SAFETY DATA SHEET

Section 1: Identification of the substance/mixture and of the company/undertaking

Product identifier

Trade name of the substance	Diesel Fuels and Gas Oils - All Grades (Refer to Synonyms for Product Name)
Identification No.	68334-30-5
Registration number	01-2119484664-27-XXXX
Synonyms	Ultra Low Sulfur Diesel, FAME Free-EN590-Ultra Low Sulfur Diesel, up to 7% FAME-Ultra Low Sulphur Gas Oil , Marked or Unmarked - FAME Free * High Sulfur Diesel * GTL Diesel * Unfinished Diesel
SDS number	2004a
Date of first issue	29-July-2011
Version number	03
Revision date	18-November-2011
Supersedes date	11-August-2011

Relevant identified uses of the substance or mixture and uses advised against

Identified uses	Distribution of a substance. Formulation & (re) packaging of substances and mixtures. Use as a Fuel. Use as an intermediate.
Uses advised against	None known.

Details of the supplier of the safety data sheet

Supplier

Company name	Valero Marketing & Supply Company and Affiliates
Address	P.O. Box 696000 San Antonio Texas 78269-6000
General information:	
United States:	01/210 345 4593
Contact person	Not available.

Emergency telephone number

Europe:	0044/(0)18 65 407333

Only Representative

Registrant Company name	The Acta Group EU, Ltd
Address	23 New Mount Street Manchester M1 2NN United Kingdom
Telephone number	+44 (0) 161 212 7407

Section 2: Hazards identification

Classification of the substance or mixture

The substance has been assessed and/or tested for its physical, health and environmental hazards and the following classification applies.

Classification according to Regulation (EC) No 1272/2008 as amended

Danger

Flam. Liq. 3, H226; Flammable liquid and vapour
Asp.Tox. 1, H304; May be fatal if swallowed and enters airways
Skin Irrit. 2, H315; Causes skin irritation
Acute Tox. 4, H332; Harmful if inhaled
Carc. 2, H351: Suspected of causing cancer
STOT RE 2, H373: May cause damage to organs through prolonged or repeated exposure
Aquatic Chronic 2, H411: Toxic to aquatic life with long lasting effects

Classification according to Directive 67/548/EEC or 1999/45/EC as amended

Classification
Harmful; Xn; R20
Harmful; Xn; R38
Harmful; Xn; R40
Harmful; Xn; R65
Dangerous for the environment; N; R51/53
The full text for all R-phrases is displayed in section 16.

Hazard summary

Physical hazards	Flammable liquid category 3
Health hazards	Skin corrosion/irritation category 2, Acute toxicity category 4 (inhalation), Aspiration category 1, Carcinogenicity category 2, Specific Target Organ Toxicity (repeat exposure) category 2
Environmental hazards	Chronic Aquatic toxicity category 2

Label elements
Label according to Regulation (EC) No. 1272/2008 as amended

Contains:	Fuels, diesel
Identification No.	649-224-00-6
Signal word	Danger
Hazard statements	Flammable liquid and vapour. May be fatal if swallowed and enters airways. Causes skin irritation. Harmful if inhaled. Suspected of causing cancer. .May cause damage to organs through prolonged or repeated exposure. .Toxic to aquatic life with long lasting effects.

Precautionary statements
Prevention
P201: Obtain special instructions before use
P202: Do not handle until all safety precautions have been read and understood
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
P260: Do not breathe dust/fume/gas/mist/vapours/spray
P261: Avoid breathing dust/fume/gas/mist/vapours/spray
P264: Wash affected skin area thoroughly after handling
P270: Do not eat, drink or smoke when using this product
P271: Use only outdoors or in a well-ventilated area
P273: Avoid release to the environment
P280: Wear protective gloves/protective clothing/eye protection/face protection
P281: Use personal protective equipment as required

Response

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
P301 + P312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
P302 + P352: IF ON SKIN: Wash with plenty of soap and water
P303 + P361 + P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P308: IF exposed or concerned:
P308 + P313: IF exposed or concerned: Get medical advice/attention
P312: Call a POISON CENTER or doctor/physician if you feel unwell
P313: Get medical advice/attention
P314: Get medical advice/attention if you feel unwell
P321: Specific treatment (see ... on this label)
P330: Rinse mouth
P331: Do NOT induce vomiting
P332 + P313: If skin irritation occurs: Get medical advice/attention
P362: Take off contaminated clothing and wash before reuse
P370+P378: In case of fire: Use foam, carbon dioxide, dry powder or water fog for extinction
P391: Collect spillage

Storage
P403 + P235: Store in a well-ventilated place. Keep cool
P403 + P233: Store in a well-ventilated place. Keep container tightly closed
P405: Store locked up

Disposal
P501: Dispose of contents/container to ….
.

Supplemental label information Repeated exposure may cause skin dryness or cracking.
Other hazards Not assigned.

Section 3: Composition/information on ingredients

Substance
General information

Chemical name	%	CAS No,/EC No.	REACH Pre- Registration No.	INDEX No.	Notes
Fuels, Diesel	100	68334-30-5/269-822-7	17-2119378924-24-0000	649-224-00-6	#
Classification:	DSD: Carc. Cat. 3;R40, Xn;R20-65, Xn;R38, N;R51/53				
	CLP: Flam. Liq. 3;H226, Asp. Tox. 1;H304, Skin Irrit. 2; H315, Acute Tox. 4;H332, Carc. 2;H351, STOT RE 2;H373, Aquatic Chronic 2;H411				

Section 4: First aid measures

General information If exposed or concerned: get medical attention/advice. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety datasheet to the doctor in attendance. Wash contaminated clothing before re-use.

Description of first aid measures

Inhalation Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration.
Get medical attention.

Skin contact Remove contaminated clothing and shoes. Wash off immediately with soap and plenty of water. Get medical attention if irritation develops or persists. Wash clothing separately before reuse. Destroy or thoroughly clean contaminated shoes. If high pressure injection under the skin occurs, Always seek medical attention.

Eye contact Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention.

Ingestion Rinse mouth thoroughly. Do not induce vomiting without advice from poison control centre. Do not give mouth-to-mouth resuscitation. Get medical attention immediately.

Most important symptoms And effects, both acute and delayed Skin irritation. Defatting of the skin. Rash. May cause eye irritation on direct contact. Aspiration may cause pulmonary oedema and pneumonitis. In high concentrations, vapours are narcotic and may cause headache, fatigue, dizziness and nausea.

Indication of any immediate medical attention and special treatment needed If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately. In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

Section 5: Firefighting measures

General fire hazards The product is flammable, and heating may generate vapours which may form explosive vapour/air mixtures. Containers may explode when heated.

Extinguishing media

Suitable extinguishing media Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing Media Do not use a solid water stream as it may scatter and spread fire.

Special hazards arising from the substance or mixture Vapor may cause flash fire. Vapors can flow along surfaces to distant ignition source and flash back. Sensitive to static discharge.

Advice for firefighters

Special protective equipment for firefighters Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

Special firefighting Procedures Withdraw immediately in case of rising sound from venting safety devices or any discolouration of tanks due to fire. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Move containers from fire area if you can do it without risk. In the event of fire, cool tanks with water spray. Cool containers exposed to flames with water until well after the fire is out. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Vapours may form explosive air mixtures even at room temperature. Prevent buildup of vapours or gasses to explosive concentrations. Some of these materials, if spilled, may evaporate leaving a flammable residue. Water runoff can cause environmental damage.

Section 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Keep upwind. Keep out of low areas. Ventilate closed spaces before entering. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. See Section 8 for personal protective equipment. Local authorities should be advised if significant spillages cannot be contained.

For emergency responders Keep unnecessary personnel away. Wear protective clothing as described in Section 8 of this safety data sheet.

Environmental precautions Prevent from entering into soil, ditches, sanitary sewers, waterways and/or groundwater. If facility or operation has an "oil or hazardous substance contingency

plan", activate its procedures. Stay upwind and away from spill. Wear appropriate protective equipment including respiratory protection as conditions warrant. Do not enter or stay in area unless monitoring indicates that it is safe to do so. Isolate hazard area and restrict entry to emergency crew. Flammable. Review Fire Fighting Measures, Section 5, before proceeding with clean up. Keep all sources of ignition (flames, smoking, flares, etc.) and hot surfaces away from release. Contain spill in smallest possible area. Recover as much product as possible (e.g. by vacuuming). Stop leak if it can be done without risk. Spilled material may be absorbed by an appropriate absorbent, and then handled in accordance with environmental regulations. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment or drainage systems and natural waterways.
Contact fire authorities and appropriate federal, state and local agencies.

Methods and material for containment and cleaning up

For containment — ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Use non-sparking tools and explosion-proof equipment. Stop leak if you can do so without risk. This material is a water pollutant and should be prevented from contaminating soil or from entering sewage and drainage systems and bodies of water. Dike the spilled material, where this is possible. Prevent entry into waterways, sewers, basements or confined areas.

For cleaning up — Small Spills: Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. This material and its container must be disposed of as hazardous waste.

Large Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Prevent product from entering drains. Do not allow material to contaminate ground water system. Should not be released into the environment.

Reference to other sections For personal protection, see section 8. For waste disposal, see section 13.

Section 7: Handling and storage

Precautions for safe handling

Wear personal protective equipment. Do not breathe dust/fume/gas/mist/vapors/spray. Avoid contact with eyes, skin, and clothing. Do not taste or swallow. Avoid prolonged exposure. Use only with adequate ventilation. Wash thoroughly after handling. The product is extremely flammable, and explosive vapour/air mixtures may be formed even at normal room temperatures.
DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. When using, do not eat, drink or smoke. Avoid release to the environment.

Conditions for safe storage, including any incompatibilities

Flammable liquid storage. Do not handle or store near an open flame, heat or other sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. The pressure in sealed containers can increase under the influence of heat. Keep container tightly closed in a cool, well-ventilated place. Keep away from food, drink and animal feeding stuffs. Keep out of the reach of children.

Specific end use(s) — Distribution of a substance. Formulation & (re) packaging of substances and mixtures. Manufacture of substance. Use as a Fuel.

Section 8: Exposure controls/personal protection

Control parameters

Occupational exposure limits

Belgium, Exposure Limit Values

Material	Type	Value	From
Fuels, Diesel (68334-30-5)	TWA	100 mg/m3	Vapor and aerosol

Ireland, Occupational Exposure Limits

Material	Type	Value	From
Fuels, Diesel (68334-30-5)	TWA	100 mg/m3	

Italy, OELs

Material	Type	Value	From
Fuels, Diesel (68334-30-5)	TWA	100 mg/m3	Inhalable fraction and vapor

Portugal, VELs, Norm on occupational exposure to chemical agents (NP 1796)

Material	Type	Value	From
Fuels, diesel (68334-30-5)	TWA	100 mg/m3	Inhalable fraction

Recommended monitoring procedures

Follow standard monitoring procedures.

DNEL Not currently publically available.

PNEC Not currently publically available.

Exposure controls

Appropriate engineering controls

Handle the substance under a closed system as much as possible. Ensure material transfers are under containment or extract ventilation. Clear transfer lines before decoupling. Use explosion-proof equipment.

Personal protection equipment

General information Use personal protective equipment as required. Personal protective equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment. Keep working clothes separately. Launder contaminated clothing before reuse.

Eye/face protection Wear safety glasses. If splash potential exists, wear full face shield or chemical goggles.

Skin protection

- Hand protection Wear chemical-resistant, impervious gloves. Chlorinated Polyethylene (or Chlorosulfonated Polyethylene), Viton, Polyurethane, Nitrile rubber. Suitable gloves can be recommended by the glove supplier. Gloves tested to EN374 are advised as a minimum standard. Be aware that the liquid may penetrate the gloves. Frequent change is advisable.

- Other skin protection Full body suit and boots are recommended when handling large volumes or in emergency situations. Flame retardant protective clothing is recommended.

Respiratory protection Wear a NIOSH-approved (or equivalent) full-face piece airline respirator in the positive pressure mode with emergency escape provisions. In case of inadequate ventilation or risk of inhalation of vapours, use suitable respiratory equipment with gas filter (type A2). Use a positive-pressure air-supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection.

Thermal hazards When material is heated, wear gloves to protect against thermal burns.

Hygiene measures Consult supervisor for special handling instructions. Avoid contact with eyes. Avoid contact with skin. Wash hands before breaks and immediately after handling the product. Provide eye wash station and safety shower. Handle in accordance with good industrial hygiene and safety practices.

Environmental exposure Controls Contain spills and prevent releases and observe national regulations on emissions.

Section 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Amber liquid.
Physical state	Liquid.
Form	Liquid.
Colour	Amber.
Odour	Petroleum.
Odour threshold	Not available.
pH	Not applicable.
Melting point/freezing Point	Not applicable.
Boiling point, initial boiling point, and boiling range	160 - 400 °C (320 - 752 °F)
Flash point	> 55 °C (> 131 °F) Pensky-Martens Closed Cup
Auto-ignition temperature	350 °C (662 °F)
Flammability (solid, gas)	Not available.
Flammability limit - lower (%)	1 % v/v
Flammability limit - upper (%)	6 % v/v
Oxidising properties	Not available.
Explosive properties	Not available.
Explosive limit	Not available.
Vapour pressure	0,04kPa @ 40 °C (104 °F)
Vapour density	> 1
Evaporation rate	Not available.
Relative density	0,81 - 0,89 @ 15°C (59°F)
Solubility (water)	Insoluble.
Partition coefficient (n-octanol/water)	Log Pow: 2 - 7
Decomposition Temperature	Not available.
Viscosity	> 1,5 mm²/s @ 40 °C (104 °F)
Percent volatile	Not available.
Other information	No relevant additional information available.

Section 10: Stability and reactivity

Reactivity	The product is stable and non reactive under normal conditions of use, storage and transport.
Chemical stability	Stable under normal temperature conditions and recommended use.
Possibility of hazardous reactions	Hazardous polymerisation does not occur.
Conditions to avoid	Heat, flames and sparks. Ignition sources. Contact with incompatible materials. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death.
Incompatible materials	Strong acids. Strong oxidizers such as nitrates, chlorates, peroxides.
Hazardous decomposition Products	Carbon oxides. Hydrocarbons.

Section 11: Toxicological information

Information on toxicological effects

Acute toxicity	Samples of vacuum or hydrocracked gas oils and distillate fuels have been tested in acute oral, dermal and inhalation studies. Results indicate the following: Rat oral LD50 > 9 ml/kg bodyweight (approx 7600 mg/kg bw) (API, 1980a,b)

	Rat inhalation LC50 ≥ 4.1 mg/l (ARCO, 1988) Rabbit dermal LD50 > 5 ml/kg bodyweight (approx 4300 mg/kg bw) (API, 1980a,b)
Skin corrosion/irritation	Samples of vacuum or hydrocracked gas oils and distillate fuels were tested in rabbit skin irritation studies (24 hour occluded). These data indicate that exposure to distillate fuels can cause skin irritation (API, 1980a; API, 1980b). There was no evidence of skin corrosion.
Serious eye damage/eye Irritation	The ability of vacuum or hydrocracked gas oils and distillate fuels to elicit eye irritation in rabbits has been investigated. None of the samples were irritating to the eye (API, 1980a; API, 1980b).
Respiratory or skin sensitisation	No studies were located for respiratory sensitization. For skin sensitization distillate fuel samples were tested and showed no evidence of skin sensitization (API, 1980a; API, 1980b).
Germ cell mutagenicity	The mutagenic potential of vacuum gas oils, hydrocracked gas oils, and distillate fuels have been extensively tested in both *in vivo* and *in vitro* tests. The *in vitro* results were ambiguous while the *in vivo* studies showed a lack of mutagenic activity. Based on the data available vacuum gas oils, hydrocracked gas oils, and distillate fuels are not considered to be germ cell mutagens (Deininger, G, et al, 1991; McKee, RH et al, 1994; API, 1985).
Carcinogenicity	Samples of vacuum gas oils, hydrocracked gas oils, and distillate fuels show variable activity in skin painting bioassays. Skin irritation has been shown to contribute to the development of tumors. Based on the data available these substances are considered as potentially carcinogenic (Biles RW et al, 1988).
Reproductive toxicity	No guideline or near-guideline studies were located that have examined the potential impact of gas oils on reproductive function, however gonadal histopathology and/or sperm parameters (counts; morphology) were among endpoints routinely included in sub-chronic dermal evaluations of some gas oils. The data indicate these substances are not reproductive toxicants (Mobil, 1989a; API, 1979a; API, 1979b).
Specific target organ toxicity - single exposure	Acute exposure studies do not indicate any specific organ toxicity following single exposure to vacuum or hydrocracked gas oils and distillate fuels (API, 1980a; API, 1980b; ARCO, 1988)
Specific target organ toxicity - repeated exposure	The repeat dose toxicity of vacuum or hydrocracked gas oils and distillate fuels has been tested. Following 13 week dermal exposure in Sprague-Dawley rats, thymus, liver, and bone marrow changes were noted in a dose dependent manner (ARCO, 1992; Mobil, 1989b).
Aspiration hazard	May be fatal if swallowed and enters airways. Vacuum or hydrocracked gas oils and distillate fuels span a range of viscosities with values reported as ≥1.5 mm2/s at 40°C.
Mixture versus substance Information	Not available.
Other information	Symptoms may be delayed.

Section 12: Ecological information

Toxicity	**Acute (short-term) Aquatic Hazard:** Acute aquatic toxicity studies on samples of vacuum or hydrocracked gas oils and distillate fuels report toxicity values in a range of 1-10 mg/l (EBSI, 1998a,b,c,d). The LL50 [96h] was 3.2 mg/l for fish (EBSI, 1998c).
Chronic (long-term)	

Aquatic Hazard:	**Chronic aquatic toxicity:** Chronic toxicity in fish is predicted utilising a QSAR and results in a 14 day NOEL of 0.083 mg/l. Long term toxicity to aquatic invertebrates is also predicted using QSAR. The 21 day NOEL is determined to be 0.21 mg/l (Redman et al, 2010)
Persistence and degradability	Gas oils are complex combinations of individual hydrocarbon species. Based on the known or expected properties of individual constituents, category members are not predicted to be readily biodegradable (The Petroleum HPV Testing Group, 2003; Mobil, 1999; Lee C, 1993). Some hydrocarbon constituents of gas oils are predicted to meet the criteria for persistence. Some components can be degraded by micro-organisms under aerobic conditions easily and are likely to bioaccumulate (log Kow values in the range of 4.0).
Mobility	Not available.
Environmental fate - Partition coefficient	Log Pow: 2 - 7
Mobility in soil	Not available.
Results of PBT and vPvB assessment	Not a PBT or vPvB substance or mixture.
Other adverse effects	Toxic to aquatic life with long lasting effects.

Section 13: Disposal considerations

Waste treatment methods	
Residual waste	Dispose of in accordance with local regulations.
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied.
EU waste code	13 07 01*
Disposal methods/ information	Dispose in accordance with all applicable regulations. This material and its container must be disposed of as hazardous waste. Do not discharge into drains, water courses or onto the ground.

Section 14: Transport information

ADR	
UN number	UN1202
UN proper shipping name	Diesel fuel
Transport hazard class(es)	3
Subsidiary class(es)	-
Packing group	III
Environmental hazards	Yes
Labels required	3
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

RID	
UN number	UN1202
UN proper shipping name	Diesel fuel
Transport hazard class(es)	3
Subsidiary class(es)	-
Packing group	III
Environmental hazards	No
Labels required	3
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

ADN

UN number	UN1202
UN proper shipping name	Diesel fuel
Transport hazard class(es)	3
Subsidiary class(es)	-
Packing group	III
Environmental hazards	Yes
Labels required	3
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IATA

UN number	UN1202
UN proper shipping name	Diesel fuel
Transport hazard class(es)	3
Subsidiary class(es)	-
Packing group	III
Environmental hazards	Yes
ERG Code	3L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1202
UN proper shipping name	Diesel fuel
Transport hazard class(es)	3
Subsidiary class(es)	-
Packing group	III
Marine pollutant	Yes
Labels required	3
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable.

Section 15: Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture
EU Regulations
Regulation (EC) No. 2037/2000 on substances that deplete the ozone layer, Annex I
Not listed.
Regulation (EC) No. 2037/2000 on substances that deplete the ozone layer, Annex II
Not listed.
Regulation (EC) No. 850/2004 on persistent organic pollutants, Annex I
Not listed.
Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 1
Not listed.
Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 2
Not listed.
Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 3
Not listed.
Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex V
Not listed.
Directive 96/61/EC concerning integrated pollution prevention and control (IPPC): Article 15, European Pollution

Emission Registry (EPER)
Not listed.
Regulation (EC) No. 1907/2006, REACH Article 59(1). Candidate List
Not listed.

Other regulations	The product is classified and labelled in accordance with Regulation (EC) 1272/2008 (CLP Regulation) as amended and respective national laws implementing EC directives. This Safety Data Sheet complies with the requirements of Regulation (EC) No 1907/2006. 96/82/EC (Seveso II) Directive; Part 2 (Classified Substances) - Flammable
National regulations	Young people under 18 years old are not allowed to work with this product according to EU Directive 94/33/EC on the protection of young people at work.
Chemical safety assessment	For this substance a chemical safety assessment has been carried out.

Section 16: Other information

List of abbreviations

DSD: Directive 67/548/EEC.
CLP: Regulation No. 1272/2008.
DNEL: Derived No-Effect Level.
PNEC: Predicted No-Effect Concentration.
PBT: Persistent, Bioaccumulative and Toxic.
vPvB: very Persistent and very Bioaccumulative.

References

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API (1979b) Teratology study in rats - diesel fuel. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 27-32174. Washington DC: American Petroleum Institute
API (1980a) Acute toxicity tests API #78-4 #2 home heating oil (50% cat). Study conducted by Elars Bioresearch Laboratories Inc. API Health Environ. Sci. Dep. Rep. 27-32068. Washington DC: American Petroleum Institute
API (1980b) Acute toxicity tests API #79-6 diesel fuel (marketplace sample). Study conducted by Elars Bioresearch Laboratories Inc. API Med. Res. Publ. 27-32817. Washington DC: American Petroleum Institute
API (1985) Acute *in vivo* cytogenetics assay in male and female rats of API 83-11. Study conducted by Microbiological Associates Inc. API Med. Res. Publ. 32-32408. Washington DC: American Petroleum Institute
ARCO (1988) Acute inhalation toxicity study in rats administered F-72-01 naval distillate. Study conducted by Bio/dynamics Inc. Study No. 85-7867A. Los Angeles CA: ARCO
ARCO (1992) 28-day dermal toxicity study in rats – F-102-01 naval distillate. UBTL Study No. 65365. Los Angeles CA: ARCO
Biles, R.W. et al (1988) Dermal carcinogenic activity of petroleum-derived middle distillate fuels. *Toxicology 53, 301-314*
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EBSI (1998b) Alga toxicity test.MRD-89-429. Study No. 142967. East Millstone NJ: Exxon Biomedical Sciences Inc.
EBSI (1998c) Fish acute toxicity test with *Menidiaberyllina*.MRD-89-429. Study No. 142940MB. East Millstone NJ: Exxon Biomedical Sciences Inc.
EBSI (1998d) Sheepshead minnow acute toxicity test.MRD-89-429. Study No.142961. East Millstone NJ: Exxon Biomedical Sciences Inc.
Lee, C. (1993) Water insoluble biodegradation test report. Method development using CONCAWE reference gas oil: Phase III. East Millstone NJ: Exxon Biomedical Sciences Inc.
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Mobil (1989a) Developmental toxicity study in rats exposed dermally to vacuum tower overheads (VTO) (CAS 64741-49-7). Mobil Environ. and Health Sci. Lab. Study No. 62328. Princeton NJ: Mobil Oil Corporation
Mobil (1989b) Thirteen-week dermal administration of vacuum tower overheads to rats (CAS 64741-49-7). Mobil Environ. and Health Sci. Lab. Study No. 62326. Princeton NJ: Mobil Oil Corporation
Mobil (1999) Determination of the aerobic ready biodegradability of Nigerian diesel fuel using the OECD 301F manometric respirometry test method. Study conducted by Ecotoxicology Laboratory. Mobil Business Resources Corp. Study No. 68246. Paulsboro NJ: Mobil Business Resources Corp.
Redman, A. and Yadav, B. (2010) Aquatic toxicity predictions using the PETROTOX model for petroleum substance categories. Report prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

The Petroleum HPV Testing Group (2003) High production volume (HPV) chemical challenge program. Test plan gas oils category. HPV Consortium No. 1100997.Administered by API. Washington DC: American Petroleum Institute

Information on evaluation method leading to the classification of mixture

The mixture is classified based on test data for physical hazards. The classification for health and environmental hazards is derived by a combination of calculation methods and test data, if available. For details, refer to Sections 9, 11 and 12.

Full text of any statements or R-phrases and H-statements under Sections 2 to 15

R20 Harmful by inhalation.
R38 Irritating to skin.
R40 Limited evidence of a carcinogenic effect.
R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R65 Harmful: may cause lung damage if swallowed.
H226 - Flammable liquid and vapour.
H304 - May be fatal if swallowed and enters airways.
H315 - Causes skin irritation.
H332 - Harmful if inhaled.
H351 - Suspected of causing cancer.
H373 - May cause damage to organs through prolonged or repeated exposure.
H411 - Toxic to aquatic life with long lasting effects.

Training information Not available.

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1. Distribution of the substance
Sector(s) of use: SU 3: Industrial uses: Uses of substances as such or in mixtures at industrial sites
Control of environmental exposure: ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles ERC 5: Industrial use resulting in inclusion into or onto a matrix ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC 6b: Industrial use of reactive processing aids ERC 6c: Industrial use of monomers for manufacture of thermoplastics ERC 6d: Industrial use of process regulators for polymerization processes in production of resins, rubbers, polymers ERC 7: Industrial use of substances in closed systems ESVOC SpERC 1.1b.v1:
Control of worker exposure: PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a: Transfer of substance or mixture (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or mixture (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or mixture into small containers (dedicated filing line, including weighing) PROC 15: Use as laboratory reagent
Processes, tasks and activities covered by this ES: Bulk loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums ands small packs) of substance, including its sampling, storage, unloading, maintenance and associated laboratory activities
2 Exposure Scenario
2.1 Contributing scenario controlling environmental exposure for distribution of the substance
Control of environmental exposure
This section describes the release of the substance to the environment through distribution and repacking of the substance, and the measures which are expected to be taken to reduce and control the amount released to the environment
Product Characteristics
Substance is complex UVCB. Predominantly hydrophobic.
Amounts used
Amount used per site (annual): 561,000 tonnes Amount used per site (daily): 190,000 kilograms
Frequency and duration of use
Continuous use 300 emission days/year
Environment factors not influenced by risk management
Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 0.01 Release fraction to wastewater from process (initial release prior to RMM): 0.0001 Release fraction to soil from process (initial release prior to RMM): 0.001
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Risk from environmental exposure is driven by human via indirect exposure (primarily ingestion). Prevent discharge of undissolved substance to or recover from onsite wastewater. No wastewater treatment required.

Treat air emission to provide a typical removal efficiency of: 90% Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥: 0 % If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal. Efficiency of: ≥0%
Organizational measures to prevent/limit release from site
Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Estimated substance removal from wastewater via domestic sewage treatment: 94.1% Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs: 94.1% Maximum allowable site tonnage (M_{safe}) based on release following total wastewater treatment removal: 2.900,000kg/day Assume domestic sewage treatment plant flow: 2000m^3/d
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable regulations.
Conditions and measures related to external recovery of waste
External recovery and recycling of waste should comply with applicable regulations.
Additional good practice advice beyond the REACH CSA Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH. Thus, the downstream user is not obliged to i) carry out an own CSA and ii) to notify the use to the Agency, if he does not implement these measures.
Use specifics: additional measures to reduce the predicted exposure beyond the estimated level.
2.2 Contributing scenario controlling worker exposure for formulation & (re)packaging of substance and mixtures
Control of worker exposure
This section describes the release of the substance to the environment through distribution and repacking of the substance, and the measures which are expected to be taken to reduce and control the amount released to the environment
Product Characteristics
Liquid product with potential for aerosol generation. Vapour pressure: <0.5 kPa at STP Concentration of substance in product: 100%
Amounts used
Amount used per site (annual): 561,000 tonnes Amount used per site (daily): 190,000 kilograms
Frequency and duration of use
Daily use for all PROC activities. Durations specified for each PROC code: PROC 1, 2, 3, 4, 8a, 8b & 15: 15 minutes to 1 hour per day PROC 9: ≤ 8 hours per day
Human factors not influenced by risk management
Hands, forearms, face, neck and hair are expected to be exposed during normal operating procedures.
Other given operational conditions affecting worker exposure
Indoor use. Assumes use at not more than 20 ºC above ambient temperature. Assumes a good basic standard of occupational hygiene is implemented.
Technical conditions and measures at process level (source) to prevent release
PROC 1, 2 & 3: Closed processes. PROC 4: Enclosed transfers, batch processes. PROC 8a: LEV (80% efficiency) PROC 8b: Enclosed transfers, vented transfer points. PROC 9: Enclosed transfers, vented transfer points. PROC 15: Predominantly open transfers, fume cupboard used
Technical conditions and measures to control dispersion from source towards the worker

Provide extract ventilation to points where emissions occur. Use drum pumps where possible to reduce exposure from drum transfers. Where drum pumps cannot be used take particular care and use appropriate PPE to avoid exposure.

Organisational measures to prevent/limit releases, dispersion and exposure

Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Ensure relevant staff is informed of exposure potential and aware of basic actions to minimize exposures. Provide regular health surveillance as appropriate. Identify and implement corrective actions.

Conditions and measures related to personal protection, hygiene and health evaluation

Gloves (tested to EN374 standard) must be worn where contact with hands is possible.

Additional good practice advice beyond the REACH CSA
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37

Additional chemical resistant PPE (such as goggles, aprons, full body protection) should be provided based upon the level of exposure likely. Always consult an experienced occupational risk assessor prior to setting new operational procedures.

3. Exposure estimation and reference to its source

Environment:
Predicted Environmental Concentrations (PEC) were calculated using the emission factors and values listed in section 2.1 of this annex. Calculations were performed using the computer model Petrorisk version 6. Values are taken from the REACH registration dossier and Chemical Safety Report (CSR).

PEC air (mg/m^3)	2.4E-02
PEC freshwater (mg/l)	1.8E-03
PEC marine water (mg/l)	5.7E-05
PEC freshwater sediment (mg/kg ww)	1.4E+00
PEC marine sediment (mg/kg ww)	6.4E-02
PEC agricultural soil (mg/kg ww)	1.7E-01
PEC effluent (mg/l)	5.7E-03
PEC sludge (mg/kg dw)	2.0E+01

Workers:
The exposure of workers from each PROC code activity (based upon the above scenario "Control of worker exposure"), is characterized quantitatively below. The values presented below have been calculated using the ECETOC Targeted Risk Assessment (TRA) tool.
Dermal irritation:
Dermal irritation has been assessed in a qualitative manner. Safe use is assumed where the following good practice instructions are adopted and practiced:
Avoid direct skin contact with the product;
Identify potential areas for indirect skin contact;
Wear gloves (EN374) if direct hand contact with the substance or product is likely;
Clean up contamination/spills as soon as they occur;
Wash off skin contamination immediately, and;
Provide basic employee training to prevent/minimize exposure and to report any skin effects that may develop.

PROC code	Inhalation exposure from process (mg/m^3)	LEV efficiency (%)	Predicted inhalation exposure (mg/m^3)	Dermal exposure from process (mg/kg/d)	Dermal protection efficiency (%)	Predicted dermal exposure (mg/kg/d)
1	0.01	0	0.01	0.34	0	0.34
2	1	0	1	1.37	0	1.37
3	3	0	3	0.34	0	0.34
4	5	0	5	6.86	80	1.37
8a	10	80	2	13.71	90	1.37
8b	5	0	5	6.86	80	1.37
9	5	0	5	6.86	80	1.372
15	5	0	5	0.34	0	0.34

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

To ensure that the use of this substance is safe, downstream users should review this section and check the ES values against values for their own, site specific, actual use of the substance.

Environment:

Scaling may be necessary to account for differences between the environmental exposure scenario in section 2 and the actual (site specific) use of the substance. The following table shows a simple scaling method. Where data is missing or actual (site specific) values are not available, the ES values can be used for calculation purposes. Only aquatic Risk Characterization Ratio (RCR) values are applicable at the local (site specific level). RCR values <1 are considered to show safe use of the substance.

Parameter	ES value	Actual value	Safety scaling
Amount used per site (annual) (A)	561,000		Actual value/ES value=A
Emission days per year (E)	300		ES value/Actual value=E
Dilution factor (D)	Freshwater 10 Marine 100		Actual value/ES value=D
Release factor (R)	Wastewater: 0.1E-04		Actual value/ES value=R
Percentage substance removal from effluent (P)	Wastewater: 94.1		1-Actual value/1-ES value=P
RCR value	Freshwater: 4.8E-02 Marine water: 8.3E-04 Freshwater sediment: 5.5E-02 Marine sediment: 1.9E-03		A*E*D*R*P*RCR ES value=RCR actual

Workers:

Scaling may be necessary to account for differences between the worker exposure scenario in section 2 and the actual (site specific) use of the substance. The following table shows a simple scaling method. Where data is missing or actual (site specific) values are not available, the ES values can be used for calculation purposes. RCR values <1 are considered to show safe use of the substance.

Parameter	ES value	Actual value	Safety scaling
Duration of exposure (hours) (D)	8		Actual value/8=D
LEV efficiency (%) (LEV)	PROC 1, 2, 3, 8b, 15: 0 PROC 8a: 80		Actual value/ES value=LEV
RPE efficiency (%) (RP)	All PROC: 0		Actual value/ES value=RPE
RCRinh	PROC 1, 2: 0.1 PROC 3: 0.04 PROC 4, 8b, 9, 15: 0.07 PROC 8a: 0.03		D*LEV*RPE*ES RCRinh=actual RCRinh
PPE efficiency (%) (PPE)	PROC 1, 2, 3, 15: 0 PROC 4, 8b, 9: 80 PROC 8a: 90		Actual value/ES value=PPE
RCRderm	PROC 1, 2, 4, 8a, 8b, 9: 0.47 PROC 3, 15: 0.12		D*PPE*ES RCRderm=actual RCRderm

1. Formulation & (re)packaging of substance and mixtures
Sector(s) of use: SU 3: Industrial uses: Uses of substances as such or in mixtures at industrial sites SU 11: Manufacture of rubber products
Control of environmental exposure: ERC 2: Formulation of mixtures ESVOC SpERC 2.2.v1: Formulation & (re)packing of substances and mixtures (industrial): solvent-borne
Control of worker exposure: PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation or mixtures and articles (multistage and/or significant contact) PROC 8a: Transfer of substance or mixture (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or mixture (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or mixture into small containers (dedicated filing line, including weighing) PROC 14: Production of mixtures or articles by tableting, compression, extrusion, pelletisation PROC 15: Use as laboratory reagent
Processes, tasks and activities covered by this ES: Formulation, packaging, and re-packaging of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, maintenance, sampling and associated laboratory activities
2 Exposure Scenario
2.1 Contributing scenario controlling environmental exposure for formulation & (re)packaging of substance and mixtures
Control of environmental exposure
This section describes the release of the substance to the environment through formulation and repacking of the substance, and the measures which are expected to be taken to reduce and control the amount released to the environment
Product Characteristics
Substance is complex UVCB. Predominantly hydrophobic.
Amounts used
Amount used per site (annual): 3,000 tonnes Amount used per site (daily): 10,000 kilograms
Frequency and duration of use
Continuous use 300 emission days/year
Environment factors not influenced by risk management
Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure
Release factor to air from process (after typical onsite RMMs, consistent with EU Solvent Emissions Directive requirements): 1 Release fraction to wastewater from process (initial release prior to RMM): 0.002 Release fraction to soil from process (initial release prior to RMM): 0.01
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Risk from environmental exposure is driven by freshwater sediment. Prevent discharge of undissolved substance to or recover from onsite wastewater. Treat air emission to provide a typical removal efficiency of: 0% Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥: 59.9 %

If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal. Efficiency of: ≥0%
Organizational measures to prevent/limit release from site
Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Estimated substance removal from wastewater via domestic sewage treatment: 94.1% Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs: 94.1% Maximum allowable site tonnage (M_{safe}) based on release following total wastewater treatment removal: 680,000kg/day Assume domestic sewage treatment plant flow: 2000m^3/d
Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable regulations.
Conditions and measures related to external recovery of waste
External recovery and recycling of waste should comply with applicable regulations.
Additional good practice advice beyond the REACH CSA Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH. Thus, the downstream user is not obliged to i) carry out an own CSA and ii) to notify the use to the Agency, if he does not implement these measures.
Use specifics: additional measures to reduce the predicted exposure beyond the estimated level.
2.2 Contributing scenario controlling worker exposure for formulation & (re)packaging of substance and mixtures
Control of worker exposure
This section describes the release of the substance to the environment through formulation and (re)packing of the substance, and the measures which are expected to be taken to reduce and control the amount released to the environment
Product Characteristics
Liquid product with potential for aerosol generation. Vapour pressure: <0.5 kPa at STP Concentration of substance in product: 100%
Amounts used
Amount used per site (annual): 3,000 tonnes Amount used per site (daily): 10,000 kilograms
Frequency and duration of use
Daily use for all PROC activities. Durations specified for each PROC code: PROC 1, 2, 3, 4, 8a, 8b & 15: 15 minutes to 1 hour per day PROC 5, 9 & 14: ≤ 8 hours per day
Human factors not influenced by risk management
Hands, forearms, face, neck and hair are expected to be exposed during normal operating procedures.
Other given operational conditions affecting worker exposure
Indoor use. Assumes use at not more than 20 ºC above ambient temperature. Assumes a good basic standard of occupational hygiene is implemented.
Technical conditions and measures at process level (source) to prevent release
PROC 1, 2 & 3: Closed processes. PROC 4: Enclosed transfers, batch processes. PROC 5: LEV (90% efficiency) PROC 8a: LEV (80% efficiency) PROC 8b: Enclosed transfers, vented transfer points. PROC 9: Enclosed transfers, vented transfer points. PROC 14: No technical conditions. PROC 15: Predominantly open transfers, fume cupboard used
Technical conditions and measures to control dispersion from source towards the worker

Provide extract ventilation to points where emissions occur. Use drum pumps where possible to reduce exposure from drum transfers. Where drum pumps cannot be used take particular care and use appropriate PPE to avoid exposure.

Organizational measures to prevent/limit releases, dispersion and exposure

Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Ensure relevant staff is informed of exposure potential and aware of basic actions to minimize exposures. Provide regular health surveillance as appropriate. Identify and implement corrective actions.

Conditions and measures related to personal protection, hygiene and health evaluation

Gloves (tested to EN374 standard) must be worn where contact with hands is possible.

Additional good practice advice beyond the REACH CSA

Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37

Additional chemical resistant PPE (such as goggles, aprons, full body protection) should be provided based upon the level of exposure likely. Always consult an experienced occupational risk assessor prior to setting new operational procedures.

3. Exposure estimation and reference to its source

Environment:

Predicted Environmental Concentrations (PEC) were calculated using the emission factors and values listed in section 2.1 of this annex. Calculations were performed using the computer model Petrorisk version 6. Values are taken from the REACH registration dossier and Chemical Safety Report (CSR).

PEC air (mg/m^3)	2.0E-02
PEC freshwater (mg/l)	1.5E-03
PEC marine water (mg/l)	2.8E-05
PEC freshwater sediment (mg/kg ww)	1.4E+00
PEC marine sediment (mg/kg ww)	6.3E-02
PEC agricultural soil (mg/kg ww)	1.7E-01
PEC effluent (mg/l)	2.8E-03
PEC sludge (mg/kg dw)	9.8E+00

Workers:

The exposure of workers from each PROC code activity (based upon the above scenario "Control of worker exposure"), is characterized quantitatively below. The values presented below have been calculated using the ECETOC Targeted Risk Assessment (TRA) tool.

Dermal irritation:

Dermal irritation has been assessed in a qualitative manner. Safe use is assumed where the following good practice instructions are adopted and practiced:

Avoid direct skin contact with the product;

Identify potential areas for indirect skin contact;

Wear gloves (EN374) if direct hand contact with the substance or product is likely;

Clean up contamination/spills as soon as they occur;

Wash off skin contamination immediately, and;

Provide basic employee training to prevent/minimize exposure and to report any skin effects that may develop.

PROC code	**Inhalation exposure from process (mg/m^3)**	**LEV efficiency (%)**	**Predicted inhalation exposure (mg/m^3)**	**Dermal exposure from process (mg/kg/d)**	**Dermal protection efficiency (%)**	**Predicted dermal exposure (mg/kg/d)**
1	0.01	0	0.01	0.03	0	0.03
2	1	0	1	1.37	0	1.37
3	3	0	3	0.34	0	0.34
4	5	0	5	6.86	80	1.37
5	25	90	2.5	13.71	90	1.37
8a	10	80	2	13.71	90	1.37
8b	5	0	5	6.86	80	1.37

9	5	0	5	6.86	80	1.372
14	5	0	5	3.43	80	0.69
15	5	0	5	0.34	0	0.34

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

To ensure that the use of this substance is safe, downstream users should review this section and check the ES values against values for their own, site specific, actual use of the substance.

Environment:

Scaling may be necessary to account for differences between the environmental exposure scenario in section 2 and the actual (site specific) use of the substance. The following table shows a simple scaling method. Where data is missing or actual (site specific) values are not available, the ES values can be used for calculation purposes. Only aquatic Risk Characterization Ratio (RCR) values are applicable at the local (site specific level). RCR values <1 are considered to show safe use of the substance.

Parameter	ES value	Actual value	Safety scaling
Amount used per site (annual) (A)	3000		Actual value/ES value=A
Emission days per year (E)	300		ES value/Actual value=E
Dilution factor (D)	Freshwater 10 Marine 100		Actual value/ES value=D
Release factor (R)	Wastewater: 2.0E-03		Actual value/ES value=R
Percentage substance removal from effluent (P)	Wastewater: 94.1		1-Actual value/1-ES value=P
RCR value	Freshwater: 8.9E-02 Marine water: 8.9E-03 Freshwater sediment: 1.5E-01 Marine sediment: 1.1E-02		A*E*D*R*P*RCR ES value=RCR actual

Workers:

Scaling may be necessary to account for differences between the worker exposure scenario in section 2 and the actual (site specific) use of the substance. The following table shows a simple scaling method. Where data is missing or actual (site specific) values are not available, the ES values can be used for calculation purposes. RCR values <1 are considered to show safe use of the substance.

Parameter	ES value	Actual value	Safety scaling
Duration of exposure (hours) (D)	8		Actual value/8=D
LEV efficiency (%) (LEV)	PROC 1, 2, 3, 4, 8b, 9, 14, 15: 0 PROC 8a: 80 PROC 5: 90		Actual value/ES value=LEV
RPE efficiency (%) (RP)	All PROC: 0		Actual value/ES value=RPE
RCRinh	PROC 1, 2: 0.01 PROC 3: 0.04 PROC 4, 8b, 9, 14, 15: 0.07 PROC 5: 0.36 PROC 8a: 0.03		D*LEV*RPE*ES RCRinh=actual RCRinh
PPE efficiency (%) (PPE)	PROC 1, 2, 3, 15: 0 PROC 4, 8b, 9, 14: 80		Actual value/ES

	PROC 5, 8a: 90		value=PPE
RCRderm	PROC 1, 2, 4, 5, 8a, 8b, 9: 0.47 PROC 3, 15: 0.12 PROC 14: 0.24		D*PPE*ES RCRderm= actual RCRderm

1. Use as a fuel - Industrial
Sector(s) of use: SU 3: Industrial uses: Uses of substances as such or in mixtures at industrial sites
Control of environmental exposure: ERC 7: Industrial use of substances in closed systems ESVOC SpERC 7.12a.v1:
Control of worker exposure: PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 8a: Transfer of substance or mixture (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or mixture (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 16: Using material as fuel sources, limited exposure to unburned product to be expected
Processes, tasks and activities covered by this ES: Process covers the use as a fuel (or fuel additives and additive components) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
2 Exposure Scenario
2.1 Contributing scenario controlling environmental exposure for use as a fuel - industrial
Control of environmental exposure
This section describes the release of the substance to the environment through the industrial use as a fuel, and the measures which are expected to be taken to reduce and control the amount released to the environment
Product Characteristics
Substance is complex UVCB. Predominantly hydrophobic.
Amounts used
Amount used per site (annual): 1,500,000 tonnes Amount used per site (daily): 500,000 kilograms
Frequency and duration of use
Continuous use 300 emission days/year
Environment factors not influenced by risk management
Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure
Release fraction to air from process (initial release prior to RMM): 0.025 Release fraction to wastewater from process (initial release prior to RMM): 0.00036 Release fraction to soil from process (initial release prior to RMM): 0
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Risk from environmental exposure is driven by freshwater sediment. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Treat air emission to provide a typical removal efficiency of: 95% Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥: 97.7 % If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal. Efficiency of: ≥60.4%
Organizational measures to prevent/limit release from site
Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Estimated substance removal from wastewater via domestic sewage treatment: 94.1% Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs: 97.7%

Maximum allowable site tonnage (M_{safe}) based on release following total wastewater treatment removal: 5,000,000kg/day Assume domestic sewage treatment plant flow: 2000m^3/d
Conditions and measures related to external treatment of waste for disposal
Combustion emissions limited by required exhaust emission controls. Combustion emissions considered regional exposure assessment.
Conditions and measures related to external recovery of waste
External recovery and recycling of waste should comply with applicable regulations.
Additional good practice advice beyond the REACH CSA Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH. Thus, the downstream user is not obliged to i) carry out an own CSA and ii) to notify the use to the Agency, if he does not implement these measures.
Use specifics: additional measures to reduce the predicted exposure beyond the estimated level.
2.2 Contributing scenario controlling worker exposure for use as a fuel - industrial
Control of worker exposure
This section describes the release of the substance to the environment through the industrial use as a fuel, and the measures which are expected to be taken to reduce and control the amount released to the environment
Product Characteristics
Liquid product with potential for aerosol generation. Vapour pressure: <0.5 kPa Concentration of substance in product: 100%
Amounts used
Amount used per site (annual): 1,500,000 tonnes Amount used per site (daily): 500,000 kilograms
Frequency and duration of use
Daily use for all PROC activities. Durations specified for each PROC code: PROC 1, 2, 3, 8a, 8b& 16: >4 hours per day Covers daily exposures up to 8 hours
Human factors not influenced by risk management
Hands, forearms, face, neck and hair are expected to be exposed during normal operating procedures.
Other given operational conditions affecting worker exposure
Indoor use. Assumes use at not more than 20 ºC above ambient temperature. Assumes a good basic standard of occupational hygiene is implemented.
Technical conditions and measures at process level (source) to prevent release
PROC 1, 2 & 3: Closed processes PROC 8a: LEV (80% efficiency) PROC 8b: Enclosed transfers, vented transfer points PROC 16: Closed processes
Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Use drum pumps where possible to reduce exposure from drum transfers. Where drum pumps cannot be used take particular care and use appropriate PPE to avoid exposure. Clean up contamination/spills as soon as they occur. Dispose of waste in accordance with regulatory requirements.
Organizational measures to prevent/limit releases, dispersion and exposure
Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Ensure relevant staff is informed of exposure potential and aware of basic actions to minimize exposures. Provide regular health surveillance as appropriate. Identify and implement corrective actions.
Conditions and measures related to personal protection, hygiene and health evaluation
Where there is the potential for exposure, ensure relevant staff are informed of exposure potential and aware of basic actions to minimize exposures. Gloves (tested to EN374 standard) must be worn where contact with hands is possible.

Additional good practice advice beyond the REACH CSA

Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37

Additional chemical resistant PPE (such as goggles, aprons, full body protection) should be provided based upon the level of exposure likely. Always consult an experienced occupational risk assessor prior to setting new operational procedures.

3. Exposure estimation and reference to its source

Environment:

Predicted Environmental Concentrations (PEC) were calculated using the emission factors and values listed in section 2.1 of this annex. Calculations were performed using the computer model Petrorisk version 6. Values are taken from the REACH registration dossier and Chemical Safety Report (CSR).

PEC air (mg/m^3)	2.9E-01
PEC freshwater (mg/l)	5.5E-02
PEC marine water (mg/l)	5.5E-03
PEC freshwater sediment (mg/kg ww)	2.1E+00
PEC marine sediment (mg/kg ww)	2.1E-01
PEC agricultural soil (mg/kg ww)	1.7E-01
PEC effluent (mg/l)	5.5E-01
PEC sludge (mg/kg dw)	1.9E+03

Workers:

The exposure of workers from each PROC code activity (based upon the above scenario "Control of worker exposure"), is characterized quantitatively below. The values presented below have been calculated using the ECETOC Targeted Risk Assessment (TRA) tool.

Dermal irritation:

Dermal irritation has been assessed in a qualitative manner. Safe use is assumed where the following good practice instructions are adopted and practiced:

Avoid direct skin contact with the product;

Identify potential areas for indirect skin contact;

Wear gloves (EN374) if direct hand contact with the substance or product is likely;

Clean up contamination/spills as soon as they occur;

Wash off skin contamination immediately, and;

Provide basic employee training to prevent/minimize exposure and to report any skin effects that may develop.

PROC code	Inhalation exposure from process (mg/m^3)	LEV efficiency (%)	Predicted inhalation exposure (mg/m^3)	Dermal exposure from process (mg/kg/d)	Dermal protection efficiency (%)	Predicted dermal exposure (mg/kg/d)
1	1	0	1	1.37	0	1.37
2	1	0	1	1.37	0	1.37
3	1	0	1	0.34	0	0.34
8a	5	80	1	13.71	90	1.37
8b	5	0	5	6.86	80	1.37
16	1	0	1	0.03	0	0.03

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

To ensure that the use of this substance is safe, downstream users should review this section and check the ES values against values for their own, site specific, actual use of the substance.

Environment:

Scaling may be necessary to account for differences between the environmental exposure scenario in section 2 and the actual (site specific) use of the substance. The following table shows a simple scaling method. Where data is missing or actual (site specific) values are not available, the ES values can be used for calculation purposes. Only aquatic Risk Characterization Ratio (RCR) values are applicable at the local (site specific level). RCR values <1 are considered to show safe use of the substance.

Parameter	ES value	Actual value	Safety scaling
Amount used per site (annual) (A)	1,500,000		Actual value/ES value=A

Emission days per year (E)	300		ES value/Actual value=E
Dilution factor (D)	Freshwater 10 Marine 100		Actual value/ES value=D
Release factor (R)	Wastewater: 3.6E-04		Actual value/ES value=R
Percentage substance removal from effluent (P)	Wastewater: 97.7		1-Actual value/1-ES value=P
RCR value	Freshwater: 8.0E-01 Marine water: 8.0E-02 Freshwater sediment: 9.1E-01 Marine sediment: 9.1E-02		A*E*D*R*P*RCR ES value=RCR actual

Workers:

Scaling may be necessary to account for differences between the worker exposure scenario in section 2 and the actual (site specific) use of the substance. The following table shows a simple scaling method. Where data is missing or actual (site specific) values are not available, the ES values can be used for calculation purposes. RCR values <1 are considered to show safe use of the substance.

Parameter	ES value	Actual value	Safety scaling
Duration of exposure (hours) (D)	8		Actual value/8=D
LEV efficiency (%) (LEV)	PROC 1, 2, 3, 8b, 16: 0 PROC 8a: 80		Actual value/ES value=LEV
RPE efficiency (%) (RP)	All PROC: 0		Actual value/ES value=RPE
RCRinh	PROC 1, 2, 3, 8a, 16: 0.01 PROC 8b: 0.07		D*LEV*RPE*ES RCRinh=actual RCRinh
PPE efficiency (%) (PPE)	PROC 1, 2, 3, 16: 0 PROC 8a: 90 PROC 8b: 80		Actual value/ES value=PPE
RCRderm	PROC 1, 2: 0.47 PROC 3, 16: 0.12 PROC 8a, 8b: 0.47		D*PPE*ES RCRderm=actual RCRderm

1. Use as a fuel - professional
Sector(s) of use: SU 22: professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Control of environmental exposure: ERC 9a: Wide dispersive indoor use of substances in closed systems ERC 9b: Wide dispersive outdoor use of substances in closed systems ESVOC SpERC 9.12b.v1
Control of worker exposure: PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 8a: Transfer of substance or mixture (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or mixture (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 16: Using material as fuel sources, limited exposure to unburned product to be expected
Processes, tasks and activities covered by this ES: Process covers the use as a fuel (or fuel additives and additive components) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
2 Exposure Scenario
2.1 Contributing scenario controlling environmental exposure for use as a fuel - professional
Control of environmental exposure
This section describes the release of the substance to the environment through the professional use as a fuel, and the measures which are expected to be taken to reduce and control the amount released to the environment.
Product Characteristics
Substance is complex UVCB. Predominantly hydrophobic.
Amounts used
Amount used per site (annual): 3340 tonnes Amount used per site (daily): 9.15 kilograms
Frequency and duration of use
Continuous use 365 emission days/year
Environment factors not influenced by risk management
Local freshwater dilution factor: 10 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure
Release factor to air from wide dispersive use (regional use only): 0.0001 Release fraction to wastewater wide dispersive use: 0.00001 Release fraction to soil from wide dispersive use (regional use only): 0.00001
Technical conditions and measures at process level (source) to prevent release
Common practices vary across sites thus conservative process release estimates used.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Risk from environmental exposure is driven by humans via indirect exposure (primary ingestion) No wastewater treatment required. Treat air emission to provide a typical removal efficiency of: N/A Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥0 % If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal. Efficiency of: ≥0%
Organizational measures to prevent/limit release from site
Prevent discharge of undissolved substance to or recover from wastewater. Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed.
Conditions and measures related to municipal sewage treatment plant
Estimated substance removal from wastewater via domestic sewage treatment: 94.1% Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs: 94.1% Maximum allowable site tonnage (M_{safe}) based on release following total wastewater treatment removal: 140,000kg/day Assume domestic sewage treatment plant flow: 2000m^3/d

Conditions and measures related to external treatment of waste for disposal
Combustion emissions limited by required exhaust emission controls. Combustion emissions considered regional exposure assessment.
Conditions and measures related to external recovery of waste
External recovery and recycling of waste should comply with applicable regulations.
Additional good practice advice beyond the REACH CSA Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH. Thus, the downstream user is not obliged to i) carry out an own CSA and ii) to notify the use to the Agency, if he does not implement these measures.
Use specifics: additional measures to reduce the predicted exposure beyond the estimated level.
2.2 Contributing scenario controlling worker exposure for formulation & (re)packaging of substance and mixtures
Control of worker exposure
This section describes the amount of the substance which may be exposed to workers through the professional use of the substance as fuel, and the measures which are expected to be taken to reduce the exposure amount.
Product Characteristics
Liquid product with potential for aerosol generation. Vapour pressure: <0.5 kPa Concentration of substance in product: 100%
Amounts used
Amount used per site (annual): 3340 tonnes Amount used per site (daily): 9.15 kilograms
Frequency and duration of use
Daily use for all PROC activities. Durations specified for each PROC code: PROC 1, 2, 3, 8a, 8b& 16: >4 hours per day Covers daily exposures up to 8 hours
Human factors not influenced by risk management
Hands, forearms, face, neck and hair are expected to be exposed during normal operating procedures.
Other given operational conditions affecting worker exposure
Indoor use. Assumes use at not more than 20 ºC above ambient temperature. Assumes a good basic standard of occupational hygiene is implemented.
Technical conditions and measures at process level (source) to prevent release
PROC 1, 2 & 3: Closed processes. PROC 8a: LEV (80% efficiency) PROC 8b: Enclosed transfers, vented transfer points. PROC 16: Closed processes
Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Use drum pumps where possible to reduce exposure from drum transfers. Where drum pumps cannot be used take particular care and use appropriate PPE to avoid exposure. Clean up contamination/spills as soon as they occur. Dispose of waste in accordance with regulatory requirements.
Organizational measures to prevent/limit releases, dispersion and exposure
Drain down systems and transfer lines prior to breaking containment. Drain down and flush equipment where possible prior to maintenance. Ensure relevant staff is informed of exposure potential and aware of basic actions to minimize exposures. Provide regular health surveillance as appropriate. Identify and implement corrective actions.
Conditions and measures related to personal protection, hygiene and health evaluation
Where there is the potential for exposure, ensure relevant staff are informed of exposure potential and aware of basic actions to minimize exposures. Gloves (tested to EN374 standard) must be worn where contact with hands is possible.
Additional good practice advice beyond the REACH CSA Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37

Additional chemical resistant PPE (such as goggles, aprons, full body protection) should be provided based upon the level of exposure likely. Always consult an experienced occupational risk assessor prior to setting new operational procedures.

3. Exposure estimation and reference to its source

Environment:

Predicted Environmental Concentrations (PEC) were calculated using the emission factors and values listed in section 2.1 of this annex. Calculations were performed using the computer model Petrorisk version 6. Values are taken from the REACH registration dossier and Chemical Safety Report (CSR).

PEC air (mg/m^3)	2.0E-02
PEC freshwater (mg/l)	1.5E-03
PEC marine water (mg/l)	2.8E-05
PEC freshwater sediment (mg/kg ww)	1.4E+00
PEC marine sediment (mg/kg ww)	6.3E-02
PEC agricultural soil (mg/kg ww)	1.7E-01
PEC effluent (mg/l)	2.8E-03
PEC sludge (mg/kg dw)	9.8E+00

Workers:

The exposure of workers from each PROC code activity (based upon the above scenario "Control of worker exposure"), is characterized quantitatively below. The values presented below have been calculated using the ECETOC Targeted Risk Assessment (TRA) tool.

Dermal irritation:

Dermal irritation has been assessed in a qualitative manner. Safe use is assumed where the following good practice instructions are adopted and practiced:

Avoid direct skin contact with the product;

Identify potential areas for indirect skin contact;

Wear gloves (EN374) if direct hand contact with the substance or product is likely;

Clean up contamination/spills as soon as they occur;

Wash off skin contamination immediately, and;

Provide basic employee training to prevent/minimize exposure and to report any skin effects that may develop.

PROC code	Inhalation exposure from process (mg/m^3)	LEV efficiency (%)	Predicted inhalation exposure (mg/m^3)	Dermal exposure from process (mg/kg/d)	Dermal protection efficiency (%)	Predicted dermal exposure (mg/kg/d)
1	1	0	1	1.34	0	1.34
2	1	0	1	1.34	0	1.34
3	1	0	1	0.34	0	0.34
8a	5	0	5	13.71	90	1.37
8b	5	0	5	6.86	80	1.37
16	20	30	14	0.34	0	0.34

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

To ensure that the use of this substance is safe, downstream users should review this section and check the ES values against values for their own, site specific, actual use of the substance.

Environment:

Scaling may be necessary to account for differences between the environmental exposure scenario in section 2 and the actual (site specific) use of the substance. The following table shows a simple scaling method. Where data is missing or actual (site specific) values are not available, the ES values can be used for calculation purposes. Only aquatic Risk Characterization Ratio (RCR) values are applicable at the local (site specific level). RCR values <1 are considered to show safe use of the substance.

Parameter	ES value	Actual value	Safety scaling
Amount used per site (annual) (A)	3340		Actual value/ES value=A
Emission days per year (E)	365		ES value/Actual value=E
Dilution factor (D)	Freshwater 10 Marine 100		Actual value/ES value=D
Release factor (R)	Wastewater: 0.1E-04		Actual value/ES value=R
Percentage substance removal from effluent (P)	Wastewater: 94.1		1-Actual value/1-ES value=P

RCR value	Freshwater: 4.3E-02 Marine water: 4.1E-04 Freshwater sediment: 5.0E-02 Marine sediment: 1.4E-03		A*E*D*R*P*RCR ES value=RCR actual

Workers:
Scaling may be necessary to account for differences between the worker exposure scenario in section 2 and the actual (site specific) use of the substance. The following table shows a simple scaling method. Where data is missing or actual (site specific) values are not available, the ES values can be used for calculation purposes. RCR values <1 are considered to show safe use of the substance.

Parameter	**ES value**	**Actual value**	**Safety scaling**
Duration of exposure (hours) (D)	8		Actual value/8=D
LEV efficiency (%) (LEV)	PROC 1, 2, 3, 8a, 8b: 0 PROC 16: 30		Actual value/ES value=LEV
RPE efficiency (%) (RP)	All PROC: 0		Actual value/ES value=RPE
RCRinh	PROC 1, 2, 3: 0.1 PROC 8a, 8b: 0.7 PROC 16: 0.2		D*LEV*RPE*ES RCRinh=actual RCRinh
PPE efficiency (%) (PPE)	PROC 1, 2, 3, 16: 0 PROC 8a: 90 PROC 8b: 80		Actual value/ES value=PPE
RCRderm	PROC 1, 2: 0.46 PROC 3, 16: 0.12 PROC 8a, 8b: 0.47		D*PPE*ES RCRderm=actual RCRderm