SAFETY DATA SHEET

Agilent Technologies

Probe Sample Kit - 500_600 DB, Part Number 94906551

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

This product is considered an article. This Safety Data Sheet is written based on the encapsulated substance or mixture in this article.

1.1 Product identifier

Product name : Probe Sample Kit - 500_600 DB, Part Number 94906551

Part No. (Kit) : 94906551

Part No. :

13C S/N ASTM	96812069
19F S/N	96812082
15N S/N	96812083
31P S/N	96812087
13C S/N ASTM doped	96812091

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

Identified uses	
Analytical chemistry.	
13C S/N ASTM	860 µl
19F S/N	860 µl
15N S/N	860 µl
31P S/N	860 µl
13C S/N ASTM doped	860 µl

1.3 Details of the supplier of the safety data sheet

Agilent Technologies Manufacturing GmbH & Co. KG
Hewlett-Packard-Str. 8
76337 Waldbronn
Germany
0800 603 1000

e-mail address of person responsible for this SDS : pdl-msds_author@agilent.com

1.4 Emergency telephone number

Emergency telephone number (with hours of operation) : CHEMTREC®: +(44)-870-8200418

SECTION 2: Hazards identification

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.

2.1 Classification of the substance or mixture

Product definition :

13C S/N ASTM	Mixture (encapsulated in article)
19F S/N	Mixture (encapsulated in article)
15N S/N	Mixture (encapsulated in article)
31P S/N	Mixture (encapsulated in article)
13C S/N ASTM doped	Mixture (encapsulated in article)

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

SECTION 2: Hazards identification

13C S/N ASTM

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

19F S/N

H225	FLAMMABLE LIQUIDS - Category 2
H315	SKIN CORROSION/IRRITATION - Category 2
H319	SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2
H340	GERM CELL MUTAGENICITY - Category 1B
H350	CARCINOGENICITY - Category 1A
H372	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1
H304	ASPIRATION HAZARD - Category 1

15N S/N

H360D	TOXIC TO REPRODUCTION (Unborn child) - Category 1B

31P S/N

H302	ACUTE TOXICITY (oral) - Category 4
H331	ACUTE TOXICITY (inhalation) - Category 3
H315	SKIN CORROSION/IRRITATION - Category 2
H319	SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2
H351	CARCINOGENICITY - Category 2
H361d	TOXIC TO REPRODUCTION (Unborn child) - Category 2
H372	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1
H412	LONG-TERM AQUATIC HAZARD - Category 3

13C S/N ASTM doped

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

See Section 16 for the full text of the H statements declared above.

See Section 11 for more detailed information on health effects and symptoms.

2.2 Label elements

Hazard pictograms :

Signal word :

13C S/N ASTM	Danger
19F S/N	Danger
15N S/N	Danger
31P S/N	Danger
13C S/N ASTM doped	Danger

Hazard statements :

SECTION 2: Hazards identification

13C S/N ASTM	**GHS02** - Highly flammable liquid and vapour. **GHS07** - Causes skin irritation. May cause respiratory irritation. Causes serious eye irritation. **GHS08** - May be fatal if swallowed and enters airways. May cause genetic defects. May cause cancer. Causes damage to organs through prolonged or repeated exposure.
19F S/N	**GHS02** - Highly flammable liquid and vapour. **GHS07** - Causes skin irritation. Causes serious eye irritation. **GHS08** - May be fatal if swallowed and enters airways. May cause genetic defects. May cause cancer. Causes damage to organs through prolonged or repeated exposure.
15N S/N	**GHS08** - May damage the unborn child.
31P S/N	**GHS06** - Toxic if inhaled. **GHS07** - Harmful if swallowed. Causes skin irritation. Causes serious eye irritation. **GHS08** - Suspected of causing cancer. Suspected of damaging the unborn child. Causes damage to organs through prolonged or repeated exposure. Harmful to aquatic life with long lasting effects.
13C S/N ASTM doped	**GHS02** - Highly flammable liquid and vapour. **GHS07** - Causes skin irritation. May cause respiratory irritation. Causes serious eye irritation. **GHS08** - May be fatal if swallowed and enters airways. May cause genetic defects. May cause cancer. Causes damage to organs through prolonged or repeated exposure.

Precautionary statements

Prevention	:	13C S/N ASTM	P201 - Obtain special instructions before use. P280 - Wear protective gloves. Wear eye or face protection. Wear protective clothing. P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P241 - Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. P260 - Do not breathe vapour.
		19F S/N	P201 - Obtain special instructions before use. P280 - Wear protective gloves. Wear eye or face protection. Wear protective clothing. P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

SECTION 2: Hazards identification

			P241 - Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. P260 - Do not breathe vapour.
		15N S/N	P201 - Obtain special instructions before use. P280 - Wear protective gloves. Wear eye or face protection. Wear protective clothing.
		31P S/N	P201 - Obtain special instructions before use. P280 - Wear protective gloves. Wear eye or face protection. Wear protective clothing. P273 - Avoid release to the environment. P260 - Do not breathe vapour.
		13C S/N ASTM doped	P201 - Obtain special instructions before use. P280 - Wear protective gloves. Wear eye or face protection. Wear protective clothing. P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P241 - Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. P260 - Do not breathe vapour.
Response	:	13C S/N ASTM	P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. P301 + P310 + P331 - IF SWALLOWED: Immediately call a POISON CENTER or physician. Do NOT induce vomiting. P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
		19F S/N	P301 + P310 + P331 - IF SWALLOWED: Immediately call a POISON CENTER or physician. Do NOT induce vomiting. P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
		15N S/N	P308 + P313 - IF exposed or concerned: Get medical attention.
		31P S/N	P304 + P340 + P311 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician.
		13C S/N ASTM doped	P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. P301 + P310 + P331 - IF SWALLOWED: Immediately call a POISON CENTER or physician. Do NOT induce vomiting. P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
Storage	:	13C S/N ASTM	P235 - Keep cool.
		19F S/N	P235 - Keep cool.
		15N S/N	P405 - Store locked up.
		31P S/N	P405 - Store locked up.
		13C S/N ASTM doped	P235 - Keep cool.
Disposal	:	13C S/N ASTM	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
		19F S/N	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
		15N S/N	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
		31P S/N	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.

SECTION 2: Hazards identification

Hazardous ingredients : **13C S/N ASTM**
(2H6)benzene
1,4-Dioxane

19F S/N
(2H6)benzene

15N S/N
Formamide

31P S/N
(^{2}H)Chloroform

13C S/N ASTM doped
(2H6)benzene
1,4-Dioxane

Supplemental label elements	: 13C S/N ASTM	Not applicable.
	19F S/N	Not applicable.
	15N S/N	Not applicable.
	31P S/N	Not applicable.
	13C S/N ASTM doped	Not applicable.
Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles	: 13C S/N ASTM	Restricted to professional users.
	19F S/N	Restricted to professional users.
	15N S/N	Restricted to professional users.
	31P S/N	For use in industrial installations only.
	13C S/N ASTM doped	Restricted to professional users.

Special packaging requirements

Tactile warning of danger	: 13C S/N ASTM	Not applicable.
	19F S/N	Not applicable.
	15N S/N	Not applicable.
	31P S/N	Not applicable.
	13C S/N ASTM doped	Not applicable.

2.3 Other hazards

Other hazards which do not result in classification	: 13C S/N ASTM	None known.
	19F S/N	None known.
	15N S/N	None known.
	31P S/N	None known.
	13C S/N ASTM doped	None known.

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.

3.2 Mixtures	: 13C S/N ASTM	Mixture (encapsulated in article)
	19F S/N	Mixture (encapsulated in article)
	15N S/N	Mixture (encapsulated in article)
	31P S/N	Mixture (encapsulated in article)
	13C S/N ASTM doped	Mixture (encapsulated in article)

Product/ingredient name	Identifiers	%	Classification	Type
13C S/N ASTM (2H6)benzene	EC: 214-061-8 CAS: 1076-43-3 Index: 601-020-00-8	≥50 - ≤75	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Muta. 1B, H340 Carc. 1A, H350 STOT RE 1, H372	[1] [2]

SECTION 3: Composition/information on ingredients

1,4-Dioxane	EC: 204-661-8 CAS: 123-91-1 Index: 603-024-00-5	≥25 - ≤50	Asp. Tox. 1, H304 Flam. Liq. 2, H225 Eye Irrit. 2, H319 Carc. 2, H351 STOT SE 3, H335 EUH019 EUH066	[1] [2]
19F S/N				
(2H6)benzene	EC: 214-061-8 CAS: 1076-43-3 Index: 601-020-00-8	≥90	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Muta. 1B, H340 Carc. 1A, H350 STOT RE 1, H372 Asp. Tox. 1, H304	[1] [2]
15N S/N				
Formamide	EC: 200-842-0 CAS: 75-12-7 Index: 616-052-00-8	≥90	Repr. 1B, H360D (Unborn child)	[1] [2]
31P S/N				
(^{2}H)Chloroform	EC: 200-663-8 CAS: 865-49-6 Index: 602-006-00-4	≥90	Acute Tox. 4, H302 Acute Tox. 3, H331 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Carc. 2, H351 Repr. 2, H361d (Unborn child) STOT RE 1, H372	[1] [2]
Triphenyl phosphate	EC: 204-112-2 CAS: 115-86-6	<2.5	Aquatic Acute 1, H400 (M=1) Aquatic Chronic 1, H410 (M=1)	[1] [2]
13C S/N ASTM doped				
(2H6)benzene	EC: 214-061-8 CAS: 1076-43-3 Index: 601-020-00-8	≥50 - ≤75	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Muta. 1B, H340 Carc. 1A, H350 STOT RE 1, H372 Asp. Tox. 1, H304	[1] [2]
1,4-Dioxane	EC: 204-661-8 CAS: 123-91-1 Index: 603-024-00-5	≥25 - ≤50	Flam. Liq. 2, H225 Eye Irrit. 2, H319 Carc. 2, H351 STOT SE 3, H335 EUH019 EUH066 **See Section 16 for the full text of the H statements declared above.**	[1] [2]

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.

Type

[1] Substance classified with a health or environmental hazard
[2] Substance with a workplace exposure limit
[3] Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII
[4] Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII
[5] Substance of equivalent concern

SECTION 4: First aid measures

4.1 Description of first aid measures

Eye contact	:	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.
		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 if irritation occurs.
		31P 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.
		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.
Inhalation	:	13C S/N ASTM	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.
		19F 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 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.
		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 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.
		31P 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

SECTION 4: First aid measures

			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.
		13C S/N ASTM doped	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	Wash skin thoroughly with soap and water or use recognised 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.
		19F S/N	Wash skin thoroughly with soap and water or use recognised 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.
		15N S/N	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.
		31P S/N	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.
		13C S/N ASTM doped	Wash skin thoroughly with soap and water or use recognised 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.
Ingestion	:	13C S/N ASTM	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.
		19F S/N	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

SECTION 4: First aid measures

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.

15N S/N

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.

31P S/N

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 doped

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.

Protection of first-aiders : 13C S/N ASTM

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.

19F S/N

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

SECTION 4: First aid measures

	water before removing it, or wear gloves.
15N S/N	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.
31P S/N	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.
13C S/N ASTM doped	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.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

Eye contact :	13C S/N ASTM	Causes serious eye irritation.
	19F S/N	Causes serious eye irritation.
	15N S/N	No known significant effects or critical hazards.
	31P S/N	Causes serious eye irritation.
	13C S/N ASTM doped	Causes serious eye irritation.
Inhalation :	13C S/N ASTM	May cause respiratory irritation.
	19F S/N	No known significant effects or critical hazards.
	15N S/N	No known significant effects or critical hazards.
	31P S/N	Toxic if inhaled.
	13C S/N ASTM doped	May cause respiratory irritation.
Skin contact :	13C S/N ASTM	Causes skin irritation. Defatting to the skin.
	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.
	13C S/N ASTM doped	Causes skin irritation. Defatting to the skin.
Ingestion :	13C S/N ASTM	May be fatal if swallowed and enters airways.
	19F S/N	May be fatal if swallowed and enters airways.
	15N S/N	No known significant effects or critical hazards.
	31P S/N	Harmful if swallowed.
	13C S/N ASTM doped	May be fatal if swallowed and enters airways.

Over-exposure signs/symptoms

Eye contact :	13C S/N ASTM	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	No specific data.
	31P S/N	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

SECTION 4: First aid measures

Inhalation	:	13C S/N ASTM	redness Adverse symptoms may include the following: respiratory tract irritation coughing
		19F S/N	No specific data.
		15N S/N	Adverse symptoms may include the following: reduced foetal weight increase in foetal deaths skeletal malformations
		31P S/N	Adverse symptoms may include the following: reduced foetal weight increase in foetal deaths skeletal malformations
		13C S/N ASTM doped	Adverse symptoms may include the following: respiratory tract irritation coughing
Skin contact	:	13C S/N ASTM	Adverse symptoms may include the following: irritation redness dryness cracking
		19F S/N	Adverse symptoms may include the following: irritation redness dryness cracking
		15N S/N	Adverse symptoms may include the following: reduced foetal weight increase in foetal deaths skeletal malformations
		31P S/N	Adverse symptoms may include the following: irritation redness reduced foetal weight increase in foetal deaths skeletal malformations
		13C S/N ASTM doped	Adverse symptoms may include the following: irritation redness dryness cracking
Ingestion	:	13C S/N ASTM	Adverse symptoms may include the following: nausea or vomiting
		19F S/N	Adverse symptoms may include the following: nausea or vomiting
		15N S/N	Adverse symptoms may include the following: reduced foetal weight increase in foetal deaths skeletal malformations
		31P S/N	Adverse symptoms may include the following: reduced foetal weight increase in foetal deaths skeletal malformations
		13C S/N ASTM doped	Adverse symptoms may include the following: nausea or vomiting

4.3 Indication of any immediate medical attention and special treatment needed

SECTION 4: First aid measures

Notes to physician :	13C S/N ASTM	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
	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.
	13C S/N ASTM doped	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments :	13C S/N ASTM	No specific treatment.
	19F S/N	No specific treatment.
	15N S/N	No specific treatment.
	31P S/N	No specific treatment.
	13C S/N ASTM doped	No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media :	13C S/N ASTM	Use dry chemical, CO_2, water spray (fog) or foam.
	19F S/N	Use dry chemical, CO_2, water spray (fog) or foam.
	15N S/N	Use an extinguishing agent suitable for the surrounding fire.
	31P S/N	Use an extinguishing agent suitable for the surrounding fire.
	13C S/N ASTM doped	Use dry chemical, CO_2, water spray (fog) or foam.
Unsuitable extinguishing media :	13C S/N ASTM	Do not use water jet.
	19F S/N	Do not use water jet.
	15N S/N	None known.
	31P S/N	None known.
	13C S/N ASTM doped	Do not use water jet.

5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture :	13C S/N ASTM	Highly flammable liquid and vapour. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapour/gas is heavier than air and will spread along the ground. Vapours 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.
	19F S/N	Highly flammable liquid and vapour. 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	In a fire or if heated, a pressure increase will occur and the container may burst.
	31P S/N	In a fire or if heated, a pressure increase will occur and the container may burst. This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
	13C S/N ASTM doped	Highly flammable liquid and vapour. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapour/gas is heavier than air and will spread along the ground. Vapours 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.

SECTION 5: Firefighting measures

Hazardous combustion products	:	13C S/N ASTM	Decomposition products may include the following materials: carbon dioxide carbon monoxide
		19F S/N	Decomposition products may include the following materials: carbon dioxide carbon monoxide
		15N S/N	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides sulfur oxides
		31P S/N	Decomposition products may include the following materials: carbon dioxide carbon monoxide phosphorus oxides halogenated compounds carbonyl halides
		13C S/N ASTM doped	Decomposition products may include the following materials: carbon dioxide carbon monoxide

5.3 Advice for firefighters

Special precautions for fire-fighters	:	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.
		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.
		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.
		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.
Special protective equipment for fire-fighters	:	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. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.
		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. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.
		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. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.
		31P S/N	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full

SECTION 5: Firefighting measures

	face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.
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. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	: 13C S/N ASTM	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 spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
	19F S/N	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 spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
	15N S/N	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 spilt material. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
	31P S/N	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 spilt material. Do not breathe vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
	13C S/N ASTM doped	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 spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
For emergency responders	: 13C S/N ASTM	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".
	19F S/N	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".
	15N S/N	If specialised clothing is required to deal with the spillage,

SECTION 6: Accidental release measures

		take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
	31P S/N	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".
	13C S/N ASTM doped	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 :	13C S/N ASTM	Avoid dispersal of spilt 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).
	19F S/N	Avoid dispersal of spilt 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).
	15N S/N	Avoid dispersal of spilt 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 spilt 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). Water polluting material. May be harmful to the environment if released in large quantities.
	13C S/N ASTM doped	Avoid dispersal of spilt 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 material for containment and cleaning up

Methods for cleaning up :	13C S/N ASTM	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.
	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. 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.
	13C S/N ASTM doped	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

SECTION 6: Accidental release measures

of via a licensed waste disposal contractor.

6.4 Reference to other sections : See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Protective measures : 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 vapour 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.

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 vapour 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 ingest. Avoid breathing vapour or mist. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. 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.

31P 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 vapour or mist. Do not ingest. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made

SECTION 7: Handling and storage

			from a compatible material, kept tightly closed when not in use. 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 vapour 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	:	13C S/N ASTM	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.
		19F S/N	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.
		15N S/N	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.
		31P S/N	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.
		13C S/N ASTM doped	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	:	13C S/N ASTM	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 unlabelled containers. Use appropriate containment to avoid environmental contamination.
		19F S/N	Store in accordance with local regulations. Store in a

SECTION 7: Handling and storage

	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 unlabelled containers. Use appropriate containment to avoid environmental contamination.
15N 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 unlabelled 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 unlabelled 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 unlabelled containers. Use appropriate containment to avoid environmental contamination.

Danger criteria

Category	Notification and MAPP threshold	Safety report threshold
13C S/N ASTM P5c: Flammable liquids 2 and 3 not falling under P5a or P5b	5000	50000
19F S/N P5c: Flammable liquids 2 and 3 not falling under P5a or P5b	5000	50000
31P S/N H2: Acute toxicity 2 any route of entry or Acute toxicity 3 Inhalation route of entry	50	200
13C S/N ASTM doped P5c: Flammable liquids 2 and 3 not falling under P5a or P5b	5000	50000

7.3 Specific end use(s)

Recommendations :

13C S/N ASTM	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.
13C S/N ASTM doped	Industrial applications, Professional applications.

SECTION 7: Handling and storage

Industrial sector specific solutions :

13C S/N ASTM	Not applicable.
19F S/N	Not applicable.
15N S/N	Not applicable.
31P S/N	Not applicable.
13C S/N ASTM doped	Not applicable.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits

Product/ingredient name	Exposure limit values
13C S/N ASTM	
benzene	**EH40/2005 WELs (United Kingdom (UK), 12/2011). Absorbed through skin.** TWA: 1 ppm 8 hours.
1,4-dioxane	**EH40/2005 WELs (United Kingdom (UK), 12/2011). Absorbed through skin.** TWA: 20 ppm 8 hours. TWA: 73 mg/m³ 8 hours.
19F S/N	
benzene	**EH40/2005 WELs (United Kingdom (UK), 12/2011). Absorbed through skin.** TWA: 1 ppm 8 hours.
15N S/N	
formamide	**EH40/2005 WELs (United Kingdom (UK), 12/2011).** STEL: 56 mg/m³ 15 minutes. STEL: 30 ppm 15 minutes. TWA: 37 mg/m³ 8 hours. TWA: 20 ppm 8 hours.
31P S/N	
trichloromethane	**EH40/2005 WELs (United Kingdom (UK), 12/2011). Absorbed through skin.** TWA: 2 ppm 8 hours. TWA: 9.9 mg/m³ 8 hours.
triphenyl phosphate	**EH40/2005 WELs (United Kingdom (UK), 12/2011).** STEL: 6 mg/m³ 15 minutes. TWA: 3 mg/m³ 8 hours.
13C S/N ASTM doped	
benzene	**EH40/2005 WELs (United Kingdom (UK), 12/2011). Absorbed through skin.** TWA: 1 ppm 8 hours.
1,4-dioxane	**EH40/2005 WELs (United Kingdom (UK), 12/2011). Absorbed through skin.** TWA: 20 ppm 8 hours. TWA: 73 mg/m³ 8 hours.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for

SECTION 8: Exposure controls/personal protection

methods for the determination of hazardous substances will also be required.

DNELs/DMELs

No DNELs/DMELs available.

PNECs

No PNECs available

8.2 Exposure controls

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, vapour or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

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. Refer to European Standard EN 1149 for further information on material and design requirements and test methods.

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 : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

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.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state :

13C S/N ASTM	Liquid.
19F S/N	Liquid.
15N S/N	Liquid.
31P S/N	Liquid.
13C S/N ASTM doped	Liquid.

SECTION 9: Physical and chemical properties

Colour	:	13C S/N ASTM	Colourless.
		19F S/N	Not available.
		15N S/N	Not available.
		31P S/N	Not available.
		13C S/N ASTM doped	Colourless.
Odour	:	13C S/N ASTM	Not available.
		19F S/N	Not available.
		15N S/N	Not available.
		31P S/N	Not available.
		13C S/N ASTM doped	Not available.
Odour threshold	:	13C S/N ASTM	Not available.
		19F S/N	Not available.
		15N S/N	Not available.
		31P S/N	Not available.
		13C S/N ASTM doped	Not available.
pH	:	13C S/N ASTM	Not available.
		19F S/N	Not available.
		15N S/N	Not available.
		31P S/N	Not available.
		13C S/N ASTM doped	Not available.
Melting point/freezing point	:	13C S/N ASTM	6.8°C
		19F S/N	5°C
		15N S/N	Not available.
		31P S/N	-64°C
		13C S/N ASTM doped	6.8°C
Initial boiling point and boiling range	:	13C S/N ASTM	79.1°C
		19F S/N	80°C
		15N S/N	Not available.
		31P S/N	62°C
		13C S/N ASTM doped	79.1°C
Flash point	:	13C S/N ASTM	Closed cup: -18 to 23°C
		19F S/N	Closed cup: -11.11°C
		15N S/N	Closed cup: 87.8°C
		31P S/N	Not available.
		13C S/N ASTM doped	Closed cup: 21.1°C
Evaporation rate	:	13C S/N ASTM	Not available.
		19F S/N	Not available.
		15N S/N	Not available.
		31P S/N	Not available.
		13C S/N ASTM doped	Not available.
Flammability (solid, gas)	:	13C S/N ASTM	Not applicable.
		19F S/N	Not applicable.
		15N S/N	Not applicable.
		31P S/N	Not applicable.
		13C S/N ASTM doped	Not applicable.
Upper/lower flammability or explosive limits	:	13C S/N ASTM	Lower: 1.3% Upper: 8%
		19F S/N	Not available.
		15N S/N	Not available.
		31P S/N	Not available.
		13C S/N ASTM doped	Not available.
Vapour pressure	:	13C S/N ASTM	22.1 kPa [room temperature]
		19F S/N	Not available.
		15N S/N	Not available.
		31P S/N	Not available.
		13C S/N ASTM doped	22.1 kPa [room temperature]
Vapour density	:	13C S/N ASTM	>1 [Air = 1]
		19F S/N	Not available.
		15N S/N	Not available.
		31P S/N	Not available.
		13C S/N ASTM doped	2.77 [Air = 1]

SECTION 9: Physical and chemical properties

Relative density	:	13C S/N ASTM	0.95
		19F S/N	Not available.
		15N S/N	Not available.
		31P S/N	Not available.
		13C S/N ASTM doped	0.98
Solubility(ies)	:	13C S/N ASTM	Easily 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 water and hot water.
		13C S/N ASTM doped	Easily soluble in the following materials: cold water and hot water.
Partition coefficient: n-octanol/water	:	13C S/N ASTM	Not available.
		19F S/N	Not available.
		15N S/N	Not available.
		31P S/N	Not available.
		13C S/N ASTM doped	Not available.
Auto-ignition temperature	:	13C S/N ASTM	Not available.
		19F S/N	Not available.
		15N S/N	Not available.
		31P S/N	Not available.
		13C S/N ASTM doped	Not available.
Decomposition temperature	:	13C S/N ASTM	Not available.
		19F S/N	Not available.
		15N S/N	Not available.
		31P S/N	Not available.
		13C S/N ASTM doped	Not available.
Viscosity	:	13C S/N ASTM	Not available.
		19F S/N	Not available.
		15N S/N	Not available.
		31P S/N	Not available.
		13C S/N ASTM doped	Not available.
Explosive properties	:	13C S/N ASTM	Not available.
		19F S/N	May form explosive mixtures with air.
		15N S/N	Not available.
		31P S/N	Not available.
		13C S/N ASTM doped	Not available.
Oxidising properties	:	13C S/N ASTM	Not available.
		19F S/N	Not available.
		15N S/N	Not available.
		31P S/N	Not available.
		13C S/N ASTM doped	Not available.

9.2 Other information

No additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity	:	13C S/N ASTM	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.
		13C S/N ASTM doped	No specific test data related to reactivity available for this product or its ingredients.

SECTION 10: Stability and reactivity

10.2 Chemical stability

13C S/N ASTM	The product is stable.
19F S/N	The product is stable.
15N S/N	The product is stable.
31P S/N	The product is stable.
13C S/N ASTM doped	The product is stable.

10.3 Possibility of hazardous reactions

13C S/N ASTM	Under normal conditions of storage and use, hazardous reactions will not occur.
19F S/N	Under normal conditions of storage and use, hazardous reactions will not occur.
15N S/N	Under normal conditions of storage and use, hazardous reactions will not occur.
31P S/N	Under normal conditions of storage and use, hazardous reactions will not occur.
13C S/N ASTM doped	Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid

13C S/N ASTM	Avoid all possible sources of ignition (spark or flame). Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapour to accumulate in low or confined areas.
19F S/N	Avoid all possible sources of ignition (spark or flame). Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
15N S/N	No specific data.
31P S/N	No specific data.
13C S/N ASTM doped	Avoid all possible sources of ignition (spark or flame). Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapour to accumulate in low or confined areas.

10.5 Incompatible materials

13C S/N ASTM	Reactive or incompatible with the following materials: oxidizing materials
19F S/N	Reactive or incompatible with the following materials: oxidizing materials
15N S/N	May react or be incompatible with oxidising materials.
31P S/N	May react or be incompatible with oxidising materials.
13C S/N ASTM doped	Reactive or incompatible with the following materials: oxidizing materials

10.6 Hazardous decomposition products

13C S/N ASTM	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
19F S/N	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
15N S/N	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
31P S/N	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
13C S/N ASTM doped	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

SECTION 11: Toxicological information

Product/ingredient name	Result	Species	Dose	Exposure
13C S/N ASTM				
(2H6)benzene	LD50 Oral	Rat	930 mg/kg	-
1,4-Dioxane	LD50 Oral	Rat	4200 mg/kg	-
19F S/N				
(2H6)benzene	LD50 Oral	Rat	930 mg/kg	-
15N S/N				
Formamide	LD50 Dermal	Rabbit	17 g/kg	-
	LD50 Oral	Rat	4000 mg/kg	-
31P S/N				
(^{2}H)Chloroform	LC50 Inhalation Vapour	Rat	47702 mg/m^3	4 hours
	LD50 Dermal	Rabbit	>20 g/kg	-
	LD50 Oral	Rat	300 mg/kg	-
Triphenyl phosphate	LD50 Dermal	Rabbit	>7900 mg/kg	-
	LD50 Oral	Rat	3500 mg/kg	-
13C S/N ASTM doped				
(2H6)benzene	LD50 Oral	Rat	930 mg/kg	-
1,4-Dioxane	LD50 Oral	Rat	4200 mg/kg	-

Acute toxicity estimates

Route	ATE value
31P S/N	
Oral	505.4 mg/kg
Inhalation (vapours)	3.032 mg/l

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
13C S/N ASTM					
(2H6)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	-
1,4-Dioxane	Eyes - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
	Skin - Mild irritant	Rabbit	-	515 milligrams	-
19F S/N					
(2H6)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	-
15N S/N					
Formamide	Eyes - Severe irritant	Rabbit	-	100 milligrams	-
31P S/N					

SECTION 11: Toxicological information

(^{2}H)Chloroform	Eyes - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
13C S/N ASTM doped					
(2H6)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	-
1,4-Dioxane	Eyes - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
	Skin - Mild irritant	Rabbit	-	515 milligrams	-

Skin : Repeated exposure may cause skin dryness or cracking.

Sensitiser

Conclusion/Summary : Not available.

Chronic toxicity / Carcinogenicity / Mutagenicity / Teratogenicity / Reproductive toxicity

Not available.

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
13C S/N ASTM			
1,4-Dioxane	Category 3	Not applicable.	Respiratory tract irritation
13C S/N ASTM doped			
1,4-Dioxane	Category 3	Not applicable.	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Product/ingredient name	Category	Route of exposure	Target organs
13C S/N ASTM			
(2H6)benzene	Category 1	Not determined	Not determined
19F S/N			
(2H6)benzene	Category 1	Not determined	Not determined
31P S/N			
(^{2}H)Chloroform	Category 1	Not determined	Not determined
13C S/N ASTM doped			
(2H6)benzene	Category 1	Not determined	Not determined

Aspiration hazard

Product/ingredient name	Result
13C S/N ASTM	
13C S/N ASTM	ASPIRATION HAZARD - Category 1
(2H6)benzene	ASPIRATION HAZARD - Category 1
19F S/N	
19F S/N	ASPIRATION HAZARD - Category 1
(2H6)benzene	ASPIRATION HAZARD - Category 1

SECTION 11: Toxicological information

13C S/N ASTM doped 13C S/N ASTM doped (2H6)benzene	 ASPIRATION HAZARD - Category 1 ASPIRATION HAZARD - Category 1

Information on likely routes of exposure

13C S/N ASTM	Routes of entry anticipated: Oral, Dermal, Inhalation.
19F S/N	Routes of entry anticipated: Oral, Dermal, Inhalation.
15N S/N	Routes of entry anticipated: Oral, Dermal, Inhalation.
31P S/N	Routes of entry anticipated: Oral, Dermal, Inhalation.
13C S/N ASTM doped	Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Inhalation

13C S/N ASTM	May cause respiratory irritation.
19F S/N	No known significant effects or critical hazards.
15N S/N	No known significant effects or critical hazards.
31P S/N	Toxic if inhaled.
13C S/N ASTM doped	May cause respiratory irritation.

Ingestion

13C S/N ASTM	May be fatal if swallowed and enters airways.
19F S/N	May be fatal if swallowed and enters airways.
15N S/N	No known significant effects or critical hazards.
31P S/N	Harmful if swallowed.
13C S/N ASTM doped	May be fatal if swallowed and enters airways.

Skin contact

13C S/N ASTM	Causes skin irritation. Defatting to the skin.
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.
13C S/N ASTM doped	Causes skin irritation. Defatting to the skin.

Eye contact

13C S/N ASTM	Causes serious eye irritation.
19F S/N	Causes serious eye irritation.
15N S/N	No known significant effects or critical hazards.
31P S/N	Causes serious eye irritation.
13C S/N ASTM doped	Causes serious eye irritation.

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation

13C S/N ASTM	Adverse symptoms may include the following: respiratory tract irritation coughing
19F S/N	No specific data.
15N S/N	Adverse symptoms may include the following: reduced foetal weight increase in foetal deaths skeletal malformations
31P S/N	Adverse symptoms may include the following: reduced foetal weight increase in foetal deaths skeletal malformations
13C S/N ASTM doped	Adverse symptoms may include the following: respiratory tract irritation coughing

Ingestion

13C S/N ASTM	Adverse symptoms may include the following: nausea or vomiting
19F S/N	Adverse symptoms may include the following: nausea or vomiting
15N S/N	Adverse symptoms may include the following: reduced foetal weight increase in foetal deaths skeletal malformations
31P S/N	Adverse symptoms may include the following: reduced foetal weight increase in foetal deaths skeletal malformations

SECTION 11: Toxicological information

		13C S/N ASTM doped	Adverse symptoms may include the following: nausea or vomiting
Skin contact	:	13C S/N ASTM	Adverse symptoms may include the following: irritation redness dryness cracking
		19F S/N	Adverse symptoms may include the following: irritation redness dryness cracking
		15N S/N	Adverse symptoms may include the following: reduced foetal weight increase in foetal deaths skeletal malformations
		31P S/N	Adverse symptoms may include the following: irritation redness reduced foetal weight increase in foetal deaths skeletal malformations
		13C S/N ASTM doped	Adverse symptoms may include the following: irritation redness dryness cracking
Eye contact	:	13C S/N ASTM	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	No specific data.
		31P S/N	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

Delayed and immediate effects as well as 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

SECTION 11: Toxicological information

General	:	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.
		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	No known significant effects or critical hazards.
		31P S/N	Causes damage to organs through prolonged or repeated exposure.
		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.
Carcinogenicity	:	13C S/N ASTM	May cause 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.
		13C S/N ASTM doped	May cause cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	:	13C S/N ASTM	May cause genetic defects.
		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.
		13C S/N ASTM doped	May cause genetic defects.
Teratogenicity	:	13C S/N ASTM	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	Suspected of damaging the unborn child.
		13C S/N ASTM doped	No known significant effects or critical hazards.
Developmental effects	:	13C S/N ASTM	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.
		13C S/N ASTM doped	No known significant effects or critical hazards.
Fertility effects	:	13C S/N ASTM	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.
		13C S/N ASTM doped	No known significant effects or critical hazards.
Other information	:	13C S/N ASTM	Not available.
		19F S/N	Not available.
		15N S/N	Not available.
		31P S/N	Not available.
		13C S/N ASTM doped	Not available.

SECTION 12: Ecological information

12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
13C S/N ASTM			
(2H6)benzene	Acute EC50 29000 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 1600000 µg/l Fresh water	Algae - Selenastrum sp.	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 98 mg/l Fresh water	Daphnia - Daphnia magna	21 days

SECTION 12: Ecological information

	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
19F S/N			
(2H6)benzene	Acute EC50 29000 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 1600000 µg/l Fresh water	Algae - Selenastrum sp.	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 98 mg/l Fresh water	Daphnia - Daphnia magna	21 days
	Chronic NOEC 1.5 to 5.4 ul/L Marine water	Fish - Morone saxatilis - Juvenile (Fledgling, Hatchling, Weanling)	4 weeks
31P S/N			
(^{2}H)Chloroform	Acute EC50 13.3 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase	72 hours
	Acute EC50 2.803 mg/l Fresh water	Crustaceans - Cypris subglobosa	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
	Chronic NOEC 1.8 mg/l Fresh water	Daphnia - Daphnia magna	21 days
Triphenyl phosphate	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 - Fingerling	96 hours
	Chronic NOEC 55 µg/l Fresh water	Fish - Oncorhynchus mykiss - Fingerling	30 days
13C S/N ASTM doped			
(2H6)benzene	Acute EC50 29000 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 1600000 µg/l Fresh water	Algae - Selenastrum sp.	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 98 mg/l Fresh water	Daphnia - Daphnia magna	21 days
	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

12.2 Persistence and degradability

Not available.

12.3 Bioaccumulative potential

SECTION 12: Ecological information

Product/ingredient name	$LogP_{ow}$	BCF	Potential
13C S/N ASTM			
(2H6)benzene	2.13	11	low
1,4-Dioxane	-0.42	0.3 to 0.7	low
19F S/N			
(2H6)benzene	2.13	11	low
15N S/N			
Formamide	-0.82	-	low
31P S/N			
(^{2}H)Chloroform	1.97	690	high
Triphenyl phosphate	4.63	144	low
13C S/N ASTM doped			
(2H6)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_{OC}) : Not available.

Mobility : Not available.

12.5 Results of PBT and vPvB assessment

PBT : Not applicable.

vPvB : Not applicable.

12.6 Other adverse effects : No known significant effects or critical hazards.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Methods of disposal : The generation of waste should be avoided or minimised 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.

Hazardous waste : The classification of the product may meet the criteria for a hazardous waste.

Packaging

Methods of disposal : The generation of waste should be avoided or minimised wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

Special precautions : 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. Vapour 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 spilt material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14: Transport information

This 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

ADR/RID / IMDG / IATA : Not regulated.

Additional information : **Remarks**
De minimis quantities

14.6 Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code : Not available.

SECTION 15: Regulatory information

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

EU Regulation (EC) No. 1907/2006 (REACH)

Annex XIV - List of substances subject to authorisation

Annex XIV

None of the components are listed.

Substances of very high concern

Ingredient name	Intrinsic property	Status	Reference number	Date of revision
15N S/N Formamide	Toxic to reproduction	Candidate	ED/87/2012	6/18/2012

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles :

13C S/N ASTM	Restricted to professional users.
19F S/N	Restricted to professional users.
15N S/N	Restricted to professional users.
31P S/N	For use in industrial installations only.
13C S/N ASTM doped	Restricted to professional users.

Other EU regulations

Europe inventory : All components are listed or exempted.

Industrial emissions (integrated pollution prevention and control) - Air : Listed

Product/ingredient name	Carcinogenic effects	Mutagenic effects	Developmental effects	Fertility effects
13C S/N ASTM				
benzene	Carc. 1A, H350	Muta. 1B, H340	-	-
1,4-dioxane	Carc. 2, H351	-	-	-
19F S/N				
benzene	Carc. 1A, H350	Muta. 1B, H340	-	-
15N S/N				
formamide	-	-	Repr. 1B, H360D (Unborn child)	-
31P S/N				
trichloromethane	Carc. 2, H351	-	Repr. 2, H361d (Unborn child)	-

SECTION 15: Regulatory information

13C S/N ASTM doped				
benzene	Carc. 1A, H350	Muta. 1B, H340	-	-
1,4-dioxane	Carc. 2, H351	-	-	-

Seveso Directive

This product is controlled under the Seveso Directive.

Danger criteria

Category
13C S/N ASTM P5c: Flammable liquids 2 and 3 not falling under P5a or P5b **19F S/N** P5c: Flammable liquids 2 and 3 not falling under P5a or P5b **31P S/N** H2: Acute toxicity 2 any route of entry or Acute toxicity 3 Inhalation route of entry **13C S/N ASTM doped** P5c: Flammable liquids 2 and 3 not falling under P5a or P5b

National regulations

Product/ingredient name	List name	Name on list	Classification	Notes
13C S/N ASTM				
benzene	UK Occupational Exposure Limits EH40 - WEL	benzene; benzol	Carc.	-
19F S/N				
benzene	UK Occupational Exposure Limits EH40 - WEL	benzene; benzol	Carc.	-
13C S/N ASTM doped				
benzene	UK Occupational Exposure Limits EH40 - WEL	benzene; benzol	Carc.	-

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Inform Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

International lists

National inventory

Australia : All components are listed or exempted.

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

China : All components are listed or exempted.

SECTION 15: Regulatory information

Japan	:	**Japan inventory (ENCS)**: All components are listed or exempted. **Japan inventory (ISHL)**: All components are listed or exempted.
Malaysia	:	All components are listed or exempted.
New Zealand	:	All components are listed or exempted.
Philippines	:	Not determined.
Republic of Korea	:	Not determined.
Taiwan	:	All components are listed or exempted.
Turkey	:	Not determined.
United States	:	All components are listed or exempted.

15.2 Chemical safety assessment : This product contains substances for which Chemical Safety Assessments might still be required.

SECTION 16: Other information

Indicates information that has changed from previously issued version.

Abbreviations and acronyms : ATE = Acute Toxicity Estimate
CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
DNEL = Derived No Effect Level
EUH statement = CLP-specific Hazard statement
PNEC = Predicted No Effect Concentration
RRN = REACH Registration Number

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Classification	Justification
13C S/N ASTM	
Flam. Liq. 2, H225	On basis of test data
Skin Irrit. 2, H315	Calculation method
Eye Irrit. 2, H319	Calculation method
Muta. 1B, H340	Calculation method
Carc. 1A, H350	Calculation method
STOT SE 3, H335	Calculation method
STOT RE 1, H372	Calculation method
Asp. Tox. 1, H304	Expert judgment
19F S/N	
Flam. Liq. 2, H225	On basis of test data
Skin Irrit. 2, H315	Calculation method
Eye Irrit. 2, H319	Calculation method
Muta. 1B, H340	Calculation method
Carc. 1A, H350	Calculation method
STOT RE 1, H372	Calculation method
Asp. Tox. 1, H304	Expert judgment
15N S/N	
Repr. 1B, H360D (Unborn child)	Calculation method
31P S/N	
Acute Tox. 4, H302	Calculation method
Acute Tox. 3, H331	Calculation method
Skin Irrit. 2, H315	Calculation method
Eye Irrit. 2, H319	Calculation method
Carc. 2, H351	Calculation method
Repr. 2, H361d (Unborn child)	Calculation method
STOT RE 1, H372	Calculation method
Aquatic Chronic 3, H412	Calculation method
13C S/N ASTM doped	
Flam. Liq. 2, H225	On basis of test data
Skin Irrit. 2, H315	Calculation method

SECTION 16: Other information

Eye Irrit. 2, H319	Calculation method
Muta. 1B, H340	Calculation method
Carc. 1A, H350	Calculation method
STOT SE 3, H335	Calculation method
STOT RE 1, H372	Calculation method
Asp. Tox. 1, H304	Expert judgment

Full text of abbreviated H statements :

13C S/N ASTM

H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H340	May cause genetic defects.
H350	May cause cancer.
H351	Suspected of causing cancer.
H372	Causes damage to organs through prolonged or repeated exposure.

19F S/N

H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H340	May cause genetic defects.
H350	May cause cancer.
H372	Causes damage to organs through prolonged or repeated exposure.

15N S/N

H360D (Unborn child)	May damage the unborn child.

31P S/N

H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H351	Suspected of causing cancer.
H361d (Unborn child)	Suspected of damaging the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.

13C S/N ASTM doped

H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H340	May cause genetic defects.
H350	May cause cancer.
H351	Suspected of causing cancer.
H372	Causes damage to organs through prolonged or repeated exposure.

Full text of classifications [CLP/GHS] :

13C S/N ASTM

Asp. Tox. 1, H304	ASPIRATION HAZARD - Category 1
Carc. 1A, H350	CARCINOGENICITY - Category 1A
Carc. 2, H351	CARCINOGENICITY - Category 2
EUH019	May form explosive peroxides.
EUH066	Repeated exposure may cause skin dryness or cracking.
Eye Irrit. 2, H319	SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2
Flam. Liq. 2, H225	FLAMMABLE LIQUIDS - Category 2

SECTION 16: Other information

Muta. 1B, H340	GERM CELL MUTAGENICITY - Category 1B
Skin Irrit. 2, H315	SKIN CORROSION/IRRITATION - Category 2
STOT RE 1, H372	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1
STOT SE 3, H335	SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3

19F S/N

Asp. Tox. 1, H304	ASPIRATION HAZARD - Category 1
Carc. 1A, H350	CARCINOGENICITY - Category 1A
Eye Irrit. 2, H319	SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2
Flam. Liq. 2, H225	FLAMMABLE LIQUIDS - Category 2
Muta. 1B, H340	GERM CELL MUTAGENICITY - Category 1B
Skin Irrit. 2, H315	SKIN CORROSION/IRRITATION - Category 2
STOT RE 1, H372	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1

15N S/N

Repr. 1B, H360D (Unborn child)	TOXIC TO REPRODUCTION (Unborn child) - Category 1B

31P S/N

Acute Tox. 3, H331	ACUTE TOXICITY (inhalation) - Category 3
Acute Tox. 4, H302	ACUTE TOXICITY (oral) - Category 4
Aquatic Acute 1, H400	ACUTE AQUATIC HAZARD - Category 1
Aquatic Chronic 1, H410	LONG-TERM AQUATIC HAZARD - Category 1
Aquatic Chronic 3, H412	LONG-TERM AQUATIC HAZARD - Category 3
Carc. 2, H351	CARCINOGENICITY - Category 2
Eye Irrit. 2, H319	SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2
Repr. 2, H361d (Unborn child)	TOXIC TO REPRODUCTION (Unborn child) - Category 2
Skin Irrit. 2, H315	SKIN CORROSION/IRRITATION - Category 2
STOT RE 1, H372	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1

13C S/N ASTM doped

Asp. Tox. 1, H304	ASPIRATION HAZARD - Category 1
Carc. 1A, H350	CARCINOGENICITY - Category 1A
Carc. 2, H351	CARCINOGENICITY - Category 2
EUH019	May form explosive peroxides.
EUH066	Repeated exposure may cause skin dryness or cracking.
Eye Irrit. 2, H319	SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2
Flam. Liq. 2, H225	FLAMMABLE LIQUIDS - Category 2
Muta. 1B, H340	GERM CELL MUTAGENICITY - Category 1B
Skin Irrit. 2, H315	SKIN CORROSION/IRRITATION - Category 2
STOT RE 1, H372	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1
STOT SE 3, H335	SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3

Date of issue/ Date of revision : 31/12/2015

Date of previous issue : No previous validation.

Version : 1

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