

Report

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First Aid Reference Guide - 2021 update



First Aid Reference Guide - 2021 update

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based on an evidence-based research on medical databases by the Centre for Evidence-Based Practice (CEBaP) of the Belgian Red Cross-Flanders.

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ABSTRACT

This reference guide is designed to provide additional information on the first aid measures in the event of significant on-site exposures to petroleum substances.

This document is intended for trained first aiders and site medical professionals and is not intended to replace the Safety Data Sheets, or other company specific procedures. This reference guide only addresses exposure from acute occupational exposure. First aid treatment should be carried out by appropriately qualified persons.

The 2021 update of the guide is based on an intensive evidence-based research on medical databases by the Centre for Evidence-Based Practice (CEBaP) of the Belgian Red Cross (www.cebap.org). Evidence summaries were based on a systematic literature review, collecting relevant studies to answer the specific research question of interest:

“For people exposed to one of the listed petroleum substance categories (Population) which first aid interventions (Intervention) are effective or helpful to improve health outcomes (Outcome)?”

KEYWORDS

First aid, petroleum substances, acute health effects

INTERNET

This report is available as an Adobe pdf file on the Concawe website (www.concawe.eu).

NOTE

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GENERAL STATEMENTS

This reference guide is designed to provide additional information on the first aid measures in the event of significant on-site exposures to petroleum substances. First aid treatment should be carried out by appropriately qualified persons.

This document:

- is intended for trained first aiders and site medical professionals
- is not intended to replace the Safety Data Sheet (SDS), or other company specific procedures
- only addresses exposures from acute occupational exposure via inhalation, eye and skin contact; it is assumed there are safety measures in place to prevent ingestion.

The following should be considered when assessing how an individual who may have been acutely exposed to a petroleum substance should be treated:

- Always assess scene safety prior to attempting to rescue casualties and administering first aid!
- If it is burning, stay away from smoke and fire.
- When the mechanism of injury includes high-pressure injection, e.g. of lubricating oil, then appropriate specialty care may be needed.
- The majority of substances in this document are considered to be aspiration hazards, i.e. the substances may enter into the airways either directly or after vomiting, and can therefore cause significant lung injury and death. Coughing and/or choking would be a sign of aspiration and medical help should be provided immediately.
- Oxygen inhalation is not regarded a routine first aid element but under certain circumstances it can be administered by a specifically trained first aider especially in cases of inhalation of gases and/or potential aspiration in potential flammable environment. The application of oxygen by layperson depends on local laws, regulations and processes, including liability protection. Consideration must also be given to maintenance of equipment, storage and care of compressed gas cylinders and local regulatory testing and inspection.
- Take off working clothes and shoes which are contaminated by substances, check the skin carefully for damages and rinse as described in specific sections. Do not tear off clothes, which are burned in or stick to skin, cut it off.
- Patient position with breathing difficulties: If the victim is conscious and breathes with difficulty, the most effective position for effective breathing should be upright or leaning slightly forward in a sitting position.
- Check vital signs and act accordingly. In case of first aid, this recommendation is always applicable since the cause of the symptoms may not be directly related to accidental exposure to a product but can be related e.g. to an individual's medical condition.
- Many products have the **potential for exposure to hydrogen sulphide (H₂S)**. Where co-exposure to H₂S is possible, then appropriate precautions must be taken to avoid exposure to this toxic gas. If there is any suspicion of inhalation of H₂S:

- Rescuers must wear breathing apparatus, belt and safety rope, and follow rescue procedures.
- Rescuers must wear personal gas detector for H₂S
- Remove casualty to fresh air as quickly as possible.
- Immediately begin artificial respiration if breathing has ceased.
- Provision of oxygen may help.
- Obtain medical advice for further treatment.

The clinical picture of H₂S poisoning depends on the concentrations exposed and the duration of exposure. However, without a measurement tool, it is impossible to adequately assess the concentration; therefore as soon as exposure is likely (smell, detector), any person should promptly leave the place.

H ₂ S CONCENTRATION IN THE INHALATION ATMOSPHERE IN PPM	SYMPTOMS AND AILMENTS ¹
0.02-0.13	Feels an unpleasant odour of hydrogen sulphide (on rotten eggs)
20-30	Feels an unpleasant and intense odour of hydrogen sulphide (on rotten eggs)
50-100	Mucosal irritations, headache, dizziness, nausea
100-150	Olfactory paralysis
200-300	Irritation and inflammation of the conjunctiva, respiratory tract irritation, possible pulmonary oedema, and loss of consciousness
500- 1000	Rapid loss of consciousness, paralysis of the respiratory centre, heart and respiratory failure with lethal outcome often in 30-60 minutes

For concerns arising from other forms of exposure, e.g. such as long-term repeated exposures, and their associated health hazards, contact your local poison control centre or medical professional.

For further information on basic life support manoeuvres, refer to the American Heart Association/ European Resuscitation Council/ International Red Cross (e.g. First Aid Guidelines of the International Federation of Red Cross/Red Crescent), or other company specified procedures.

Unless otherwise noted, recommendations are based on guidelines from the Hazardous Substance Database (HSDB), the petroleum substances category chemical

¹ Source: official literature of the Zagreb University: Duraković, Zijad et al. Klinička toksikologija (Clinical toxicology) Zagreb: Grafos, 2000, 112-117; Sofilić , Makić, Toksikologija (Toxicology), Sisak: University of Zagreb ,2019: 133-135

safety assessments in Concawe REACH registration dossiers, and Concawe report No.22/20 on hazard classification and labelling of petroleum substances².

The following categories are not included in this publication as no actual acute health effects could be found in literature:

- Paraffin and hydrocarbon waxes
- Petrolatums
- Slack waxes

Long-term occupational exposure effects are not included in this guide. They have to be taken care of appropriately and according to local legal requirements.

A list of EC/CAS Nos of registered substances in each category of petroleum substances is provided in the Concawe “Handbook of Identified Uses of petroleum substances”³, which is updated annually (latest edition: 2020).

The 2021 version of the guide makes use of standard phrases from the **EUPhraC Catalogue**⁴, where available. These have been highlighted in the report in *italics*. In addition, the structure of certain phrases has been updated and harmonised since previous version to accommodate potential requests of new EUPhraC phrases by Concawe foreseen in Q3-Q4 2021.

² For the most recent version of the Hazard classification and labelling of petroleum substances in the European Economic Area, please consult the Concawe website (www.concawe.eu) as this document is updated periodically.

³ Available at: <https://www.concawe.eu/reach/documents-to-download/>

⁴ EuPhraC is an independent and non-proprietary standard phrase catalogue to define a sufficient phrase set for supply chain communication. Available at: <https://draft.euphrac.eu/Catalogue.aspx?Language=en>

PETROLEUM GASES

Description:

The petroleum gases category covers mono-constituent C1-C4 alkanes. Members of this category include liquid petroleum gases (LPGs) and are products of hydrocarbon refining operations, such as catalytic cracking, catalytic reforming and steam-cracking, or are produced in association with natural gas processing as well as processing in chemical plants.

Physical/Chemical Properties:

Flammable Gas: Petroleum gases have flash points which range from -104 to -60.0°C.

Flammability data for the petroleum gases have maximum lower and upper explosion limits from 5-15 %.

Route of Exposure	Health Effects	First Aid Statements
Inhalation	May cause: weakness, <i>headache</i> , light-headedness, <i>nausea</i> , confusion, blurred vision, increased drowsiness. Exposure to very high concentrations may cause: <i>impaired consciousness</i> , convulsions, asphyxiation.	Move to well-ventilated area. Monitor for respiratory distress, administer oxygen and assist ventilation as required. <i>In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).</i> Check vital signs regularly and act accordingly.
Skin	N/A	N/A
Skin (in liquid form)	<i>Frostbite</i>	Seek specialised medical treatment immediately. If safe and possible to do so initiate warming of the affected tissue (water bath at 37 - 42 °C).
Eye	May cause mild eye irritation	Remove contact lenses. Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes. Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.

OTHER PETROLEUM GASES

Description:

This category covers hydrocarbon streams containing petroleum gases (alkanes/alkenes) predominantly in the C1-C5 range (with some carbon numbers present at levels up to C10) and includes some LPGs. Members of this category are products of refining for example distillation of crude oil, catalytic cracking and catalytic reforming, sometimes in association with steam-crackers, or they are produced in association with natural gas processing.

Physical/Chemical Properties:

Flammable Gas: Other petroleum gases have flash points which range from -104 to -60.0 °C.

Flammability data for the petroleum gases have maximum lower and upper explosion limits from 1.8-15 %.

Route of Exposure	Health Effects	First Aid Statements
Inhalation	<p>May cause: weakness, <i>headache</i>, light-headedness, <i>nausea</i>, confusion, blurred vision, increased drowsiness.</p> <p>Exposure to very high concentrations may cause: <i>impaired consciousness</i>, convulsions, asphyxiation.</p>	<p>Move to well-ventilated area.</p> <p>Monitor for respiratory distress, administer oxygen and assist ventilation as required.</p> <p><i>In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).</i></p> <p>Check vital signs regularly and act accordingly.</p>
Skin	N/A	N/A
Skin (in liquid form)	<i>Frostbite</i>	<p>Seek specialised medical treatment immediately.</p> <p>If safe and possible to do so initiate warming of the affected tissue (water bath at 37 - 42 °C).</p>
Eye	May cause mild eye irritation	<p>Remove contact lenses.</p> <p>Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes.</p> <p>Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.</p>

LOW BOILING POINT NAPHTHAS (GASOLINES)

Description:

This category is defined by the refining processes in which the category members are produced, the predominant hydrocarbon classes present, the boiling point range and the carbon number range. Hydrocarbon types: saturated, olefinic, aromatic. Typical boiling point range: approximately -88°C to 260°C. Typical carbon number range: predominantly C4 to C12.

Physical/Chemical Properties:

Liquids of variable flash point / initial boiling points.

Typical value for flash point is < 0°C.

Initial boiling point < 35°C.

Route of Exposure*	Health Effects	First Aid Statements
Inhalation	May cause: <i>headache, nausea, dizziness.</i> Acute, high dose exposure may cause: <i>central nervous system depression, confusion, altered mental status, seizures, cardiac arrhythmias.</i>	Move to well-ventilated area. Monitor for respiratory distress, administer oxygen and assist ventilation as required. <i>In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).</i> Check vital signs regularly and act accordingly.
Skin	Skin irritation	<i>Remove contaminated, saturated clothing immediately.</i> Wash area with soap and water for 10 to 15 minutes.
Eye	May cause mild reversible eye irritation	Remove contact lenses. Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes. Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.

*Incidental oral exposure: aspiration hazard; may be fatal if it enters the airways after swallowing.

IF SWALLOWED: Immediately call a POISON CENTRE or doctor/ physician. *Do NOT induce vomiting.* If vomiting does occur, have victim lean forward to reduce risk of aspiration.

KEROSINES

Description:

This category is defined by the refining processes by which the category members are produced. Hydrocarbon types: the major components include branched and straight chain paraffins and naphthenes (cycloparaffins), and aromatic hydrocarbons (alkylbenzenes and alkylnaphthalenes). Typical boiling point range: approximately 90°C to 320°C. Typical carbon number range: predominantly C6 to C17.

Physical/Chemical Properties:

Liquids of variable flash point.

Typical range of flash point is $\geq 23^{\circ}\text{C}$ to $\leq 70^{\circ}\text{C}$.

Route of Exposure*	Health Effects	First Aid Statements
Inhalation	May cause: <i>headache, nausea, dizziness</i> . Acute, high dose exposure may cause: <i>central nervous system depression, confusion, altered mental status, seizures, cardiac arrhythmias</i> .	Move to well-ventilated area. Monitor for respiratory distress, administer oxygen and assist ventilation as required. <i>In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).</i> Check vital signs regularly and act accordingly.
Skin	Skin irritation	<i>Remove contaminated, saturated clothing immediately.</i> Wash area with soap and water for 10 to 15 minutes.
Eye	May cause mild reversible eye irritation	Remove contact lenses. Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes. Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.

* Incidental oral exposure: aspiration hazard; may be fatal if it enters the airways after swallowing.

IF SWALLOWED: Immediately call a POISON CENTRE or doctor/ physician. *Do NOT induce vomiting*. If vomiting does occur, have victim lean forward to reduce risk of aspiration.

MK1 DIESEL FUEL

Description:

MK1 diesel fuel is a light petroleum distillate derived from crude petroleum, manufactured by treatment of a petroleum fraction with hydrogen in the presence of a catalyst. Given the similarity in carbon number distribution and distillation temperature range to kerosine, MK1 diesel fuel is often described as a kerosine rather than a gas oil. MK1 diesel fuel properties are defined by the predominant hydrocarbon classes present, the boiling point range and the carbon number range. Hydrocarbon types: Branched and straight chain paraffins and cycloparaffins. Typical boiling point range: approximately 180°C to 295°C. Typical carbon number range: predominantly C10 to C18.

Physical/Chemical Properties:

Flammable Liquid: liquid of variable flash point / initial boiling points.

Flash point is ~ 67°C and initial boiling point ~180°C.

Route of Exposure*	Health Effects	First Aid Statements
Inhalation	May cause: <i>headache, nausea, dizziness.</i> Acute, high dose exposure may cause: <i>central nervous system depression, confusion, altered mental status, seizures, cardiac arrhythmias.</i>	Move to well-ventilated area. <i>In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).</i> Check vital signs regularly and act accordingly.
Skin	Skin irritation	<i>Remove contaminated, saturated clothing immediately.</i> Wash area with soap and water for 10 to 15 minutes.
Eye	May cause mild reversible eye irritation	Remove contact lenses. Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes. Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.

* Incidental oral exposure: aspiration hazard; may be fatal if it enters the airways after swallowing.

IF SWALLOWED: Immediately call a POISON CENTRE or doctor/ physician. *Do NOT induce vomiting.* If vomiting does occur, have victim lean forward to reduce risk of aspiration.

STRAIGHT - RUN GAS OILS (SRGO)

Description:

This category is established by the refining process by which the category members are produced, the boiling point and the carbon number ranges.

Hydrocarbon types: straight and branched alkanes and alkenes, cycloalkanes and cycloalkenes, aromatics and mixed aromatic cycloalkanes. Boiling point range: 150 - 471 °C. Carbon number range: predominantly C9 to C25.

Physical/Chemical Properties:

Liquids of variable flash points.

Typical value for flash point is >56 °C.

For liquids, only flash point data are required to characterise flammability.

Route of Exposure*	Health Effects	First Aid Statements
Inhalation	May cause: <i>headache, nausea, dizziness</i> . Acute, high dose exposure may cause: <i>central nervous system depression</i> , confusion, altered mental status, <i>seizures, cardiac arrhythmias</i> .	Move to well-ventilated area. Check vital signs regularly and act accordingly.
Skin	May cause mild skin irritation.	<i>Remove contaminated, saturated clothing immediately</i> . Wash area with soap and water for 10 to 15 minutes.
Eye	May cause mild reversible eye irritation.	Remove contact lenses. Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes. Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.

* Incidental oral exposure: aspiration hazard; may be fatal if it enters the airways after swallowing.

IF SWALLOWED: Immediately call a POISON CENTRE or doctor/ physician. *Do NOT induce vomiting*. If vomiting does occur, have victim lean forward to reduce risk of aspiration.

CRACKED GAS OILS (CRACKEDGO)

Description:

This category is established by the refining processes by which the category members are produced and the boiling point and the carbon number range.

Hydrocarbon types: aromatics, alkylated aromatics, mixed aromatic cycloalkanes, straight and branched alkanes and alkenes, cycloalkanes and cycloalkenes. Boiling point range: 150 - 450°C. Carbon number range: predominantly C9 to C30.

Physical/Chemical Properties:

Liquids of variable flash points.

Typical value for flash point is >56°C.

For liquids, only flash point data are required to characterise flammability.

Route of Exposure*	Health Effects	First Aid Statements
Inhalation	May cause: <i>headache, nausea, dizziness.</i> Acute, high dose exposure may cause: <i>central nervous system depression, confusion, altered mental status, seizures, cardiac arrhythmias.</i>	Move to well-ventilated area. Check vital signs regularly and act accordingly.
Skin	Skin irritation.	<i>Remove contaminated, saturated clothing immediately.</i> Wash area with soap and water for 10 to 15 minutes.
Eye	May cause mild reversible eye irritation.	Remove contact lenses. Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes. Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.

* Incidental oral exposure: aspiration hazard; may be fatal if it enters the airways after swallowing.

IF SWALLOWED: Immediately call a POISON CENTRE or doctor/ physician. *Do NOT induce vomiting.* If vomiting does occur, have victim lean forward to reduce risk of aspiration.

VACUUM GAS OILS, HYDROCRACKED GAS OILS, AND DISTILLATE FUELS (VHGO)

Description:

This category is established by the refining processes by which the category members are produced and the boiling point and the carbon number range.

Hydrocarbon types: straight and branched alkanes and alkenes, cycloalkanes and cycloalkenes, aromatics and mixed aromatic cycloalkanes. Boiling point range: 141-500°C. Carbon number range: predominantly C9 to C30.

Physical/Chemical Properties:

Liquids of variable flash points.

Typical value for flash point is >56°C.

(gas oils, diesel and light heating oils having a flash point between $\geq 55^{\circ}\text{C}$ and $\leq 75^{\circ}\text{C}$).

Route of Exposure*	Health Effects	First Aid Statements
Inhalation	May cause: <i>headache, nausea, dizziness</i> . Acute, high dose exposure may cause: <i>central nervous system depression, confusion, altered mental status, seizures, cardiac arrhythmias</i> .	Move to well-ventilated area. Check vital signs regularly and act accordingly.
Skin	Skin irritation	<i>Remove contaminated, saturated clothing immediately.</i> Wash area with soap and water for 10 to 15 minutes.
Eye	May cause mild reversible eye irritation.	Remove contact lenses. Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes. Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.

* Incidental oral exposure: aspiration hazard; may be fatal if it enters the airways after swallowing.

IF SWALLOWED: Immediately call a POISON CENTRE or doctor/ physician. *Do NOT induce vomiting*. If vomiting does occur, have victim lean forward to reduce risk of aspiration.

OTHER GAS OILS (OTHERGO)

Description:

This category is established by the refining process by which the category members are produced and the boiling point and the carbon number range.

Hydrocarbon types: aromatics, alkylated aromatics, mixed aromatic cycloalkanes, straight and branched alkanes and alkenes, cycloalkanes and cycloalkenes. Boiling point range: 150°C - 400°C. Carbon number range: predominantly C9 to C36.

Physical/Chemical Properties:

Liquids of variable flash points.

Typical value for flash point is >56°C.

For liquids, only flash point data are required to characterise flammability.

Route of Exposure*	Health Effects	First Aid Statements
Inhalation	May cause: <i>headache, nausea, dizziness.</i> Acute, high dose exposure may cause: <i>central nervous system depression, confusion, altered mental status, seizures, cardiac arrhythmias.</i>	Move to well-ventilated area. Check vital signs regularly and act accordingly.
Skin	Skin irritation	<i>Remove contaminated, saturated clothing immediately.</i> Wash area with soap and water for 10 to 15 minutes.
Eye	May cause mild reversible eye irritation.	Remove contact lenses. Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes. Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.

* Incidental oral exposure: aspiration hazard; may be fatal if it enters the airways after swallowing.

IF SWALLOWED: Immediately call a POISON CENTRE or doctor/ physician. *Do NOT induce vomiting.* If vomiting does occur, have victim lean forward to reduce risk of aspiration.

HEAVY FUEL OIL COMPONENTS (HFO)

Description:

This category is defined as streams obtained as either distillates or residues from distillation and cracking processes and containing saturated, aromatic and olefinic hydrocarbons, with carbon numbers >C8 and boiling point range of 150 to >750°C. Heavy Fuel Oil Components (HFO) are produced using various refinery distillation and cracking processes.

Physical/Chemical Properties:

Heavy Fuel Oil Components are liquids of variable flash point.
Typical value for flash point is > 60°C.

Route of Exposure*	Health Effects	First Aid Statements
Inhalation	Nasal irritation. Respiratory tract irritation. Exposure to hot fumes may cause: eye irritation, nasal irritation, throat irritation, respiratory tract irritation, <i>headache, nausea, nervousness.</i>	Move to well-ventilated area. Check vital signs regularly and act accordingly.
Skin	May cause mild skin irritation. Exposure to hot fumes may cause thermal burns.	<i>Remove contaminated, saturated clothing immediately.</i> Wash area with soap and water for 10 to 15 minutes.
Eye	May cause mild eye reversible irritation. Exposure to hot fumes may cause severe irritation of eyes and mucous membranes.	Remove contact lenses. Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes. Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.

* Incidental oral exposure: aspiration hazard; may be fatal if it enters the airways after swallowing.

IF SWALLOWED: Immediately call a POISON CENTRE or doctor/ physician. *Do NOT induce vomiting.* If vomiting does occur, have victim lean forward to reduce risk of aspiration.

UNREFINED/ACID TREATED OILS (UATO)

Description:

The unrefined base oils, or vacuum distillate fractions, are complex aliphatic and aromatic hydrocarbon substances. These mostly comprise highly alkylated multi-ring structures and branched alkane constituents, along with some heteroatom (nitrogen, oxygen, sulphur) - containing species, including some gums and resins. The unrefined base oil fractions are subject to further refinery process (chemical or physical) steps to convert them into lubricating oils for commercial use. Treatment with sulphuric acid partially removes aromatics and sulphur-containing species, precipitate asphaltenes and gums, and improve colour and stability.

Hydrocarbon types: highly alkylated multi ring structures, branched alkanes, aromatic hydrocarbons. Typical boiling range: 210°C to 800°C. Typical carbon number range: C15 to C50.

Physical/Chemical Properties:

Liquids.

Typical value for flash point is >98°C.

Route of Exposure*	Health Effects	First Aid Statements
Inhalation	N/A	Check vital signs regularly and act accordingly.
Skin	May cause mild skin irritation	<i>Remove contaminated, saturated clothing immediately.</i> Wash area with soap and water for 10 to 15 minutes.
Eye	May cause mild eye irritation	Remove contact lenses. Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes. Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.

* Incidental oral exposure: aspiration hazard; may be fatal if it enters the airways after swallowing.

IF SWALLOWED: Immediately call a POISON CENTRE or doctor/ physician. *Do NOT induce vomiting.* If vomiting does occur, have victim lean forward to reduce risk of aspiration.

HIGHLY REFINED BASE OILS (HRBO)

Description:

This category is established by the refining processes by which the category members are produced and the low level of polyaromatic content present in the oils.

Hydrocarbon types: saturated, naphthenic, isoparaffinic. Boiling point range: 200 to < 600°C. Carbon number range: predominantly C12 to C50. Very low aromatic and sulphur content.

Physical/Chemical Properties:

Liquids.

Typical value for flash point is >112°C.

Route of Exposure	Health Effects	First Aid Statements
Inhalation	May cause: nasal irritation, respiratory tract irritation	Move to well-ventilated area. Check vital signs and act accordingly.
Skin	May cause mild skin irritation	<i>Remove contaminated, saturated clothing immediately.</i> Wash area with soap and water for 10 to 15 minutes.
Eye	May cause mild eye irritation	Remove contact lenses. Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes. Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.

* Incidental oral exposure: aspiration hazard; may be fatal if it enters the airways after swallowing.

IF SWALLOWED: Immediately call a POISON CENTRE or doctor/ physician. *Do NOT induce vomiting.* If vomiting does occur, have victim lean forward to reduce risk of aspiration.

LUBRICANT BASE OILS (LBO)

Description:

This category is established by the refining processes by which the category members are produced, the predominant hydrocarbon classes present, the boiling point range and the carbon number range.

Hydrocarbon types: aromatics, paraffins, naphthenics. Typical boiling ranges of 200°C to 800°C. Typical carbon number range: predominantly C12 to C120.

Physical/Chemical Properties:

Typical value for flash point is >98°C.

Route of Exposure*	Health Effects	First Aid Statements
Inhalation	May cause: nasal irritation, respiratory tract irritation.	Move to well-ventilated area. Check vital signs regularly and act accordingly.
Skin	May cause mild skin irritation	<i>Remove contaminated, saturated clothing immediately.</i> Wash area with soap and water for 10 to 15 minutes or rinse the skin with 10% dioctyl sulfosuccinate (DS) if available.
Eye	May cause mild eye irritation	Remove contact lenses. Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes. Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.

* Incidental oral exposure: aspiration hazard; may be fatal if it enters the airways after swallowing.

IF SWALLOWED: Immediately call a POISON CENTRE or doctor/ physician. *Do NOT induce vomiting.* If vomiting does occur, have victim lean forward to reduce risk of aspiration.

UNTREATED DISTILLATE AROMATIC EXTRACTS (UDAE)

Description:

Distillate aromatic extract (DAE) is the generic name for extracts of a vacuum distillate produced as by-products in the refining of lubricant base oils and waxes. The category is established by the refining processes by which the category members are produced, the predominant hydrocarbon classes present, the boiling point range and the carbon number range.

Hydrocarbon types: mostly alkylated Polycyclic aromatic compound (PAC), naphthenic and isoparaffinic. Typical Boiling range: 250°C to 640°C. Typical carbon number range: C15 to C50.

Physical/Chemical Properties:

Typical value for flash point is > 140°C.

Route of Exposure*	Health Effects	First Aid Statements
Inhalation	Exposure to spray may cause: nasal irritation, respiratory tract irritation, <i>headache, -nausea</i> .	Move to well-ventilated area. Check vital signs regularly and act accordingly.
Skin	May cause mild skin irritation	<i>Remove contaminated, saturated clothing immediately.</i> Wash area with soap and water for 10 to 15 minutes.
Eye	May cause mild eye irritation	Remove contact lenses. Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes. Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.

* Incidental oral exposure: aspiration hazard; may be fatal if it enters the airways after swallowing.

IF SWALLOWED: Immediately call a POISON CENTRE or doctor/ physician. *Do NOT induce vomiting*. If vomiting does occur, have victim lean forward to reduce risk of aspiration.

TREATED DISTILLATE AROMATIC EXTRACTS (TDAE)

Description:

Distillate aromatic extracts (DAE) is the generic name for extracts of a vacuum distillate produced as by-products in the refining of lubricant base oils and waxes. When the DAE is further processed it is termed a treated DAE (TDAE) as the specifications are changed to meet physical-chemical and technical specifications, rather than chemical composition.

The category domain of TDAE is established by the refining processes by which the category members are produced, the predominant hydrocarbon classes present, the boiling point range and the carbon number range. Hydrocarbon types: mostly alkylated PAC, naphthenic and isoparaffinic. TDAE subjected to hydrotreatment may significantly decrease levels of PAC contained in them. Typical boiling range: 250°C to 640°C. Typical carbon number range: C13 to C50.

Physical/Chemical Properties:

Typical value for flash point is >140°C.

Route of Exposure*	Health Effects	First Aid Statements
Inhalation	Exposure to spray may cause: nasal irritation, respiratory tract irritation, <i>headache</i> , <i>nausea</i> .	Move to well-ventilated area. Check vital signs regularly and act accordingly.
Skin	May cause mild skin irritation	<i>Remove contaminated, saturated clothing immediately.</i> Wash area with soap and water for 10 to 15 minutes.
Eye	May cause mild eye irritation	Remove contact lenses. Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes. Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.

* Incidental oral exposure: aspiration hazard; may be fatal if it enters the airways after swallowing.

IF SWALLOWED: Immediately call a POISON CENTRE or doctor/ physician. *Do NOT induce vomiting*. If vomiting does occur, have victim lean forward to reduce risk of aspiration.

FOOTS OILS

Description:

This category is established by the refining processes by which the category members are produced, the predominant hydrocarbon classes present and the carbon number range.

Hydrocarbon types: aromatics, paraffins, naphthenics. Typical carbon number range: predominantly C20 to C50.

Physical/Chemical Properties:

Typical value for flash point is >98°C.

Route of Exposure*	Health Effects *	First Aid Statements
Inhalation	N/A	Check vital signs regularly and act accordingly.
Skin	May cause mild skin irritation	<i>Remove contaminated, saturated clothing immediately.</i> Wash area with soap and water for 10 to 15 minutes.
Eye	May cause mild reversible eye irritation.	Remove contact lenses. Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes. Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.

* Incidental oral exposure: aspiration hazard; may be fatal if it enters the airways after swallowing.

IF SWALLOWED: Immediately call a POISON CENTRE or doctor/ physician. *Do NOT induce vomiting.* If vomiting does occur, have victim lean forward to reduce risk of aspiration.

BITUMEN

Description:

This category is established by the petroleum refining processes, or combination of, by which the category members are produced, the predominant hydrocarbon classes present, the boiling point range and the carbon number range.

Hydrocarbon types: predominantly asphaltenes (MW 2,000 to 5,000) and maltenes (MW 500 to 2,000) with small amounts of lower weight materials, including polycyclic aromatic hydrocarbons (PAHs). Typical boiling point range greater than 320°C to more than 500°C. Typical carbon number range: predominantly greater than C25 but with the bulk of the material having carbon numbers greater than C50 and up to C80.

Physical/Chemical Properties:

Typical value for flash point is > 180°C.

Route of Exposure	Health Effects	First Aid Statements
Inhalation	Exposure to hot fumes may cause: eye irritation, nasal irritation, throat irritation, respiratory tract irritation, <i>headache, nausea, nervousness</i> .	In case of exposure to hot fumes: Move to well-ventilated area. Monitor for respiratory distress, administer oxygen and assist ventilation as required. Check vital signs regularly and act accordingly
Skin	Exposure to hot product may cause thermal burns.	In case of exposure to hot product: Do not remove contaminated clothing adhered to the skin at the scene . Burns should be cooled for at least 15 minutes, first with cool water to reduce pain, then with warm water to prevent hypothermia if the burned surface is larger than the size of a hand. <u>No attempt should be made to remove the hot product at the worksite.</u> Transport to a clinic or emergency room. If product is to be removed at clinic, remove with mineral or edible oils. Alternatively, product layer should be left in place and covered with thick

		<p>gauze containing paraffin or a paraffin-based antibiotic cream, e.g. Flammazine (silver sulphadiazine) for softening effect and removal after few days.</p> <p>In case hot product completely encircles a limb, or other body part, the cooled and hardened product may cause a tourniquet effect due to oedema (swelling) in the burn. In the event of this occurring, the product must be softened as soon as possible and/or split to prevent restriction of blood flow.</p> <p><u>Source</u>¹: www.eurobitume.eu</p>
Eye	Exposure to hot fumes may cause severe irritation of eyes and mucous membranes.	<p>Remove contact lenses.</p> <p>Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes.</p> <p>Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.</p> <p>In case of eye burns, no attempt should be made to remove the bitumen by unqualified personnel. Transport urgently to an ophthalmologist or hospital with an ophthalmology unit for diagnosis and appropriate treatment.</p>

¹ <https://www.eurobitume.eu/publications/documents/?L=0&keyword=EB%20Burns%20Card&category=30>

OXIDIZED ASPHALT

Description:

Oxidized asphalt is derived from crude petroleum. It is a complex black solid, obtained by blowing air through heated petroleum residues, or the raffinate from a deasphalting process with or without a catalyst.

Hydrocarbon types: Predominantly asphaltenes (MW 2,000 to 5,000) and maltenes (MW 500 to 2,000) with small amounts of lower weight materials, including polycyclic aromatic hydrocarbons (PAHs). Typical boiling point range: Greater than 308°C. Typical carbon number range: Predominantly greater than C25 but with the bulk of the material having carbon numbers greater than C50 and up to C80.

Physical/Chemical Properties:

Typical value for flash point is > 180°C.

Route of Exposure	Health Effects	First Aid Statements
Inhalation	Exposure to hot fumes may cause: eye irritation, nasal irritation, throat irritation, respiratory tract irritation, <i>headache, nausea, nervousness</i> .	In case of exposure to hot fumes: Move to well-ventilated area. Monitor for respiratory distress, administer oxygen and assist ventilation as required. Check vital signs regularly and act accordingly.
Skin	Exposure to hot product may cause thermal burns.	In case of exposure to hot product: Do not remove contaminated clothing adhered to the skin at the scene . Burns should be cooled for at least 15 minutes, first with cool water to reduce pain, then with warm water to prevent hypothermia if the burned surface is larger than the size of a hand. <u>No attempt should be made to remove the hot product at the worksite.</u> Transport to a clinic or emergency room. If product is to be removed at clinic, remove with mineral or edible oils. Alternatively, product layer should be left in place and covered with thick gauze containing paraffin or a

		<p>paraffin-based antibiotic cream, e.g. Flammazine (silver sulphadiazine) for softening effect and removal after few days.</p> <p>In case hot product completely encircles a limb, or other body part, the cooled and hardened product may cause a tourniquet effect due to oedema (swelling) in the burn. In the event of this occurring, the product must be softened as soon as possible and/or split to prevent restriction of blood flow.</p> <p><u>Source</u>²: www.eurobitume.eu</p>
Eye	Exposure to hot fumes may cause severe irritation of eyes and mucous membranes.	<p>Remove contact lenses.</p> <p>Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes.</p> <p>Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.</p> <p>In case of eye burns, no attempt should be made to remove the bitumen by unqualified personnel. Transport urgently to an ophthalmologist or hospital with an ophthalmology unit for diagnosis and appropriate treatment.</p>

² <https://www.eurobitume.eu/publications/documents/?L=0&keyword=EB%20Burns%20Card&category=30>

RESIDUAL AROMATIC EXTRACTS (RAE)

Description:

This category is established by the refining processes by which the category members are produced, the predominant hydrocarbon classes present, the boiling point range and the carbon number range.

Hydrocarbon types: alkylated aromatics, mixed aromatic cycloalkanes, and cycloparaffins. Typical boiling point range: > 380°C. Typical carbon number range: predominantly >C25.

Physical/Chemical Properties:

Typical value for flash point is > 250°C.

Route of Exposure	Health Effects	First Aid Statements
Inhalation	Exposure to hot fumes may cause: eye irritation, nasal irritation, throat irritation, respiratory tract irritation, <i>headache</i> , <i>nausea</i> , nervousness.	In case of exposure to hot fumes: Move to well-ventilated area. Monitor for respiratory distress, administer oxygen and assist ventilation as required. Check vital signs regularly and act accordingly.
Skin	Exposure to hot product may cause thermal burns.	In case of exposure to hot product: Do not remove contaminated clothing adhered to the skin at the scene . Burns should be cooled for at least 15 minutes, first with cool water to reduce pain, then with warm water to prevent hypothermia if the burned surface is larger than the size of a hand. <u>No attempt should be made to remove the hot product at the worksite.</u> Transport to a clinic or emergency room. If product is to be removed at clinic, remove with mineral or edible oils. Alternatively, product layer should be left in place and covered with thick gauze containing paraffin or a paraffin-based antibiotic cream, e.g. Flammazine (silver

		<p>sulphadiazine) for softening effect and removal after few days.</p> <p>In case hot product completely encircles a limb, or other body part, the cooled and hardened product may cause a tourniquet effect due to oedema (swelling) in the burn. In the event of this occurring, the product must be softened as soon as possible and/or split to prevent restriction of blood flow.</p> <p>Source³: www.eurobitume.eu</p>
Eye	Exposure to hot fumes may cause severe irritation of eyes and mucous membranes.	<p>Remove contact lenses.</p> <p>Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes.</p> <p>Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.</p> <p>In case of eye burns, no attempt should be made to remove the bitumen by unqualified personnel. Transport urgently to an ophthalmologist or hospital with an ophthalmology unit for diagnosis and appropriate treatment.</p>

³ <https://www.eurobitume.eu/publications/documents/?L=0&keyword=EB%20Burns%20Card&category=30>

SULFUR

Description:

Most sulfur is produced in de-sulfurisation processes of oil refinery streams, natural gas, gas from coke manufacture, synthesis gas or biogas, where the sulfur is extracted in the form of hydrogen sulfide which is subsequently converted to elemental sulfur. These processes provide sulfur in the form of a mono-constituent substance, i.e. with a concentration of 80% weight/weight or more. Some of these processes, such as the Claus process, yield sulfur with purity in excess of 99%.

Physical/Chemical Properties:

Solid

Route of Exposure	Health Effects	First Aid Statements
Inhalation	May cause: shortness of breath, <i>cough</i> , wheezing.	Move to well-ventilated area. Monitor for respiratory distress, administer oxygen and assist ventilation as required. Check vital signs regularly and act accordingly.
Skin	Skin irritation	<i>Remove contaminated, saturated clothing immediately.</i> Wash area with soap and water for 10 to 15 minutes.
Eye	May cause mild eye irritation	Remove contact lenses. Irrigate exposed eyes with 0.9% normal saline if available or water for at least 15 minutes. Irrigate before and after removing the lenses to prevent a carry-over of the substances to the shielded area of the lens.

GLOSSARY

Acronym	Definition
H ₂ S	Hydrogen sulphide
PAC	Polycyclic aromatic compound
PAH	Polycyclic aromatic hydrocarbon
REACH	Registration, Evaluation and Authorisation of CHemicals
SDS	Safety Data Sheet

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