:		0.1		
Regional use tonnage (tons/year):		1.7E+06		
Fraction of Regional tonnage used locally (tor	ns/vear):	5.0E-04		
Annual site tonnage (tons/year):	, , -	8.5E+02		
Maximum daily site tonnage (kg/day):		2.3E+03		
Environment factors not influenced by risk	c management	2.02 100		
Flow rate of receiving surface water (m³/d):	managomone	Not define	nd (default – 18 000)	
Local freshwater dilution factor:		Not defined (default = 18,000)		
Local marine water dilution factor:		100		
Operational conditions		100		
Emission days (days/year):		365		
Release fraction to air from wide dispersive us	co (regional only):	1.0E-05		
Release fraction to wastewater from wide disp		1.0E-07		
Release fraction to wastewater from wide dispersive use.  Release fraction to soil from wide dispersive use (regional only):		1.0E-05		
Technical conditions and measures at pro-			release	
Common practices vary across sites thus con				
Technical onsite conditions and measures	•			
			primarily ingestion). No wastewater treatment required.	
Treat air emission to provide a typical remova		Not applicable		
Treat onsite wastewater (prior to receiving wa	• ' '			
provide the required removal efficiency of (%)		0		
If discharging to domestic sewage treatment p		0		
required onsite wastewater removal efficiency				
Treat soil emission to provide a typical remova		Not defined		
Common practices vary across sites thus con				
Organisational measures to prevent/limit r	•			
Do not apply industrial sludge to natural soils.		cinerated, c	ontained or reclaimed.	
Conditions and measures related to munic				
Size of municipal sewage system/treatment plant (m³/d):		2.0E+03		
Degradation effectiveness (%):		94.2		
Conditions and measures related to external treatment of waste for disposal				
Combustion emissions limited by required exhaust emission controls. Combustion emissions considered in regional exposure assessment. Externa				
treatment and disposal of waste should comply with applicable local and/or national regulations.				
Conditions and measures related to extern				
Conditions and measures related to extern This substance is consumed during use and r	o waste of the subst			
This substance is consumed during use and r				
			ed	
This substance is consumed during use and r Substance release quantities after risk ma	nagement measure	s	ed .	

3. Exposure estimation and reference to its source	
3.1 Human exposure prediction	
Exposure assessment (method/calculation model)	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. (PROC1, PROC2, PROC3, PROC16). The Advanced REACH Tool (ART) has been used to estimate workplace

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exposures unless otherwise indicated. (PROC2 (Storage), PROC8a (Maintenance), PROC8b (Bulk), PROC8b (Drum) and PROC8b (Refuelling))

	Inhalation		Dermal		Combined
Process Category [PROC]	Inhalation exposure (mg/m³)	Risk characterisation ratio (RCR)	Dermal exposure (mg/kg bw/day)	Risk characterisation ratio (RCR)	Risk characterisation ratio (RCR)
PROC1	0.01	0.06	0.03	0.57	0.62
PROC2	0.06	0.33	0.02	0.28	0.62
PROC2 (Storage)	0.04	0.21	0.03	0.57	0.78
PROC3	0.03	0.17	0.03	0.57	0.73
PROC8a (Maintenance)	0.01	0.05	0.05	0.83	0.88
PROC8b (Bulk)	0.03	0.19	0.03	0.57	0.76
PROC8b (Drum)	0.03	0.19	0.03	0.57	0.76
PROC8b (Refuelling)	0.03	0.19	0.03	0.57	0.76
PROC16	0.01	0.06	0.03	0.57	0.62

#### 3.2 Environmental exposure prediction

Exposure assessment (method/calculation model)

The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

Fuel oil, residual is a hydrocarbon UVCB. The hydrocarbon block method is used in PETRORISK to calculate the environmental toxicity (HC5) of each group of components in the substance. These are used to estimate the environmental risk for the substance. Therefore individual environmental compartments PNECs are not available for this product.

Environmental exposure	STP	Freshwater	Marine water	Soil	Freshwater sediment	Marine sediment
Predicted Environmental Exposure (PEC)	7.2E-06 mg/l	1.1E-04 mg/l	7.3E-07 mg/l	6.2E-02 mg/kg ww	1.4E+00 mg/kg ww	3.6E-02 mg/kg ww
Risk characterisation ratio (RCR)	7.5E-06	4.7E-03	6.2E-05	5.7E-05	3.5E-03	4.1E-05

Human exposure prediction:

Route of Exposure	Exposure (μg/kg/Day)	Risk characterisation ratio (RCR)
Oral	2.0E+01	7.7E-01
Inhalation	1.2E-01	2.3E-03

4. Evaluation guidance to downstream user				
For scaling see	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.  Available hazard data do not support the need for a DNEL to be established for other health effects.  Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).			
Exposure assessment instrument/tool/method	Worker	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. (PROC1, PROC2, PROC3, PROC16).  The Advanced REACH Tool (ART) has been used to estimate workplace exposures unless otherwise indicated. (PROC2 (Storage), PROC8a (Maintenance), PROC8b (Bulk), PROC8b (Drum) and PROC8b (Refuelling))		
	Environment	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.		

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