



## Section 2. Hazards identification

<b>OSHA/HCS status</b>	: 4Hz 1% H2O/D2O	While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.
	1H S/N	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
	19F S/N	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
	15N S/N	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
	31P S/N	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
	1H Lineshape	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
	13C S/N ASTM doped	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
	13C S/N ASTM	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

### Classification of the substance or mixture

#### 1H S/N

H302	ACUTE TOXICITY (oral) - Category 4
H315	SKIN CORROSION/IRRITATION - Category 2
H319	SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
H351	CARCINOGENICITY - Category 2
H335 and H336	SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation and Narcotic effects) - Category 3
H373	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2

#### 19F S/N

H225	FLAMMABLE LIQUIDS - Category 2
H302	ACUTE TOXICITY (oral) - Category 4
H315	SKIN CORROSION/IRRITATION - Category 2
H319	SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
H340	GERM CELL MUTAGENICITY - Category 1B
H350	CARCINOGENICITY - Category 1A
H335 and H336	SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation and Narcotic effects) - Category 3
H372	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1
H304	ASPIRATION HAZARD - Category 1

#### 15N S/N

H227	FLAMMABLE LIQUIDS - Category 4
H319	SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
H360	TOXIC TO REPRODUCTION (Unborn child) - Category 1B
H373	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2

#### 31P S/N

H302	ACUTE TOXICITY (oral) - Category 4
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## Section 2. Hazards identification

H315	SKIN CORROSION/IRRITATION - Category 2
H319	SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
H351	CARCINOGENICITY - Category 2
H335 and H336	SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation and Narcotic effects) - Category 3
H373	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2

### 1H Lineshape

H225	FLAMMABLE LIQUIDS - Category 2
H319	SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
H351	CARCINOGENICITY - Category 2
H336	SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3
H373	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2

### 13C S/N ASTM doped

H225	FLAMMABLE LIQUIDS - Category 2
H302	ACUTE TOXICITY (oral) - Category 4
H315	SKIN CORROSION/IRRITATION - Category 2
H319	SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
H340	GERM CELL MUTAGENICITY - Category 1B
H350	CARCINOGENICITY - Category 1A
H335 and H336	SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation and Narcotic effects) - Category 3
H372	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1

### 13C S/N ASTM

H225	FLAMMABLE LIQUIDS - Category 2
H302	ACUTE TOXICITY (oral) - Category 4
H315	SKIN CORROSION/IRRITATION - Category 2
H319	SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
H340	GERM CELL MUTAGENICITY - Category 1B
H350	CARCINOGENICITY - Category 1A
H335 and H336	SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation and Narcotic effects) - Category 3
H372	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1
H304	ASPIRATION HAZARD - Category 1

## 2.2 GHS label elements

### Hazard pictograms



### Signal word

:	4Hz 1% H2O/D2O	No signal word.
	1H S/N	Warning
	19F S/N	Danger
	15N S/N	Danger
	31P S/N	Warning
	1H Lineshape	Danger
	13C S/N ASTM doped	Danger
	13C S/N ASTM	Danger

## Section 2. Hazards identification

<b>Hazard statements</b>	: 4H 1% H <sub>2</sub> O/D <sub>2</sub> O 1H S/N	No known significant effects or critical hazards. H302 - Harmful if swallowed. H319 - Causes serious eye irritation. H315 - Causes skin irritation. H351 - Suspected of causing cancer. H335 - May cause respiratory irritation. H336 - May cause drowsiness and dizziness. H373 - May cause damage to organs through prolonged or repeated exposure.
	19F S/N	H225 - Highly flammable liquid and vapor. H302 - Harmful if swallowed. H319 - Causes serious eye irritation. H315 - Causes skin irritation. H340 - May cause genetic defects. H350 - May cause cancer. H304 - May be fatal if swallowed and enters airways. H335 - May cause respiratory irritation. H336 - May cause drowsiness and dizziness. H372 - Causes damage to organs through prolonged or repeated exposure.
	15N S/N	H227 - Combustible liquid. H319 - Causes serious eye irritation. H360 - May damage the unborn child. H373 - May cause damage to organs through prolonged or repeated exposure.
	31P S/N	H302 - Harmful if swallowed. H319 - Causes serious eye irritation. H315 - Causes skin irritation. H351 - Suspected of causing cancer. H335 - May cause respiratory irritation. H336 - May cause drowsiness and dizziness. H373 - May cause damage to organs through prolonged or repeated exposure.
	1H Lineshape	H225 - Highly flammable liquid and vapor. H319 - Causes serious eye irritation. H351 - Suspected of causing cancer. H336 - May cause drowsiness and dizziness. H373 - May cause damage to organs through prolonged or repeated exposure.
	13C S/N ASTM doped	H225 - Highly flammable liquid and vapor. H302 - Harmful if swallowed. H319 - Causes serious eye irritation. H315 - Causes skin irritation. H340 - May cause genetic defects. H350 - May cause cancer. H335 - May cause respiratory irritation. H336 - May cause drowsiness and dizziness. H372 - Causes damage to organs through prolonged or repeated exposure.
	13C S/N ASTM	H225 - Highly flammable liquid and vapor. H302 - Harmful if swallowed. H319 - Causes serious eye irritation. H315 - Causes skin irritation. H340 - May cause genetic defects. H350 - May cause cancer. H304 - May be fatal if swallowed and enters airways. H335 - May cause respiratory irritation.

## Section 2. Hazards identification

H336 - May cause drowsiness and dizziness.  
 H372 - Causes damage to organs through prolonged or repeated exposure.

### Precautionary statements

#### Prevention

: 4Hz 1% H2O/D2O  
 1H S/N

19F S/N

15N S/N

31P S/N

Not applicable.

P201 - Obtain special instructions before use.

P202 - Do not handle until all safety precautions have been read and understood.

P281 - Use personal protective equipment as required.

P280 - Wear protective gloves. Wear eye or face protection.

P271 - Use only outdoors or in a well-ventilated area.

P260 - Do not breathe vapor.

P270 - Do not eat, drink or smoke when using this product.

P264 - Wash hands thoroughly after handling.

P201 - Obtain special instructions before use.

P202 - Do not handle until all safety precautions have been read and understood.

P281 - Use personal protective equipment as required.

P280 - Wear protective gloves. Wear eye or face protection.

P210 - Keep away from heat, sparks, open flames and hot surfaces. - No smoking.

P241 - Use explosion-proof electrical, ventilating, lighting and all material-handling equipment.

P242 - Use only non-sparking tools.

P243 - Take precautionary measures against static discharge.

P233 - Keep container tightly closed.

P271 - Use only outdoors or in a well-ventilated area.

P260 - Do not breathe vapor.

P270 - Do not eat, drink or smoke when using this product.

P264 - Wash hands thoroughly after handling.

P201 - Obtain special instructions before use.

P202 - Do not handle until all safety precautions have been read and understood.

P281 - Use personal protective equipment as required.

P280 - Wear protective gloves. Wear eye or face protection.

P210 - Keep away from flames and hot surfaces. - No smoking.

P260 - Do not breathe vapor.

P264 - Wash hands thoroughly after handling.

P201 - Obtain special instructions before use.

P202 - Do not handle until all safety precautions have been read and understood.

P281 - Use personal protective equipment as required.

P280 - Wear protective gloves. Wear eye or face protection.

P271 - Use only outdoors or in a well-ventilated area.

## Section 2. Hazards identification

1H Lineshape

P260 - Do not breathe vapor.  
 P270 - Do not eat, drink or smoke when using this product.  
 P264 - Wash hands thoroughly after handling.  
 P201 - Obtain special instructions before use.  
 P202 - Do not handle until all safety precautions have been read and understood.  
 P281 - Use personal protective equipment as required.  
 P280 - Wear protective gloves. Wear eye or face protection.  
 P210 - Keep away from heat, sparks, open flames and hot surfaces. - No smoking.  
 P241 - Use explosion-proof electrical, ventilating, lighting and all material-handling equipment.  
 P242 - Use only non-sparking tools.  
 P243 - Take precautionary measures against static discharge.  
 P233 - Keep container tightly closed.  
 P271 - Use only outdoors or in a well-ventilated area.

13C S/N ASTM doped

P260 - Do not breathe vapor.  
 P264 - Wash hands thoroughly after handling.  
 P201 - Obtain special instructions before use.  
 P202 - Do not handle until all safety precautions have been read and understood.  
 P281 - Use personal protective equipment as required.  
 P280 - Wear protective gloves. Wear eye or face protection.  
 P210 - Keep away from heat, sparks, open flames and hot surfaces. - No smoking.  
 P241 - Use explosion-proof electrical, ventilating, lighting and all material-handling equipment.  
 P242 - Use only non-sparking tools.  
 P243 - Take precautionary measures against static discharge.  
 P233 - Keep container tightly closed.  
 P271 - Use only outdoors or in a well-ventilated area.

13C S/N ASTM

P260 - Do not breathe vapor.  
 P270 - Do not eat, drink or smoke when using this product.  
 P264 - Wash hands thoroughly after handling.  
 P201 - Obtain special instructions before use.  
 P202 - Do not handle until all safety precautions have been read and understood.  
 P281 - Use personal protective equipment as required.  
 P280 - Wear protective gloves. Wear eye or face protection.  
 P210 - Keep away from heat, sparks, open flames and hot surfaces. - No smoking.  
 P241 - Use explosion-proof electrical, ventilating, lighting and all material-handling equipment.  
 P242 - Use only non-sparking tools.  
 P243 - Take precautionary measures against static discharge.  
 P233 - Keep container tightly closed.

## Section 2. Hazards identification

### Response

: 4Hz 1% H2O/D2O  
1H S/N

19F S/N

15N S/N

P271 - Use only outdoors or in a well-ventilated area.

P260 - Do not breathe vapor.

P270 - Do not eat, drink or smoke when using this product.

P264 - Wash hands thoroughly after handling.

Not applicable.

P314 - Get medical attention if you feel unwell.

P308 + P313 - IF exposed or concerned: Get medical attention.

P304 + P340 + P312 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell.

P301 + P312 + P330 - IF SWALLOWED: Call a POISON CENTER or physician if you feel unwell. Rinse mouth.

P302 + P352 + P362-2 + P363 - IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. Wash contaminated clothing before reuse.

P332 + P313 - If skin irritation occurs: Get medical attention.

P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P337 + P313 - If eye irritation persists: Get medical attention.

P314 - Get medical attention if you feel unwell.

P308 + P313 - IF exposed or concerned: Get medical attention.

P304 + P340 + P312 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell.

P301 + P310 + P330 + P331 - IF SWALLOWED: Immediately call a POISON CENTER or physician. Rinse mouth. Do NOT induce vomiting.

P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.

P302 + P352 + P362-2 - IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing.

P332 + P313 - If skin irritation occurs: Get medical attention.

P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes.

Remove contact lenses, if present and easy to do. Continue rinsing.

P337 + P313 - If eye irritation persists: Get medical attention.

P314 - Get medical attention if you feel unwell.

P308 + P313 - IF exposed or concerned: Get medical attention.

P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes.

Remove contact lenses, if present and easy to do.

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31P S/N

Continue rinsing.  
 P337 + P313 - If eye irritation persists: Get medical attention.  
 P314 - Get medical attention if you feel unwell.  
 P308 + P313 - IF exposed or concerned: Get medical attention.  
 P304 + P340 + P312 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell.  
 P301 + P312 + P330 - IF SWALLOWED: Call a POISON CENTER or physician if you feel unwell.  
 Rinse mouth.  
 P302 + P352 + P362-2 + P363 - IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. Wash contaminated clothing before reuse.  
 P332 + P313 - If skin irritation occurs: Get medical attention.  
 P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

1H Lineshape

P337 + P313 - If eye irritation persists: Get medical attention.  
 P314 - Get medical attention if you feel unwell.  
 P308 + P313 - IF exposed or concerned: Get medical attention.  
 P304 + P340 + P312 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell.  
 P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or 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.

13C S/N ASTM doped

P337 + P313 - If eye irritation persists: Get medical attention.  
 P314 - Get medical attention if you feel unwell.  
 P308 + P313 - IF exposed or concerned: Get medical attention.  
 P304 + P340 + P312 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell.  
 P301 + P312 + P330 - IF SWALLOWED: Call a POISON CENTER or physician if you feel unwell.  
 Rinse mouth.  
 P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.  
 P302 + P352 + P362-2 - IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing.  
 P332 + P313 - If skin irritation occurs: Get medical attention.

## Section 2. Hazards identification

	13C S/N ASTM	<p>P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.</p> <p>P337 + P313 - If eye irritation persists: Get medical attention.</p> <p>P314 - Get medical attention if you feel unwell.</p> <p>P308 + P313 - IF exposed or concerned: Get medical attention.</p> <p>P304 + P340 + P312 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell.</p> <p>P301 + P310 + P330 + P331 - IF SWALLOWED: Immediately call a POISON CENTER or physician. Rinse mouth. Do NOT induce vomiting.</p> <p>P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.</p> <p>P302 + P352 + P362-2 - IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing.</p> <p>P332 + P313 - If skin irritation occurs: Get medical attention.</p> <p>P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.</p> <p>P337 + P313 - If eye irritation persists: Get medical attention.</p>
<b>Storage</b>	<p>: 4Hz 1% H2O/D2O 1H S/N 19F S/N</p> <p>15N S/N</p> <p>31P S/N 1H Lineshape</p> <p>13C S/N ASTM doped</p> <p>13C S/N ASTM</p>	<p>Not applicable.</p> <p>P405 - Store locked up.</p> <p>P405 - Store locked up.</p> <p>P403 - Store in a well-ventilated place.</p> <p>P235 - Keep cool.</p> <p>P405 - Store locked up.</p> <p>P403 - Store in a well-ventilated place.</p> <p>P235 - Keep cool.</p> <p>P405 - Store locked up.</p> <p>P405 - Store locked up.</p> <p>P403 - Store in a well-ventilated place.</p> <p>P235 - Keep cool.</p> <p>P405 - Store locked up.</p> <p>P403 - Store in a well-ventilated place.</p> <p>P235 - Keep cool.</p> <p>P405 - Store locked up.</p> <p>P403 - Store in a well-ventilated place.</p> <p>P235 - Keep cool.</p>
<b>Disposal</b>	<p>: 4Hz 1% H2O/D2O 1H S/N</p> <p>19F S/N</p> <p>15N S/N</p> <p>31P S/N</p>	<p>Not applicable.</p> <p>P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.</p> <p>P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.</p> <p>P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.</p> <p>P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.</p>

## Section 2. Hazards identification

accordance with all local, regional, national and international regulations.

1H Lineshape

P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

13C S/N ASTM doped

P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

13C S/N ASTM

P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

### Supplemental label elements

: 4Hz 1% H2O/D2O

None known.

1H S/N

None known.

19F S/N

Avoid contact with skin and clothing. Wash thoroughly after handling.

15N S/N

None known.

31P S/N

None known.

1H Lineshape

Avoid contact with skin and clothing. Wash thoroughly after handling.

13C S/N ASTM doped

Avoid contact with skin and clothing. Wash thoroughly after handling.

13C S/N ASTM

Avoid contact with skin and clothing. Wash thoroughly after handling.

### 2.3 Other hazards

#### Hazards not otherwise classified

: 4Hz 1% H2O/D2O

None known.

1H S/N

None known.

19F S/N

Defatting to the skin. Prolonged or repeated contact may dry skin and cause irritation.

15N S/N

None known.

31P S/N

None known.

1H Lineshape

Defatting to the skin. Prolonged or repeated contact may dry skin and cause irritation.

13C S/N ASTM doped

Defatting to the skin. Prolonged or repeated contact may dry skin and cause irritation.

13C S/N ASTM

Defatting to the skin. Prolonged or repeated contact may dry skin and cause irritation.

## Section 3. Composition/information on ingredients

This article, when used under reasonable conditions and in accordance with the directions for use, should not present a health hazard. The substance or mixture is encapsulated in the article. Only if released due to use or processing of the article in a manner not in accordance with the product's directions for use it may present potential health and safety hazards.

### Substance/mixture

: 4Hz 1% H2O/D2O

Mixture

1H S/N

Mixture

19F S/N

Mixture

15N S/N

Mixture

31P S/N

Mixture

1H Lineshape

Mixture

13C S/N ASTM doped

Mixture

13C S/N ASTM

Mixture

## Section 3. Composition/information on ingredients

Ingredient name	%	CAS number
<b>1H S/N</b> ( <sup>2</sup> H)Chloroform Ethylbenzene	60 - 100 < 0.1	865-49-6 100-41-4
<b>19F S/N</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	60 - 100	1076-43-3
<b>15N S/N</b> Formamide di[( <sup>2</sup> H <sub>3</sub> )Methyl] sulphoxide	60 - 100 5 - 10	75-12-7 2206-27-1
<b>31P S/N</b> ( <sup>2</sup> H)Chloroform Triphenyl phosphate	60 - 100 1 - 5	865-49-6 115-86-6
<b>1H Lineshape</b> ( <sup>2</sup> H <sub>6</sub> )Acetone Trichloromethane	60 - 100 0.1 - 1	666-52-4 67-66-3
<b>13C S/N ASTM doped</b> ( <sup>2</sup> H <sub>6</sub> )Benzene 1,4-Dioxane	30 - 60 30 - 60	1076-43-3 123-91-1
<b>13C S/N ASTM</b> ( <sup>2</sup> H <sub>6</sub> )Benzene 1,4-Dioxane	30 - 60 30 - 60	1076-43-3 123-91-1

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

**There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.**

Occupational exposure limits, if available, are listed in Section 8.

## Section 4. First aid measures

### 4.1 Description of necessary first aid measures

**Eye contact** : 4Hz 1% H<sub>2</sub>O/D<sub>2</sub>O

Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

1H S/N

Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

19F S/N

Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

15N S/N

Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

31P S/N

Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids.

## Section 4. First aid measures

Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

1H Lineshape

Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

13C S/N ASTM doped

Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

13C S/N ASTM

Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

### Inhalation

: 4Hz 1% H<sub>2</sub>O/D<sub>2</sub>O

Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.

1H S/N

Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

19F S/N

Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

15N S/N

Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be

## Section 4. First aid measures

31P S/N	<p>dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.</p>
	<p>Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.</p>
1H Lineshape	<p>Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.</p>
13C S/N ASTM doped	<p>Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open</p>

## Section 4. First aid measures

airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

### Skin contact

13C S/N ASTM

: 4Hz 1% H<sub>2</sub>O/D<sub>2</sub>O

1H S/N

19F S/N

15N S/N

31P S/N

1H Lineshape

13C S/N ASTM doped

13C S/N ASTM

Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Wash skin thoroughly with soap and water or use recognized skin cleanser. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Wash skin thoroughly with soap and water or use recognized skin cleanser. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Wash skin thoroughly with soap and water or use recognized skin cleanser. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Wash skin thoroughly with soap and water or use recognized skin cleanser. Remove contaminated clothing and shoes. Wash contaminated clothing

## Section 4. First aid measures

### Ingestion

: 4Hz 1% H2O/D2O

1H S/N

19F S/N

15N S/N

31P S/N

thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Aspiration hazard if swallowed. Can enter lungs and cause damage. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Wash out mouth with water. Remove dentures if

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1H Lineshape

any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

13C S/N ASTM doped

Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

13C S/N ASTM

Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Aspiration hazard if swallowed. Can enter lungs and cause damage. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by

## Section 4. First aid measures

mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

### 4.2 Most important symptoms/effects, acute and delayed

#### Potential acute health effects

<b>Eye contact</b>	: 4Hz 1% H2O/D2O 1H S/N 19F S/N 15N S/N 31P S/N 1H Lineshape 13C S/N ASTM doped 13C S/N ASTM	No known significant effects or critical hazards. Causes serious eye irritation. Causes serious eye irritation.
<b>Inhalation</b>	: 4Hz 1% H2O/D2O 1H S/N  19F S/N  15N S/N  31P S/N  1H Lineshape  13C S/N ASTM doped  13C S/N ASTM	No known significant effects or critical hazards. Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness. May cause respiratory irritation. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure. Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness. May cause respiratory irritation. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure. Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness. May cause respiratory irritation. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure. Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure. Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness. May cause respiratory irritation.
<b>Skin contact</b>	: 4Hz 1% H2O/D2O 1H S/N 19F S/N 15N S/N 31P S/N 1H Lineshape  13C S/N ASTM doped 13C S/N ASTM	No known significant effects or critical hazards. Causes skin irritation. Causes skin irritation. Defatting to the skin. No known significant effects or critical hazards. Causes skin irritation. Defatting to the skin. May cause skin dryness and irritation.  Causes skin irritation. Defatting to the skin. Causes skin irritation. Defatting to the skin.

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<b>Ingestion</b>	: 4Hz 1% H2O/D2O 1H S/N	No known significant effects or critical hazards. Harmful if swallowed. Can cause central nervous system (CNS) depression. Irritating to mouth, throat and stomach.
	19F S/N	Harmful if swallowed. Can cause central nervous system (CNS) depression. May be fatal if swallowed and enters airways. Irritating to mouth, throat and stomach.
	15N S/N 31P S/N	Irritating to mouth, throat and stomach. Harmful if swallowed. Can cause central nervous system (CNS) depression. Irritating to mouth, throat and stomach.
	1H Lineshape	Can cause central nervous system (CNS) depression. Irritating to mouth, throat and stomach.
	13C S/N ASTM doped	Harmful if swallowed. Can cause central nervous system (CNS) depression. Irritating to mouth, throat and stomach.
	13C S/N ASTM	Harmful if swallowed. Can cause central nervous system (CNS) depression. May be fatal if swallowed and enters airways. Irritating to mouth, throat and stomach.
 <b><u>Over-exposure signs/symptoms</u></b>		
<b>Eye contact</b>	: 4Hz 1% H2O/D2O 1H S/N	No specific data. Adverse symptoms may include the following: pain or irritation watering redness
	19F S/N	Adverse symptoms may include the following: pain or irritation watering redness
	15N S/N	Adverse symptoms may include the following: pain or irritation watering redness
	31P S/N	Adverse symptoms may include the following: pain or irritation watering redness
	1H Lineshape	Adverse symptoms may include the following: pain or irritation watering redness
	13C S/N ASTM doped	Adverse symptoms may include the following: pain or irritation watering redness
	13C S/N ASTM	Adverse symptoms may include the following: pain or irritation watering redness
<b>Inhalation</b>	: 4Hz 1% H2O/D2O 1H S/N	No specific data. Adverse symptoms may include the following: respiratory tract irritation coughing nausea or vomiting headache drowsiness/fatigue

## Section 4. First aid measures

		dizziness/vertigo unconsciousness
	19F S/N	Adverse symptoms may include the following: respiratory tract irritation coughing nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
	15N S/N	Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations
	31P S/N	Adverse symptoms may include the following: respiratory tract irritation coughing nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
	1H Lineshape	Adverse symptoms may include the following: nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
	13C S/N ASTM doped	Adverse symptoms may include the following: respiratory tract irritation coughing nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
	13C S/N ASTM	Adverse symptoms may include the following: respiratory tract irritation coughing nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
<b>Skin contact</b>	: 4Hz 1% H <sub>2</sub> O/D <sub>2</sub> O 1H S/N	No specific data. Adverse symptoms may include the following: irritation redness
	19F S/N	Adverse symptoms may include the following: irritation redness dryness cracking
	15N S/N	Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations
	31P S/N	Adverse symptoms may include the following: irritation

## Section 4. First aid measures

	1H Lineshape	redness Adverse symptoms may include the following: irritation dryness cracking
	13C S/N ASTM doped	Adverse symptoms may include the following: irritation redness dryness cracking
	13C S/N ASTM	Adverse symptoms may include the following: irritation redness dryness cracking
<b>Ingestion</b>	: 4Hz 1% H <sub>2</sub> O/D <sub>2</sub> O	No specific data.
	1H S/N	No specific data.
	19F S/N	Adverse symptoms may include the following: nausea or vomiting
	15N S/N	Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations
	31P S/N	No specific data.
	1H Lineshape	No specific data.
	13C S/N ASTM doped	No specific data.
	13C S/N ASTM	Adverse symptoms may include the following: nausea or vomiting

### 4.3 Indication of immediate medical attention and special treatment needed, if necessary

<b>Notes to physician</b>	: 4Hz 1% H <sub>2</sub> O/D <sub>2</sub> O	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
	1H S/N	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
	19F S/N	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
	15N S/N	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
	31P S/N	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
	1H Lineshape	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
	13C S/N ASTM doped	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
	13C S/N ASTM	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

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<b>Specific treatments</b>	: 4Hz 1% H2O/D2O 1H S/N 19F S/N 15N S/N 31P S/N 1H Lineshape 13C S/N ASTM doped 13C S/N ASTM	No specific treatment. No specific treatment.
<b>Protection of first-aiders</b>	: 4Hz 1% H2O/D2O  1H S/N  19F S/N  15N S/N  31P S/N  1H Lineshape  13C S/N ASTM doped  13C S/N ASTM	No action shall be taken involving any personal risk or without suitable training. No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

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before removing it, or wear gloves.

See toxicological information (Section 11)

## Section 5. Fire-fighting measures

### 5.1 Extinguishing media

<b>Suitable extinguishing media</b>	: 4Hz 1% H2O/D2O	Use an extinguishing agent suitable for the surrounding fire.	
	1H S/N	Use an extinguishing agent suitable for the surrounding fire.	
	19F S/N	Use dry chemical, CO <sub>2</sub> , water spray (fog) or foam.	
	15N S/N	Use dry chemical, CO <sub>2</sub> , water spray (fog) or foam.	
	31P S/N	Use an extinguishing agent suitable for the surrounding fire.	
	1H Lineshape	Use dry chemical, CO <sub>2</sub> , water spray (fog) or foam.	
	13C S/N ASTM doped	Use dry chemical, CO <sub>2</sub> , water spray (fog) or foam.	
	13C S/N ASTM	Use dry chemical, CO <sub>2</sub> , water spray (fog) or foam.	
	<b>Unsuitable extinguishing media</b>	: 4Hz 1% H2O/D2O	None known.
		1H S/N	None known.
19F S/N		Do not use water jet.	
15N S/N		Do not use water jet.	
31P S/N		None known.	
1H Lineshape		Do not use water jet.	
13C S/N ASTM doped		Do not use water jet.	
13C S/N ASTM		Do not use water jet.	

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

<b>Specific hazards arising from the chemical</b>	: 4Hz 1% H2O/D2O	In a fire or if heated, a pressure increase will occur and the container may burst.
	1H S/N	In a fire or if heated, a pressure increase will occur and the container may burst.
	19F S/N	Highly flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.
	15N S/N	Combustible liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.
	31P S/N	In a fire or if heated, a pressure increase will occur and the container may burst.
	1H Lineshape	Highly flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.
	13C S/N ASTM doped	Highly flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.
	13C S/N ASTM	Highly flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and

## Section 5. Fire-fighting measures

will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

### Hazardous thermal decomposition products

- : Decomposition products may include the following materials:
- carbon dioxide
  - carbon monoxide
  - nitrogen oxides
  - sulfur oxides
  - halogenated compounds
  - carbonyl halides

### 5.3 Advice for firefighters

#### Special protective actions for fire-fighters

- : 4Hz 1% H<sub>2</sub>O/D<sub>2</sub>O

1H S/N

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

19F S/N

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

15N S/N

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

31P S/N

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

1H Lineshape

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

13C S/N ASTM doped

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

13C S/N ASTM

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

## Section 5. Fire-fighting measures

<b>Special protective equipment for fire-fighters</b>	: 4Hz 1% H2O/D2O	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
	1H S/N	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
	19F S/N	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
	15N S/N	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
	31P S/N	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
	1H Lineshape	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
	13C S/N ASTM doped	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
	13C S/N ASTM	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

## Section 6. Accidental release measures

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

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

### 6.2 Environmental precautions

- : 4Hz 1% H2O/D2O
- 1H S/N
- 19F S/N
- Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

## Section 6. Accidental release measures

15N S/N	Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
31P S/N	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
1H Lineshape	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
13C S/N ASTM doped	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
13C S/N ASTM	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

### 6.3 Methods and materials for containment and cleaning up

4Hz 1% H <sub>2</sub> O/D <sub>2</sub> O	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
1H S/N	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
19F S/N	Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
15N S/N	Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
31P S/N	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
1H Lineshape	Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
13C S/N ASTM doped	Stop leak if without risk. Move containers from spill area. Use spark-

## Section 6. Accidental release measures

13C S/N ASTM

proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

## Section 7. Handling and storage

### 7.1 Precautions for safe handling

**Protective measures** : 4Hz 1% H<sub>2</sub>O/D<sub>2</sub>O

1H S/N

Put on appropriate personal protective equipment (see Section 8).

Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use.

Empty containers retain product residue and can be hazardous. Do not reuse container.

19F S/N

Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not swallow. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

15N S/N

Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless

## Section 7. Handling and storage

31P S/N	adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Empty containers retain product residue and can be hazardous. Do not reuse container.
	Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
1H Lineshape	Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.
13C S/N ASTM doped	Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical

## Section 7. Handling and storage

(ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

13C S/N ASTM

Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not swallow. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

### Advice on general occupational hygiene

- : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

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

- : 4Hz 1% H<sub>2</sub>O/D<sub>2</sub>O

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

1H S/N

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

19F S/N

Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in

## Section 7. Handling and storage

	a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.
15N S/N	Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.
31P S/N	Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.
1H Lineshape	Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.
13C S/N ASTM doped	Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid

## Section 7. Handling and storage

13C S/N ASTM

environmental contamination.  
Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

### 7.3 Specific end use(s)

<b>Recommendations</b>	: 4Hz 1% H2O/D2O	Industrial applications, Professional applications.
	1H S/N	Industrial applications, Professional applications.
	19F S/N	Industrial applications, Professional applications.
	15N S/N	Industrial applications, Professional applications.
	31P S/N	Industrial applications, Professional applications.
	1H Lineshape	Industrial applications, Professional applications.
	13C S/N ASTM doped	Industrial applications, Professional applications.
	13C S/N ASTM	Industrial applications, Professional applications.
<b>Industrial sector specific solutions</b>	: Not applicable.	

## Section 8. Exposure controls/personal protection

Since the hazardous ingredient in this article is encapsulated, the risk of exposure by inhalation, ingestion, skin contact and eyes contact is minimum.

### 8.1 Control parameters

#### Occupational exposure limits

Ingredient name	Exposure limits
1H S/N ( <sup>2</sup> H)Chloroform	<p><b>ACGIH TLV (United States, 3/2012).</b> TWA: 10 ppm 8 hours. TWA: 49 mg/m<sup>3</sup> 8 hours.</p> <p><b>OSHA PEL 1989 (United States, 3/1989).</b> TWA: 2 ppm 8 hours. TWA: 9.78 mg/m<sup>3</sup> 8 hours.</p> <p><b>NIOSH REL (United States, 6/2009).</b> STEL: 2 ppm 60 minutes. STEL: 9.78 mg/m<sup>3</sup> 60 minutes.</p> <p><b>OSHA PEL (United States, 6/2010).</b> CEIL: 50 ppm CEIL: 240 mg/m<sup>3</sup></p>
Ethylbenzene	<p><b>ACGIH TLV (United States, 6/2013).</b> TWA: 20 ppm 8 hours.</p> <p><b>NIOSH REL (United States, 4/2013).</b> STEL: 545 mg/m<sup>3</sup> 15 minutes. STEL: 125 ppm 15 minutes. TWA: 435 mg/m<sup>3</sup> 10 hours. TWA: 100 ppm 10 hours.</p> <p><b>OSHA PEL (United States, 2/2013).</b> TWA: 435 mg/m<sup>3</sup> 8 hours.</p>

## Section 8. Exposure controls/personal protection

**19F S/N**  
(<sup>2</sup>H<sub>6</sub>)Benzene

TWA: 100 ppm 8 hours.  
**OSHA PEL 1989 (United States, 3/1989).**  
 STEL: 545 mg/m<sup>3</sup> 15 minutes.  
 STEL: 125 ppm 15 minutes.  
 TWA: 435 mg/m<sup>3</sup> 8 hours.  
 TWA: 100 ppm 8 hours.

**ACGIH TLV (United States, 3/2012).**  
**Absorbed through skin.**  
 TWA: 0.5 ppm 8 hours.  
 TWA: 1.6 mg/m<sup>3</sup> 8 hours.  
 STEL: 2.5 ppm 15 minutes.  
 STEL: 8 mg/m<sup>3</sup> 15 minutes.  
**OSHA PEL 1989 (United States, 3/1989).**  
 TWA: 1 ppm 8 hours.  
 STEL: 5 ppm 15 minutes.  
**OSHA PEL Z2 (United States, 11/2006).**  
 TWA: 10 ppm 8 hours.  
 CEIL: 25 ppm  
 AMP: 50 ppm 10 minutes.  
**NIOSH REL (United States, 6/2009).**  
 TWA: 0.1 ppm 10 hours.  
 STEL: 1 ppm 15 minutes.  
**OSHA PEL (United States, 6/2010).**  
 TWA: 1 ppm 8 hours.  
 STEL: 5 ppm 15 minutes.

**15N S/N**  
Formamide

**ACGIH TLV (United States, 6/2013).**  
**Absorbed through skin.**  
 TWA: 10 ppm 8 hours.  
 TWA: 18 mg/m<sup>3</sup> 8 hours.  
**OSHA PEL 1989 (United States, 3/1989).**  
 TWA: 20 ppm 8 hours.  
 TWA: 30 mg/m<sup>3</sup> 8 hours.  
 STEL: 30 ppm 15 minutes.  
 STEL: 45 mg/m<sup>3</sup> 15 minutes.  
**NIOSH REL (United States, 4/2013).**  
**Absorbed through skin.**  
 TWA: 10 ppm 10 hours.  
 TWA: 15 mg/m<sup>3</sup> 10 hours.  
**AIHA WEEL (United States, 10/2011).**  
 TWA: 250 ppm 8 hours.

di[(<sup>2</sup>H<sub>3</sub>)Methyl] sulphoxide

**31P S/N**  
(<sup>2</sup>H)Chloroform

**ACGIH TLV (United States, 3/2012).**  
 TWA: 10 ppm 8 hours.  
 TWA: 49 mg/m<sup>3</sup> 8 hours.  
**OSHA PEL 1989 (United States, 3/1989).**  
 TWA: 2 ppm 8 hours.  
 TWA: 9.78 mg/m<sup>3</sup> 8 hours.  
**NIOSH REL (United States, 6/2009).**  
 STEL: 2 ppm 60 minutes.  
 STEL: 9.78 mg/m<sup>3</sup> 60 minutes.  
**OSHA PEL (United States, 6/2010).**  
 CEIL: 50 ppm

## Section 8. Exposure controls/personal protection

Triphenyl phosphate

CEIL: 240 mg/m<sup>3</sup>  
**ACGIH TLV (United States, 6/2013).**  
 TWA: 3 mg/m<sup>3</sup> 8 hours.  
**OSHA PEL 1989 (United States, 3/1989).**  
 TWA: 3 mg/m<sup>3</sup> 8 hours.  
**NIOSH REL (United States, 4/2013).**  
 TWA: 3 mg/m<sup>3</sup> 10 hours.  
**OSHA PEL (United States, 2/2013).**  
 TWA: 3 mg/m<sup>3</sup> 8 hours.

**1H Lineshape**  
 (<sup>2</sup>H<sub>6</sub>)Acetone

**ACGIH TLV (United States, 3/2012).**  
 TWA: 500 ppm 8 hours.  
 TWA: 1188 mg/m<sup>3</sup> 8 hours.  
 STEL: 750 ppm 15 minutes.  
 STEL: 1782 mg/m<sup>3</sup> 15 minutes.  
**OSHA PEL 1989 (United States, 3/1989).**  
 TWA: 750 ppm 8 hours.  
 TWA: 1800 mg/m<sup>3</sup> 8 hours.  
 STEL: 1000 ppm 15 minutes.  
 STEL: 2400 mg/m<sup>3</sup> 15 minutes.  
**NIOSH REL (United States, 6/2009).**  
 TWA: 250 ppm 10 hours.  
 TWA: 590 mg/m<sup>3</sup> 10 hours.  
**OSHA PEL (United States, 6/2010).**  
 TWA: 1000 ppm 8 hours.  
 TWA: 2400 mg/m<sup>3</sup> 8 hours.

Trichloromethane

**ACGIH TLV (United States, 6/2013).**  
 TWA: 49 mg/m<sup>3</sup> 8 hours.  
 TWA: 10 ppm 8 hours.  
**NIOSH REL (United States, 4/2013).**  
 STEL: 9.78 mg/m<sup>3</sup> 60 minutes.  
 STEL: 2 ppm 60 minutes.  
**OSHA PEL (United States, 2/2013).**  
 CEIL: 240 mg/m<sup>3</sup>  
 CEIL: 50 ppm  
**OSHA PEL 1989 (United States, 3/1989).**  
 TWA: 9.78 mg/m<sup>3</sup> 8 hours.  
 TWA: 2 ppm 8 hours.

**13C S/N ASTM doped**  
 (<sup>2</sup>H<sub>6</sub>)Benzene

**ACGIH TLV (United States, 3/2012).**  
**Absorbed through skin.**  
 TWA: 0.5 ppm 8 hours.  
 TWA: 1.6 mg/m<sup>3</sup> 8 hours.  
 STEL: 2.5 ppm 15 minutes.  
 STEL: 8 mg/m<sup>3</sup> 15 minutes.  
**OSHA PEL 1989 (United States, 3/1989).**  
 TWA: 1 ppm 8 hours.  
 STEL: 5 ppm 15 minutes.  
**OSHA PEL Z2 (United States, 11/2006).**  
 TWA: 10 ppm 8 hours.  
 CEIL: 25 ppm  
 AMP: 50 ppm 10 minutes.  
**NIOSH REL (United States, 6/2009).**  
 TWA: 0.1 ppm 10 hours.  
 STEL: 1 ppm 15 minutes.

## Section 8. Exposure controls/personal protection

<p>1,4-Dioxane</p>	<p><b>OSHA PEL (United States, 6/2010).</b> TWA: 1 ppm 8 hours. STEL: 5 ppm 15 minutes. <b>OSHA PEL 1989 (United States, 3/1989).</b> <b>Absorbed through skin.</b> TWA: 25 ppm 8 hours. TWA: 90 mg/m<sup>3</sup> 8 hours. <b>NIOSH REL (United States, 4/2013).</b> CEIL: 1 ppm 30 minutes. CEIL: 3.6 mg/m<sup>3</sup> 30 minutes. <b>ACGIH TLV (United States, 6/2013).</b> <b>Absorbed through skin.</b> TWA: 20 ppm 8 hours. <b>OSHA PEL (United States, 2/2013).</b> <b>Absorbed through skin.</b> TWA: 100 ppm 8 hours. TWA: 360 mg/m<sup>3</sup> 8 hours.</p>
<p><b>13C S/N ASTM</b> (<sup>2</sup>H<sub>6</sub>)Benzene</p>	<p><b>ACGIH TLV (United States, 3/2012).</b> <b>Absorbed through skin.</b> TWA: 0.5 ppm 8 hours. TWA: 1.6 mg/m<sup>3</sup> 8 hours. STEL: 2.5 ppm 15 minutes. STEL: 8 mg/m<sup>3</sup> 15 minutes. <b>OSHA PEL 1989 (United States, 3/1989).</b> TWA: 1 ppm 8 hours. STEL: 5 ppm 15 minutes. <b>OSHA PEL Z2 (United States, 11/2006).</b> TWA: 10 ppm 8 hours. CEIL: 25 ppm AMP: 50 ppm 10 minutes. <b>NIOSH REL (United States, 6/2009).</b> TWA: 0.1 ppm 10 hours. STEL: 1 ppm 15 minutes. <b>OSHA PEL (United States, 6/2010).</b> TWA: 1 ppm 8 hours. STEL: 5 ppm 15 minutes.</p>
<p>1,4-Dioxane</p>	<p><b>OSHA PEL 1989 (United States, 3/1989).</b> <b>Absorbed through skin.</b> TWA: 25 ppm 8 hours. TWA: 90 mg/m<sup>3</sup> 8 hours. <b>NIOSH REL (United States, 4/2013).</b> CEIL: 1 ppm 30 minutes. CEIL: 3.6 mg/m<sup>3</sup> 30 minutes. <b>ACGIH TLV (United States, 6/2013).</b> <b>Absorbed through skin.</b> TWA: 20 ppm 8 hours. <b>OSHA PEL (United States, 2/2013).</b> <b>Absorbed through skin.</b> TWA: 100 ppm 8 hours. TWA: 360 mg/m<sup>3</sup> 8 hours.</p>

### [8.2 Exposure controls](#)

## Section 8. Exposure controls/personal protection

- Appropriate engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.
- Individual protection measures**
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.
- Skin protection**
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

## Section 9. Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

#### Appearance

<b>Physical state</b>	: 4Hz 1% H <sub>2</sub> O/D <sub>2</sub> O	Liquid.
	1H S/N	Liquid.
	19F S/N	Liquid.
	15N S/N	Liquid.
	31P S/N	Liquid.
	1H Lineshape	Liquid.
	13C S/N ASTM doped	Liquid.
	13C S/N ASTM	Liquid.

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<b>Color</b>	: 4Hz 1% H2O/D2O	Not available.
	1H S/N	Not available.
	19F S/N	Not available.
	15N S/N	Not available.
	31P S/N	Not available.
	1H Lineshape	Not available.
	13C S/N ASTM doped	Not available.
	13C S/N ASTM	Colorless.
<b>Odor</b>	: 4Hz 1% H2O/D2O	Not available.
	1H S/N	Not available.
	19F S/N	Not available.
	15N S/N	Not available.
	31P S/N	Not available.
	1H Lineshape	Not available.
	13C S/N ASTM doped	Not available.
	13C S/N ASTM	Not available.
<b>Odor threshold</b>	: 4Hz 1% H2O/D2O	Not available.
	1H S/N	Not available.
	19F S/N	Not available.
	15N S/N	Not available.
	31P S/N	Not available.
	1H Lineshape	Not available.
	13C S/N ASTM doped	Not available.
	13C S/N ASTM	Not available.
<b>pH</b>	: 4Hz 1% H2O/D2O	Not available.
	1H S/N	Not available.
	19F S/N	Not available.
	15N S/N	Not available.
	31P S/N	Not available.
	1H Lineshape	Not available.
	13C S/N ASTM doped	Not available.
	13C S/N ASTM	Not available.
<b>Melting point</b>	: 4Hz 1% H2O/D2O	Not available.
	1H S/N	-64°C (-83.2°F)
	19F S/N	5°C (41°F)
	15N S/N	Not available.
	31P S/N	-64°C (-83.2°F)
	1H Lineshape	-95°C (-139°F)
	13C S/N ASTM doped	Not available.
	13C S/N ASTM	6.8°C (44.2°F)
<b>Boiling point</b>	: 4Hz 1% H2O/D2O	101.4°C (214.5°F)
	1H S/N	60.9°C (141.6°F)
	19F S/N	80°C (176°F)
	15N S/N	Not available.
	31P S/N	62°C (143.6°F)
	1H Lineshape	55.5°C (131.9°F)
	13C S/N ASTM doped	90°C (194°F)
	13C S/N ASTM	79.1°C (174.4°F)
<b>Flash point</b>	: 4Hz 1% H2O/D2O	Not available.
	1H S/N	Not available.
	19F S/N	Closed cup: -11.11°C (12°F)
	15N S/N	Closed cup: 87.8°C (190°F)
	31P S/N	Not available.
	1H Lineshape	Closed cup: -17°C (1.4°F)
	13C S/N ASTM doped	Closed cup: 21.1°C (70°F)
	13C S/N ASTM	Closed cup: -18 to 23°C (-0.4 to 73.4°F)

## Section 9. Physical and chemical properties

<b>Evaporation rate</b>	: 4Hz 1% H2O/D2O	Not available.
	1H S/N	Not available.
	19F S/N	Not available.
	15N S/N	Not available.
	31P S/N	Not available.
	1H Lineshape	Not available.
	13C S/N ASTM doped	Not available.
	13C S/N ASTM	Not available.
<b>Flammability (solid, gas)</b>	: 4Hz 1% H2O/D2O	Not available.
	1H S/N	Not available.
	19F S/N	Not available.
	15N S/N	Not available.
	31P S/N	Not available.
	1H Lineshape	Not available.
	13C S/N ASTM doped	Not available.
	13C S/N ASTM	Not available.
<b>Lower and upper explosive (flammable) limits</b>	: 4Hz 1% H2O/D2O	Not available.
	1H S/N	Not available.
	19F S/N	Not available.
	15N S/N	Not available.
	31P S/N	Not available.
	1H Lineshape	Not available.
	13C S/N ASTM doped	Not available.
	13C S/N ASTM	Lower: 1.3% Upper: 8%
<b>Vapor pressure</b>	: 4Hz 1% H2O/D2O	Not available.
	1H S/N	Not available.
	19F S/N	Not available.
	15N S/N	Not available.
	31P S/N	Not available.
	1H Lineshape	Not available.
	13C S/N ASTM doped	Not available.
	13C S/N ASTM	22.1 kPa (166 mm Hg) [room temperature]
<b>Vapor density</b>	: 4Hz 1% H2O/D2O	Not available.
	1H S/N	Not available.
	19F S/N	Not available.
	15N S/N	Not available.
	31P S/N	Not available.
	1H Lineshape	Not available.
	13C S/N ASTM doped	Not available.
	13C S/N ASTM	2.77 [Air = 1]
<b>Relative density</b>	: 4Hz 1% H2O/D2O	1.107
	1H S/N	1.5
	19F S/N	Not available.
	15N S/N	Not available.
	31P S/N	Not available.
	1H Lineshape	0.872
	13C S/N ASTM doped	0.98
	13C S/N ASTM	0.95
<b>Solubility</b>	: 4Hz 1% H2O/D2O	Easily soluble in the following materials: cold water and hot water.
	1H S/N	Very slightly soluble in the following materials: cold water and hot water.
	19F S/N	Insoluble in the following materials: cold water and hot water.
	15N S/N	Soluble in the following materials: cold water and hot water.
	31P S/N	Very slightly soluble in the following materials: cold

## Section 9. Physical and chemical properties

	1H Lineshape	water and hot water.
	13C S/N ASTM doped	Easily soluble in the following materials: cold water, hot water and acetone.
	13C S/N ASTM	Easily soluble in the following materials: cold water and hot water.
<b>Solubility in water</b>	: Not available.	
<b>Partition coefficient: n-octanol/water</b>	: 4Hz 1% H <sub>2</sub> O/D <sub>2</sub> O	Not available.
	1H S/N	Not available.
	19F S/N	Not available.
	15N S/N	Not available.
	31P S/N	Not available.
	1H Lineshape	Not available.
	13C S/N ASTM doped	Not available.
	13C S/N ASTM	Not available.
<b>Auto-ignition temperature</b>	: 4Hz 1% H <sub>2</sub> O/D <sub>2</sub> O	Not available.
	1H S/N	Not available.
	19F S/N	Not available.
	15N S/N	Not available.
	31P S/N	Not available.
	1H Lineshape	Not available.
	13C S/N ASTM doped	Not available.
	13C S/N ASTM	Not available.
<b>Decomposition temperature</b>	: 4Hz 1% H <sub>2</sub> O/D <sub>2</sub> O	Not available.
	1H S/N	Not available.
	19F S/N	Not available.
	15N S/N	Not available.
	31P S/N	Not available.
	1H Lineshape	Not available.
	13C S/N ASTM doped	Not available.
	13C S/N ASTM	Not available.
<b>Viscosity</b>	: 4Hz 1% H <sub>2</sub> O/D <sub>2</sub> O	Not available.
	1H S/N	Not available.
	19F S/N	Not available.
	15N S/N	Not available.
	31P S/N	Not available.
	1H Lineshape	Not available.
	13C S/N ASTM doped	Not available.
	13C S/N ASTM	Not available.

## Section 10. Stability and reactivity

<b>10.1 Reactivity</b>	: 4Hz 1% H <sub>2</sub> O/D <sub>2</sub> O	No specific test data related to reactivity available for this product or its ingredients.
	1H S/N	No specific test data related to reactivity available for this product or its ingredients.
	19F S/N	No specific test data related to reactivity available for this product or its ingredients.
	15N S/N	No specific test data related to reactivity available for this product or its ingredients.
	31P S/N	No specific test data related to reactivity available for this product or its ingredients.
	1H Lineshape	No specific test data related to reactivity available for this product or its ingredients.
	13C S/N ASTM doped	No specific test data related to reactivity available for this product or its ingredients.
	13C S/N ASTM	No specific test data related to reactivity available

## Section 10. Stability and reactivity

for this product or its ingredients.

<b>10.2 Chemical stability</b>	: 4Hz 1% H2O/D2O 1H S/N 19F S/N 15N S/N 31P S/N 1H Lineshape 13C S/N ASTM doped 13C S/N ASTM	The product is stable. The product is stable.
<b>10.3 Possibility of hazardous reactions</b>	: 4Hz 1% H2O/D2O 1H S/N 19F S/N 15N S/N 31P S/N 1H Lineshape 13C S/N ASTM doped 13C S/N ASTM	Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous reactions will not occur.
<b>10.4 Conditions to avoid</b>	: 4Hz 1% H2O/D2O 1H S/N 19F S/N 15N S/N 31P S/N 1H Lineshape 13C S/N ASTM doped 13C S/N ASTM	No specific data. No specific data. Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. No specific data. Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.

## Section 10. Stability and reactivity

<b>10.5 Incompatible materials</b>	: 4Hz 1% H2O/D2O 1H S/N 19F S/N  15N S/N  31P S/N 1H Lineshape  13C S/N ASTM doped  13C S/N ASTM	No specific data. No specific data. Reactive or incompatible with the following materials: oxidizing materials Reactive or incompatible with the following materials: oxidizing materials No specific data. Reactive or incompatible with the following materials: oxidizing materials Reactive or incompatible with the following materials: oxidizing materials Reactive or incompatible with the following materials: oxidizing materials
<b>10.6 Hazardous decomposition products</b>	: 4Hz 1% H2O/D2O  1H S/N  19F S/N  15N S/N  31P S/N  1H Lineshape  13C S/N ASTM doped  13C S/N ASTM	Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## Section 11. Toxicological information

### 11.1 Information on toxicological effects

#### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
1H S/N ( <sup>2</sup> H)Chloroform	LC50 Inhalation Vapor	Rat	47702 mg/m <sup>3</sup>	4 hours
	LD50 Dermal	Rabbit	>20 g/kg	-
Ethylbenzene	LD50 Oral	Rat	300 mg/kg	-
	LC50 Inhalation Gas.	Rat	4000 ppm	4 hours
	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	3500 mg/kg	-

## Section 11. Toxicological information

<b>19F S/N</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	LD50 Oral	Rat	930 mg/kg	-
<b>15N S/N</b> Formamide	LD50 Dermal	Rabbit	17 g/kg	-
di[( <sup>2</sup> H <sub>3</sub> )Methyl] sulphoxide	LD50 Oral	Rat	4000 mg/kg	-
	LD50 Dermal	Rat	40000 mg/kg	-
	LD50 Oral	Rat	14500 mg/kg	-
<b>31P S/N</b> ( <sup>2</sup> H)Chloroform	LC50 Inhalation Vapor	Rat	47702 mg/m <sup>3</sup>	4 hours
Triphenyl phosphate	LD50 Dermal	Rabbit	>20 g/kg	-
	LD50 Oral	Rat	300 mg/kg	-
	LD50 Dermal	Rabbit	>7900 mg/kg	-
	LD50 Oral	Rat	3500 mg/kg	-
<b>1H Lineshape</b> ( <sup>2</sup> H <sub>6</sub> )Acetone	LD50 Oral	Rat	5800 mg/kg	-
Trichloromethane	LC50 Inhalation Vapor	Rat	47702 mg/m <sup>3</sup>	4 hours
	LD50 Dermal	Rabbit	>20 g/kg	-
	LD50 Oral	Rat	300 mg/kg	-
<b>13C S/N ASTM doped</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	LD50 Oral	Rat	930 mg/kg	-
1,4-Dioxane	LD50 Oral	Rat	4200 mg/kg	-
<b>13C S/N ASTM</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	LD50 Oral	Rat	930 mg/kg	-
1,4-Dioxane	LD50 Oral	Rat	4200 mg/kg	-

### Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
<b>1H S/N</b> ( <sup>2</sup> H)Chloroform	Eyes - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Ethylbenzene	Rabbit	-	24 hours 15 milligrams	-
<b>19F S/N</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	Eyes - Moderate irritant	Rabbit	-	88 milligrams	-
	Eyes - Severe irritant	Rabbit	-	24 hours 2 milligrams	-
	Skin - Mild irritant	Rat	-	8 hours 60 microliters	-
	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
<b>15N S/N</b> Formamide	Eyes - Severe irritant	Rabbit	-	100 milligrams	-
	di[( <sup>2</sup> H <sub>3</sub> )Methyl] sulphoxide	Rabbit	-	24 hours 500 milligrams	-
		Rabbit	-	100 milligrams	-

## Section 11. Toxicological information

<b>31P S/N</b> ( <sup>2</sup> H)Chloroform	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-	100 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
<b>1H Lineshape</b> ( <sup>2</sup> H <sub>6</sub> )Acetone	Eyes - Mild irritant	Human	-	186300 parts per million	-
	Eyes - Mild irritant	Rabbit	-	10 microliters	-
	Eyes - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
	Eyes - Severe irritant	Rabbit	-	20 milligrams	-
Trichloromethane	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-	395 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
<b>13C S/N ASTM doped</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	Eyes - Moderate irritant	Rabbit	-	88 milligrams	-
	Eyes - Severe irritant	Rabbit	-	24 hours 2 milligrams	-
	Skin - Mild irritant	Rat	-	8 hours 60 microliters	-
	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams	-
1,4-Dioxane	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
	Skin - Mild irritant	Rabbit	-	515 milligrams	-
	<b>13C S/N ASTM</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	Eyes - Moderate irritant	Rabbit	-	88 milligrams
Eyes - Severe irritant		Rabbit	-	24 hours 2 milligrams	-
Skin - Mild irritant		Rat	-	8 hours 60 microliters	-
Skin - Mild irritant		Rabbit	-	24 hours 15 milligrams	-
1,4-Dioxane	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
	Skin - Mild irritant	Rabbit	-	515 milligrams	-

### Sensitization

Not available.

## Section 11. Toxicological information

### Mutagenicity

Not available.

### Carcinogenicity

Not available.

### Classification

Product/ingredient name	OSHA	IARC	NTP
<b>1H S/N</b> ( <sup>2</sup> H)Chloroform	-	2B	Reasonably anticipated to be a human carcinogen.
Ethylbenzene	-	2B	-
<b>19F S/N</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	+	1	Known to be a human carcinogen.
<b>31P S/N</b> ( <sup>2</sup> H)Chloroform	-	2B	Reasonably anticipated to be a human carcinogen.
<b>1H Lineshape</b> Trichloromethane	-	2B	Reasonably anticipated to be a human carcinogen.
<b>13C S/N ASTM doped</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	+	1	Known to be a human carcinogen.
1,4-Dioxane	-	2B	Reasonably anticipated to be a human carcinogen.
<b>13C S/N ASTM</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	+	1	Known to be a human carcinogen.
1,4-Dioxane	-	2B	Reasonably anticipated to be a human carcinogen.

### Reproductive toxicity

Not available.

### Teratogenicity

Not available.

### Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
<b>1H S/N</b> ( <sup>2</sup> H)Chloroform	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects
Ethylbenzene	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects
<b>19F S/N</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects
<b>31P S/N</b> ( <sup>2</sup> H)Chloroform	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects
<b>1H Lineshape</b>			

**Section 11. Toxicological information**

( <sup>2</sup> H <sub>6</sub> )Acetone Trichloromethane	Category 3 Category 3	Not applicable. Not applicable.	Narcotic effects Respiratory tract irritation and Narcotic effects
<b>13C S/N ASTM doped</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects
1,4-Dioxane	Category 3	Not applicable.	Respiratory tract irritation
<b>13C S/N ASTM</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects
1,4-Dioxane	Category 3	Not applicable.	Respiratory tract irritation

**Specific target organ toxicity (repeated exposure)**

<b>Name</b>	<b>Category</b>	<b>Route of exposure</b>	<b>Target organs</b>
<b>1H S/N</b> ( <sup>2</sup> H)Chloroform	Category 2	Not determined	kidneys and liver
<b>19F S/N</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	Category 1	Oral Inhalation	blood system blood system
<b>15N S/N</b> di[( <sup>2</sup> H <sub>3</sub> )Methyl] sulphoxide	Category 2	Oral	kidneys and liver
<b>31P S/N</b> ( <sup>2</sup> H)Chloroform Triphenyl phosphate	Category 2 Category 2	Not determined Not determined	kidneys and liver nervous system
<b>1H Lineshape</b> Trichloromethane	Category 2	Not determined	heart, kidneys and liver
<b>13C S/N ASTM doped</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	Category 1	Oral Inhalation	blood system blood system
1,4-Dioxane	Category 1	Oral	kidneys and liver
<b>13C S/N ASTM</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	Category 1	Oral Inhalation	blood system blood system
1,4-Dioxane	Category 1	Oral	kidneys and liver

**Aspiration hazard**

## Section 11. Toxicological information

Name	Result
<b>1H S/N</b> ( <sup>2</sup> H)Chloroform Ethylbenzene	ASPIRATION HAZARD - Category 1 ASPIRATION HAZARD - Category 1
<b>19F S/N</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	ASPIRATION HAZARD - Category 1
<b>31P S/N</b> ( <sup>2</sup> H)Chloroform	ASPIRATION HAZARD - Category 1
<b>13C S/N ASTM doped</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	ASPIRATION HAZARD - Category 1
<b>13C S/N ASTM</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	ASPIRATION HAZARD - Category 1

**Information on the likely routes of exposure** : Not available.

### Potential acute health effects

<b>Eye contact</b>	: 4Hz 1% H <sub>2</sub> O/D <sub>2</sub> O 1H S/N 19F S/N 15N S/N 31P S/N 1H Lineshape 13C S/N ASTM doped 13C S/N ASTM	No known significant effects or critical hazards. Causes serious eye irritation. Causes serious eye irritation.
<b>Inhalation</b>	: 4Hz 1% H <sub>2</sub> O/D <sub>2</sub> O 1H S/N  19F S/N  15N S/N  31P S/N  1H Lineshape  13C S/N ASTM doped  13C S/N ASTM	No known significant effects or critical hazards. Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness. May cause respiratory irritation. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure. Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness. May cause respiratory irritation. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure. Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness. May cause respiratory irritation. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure. Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure. Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness. May cause respiratory irritation. Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness. May cause respiratory irritation.

## Section 11. Toxicological information

<b>Skin contact</b>	: 4Hz 1% H2O/D2O	No known significant effects or critical hazards.
	1H S/N	Causes skin irritation.
	19F S/N	Causes skin irritation. Defatting to the skin.
	15N S/N	No known significant effects or critical hazards.
	31P S/N	Causes skin irritation.
<b>Ingestion</b>	1H Lineshape	Defatting to the skin. May cause skin dryness and irritation.
	13C S/N ASTM doped	Causes skin irritation. Defatting to the skin.
	13C S/N ASTM	Causes skin irritation. Defatting to the skin.
	: 4Hz 1% H2O/D2O	No known significant effects or critical hazards.
	1H S/N	Harmful if swallowed. Can cause central nervous system (CNS) depression. Irritating to mouth, throat and stomach.
	19F S/N	Harmful if swallowed. Can cause central nervous system (CNS) depression. May be fatal if swallowed and enters airways. Irritating to mouth, throat and stomach.
	15N S/N	Irritating to mouth, throat and stomach.
	31P S/N	Harmful if swallowed. Can cause central nervous system (CNS) depression. Irritating to mouth, throat and stomach.
	1H Lineshape	Can cause central nervous system (CNS) depression. Irritating to mouth, throat and stomach.
	13C S/N ASTM doped	Harmful if swallowed. Can cause central nervous system (CNS) depression. Irritating to mouth, throat and stomach.
13C S/N ASTM	Harmful if swallowed. Can cause central nervous system (CNS) depression. May be fatal if swallowed and enters airways. Irritating to mouth, throat and stomach.	

### Symptoms related to the physical, chemical and toxicological characteristics

<b>Eye contact</b>	: 4Hz 1% H2O/D2O	No specific data.
	1H S/N	Adverse symptoms may include the following: pain or irritation watering redness
	19F S/N	Adverse symptoms may include the following: pain or irritation watering redness
	15N S/N	Adverse symptoms may include the following: pain or irritation watering redness
	31P S/N	Adverse symptoms may include the following: pain or irritation watering redness
	1H Lineshape	Adverse symptoms may include the following: pain or irritation watering redness
	13C S/N ASTM doped	Adverse symptoms may include the following: pain or irritation watering redness
	13C S/N ASTM	Adverse symptoms may include the following:

## Section 11. Toxicological information

<b>Inhalation</b>	: 4Hz 1% H2O/D2O 1H S/N	pain or irritation watering redness No specific data. Adverse symptoms may include the following: respiratory tract irritation coughing nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
	19F S/N	Adverse symptoms may include the following: respiratory tract irritation coughing nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
	15N S/N	Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations
	31P S/N	Adverse symptoms may include the following: respiratory tract irritation coughing nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
	1H Lineshape	Adverse symptoms may include the following: nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
	13C S/N ASTM doped	Adverse symptoms may include the following: respiratory tract irritation coughing nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
	13C S/N ASTM	Adverse symptoms may include the following: respiratory tract irritation coughing nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness

## Section 11. Toxicological information

<b>Skin contact</b>	: 4Hz 1% H2O/D2O 1H S/N	No specific data. Adverse symptoms may include the following: irritation redness
	19F S/N	Adverse symptoms may include the following: irritation redness dryness cracking
	15N S/N	Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations
	31P S/N	Adverse symptoms may include the following: irritation redness
	1H Lineshape	Adverse symptoms may include the following: irritation dryness cracking
	13C S/N ASTM doped	Adverse symptoms may include the following: irritation redness dryness cracking
	13C S/N ASTM	Adverse symptoms may include the following: irritation redness dryness cracking
	<b>Ingestion</b>	: 4Hz 1% H2O/D2O 1H S/N 19F S/N
	15N S/N	Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths skeletal malformations
	31P S/N 1H Lineshape 13C S/N ASTM doped 13C S/N ASTM	No specific data. No specific data. No specific data. Adverse symptoms may include the following: nausea or vomiting

### Delayed and immediate effects and also chronic effects from short and long term exposure

#### Short term exposure

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

#### Long term exposure

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

#### Potential chronic health effects

Not available.

## Section 11. Toxicological information

<b>General</b>	: 4Hz 1% H2O/D2O	No known significant effects or critical hazards.
	1H S/N	May cause damage to organs through prolonged or repeated exposure.
	19F S/N	Causes damage to organs through prolonged or repeated exposure. Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.
	15N S/N	May cause damage to organs through prolonged or repeated exposure.
	31P S/N	May cause damage to organs through prolonged or repeated exposure.
	1H Lineshape	May cause damage to organs through prolonged or repeated exposure. Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.
	13C S/N ASTM doped	Causes damage to organs through prolonged or repeated exposure. Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.
	13C S/N ASTM	Causes damage to organs through prolonged or repeated exposure. Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.
<b>Carcinogenicity</b>	: 4Hz 1% H2O/D2O	No known significant effects or critical hazards.
	1H S/N	Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.
	19F S/N	May cause cancer. Risk of cancer depends on duration and level of exposure.
	15N S/N	No known significant effects or critical hazards.
	31P S/N	Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.
	1H Lineshape	Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.
	13C S/N ASTM doped	May cause cancer. Risk of cancer depends on duration and level of exposure.
	13C S/N ASTM	May cause cancer. Risk of cancer depends on duration and level of exposure.
<b>Mutagenicity</b>	: 4Hz 1% H2O/D2O	No known significant effects or critical hazards.
	1H S/N	No known significant effects or critical hazards.
	19F S/N	May cause genetic defects.
	15N S/N	No known significant effects or critical hazards.
	31P S/N	No known significant effects or critical hazards.
	1H Lineshape	No known significant effects or critical hazards.
	13C S/N ASTM doped	May cause genetic defects.
	13C S/N ASTM	May cause genetic defects.
<b>Teratogenicity</b>	: 4Hz 1% H2O/D2O	No known significant effects or critical hazards.
	1H S/N	No known significant effects or critical hazards.
	19F S/N	No known significant effects or critical hazards.
	15N S/N	May damage the unborn child.
	31P S/N	No known significant effects or critical hazards.
	1H Lineshape	No known significant effects or critical hazards.
	13C S/N ASTM doped	No known significant effects or critical hazards.
	13C S/N ASTM	No known significant effects or critical hazards.

## Section 11. Toxicological information

<b>Developmental effects</b>	: 4Hz 1% H2O/D2O	No known significant effects or critical hazards.
	1H S/N	No known significant effects or critical hazards.
	19F S/N	No known significant effects or critical hazards.
	15N S/N	No known significant effects or critical hazards.
	31P S/N	No known significant effects or critical hazards.
	1H Lineshape	No known significant effects or critical hazards.
	13C S/N ASTM doped	No known significant effects or critical hazards.
<b>Fertility effects</b>	: 4Hz 1% H2O/D2O	No known significant effects or critical hazards.
	1H S/N	No known significant effects or critical hazards.
	19F S/N	No known significant effects or critical hazards.
	15N S/N	No known significant effects or critical hazards.
	31P S/N	No known significant effects or critical hazards.
	1H Lineshape	No known significant effects or critical hazards.
	13C S/N ASTM doped	No known significant effects or critical hazards.
	13C S/N ASTM	No known significant effects or critical hazards.

### Numerical measures of toxicity

#### Acute toxicity estimates

Route	ATE value
<b>1H S/N</b> Oral	500.5 mg/kg
<b>19F S/N</b> Oral	930.5 mg/kg
<b>15N S/N</b> Oral	4444.4 mg/kg
<b>31P S/N</b> Oral	504.6 mg/kg
<b>1H Lineshape</b> Oral	30000 mg/kg
<b>13C S/N ASTM doped</b> Oral	1360.7 mg/kg
<b>13C S/N ASTM</b> Oral	1356.8 mg/kg

<b>Other information</b>	: 4Hz 1% H2O/D2O	Not available.
	1H S/N	Not available.
	19F S/N	Not available.
	15N S/N	Not available.
	31P S/N	Not available.
	1H Lineshape	Not available.
	13C S/N ASTM doped	Not available.
	13C S/N ASTM	Not available.

## Section 12. Ecological information

### 12.1 Toxicity

Product/ingredient name	Result	Species	Exposure	
<b>1H S/N</b> ( <sup>2</sup> H)Chloroform	Acute EC50 13.3 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase	72 hours	
	Acute LC50 81.5 mg/l Marine water	Crustaceans - Penaeus duorarum	48 hours	
	Acute LC50 29000 µg/l Fresh water	Daphnia - Daphnia magna	48 hours	
	Acute LC50 13300 µg/l Fresh water	Fish - Lepomis macrochirus	96 hours	
	Chronic EC10 3.61 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase	72 hours	
	Ethylbenzene	Chronic NOEC 6300 µg/l Fresh water	Daphnia - Daphnia magna	21 days
		Acute EC50 4600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
		Acute EC50 3600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
		Acute EC50 2970 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
		Acute LC50 5200 µg/l Marine water	Crustaceans - Americamysis bahia	48 hours
Acute LC50 4200 µg/l Fresh water Chronic NOEC 1000 µg/l Fresh water		Fish - Oncorhynchus mykiss Algae - Pseudokirchneriella subcapitata	96 hours 96 hours	
<b>19F S/N</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	Acute EC50 29000 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours	
	Acute EC50 1360000 µg/l Fresh water	Algae - Scenedesmus abundans	96 hours	
	Acute EC50 9230 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours	
	Acute LC50 21000 µg/l Marine water	Crustaceans - Artemia salina - Nauplii	48 hours	
	Acute LC50 5.28 ul/L Fresh water	Fish - Oncorhynchus gorbuscha - Fry	96 hours	
	Chronic NOEC 1.5 to 5.4 ul/L Marine water	Fish - Morone saxatilis - Juvenile (Fledgling, Hatchling, Weanling)	4 weeks	
<b>15N S/N</b> di[( <sup>2</sup> H <sub>3</sub> )Methyl] sulphoxide	Acute LC50 25000 ppm Fresh water	Daphnia - Daphnia magna - Neonate	48 hours	
	Acute LC50 34000000 µg/l Fresh water	Fish - Pimephales promelas	96 hours	
<b>31P S/N</b> ( <sup>2</sup> H)Chloroform	Acute EC50 13.3 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase	72 hours	
	Acute LC50 81.5 mg/l Marine water	Crustaceans - Penaeus duorarum	48 hours	
	Acute LC50 29000 µg/l Fresh water	Daphnia - Daphnia magna	48 hours	
	Acute LC50 13300 µg/l Fresh water	Fish - Lepomis macrochirus	96 hours	
	Chronic EC10 3.61 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase	72 hours	
	Triphenyl phosphate	Chronic NOEC 6300 µg/l Fresh water	Daphnia - Daphnia magna	21 days
		Acute EC50 2000 µg/l	Algae - Pseudokirchneriella subcapitata	96 hours
		Acute EC50 1000 µg/l	Daphnia - Daphnia magna	48 hours
		Acute EC50 225 µg/l Fresh water	Fish - Oncorhynchus mykiss -	96 hours

## Section 12. Ecological information

<b>1H Lineshape</b> ( <sup>2</sup> H <sub>6</sub> )Acetone	Chronic NOEC 55 µg/l Fresh water	Fingerling Fish - Oncorhynchus mykiss - Fingerling	30 days
	Acute EC50 20.565 mg/l Marine water Acute LC50 6000000 µg/l Fresh water Acute LC50 10000 µg/l Fresh water Acute LC50 100000 µg/l Fresh water	Algae - Ulva pertusa Crustaceans - Gammarus pulex Daphnia - Daphnia magna Fish - Pimephales promelas - Juvenile (Fledgling, Hatchling, Weanling)	96 hours 48 hours 48 hours 96 hours
Trichloromethane	Chronic NOEC 4.95 mg/l Marine water Chronic NOEC 0.1 ml/L Fresh water	Algae - Ulva pertusa Daphnia - Daphnia magna - Neonate	96 hours 21 days
	Acute EC50 13.3 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase	72 hours
	Acute EC50 2.803 mg/l Fresh water Acute LC50 63800 µg/l Fresh water	Crustaceans - Cypris subglobosa Daphnia - Daphnia magna - Neonate	48 hours 48 hours
	Acute LC50 13.3 ppm Fresh water Chronic EC10 3.61 mg/l Fresh water	Fish - Lepomis macrochirus Algae - Chlamydomonas reinhardtii - Exponential growth phase	96 hours 72 hours
<b>13C S/N ASTM doped</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	Chronic NOEC 6300 µg/l Fresh water	Daphnia - Daphnia magna	21 days
	Acute EC50 29000 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 1360000 µg/l Fresh water Acute EC50 9230 µg/l Fresh water	Algae - Scenedesmus abundans Daphnia - Daphnia magna - Neonate	96 hours 48 hours
	Acute LC50 21000 µg/l Marine water	Crustaceans - Artemia salina - Nauplii	48 hours
	Acute LC50 5.28 ul/L Fresh water	Fish - Oncorhynchus gorbuscha - Fry	96 hours
	Chronic NOEC 1.5 to 5.4 ul/L Marine water	Fish - Morone saxatilis - Juvenile (Fledgling, Hatchling, Weanling)	4 weeks
1,4-Dioxane	Acute LC50 6700000 µg/l Marine water	Fish - Menidia beryllina	96 hours
<b>13C S/N ASTM</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	Acute EC50 29000 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 1360000 µg/l Fresh water Acute EC50 9230 µg/l Fresh water	Algae - Scenedesmus abundans Daphnia - Daphnia magna - Neonate	96 hours 48 hours
	Acute LC50 21000 µg/l Marine water	Crustaceans - Artemia salina - Nauplii	48 hours
	Acute LC50 5.28 ul/L Fresh water	Fish - Oncorhynchus gorbuscha - Fry	96 hours
	Chronic NOEC 1.5 to 5.4 ul/L Marine water	Fish - Morone saxatilis - Juvenile (Fledgling, Hatchling, Weanling)	4 weeks
	1,4-Dioxane	Acute LC50 6700000 µg/l Marine water	Fish - Menidia beryllina

### [12.2 Persistence and degradability](#)

## Section 12. Ecological information

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
<b>1H S/N</b> Ethylbenzene	-	-	Readily

### 12.3 Bioaccumulative potential

Product/ingredient name	LogP <sub>ow</sub>	BCF	Potential
<b>1H S/N</b> ( <sup>2</sup> H)Chloroform	1.97	690	high
Ethylbenzene	3.6	-	low
<b>19F S/N</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	2.13	11	low
<b>15N S/N</b> Formamide	-0.82	-	low
di[( <sup>2</sup> H <sub>3</sub> )Methyl] sulphoxide	-1.35	3.16	low
<b>31P S/N</b> ( <sup>2</sup> H)Chloroform	1.97	690	high
Triphenyl phosphate	4.63	144	low
<b>1H Lineshape</b> ( <sup>2</sup> H <sub>6</sub> )Acetone	-0.23	-	low
Trichloromethane	1.97	690	high
<b>13C S/N ASTM doped</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	2.13	11	low
1,4-Dioxane	-0.42	0.3 to 0.7	low
<b>13C S/N ASTM</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	2.13	11	low
1,4-Dioxane	-0.42	0.3 to 0.7	low

### 12.4 Mobility in soil

**Soil/water partition coefficient (K<sub>oc</sub>)** : Not available.

**12.5 Other adverse effects** : 4Hz 1% H<sub>2</sub>O/D<sub>2</sub>O No known significant effects or critical hazards.  
 1H S/N No known significant effects or critical hazards.  
 19F S/N No known significant effects or critical hazards.  
 15N S/N No known significant effects or critical hazards.  
 31P S/N No known significant effects or critical hazards.  
 1H Lineshape No known significant effects or critical hazards.  
 13C S/N ASTM doped No known significant effects or critical hazards.  
 13C S/N ASTM No known significant effects or critical hazards.

## Section 13. Disposal considerations

### 13.1 Waste treatment methods

## Section 13. Disposal considerations

**Disposal methods** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

## Section 14. Transport information

This Material Safety Data Sheet is written based on the encapsulated substance or mixture in this article. Since the hazardous ingredient is encapsulated, the risk of exposure by inhalation, ingestion, skin contact and eyes contact is minimum.

### Regulatory information

**Additional information** : **Remarks**  
De minimis quantities

**DOT / IMDG / IATA** : Not regulated.

## Section 15. Regulatory information

### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

**U.S. Federal regulations** : **TSCA 8(a) PAIR**: Formamide  
**United States inventory (TSCA 8b)**: All components are listed or exempted.  
**Clean Water Act (CWA) 307**: (<sup>2</sup>H<sub>6</sub>)Benzene; Chromium(III) 4-oxopent-2-ene-2-olate; Trichloromethane; (<sup>2</sup>H)Chloroform; Ethylbenzene  
**Clean Water Act (CWA) 311**: (<sup>2</sup>H<sub>6</sub>)Benzene; Trichloromethane; (<sup>2</sup>H)Chloroform; Ethylbenzene  
**Clean Air Act (CAA) 112 regulated toxic substances**: (<sup>2</sup>H)Chloroform  
**Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)** : Listed  
**Clean Air Act Section 602 Class I Substances** : Not listed  
**Clean Air Act Section 602 Class II Substances** : Not listed

## Section 15. Regulatory information

**DEA List I Chemicals** : Not listed  
(Precursor Chemicals)

**DEA List II Chemicals** : Listed  
(Essential Chemicals)

### SARA 302/304

#### Composition/information on ingredients

Name	%	EHS	SARA 302 TPQ		SARA 304 RQ	
			(lbs)	(gallons)	(lbs)	(gallons)
<b>1H S/N</b> ( <sup>2</sup> H)Chloroform	60 - 100	Yes.	-	-	-	-
<b>31P S/N</b> ( <sup>2</sup> H)Chloroform	60 - 100	Yes.	-	-	-	-
<b>1H Lineshape</b> Trichloromethane	0.1 - 1	Yes.	10000	803.8	10	0.8

**SARA 304 RQ** : 8000 lbs / 3632 kg

### SARA 311/312

**Classification** : Fire hazard  
Immediate (acute) health hazard  
Delayed (chronic) health hazard

#### Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
<b>1H S/N</b> ( <sup>2</sup> H)Chloroform	60 - 100	No.	No.	No.	Yes.	Yes.
Ethylbenzene	< 0.1	Yes.	No.	No.	Yes.	Yes.
<b>19F S/N</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	60 - 100	Yes.	No.	No.	Yes.	Yes.
<b>15N S/N</b> Formamide	60 - 100	No.	No.	No.	Yes.	Yes.
di[( <sup>2</sup> H <sub>3</sub> )Methyl] sulphoxide	5 - 10	Yes.	No.	No.	Yes.	Yes.
<b>31P S/N</b> ( <sup>2</sup> H)Chloroform	60 - 100	No.	No.	No.	Yes.	Yes.
Triphenyl phosphate	1 - 5	No.	No.	No.	No.	Yes.
<b>1H Lineshape</b> ( <sup>2</sup> H <sub>6</sub> )Acetone	60 - 100	Yes.	No.	No.	Yes.	No.
Trichloromethane	0.1 - 1	No.	No.	No.	Yes.	Yes.
<b>13C S/N ASTM doped</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	30 - 60	Yes.	No.	No.	Yes.	Yes.
1,4-Dioxane	30 - 60	Yes.	No.	No.	Yes.	Yes.
<b>13C S/N ASTM</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	30 - 60	Yes.	No.	No.	Yes.	Yes.
1,4-Dioxane	30 - 60	Yes.	No.	No.	Yes.	Yes.

## Section 15. Regulatory information

### SARA 313

	Product name	CAS number	%
<b>Form R - Reporting requirements</b>	<b>1H S/N</b> ( <sup>2</sup> H)Chloroform Ethylbenzene	865-49-6 100-41-4	60 - 100 0.1 - 1
	<b>19F S/N</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	1076-43-3	60 - 100
	<b>31P S/N</b> ( <sup>2</sup> H)Chloroform	865-49-6	60 - 100
	<b>1H Lineshape</b> Trichloromethane	67-66-3	0.1 - 1
	<b>13C S/N ASTM doped</b> ( <sup>2</sup> H <sub>6</sub> )Benzene 1,4-Dioxane	1076-43-3 123-91-1	30 - 60 15 - 40
	<b>13C S/N ASTM</b> ( <sup>2</sup> H <sub>6</sub> )Benzene 1,4-Dioxane	1076-43-3 123-91-1	30 - 60 30 - 60
<b>Supplier notification</b>	<b>1H S/N</b> ( <sup>2</sup> H)Chloroform Ethylbenzene	865-49-6 100-41-4	60 - 100 <0.1
	<b>19F S/N</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	1076-43-3	60 - 100
	<b>31P S/N</b> ( <sup>2</sup> H)Chloroform	865-49-6	60 - 100
	<b>1H Lineshape</b> Trichloromethane	67-66-3	0.1 - 1
	<b>13C S/N ASTM doped</b> ( <sup>2</sup> H <sub>6</sub> )Benzene 1,4-Dioxane	1076-43-3 123-91-1	30 - 60 15 - 40
	<b>13C S/N ASTM</b> ( <sup>2</sup> H <sub>6</sub> )Benzene 1,4-Dioxane	1076-43-3 123-91-1	30 - 60 30 - 60

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

### State regulations

#### Massachusetts

: The following components are listed: 1,4-DIOXANE; BENZENE; ACETONE; CHLOROFORM; FORMAMIDE

#### New York

: The following components are listed: 1,4-Dioxane; Benzene; Acetone; 2-Propanone; Chloroform; Methane, trichloro-; Chloroform; Methane, trichloro-

#### New Jersey

: The following components are listed: 1,4-DIOXANE; 1,4-DIETHYLENE DIOXIDE; BENZENE; ACETONE; 2-PROPANONE; CHLOROFORM; METHANE, TRICHLORO-; CHLOROFORM; METHANE, TRICHLORO-; DIMETHYL SULFOXIDE; METHANE, SULFINYLBI-; FORMAMIDE

## Section 15. Regulatory information

**Pennsylvania** : The following components are listed: 1,4-DIOXANE; BENZENE; 2-PROPANONE; METHANE, TRICHLORO-; METHANE, TRICHLORO-; di[(<sup>2</sup>H<sub>3</sub>)Methyl] sulphoxide; FORMAMIDE

### California Prop. 65

**WARNING:** This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
<b>1H S/N</b> ( <sup>2</sup> H)Chloroform	Yes.	Yes.	20 µg/day (ingestion) 40 µg/day (inhalation)	No.
Ethylbenzene	Yes.	No.	41 µg/day (ingestion) 54 µg/day (inhalation)	No.
<b>19F S/N</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	Yes.	Yes.	6.4 µg/day (ingestion) 13 µg/day (inhalation)	24 µg/day (ingestion) 49 µg/day (inhalation)
<b>31P S/N</b> ( <sup>2</sup> H)Chloroform	Yes.	Yes.	20 µg/day (ingestion) 40 µg/day (inhalation)	No.
<b>1H Lineshape</b> Trichloromethane	Yes.	Yes.	20 µg/day (ingestion) 40 µg/day (inhalation)	No.
<b>13C S/N ASTM doped</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	Yes.	Yes.	6.4 µg/day (ingestion) 13 µg/day (inhalation)	24 µg/day (ingestion) 49 µg/day (inhalation)
1,4-Dioxane	Yes.	No.	Yes.	No.
<b>13C S/N ASTM</b> ( <sup>2</sup> H <sub>6</sub> )Benzene	Yes.	Yes.	6.4 µg/day (ingestion) 13 µg/day (inhalation)	24 µg/day (ingestion) 49 µg/day (inhalation)
1,4-Dioxane	Yes.	No.	Yes.	No.

**Canada inventory** : At least one component is not listed in DSL but all such components are listed in NDSL.

### International regulations

#### International lists

**Australia inventory (AICS):** Not determined.  
**China inventory (IECSC):** Not determined.  
**Japan inventory:** Not determined.  
**Korea inventory:** Not determined.  
**Malaysia Inventory (EHS Register):** Not determined.  
**New Zealand Inventory of Chemicals (NZIoC):** Not determined.  
**Philippines inventory (PICCS):** Not determined.  
**Taiwan inventory (CSNN):** Not determined.

## Section 15. Regulatory information

**Chemical Weapons  
Convention List Schedule  
I Chemicals** : Not listed

**Chemical Weapons  
Convention List Schedule  
II Chemicals** : Not listed

**Chemical Weapons  
Convention List Schedule  
III Chemicals** : Not listed

## Section 16. Other information

### History

**Date of issue** : 01/29/2014.  
**Date of previous issue** : No previous validation.  
**Version** : 3

✔ Indicates information that has changed from previously issued version.

### Notice to reader

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