



# ROHS PBDE CLEANUP SPIKE (13C12, 99%) IN NONANE

## Safety Data Sheet

according to Regulation (EC) No. 453/2010 and according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 22/12/2015

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Version: 1.0

**EO-5403**

### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1. Product identifier

Product form : Mixture  
Product name. : ROHS PBDE CLEANUP SPIKE (13C12, 99%) IN NONANE  
Product code : EO-5403

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against

##### 1.2.1. Relevant identified uses

Industrial/Professional use spec : For professional use only.

##### 1.2.2. Uses advised against

No additional information available

#### 1.3. Details of the supplier of the safety data sheet

Cambridge Isotope Laboratories, Inc.  
50 Frontage Road  
Andover, MA 01810  
USA

USA: 1-800-322-1174 Int: 1-978-749-8000  
[cilsales@isotope.com](mailto:cilsales@isotope.com) [www.isotope.com](http://www.isotope.com)

#### Emergency telephone number

Emergency numbers:

Chemtrec: 1-800-424-9300 (24 hours)  
International: 1-703-741-5970 (24 hours)

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture

##### Classification according to Regulation (EC) No. 1272/2008 [CLP]

|                           |      |
|---------------------------|------|
| Flam. Liq. 3              | H226 |
| Acute Tox. 4 (Inhalation) | H332 |
| Skin Irrit. 2             | H315 |
| Eye Irrit. 2              | H319 |
| STOT SE 3                 | H336 |
| Asp. Tox. 1               | H304 |

Full text of H-phrases: see section 16

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

Xn; R20  
Xn; R65  
Xi; R38  
R10

Full text of R-phrases: see section 16

##### GHS-US classification

|                           |      |
|---------------------------|------|
| Flam. Liq. 3              | H226 |
| Acute Tox. 4 (Inhalation) | H332 |
| Skin Irrit. 2             | H315 |
| Eye Irrit. 2A             | H319 |
| STOT SE 3                 | H336 |
| Asp. Tox. 1               | H304 |

##### Adverse physicochemical, human health and environmental effects

Central Nervous System.

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### 2.2. Label elements

#### Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



Signal word (CLP) :

Danger

Hazard statements (CLP) :

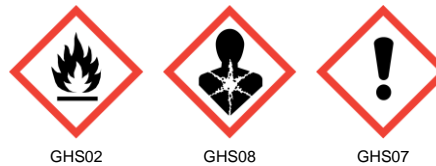
H226 - Flammable liquid and vapour  
H304 - May be fatal if swallowed and enters airways  
H315 - Causes skin irritation  
H319 - Causes serious eye irritation  
H332 - Harmful if inhaled  
H336 - May cause drowsiness or dizziness

Precautionary statements (CLP) :

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking  
P233 - Keep container tightly closed  
P240 - Ground/bond container and receiving equipment  
P241 - Use explosion-proof electrical, lighting, ventilating equipment  
P261 - Avoid breathing dust, fume, gas, mist, spray, vapours  
P264 - Wash Both hands thoroughly after handling  
P271 - Use only outdoors or in a well-ventilated area  
P280 - Wear eye protection, face protection, protective clothing, protective gloves

#### GHS-US labelling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

H226 - Flammable liquid and vapour  
H304 - May be fatal if swallowed and enters airways  
H315 - Causes skin irritation  
H319 - Causes serious eye irritation  
H332 - Harmful if inhaled  
H336 - May cause drowsiness or dizziness

Precautionary statements (GHS-US) :

P210 - Keep away from heat, hot surfaces, open flames, sparks. - No smoking  
P233 - Keep container tightly closed  
P240 - Ground/bond container and receiving equipment  
P241 - Use explosion-proof electrical, lighting, ventilating equipment  
P242 - Use only non-sparking tools  
P243 - Take precautionary measures against static discharge  
P261 - Avoid breathing dust, fume, gas, mist, spray, vapours  
P264 - Wash Both hands thoroughly after handling  
P271 - Use only outdoors or in a well-ventilated area  
P280 - Wear eye protection, face protection, protective clothing, protective gloves  
P301+P310 - IF SWALLOWED: immediately call a POISON CENTER or doctor/physician  
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  
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
P312 - Call a POISON CENTER/doctor/physician if you feel unwell  
P321 - Specific treatment (see Hazard pictograms (CLP) on this label)  
P331 - If swallowed, do NOT induce vomiting  
P332+P313 - If skin irritation occurs: Get medical advice/attention  
P337+P313 - If eye irritation persists: Get medical advice/attention  
P362 - Take off contaminated clothing and wash before reuse  
P370+P378 - In case of fire: Use Alcohol resistant foam, Carbon dioxide., Dry chemical, Water spray for extinction  
P403+P233 - Store in a well-ventilated place. Keep container tightly closed  
P403+P235 - Store in a well-ventilated place. Keep cool  
P405 - Store locked up  
P501 - Dispose of contents/container to Comply with applicable regulations.

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### 2.3. Other hazards

No additional information available

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Not applicable

### 3.2. Mixture

| Name   | Product identifier                                  | %        | Classification according to Directive 67/548/EEC  |
|--|---|----------|---|
| N-NONANE UNLABELED   | (CAS No) 111-84-2<br>(EC no) 203-913-4              | 99.99698 | R10<br>Xn; R20<br>Xn; R65<br>R67<br>Xi; R38   |
| 2,2',3,3',4,4',5,6,6'-NONABDE (BDE-207) (13C12, 99%)   | (CAS No) 437701-79-6 (Unlabeled)                    | 0.00007  | Xn; R20/21/22<br>N; R50/53  |
| DECABDE (BDE-209) (13C12, 99%)<br>substance listed as REACH Candidate ("Bis(pentabromophenyl) ether (decabromodiphenyl ether; DecaBDE)") | (CAS No) 1163-19-5 (Unlabeled)<br>(EC no) 214-604-9 | 0.00007  | T; R25<br>Xn; R20<br>Xn; R22  |
| 2,2',4,4',5,5'-HEXABDE (BDE-153) (13C12, 99%)  | (CAS No) 68631-49-2 (Unlabeled)                     | 0.000028 | Carc. Cat. 1; R45<br>Carc. Cat. 1; R49<br>Xn; R22<br>Xi; R41<br>Xi; R37<br>Xi; R38<br>N; R51/53 |
| 2,2',4,4',5,6'-HEXABDE (BDE-154) (13C12, 99%)  | (CAS No) 488710-23-2                                | 0.000028 | Carc. Cat. 1; R45<br>Carc. Cat. 1; R49<br>Xn; R20<br>Xn; R21<br>Xn; R22<br>N; R50               |
| 2,2',3,4,4',5',6-HEPTABDE (BDE-183) (13C12, 99%)   | (CAS No) 207122-16-5 (Unlabeled)                    | 0.000028 | Carc. Cat. 1; R45<br>Carc. Cat. 1; R49<br>Xn; R22<br>Xi; R41<br>Xi; R37<br>Xi; R38<br>N; R51/53 |
| 2,2',3,4,4',5,6,6'-OCTABDE (BDE-204) (13C12, 99%)  | (CAS No) 446255-54-5 (Unlabeled)                    | 0.000028 | Carc. Cat. 1; R45<br>Carc. Cat. 1; R49<br>Xn; R22<br>Xi; R41<br>Xi; R37<br>Xi; R38<br>N; R51/53 |
| 4-MONOBDE (BDE-3) (13C12, 99%)   | (CAS No) 101-55-3 (Unlabeled)                       | 0.000014 | Carc. Cat. 1; R45<br>Carc. Cat. 1; R49<br>Xn; R22<br>Xi; R41<br>Xi; R37<br>Xi; R38<br>N; R51/53 |
| 4,4'-DIBDE (BDE-15) (13C12, 99%)   | (CAS No) 2050-47-7 (Unlabeled)<br>(EC no) 218-090-7 | 0.000014 | Carc. Cat. 1; R45<br>Carc. Cat. 1; R49<br>Xn; R22<br>Xi; R41<br>Xi; R37<br>Xi; R38<br>N; R51/53 |
| 2,2',4,4',5-PENTABDE (BDE-99) (13C12, 99%)   | (CAS No) 60348-60-9 (Unlabeled)                     | 0.000014 | Carc. Cat. 1; R45<br>Carc. Cat. 1; R49<br>Xn; R22<br>Xi; R41<br>Xi; R37<br>Xi; R38<br>N; R51/53 |

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| Name   | Product identifier                                  | %        | Classification according to Directive 67/548/EEC  |
|--|---|----------|---|
| 2,4,4'-TRIBDE (BDE-28) (13C12, 99%)  | (CAS No) 41318-75-6 (Unlabeled)                     | 0.000014 | Xn; R20/21/22<br>Carc.Cat.2; R45<br>Carc.Cat.2; R49   |
| 2,2',4,4'-TETRABDE (BDE-47) (13C12, 99%)   | (CAS No) 5436-43-1 (Unlabeled)                      | 0.000014 | Xn; R20/21/22   |
| Name   | Product identifier                                  | %        | Classification according to Regulation (EC) No. 1272/2008 [CLP]   |
| N-NONANE UNLABELED   | (CAS No) 111-84-2<br>(EC no) 203-913-4              | 99.99698 | Flam. Liq. 3, H226<br>Acute Tox. 4 (Inhalation:vapour), H332<br>Skin Irrit. 2, H315<br>Eye Irrit. 2, H319<br>STOT SE 3, H336<br>Asp. Tox. 1, H304 |
| 2,2',3,3',4,4',5,6,6'-NONABDE (BDE-207) (13C12, 99%)   | (CAS No) 437701-79-6 (Unlabeled)                    | 0.00007  | Skin Irrit. 2, H315<br>Eye Dam. 1, H318<br>Skin Sens. 1, H317<br>Carc. 1A, H350<br>STOT SE 3, H336<br>Aquatic Chronic 2, H411                     |
| DECABDE (BDE-209) (13C12, 99%)<br>substance listed as REACH Candidate ("Bis(pentabromophenyl) ether (decabromodiphenyl ether; DecaBDE)") | (CAS No) 1163-19-5 (Unlabeled)<br>(EC no) 214-604-9 | 0.00007  | Acute Tox. 4 (Oral), H302<br>Acute Tox. 4 (Dermal), H312<br>Acute Tox. 4 (Inhalation), H332   |
| 2,2',4,4',5,5'-HEXABDE (BDE-153) (13C12, 99%)  | (CAS No) 68631-49-2 (Unlabeled)                     | 0.000028 | Skin Irrit. 2, H315<br>Eye Dam. 1, H318<br>Skin Sens. 1, H317<br>Carc. 1A, H350<br>STOT SE 3, H336<br>Aquatic Chronic 2, H411                     |
| 2,2',4,4',5,6'-HEXABDE (BDE-154) (13C12, 99%)  | (CAS No) 488710-23-2                                | 0.000028 | Skin Irrit. 2, H315<br>Eye Dam. 1, H318<br>Skin Sens. 1, H317<br>Carc. 1A, H350<br>STOT SE 3, H336<br>Aquatic Chronic 2, H411                     |
| 2,2',3,4,4',5',6'-HEPTABDE (BDE-183) (13C12, 99%)  | (CAS No) 207122-16-5 (Unlabeled)                    | 0.000028 | Skin Irrit. 2, H315<br>Eye Dam. 1, H318<br>Skin Sens. 1, H317<br>Carc. 1A, H350<br>STOT SE 3, H336<br>Aquatic Chronic 2, H411                     |
| 2,2',3,4,4',5,6,6'-OCTABDE (BDE-204) (13C12, 99%)  | (CAS No) 446255-54-5 (Unlabeled)                    | 0.000028 | Skin Irrit. 2, H315<br>Eye Dam. 1, H318<br>Skin Sens. 1A, H317<br>Carc. 1A, H350<br>STOT SE 3, H336<br>Aquatic Chronic 2, H411                    |
| 4-MONOBDE (BDE-3) (13C12, 99%)   | (CAS No) 101-55-3 (Unlabeled)                       | 0.000014 | Skin Irrit. 2, H315<br>Eye Dam. 1, H318<br>Skin Sens. 1, H317<br>Carc. 1A, H350<br>STOT SE 3, H336<br>Aquatic Chronic 2, H411                     |
| 4,4'-DIBDE (BDE-15) (13C12, 99%)   | (CAS No) 2050-47-7 (Unlabeled)<br>(EC no) 218-090-7 | 0.000014 | Skin Irrit. 2, H315<br>Eye Dam. 1, H318<br>Skin Sens. 1, H317<br>Carc. 1A, H350<br>STOT SE 3, H336<br>STOT SE 3, H335<br>Aquatic Chronic 2, H411  |
| 2,2',4,4',5-PENTABDE (BDE-99) (13C12, 99%)   | (CAS No) 60348-60-9 (Unlabeled)                     | 0.000014 | Skin Irrit. 2, H315<br>Eye Dam. 1, H318<br>Skin Sens. 1, H317<br>Carc. 1A, H350<br>STOT SE 3, H335<br>Aquatic Chronic 2, H411                     |
| 2,4,4'-TRIBDE (BDE-28) (13C12, 99%)  | (CAS No) 41318-75-6 (Unlabeled)                     | 0.000014 | Skin Irrit. 2, H315<br>Eye Dam. 1, H318<br>Skin Sens. 1, H317<br>Carc. 1A, H350<br>STOT SE 3, H336<br>Aquatic Chronic 2, H411                     |
| 2,2',4,4'-TETRABDE (BDE-47) (13C12, 99%)   | (CAS No) 5436-43-1 (Unlabeled)                      | 0.000014 | Skin Irrit. 2, H315<br>Eye Dam. 1, H318<br>Skin Sens. 1, H317<br>Carc. 1A, H350<br>STOT SE 3, H336<br>Aquatic Chronic 2, H411                     |

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| Name               | Product identifier | %        | GHS-US classification  |
|--------------------|--------------------|----------|--|
| N-NONANE UNLABELED | (CAS No) 111-84-2  | 99.99698 | Flam. Liq. 3, H226<br>Acute Tox. 4 (Inhalation:vapour), H332<br>Skin Irrit. 2, H315<br>Eye Irrit. 2A, H319<br>STOT SE 3, H336<br>Asp. Tox. 1, H304 |

Full text of R-, H- and EUH-phrases: see section 16

### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

|                                       |  |
|---------------------------------------|--|
| First-aid measures general            | : Move out of dangerous area. Consult a physician and show this safety data sheet.   |
| First-aid measures after inhalation   | : Remove to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER/doctor/physician if you feel unwell.  |
| First-aid measures after skin contact | : Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash with plenty of soap and water. Wash contaminated clothing before reuse. If skin irritation occurs: Wash with plenty of soap and water. Get medical advice/attention. Specific treatment (see Hazard pictograms (CLP) on this label). |
| First-aid measures after eye contact  | : Immediately flush eyes with plenty of water for at least 15 minutes. Get immediate medical attention.  |
| First-aid measures after ingestion    | : Immediately call a POISON CENTER or doctor/physician.  |

#### 4.2. Most important symptoms and effects, both acute and delayed

|                                      |   |
|--------------------------------------|---|
| Symptoms/injuries after inhalation   | : May cause drowsiness or dizziness.            |
| Symptoms/injuries after skin contact | : Causes skin irritation.                       |
| Symptoms/injuries after eye contact  | : Causes eye irritation.                        |
| Symptoms/injuries after ingestion    | : May be fatal if swallowed and enters airways. |

#### 4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

Suitable extinguishing media : Use water spray, alcohol-resistant foam, dry chemical, or carbon dioxide.

#### 5.2. Special hazards arising from the substance or mixture

|                  |  |
|------------------|--|
| Fire hazard      | : Flammable liquid and vapour.                     |
| Explosion hazard | : May form flammable/explosive vapour-air mixture. |
| Reactivity       | : Vapors may form explosive mixture with air.      |

#### 5.3. Advice for firefighters

|                                |   |
|--------------------------------|---|
| Firefighting instructions      | : Use water spray to cool unopened containers.  |
| Protection during firefighting | : Do not enter fire area without proper protective equipment, including respiratory protection. |

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

General measures : Remove ignition sources. Use special care to avoid static electric charges. No naked lights. No smoking.

##### 6.1.1. For non-emergency personnel

Emergency procedures : Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

##### 6.1.2. For emergency responders

Protective equipment : Avoid breathing dust, mist or spray.

#### 6.2. Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

#### 6.3. Methods and material for containment and cleaning up

For containment : Contain spillage, then collect with non-combustible absorbent material. Disposal should be in accordance with applicable Federal, State and local regulations.

#### 6.4. Reference to other sections

No additional information available

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### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

- Additional hazards when processed : Handle empty containers with care because residual vapours are flammable.
- Precautions for safe handling : No naked lights. No smoking. Take precautionary measures against static discharge. Use only non-sparking tools. Use only outdoors or in a well-ventilated area. Avoid breathing dust, mist or spray.
- Hygiene measures : Wash Both hands thoroughly after handling.

#### 7.2. Conditions for safe storage, including any incompatibilities

- Technical measures : Proper grounding procedures to avoid static electricity should be followed. Ground/bond container and receiving equipment. Use explosion-proof electrical equipment.
- Storage conditions : Store at room temperature away from light and moisture.
- Incompatible materials : Heat sources.

#### 7.3. Specific end use(s)

No additional information available

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

| ROHS PBDE CLEANUP SPIKE (13C12, 99%) IN NONANE         |                                     |  |
|--|-------------------------------------|--|
| Italy - Portugal - USA ACGIH                           | ACGIH TWA (ppm)                     | 200.000000000 ppm Central Nervous System impairment. |
| N-NONANE UNLABELED (111-84-2)                          |                                     |  |
| Italy - Portugal - USA ACGIH                           | ACGIH TWA (ppm)                     | 200.000000000 ppm Central Nervous System impairment. |
| DECABDE (BDE-209) (13C12, 99%) (1163-19-5 (Unlabeled)) |                                     |  |
| USA OSHA   | OSHA PEL (TWA) (mg/m <sup>3</sup> ) | 5.000000000 mg/m <sup>3</sup>                        |

#### 8.2. Exposure controls

Personal protective equipment : Protective clothing. Protective goggles. Self-contained breathing apparatus. Gloves.



- Hand protection : Wear suitable protective clothing and gloves.
- Eye protection : Wear safety glasses with side shields (or goggles) and a face shield.
- Skin and body protection : Wear suitable protective clothing.
- Respiratory protection : Where exposure through inhalation may occur from use, respiratory protection equipment is recommended. Wear respiratory protection.

### SECTION 9: Physical and chemical properties

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

*The properties listed below are for the solvent, the main component of this mixture.*

- Physical state : Liquid
- Appearance : Liquid.
- Molecular mass : 128.3 g/mol
- Colour : Colourless.
- Odour : No data available
- Odour threshold : No data available
- pH : No data available
- Relative evaporation rate (butylacetate=1) : No data available
- Melting point : No data available
- Freezing point : -53 °C (- 63 °F) - lit
- Boiling point : 151 °C (304 °F) - lit
- Flash point : 31.0 °C (87.8 °F) - closed cup
- Self ignition temperature : 205 °C (401 °F)
- Decomposition temperature : No data available
- Flammability (solid, gas) : Flammable liquid and vapour
- Vapour pressure : 12.4 hPa (9.3 mmHg) at 37.7 °C (99.9 °F)
- Relative vapour density at 20 °C : No data available

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|                      |                     |
|----------------------|---------------------|
| Relative density     | : No data available |
| Density              | : 0.718 g/ml        |
| Solubility           | : Water: 0 %        |
| Log Pow              | : 5.65              |
| Log Kow              | : No data available |
| Viscosity, kinematic | : No data available |
| Viscosity, dynamic   | : No data available |
| Explosive properties | : No data available |
| Oxidising properties | : No data available |
| Explosive limits     | : 0.87 - 2.9 % (V)  |

### 9.2. Other information

No additional information available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

Vapors may form explosive mixture with air.

### 10.2. Chemical stability

See storage and expiration date on CoA.

### 10.3. Possibility of hazardous reactions

No additional information available

### 10.4. Conditions to avoid

Open flame. Overheating. Direct sunlight. Heat. Sparks.

### 10.5. Incompatible materials

Strong oxidizing agents.

### 10.6. Hazardous decomposition products

May release flammable gases.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Acute toxicity : Harmful if inhaled.

| ROHS PBDE CLEANUP SPIKE (13C12, 99%) IN NONANE |                                    |
|--|------------------------------------|
| LC50 inhalation rat (mg/l)                     | 23760 mg/m <sup>3</sup> male - 4 h |
| LC50 inhalation rat (ppm)                      | 3200 ppm/4h                        |
| ATE (gases)                                    | 4500.000 ppmV/4h                   |
| ATE (vapours)                                  | 11.000 mg/l/4h                     |
| ATE (dust,mist)                                | 1.500 mg/l/4h                      |

| 2,2',4,4',5-PENTABDE (BDE-99) (13C12, 99%) (60348-60-9 (Unlabeled)) |                                     |
|---|-------------------------------------|
|   | LD50 Intraperitoneal-mouse-125mg/kg |

| N-NONANE UNLABELED (111-84-2) |                                    |
|-------------------------------|------------------------------------|
| LC50 inhalation rat (mg/l)    | 23760 mg/m <sup>3</sup> male - 4 h |
| LC50 inhalation rat (ppm)     | 3200 ppm/4h                        |
| ATE (gases)                   | 3200.000 ppmV/4h                   |
| ATE (vapours)                 | 11.000 mg/l/4h                     |
| ATE (dust,mist)               | 23.760 mg/l/4h                     |

| DECABDE (BDE-209) (13C12, 99%) (1163-19-5 (Unlabeled)) |                           |
|--|---------------------------|
| ATE (oral)   | 500.000 mg/kg bodyweight  |
| ATE (dermal)   | 1100.000 mg/kg bodyweight |
| ATE (gases)  | 4500.000 ppmV/4h          |
| ATE (vapours)  | 11.000 mg/l/4h            |
| ATE (dust,mist)  | 1.500 mg/l/4h             |

|                                   |   |
|-----------------------------------|---|
| Skin corrosion/irritation         | : Causes skin irritation.<br>Skin - rat - Skin irritation - Draize test |
| Serious eye damage/irritation     | : Causes serious eye irritation.<br>No data available                   |
| Respiratory or skin sensitisation | : Not available<br>No data available                                    |

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|   |   |
|---|---|
| Germ cell mutagenicity                              | : Not available   |
| Carcinogenicity                                     | : Not classified  |
| Reproductive toxicity                               | : Not available   |
| Specific target organ toxicity (single exposure)    | : May cause drowsiness or dizziness.<br>May cause drowsiness or dizziness.                    |
| Specific target organ toxicity (repeated exposure)  | : Not classified<br>No data available   |
| Aspiration hazard                                   | : May be fatal if swallowed and enters airways.   |
| Potential Adverse human health effects and symptoms | : The chemical, physical, and toxicological properties have not been thoroughly investigated. |
| Symptoms/injuries after inhalation                  | : May cause drowsiness or dizziness.  |
| Symptoms/injuries after skin contact                | : Causes skin irritation.   |
| Symptoms/injuries after eye contact                 | : Causes eye irritation.  |
| Symptoms/injuries after ingestion                   | : May be fatal if swallowed and enters airways.   |

## SECTION 12: Ecological information

### 12.1. Toxicity

#### 4-MONOBDE (BDE-3) (13C12, 99%) (101-55-3 (Unlabeled))

|               |  |
|---------------|--|
| LC50 fishes 1 | 50.90 mg/l Lepomis macrochirus (Bluegill) - 24 h |
| LC50 fish 2   | 9.6 mg/l Lepomis macrochirus (Bluegill) - 48 h   |

### 12.2. Persistence and degradability

#### 2,2',3,4,4',5,6,6'-OCTABDE (BDE-204) (13C12, 99%) (446255-54-5 (Unlabeled))

|                               |                |
|-------------------------------|----------------|
| Persistence and degradability | Not available. |
|-------------------------------|----------------|

#### 4-MONOBDE (BDE-3) (13C12, 99%) (101-55-3 (Unlabeled))

|                               |                |
|-------------------------------|----------------|
| Persistence and degradability | Not available. |
|-------------------------------|----------------|

#### 4,4'-DIBDE (BDE-15) (13C12, 99%) (2050-47-7 (Unlabeled))

|                               |                |
|-------------------------------|----------------|
| Persistence and degradability | Not available. |
|-------------------------------|----------------|

#### 2,2',3,3',4,4',5,6,6'-NONABDE (BDE-207) (13C12, 99%) (437701-79-6 (Unlabeled))

|                               |                |
|-------------------------------|----------------|
| Persistence and degradability | Not available. |
|-------------------------------|----------------|

### 12.3. Bioaccumulative potential

#### ROHS PBDE CLEANUP SPIKE (13C12, 99%) IN NONANE

|                           |                                |
|---------------------------|--------------------------------|
| Log Pow                   | 5.65                           |
| Bioaccumulative potential | Indication of bioaccumulation. |

#### 2,2',3,4,4',5,6,6'-OCTABDE (BDE-204) (13C12, 99%) (446255-54-5 (Unlabeled))

|                           |                |
|---------------------------|----------------|
| Bioaccumulative potential | Not available. |
|---------------------------|----------------|

#### 4-MONOBDE (BDE-3) (13C12, 99%) (101-55-3 (Unlabeled))

|                           |                |
|---------------------------|----------------|
| Bioaccumulative potential | Not available. |
|---------------------------|----------------|

#### 4,4'-DIBDE (BDE-15) (13C12, 99%) (2050-47-7 (Unlabeled))

|                           |                |
|---------------------------|----------------|
| Bioaccumulative potential | Not available. |
|---------------------------|----------------|

#### N-NONANE UNLABELED (111-84-2)

|                           |                                |
|---------------------------|--------------------------------|
| Log Pow                   | 5.65                           |
| Bioaccumulative potential | Indication of bioaccumulation. |

#### 2,2',3,3',4,4',5,6,6'-NONABDE (BDE-207) (13C12, 99%) (437701-79-6 (Unlabeled))

|                           |                |
|---------------------------|----------------|
| Bioaccumulative potential | Not available. |
|---------------------------|----------------|

### 12.4. Mobility in soil

#### 2,2',3,4,4',5,6,6'-OCTABDE (BDE-204) (13C12, 99%) (446255-54-5 (Unlabeled))

|                |                |
|----------------|----------------|
| Ecology - soil | Not available. |
|----------------|----------------|

#### 4-MONOBDE (BDE-3) (13C12, 99%) (101-55-3 (Unlabeled))

|                |                |
|----------------|----------------|
| Ecology - soil | Not available. |
|----------------|----------------|



# ROHS PBDE CLEANUP SPIKE (13C12, 99%) IN NONANE EO-5403

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|   |                |
|---|----------------|
| <b>4,4'-DIBDE (BDE-15) (13C12, 99%) (2050-47-7 (Unlabeled))</b> |                |
| Ecology - soil  | Not available. |

|   |                |
|---|----------------|
| <b>2,2',3,3',4,4',5,6,6'-NONABDE (BDE-207) (13C12, 99%) (437701-79-6 (Unlabeled))</b> |                |
| Ecology - soil  | Not available. |

### 12.5. Results of PBT and vPvB assessment

|  |  |
|--|--|
| <b>DECABDE (BDE-209) (13C12, 99%) (1163-19-5 (Unlabeled))</b>        |  |
| This substance/mixture meets the PBT criteria of REACH, annex XIII.  |  |
| This substance/mixture meets the vPvB criteria of REACH, annex XIII. |  |

### 12.6. Other adverse effects

Other adverse effects : An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

Regional legislation (waste) : Waste materials should be disposed of under conditions which meet Federal, State, and Local environmental control regulations.

Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations.

Additional information : Handle empty containers with care because residual vapours are flammable.

Ecology - waste materials : Hazardous waste due to toxicity.

## SECTION 14: Transport information

In accordance with ADR / RID / ADNR / IMDG / ICAO / IATA

### 14.1. UN number

UN-No.(DOT) : 1920  
DOT NA no. UN1920

### 14.2. UN proper shipping name

DOT Proper Shipping Name : Nonanes

Department of Transportation (DOT) Hazard Classes : 3 - Class 3 - Flammable and combustible liquid 49 CFR 173.120

Hazard labels (DOT) : 3 - Flammable liquid



Packing group (DOT) : III - Minor Danger

DOT Special Provisions (49 CFR 172.102) : B1 - If the material has a flash point at or above 38 C (100 F) and below 93 C (200 F), then the bulk packaging requirements of 173.241 of this subchapter are applicable. If the material has a flash point of less than 38 C (100 F), then the bulk packaging requirements of 173.242 of this subchapter are applicable.  
IB3 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1 and 31HA2, 31HB2, 31HN2, 31HD2 and 31HH2). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized, except for UN2672 (also see Special Provision IP8 in Table 2 for UN2672).  
T2 - 1.5 178.274(d)(2) Normal..... 178.275(d)(3)  
TP1 - The maximum degree of filling must not exceed the degree of filling determined by the following: Degree of filling =  $97 / (1 + a (tr - tf))$  Where: tr is the maximum mean bulk temperature during transport, and tf is the temperature in degrees celsius of the liquid during filling.

DOT Packaging Exceptions (49 CFR 173.xxx) : 150

DOT Packaging Non Bulk (49 CFR 173.xxx) : 203

DOT Packaging Bulk (49 CFR 173.xxx) : 242

### 14.3. Additional information

Other information : No supplementary information available.

### Overland transport

Packing group (ADR) : III

Class (ADR) : 3 - Flammable liquids

Hazard identification number (Kemler No.) : 30

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Classification code (ADR) : F1  
Danger labels (ADR) : 3 - Flammable liquids



Orange plates :

Tunnel restriction code : D/E  
Limited quantities (ADR) : 5L  
EAC code : 3Y  
Excepted quantities (ADR) : E1

### Transport by sea

DOT Vessel Stowage Location : A - The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel.  
MFAG-No : 128

### Air transport

DOT Quantity Limitations Passenger aircraft/rail : 60 L  
(49 CFR 173.27)  
DOT Quantity Limitations Cargo aircraft only (49 : 220 L  
CFR 175.75)  
Civil Aeronautics Law : Flammable liquids(Hazardous materials notice Appended Table 1 Article 194 of the Enforcement Regulations)

### 14.4. Environmental hazards

Other information : No supplementary information available.

### 14.5. Special precautions for user

### 14.6. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

#### ROHS PBDE CLEANUP SPIKE (13C12, 99%) IN NONANE

|                                     |  |
|-------------------------------------|--|
| SARA Section 311/312 Hazard Classes | Fire hazard<br>Immediate (acute) health hazard |
|-------------------------------------|--|

#### N-NONANE UNLABELED (111-84-2)

|                                     |  |
|-------------------------------------|--|
| SARA Section 311/312 Hazard Classes | Fire hazard<br>Immediate (acute) health hazard |
|-------------------------------------|--|

### 15.2. International regulations

#### CANADA

#### ROHS PBDE CLEANUP SPIKE (13C12, 99%) IN NONANE

Listed on the Canadian DSL (Domestic Substances List) inventory.

#### 15.2.1. National regulations

No additional information available

### 15.3. US State regulations

#### ROHS PBDE CLEANUP SPIKE (13C12, 99%) IN NONANE()

|                            |   |
|----------------------------|---|
| State or local regulations | U.S. - Massachusetts - Right To Know List<br>U.S. - Pennsylvania - RTK (Right to Know) List<br>U.S. - New Jersey - Right to Know Hazardous Substance List |
|----------------------------|---|

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### ROHS PBDE CLEANUP SPIKE (13C12, 99%) IN NONANE()

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

### N-NONANE UNLABELED (111-84-2)

U.S. - Massachusetts - Right To Know List

U.S. - Pennsylvania - RTK (Right to Know) List

U.S. - New Jersey - Right to Know Hazardous Substance List

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

## SECTION 16: Other information

Other information : This product is not radioactive. The data given for this product are those of the corresponding unlabeled compound, unless specifically indicated otherwise. Health and safety data for labeled compounds are generally not available, but are assumed to be similar or identical to the corresponding unlabeled compound.

Full text of R-, H- and EUH-phrases::

|                                  |   |
|----------------------------------|---|
| Acute Tox. 4 (Dermal)            | Acute toxicity (dermal), Category 4   |
| Acute Tox. 4 (Inhalation)        | Acute toxicity (inhal.), Category 4   |
| Acute Tox. 4 (Inhalation:vapour) | Acute toxicity (inhalation:vapour) Category 4   |
| Acute Tox. 4 (Oral)              | Acute toxicity (oral), Category 4   |
| Aquatic Chronic 2                | Hazardous to the aquatic environment — Chronic Hazard, Category 2                               |
| Asp. Tox. 1                      | Aspiration hazard, Category 1   |
| Carc. 1A                         | Carcinogenicity, Category 1A  |
| Eye Dam. 1                       | Serious eye damage/eye irritation, Category 1   |
| Eye Irrit. 2                     | Serious eye damage/eye irritation, Category 2   |
| Flam. Liq. 3                     | Flammable liquids, Category 3   |
| Skin Irrit. 2                    | Skin corrosion/irritation, Category 2   |
| Skin Sens. 1                     | Sensitisation — Skin, category 1  |
| Skin Sens. 1A                    | Sensitisation — Skin, category 1A   |
| STOT SE 3                        | Specific target organ toxicity — Single exposure, Category 3, Narcosis                          |
| STOT SE 3                        | Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation      |
| H226                             | Flammable liquid and vapour   |
| H302                             | Harmful if swallowed  |
| H304                             | May be fatal if swallowed and enters airways  |
| H312                             | Harmful in contact with skin  |
| H315                             | Causes skin irritation  |
| H317                             | May cause an allergic skin reaction   |
| H318                             | Causes serious eye damage   |
| H319                             | Causes serious eye irritation   |
| H332                             | Harmful if inhaled  |
| H335                             | May cause respiratory irritation  |
| H336                             | May cause drowsiness or dizziness   |
| H350                             | May cause cancer  |
| H411                             | Toxic to aquatic life with long lasting effects   |
| R10                              | Flammable   |
| R20                              | Harmful by inhalation   |
| R20/21/22                        | Harmful by inhalation, in contact with skin and if swallowed                                    |
| R21                              | Harmful in contact with skin  |
| R22                              | Harmful if swallowed  |
| R25                              | Toxic if swallowed  |
| R37                              | Irritating to respiratory system  |
| R38                              | Irritating to skin  |
| R41                              | Risk of serious damage to eyes  |
| R45                              | May cause cancer  |
| R49                              | May cause cancer by inhalation  |
| R50                              | Very toxic to aquatic organisms   |
| R50/53                           | Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment |
| R51/53                           | Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment      |
| R65                              | Harmful: may cause lung damage if swallowed   |
| R67                              | Vapours may cause drowsiness and dizziness  |
| N                                | Dangerous for the environment   |
| T                                | Toxic   |

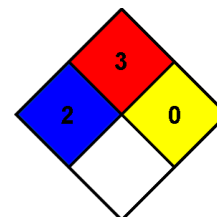
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|    |          |
|----|----------|
| Xi | Irritant |
| Xn | Harmful  |

- NFPA health hazard : 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.
- NFPA fire hazard : 3 - Liquids and solids that can be ignited under almost all ambient conditions.
- NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



### HMIS III Rating

- Health : 2 Moderate Hazard - Temporary or minor injury may occur
- Flammability : 3 Serious Hazard
- Physical : 0 Minimal Hazard

### CIL Mixture SDS

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product*