

1 Identification

- **Product identifier**
- **Trade name:** Virent BioForm® Synthesized Aromatic Kerosene (SAK) Jet Fuel
- **Article number:** F0302D
- **Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
- **Application of the substance / the mixture**
This material is only to be used for research and development, under the direct supervision of a technically qualified person. The toxicological properties have not been thoroughly investigated.
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**
Virent, Inc.
3571 Anderson Street
Madison, WI USA 53704
- **Information department:** Product safety department: dave_runnels@virent.com
- **Emergency telephone number:**
For Chemical Emergency, Spill, Leak, Fire, Exposure or Accident, Call CHEMTREC (Day or Night)
CHEMTREC: NORTH AMERICA: 800-424-9300
CHEMTREC: INTERNATIONAL: CALL 703-527-3887 (collect calls accepted)

2 Hazard(s) identification

- **Classification of the substance or mixture**



GHS02 Flame

Flam. Liq. 3 H226 Flammable liquid and vapor.



GHS08 Health hazard

Repr. 2 H361 Suspected of damaging fertility or the unborn child.
Asp. Tox. 1 H304 May be fatal if swallowed and enters airways.



GHS07

Acute Tox. 4 H332 Harmful if inhaled.
Skin Irrit. 2 H315 Causes skin irritation.
Eye Irrit. 2A H319 Causes serious eye irritation.
STOT SE 3 H335-H336 May cause respiratory irritation. May cause drowsiness or dizziness.
Aquatic Chronic 3 H412 Harmful to aquatic life with long lasting effects.

- **Label elements**

- **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).

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Trade name: Virent BioForm® Synthesized Aromatic Kerosene (SAK) Jet Fuel

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· **Hazard pictograms**



· **Signal word** *Danger*

· **Hazard-determining components of labeling:**

Aromatics (predominately C9-C11), mildly hydrotreated

· **Hazard statements**

- H226 *Flammable liquid and vapor.*
- H332 *Harmful if inhaled.*
- H315 *Causes skin irritation.*
- H319 *Causes serious eye irritation.*
- H361 *Suspected of damaging fertility or the unborn child.*
- H335-H336 *May cause respiratory irritation. May cause drowsiness or dizziness.*
- H304 *May be fatal if swallowed and enters airways.*
- H412 *Harmful to aquatic life with long lasting effects.*

· **Precautionary statements**

- P210 *Keep away from flames and hot surfaces. – No smoking.*
- P241 *Use explosion-proof electrical/ventilating/lighting/equipment.*
- P261 *Avoid breathing dust/fume/gas/mist/vapors/spray*
- P280 *Wear protective gloves / eye protection / face protection.*
- P280 *Wear protective gloves.*
- P280 *Wear eye protection / face protection.*
- P240 *Ground/bond container and receiving equipment.*
- P242 *Use only non-sparking tools.*
- P273 *Avoid release to the environment.*
- P243 *Take precautionary measures against static discharge.*
- P264 *Wash thoroughly after handling.*
- P271 *Use only outdoors or in a well-ventilated area.*
- P201 *Obtain special instructions before use.*
- P202 *Do not handle until all safety precautions have been read and understood.*
- P301+P310 *If swallowed: Immediately call a poison center/doctor.*
- P303+P361+P353 *IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.*
- P305+P351+P338 *If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.*
- P321 *Specific treatment (see on this label).*
- P304+P340 *IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.*
- P312 *Call a poison center/doctor if you feel unwell.*
- P308+P313 *IF exposed or concerned: Get medical advice/attention.*
- P332+P313 *If skin irritation occurs: Get medical advice/attention.*
- P337+P313 *If eye irritation persists: Get medical advice/attention.*
- P331 *Do NOT induce vomiting.*
- P370+P378 *In case of fire: Use for extinction: CO2, powder or water spray.*
- P362+P364 *Take off contaminated clothing and wash it before reuse.*
- P405 *Store locked up.*
- P403+P233 *Store in a well-ventilated place. Keep container tightly closed.*
- P403+P235 *Store in a well-ventilated place. Keep cool.*
- P501 *Dispose of contents/container in accordance with local/regional/national/international regulations.*

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Trade name: Virent BioForm® Synthesized Aromatic Kerosene (SAK) Jet Fuel

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- **Classification system:**
- **NFPA ratings (scale 0 - 4)**



- **HMIS-ratings (scale 0 - 4)**



- **Hazards Not Otherwise Classified** None
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.

3 Composition/information on ingredients

- **Chemical characterization: Mixtures**
- **Description:** Mixture of the substances listed below with nonhazardous additions.

· **Components:**

25550-14-5	Ethylmethylbenzene ⚠ Flam. Liq. 3, H226; ⚠ Asp. Tox. 1, H304; ⚠ STOT SE 3, H336	25-50%
25551-13-7	Trimethylbenzene ⚠ Flam. Liq. 3, H226; ⚠ Asp. Tox. 1, H304; ⚠ Aquatic Chronic 2, H411; ⚠ Acute Tox. 4, H332; ⚠ Skin Irrit. 2, H315; ⚠ Eye Irrit. 2A, H319; ⚠ STOT SE 3, H335-H336; ⚠ Aquatic Acute 2, H401	20-40%
1758-88-9	Benzene, 2-ethyl-1,4-dimethyl- ⚠ Flam. Liq. 3, H226; ⚠ Acute Tox. 3, H331; ⚠ Asp. Tox. 1, H304; ⚠ Skin Irrit. 2, H315; ⚠ STOT SE 3, H336	10-20%
100-41-4	ethylbenzene ⚠ Flam. Liq. 2, H225; ⚠ Carc. 2, H351; ⚠ STOT RE 2, H373; ⚠ Asp. Tox. 1, H304; ⚠ Acute Tox. 4, H332	<0.1%
108-88-3	toluene ⚠ Flam. Liq. 2, H225; ⚠ Repr. 2, H361; ⚠ STOT RE 2, H373; ⚠ Asp. Tox. 1, H304; ⚠ Skin Irrit. 2, H315; ⚠ STOT SE 3, H336	<0.3%
71-43-2	benzene ⚠ Flam. Liq. 2, H225; ⚠ Muta. 1B, H340; ⚠ Carc. 1A, H350; ⚠ STOT RE 1, H372; ⚠ Asp. Tox. 1, H304; ⚠ Skin Irrit. 2, H315; ⚠ Eye Irrit. 2A, H319	<0.01%

4 First-aid measures

- **Description of first aid measures**
- **General information:**
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
- **After inhalation:**
Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.

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- In case of unconsciousness place patient stably in side position for transportation.*
- **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
- **After eye contact:**
Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
- **After swallowing:** If symptoms persist consult doctor.
- **Information for doctor:**
- **Most important symptoms and effects, both acute and delayed** No further relevant information available.
- **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:** CO₂, sand, extinguishing powder. Do not use water.
- **For safety reasons unsuitable extinguishing agents:** Water with full jet
- **Special hazards arising from the substance or mixture** No further relevant information available.
- **Advice for firefighters**
- **Protective equipment:** Mouth respiratory protective device.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
Wear protective equipment. Keep unprotected persons away.
- **Environmental precautions:** Inform respective authorities in case of seepage into water course or sewage system.
- **Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
Do not flush with water or aqueous cleansing agents
- **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

- **Handling:**
- **Precautions for safe handling**
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
Prevent formation of aerosols.
- **Information about protection against explosions and fires:**
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.
Keep respiratory protective device available.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:** No special requirements.
- **Information about storage in one common storage facility:** Not required.
- **Further information about storage conditions:** Keep receptacle tightly sealed.

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· **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

· **Additional information about design of technical systems:** No further data; see item 7.

· **Control parameters**

· **Components with limit values that require monitoring at the workplace:**

25551-13-7 Trimethylbenzene

TLV Long-term value: 120 mg/m³, 20 ppm

100-41-4 ethylbenzene

PEL Long-term value: 435 mg/m³, 100 ppm

REL Short-term value: 545 mg/m³, 125 ppm

Long-term value: 435 mg/m³, 100 ppm

TLV Long-term value: 87 mg/m³, 20 ppm

BEI

108-88-3 toluene

PEL Long-term value: 200 ppm

Ceiling limit value: 300; 500* ppm

*10-min peak per 8-hr shift

REL Short-term value: 560 mg/m³, 150 ppm

Long-term value: 375 mg/m³, 100 ppm

TLV Long-term value: 75 mg/m³, 20 ppm

BEI

71-43-2 benzene

PEL Short-term value: 15* mg/m³, 5* ppm

Long-term value: 3* mg/m³, 1* ppm

*table Z-2 for exclusions in 29CFR1910.1028(d)

REL Short-term value: 1 ppm

Long-term value: 0.1 ppm

See Pocket Guide App. A

TLV Short-term value: 8 mg/m³, 2.5 ppm

Long-term value: 1.6 mg/m³, 0.5 ppm

Skin; BEI

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**

· **Personal protective equipment:**

· **General protective and hygienic measures:**

Keep away from foodstuffs, beverages and feed.

Immediately remove all soiled and contaminated clothing.

Wash hands before breaks and at the end of work.

Store protective clothing separately.

Avoid contact with the eyes and skin.

· **Breathing equipment:**

In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.

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· Protection of hands:



Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

· Material of gloves

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

· Penetration time of glove material

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

· Eye protection:



Tightly sealed goggles

9 Physical and chemical properties

· Information on basic physical and chemical properties

· General Information

· Appearance:

Form: Liquid
Color: Transparent with a slight yellow tint.

· Odor: Petrol-like

· Odour threshold: Not determined.

· pH-value: Not determined.

· Change in condition

Melting point/Melting range: Not determined.
Boiling point/Boiling range: > 140 °C (> 284 °F)

· Flash point: >38 °C (>100 °F)

· Flammability (solid, gaseous): Not applicable.

· Ignition temperature:

Decomposition temperature: Not determined.

· Auto igniting: Product is not selfigniting.

· Danger of explosion: Product is not explosive. However, formation of explosive air/vapor mixtures are possible.

· Explosion limits:

Lower: Not determined.
Upper: Not determined.

· Vapor pressure: Not determined.

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Trade name: Virent BioForm® Synthesized Aromatic Kerosene (SAK) Jet Fuel

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- | | |
|---|--|
| · Density at 20 °C (68 °F): | 0.84-0.89 g/cm ³ (7.01-7.427 lbs/gal) |
| · Relative density | Not determined. |
| · Vapour density | Not determined. |
| · Evaporation rate | Not determined. |
| · Solubility in / Miscibility with Water: | Not miscible or difficult to mix. |
| · Partition coefficient (n-octanol/water): | Not determined. |
| · Viscosity: | |
| Dynamic at 20 °C (68 °F): | 0.5-1.5 mPas |
| Kinematic: | Not determined. |
| · Solvent content: | |
| Organic solvents: | Not tested |
| VOC content: | 5.2 g/l / 0.04 lb/gl |
| · Other information | No further relevant information available. |

10 Stability and reactivity

- **Reactivity**
- **Chemical stability**
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**

 · **LD/LC50 values that are relevant for classification:**
25550-14-5 Ethylmethylbenzene

Oral	LD50	4850 mg/kg (rat)
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25551-13-7 Trimethylbenzene

Oral	LD50	8970 mg/kg (rat)
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- **Primary irritant effect:**
- **on the skin:** Irritant to skin and mucous membranes.
- **on the eye:** Irritating effect.
- **Sensitization:** No sensitizing effects known.

 · **Additional toxicological information:**

The product shows the following dangers according to internally approved calculation methods for preparations:
 Harmful
 Irritant
 Carcinogenic.

 · **Carcinogenic categories**

 · **IARC (International Agency for Research on Cancer)**

100-41-4	ethylbenzene	
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2B

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Trade name: Virent BioForm® Synthesized Aromatic Kerosene (SAK) Jet Fuel

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108-88-3	toluene	3
71-43-2	benzene	I
· NTP (National Toxicology Program)		
71-43-2	benzene	K
· OSHA-Ca (Occupational Safety & Health Administration)		
71-43-2	benzene	

12 Ecological information

- **Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability** No further relevant information available.
- **Behavior in environmental systems:**
- **Bioaccumulative potential** No further relevant information available.
- **Mobility in soil** No further relevant information available.
- **Ecotoxicological effects:**
- **Remark:** Toxic for fish
- **Additional ecological information:**
- **General notes:**
 Generally not hazardous for water
 Also poisonous for fish and plankton in water bodies.
 Toxic for aquatic organisms
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Other adverse effects** No further relevant information available.

13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:**
 Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

· UN-Number	
· DOT, ADR, IMDG, IATA	UN1863
· UN proper shipping name	
· DOT	Fuel, aviation, turbine engine
· ADR	1863 Fuel, aviation, turbine engine
· IMDG	FUEL, AVIATION, TURBINE ENGINE, MARINE POLLUTANT
· IATA	FUEL, AVIATION, TURBINE ENGINE

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Trade name: Virent BioForm® Synthesized Aromatic Kerosene (SAK) Jet Fuel

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· **Transport hazard class(es)**

· **DOT**



· **Class** 3 Flammable liquids
· **Label** 3

· **ADR, IATA**



· **Class** 3 Flammable liquids
· **Label** 3

· **IMDG**



· **Class** 3 Flammable liquids
· **Label** 3

· **Packing group**

· **DOT, ADR, IMDG, IATA** III

· **Environmental hazards:** Product contains environmentally hazardous substances: 1,2,4-trimethylbenzene

· **Marine pollutant:** Yes
Symbol (fish and tree)

· **Special precautions for user** Warning: Flammable liquids

· **Danger code (Kemler):** 30

· **EMS Number:** F-E,S-E

· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.

· **Transport/Additional information:**

· **ADR**

· **Excepted quantities (EQ)** Code: E1
Maximum net quantity per inner packaging: 30 ml
Maximum net quantity per outer packaging: 1000 ml

· **IMDG**

· **Limited quantities (LQ)** 5L
· **Excepted quantities (EQ)** Code: E1
Maximum net quantity per inner packaging: 30 ml
Maximum net quantity per outer packaging: 1000 ml

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Safety Data Sheet

acc. to OSHA HCS

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Trade name: Virent BioForm® Synthesized Aromatic Kerosene (SAK) Jet Fuel

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· **UN "Model Regulation":** UN1863, Fuel, aviation, turbine engine, 3, III

15 Regulatory information

- Safety, health and environmental regulations/legislation specific for the substance or mixture
- Sara

· **Section 355 (extremely hazardous substances):**

None of the ingredients is listed.

· **Section 313 (Specific toxic chemical listings):**

100-41-4 ethylbenzene

108-88-3 toluene

71-43-2 benzene

· **TSCA (Toxic Substances Control Act):**

All ingredients are listed.

· **Proposition 65**

· **Chemicals known to cause cancer:**

100-41-4 ethylbenzene

71-43-2 benzene

· **Chemicals known to cause reproductive toxicity for females:**

108-88-3 toluene

· **Chemicals known to cause reproductive toxicity for males:**

71-43-2 benzene

· **Chemicals known to cause developmental toxicity:**

108-88-3 toluene

71-43-2 benzene

· **Carcinogenicity categories**

· **EPA (Environmental Protection Agency)**

100-41-4 ethylbenzene

D

108-88-3 toluene

II

71-43-2 benzene

A, K/L

· **TLV (Threshold Limit Value established by ACGIH)**

100-41-4 ethylbenzene

A3

108-88-3 toluene

A4

71-43-2 benzene

A1

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**

71-43-2 benzene

- **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).

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Trade name: Virent BioForm® Synthesized Aromatic Kerosene (SAK) Jet Fuel

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 · **Hazard pictograms**


GHS02 GHS07 GHS08

 · **Signal word** *Danger*

 · **Hazard-determining components of labeling:**
Aromatics (predominately C9-C11), mildly hydrotreated

 · **Hazard statements**

- H226 *Flammable liquid and vapor.*
 H332 *Harmful if inhaled.*
 H315 *Causes skin irritation.*
 H319 *Causes serious eye irritation.*
 H361 *Suspected of damaging fertility or the unborn child.*
 H335-H336 *May cause respiratory irritation. May cause drowsiness or dizziness.*
 H304 *May be fatal if swallowed and enters airways.*
 H412 *Harmful to aquatic life with long lasting effects.*

 · **Precautionary statements**

- P210 *Keep away from flames and hot surfaces. – No smoking.*
 P241 *Use explosion-proof electrical/ventilating/lighting/equipment.*
 P261 *Avoid breathing dust/fume/gas/mist/vapors/spray*
 P280 *Wear protective gloves / eye protection / face protection.*
 P280 *Wear protective gloves.*
 P280 *Wear eye protection / face protection.*
 P240 *Ground/bond container and receiving equipment.*
 P242 *Use only non-sparking tools.*
 P273 *Avoid release to the environment.*
 P243 *Take precautionary measures against static discharge.*
 P264 *Wash thoroughly after handling.*
 P271 *Use only outdoors or in a well-ventilated area.*
 P201 *Obtain special instructions before use.*
 P202 *Do not handle until all safety precautions have been read and understood.*
 P301+P310 *If swallowed: Immediately call a poison center/doctor.*
 P303+P361+P353 *IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.*
 P305+P351+P338 *If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.*
 P321 *Specific treatment (see on this label).*
 P304+P340 *IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.*
 P312 *Call a poison center/doctor if you feel unwell.*
 P308+P313 *IF exposed or concerned: Get medical advice/attention.*
 P332+P313 *If skin irritation occurs: Get medical advice/attention.*
 P337+P313 *If eye irritation persists: Get medical advice/attention.*
 P331 *Do NOT induce vomiting.*
 P370+P378 *In case of fire: Use for extinction: CO2, powder or water spray.*
 P362+P364 *Take off contaminated clothing and wash it before reuse.*
 P405 *Store locked up.*
 P403+P233 *Store in a well-ventilated place. Keep container tightly closed.*
 P403+P235 *Store in a well-ventilated place. Keep cool.*

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P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

· **National regulations:**

· **Information about limitation of use:**

Workers are not allowed to be exposed to the hazardous carcinogenic materials contained in this preparation. Exceptions can be made by the authorities in certain cases.

· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Date of preparation / last revision** 06/15/2015 / -

· **Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

ACGIH: American Conference of Governmental Industrial Hygienists

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

VOC: Volatile Organic Compounds (USA, EU)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

Flam. Liq. 2: Flammable liquids, Hazard Category 2

Flam. Liq. 3: Flammable liquids, Hazard Category 3

Acute Tox. 3: Acute toxicity, Hazard Category 3

Acute Tox. 4: Acute toxicity, Hazard Category 4

Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2

Eye Irrit. 2A: Serious eye damage/eye irritation, Hazard Category 2A

Muta. 1B: Germ cell mutagenicity, Hazard Category 1B

Carc. 1A: Carcinogenicity, Hazard Category 1A

Carc. 2: Carcinogenicity, Hazard Category 2

Repr. 2: Reproductive toxicity, Hazard Category 2

STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3

STOT RE 1: Specific target organ toxicity - Repeated exposure, Hazard Category 1

STOT RE 2: Specific target organ toxicity - Repeated exposure, Hazard Category 2

Asp. Tox. 1: Aspiration hazard, Hazard Category 1

Aquatic Acute 2: Hazardous to the aquatic environment - Acute Hazard, Category 2

Aquatic Chronic 2: Hazardous to the aquatic environment - Chronic Hazard, Category 2

Aquatic Chronic 3: Hazardous to the aquatic environment - Chronic Hazard, Category 3