Conforms to US OSHA Hazard Communication 29CFR1910.1200

SAFETY DATA SHEET

RNA Isolation Kit, Part Number 200345

Section 1. Identification

1.1 Product identifier

Product name : RNA Isolation Kit, Part Number 200345

Part no. (chemical kit) : 200345

Part no. :

β-Mercaptoethanol	200345-21
Isopropanol	200345-17
Denaturing solution	200345-14
2M Sodium Acetate	200345-16
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	200345-64
RNA Isolation Chloroform, Isoamyl Alcohol	200345-18

Validation date : 6/29/2018

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

Material uses : Analytical reagent.

β-Mercaptoethanol	0.75 mL (750 µl	14.33 M)
Isopropanol	100 mL	
Denaturing solution	100 mL	
2M Sodium Acetate	pH : 4.0	7.5 mL
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	75 mL	
RNA Isolation Chloroform, Isoamyl Alcohol	15 mL	

1.3 Details of the supplier of the safety data sheet

Supplier/Manufacturer : Agilent Technologies, Inc.
5301 Stevens Creek Blvd
Santa Clara, CA 95051, USA
800-227-9770

1.4 Emergency telephone number

In case of emergency : CHEMTREC®: 1-800-424-9300

Section 2. Hazards identification

2.1 Classification of the substance or mixture

OSHA/HCS status :

β-Mercaptoethanol	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Isopropanol	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Denaturing solution	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
2M Sodium Acetate	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
RNA Isolation Chloroform, Isoamyl Alcohol	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture

Section 2. Hazards identification

β-Mercaptoethanol

H227	FLAMMABLE LIQUIDS - Category 4
H301	ACUTE TOXICITY (oral) - Category 3
H310	ACUTE TOXICITY (dermal) - Category 2
H330	ACUTE TOXICITY (inhalation) - Category 2
H315	SKIN IRRITATION - Category 2
H318	SERIOUS EYE DAMAGE - Category 1
H317	SKIN SENSITIZATION - Category 1
H335	SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
H411	AQUATIC HAZARD (LONG-TERM) - Category 2

Isopropanol

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

Denaturing solution

H302	ACUTE TOXICITY (oral) - Category 4
H332	ACUTE TOXICITY (inhalation) - Category 4
H412	AQUATIC HAZARD (LONG-TERM) - Category 3

2M Sodium Acetate

H315	SKIN IRRITATION - Category 2
H319	EYE IRRITATION - Category 2A
H402	AQUATIC HAZARD (ACUTE) - Category 3

RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid

H227	FLAMMABLE LIQUIDS - Category 4
H301	ACUTE TOXICITY (oral) - Category 3
H311	ACUTE TOXICITY (dermal) - Category 3
H330	ACUTE TOXICITY (inhalation) - Category 2
H314	SKIN CORROSION - Category 1B
H318	SERIOUS EYE DAMAGE - Category 1
H341	GERM CELL MUTAGENICITY - Category 2
H373	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (kidneys, liver, nervous system) - Category 2
H400	AQUATIC HAZARD (ACUTE) - Category 1
H410	AQUATIC HAZARD (LONG-TERM) - Category 1

RNA Isolation Chloroform, Isoamyl Alcohol

H302	ACUTE TOXICITY (oral) - Category 4
H331	ACUTE TOXICITY (inhalation) - Category 3
H315	SKIN IRRITATION - Category 2
H319	EYE IRRITATION - Category 2A
H351	CARCINOGENICITY - Category 2
H361	TOXIC TO REPRODUCTION (Unborn child) - Category 2
H335	SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
H336	SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3
H372	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (kidneys, liver) - Category 1
H401	AQUATIC HAZARD (ACUTE) - Category 2

Section 2. Hazards identification

H412 AQUATIC HAZARD (LONG-TERM) - Category 3

Ingredients of unknown toxicity :

2M Sodium Acetate	Percentage of the mixture consisting of ingredient(s) of unknown dermal toxicity: 10 - 30% Percentage of the mixture consisting of ingredient(s) of unknown inhalation toxicity: 10 - 30%
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Percentage of the mixture consisting of ingredient(s) of unknown dermal toxicity: 1 - 10% Percentage of the mixture consisting of ingredient(s) of unknown inhalation toxicity: 1 - 10%
RNA Isolation Chloroform, Isoamyl Alcohol	Percentage of the mixture consisting of ingredient(s) of unknown dermal toxicity: 1 - 10%
RNA Isolation Chloroform, Isoamyl Alcohol	Percentage of the mixture consisting of ingredient(s) of unknown hazards to the aquatic environment: 2%

2.2 GHS label elements

Hazard pictograms :

β-Mercaptoethanol

Isopropanol

Denaturing solution

2M Sodium Acetate

RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid

RNA Isolation Chloroform, Isoamyl Alcohol

Signal word :

β-Mercaptoethanol	Danger
Isopropanol	Danger
Denaturing solution	Warning
2M Sodium Acetate	Warning
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Danger
RNA Isolation Chloroform, Isoamyl Alcohol	Danger

Section 2. Hazards identification

Hazard statements :

β-Mercaptoethanol	H227 - Combustible liquid. H310 + H330 - Fatal in contact with skin or if inhaled. H301 - Toxic if swallowed. H318 - Causes serious eye damage. H315 - Causes skin irritation. H317 - May cause an allergic skin reaction. H335 - May cause respiratory irritation. H411 - Toxic to aquatic life with long lasting effects.
Isopropanol	H225 - Highly flammable liquid and vapor. H319 - Causes serious eye irritation. H336 - May cause drowsiness or dizziness. H373 - May cause damage to organs through prolonged or repeated exposure. (liver)
Denaturing solution	H302 + H332 - Harmful if swallowed or if inhaled. H412 - Harmful to aquatic life with long lasting effects.
2M Sodium Acetate	H319 - Causes serious eye irritation. H315 - Causes skin irritation. H402 - Harmful to aquatic life.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	H227 - Combustible liquid. H330 - Fatal if inhaled. H301 + H311 - Toxic if swallowed or in contact with skin. H314 - Causes severe skin burns and eye damage. H341 - Suspected of causing genetic defects. H373 - May cause damage to organs through prolonged or repeated exposure. (kidneys, liver, nervous system) H410 - Very toxic to aquatic life with long lasting effects.
RNA Isolation Chloroform, Isoamyl Alcohol	H331 - Toxic if inhaled. H302 - Harmful if swallowed. H319 - Causes serious eye irritation. H315 - Causes skin irritation. H361 - Suspected of damaging the unborn child. H351 - Suspected of causing cancer. H335 - May cause respiratory irritation. H336 - May cause drowsiness or dizziness. H372 - Causes damage to organs through prolonged or repeated exposure. (kidneys, liver) H401 - Toxic to aquatic life. H412 - Harmful to aquatic life with long lasting effects.

Precautionary statements

Prevention :

β-Mercaptoethanol	P280 - Wear protective gloves. Wear eye or face protection. Wear protective clothing. P284 - Wear respiratory protection. P210 - Keep away from flames and hot surfaces. - No smoking. P271 - Use only outdoors or in a well-ventilated area. P273 - Avoid release to the environment. P262 - Do not get in eyes, on skin, or on clothing. P260 - Do not breathe vapor. P270 - Do not eat, drink or smoke when using this

Section 2. Hazards identification

	product. P264 - Wash hands thoroughly after handling. P272 (OSHA) - Contaminated work clothing must not be allowed out of the workplace.
Isopropanol	P280 - Wear protective gloves. Wear eye or face protection. 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. P242 - Use only non-sparking tools. P243 - Take precautionary measures against static discharge. P233 - Keep container tightly closed. P271 - Use only outdoors or in a well-ventilated area. P260 - Do not breathe vapor. P264 - Wash hands thoroughly after handling.
Denaturing solution	P271 - Use only outdoors or in a well-ventilated area. P273 - Avoid release to the environment. P261 - Avoid breathing vapor. P270 - Do not eat, drink or smoke when using this product. P264 - Wash hands thoroughly after handling.
2M Sodium Acetate	P280 - Wear protective gloves. Wear eye or face protection. P273 - Avoid release to the environment. P264 - Wash hands thoroughly after handling.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	P201 - Obtain special instructions before use. P202 - Do not handle until all safety precautions have been read and understood. P280 - Wear protective gloves. Wear eye or face protection. Wear protective clothing. P284 - Wear respiratory protection. P210 - Keep away from flames and hot surfaces. - No smoking. P271 - Use only outdoors or in a well-ventilated area. P273 - Avoid release to the environment. P260 - Do not breathe vapor. P270 - Do not eat, drink or smoke when using this product. P264 - Wash hands thoroughly after handling.
RNA Isolation Chloroform, Isoamyl Alcohol	P201 - Obtain special instructions before use. P202 - Do not handle until all safety precautions have been read and understood. P280 - Wear protective gloves. Wear eye or face protection. Wear protective clothing. P271 - Use only outdoors or in a well-ventilated area. P273 - Avoid release to the environment. P260 - Do not breathe vapor. P270 - Do not eat, drink or smoke when using this product. P264 - Wash hands thoroughly after handling.

Section 2. Hazards identification

Response	:	β-Mercaptoethanol	P391 - Collect spillage. P304 + P340 + P310 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or physician. P301 + P310 + P330 - IF SWALLOWED: Immediately call a POISON CENTER or physician. Rinse mouth. P302 + P361+P364 + P352 + P310 + P363 - IF ON SKIN: Take off immediately all contaminated clothing and wash it before reuse. Wash with plenty of soap and water. Immediately call a POISON CENTER or physician. Wash contaminated clothing before reuse. P333 + P313 - If skin irritation or rash occurs: Get medical attention. P305 + P351 + P338 + P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.
		Isopropanol	P314 - Get medical attention if you feel unwell. P304 + P340 + P312 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P337 + P313 - If eye irritation persists: Get medical attention.
		Denaturing solution	P304 + P340 + P312 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. P301 + P312 + P330 - IF SWALLOWED: Call a POISON CENTER or physician if you feel unwell. Rinse mouth.
		2M Sodium Acetate	P302 + P352 + P362+P364 - IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. P332 + P313 - If skin irritation occurs: Get medical attention. P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P337 + P313 - If eye irritation persists: Get medical attention.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	P391 - Collect spillage. P314 - Get medical attention if you feel unwell. P308 + P313 - IF exposed or concerned: Get medical attention. P304 + P340 + P310 - IF INHALED: Remove

Section 2. Hazards identification

			person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or physician. P301 + P310 + P330 + P331 - IF SWALLOWED: Immediately call a POISON CENTER or physician. Rinse mouth. Do NOT induce vomiting. P303 + P361 + P353 + P363 + P310 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. Immediately call a POISON CENTER or physician. P302 + P361+P364 + P352 + P312 - IF ON SKIN: Take off immediately all contaminated clothing and wash it before reuse. Wash with plenty of soap and water. Call a POISON CENTER or physician if you feel unwell. P305 + P351 + P338 + P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.
		RNA Isolation Chloroform, Isoamyl Alcohol	P314 - Get medical attention if you feel unwell. P308 + P313 - IF exposed or concerned: Get medical attention. P304 + P340 + P311 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician. P301 + P312 + P330 - IF SWALLOWED: Call a POISON CENTER or physician if you feel unwell. Rinse mouth. P302 + P352 + P362+P364 - IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. P332 + P313 - If skin irritation occurs: Get medical attention. P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P337 + P313 - If eye irritation persists: Get medical attention.
Storage	:	β-Mercaptoethanol	P405 - Store locked up. P403 - Store in a well-ventilated place. P235 - Keep cool.
		Isopropanol	P405 - Store locked up. P403 - Store in a well-ventilated place. P235 - Keep cool.
		Denaturing solution	Not applicable.
		2M Sodium Acetate	Not applicable.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	P405 - Store locked up. P403 - Store in a well-ventilated place. P235 - Keep cool.
		RNA Isolation Chloroform, Isoamyl Alcohol	P405 - Store locked up.
Disposal	:		

Section 2. Hazards identification

	ß-Mercaptoethanol	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
	Isopropanol	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
	Denaturing solution	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
	2M Sodium Acetate	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
	RNA Isolation Chloroform, Isoamyl Alcohol	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
Supplemental label elements :	ß-Mercaptoethanol	None known.
	Isopropanol	None known.
	Denaturing solution	None known.
	2M Sodium Acetate	None known.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Do not taste or swallow. Wash thoroughly after handling.
	RNA Isolation Chloroform, Isoamyl Alcohol	None known.

2.3 Other hazards

Hazards not otherwise classified :	ß-Mercaptoethanol	None known.
	Isopropanol	None known.
	Denaturing solution	None known.
	2M Sodium Acetate	None known.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Causes digestive tract burns.
	RNA Isolation Chloroform, Isoamyl Alcohol	None known.

Section 3. Composition/information on ingredients

Substance/mixture :	ß-Mercaptoethanol	Substance
	Isopropanol	Substance
	Denaturing solution	Mixture
	2M Sodium Acetate	Mixture
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Mixture
	RNA Isolation Chloroform, Isoamyl Alcohol	Mixture

Ingredient name	%	CAS number
ß-Mercaptoethanol		
ß-Mercaptoethanol	100	60-24-2
Isopropanol		
Propan-2-ol	100	67-63-0
Denaturing solution		
Guanidinium thiocyanate	≥25 - ≤50	593-84-0

Section 3. Composition/information on ingredients

2M Sodium Acetate		
Acetic acid	≥25 - ≤38	64-19-7
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid		
Phenol	≥90	108-95-2
Succinic acid	≤2.4	110-15-6
RNA Isolation Chloroform, Isoamyl Alcohol		
Trichloromethane	≥90	67-66-3
3-Methylbutan-1-ol	≤3	123-51-3

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

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

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

Section 4. First aid measures

4.1 Description of necessary first aid measures

Eye contact :

β-Mercaptoethanol	Get medical attention immediately. Call a poison center or physician. 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. Chemical burns must be treated promptly by a physician.
Isopropanol	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.
Denaturing solution	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.
2M Sodium Acetate	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.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Get medical attention immediately. Call a poison center or physician. 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. Chemical burns must be treated promptly by a physician.
RNA Isolation Chloroform, Isoamyl Alcohol	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.

Section 4. First aid measures

Inhalation	:	β-Mercaptoethanol	Get medical attention immediately. Call a poison center or physician. 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. 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.
		Isopropanol	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.
		Denaturing solution	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 adverse health effects persist or are severe. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
		2M Sodium Acetate	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 adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain

Section 4. First aid measures

			an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Get medical attention immediately. Call a poison center or physician. 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. 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.
		RNA Isolation Chloroform, Isoamyl Alcohol	Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Skin contact	:	β-Mercaptoethanol	Get medical attention immediately. Call a poison center or physician. Gently wash with plenty of soap and 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. Chemical burns must be treated promptly by a physician. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.
		Isopropanol	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get medical attention following exposure or if feeling unwell. Wash clothing before reuse. Clean shoes thoroughly before reuse.
		Denaturing solution	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
		2M Sodium Acetate	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get

Section 4. First aid measures

			medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Get medical attention immediately. Call a poison center or physician. Wash with plenty of soap and 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. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.
		RNA Isolation Chloroform, Isoamyl Alcohol	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.
Ingestion	:	β-Mercaptoethanol	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. 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. Chemical burns must be treated promptly by a 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.
		Isopropanol	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.
		Denaturing solution	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

Section 4. First aid measures

	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.
2M Sodium Acetate	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 adverse health effects persist or are severe. 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.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	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. 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. Chemical burns must be treated promptly by a 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.
RNA Isolation Chloroform, Isoamyl Alcohol	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.

4.2 Most important symptoms/effects, acute and delayed

Potential acute health effects

Section 4. First aid measures

Eye contact :

β-Mercaptoethanol	Causes serious eye damage.
Isopropanol	Causes serious eye irritation.
Denaturing solution	No known significant effects or critical hazards.
2M Sodium Acetate	Causes serious eye irritation.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Causes serious eye damage.
RNA Isolation Chloroform, Isoamyl Alcohol	Causes serious eye irritation.

Inhalation :

β-Mercaptoethanol	Fatal if inhaled. May cause respiratory irritation.
Isopropanol	Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness.
Denaturing solution	Harmful if inhaled.
2M Sodium Acetate	No known significant effects or critical hazards.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Fatal if inhaled.
RNA Isolation Chloroform, Isoamyl Alcohol	Toxic if inhaled. Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness. May cause respiratory irritation.

Skin contact :

β-Mercaptoethanol	Fatal in contact with skin. Causes skin irritation. May cause an allergic skin reaction.
Isopropanol	No known significant effects or critical hazards.
Denaturing solution	No known significant effects or critical hazards.
2M Sodium Acetate	Causes skin irritation.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Causes severe burns. Toxic in contact with skin.
RNA Isolation Chloroform, Isoamyl Alcohol	Causes skin irritation.

Ingestion :

β-Mercaptoethanol	Toxic if swallowed.
Isopropanol	Can cause central nervous system (CNS) depression.
Denaturing solution	Harmful if swallowed.
2M Sodium Acetate	No known significant effects or critical hazards.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Toxic if swallowed. Corrosive to the digestive tract. Causes burns.
RNA Isolation Chloroform, Isoamyl Alcohol	Harmful if swallowed. Can cause central nervous system (CNS) depression.

Over-exposure signs/symptoms

Eye contact :

β-Mercaptoethanol	Adverse symptoms may include the following: pain watering redness
Isopropanol	Adverse symptoms may include the following: pain or irritation watering redness
Denaturing solution	No specific data.
2M Sodium Acetate	Adverse symptoms may include the following: pain or irritation watering redness
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Adverse symptoms may include the following: pain watering redness
RNA Isolation Chloroform, Isoamyl Alcohol	Adverse symptoms may include the following: pain or irritation

Section 4. First aid measures

			watering redness
Inhalation	:	β-Mercaptoethanol	Adverse symptoms may include the following: respiratory tract irritation coughing
		Isopropanol	Adverse symptoms may include the following: nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
		Denaturing solution	No specific data.
		2M Sodium Acetate	No specific data.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	No specific data.
		RNA Isolation Chloroform, Isoamyl Alcohol	Adverse symptoms may include the following: respiratory tract irritation coughing nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness reduced fetal weight increase in fetal deaths skeletal malformations
Skin contact	:	β-Mercaptoethanol	Adverse symptoms may include the following: pain or irritation redness blistering may occur
		Isopropanol	No specific data.
		Denaturing solution	No specific data.
		2M Sodium Acetate	Adverse symptoms may include the following: irritation redness
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Adverse symptoms may include the following: pain or irritation redness blistering may occur
		RNA Isolation Chloroform, Isoamyl Alcohol	Adverse symptoms may include the following: irritation redness reduced fetal weight increase in fetal deaths skeletal malformations
Ingestion	:	β-Mercaptoethanol	Adverse symptoms may include the following: stomach pains
		Isopropanol	No specific data.
		Denaturing solution	No specific data.
		2M Sodium Acetate	No specific data.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Adverse symptoms may include the following: stomach pains
		RNA Isolation Chloroform, Isoamyl Alcohol	Adverse symptoms may include the following:

Section 4. First aid measures

			reduced fetal weight increase in fetal deaths skeletal malformations

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

Notes to physician	:	β-Mercaptoethanol	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
		Isopropanol	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
		Denaturing solution	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.
		2M Sodium Acetate	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
		RNA Isolation Chloroform, Isoamyl Alcohol	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.
Specific treatments	:	β-Mercaptoethanol	No specific treatment.
		Isopropanol	No specific treatment.
		Denaturing solution	No specific treatment.
		2M Sodium Acetate	No specific treatment.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	No specific treatment.
		RNA Isolation Chloroform, Isoamyl Alcohol	No specific treatment.
Protection of first-aiders	:	β-Mercaptoethanol	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.
		Isopropanol	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.
		Denaturing solution	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.
		2M Sodium Acetate	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Section 4. First aid measures

RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	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.
RNA Isolation Chloroform, Isoamyl Alcohol	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.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media :	β-Mercaptoethanol	Use dry chemical, CO_2, water spray (fog) or foam.
	Isopropanol	Use dry chemical, CO_2, water spray (fog) or foam.
	Denaturing solution	Use an extinguishing agent suitable for the surrounding fire.
	2M Sodium Acetate	Use an extinguishing agent suitable for the surrounding fire.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Use dry chemical, CO_2, water spray (fog) or foam.
	RNA Isolation Chloroform, Isoamyl Alcohol	Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media :	β-Mercaptoethanol	Do not use water jet.
	Isopropanol	Do not use water jet.
	Denaturing solution	None known.
	2M Sodium Acetate	None known.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Do not use water jet.
	RNA Isolation Chloroform, Isoamyl Alcohol	None known.

5.2 Special hazards arising from the substance or mixture

Specific hazards arising from the chemical :	β-Mercaptoethanol	Combustible liquid. Runoff to sewer may create fire or explosion hazard. 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. This material is toxic 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.
	Isopropanol	Highly flammable liquid and vapor. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and

Section 5. Fire-fighting measures

		will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back.
	Denaturing solution	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.
	2M Sodium Acetate	In a fire or if heated, a pressure increase will occur and the container may burst. This material is harmful to aquatic life. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Combustible liquid. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. This material is very toxic 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.
	RNA Isolation Chloroform, Isoamyl Alcohol	In a fire or if heated, a pressure increase will occur and the container may burst. This material is toxic to aquatic life. 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.
Hazardous thermal decomposition products :	β-Mercaptoethanol	Decomposition products may include the following materials: carbon dioxide carbon monoxide sulfur oxides
	Isopropanol	Decomposition products may include the following materials: carbon dioxide carbon monoxide
	Denaturing solution	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides sulfur oxides
	2M Sodium Acetate	Decomposition products may include the following materials: carbon dioxide carbon monoxide metal oxide/oxides
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Decomposition products may include the following materials: carbon dioxide carbon monoxide
	RNA Isolation Chloroform, Isoamyl Alcohol	Decomposition products may include the following materials: carbon dioxide carbon monoxide

Section 5. Fire-fighting measures

halogenated compounds
carbonyl halides

5.3 Advice for firefighters

Special protective actions for fire-fighters	:	β-Mercaptoethanol	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.
		Isopropanol	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.
		Denaturing solution	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.
		2M Sodium Acetate	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.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	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.
		RNA Isolation Chloroform, Isoamyl Alcohol	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.
Special protective equipment for fire-fighters	:	β-Mercaptoethanol	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
		Isopropanol	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
		Denaturing solution	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
		2M Sodium Acetate	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
		RNA Isolation Chloroform, Isoamyl Alcohol	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel :	β-Mercaptoethanol	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. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
	Isopropanol	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.
	Denaturing solution	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.
	2M Sodium Acetate	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.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	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. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
	RNA Isolation Chloroform, Isoamyl Alcohol	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. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

Section 6. Accidental release measures

For emergency responders :	β-Mercaptoethanol	If specialized 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".
	Isopropanol	If specialized 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".
	Denaturing solution	If specialized 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".
	2M Sodium Acetate	If specialized 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".
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	If specialized 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".
	RNA Isolation Chloroform, Isoamyl Alcohol	If specialized 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 :	β-Mercaptoethanol	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). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.
	Isopropanol	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).
	Denaturing solution	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). Water polluting material. May be harmful to the environment if released in large quantities.
	2M Sodium Acetate	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). Water polluting material. May be harmful to the environment if released in large quantities.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	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). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

Section 6. Accidental release measures

RNA Isolation Chloroform, Isoamyl Alcohol	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). Water polluting material. May be harmful to the environment if released in large quantities.

6.3 Methods and materials for containment and cleaning up

Methods for cleaning up :

β-Mercaptoethanol	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.
Isopropanol	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.
Denaturing solution	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.
2M Sodium Acetate	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.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	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.
RNA Isolation Chloroform, Isoamyl Alcohol	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.

Section 7. Handling and storage

7.1 Precautions for safe handling

Section 7. Handling and storage

Protective measures	:	β-Mercaptoethanol	Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Avoid release to the environment. 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. Empty containers retain product residue and can be hazardous. Do not reuse container.
		Isopropanol	Put on appropriate personal protective equipment (see Section 8). Do not breathe vapor or mist. Do not ingest. Avoid contact with eyes, skin and clothing. 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.
		Denaturing solution	Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. 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 from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
		2M Sodium Acetate	Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Avoid release to the environment. 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.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all

Section 7. Handling and storage

		safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Avoid release to the environment. 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. Empty containers retain product residue and can be hazardous. Do not reuse container.
	RNA Isolation Chloroform, Isoamyl Alcohol	Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. 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 from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
Advice on general occupational hygiene :	β-Mercaptoethanol	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.
	Isopropanol	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.
	Denaturing solution	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.
	2M Sodium Acetate	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.
	RNA Phenol pH 5.3 - 5.7	Eating, drinking and smoking should be prohibited

Section 7. Handling and storage

	Equilibrated with Succinic Acid	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.
	RNA Isolation Chloroform, Isoamyl Alcohol	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 :	β-Mercaptoethanol	Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.
	Isopropanol	Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.
	Denaturing solution	Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.
	2M Sodium Acetate	Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed

Section 7. Handling and storage

	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. See Section 10 for incompatible materials before handling or use.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.
RNA Isolation Chloroform, Isoamyl Alcohol	Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

7.3 Specific end use(s)

Recommendations	:	β-Mercaptoethanol	Industrial applications, Professional applications.
		Isopropanol	Industrial applications, Professional applications.
		Denaturing solution	Industrial applications, Professional applications.
		2M Sodium Acetate	Industrial applications, Professional applications.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Industrial applications, Professional applications.
		RNA Isolation Chloroform, Isoamyl Alcohol	Industrial applications, Professional applications.
Industrial sector specific solutions	:	β-Mercaptoethanol	Not applicable.
		Isopropanol	Not applicable.
		Denaturing solution	Not applicable.
		2M Sodium Acetate	Not applicable.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Not applicable.
		RNA Isolation Chloroform, Isoamyl Alcohol	Not applicable.

Section 8. Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
ß-Mercaptoethanol ß-Mercaptoethanol	**AIHA WEEL (United States, 10/2011).** **Absorbed through skin.** TWA: 0.2 ppm 8 hours.
Isopropanol Propan-2-ol	**ACGIH TLV (United States, 3/2017).** TWA: 200 ppm 8 hours. STEL: 400 ppm 15 minutes. **OSHA PEL 1989 (United States, 3/1989).** TWA: 400 ppm 8 hours. TWA: 980 mg/m³ 8 hours. STEL: 500 ppm 15 minutes. STEL: 1225 mg/m³ 15 minutes. **NIOSH REL (United States, 10/2016).** TWA: 400 ppm 10 hours. TWA: 980 mg/m³ 10 hours. STEL: 500 ppm 15 minutes. STEL: 1225 mg/m³ 15 minutes. **OSHA PEL (United States, 6/2016).** TWA: 400 ppm 8 hours. TWA: 980 mg/m³ 8 hours.
Denaturing solution Guanidinium thiocyanate	None.
2M Sodium Acetate Acetic acid	**ACGIH TLV (United States, 3/2017).** TWA: 10 ppm 8 hours. TWA: 25 mg/m³ 8 hours. STEL: 15 ppm 15 minutes. STEL: 37 mg/m³ 15 minutes. **OSHA PEL 1989 (United States, 3/1989).** TWA: 10 ppm 8 hours. TWA: 25 mg/m³ 8 hours. **NIOSH REL (United States, 10/2016).** TWA: 10 ppm 10 hours. TWA: 25 mg/m³ 10 hours. STEL: 15 ppm 15 minutes. STEL: 37 mg/m³ 15 minutes. **OSHA PEL (United States, 6/2016).** TWA: 10 ppm 8 hours. TWA: 25 mg/m³ 8 hours.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid Phenol	**ACGIH TLV (United States, 3/2017).** **Absorbed through skin.** TWA: 19 mg/m³ 8 hours. TWA: 5 ppm 8 hours. **NIOSH REL (United States, 10/2016).** **Absorbed through skin.** CEIL: 60 mg/m³ 15 minutes.

Section 8. Exposure controls/personal protection

	CEIL: 15.6 ppm 15 minutes. TWA: 19 mg/m³ 10 hours. TWA: 5 ppm 10 hours. **OSHA PEL (United States, 6/2016).** **Absorbed through skin.** TWA: 19 mg/m³ 8 hours. TWA: 5 ppm 8 hours. **OSHA PEL 1989 (United States, 3/1989).** **Absorbed through skin.** TWA: 19 mg/m³ 8 hours. TWA: 5 ppm 8 hours.
Succinic acid	None.
RNA Isolation Chloroform, Isoamyl Alcohol	
Trichloromethane	**ACGIH TLV (United States, 3/2017).** 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, 10/2016).** STEL: 2 ppm 60 minutes. STEL: 9.78 mg/m³ 60 minutes. **OSHA PEL (United States, 6/2016).** CEIL: 50 ppm CEIL: 240 mg/m³
3-Methylbutan-1-ol	**ACGIH TLV (United States, 3/2017).** TWA: 100 ppm 8 hours. TWA: 361 mg/m³ 8 hours. STEL: 125 ppm 15 minutes. STEL: 452 mg/m³ 15 minutes. **OSHA PEL 1989 (United States, 3/1989).** TWA: 100 ppm 8 hours. TWA: 360 mg/m³ 8 hours. STEL: 125 ppm 15 minutes. STEL: 450 mg/m³ 15 minutes. **NIOSH REL (United States, 10/2016).** TWA: 100 ppm 10 hours. TWA: 360 mg/m³ 10 hours. STEL: 125 ppm 15 minutes. STEL: 450 mg/m³ 15 minutes. **OSHA PEL (United States, 6/2016).** TWA: 100 ppm 8 hours. TWA: 360 mg/m³ 8 hours.

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

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Section 8. Exposure controls/personal protection

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. Contaminated work clothing should not be allowed out of the workplace. 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 and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : 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.

Section 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state :

β-Mercaptoethanol	Liquid.
Isopropanol	Liquid.
Denaturing solution	Liquid.
2M Sodium Acetate	Liquid.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Liquid.
RNA Isolation Chloroform, Isoamyl Alcohol	Liquid.

Color :

β-Mercaptoethanol	Colorless.
Isopropanol	Colorless.
Denaturing solution	Not available.
2M Sodium Acetate	Not available.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Not available.
RNA Isolation Chloroform, Isoamyl Alcohol	Not available.

Section 9. Physical and chemical properties

Odor	:	β-Mercaptoethanol	Characteristic.
		Isopropanol	Alcohol-like.
		Denaturing solution	Not available.
		2M Sodium Acetate	Not available.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Not available.
		RNA Isolation Chloroform, Isoamyl Alcohol	Not available.
Odor threshold	:	β-Mercaptoethanol	Not available.
		Isopropanol	Not available.
		Denaturing solution	Not available.
		2M Sodium Acetate	Not available.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Not available.
		RNA Isolation Chloroform, Isoamyl Alcohol	Not available.
pH	:	β-Mercaptoethanol	Not available.
		Isopropanol	Not available.
		Denaturing solution	7
		2M Sodium Acetate	4
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	5.3 to 5.7
		RNA Isolation Chloroform, Isoamyl Alcohol	Not available.
Melting point	:	β-Mercaptoethanol	-100°C (-148°F)
		Isopropanol	-90°C (-130°F)
		Denaturing solution	Not available.
		2M Sodium Acetate	Not available.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	40.85°C (105.5°F)
		RNA Isolation Chloroform, Isoamyl Alcohol	-64°C (-83.2°F)
Boiling point	:	β-Mercaptoethanol	157°C (314.6°F)
		Isopropanol	83°C (181.4°F)
		Denaturing solution	Not available.
		2M Sodium Acetate	Not available.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	182°C (359.6°F)
		RNA Isolation Chloroform, Isoamyl Alcohol	62°C (143.6°F)
Flash point	:	β-Mercaptoethanol	Closed cup: 74°C (165.2°F) Open cup: 74°C (165.2°F)
		Isopropanol	Closed cup: 11.7°C (53.1°F)
		Denaturing solution	Not available.
		2M Sodium Acetate	Not available.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Closed cup: 79°C (174.2°F)
		RNA Isolation Chloroform, Isoamyl Alcohol	Not available.
Evaporation rate	:	β-Mercaptoethanol	Not available.
		Isopropanol	Not available.
		Denaturing solution	Not available.
		2M Sodium Acetate	Not available.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Not available.
		RNA Isolation Chloroform, Isoamyl Alcohol	Not available.

Section 9. Physical and chemical properties

Flammability (solid, gas) :

β-Mercaptoethanol	Not applicable.
Isopropanol	Not applicable.
Denaturing solution	Not applicable.
2M Sodium Acetate	Not applicable.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Not applicable.
RNA Isolation Chloroform, Isoamyl Alcohol	Not applicable.

Lower and upper explosive (flammable) limits :

β-Mercaptoethanol	Lower: 2.3% Upper: 18%
Isopropanol	Lower: 2% Upper: 12%
Denaturing solution	Not available.
2M Sodium Acetate	Not available.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Lower: 1.36% Upper: 10%
RNA Isolation Chloroform, Isoamyl Alcohol	Not available.

Vapor pressure :

β-Mercaptoethanol	0.13 kPa (0.98 mm Hg) [room temperature]
Isopropanol	4.4 kPa (33 mm Hg) [room temperature]
Denaturing solution	Not available.
2M Sodium Acetate	Not available.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Not available.
RNA Isolation Chloroform, Isoamyl Alcohol	Not available.

Vapor density :

β-Mercaptoethanol	2.7 [Air = 1]
Isopropanol	2.1 [Air = 1]
Denaturing solution	Not available.
2M Sodium Acetate	Not available.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Not available.
RNA Isolation Chloroform, Isoamyl Alcohol	Not available.

Relative density :

β-Mercaptoethanol	1.1
Isopropanol	0.79
Denaturing solution	Not available.
2M Sodium Acetate	Not available.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Not available.
RNA Isolation Chloroform, Isoamyl Alcohol	Not available.

Solubility :

β-Mercaptoethanol	Easily soluble in the following materials: cold water and hot water.
Isopropanol	Easily soluble in the following materials: cold water and hot water.
Denaturing solution	Soluble in the following materials: cold water and hot water.
2M Sodium Acetate	Easily soluble in the following materials: cold water and hot water.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Not available.
RNA Isolation Chloroform, Isoamyl Alcohol	Very slightly soluble in the following materials: cold water and hot water.

Section 9. Physical and chemical properties

Partition coefficient: n-octanol/water	:	β-Mercaptoethanol	-0.056
		Isopropanol	Not available.
		Denaturing solution	Not available.
		2M Sodium Acetate	Not available.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Not available.
		RNA Isolation Chloroform, Isoamyl Alcohol	Not available.
Auto-ignition temperature	:	β-Mercaptoethanol	295°C (563°F)
		Isopropanol	Not available.
		Denaturing solution	Not available.
		2M Sodium Acetate	Not available.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Not available.
		RNA Isolation Chloroform, Isoamyl Alcohol	Not available.
Decomposition temperature	:	β-Mercaptoethanol	Not available.
		Isopropanol	Not available.
		Denaturing solution	Not available.
		2M Sodium Acetate	Not available.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Not available.
		RNA Isolation Chloroform, Isoamyl Alcohol	Not available.
Viscosity	:	β-Mercaptoethanol	Dynamic (room temperature): 3.43 mPa·s (3.43 cP)
		Isopropanol	Not available.
		Denaturing solution	Not available.
		2M Sodium Acetate	Not available.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Not available.
		RNA Isolation Chloroform, Isoamyl Alcohol	Not available.

Section 10. Stability and reactivity

10.1 Reactivity	:	β-Mercaptoethanol	No specific test data related to reactivity available for this product or its ingredients.
		Isopropanol	No specific test data related to reactivity available for this product or its ingredients.
		Denaturing solution	No specific test data related to reactivity available for this product or its ingredients.
		2M Sodium Acetate	No specific test data related to reactivity available for this product or its ingredients.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	No specific test data related to reactivity available for this product or its ingredients.
		RNA Isolation Chloroform, Isoamyl Alcohol	No specific test data related to reactivity available for this product or its ingredients.
10.2 Chemical stability	:	β-Mercaptoethanol	The product is stable.
		Isopropanol	The product is stable.
		Denaturing solution	The product is stable.
		2M Sodium Acetate	The product is stable.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	The product is stable.
		RNA Isolation Chloroform, Isoamyl Alcohol	The product is stable.

Section 10. Stability and reactivity

10.3 Possibility of hazardous reactions	: β-Mercaptoethanol	Under normal conditions of storage and use, hazardous reactions will not occur.
	Isopropanol	Under normal conditions of storage and use, hazardous reactions will not occur.
	Denaturing solution	Under normal conditions of storage and use, hazardous reactions will not occur.
	2M Sodium Acetate	Under normal conditions of storage and use, hazardous reactions will not occur.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Under normal conditions of storage and use, hazardous reactions will not occur.
	RNA Isolation Chloroform, Isoamyl Alcohol	Under normal conditions of storage and use, hazardous reactions will not occur.
10.4 Conditions to avoid	: β-Mercaptoethanol	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.
	Isopropanol	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.
	Denaturing solution	No specific data.
	2M Sodium Acetate	No specific data.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	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.
	RNA Isolation Chloroform, Isoamyl Alcohol	No specific data.
10.5 Incompatible materials	: β-Mercaptoethanol	Reactive or incompatible with the following materials: oxidizing materials
	Isopropanol	Reactive or incompatible with the following materials: oxidizing materials
	Denaturing solution	May react or be incompatible with oxidizing materials.
	2M Sodium Acetate	May react or be incompatible with oxidizing materials.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Reactive or incompatible with the following materials: oxidizing materials
	RNA Isolation Chloroform, Isoamyl Alcohol	May react or be incompatible with oxidizing materials.
10.6 Hazardous decomposition products	: β-Mercaptoethanol	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
	Isopropanol	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
	Denaturing solution	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
	2M Sodium Acetate	Under normal conditions of storage and use,

Section 10. Stability and reactivity

	hazardous decomposition products should not be produced.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
RNA Isolation Chloroform, Isoamyl Alcohol	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
ß-Mercaptoethanol				
ß-Mercaptoethanol	LD50 Dermal	Rabbit	167.1 mg/kg	-
	LD50 Oral	Rat	244 mg/kg	-
Isopropanol				
Propan-2-ol	LD50 Dermal	Rabbit	12800 mg/kg	-
	LD50 Oral	Rat	5000 mg/kg	-
2M Sodium Acetate				
Acetic acid	LC50 Inhalation Vapor	Rat	11000 mg/m³	4 hours
	LD50 Dermal	Rabbit	1060 mg/kg	-
	LD50 Oral	Rat	3310 mg/kg	-
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid				
Phenol	LC50 Inhalation Dusts and mists	Rat	316 mg/m³	4 hours
	LD50 Dermal	Rabbit	630 mg/kg	-
	LD50 Dermal	Rat	669 mg/kg	-
	LD50 Oral	Rat	317 mg/kg	-
Succinic acid	LD50 Oral	Rat	2260 mg/kg	-
RNA Isolation Chloroform, Isoamyl Alcohol				
Trichloromethane	LD50 Dermal	Rabbit	>20 g/kg	-
	LD50 Oral	Rat	300 mg/kg	-
3-Methylbutan-1-ol	LD50 Oral	Rat	1300 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
ß-Mercaptoethanol					
ß-Mercaptoethanol	Eyes - Severe irritant	Rabbit	-	2 milligrams	-
Isopropanol					
Propan-2-ol	Eyes - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	10 milligrams	-
	Skin - Mild irritant	Rabbit	-	500 milligrams	-
2M Sodium Acetate					
Acetic acid	Skin - Severe irritant	Rabbit	-	525 milligrams	-

Section 11. Toxicological information

RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid					
Phenol	Eyes - Severe irritant	Rabbit	-	5 milligrams	-
	Skin - Severe irritant	Rabbit	-	535 milligrams	-
Succinic acid	Eyes - Severe irritant	Rabbit	-	750 Micrograms	-
RNA Isolation Chloroform, Isoamyl Alcohol					
Trichloromethane	Eyes - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
3-Methylbutan-1-ol	Eyes - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-

Sensitization

Not available.

Mutagenicity

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
Isopropanol			
Propan-2-ol	-	3	-
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid			
Phenol	-	3	-
RNA Isolation Chloroform, Isoamyl Alcohol			
Trichloromethane	-	2B	Reasonably anticipated to be a human carcinogen.

Reproductive toxicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Section 11. Toxicological information

Name	Category	Route of exposure	Target organs
ß-Mercaptoethanol			
ß-Mercaptoethanol	Category 3	Not applicable.	Respiratory tract irritation
Isopropanol			
Propan-2-ol	Category 3	Not applicable.	Narcotic effects
RNA Isolation Chloroform, Isoamyl Alcohol			
Trichloromethane	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects
3-Methylbutan-1-ol	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Isopropanol			
Propan-2-ol	Category 2	Not determined	liver
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid			
Phenol	Category 2	Not determined	kidneys, liver and nervous system
RNA Isolation Chloroform, Isoamyl Alcohol			
Trichloromethane	Category 1	Not determined	kidneys and liver

Aspiration hazard

Not available.

Information on the likely routes of exposure :

ß-Mercaptoethanol	Routes of entry anticipated: Oral, Dermal, Inhalation.
Isopropanol	Routes of entry anticipated: Oral, Dermal, Inhalation.
Denaturing solution	Routes of entry anticipated: Oral, Dermal, Inhalation.
2M Sodium Acetate	Routes of entry anticipated: Oral, Dermal, Inhalation.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Routes of entry anticipated: Oral, Dermal, Inhalation.
RNA Isolation Chloroform, Isoamyl Alcohol	Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Eye contact :

ß-Mercaptoethanol	Causes serious eye damage.
Isopropanol	Causes serious eye irritation.
Denaturing solution	No known significant effects or critical hazards.
2M Sodium Acetate	Causes serious eye irritation.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Causes serious eye damage.
RNA Isolation Chloroform, Isoamyl Alcohol	Causes serious eye irritation.

Section 11. Toxicological information

Inhalation :	β-Mercaptoethanol	Fatal if inhaled. May cause respiratory irritation.
	Isopropanol	Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness.
	Denaturing solution	Harmful if inhaled.
	2M Sodium Acetate	No known significant effects or critical hazards.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Fatal if inhaled.
	RNA Isolation Chloroform, Isoamyl Alcohol	Toxic if inhaled. Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness. May cause respiratory irritation.
Skin contact :	β-Mercaptoethanol	Fatal in contact with skin. Causes skin irritation. May cause an allergic skin reaction.
	Isopropanol	No known significant effects or critical hazards.
	Denaturing solution	No known significant effects or critical hazards.
	2M Sodium Acetate	Causes skin irritation.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Causes severe burns. Toxic in contact with skin.
	RNA Isolation Chloroform, Isoamyl Alcohol	Causes skin irritation.
Ingestion :	β-Mercaptoethanol	Toxic if swallowed.
	Isopropanol	Can cause central nervous system (CNS) depression.
	Denaturing solution	Harmful if swallowed.
	2M Sodium Acetate	No known significant effects or critical hazards.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Toxic if swallowed. Corrosive to the digestive tract. Causes burns.
	RNA Isolation Chloroform, Isoamyl Alcohol	Harmful if swallowed. Can cause central nervous system (CNS) depression.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact :	β-Mercaptoethanol	Adverse symptoms may include the following: pain watering redness
	Isopropanol	Adverse symptoms may include the following: pain or irritation watering redness
	Denaturing solution	No specific data.
	2M Sodium Acetate	Adverse symptoms may include the following: pain or irritation watering redness
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Adverse symptoms may include the following: pain watering redness
	RNA Isolation Chloroform, Isoamyl Alcohol	Adverse symptoms may include the following: pain or irritation watering redness

Section 11. Toxicological information

Inhalation	:	β-Mercaptoethanol	Adverse symptoms may include the following: respiratory tract irritation coughing
		Isopropanol	Adverse symptoms may include the following: nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
		Denaturing solution	No specific data.
		2M Sodium Acetate	No specific data.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	No specific data.
		RNA Isolation Chloroform, Isoamyl Alcohol	Adverse symptoms may include the following: respiratory tract irritation coughing nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness reduced fetal weight increase in fetal deaths skeletal malformations
Skin contact	:	β-Mercaptoethanol	Adverse symptoms may include the following: pain or irritation redness blistering may occur
		Isopropanol	No specific data.
		Denaturing solution	No specific data.
		2M Sodium Acetate	Adverse symptoms may include the following: irritation redness
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Adverse symptoms may include the following: pain or irritation redness blistering may occur
		RNA Isolation Chloroform, Isoamyl Alcohol	Adverse symptoms may include the following: irritation redness reduced fetal weight increase in fetal deaths skeletal malformations
Ingestion	:	β-Mercaptoethanol	Adverse symptoms may include the following: stomach pains
		Isopropanol	No specific data.
		Denaturing solution	No specific data.
		2M Sodium Acetate	No specific data.
		RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Adverse symptoms may include the following: stomach pains
		RNA Isolation Chloroform, Isoamyl Alcohol	Adverse symptoms may include the following: reduced fetal weight increase in fetal deaths

Section 11. Toxicological information

skeletal malformations

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

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

General	: β-Mercaptoethanol	Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
	Isopropanol	May cause damage to organs through prolonged or repeated exposure.
	Denaturing solution	No known significant effects or critical hazards.
	2M Sodium Acetate	No known significant effects or critical hazards.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	May cause damage to organs through prolonged or repeated exposure.
	RNA Isolation Chloroform, Isoamyl Alcohol	Causes damage to organs through prolonged or repeated exposure.
Carcinogenicity	: β-Mercaptoethanol	No known significant effects or critical hazards.
	Isopropanol	No known significant effects or critical hazards.
	Denaturing solution	No known significant effects or critical hazards.
	2M Sodium Acetate	No known significant effects or critical hazards.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	No known significant effects or critical hazards.
	RNA Isolation Chloroform, Isoamyl Alcohol	Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	: β-Mercaptoethanol	No known significant effects or critical hazards.
	Isopropanol	No known significant effects or critical hazards.
	Denaturing solution	No known significant effects or critical hazards.
	2M Sodium Acetate	No known significant effects or critical hazards.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Suspected of causing genetic defects.
	RNA Isolation Chloroform, Isoamyl Alcohol	No known significant effects or critical hazards.
Teratogenicity	: β-Mercaptoethanol	No known significant effects or critical hazards.
	Isopropanol	No known significant effects or critical hazards.
	Denaturing solution	No known significant effects or critical hazards.
	2M Sodium Acetate	No known significant effects or critical hazards.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	No known significant effects or critical hazards.
	RNA Isolation Chloroform, Isoamyl Alcohol	Suspected of damaging the unborn child.
Developmental effects	: β-Mercaptoethanol	No known significant effects or critical hazards.
	Isopropanol	No known significant effects or critical hazards.
	Denaturing solution	No known significant effects or critical hazards.
	2M Sodium Acetate	No known significant effects or critical hazards.
	RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	No known significant effects or critical hazards.
	RNA Isolation Chloroform, Isoamyl Alcohol	No known significant effects or critical hazards.

Section 11. Toxicological information

Fertility effects :

β-Mercaptoethanol	No known significant effects or critical hazards.
Isopropanol	No known significant effects or critical hazards.
Denaturing solution	No known significant effects or critical hazards.
2M Sodium Acetate	No known significant effects or critical hazards.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	No known significant effects or critical hazards.
RNA Isolation Chloroform, Isoamyl Alcohol	No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Isopropanol	
Oral	5000 mg/kg
Denaturing solution	
Oral	1058 mg/kg
Dermal	2327.7 mg/kg
Inhalation (dusts and mists)	3.174 mg/l
2M Sodium Acetate	
Oral	6304.2 mg/kg
Dermal	2858.1 mg/kg
Inhalation (vapors)	29.66 mg/l
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	
Oral	102 mg/kg
Dermal	642.9 mg/kg
Inhalation (dusts and mists)	0.3224 mg/l
RNA Isolation Chloroform, Isoamyl Alcohol	
Oral	506.2 mg/kg
Inhalation (vapors)	7.397 mg/l

Other information :

β-Mercaptoethanol	Not available.
Isopropanol	Adverse symptoms may include the following: Repeated exposure may cause skin dryness or cracking.
Denaturing solution	Not available.
2M Sodium Acetate	Not available.
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	Not available.
RNA Isolation Chloroform, Isoamyl Alcohol	Adverse symptoms may include the following: Repeated exposure may cause skin dryness or cracking.

Section 12. Ecological information

12.1 Toxicity

Section 12. Ecological information

Product/ingredient name	Result	Species	Exposure
Isopropanol			
Propan-2-ol	Acute EC50 10100 mg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 1400000 µg/l Marine water	Crustaceans - Crangon crangon	48 hours
	Acute LC50 4200 mg/l Fresh water	Fish - Rasbora heteromorpha	96 hours
2M Sodium Acetate			
Acetic acid	Acute EC50 73400 µg/l Fresh water	Algae - Navicula seminulum	96 hours
	Acute EC50 65000 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 32 mg/l Marine water	Crustaceans - Artemia salina	48 hours
	Acute LC50 75000 µg/l Fresh water	Fish - Lepomis macrochirus	96 hours
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid			
Phenol	Acute EC50 61.1 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
	Acute EC50 36 mg/l Marine water	Algae - Hormosira banksii - Gamete	72 hours
	Acute EC50 94 mg/l Fresh water	Aquatic plants - Lemna aequinoctialis	96 hours
	Acute EC50 4200 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 800 µg/l Marine water	Crustaceans - Archaeomysis kokuboi - Juvenile (Fledgling, Hatchling, Weanling)	48 hours
	Acute LC50 1555 µg/l Fresh water	Fish - Cirrhinus mrigala - Larvae	96 hours
	Chronic NOEC 16 µg/l Marine water	Algae - Hormosira banksii - Gamete	72 hours
	Chronic NOEC 1.5 mg/l Fresh water	Daphnia - Daphnia magna	21 days
	Chronic NOEC 118 µg/l Fresh water	Fish - Oncorhynchus mykiss	90 days
Succinic acid	Acute EC50 >100 mg/l Fresh water	Algae	72 hours
	Acute EC50 374200 µg/l Fresh water	Daphnia - Daphnia magna - Larvae	48 hours
	Acute LC50 >100 mg/l Fresh water	Fish	96 hours
	Acute NOEC 100 mg/l Fresh water	Algae	72 hours
	Acute NOEC 23 mg/l Fresh water	Daphnia	48 hours
	Acute NOEC 100 mg/l Fresh water	Fish	96 hours
RNA Isolation Chloroform, Isoamyl Alcohol			
Trichloromethane	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 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 1.8 mg/l Fresh water	Daphnia - Daphnia magna	21 days

12.2 Persistence and degradability

Section 12. Ecological information

Product/ingredient name	Test	Result	Dose	Inoculum
ß-Mercaptoethanol				
ß-Mercaptoethanol	OECD 310 Ready Biodegradability - CO_2 in Sealed Vessels (Headspace Test)	69 % - Inherent - 60 days	20 mg/l	-
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid				
Succinic acid	OECD 301E Ready Biodegradability - Modified OECD Screening Test	96.55 % - Readily - 28 days	-	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Isopropanol			
Propan-2-ol	-	-	Readily
2M Sodium Acetate			
Acetic acid	-	-	Readily
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid			
Succinic acid	-	-	Readily
RNA Isolation Chloroform, Isoamyl Alcohol			
Trichloromethane	-	-	Not readily

12.3 Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
ß-Mercaptoethanol			
ß-Mercaptoethanol	-0.056	-	low
Isopropanol			
Propan-2-ol	0.05	-	low
2M Sodium Acetate			
Acetic acid	-0.17	3.16	low
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid			
Phenol	1.47	647	high
Succinic acid	-0.59	-	low
RNA Isolation Chloroform, Isoamyl Alcohol			
Trichloromethane	1.97	690	high
3-Methylbutan-1-ol	1.35	-	low

Section 12. Ecological information

12.4 Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

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

Section 13. Disposal considerations

13.1 Waste treatment methods

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

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid			
Phenol	108-95-2	Listed	U188
RNA Isolation Chloroform, Isoamyl Alcohol			
Chloroform; Methane, trichloro-	67-66-3	Listed	U044

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

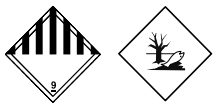
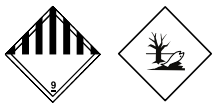
The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of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

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

Section 14. Transport information

	DOT Classification	TDG Classification	Mexico Classification	IMDG	IATA
UN number	UN3316	UN3316	UN3316	UN3316	UN3316
UN proper shipping name	Chemical kits	CHEMICAL KIT	EQUIPO QUIMICO	CHEMICAL KIT	Chemical kit

Section 14. Transport information

Transport hazard class(es)	9 	9 	9 	9 	9 
Packing group	II	II	II	II	II
Environmental hazards	No.	Yes.	Yes. The environmentally hazardous substance mark is not required.	Yes.	Yes. The environmentally hazardous substance mark is not required.

Additional information

DOT Classification : **Reportable quantity** 61.224 lbs / 27.796 kg. Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.
Limited quantity Yes.
Packaging instruction Exceptions: 161. Non-bulk: 161. Bulk: None.
Quantity limitation Passenger aircraft/rail: 10 kg. Cargo aircraft: 10 kg.
Special provisions 15

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.43-2.45 (Class 9), 2.7 (Marine pollutant mark).
The marine pollutant mark is not required when transported by road or rail.

Mexico Classification : **Special provisions** 251, 340

IMDG : The marine pollutant mark is not required when transported in sizes of ≤5 L or ≤5 kg.
Emergency schedules F-A, _S-P_
Special provisions 251, 340

IATA : The environmentally hazardous substance mark may appear if required by other transportation regulations.
Quantity limitation Passenger and Cargo Aircraft: 10 kg. Packaging instructions: 960. Cargo Aircraft Only: 10 kg. Packaging instructions: 960. Limited Quantities - Passenger Aircraft: 1 kg. Packaging instructions: Y960.
Special provisions A44, A163

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.

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

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined
Clean Water Act (CWA) 307: Trichloromethane; Phenol
Clean Water Act (CWA) 311: Trichloromethane; Phenol; Acetic acid

Clean Air Act (CAA) 112 regulated toxic substances: Trichloromethane

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Section 15. Regulatory information

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

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

Name	%	EHS	SARA 302 TPQ (lbs)	SARA 302 TPQ (gallons)	SARA 304 RQ (lbs)	SARA 304 RQ (gallons)
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid						
Phenol	≥90	Yes.	500 / 10000	-	1000	-
RNA Isolation Chloroform, Isoamyl Alcohol						
Trichloromethane	≥90	Yes.	10000	803.8	10	0.8

SARA 304 RQ : 61.2 lbs / 27.8 kg

SARA 311/312

Classification :

β-Mercaptoethanol	FLAMMABLE LIQUIDS - Category 4 ACUTE TOXICITY (oral) - Category 3 ACUTE TOXICITY (dermal) - Category 2 ACUTE TOXICITY (inhalation) - Category 2 SKIN IRRITATION - Category 2 SERIOUS EYE DAMAGE - Category 1 SKIN SENSITIZATION - Category 1 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
Isopropanol	FLAMMABLE LIQUIDS - Category 2 EYE IRRITATION - Category 2A SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (liver) - Category 2
Denaturing solution	ACUTE TOXICITY (oral) - Category 4 ACUTE TOXICITY (inhalation) - Category 4 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A
2M Sodium Acetate	FLAMMABLE LIQUIDS - Category 4
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	ACUTE TOXICITY (oral) - Category 3 ACUTE TOXICITY (dermal) - Category 3 ACUTE TOXICITY (inhalation) - Category 2 SKIN CORROSION - Category 1B SERIOUS EYE DAMAGE - Category 1 GERM CELL MUTAGENICITY - Category 2 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (kidneys, liver, nervous system) - Category 2 HNOC - Corrosive to digestive tract
RNA Isolation Chloroform, Isoamyl Alcohol	ACUTE TOXICITY (oral) - Category 4 ACUTE TOXICITY (inhalation) - Category 3 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A CARCINOGENICITY - Category 2 TOXIC TO REPRODUCTION (Unborn child) - Category 2 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)

Section 15. Regulatory information

(Narcotic effects) - Category 3
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (kidneys, liver) - Category 1

Composition/information on ingredients

Name	%	Classification
ß-Mercaptoethanol		
ß-Mercaptoethanol	100	FLAMMABLE LIQUIDS - Category 4 ACUTE TOXICITY (oral) - Category 3 ACUTE TOXICITY (dermal) - Category 2 ACUTE TOXICITY (inhalation) - Category 2 SKIN IRRITATION - Category 2 SERIOUS EYE DAMAGE - Category 1 SKIN SENSITIZATION - Category 1 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
Isopropanol		
Propan-2-ol	100	FLAMMABLE LIQUIDS - Category 2 EYE IRRITATION - Category 2A SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (liver) - Category 2 HNOC - Defatting irritant
Denaturing solution		
Guanidinium thiocyanate	≥25 - ≤50	ACUTE TOXICITY (oral) - Category 4 ACUTE TOXICITY (dermal) - Category 4 ACUTE TOXICITY (inhalation) - Category 4
2M Sodium Acetate		
Acetic acid	≥25 - ≤38	FLAMMABLE LIQUIDS - Category 3 ACUTE TOXICITY (dermal) - Category 4 ACUTE TOXICITY (inhalation) - Category 4 SKIN CORROSION - Category 1A SERIOUS EYE DAMAGE - Category 1 HNOC - Corrosive to digestive tract [severe]
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid		
Phenol	≥90	ACUTE TOXICITY (oral) - Category 3 ACUTE TOXICITY (dermal) - Category 3 ACUTE TOXICITY (inhalation) - Category 2 SKIN CORROSION - Category 1B SERIOUS EYE DAMAGE - Category 1 GERM CELL MUTAGENICITY - Category 2 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (kidneys, liver, nervous system) - Category 2 HNOC - Corrosive to digestive tract
Succinic acid	≤2.4	EYE IRRITATION - Category 2A
RNA Isolation Chloroform, Isoamyl Alcohol		
Trichloromethane	≥90	ACUTE TOXICITY (oral) - Category 4 ACUTE TOXICITY (inhalation) - Category 3 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A CARCINOGENICITY - Category 2 TOXIC TO REPRODUCTION (Unborn child) - Category 2 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (kidneys, liver) - Category 1
3-Methylbutan-1-ol	≤3	FLAMMABLE LIQUIDS - Category 3

Section 15. Regulatory information

		ACUTE TOXICITY (oral) - Category 4 ACUTE TOXICITY (inhalation) - Category 4 SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	**RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid** Phenol **RNA Isolation Chloroform, Isoamyl Alcohol** Trichloromethane	 108-95-2 67-66-3	 ≥90 ≥90
Supplier notification	**RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid** Phenol **RNA Isolation Chloroform, Isoamyl Alcohol** Trichloromethane	 108-95-2 67-66-3	 ≥90 ≥90

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

State regulations

Massachusetts : The following components are listed: 2-MERCAPTOETHANOL; ISOPROPYL ALCOHOL; 2-PROPANOL; CHLOROFORM; TRICHLOROMETHANE; PHENOL; ACETIC ACID; ACETIC ACID GLACIAL

New York : The following components are listed: Chloroform; Methane, trichloro-; Phenol; Carbolic acid; Acetic acid

New Jersey : The following components are listed: THIOGLYCOL; 2-MERCAPTOETHANOL; ISOPROPYL ALCOHOL; 2-PROPANOL; CHLOROFORM; METHANE, TRICHLORO-; PHENOL; CARBOLIC ACID; ACETIC ACID; ETHANOIC ACID

Pennsylvania : The following components are listed: ETHANOL, 2-MERCAPTO-; 2-PROPANOL; METHANE, TRICHLORO-; PHENOL; ACETIC ACID; ACETIC ACID, WATER SOLUTIONS

California Prop. 65

⚠ **WARNING**: This product can expose you to Chloroform, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Ingredient name	No significant risk level	Maximum acceptable dosage level
RNA Isolation Chloroform, Isoamyl Alcohol Chloroform	 Yes.	 -

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

Section 15. Regulatory information

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

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

Section 16. Other information

History

Date of issue	:	06/29/2018
Date of previous issue	:	08/31/2016
Version	:	6

Procedure used to derive the classification

Classification	Justification
ß-Mercaptoethanol	
FLAMMABLE LIQUIDS - Category 4	On basis of test data
ACUTE TOXICITY (oral) - Category 3	On basis of test data
ACUTE TOXICITY (dermal) - Category 2	On basis of test data
ACUTE TOXICITY (inhalation) - Category 2	On basis of test data
SKIN IRRITATION - Category 2	Expert judgment
SERIOUS EYE DAMAGE - Category 1	Expert judgment
SKIN SENSITIZATION - Category 1	Expert judgment
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3	Expert judgment
AQUATIC HAZARD (LONG-TERM) - Category 2	Expert judgment
Isopropanol	
FLAMMABLE LIQUIDS - Category 2	On basis of test data
EYE IRRITATION - Category 2A	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (liver) - Category 2	Calculation method

Section 16. Other information

Denaturing solution	
ACUTE TOXICITY (oral) - Category 4	Calculation method
ACUTE TOXICITY (inhalation) - Category 4	Calculation method
AQUATIC HAZARD (LONG-TERM) - Category 3	Calculation method
2M Sodium Acetate	
SKIN IRRITATION - Category 2	Expert judgment
EYE IRRITATION - Category 2A	Expert judgment
AQUATIC HAZARD (ACUTE) - Category 3	Calculation method
RNA Phenol pH 5.3 - 5.7 Equilibrated with Succinic Acid	
FLAMMABLE LIQUIDS - Category 4	On basis of test data
ACUTE TOXICITY (oral) - Category 3	Calculation method
ACUTE TOXICITY (dermal) - Category 3	Calculation method
ACUTE TOXICITY (inhalation) - Category 2	Calculation method
SKIN CORROSION - Category 1B	Calculation method
SERIOUS EYE DAMAGE - Category 1	Calculation method
GERM CELL MUTAGENICITY - Category 2	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (kidneys, liver, nervous system) - Category 2	Calculation method
AQUATIC HAZARD (ACUTE) - Category 1	Calculation method
AQUATIC HAZARD (LONG-TERM) - Category 1	Calculation method
RNA Isolation Chloroform, Isoamyl Alcohol	
ACUTE TOXICITY (oral) - Category 4	Calculation method
ACUTE TOXICITY (inhalation) - Category 3	Calculation method
SKIN IRRITATION - Category 2	Calculation method
EYE IRRITATION - Category 2A	Calculation method
CARCINOGENICITY - Category 2	Calculation method
TOXIC TO REPRODUCTION (Unborn child) - Category 2	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (kidneys, liver) - Category 1	Calculation method
AQUATIC HAZARD (ACUTE) - Category 2	Calculation method
AQUATIC HAZARD (LONG-TERM) - Category 3	Calculation method

Indicates information that has changed from previously issued version.

Notice to reader

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