

Material Safety Data Sheet

PROBE SAMPLE KIT - 5MM - 400 OneNMR Probe

1. Product and company identification

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

Product name : PROBE SAMPLE KIT - 5MM - 400 OneNMR Probe

Material uses : Analytical chemistry.

19F S/N	860 µl
15N S/N	860 µl
31P S/N	860 µl
1H Lineshape	860 µl
13C S/N ASTM doped	860 µl
13C S/N	860 µl
13C S/N ASTM	860 µl
1H S/N	860 µl

Supplier/Manufacturer : Agilent Technologies, Inc.
Logistics Center - Americas
500 Ships Landing Way
New Castle, Delaware 19720
800-227-9770

Part No. (Chemical Kit) : 94906563

Part No.	19F S/N	96812082
	15N S/N	96812083
	31P S/N	96812087
	1H Lineshape	96812089
	13C S/N ASTM doped	96812091
	13C S/N	9100071116
	13C S/N ASTM	9100071169
	1H S/N	9100071170

Validation date : 08/15/2012

In case of emergency : Chemtrec: 1-800-424-9300

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.

Physical state	19F S/N	Liquid.
	15N S/N	Liquid.
	31P S/N	Liquid.
	1H Lineshape	Liquid.
	13C S/N ASTM doped	Liquid.
	13C S/N	Liquid.
	13C S/N ASTM	Liquid.
	1H S/N	Liquid.
Odor	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	Pleasant. / Sweet.
	13C S/N ASTM	Not available.
	1H S/N	Not available.

2. Hazards identification

OSHA/HCS status	: 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	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).
	1H S/N	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
<u>Emergency overview</u>		
Signal word	: 19F S/N	WARNING!
	15N S/N	WARNING!
	31P S/N	WARNING!
	1H Lineshape	WARNING!
	13C S/N ASTM doped	WARNING!
	13C S/N	WARNING!
	13C S/N ASTM	WARNING!
	1H S/N	WARNING!
Hazard statements	: 19F S/N	FLAMMABLE LIQUID AND VAPOR. MAY BE HARMFUL IF SWALLOWED. MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. CONTAINS MATERIAL WHICH MAY CAUSE HERITABLE GENETIC EFFECTS.
	15N S/N	COMBUSTIBLE LIQUID AND VAPOR. CAUSES EYE IRRITATION. MAY CAUSE SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. POSSIBLE DEVELOPMENTAL HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE ADVERSE DEVELOPMENTAL EFFECTS, BASED ON ANIMAL DATA.
	31P S/N	CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY BE HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. SUSPECT CANCER HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE CANCER.
	1H Lineshape	FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. SUSPECT CANCER HAZARD -

2. Hazards identification

13C S/N ASTM doped	CONTAINS MATERIAL WHICH MAY CAUSE CANCER. FLAMMABLE LIQUID AND VAPOR. CAUSES RESPIRATORY TRACT AND EYE IRRITATION. MAY BE HARMFUL IF SWALLOWED. MAY CAUSE SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. CONTAINS MATERIAL WHICH MAY CAUSE HERITABLE GENETIC EFFECTS.
13C S/N	FLAMMABLE LIQUID AND VAPOR. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY BE HARMFUL IF SWALLOWED. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. SUSPECT CANCER HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE CANCER.
13C S/N ASTM	FLAMMABLE LIQUID AND VAPOR. CAUSES RESPIRATORY TRACT AND EYE IRRITATION. MAY BE HARMFUL IF SWALLOWED. MAY CAUSE SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. CONTAINS MATERIAL WHICH MAY CAUSE HERITABLE GENETIC EFFECTS.
1H S/N	CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY BE HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. SUSPECT CANCER HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE CANCER.
Precautions : 19F S/N	Keep away from heat, sparks and flame. Avoid exposure - obtain special instructions before use. Do not breathe vapor or mist. Do not ingest. Do not get on skin or clothing. Avoid contact with eyes. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
15N S/N	Keep away from heat, sparks and flame. Avoid exposure - obtain special instructions before use. Do not breathe vapor or mist. Do not get on skin or clothing. Avoid contact with eyes. Avoid exposure during pregnancy. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
31P S/N	Avoid exposure - obtain special instructions before use. Do not breathe vapor or mist. Do not ingest. Do not get on skin or clothing. Avoid contact with eyes. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
1H Lineshape	Keep away from heat, sparks and flame. Avoid exposure - obtain special instructions before use. Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash

2. Hazards identification

13C S/N ASTM doped	thoroughly after handling. Keep away from heat, sparks and flame. Avoid exposure - obtain special instructions before use. Do not breathe vapor or mist. Do not ingest. Do not get on skin or clothing. Avoid contact with eyes. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
13C S/N	Keep away from heat, sparks and flame. Avoid exposure - obtain special instructions before use. Do not breathe vapor or mist. Do not ingest. Do not get on skin or clothing. Avoid contact with eyes. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
13C S/N ASTM	Keep away from heat, sparks and flame. Avoid exposure - obtain special instructions before use. Do not breathe vapor or mist. Do not ingest. Do not get on skin or clothing. Avoid contact with eyes. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
1H S/N	Avoid exposure - obtain special instructions before use. Do not breathe vapor or mist. Do not ingest. Do not get on skin or clothing. Avoid contact with eyes. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
Routes of entry :	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	Not available.
13C S/N ASTM	Not available.
1H S/N	Not available.

Potential acute health effects

Inhalation :	Moderately irritating to the respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
19F S/N	Irritating to respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
15N S/N	Irritating to respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
31P S/N	Irritating to respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
1H Lineshape	Irritating to respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
13C S/N ASTM doped	Irritating to respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
13C S/N	Irritating to respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
13C S/N ASTM	Irritating to respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
1H S/N	Irritating to respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

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Ingestion	: 19F S/N 15N S/N 31P S/N 1H Lineshape 13C S/N ASTM doped 13C S/N 13C S/N ASTM 1H S/N	Harmful if swallowed. No known significant effects or critical hazards. Harmful if swallowed. Toxic if swallowed. Harmful if swallowed. Harmful if swallowed. Harmful if swallowed. Harmful if swallowed.
Skin	: 19F S/N 15N S/N 31P S/N 1H Lineshape 13C S/N ASTM doped 13C S/N 13C S/N ASTM 1H S/N	Moderately irritating to the skin. Moderately irritating to the skin. Irritating to skin. Irritating to skin. Moderately irritating to the skin. Defatting to the skin. Irritating to skin. Moderately irritating to the skin. Defatting to the skin. Irritating to skin.
Eyes	: 19F S/N 15N S/N 31P S/N 1H Lineshape 13C S/N ASTM doped 13C S/N 13C S/N ASTM 1H S/N	Moderately irritating to eyes. Irritating to eyes. Irritating to eyes. Severely irritating to eyes. Risk of serious damage to eyes. Irritating to eyes. Irritating to eyes. Irritating to eyes. Irritating to eyes.
<u>Potential chronic health effects</u>		
Chronic effects	: 19F S/N 15N S/N 31P S/N 1H Lineshape 13C S/N ASTM doped 13C S/N 13C S/N ASTM 1H S/N	Contains material that may cause target organ damage, based on animal data. Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis. Contains material that may cause target organ damage, based on animal data. Contains material that may cause target organ damage, based on animal data. Contains material that may cause target organ damage, based on animal data. Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis. Contains material that may cause target organ damage, based on animal data. Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis. May cause target organ damage, based on animal data. Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis. Contains material that may cause target organ damage, based on animal data. Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis. Contains material that may cause target organ damage, based on animal data.
Carcinogenicity	: 19F S/N 15N S/N 31P S/N 1H Lineshape	Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure. No known significant effects or critical hazards. Contains material which may cause cancer. Risk of cancer depends on duration and level of exposure. Contains material which may cause cancer. Risk

2. Hazards identification

	13C S/N ASTM doped	of cancer depends on duration and level of exposure. Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.
	13C S/N	Contains material which may cause cancer. Risk of cancer depends on duration and level of exposure.
	13C S/N ASTM	Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.
	1H S/N	Contains material which may cause cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	: 19F S/N	Contains material which may cause heritable genetic effects.
	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	Contains material which may cause heritable genetic effects.
	13C S/N	No known significant effects or critical hazards.
	13C S/N ASTM	Contains material which may cause heritable genetic effects.
	1H S/N	No known significant effects or critical hazards.
Teratogenicity	: 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	No known significant effects or critical hazards.
	13C S/N ASTM	No known significant effects or critical hazards.
	1H S/N	No known significant effects or critical hazards.
Developmental effects	: 19F S/N	No known significant effects or critical hazards.
	15N S/N	Contains material which may cause developmental abnormalities, based on animal data.
	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	No known significant effects or critical hazards.
	13C S/N ASTM	No known significant effects or critical hazards.
	1H S/N	No known significant effects or critical hazards.
Fertility effects	: 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	No known significant effects or critical hazards.
	13C S/N ASTM	No known significant effects or critical hazards.
	1H S/N	No known significant effects or critical hazards.
Target organs	: 19F S/N	Contains material which may cause damage to the following organs: blood, upper respiratory tract, skin, eyes, bone marrow, central nervous system (CNS).
	15N S/N	Contains material which may cause damage to the following organs: kidneys, the reproductive system, liver, mucous membranes, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.
	31P S/N	Contains material which may cause damage to the following organs: blood, kidneys, the nervous system, the reproductive system, liver, heart,

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1H Lineshape	peripheral nervous system, upper respiratory tract, skin, eyes, central nervous system (CNS). Contains material which may cause damage to the following organs: blood, kidneys, the reproductive system, liver, heart, gastrointestinal tract, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.
13C S/N ASTM doped	Contains material which may cause damage to the following organs: blood, kidneys, liver, upper respiratory tract, skin, bone marrow, central nervous system (CNS), eye, lens or cornea.
13C S/N	May cause damage to the following organs: cardiovascular system. Contains material which may cause damage to the following organs: kidneys, the reproductive system, liver, heart, upper respiratory tract, skin, eyes, central nervous system (CNS), ears.
13C S/N ASTM	Contains material which may cause damage to the following organs: blood, kidneys, liver, upper respiratory tract, skin, bone marrow, central nervous system (CNS), eye, lens or cornea.
1H S/N	Contains material which may cause damage to the following organs: kidneys, the reproductive system, liver, heart, upper respiratory tract, skin, eyes, central nervous system (CNS).

Over-exposure signs/symptoms

Inhalation	: 19F S/N	Adverse symptoms may include the following: respiratory tract irritation coughing
	15N S/N	Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths
	31P S/N	Adverse symptoms may include the following: respiratory tract irritation coughing
	1H Lineshape	Adverse symptoms may include the following: respiratory tract irritation coughing
	13C S/N ASTM doped	Adverse symptoms may include the following: respiratory tract irritation coughing
	13C S/N	Adverse symptoms may include the following: respiratory tract irritation coughing
	13C S/N ASTM	Adverse symptoms may include the following: respiratory tract irritation coughing
	1H S/N	Adverse symptoms may include the following: respiratory tract irritation coughing
Ingestion	: 19F S/N	No specific data.
	15N S/N	Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths
	31P S/N	No specific data.
	1H Lineshape	No specific data.
	13C S/N ASTM doped	No specific data.
	13C S/N	No specific data.
	13C S/N ASTM	No specific data.
	1H S/N	No specific data.

2. Hazards identification

Skin	: 19F S/N	Adverse symptoms may include the following: irritation redness dryness cracking
	15N S/N	Adverse symptoms may include the following: irritation redness reduced fetal weight increase in fetal deaths
	31P S/N	Adverse symptoms may include the following: irritation redness
	1H Lineshape	Adverse symptoms may include the following: irritation redness dryness cracking
	13C S/N ASTM doped	Adverse symptoms may include the following: irritation redness dryness cracking
	13C S/N	Adverse symptoms may include the following: irritation redness dryness cracking
	13C S/N ASTM	Adverse symptoms may include the following: irritation redness dryness cracking
	1H S/N	Adverse symptoms may include the following: irritation redness
	Eyes	: 19F S/N
15N S/N		Adverse symptoms may include the following: pain or irritation watering redness reduced fetal weight increase in fetal deaths
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		Adverse symptoms may include the following: pain or irritation watering redness
13C S/N ASTM		Adverse symptoms may include the following:

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		pain or irritation watering redness
	1H S/N	Adverse symptoms may include the following: pain or irritation watering redness
Medical conditions aggravated by over-exposure	: 19F S/N	Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.
	15N S/N	Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.
	31P S/N	Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.
	1H Lineshape	Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.
	13C S/N ASTM doped	Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.
	13C S/N	Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.
	13C S/N ASTM	Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.
	1H S/N	Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

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.

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

3. Composition/information on ingredients

Ethylbenzene	100-41-4	5 - 10
13C S/N ASTM (² H ₆)Benzene	1076-43-3	30 - 60
1,4-Dioxane	123-91-1	30 - 60
1H S/N (² H)Chloroform	865-49-6	60 - 100

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.

4. First aid measures

Eye contact	: 19F S/N	Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
	15N S/N	Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
	31P S/N	Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
	1H Lineshape	Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
	13C S/N ASTM doped	Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
	13C S/N	Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
	13C S/N ASTM	Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
	1H S/N	Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
Skin contact	: 19F S/N	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
	15N S/N	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
	31P S/N	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
	1H Lineshape	In case of contact, immediately flush skin with

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	13C S/N ASTM doped	plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately. In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
	13C S/N	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
	13C S/N ASTM	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
	1H S/N	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
Inhalation	: 19F S/N	Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
	15N S/N	Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
	31P S/N	Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
	1H Lineshape	Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
	13C S/N ASTM doped	Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
	13C S/N	Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
	13C S/N ASTM	Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by

4. First aid measures

	1H S/N	trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.	
Ingestion	: 19F S/N	Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.	
	15N S/N	Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.	
	31P S/N	Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.	
	1H Lineshape	Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.	
	13C S/N ASTM doped	Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.	
	13C S/N	Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.	
	13C S/N ASTM	Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.	
	1H S/N	Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.	
	Protection of first-aiders	: 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 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

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31P S/N

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.

1H Lineshape

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.

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.

13C S/N

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13C S/N ASTM

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1H 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.

4. First aid measures

Notes to physician	: 19F S/N	No specific treatment. 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	No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
	1H Lineshape	No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
	13C S/N ASTM doped	No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
	13C S/N	No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
	13C S/N ASTM	No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
	1H S/N	No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

Flammability of the product	: 19F S/N	Flammable 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.
	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.
	31P S/N	In a fire or if heated, a pressure increase will occur and the container may burst.
	1H Lineshape	Flammable 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.
	13C S/N ASTM doped	Flammable liquid. 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 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.
	13C S/N	Flammable 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.
	13C S/N ASTM	Flammable liquid. 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 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.
	1H S/N	In a fire or if heated, a pressure increase will occur and the container may burst.

5. Fire-fighting measures

Hazardous thermal decomposition products	: 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
	1H Lineshape	Decomposition products may include the following materials: carbon dioxide carbon monoxide halogenated compounds carbonyl halides
	13C S/N ASTM doped	Decomposition products may include the following materials: carbon dioxide carbon monoxide
	13C S/N	Decomposition products may include the following materials: carbon dioxide carbon monoxide halogenated compounds carbonyl halides
	13C S/N ASTM	Decomposition products may include the following materials: carbon dioxide carbon monoxide
	1H S/N	Decomposition products may include the following materials: carbon dioxide carbon monoxide halogenated compounds carbonyl halides
Special protective equipment for fire-fighters	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.	

6. Accidental release measures

Personal precautions	: 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 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 (see Section 8).
	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 spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard

6. Accidental release measures

31P S/N

area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8). 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. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

1H Lineshape

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13C S/N ASTM doped

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1H S/N

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6. Accidental release measures

<p>Environmental precautions : 19F S/N</p>	<p>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).</p>
<p>15N S/N</p>	<p>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).</p>
<p>31P S/N</p>	<p>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).</p>
<p>1H Lineshape</p>	<p>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).</p>
<p>13C S/N ASTM doped</p>	<p>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).</p>
<p>13C S/N</p>	<p>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).</p>
<p>13C S/N ASTM</p>	<p>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).</p>
<p>1H S/N</p>	<p>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).</p>
<p>Methods for cleaning up : 19F S/N</p>	<p>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. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.</p>
<p>15N S/N</p>	<p>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. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.</p>
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<p>1H Lineshape</p>	<p>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</p>

6. Accidental release measures

13C S/N ASTM doped

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13C S/N

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13C S/N ASTM

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7. Handling and storage

Handling

: 19F S/N

Put on appropriate personal protective equipment (see Section 8). 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. Avoid exposure - obtain special instructions before use. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. 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 non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. 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). Eating, drinking and smoking should be prohibited in areas where this material is

7. Handling and storage

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. Avoid exposure during pregnancy. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. 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 non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. 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). 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. Avoid exposure - obtain special instructions before use. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. 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

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7. Handling and storage

13C S/N ASTM doped

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7. Handling and storage

1H S/N

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Storage

: 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 a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. 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. 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

7. Handling and storage

1H Lineshape

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.

13C S/N ASTM doped

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13C S/N

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1H S/N

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7. Handling and storage

upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

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.

Ingredient	Exposure limits
<p>19F S/N (²H₆)Benzene</p>	<p>ACGIH TLV (United States, 2/2010). Absorbed through skin. TWA: 0.5 ppm 8 hours. TWA: 1.6 mg/m³ 8 hours. STEL: 2.5 ppm 15 minutes. STEL: 8 mg/m³ 15 minutes.</p> <p>OSHA PEL 1989 (United States, 3/1989). TWA: 1 ppm 8 hours. STEL: 5 ppm 15 minutes.</p> <p>OSHA PEL Z2 (United States, 11/2006). TWA: 10 ppm 8 hours. CEIL: 25 ppm AMP: 50 ppm 10 minutes.</p> <p>NIOSH REL (United States, 6/2009). TWA: 0.1 ppm 10 hours. STEL: 1 ppm 15 minutes.</p> <p>OSHA PEL (United States, 6/2010). TWA: 1 ppm 8 hours. STEL: 5 ppm 15 minutes.</p>
<p>15N S/N Formamide</p>	<p>ACGIH TLV (United States, 1/2011). Absorbed through skin. TWA: 10 ppm 8 hours. TWA: 18 mg/m³ 8 hours.</p> <p>OSHA PEL 1989 (United States, 3/1989). TWA: 20 ppm 8 hours. TWA: 30 mg/m³ 8 hours. STEL: 30 ppm 15 minutes. STEL: 45 mg/m³ 15 minutes.</p> <p>NIOSH REL (United States, 6/2009). Absorbed through skin. TWA: 10 ppm 10 hours. TWA: 15 mg/m³ 10 hours.</p>
<p>di[(²H₃)Methyl] sulphoxide</p>	<p>AIHA WEEL (United States, 10/2011). TWA: 250 ppm 8 hours.</p>
<p>31P S/N (²H)Chloroform</p> <p>Triphenyl phosphate</p>	<p>ACGIH TLV (United States, 1/2011). TWA: 10 ppm 8 hours. TWA: 49 mg/m³ 8 hours.</p> <p>OSHA PEL 1989 (United States, 3/1989). TWA: 2 ppm 8 hours. TWA: 9.78 mg/m³ 8 hours.</p> <p>NIOSH REL (United States, 6/2009). STEL: 2 ppm 60 minutes. STEL: 9.78 mg/m³ 60 minutes.</p> <p>OSHA PEL (United States, 6/2010). CEIL: 50 ppm CEIL: 240 mg/m³</p> <p>ACGIH TLV (United States, 1/2011). TWA: 3 mg/m³ 8 hours.</p> <p>OSHA PEL 1989 (United States, 3/1989). TWA: 3 mg/m³ 8 hours.</p>

8. Exposure controls/personal protection

<p>1H Lineshape (²H₆)Acetone</p>	<p>NIOSH REL (United States, 6/2009). TWA: 3 mg/m³ 10 hours. OSHA PEL (United States, 6/2010). TWA: 3 mg/m³ 8 hours.</p>
<p>Trichloromethane</p>	<p>ACGIH TLV (United States, 1/2011). TWA: 500 ppm 8 hours. TWA: 1188 mg/m³ 8 hours. STEL: 750 ppm 15 minutes. STEL: 1782 mg/m³ 15 minutes. OSHA PEL 1989 (United States, 3/1989). TWA: 750 ppm 8 hours. TWA: 1800 mg/m³ 8 hours. STEL: 1000 ppm 15 minutes. STEL: 2400 mg/m³ 15 minutes. NIOSH REL (United States, 6/2009). TWA: 250 ppm 10 hours. TWA: 590 mg/m³ 10 hours. OSHA PEL (United States, 6/2010). TWA: 1000 ppm 8 hours. TWA: 2400 mg/m³ 8 hours.</p>
<p>13C S/N ASTM doped (²H₆)Benzene</p>	<p>ACGIH TLV (United States, 1/2011). TWA: 49 mg/m³ 8 hours. TWA: 10 ppm 8 hours. NIOSH REL (United States, 6/2009). STEL: 9.78 mg/m³ 60 minutes. STEL: 2 ppm 60 minutes. OSHA PEL (United States, 6/2010). CEIL: 240 mg/m³ CEIL: 50 ppm OSHA PEL 1989 (United States, 3/1989). TWA: 9.78 mg/m³ 8 hours. TWA: 2 ppm 8 hours.</p>
<p>1,4-Dioxane</p>	<p>ACGIH TLV (United States, 2/2010). Absorbed through skin. TWA: 0.5 ppm 8 hours. TWA: 1.6 mg/m³ 8 hours. STEL: 2.5 ppm 15 minutes. STEL: 8 mg/m³ 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. OSHA PEL 1989 (United States, 3/1989). Absorbed through skin. TWA: 25 ppm 8 hours. TWA: 90 mg/m³ 8 hours. NIOSH REL (United States, 6/2009). CEIL: 1 ppm 30 minutes. CEIL: 3.6 mg/m³ 30 minutes. ACGIH TLV (United States, 1/2011). Absorbed through skin.</p>

8. Exposure controls/personal protection

<p>13C S/N (²H)Chloroform</p>	<p>TWA: 20 ppm 8 hours. OSHA PEL (United States, 6/2010). Absorbed through skin. TWA: 100 ppm 8 hours. TWA: 360 mg/m³ 8 hours.</p>
<p>Ethylbenzene</p>	<p>ACGIH TLV (United States, 1/2011). TWA: 10 ppm 8 hours. TWA: 49 mg/m³ 8 hours. OSHA PEL 1989 (United States, 3/1989). TWA: 2 ppm 8 hours. TWA: 9.78 mg/m³ 8 hours. NIOSH REL (United States, 6/2009). STEL: 2 ppm 60 minutes. STEL: 9.78 mg/m³ 60 minutes. OSHA PEL (United States, 6/2010). CEIL: 50 ppm CEIL: 240 mg/m³ ACGIH TLV (United States, 1/2011). TWA: 20 ppm 8 hours. NIOSH REL (United States, 6/2009). STEL: 545 mg/m³ 15 minutes. STEL: 125 ppm 15 minutes. TWA: 435 mg/m³ 10 hours. TWA: 100 ppm 10 hours. OSHA PEL (United States, 6/2010). TWA: 435 mg/m³ 8 hours. TWA: 100 ppm 8 hours. OSHA PEL 1989 (United States, 3/1989). STEL: 545 mg/m³ 15 minutes. STEL: 125 ppm 15 minutes. TWA: 435 mg/m³ 8 hours. TWA: 100 ppm 8 hours.</p>
<p>13C S/N ASTM (²H₆)Benzene</p>	<p>ACGIH TLV (United States, 2/2010). Absorbed through skin. TWA: 0.5 ppm 8 hours. TWA: 1.6 mg/m³ 8 hours. STEL: 2.5 ppm 15 minutes. STEL: 8 mg/m³ 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.</p>
<p>1,4-Dioxane</p>	<p>OSHA PEL 1989 (United States, 3/1989). Absorbed through skin. TWA: 25 ppm 8 hours. TWA: 90 mg/m³ 8 hours. NIOSH REL (United States, 6/2009). CEIL: 1 ppm 30 minutes. CEIL: 3.6 mg/m³ 30 minutes. ACGIH TLV (United States, 1/2011). Absorbed through skin. TWA: 20 ppm 8 hours.</p>

8. Exposure controls/personal protection

<p>1H S/N (²H)Chloroform</p>	<p>OSHA PEL (United States, 6/2010). Absorbed through skin. TWA: 100 ppm 8 hours. TWA: 360 mg/m³ 8 hours.</p>
<p>Ethylbenzene</p>	<p>ACGIH TLV (United States, 1/2011). TWA: 10 ppm 8 hours. TWA: 49 mg/m³ 8 hours. OSHA PEL 1989 (United States, 3/1989). TWA: 2 ppm 8 hours. TWA: 9.78 mg/m³ 8 hours. NIOSH REL (United States, 6/2009). STEL: 2 ppm 60 minutes. STEL: 9.78 mg/m³ 60 minutes. OSHA PEL (United States, 6/2010). CEIL: 50 ppm CEIL: 240 mg/m³</p> <p>ACGIH TLV (United States, 1/2011). TWA: 20 ppm 8 hours. NIOSH REL (United States, 6/2009). STEL: 545 mg/m³ 15 minutes. STEL: 125 ppm 15 minutes. TWA: 435 mg/m³ 10 hours. TWA: 100 ppm 10 hours. OSHA PEL (United States, 6/2010). TWA: 435 mg/m³ 8 hours. TWA: 100 ppm 8 hours. OSHA PEL 1989 (United States, 3/1989). STEL: 545 mg/m³ 15 minutes. STEL: 125 ppm 15 minutes. TWA: 435 mg/m³ 8 hours. TWA: 100 ppm 8 hours.</p>

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 appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Engineering measures : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

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.

Personal protection

Respiratory : 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.

Hands : 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.

8. Exposure controls/personal protection

- Eyes** : 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 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** : 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.
- 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.
- Other protection** : Not available.

9. Physical and chemical properties

- Physical state** : 19F S/N Liquid.
 15N S/N Liquid.
 31P S/N Liquid.
 1H Lineshape Liquid.
 13C S/N ASTM doped Liquid.
 13C S/N Liquid.
 13C S/N ASTM Liquid.
 1H S/N Liquid.
- Flash point** : 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 Closed cup: 15°C (59°F) [(Ethylbenzene)]
 13C S/N ASTM Closed cup: -18 to 23°C (-0.4 to 73.4°F)
 1H S/N Not available.
- Auto-ignition temperature** : 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 Not available.
 13C S/N ASTM Not available.
 1H S/N Not available.
- Flammable limits** : 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 Not available.
 13C S/N ASTM Lower: 1.3%
 Upper: 8%
 1H S/N Not available.
- Color** : 19F S/N Not available.
 15N S/N Not available.
 31P S/N Not available.
 1H Lineshape Not available.
 13C S/N ASTM doped Colorless.
 13C S/N Colorless.
 13C S/N ASTM Colorless.
 1H S/N Not available.

9. Physical and chemical properties

Odor	: 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	Pleasant. / Sweet.
	13C S/N ASTM	Not available.
	1H S/N	Not available.
pH	: 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	Not available.
	13C S/N ASTM	Not available.
	1H S/N	Not available.
Boiling/condensation point	: 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	79.1°C (174.4°F)
	13C S/N	60.9°C (141.6°F)
	13C S/N ASTM	79.1°C (174.4°F)
	1H S/N	60.9°C (141.6°F)
Melting/freezing point	: 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	6.8°C (44.2°F)
	13C S/N	-64°C (-83.2°F)
	13C S/N ASTM	6.8°C (44.2°F)
	1H S/N	-64°C (-83.2°F)
Specific gravity	: 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	1.5
	13C S/N ASTM	0.95
	1H S/N	1.5
Vapor pressure	: 19F S/N	Not available.
	15N S/N	Not available.
	31P S/N	Not available.
	1H Lineshape	Not available.
	13C S/N ASTM doped	22.1 kPa (166 mm Hg) [room temperature]
	13C S/N	Not available.
	13C S/N ASTM	22.1 kPa (166 mm Hg) [room temperature]
	1H S/N	Not available.
Vapor density	: 19F S/N	Not available.
	15N S/N	Not available.
	31P S/N	Not available.
	1H Lineshape	Not available.
	13C S/N ASTM doped	2.77 [Air = 1]
	13C S/N	Not available.
	13C S/N ASTM	>1 [Air = 1]
	1H S/N	Not available.

9. Physical and chemical properties

Volatility	: 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	Not available.
	13C S/N ASTM	Not available.
	1H S/N	Not available.
Odor threshold	: 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	Not available.
	13C S/N ASTM	Not available.
	1H S/N	Not available.
Evaporation rate	: 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	Not available.
	13C S/N ASTM	Not available.
	1H S/N	Not available.
Viscosity	: 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	Not available.
	13C S/N ASTM	Not available.
	1H S/N	Not available.
Solubility	: 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.
	1H Lineshape	Easily soluble in the following materials: cold water, hot water and acetone.
	13C S/N ASTM doped	Easily soluble in the following materials: cold water and hot water.
	13C S/N	Very slightly soluble in the following materials: cold water and hot water.
	13C S/N ASTM	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.

10. Stability and reactivity

Chemical stability	: 19F S/N	The product is stable.
	15N S/N	The product is stable.
	31P S/N	The product is stable.
	1H Lineshape	The product is stable.
	13C S/N ASTM doped	The product is stable.
	13C S/N	The product is stable.
	13C S/N ASTM	The product is stable.
	1H S/N	The product is stable.

10. Stability and reactivity

Conditions to avoid	: 19F S/N	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.	
	15N S/N	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.	
	31P S/N	No specific data.	
	1H Lineshape	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.	
	13C S/N ASTM doped	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.	
	13C S/N	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.	
	13C S/N ASTM	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.	
	1H S/N	No specific data.	
	Materials to avoid	: 19F S/N	Reactive or incompatible with the following materials: oxidizing materials
		15N S/N	Reactive or incompatible with the following materials: oxidizing materials
31P S/N		No specific data.	
1H Lineshape		Reactive or incompatible with the following materials: oxidizing materials	
13C S/N ASTM doped		Reactive or incompatible with the following materials: oxidizing materials	
13C S/N		Reactive or incompatible with the following materials: oxidizing materials	
13C S/N ASTM		Reactive or incompatible with the following materials: oxidizing materials	
1H S/N		No specific data.	
Hazardous decomposition products		: 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.	
	1H Lineshape	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.	

10. Stability and reactivity

	13C S/N	produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced.
	13C S/N ASTM	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
	1H S/N	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Possibility of hazardous reactions	: 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.
	1H Lineshape	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.
	13C S/N	Under normal conditions of storage and use, hazardous reactions will not occur.
	13C S/N ASTM	Under normal conditions of storage and use, hazardous reactions will not occur.
	1H S/N	Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
19F S/N (² H ₆)Benzene	LD50 Oral	Rat	930 mg/kg	-
15N S/N Formamide	LD50 Dermal	Rabbit	17 g/kg	-
di[(² H ₃)Methyl] sulphoxide	LD50 Oral	Rat	4000 mg/kg	-
	LD50 Dermal	Rat	40000 mg/kg	-
	LD50 Oral	Rat	14500 mg/kg	-
31P S/N (² H)Chloroform	LC50 Inhalation Vapor	Rat	47702 mg/m ³	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	-
1H Lineshape (² H ₆)Acetone	LD50 Oral	Rat	5800 mg/kg	-
Trichloromethane	LC50 Inhalation Vapor	Rat	47702 mg/m ³	4 hours
	LD50 Dermal	Rabbit	>20 g/kg	-
	LD50 Oral	Rat	300 mg/kg	-
13C S/N ASTM doped (² H ₆)Benzene	LD50 Oral	Rat	930 mg/kg	-
1,4-Dioxane	LD50 Oral	Rat	4200 mg/kg	-
13C S/N (² H)Chloroform	LC50 Inhalation Vapor	Rat	47702 mg/m ³	4 hours
Ethylbenzene	LD50 Dermal	Rabbit	>20 g/kg	-
	LD50 Oral	Rat	300 mg/kg	-
	LD50 Dermal	Rabbit	>5000 mg/kg	-

11. Toxicological information

13C S/N ASTM (² H ₆)Benzene 1,4-Dioxane	LD50 Oral	Rat	3500 mg/kg	-
	LD50 Oral	Rat	930 mg/kg	-
	LD50 Oral	Rat	4200 mg/kg	-
1H S/N (² H)Chloroform Ethylbenzene	LC50 Inhalation Vapor	Rat	47702 mg/m ³	4 hours
	LD50 Dermal	Rabbit	>20 g/kg	-
	LD50 Oral	Rat	300 mg/kg	-
	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	3500 mg/kg	-

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
15N S/N Formamide di[(² H ₃)Methyl] sulphoxide	Eyes - Severe irritant	Rabbit	-	100 milligrams	-
	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Eyes - Mild irritant	Rabbit	-	100 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
1H Lineshape (² H ₆)Acetone	Eyes - Mild irritant	Human	-	186300 parts per million	-
	Eyes - Mild irritant Eyes - Moderate irritant	Rabbit Rabbit	- -	10 microliters 24 hours 20 milligrams	- -
Trichloromethane	Eyes - Severe irritant Skin - Mild irritant	Rabbit Rabbit	- -	20 milligrams 24 hours 500 milligrams	- -
	Skin - Mild irritant Eyes - Moderate irritant	Rabbit Rabbit	- -	395 milligrams 24 hours 20 milligrams	- -
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
13C S/N ASTM doped 1,4-Dioxane	Eyes - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
	Skin - Mild irritant	Rabbit	-	515 milligrams	-
13C S/N Ethylbenzene	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams	-
13C S/N ASTM 1,4-Dioxane	Eyes - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
	Skin - Mild irritant	Rabbit	-	515 milligrams	-
1H S/N Ethylbenzene	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams	-

Sensitizer

Conclusion/Summary : Not available.

Carcinogenicity

11. Toxicological information

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
19F S/N (² H ₆)Benzene	A1	1	-	+	Proven.	+
31P S/N (² H)Chloroform	A3	2B	-	+	Possible	-
Triphenyl phosphate	A4	-	-	-	-	-
1H Lineshape (² H ₆)Acetone	A4	-	-	-	-	-
Trichloromethane	A3	2B	-	+	Possible	-
13C S/N ASTM doped (² H ₆)Benzene	A1	1	-	+	Proven.	+
1,4-Dioxane	A3	2B	-	+	Possible	-
13C S/N (² H)Chloroform	A3	2B	-	+	Possible	-
Ethylbenzene	A3	2B	-	-	-	-
13C S/N ASTM (² H ₆)Benzene	A1	1	-	+	Proven.	+
1,4-Dioxane	A3	2B	-	+	Possible	-
1H S/N (² H)Chloroform	A3	2B	-	+	Possible	-
Ethylbenzene	A3	2B	-	-	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

Other adverse symptoms

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 Not available.
 13C S/N ASTM Not available.
 1H S/N Not available.

12. Ecological information

Ecotoxicity : This material is toxic to aquatic life.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
19F S/N (² H ₆)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 1.5 to 5.4 ul/L Marine	Fish - Morone saxatilis - Juvenile	4 weeks

12. Ecological information

	water	(Fledgling, Hatchling, Weanling)	
15N S/N di[(² H ₃)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
31P S/N (² 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
	Chronic NOEC 6300 µg/l Fresh water	Daphnia - Daphnia magna	21 days
	Acute EC50 2000 µg/l	Algae - Pseudokirchneriella subcapitata	96 hours
Triphenyl phosphate	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
1H Lineshape (² H ₆)Acetone	Acute EC50 20.565 mg/l Marine water	Algae - Ulva pertusa	96 hours
	Acute LC50 6000000 µg/l Fresh water	Crustaceans - Gammarus pulex	48 hours
	Acute LC50 10000 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 5.54 ml/L Fresh water	Fish - Oncorhynchus mykiss	96 hours
	Chronic NOEC 4.95 mg/l Marine water	Algae - Ulva pertusa	96 hours
	Chronic NOEC 0.1 ml/L Fresh water	Daphnia - Daphnia magna - Neonate	21 days
Trichloromethane	Acute EC50 13.3 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase	72 hours
	Acute LC50 290000 µg/l Fresh water	Crustaceans - Ceriodaphnia dubia - Neonate	48 hours
	Acute LC50 63800 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 13.3 ppm 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 6300 µg/l Fresh water	Daphnia - Daphnia magna	21 days
13C S/N ASTM doped (² H ₆)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 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
13C S/N			

12. Ecological information

(2H)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
	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 6530 µg/l Fresh water	Crustaceans - Artemia sp. - Nauplii	48 hours
	Acute EC50 2970 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
Ethylbenzene	Acute LC50 4200 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
	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 1.5 to 5.4 ul/L Marine water	Fish - Morone saxatilis - Juvenile (Fledgling, Hatchling, Wearling)	4 weeks
	Acute LC50 6700000 µg/l Marine water	Fish - Menidia beryllina	96 hours
	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
13C S/N ASTM (2H6)Benzene	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 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 6530 µg/l Fresh water	Crustaceans - Artemia sp. - Nauplii	48 hours
	Acute EC50 2970 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 4200 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
	1,4-Dioxane	Acute EC50 13.3 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase
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
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 6530 µg/l Fresh water		Crustaceans - Artemia sp. - Nauplii	48 hours
Acute EC50 2970 µg/l Fresh water		Daphnia - Daphnia magna - Neonate	48 hours
1H S/N (2H)Chloroform	Acute LC50 4200 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
	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 1.5 to 5.4 ul/L Marine water	Fish - Morone saxatilis - Juvenile (Fledgling, Hatchling, Wearling)	4 weeks
	Acute LC50 6700000 µg/l Marine water	Fish - Menidia beryllina	96 hours
	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
Ethylbenzene	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 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 6530 µg/l Fresh water	Crustaceans - Artemia sp. - Nauplii	48 hours
	Acute EC50 2970 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 4200 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours

Partition coefficient: n-octanol/water	: 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	Not available.
	13C S/N ASTM	Not available.

12. Ecological information

1H S/N

Not available.

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

13. Disposal considerations

Waste disposal : 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. 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.

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	UN number	Proper shipping name	Classes	PG*	Label	Additional information

14. Transport information

<p>DOT</p>	<p>UN3316</p>	<p>Chemical kits RQ (Deuterated chloroform, Benzene- D6)</p>	<p>9</p>	<p>II</p>		<p>Reportable quantity 27.698 lbs / 12.575 kg The classification of the product is due solely to the presence of one or more US DOT-listed 'Hazardous substances' that are subject to reportable quantity requirements and only applies to shipments of packages greater than, or equal to, the product reportable quantity. Package sizes less than the product reportable quantity are not regulated as hazardous materials.</p> <p>Limited quantity Yes.</p> <p>Packaging instruction Passenger aircraft Quantity limitation: 10 kg Cargo aircraft Quantity limitation: 10 kg</p> <p>Special provisions 15</p>
<p>IMDG</p>	<p>UN3316</p>	<p>CHEMICAL KIT</p>	<p>9</p>	<p>II</p>		<p>Emergency schedules (EmS) F-A, _S-P_</p>
<p>IATA</p>	<p>UN3316</p>	<p>Chemical kit</p>	<p>9</p>	<p>II</p>		<p>Passenger and Cargo Aircraft Quantity limitation: 10 kg Packaging instructions: 960 Cargo Aircraft Only Quantity limitation: 10 kg Packaging instructions: 960 Limited Quantities - Passenger Aircraft Quantity limitation: 1 kg Packaging instructions: Y960</p>

PG* : Packing group

15. Regulatory information

HCS Classification	: 19F S/N	Flammable liquid Irritating material Carcinogen Target organ effects
	15N S/N	Combustible liquid Irritating material Target organ effects
	31P S/N	Irritating material Carcinogen Target organ effects
	1H Lineshape	Flammable liquid Toxic material Irritating material Carcinogen Target organ effects
	13C S/N ASTM doped	Flammable liquid Irritating material Carcinogen Target organ effects
	13C S/N	Flammable liquid Irritating material Carcinogen Target organ effects
	13C S/N ASTM	Flammable liquid Irritating material Carcinogen Target organ effects
	1H S/N	Irritating material Carcinogen Target organ effects

U.S. Federal regulations : **TSCA 8(a) PAIR:** Formamide
TSCA 8(a) IUR Exempt/Partial exemption: Not determined
United States inventory (TSCA 8b): Not determined.
SARA 302/304/311/312 extremely hazardous substances: (²H)Chloroform
SARA 302/304 emergency planning and notification: (²H)Chloroform
SARA 302/304/311/312 hazardous chemicals: (²H₆)Benzene; Formamide; di[(²H₃)Methyl] sulphoxide; (²H)Chloroform; (²H₆)Acetone; 1,4-Dioxane; Ethylbenzene
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: (²H₆) Benzene: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard; Formamide: Immediate (acute) health hazard, Delayed (chronic) health hazard; di[(²H₃) Methyl] sulphoxide: Immediate (acute) health hazard, Delayed (chronic) health hazard; (²H)Chloroform: Immediate (acute) health hazard, Delayed (chronic) health hazard; (²H₆) Acetone: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard; 1,4-Dioxane: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard; Ethylbenzene: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard
Clean Water Act (CWA) 307: Ethylbenzene; Chromium(III) 4-oxopent-2-ene-2-olate; Trichloromethane
Clean Water Act (CWA) 311: Ethylbenzene; Trichloromethane

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

DEA List I Chemicals (Precursor Chemicals) : Not listed

15. Regulatory information

DEA List II Chemicals : Not listed
(Essential Chemicals)

SARA 313

	Product name	CAS number	Concentration
Form R - Reporting requirements	19F S/N (² H ₆)Benzene	1076-43-3	60 - 100
	31P S/N (² H)Chloroform	865-49-6	60 - 100
	1H Lineshape Trichloromethane	67-66-3	0.1 - 1
	13C S/N ASTM doped (² H ₆)Benzene 1,4-Dioxane	1076-43-3 123-91-1	30 - 60 15 - 40
	13C S/N (² H)Chloroform Ethylbenzene	865-49-6 100-41-4	60 - 100 5 - 10
	13C S/N ASTM (² H ₆)Benzene 1,4-Dioxane	1076-43-3 123-91-1	30 - 60 30 - 60
	1H S/N (² H)Chloroform Ethylbenzene	865-49-6 100-41-4	60 - 100 0.1 - 1
Supplier notification	19F S/N (² H ₆)Benzene	1076-43-3	60 - 100
	31P S/N (² H)Chloroform	865-49-6	60 - 100
	1H Lineshape Trichloromethane	67-66-3	0.1 - 1
	13C S/N ASTM doped (² H ₆)Benzene 1,4-Dioxane	1076-43-3 123-91-1	30 - 60 15 - 40
	13C S/N (² H)Chloroform Ethylbenzene	865-49-6 100-41-4	60 - 100 5 - 10
	13C S/N ASTM (² H ₆)Benzene 1,4-Dioxane	1076-43-3 123-91-1	30 - 60 30 - 60
	1H S/N (² H)Chloroform Ethylbenzene	865-49-6 100-41-4	60 - 100 <0.1

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

State regulations

Massachusetts : The following components are listed: ETHYL BENZENE; 1,4-DIOXANE; FORMAMIDE

New York : The following components are listed: Ethylbenzene; 1,4-Dioxane; Chloroform

15. Regulatory information

- New Jersey** : The following components are listed: ETHYL BENZENE; BENZENE, ETHYL-; 1, 4-DIOXANE; 1,4-DIETHYLENE DIOXIDE; CHLOROFORM; METHANE, TRICHLORO-; DIMETHYL SULFOXIDE; METHANE, SULFINYLBI-; FORMAMIDE
- Pennsylvania** : The following components are listed: BENZENE, ETHYL-; 1,4-DIOXANE; METHANE, TRICHLORO-; di[(²H₃)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
19F S/N (² H ₆)Benzene	Yes.	Yes.	6.4 µg/day (ingestion) 13 µg/day (inhalation)	24 µg/day (ingestion) 49 µg/day (inhalation)
31P S/N (² H)Chloroform	Yes.	Yes.	20 µg/day (ingestion) 40 µg/day (inhalation)	No.
1H Lineshape Trichloromethane	Yes.	Yes.	20 µg/day (ingestion) 40 µg/day (inhalation)	No.
13C S/N ASTM doped (² H ₆)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.
13C S/N (² 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.
13C S/N ASTM (² H ₆)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.
1H S/N (² 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.

16. Other information

Label requirements	: 19F S/N	FLAMMABLE LIQUID AND VAPOR. MAY BE HARMFUL IF SWALLOWED. MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. CONTAINS MATERIAL WHICH MAY CAUSE HERITABLE GENETIC EFFECTS.
	15N S/N	COMBUSTIBLE LIQUID AND VAPOR. CAUSES EYE IRRITATION. MAY CAUSE SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. POSSIBLE DEVELOPMENTAL HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE ADVERSE DEVELOPMENTAL EFFECTS, BASED ON ANIMAL DATA.
	31P S/N	CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY BE HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. SUSPECT CANCER HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE CANCER.
	1H Lineshape	FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. SUSPECT CANCER HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE CANCER.
	13C S/N ASTM doped	FLAMMABLE LIQUID AND VAPOR. CAUSES RESPIRATORY TRACT AND EYE IRRITATION. MAY BE HARMFUL IF SWALLOWED. MAY CAUSE SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. CONTAINS MATERIAL WHICH MAY CAUSE HERITABLE GENETIC EFFECTS.
	13C S/N	FLAMMABLE LIQUID AND VAPOR. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY BE HARMFUL IF SWALLOWED. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. SUSPECT CANCER HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE CANCER.
	13C S/N ASTM	FLAMMABLE LIQUID AND VAPOR. CAUSES RESPIRATORY TRACT AND EYE IRRITATION. MAY BE HARMFUL IF SWALLOWED. MAY CAUSE SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. CONTAINS MATERIAL WHICH MAY CAUSE HERITABLE GENETIC EFFECTS.
	1H S/N	CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY BE HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. SUSPECT CANCER

16. Other information

HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE CANCER.

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Date of previous issue : No previous validation.
Version : 1

✔ Indicates information that has changed from previously issued version.

Notice to reader

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