

MATERIAL SAFETY DATA SHEET

Date Revised: July 15, 2013

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: CF Dye TUNEL Assay Equilibration Buffer
Catalog Number: 99965
Unit Size: 50 assays
Manufacturer/Supplier: Biotium, Inc.
46117 Landing Parkway, Fremont, CA 94538, USA
Phone: 1-510-265-1027, Fax: 1-510-265-1352
Web: <http://www.biotium.com>

2. HAZARDS IDENTIFICATION

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

Acute toxicity 4, Acute toxicity 2, Carcinogen 1A, Aquatic acute 1, Aquatic chronic 1
Acute Toxicity. 4, Skin Sensitizer. 1, Respiratory Sensitizer 1, Mutagenicity 2, Carcinogenicity 1B,
Reproductive Toxicity 1B

Classification according to Directive 1999/45/EC

None

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

Hazard pictogram GHS06 Skull and Crossbones, GHS08 Health Hazard, GHS09 Environment

Signal word Danger

Hazard statements H301 Toxic if swallowed, H302 Harmful if swallowed, H317 May cause an allergic skin reaction, H330 Fatal if inhaled, H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled, H341 Suspected of causing genetic defects, H350 May cause cancer, H360 May damage fertility or the unborn child, H400 Very toxic to aquatic life, H410 Very toxic to aquatic life with long lasting effects

Precautionary statements

P264 Wash skin thoroughly after handling, P270 Do not eat, drink or smoke when using this product, P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician, P330 Rinse mouth, P405 Store locked up, P501 Dispose of contents/container to hazardous chemical waste, P260 Do not breathe dust/fume/gas/mist/vapours/spray, P271 Use only in a well-ventilated area, P284 Wear respiratory protection, P304+P340 IF INHALED: Remove victim to fresh air and Keep at rest in a position comfortable for breathing, P310 Immediately call a POISON CENTER or doctor/physician, P403+P233 Store in a well-ventilated place and keep container tightly closed, P201 Obtain special instructions before use, P202 Do not handle until all safety precautions have been read and understood, P281 Use personal protective equipment as required, P308+P313 IF exposed or concerned: Get medical advice/attention, P272 Contaminated work clothing should not be allowed out of the workplace, P273 Avoid release to the environment, P280 Wear protective gloves/protective clothing/eye protection/face protection, P391 Collect spillage. Hazardous to the aquatic environment. P302+P352 IF ON SKIN: wash with plenty of soap and water, P333+P313 IF SKIN irritation or rash occurs: Get medical advice/attention. P363 Wash contaminated clothing before reuse, P285 In case of inadequate ventilation wear respiratory protection, P304+P341 IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing, P342 + P311 IF experiencing respiratory symptoms: call a POISON CENTER or doctor/physician, P405 Store locked up.

HMIS Classification

Health hazard: 3

Flammability: 0

Physical hazards: 0

NFPA Rating

Health hazard: 3

Fire: 0
Reactivity Hazard: 0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Name	CAS No.	EC No.	Index No.	Weight %	Classification according to 67/548/EEC	Classification according to regulation (EC)No1278/2008
Sodium cacodylate (cacodylic acid, dimethylarsenic acid)	75-60-5	200-883-4	N/A	3%	Acute Tox. 4 * Acute Tox. 2 Carc. 1A Aquatic Acute 1 Aquatic Chronic 1	N/A
Cobalt(II) Chloride (cobalt dichloride)	7646-79-9	231-589-4	027-004-00-5	<0.1%	Acute Tox. 4 * Carc. 1B Skin Sens. 1 Resp. Sens. 1 Muta. 2 Carc. 1B Repr. 1B Aquatic Acute 1 Aquatic Chronic 1	Carc. 1B Acute Tox. 4 * Resp. Sens. 1 Skin Sens. 1 Aquatic Acute 1 Aquatic Chronic 1

4. FIRST-AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Suitable extinguishing media

Carbon dioxide, dry chemical extinguishers, foam extinguishers or water.

Special protective equipment for firefighters

Wear self contained breathing apparatus for firefighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Avoid breathing vapors, mist or gas. Remove all sources of ignition.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up

Contain spillage. Soak up spilled substance with inert absorbent material. . Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling

Avoid inhalation of vapor or mist.
 Avoid direct contact with substance.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place.
 Store at -20°C.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Substance: Cobalt dichloride
 CAS no. 7646-79-9

country	Austria	Belgium	Denmark	European Union	France	Germany
Limit value, 8hours	--	--	--	--	--	--
Limit value, short term	--	--	--	--	--	--

country	Hungary	Italy	Poland	Spain	Sweden	Netherlands	United Kingdom
Limit value, 8hours	--	--	--	--	0.02 mg/m ³	--	--
Limit value, short term	--	--	--	--	--	--	--

country	United Kingdom	USA-NIOSH	USA-OSHA	Australia	Canada	Japan	South Korea
Limit value, 8hours	--	--	--	--	--	--	--
Limit value, short term	--	--	--	--	--	--	--

Personal protective equipment

Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Respiratory protection

Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Eye protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Chemical Name	CF Dye TUNEL Assay Equilibration Buffer
Appearance	Light pink solution
Odor	No data available
Odor threshold	No data available
pH	6.6
Melting point/freezing point	No data available
Boiling point	No data available
Flash point	No data available
Evaporate rate	No data available
Flammability	No data available
Explosive limits	No data available
Vapor pressure	No data available
Vapor density	No data available
Relative density	No data available
Solubility	Water soluble
Partition coefficient:n-octanol/water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Explosive properties	No data available
Oxidising properties	No data available

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

No data available

Conditions to avoid

Heat, flames and sparks.

Materials to avoid

Oxidizing agents, Alkali metals, Strong bases

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sodium oxides, Arsenic oxides Hydrogen chloride gas, Cobalt/cobalt oxides

Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50

Sodium cacodylate : rat - 644 mg/kg; cobalt dichloride: 418 mg/kg

Inhalation LC50 None

Dermal LD50 None

Other information on acute toxicity No data available

Skin corrosion/irritation no data available

Serious eye damage/eye irritation no data available

Respiratory or skin sensitization no data available

Germ cell mutagenicity Sodium cacodylate, cobalt dichloride: Laboratory experiments have shown mutagenic effects.

Carcinogenicity

Carcinogenicity - mouse – Oral (Dimethylarsinic acid)

Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration: Tumors.

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification. (Dimethylarsinic acid)

IARC: 1 - Group 1: Carcinogenic to humans (Dimethylarsinic acid); IARC: 2B - Group 2B: Possibly carcinogenic to humans (Cobalt dichloride)

2B - Group 2B: Possibly carcinogenic to humans (Dimethylarsinic acid), 2B - Group 2B: Possibly carcinogenic to humans (Cobalt dichloride)

IARC: 1 - Group 1: Carcinogenic to humans (Dimethylarsinic acid)

2B - Group 2B: Possibly carcinogenic to humans (Dimethylarsinic acid)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Reproductive toxicity - mouse - Oral

Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Physical.

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals. (Dimethylarsinic acid)

Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count).

Paternal Effects: Testes, epididymis, sperm duct. Effects on Fertility: Male fertility index (e.g., # males impregnating females per # males exposed to fertile nonpregnant females) (Cobalt dichloride).

May damage fertility.

Teratogenicity

May cause congenital malformation in the fetus. (Dimethylarsinic acid)

Specific target organ toxicity - single exposure (Globally Harmonized System)

Inhalation - May cause respiratory irritation. (Dimethylarsinic acid)

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

no data available

Potential health effects

Inhalation Toxic if inhaled. Causes respiratory tract irritation. (Dimethylarsinic acid)

Ingestion Toxic if swallowed. (Dimethylarsinic acid)

Skin May be harmful if absorbed through skin. Causes skin irritation. (Dimethylarsinic acid)

Eyes Causes eye irritation. (Dimethylarsinic acid)

Aggravated

Medical Condition

Cacodylic acid may be partially reduced to inorganic arsenic in the body, Exposure to arsenic compounds can cause: burning, dry nose, dry mouth, Muscle cramps/spasms, May cause irritation of the Gastrointestinal tract, Vomiting, Nausea, Diarrhea, Shock, Death.

Signs and Symptoms of Exposure

Drowsiness, Tremors, Convulsions, dry mouth, metallic taste, loss of appetite, respiratory difficulties, garlic-like breath odor, garlic-like perspiration (Dimethylarsinic acid). Blood disorders, Cough, Shortness of breath, Headache, Nausea, Vomiting (Cobalt dichloride).

Synergistic effects

no data available

Additional InformationRTECS: CH7525000 (Dimethylarsinic acid)
RTECS: GF9800000 (Cobalt dichloride)

12. ECOLOGICAL INFORMATION**Toxicity** Sodium cacodylate: Toxicity to fish LC50 - Lepomis macrochirus - > 180 mg/l - 96 h
Cobalt dichloride: Toxicity to fish LC50 - Cyprinus carpio (Carp) - 0.33 mg/l - 96 h
Cobalt dichloride: Toxicity to daphnia and other aquatic invertebrates mortality
NOEC - Daphnia - < 0.05 mg/l - 7 d EC50 - Daphnia magna (Water flea) - 1.1 -
1.6 mg/l - 48 h
Cobalt dichloride: Toxicity to algae EC50 - Chlorella vulgaris (Fresh water algae)
- 0.52 mg/l - 96 h**Persistence and degradability** Sodium cacodylate: Bioaccumulation Gambusia affinis (Mosquito fish) -
32 d Bioconcentration factor (BCF): 21**Biodegradation** no information available**Mobility in soil** no information available**Results of PBT and vPvB assessment** no information available**Other adverse effects** Very toxic to aquatic life with long lasting effects. An environmental hazard
cannot be excluded in the event of unprofessional handling or disposal.**Additional information** no information available

13. DISPOSAL CONSIDERATIONS

Do not dispose product directly into sewage. Consult local state or national regulation for proper disposal.

14. TRANSPORT INFORMATION**IATA, IMDG, DOT(US)** not dangerous good during transportation

UN number none

UN proper shipping name none

Transport hazard class none

Packing group none

Environmental hazards none

Special precaution for user none

15. REGULATION INFORMATION**US Federal Regulations**

Us Toxic Substances Control Act (TSCA): Not listed

SARA 302: No chemicals were found.

SARA 313: No chemicals were found.

SARA 311/312 Hazards : No chemicals were found.

16. OTHER INFORMATION

Classification according to Regulation (EC) Nr. 1272/2008

Prepared by: Regulatory Department
Biotium Inc.
Version no. 2
Reason for revision Application of CLP labeling and corresponding requirements

The information provided above is believed to be correct to our best knowledge, but does not purport to be all inclusive, and shall be used only as a guide. This material is sold for research purposes only and is not required to appear on the TSCA inventory. It is not intended for food, drug, household, agricultural or cosmetic use. Its use must be supervised by a technically qualified individual experienced in handling potentially hazardous chemicals. Biotium shall not be held liable for any damage resulting from handling or contact with the above product.

MATERIAL SAFETY DATA SHEET

Date Revised: July 15, 2013

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: CF Dye TUNEL Assay Reaction Buffer
Catalog Number: 30063A, 30064A, or 30074A
Unit Size: 50 assays
Manufacturer/Supplier: Biotium, Inc.
46117 Landing Parkway, Fremont, CA 94538, USA
Phone: 1-510-265-1027, Fax: 1-510-265-1352
Web: <http://www.biotium.com>

2. HAZARDS IDENTIFICATION

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

Acute toxicity 4, Acute toxicity 2, Carcinogen 1A, Aquatic acute 1, Aquatic chronic 1
Acute Toxicity. 4, Skin Sensitizer. 1, Respiratory Sensitizer 1, Mutagenicity 2, Carcinogenicity 1B,
Reproductive Toxicity 1B

Classificative according to Directive 1999/45/EC

None

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

Hazard pictogram GHS06 Skull and Crossbones, GHS08 Health Hazard, GHS09 Environment

Signal word Danger

Hazard statements H301 Toxic if swallowed, H302 Harmful if swallowed, H317 May cause an allergic skin reaction, H330 Fatal if inhaled, H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled, H341 Suspected of causing genetic defects, H350 May cause cancer, H360 May damage fertility or the unborn child, H400 Very toxic to aquatic life, H410 Very toxic to aquatic life with long lasting effects

Precautionary statements

P264 Wash skin thoroughly after handling, P270 Do not eat, drink or smoke when using this product, P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician, P330 Rinse mouth, P405 Store locked up, P501 Dispose of contents/container to hazardous chemical waste, P260 Do not breathe dust/fume/gas/mist/vapours/spray, P271 Use only in a well-ventilated area, P284 Wear respiratory protection, P304+P340 IF INHALED: Remove victim to fresh air and Keep at rest in a position comfortable for breathing, P310 Immediately call a POISON CENTER or doctor/physician, P403+P233 Store in a well-ventilated place and keep container tightly closed, P201 Obtain special instructions before use, P202 Do not handle until all safety precautions have been read and understood, P281 Use personal protective equipment as required, P308+P313 IF exposed or concerned: Get medical advice/attention, P272 Contaminated work clothing should not be allowed out of the workplace, P273 Avoid release to the environment, P280 Wear protective gloves/protective clothing/eye protection/face protection, P391 Collect spillage. Hazardous to the aquatic environment. P302+P352 IF ON SKIN: wash with plenty of soap and water, P333+P313 IF SKIN irritation or rash occurs: Get medical advice/attention. P363 Wash contaminated clothing before reuse, P285 In case of inadequate ventilation wear respiratory protection, P304+P341 IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing, P342 + P311 IF experiencing respiratory symptoms: call a POISON CENTER or doctor/physician, P405 Store locked up.

HMIS Classification

Health hazard: 3

Flammability: 0

Physical hazards: 0

NFPA Rating

Health hazard: 3

Fire: 0

Reactivity Hazard: 0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Name	CAS No.	EC No.	Index No.	Weight %	Classification according to 67/548/EEC	Classification according to regulation (EC)No1278/2008
Sodium cacodylate (cacodylic acid, dimethylarsenic acid)	75-60-5	200-883-4	N/A	3%	Acute Tox. 4 * Acute Tox. 2 Carc. 1A Aquatic Acute 1 Aquatic Chronic 1	N/A
Cobalt(II) Chloride (cobalt dichloride)	7646-79-9	231-589-4	027-004-00-5	<0.1%	Acute Tox. 4 * Carc. 1B Skin Sens. 1 Resp. Sens. 1 Muta. 2 Carc. 1B Repr. 1B Aquatic Acute 1 Aquatic Chronic 1	Carc. 1B Acute Tox. 4 * Resp. Sens. 1 Skin Sens. 1 Aquatic Acute 1 Aquatic Chronic 1
dATP	1927-31-7	N/A	N/A	<0.01%	N/A	N/A
dUTP, CF dye conjugate	N/A	N/A	N/A	<0.001%	N/A	N/A

4. FIRST-AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Suitable extinguishing media

Carbon dioxide, dry chemical extinguishers, foam extinguishers or water.

Special protective equipment for firefighters

Wear self contained breathing apparatus for firefighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Avoid breathing vapors, mist or gas. Remove all sources of ignition.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up

Contain spillage. Soak up spilled substance with inert absorbent material. . Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling

Avoid inhalation of vapor or mist.
 Avoid direct contact with substance.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place.
 Store at -20°C.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Substance: Cobalt dichloride
 CAS no. 7646-79-9

country	Austria	Belgium	Denmark	European Union	France	Germany
Limit value,8hours	--	--	--	--	--	--
Limit value, short term	--	--	--	--	--	--

country	Hungary	Italy	Poland	Spain	Sweden	Netherlands	United Kingdom
Limit value,8hours	--	--	--	--	0.02 mg/m ³	--	--
Limit value, short term	--	--	--	--	--	--	--

country	United Kingdom	USA-NIOSH	USA-OSHA	Australia	Canada	Japan	South Korea
Limit value,8hours	--	--	--	--	--	--	--
Limit value, short term	--	--	--	--	--	--	--

Personal protective equipment

Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Respiratory protection

Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Eye protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Chemical Name	CF Dye TUNEL Assay Equilibration Buffer
Appearance	Light pink solution
Odor	No data available
Odor threshold	No data available
pH	6.6
Melting point/freezing point	No data available
Boiling point	No data available
Flash point	No data available
Evaporate rate	No data available
Flammability	No data available
Explosive limits	No data available
Vapor pressure	No data available
Vapor density	No data available
Relative density	No data available
Solubility	Water soluble
Partition coefficient:n-octanol/water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Explosive properties	No data available
Oxidising properties	No data available

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

No data available

Conditions to avoid

Heat, flames and sparks.

Materials to avoid

Oxidizing agents, Alkali metals, Strong bases

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sodium oxides, Arsenic oxides Hydrogen chloride gas, Cobalt/cobalt oxides

Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity**Oral LD50** Sodium cacodylate : rat - 644 mg/kg; cobalt dichloride: 418 mg/kg**Inhalation LC50** None**Dermal LD50** None**Other information on acute toxicity** No data available**Skin corrosion/irritation** no data available**Serious eye damage/eye irritation** no data available**Respiratory or skin sensitization** no data available**Germ cell mutagenicity** Sodium cacodylate, cobalt dichloride: Laboratory experiments have shown mutagenic effects.**Carcinogenicity**

Carcinogenicity - mouse – Oral (Dimethylarsinic acid)

Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration: Tumors.

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification. (Dimethylarsinic acid)

IARC: 1 - Group 1: Carcinogenic to humans (Dimethylarsinic acid); IARC: 2B - Group 2B: Possibly carcinogenic to humans (Cobalt dichloride)

2B - Group 2B: Possibly carcinogenic to humans (Dimethylarsinic acid), 2B - Group 2B: Possibly carcinogenic to humans (Cobalt dichloride)

IARC: 1 - Group 1: Carcinogenic to humans (Dimethylarsinic acid)

2B - Group 2B: Possibly carcinogenic to humans (Dimethylarsinic acid)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Reproductive toxicity - mouse - Oral

Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Physical.

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals. (Dimethylarsinic acid)

Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count).

Paternal Effects: Testes, epididymis, sperm duct. Effects on Fertility: Male fertility index (e.g., # males impregnating females per # males exposed to fertile nonpregnant females) (Cobalt dichloride).

May damage fertility.

Teratogenicity

May cause congenital malformation in the fetus. (Dimethylarsinic acid)

Specific target organ toxicity - single exposure (Globally Harmonized System)

Inhalation - May cause respiratory irritation. (Dimethylarsinic acid)

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

no data available

Potential health effects**Inhalation** Toxic if inhaled. Causes respiratory tract irritation. (Dimethylarsinic acid)**Ingestion** Toxic if swallowed. (Dimethylarsinic acid)**Skin** May be harmful if absorbed through skin. Causes skin irritation. (Dimethylarsinic acid)**Eyes** Causes eye irritation. (Dimethylarsinic acid)**Aggravated****Medical Condition**

Cacodylic acid may be partially reduced to inorganic arsenic in the body, Exposure to arsenic compounds can cause: burning, dry nose, dry mouth, Muscle cramps/spasms, May cause irritation of the Gastrointestinal tract, Vomiting, Nausea, Diarrhea, Shock, Death.

Signs and Symptoms of Exposure

Drowsiness, Tremors, Convulsions, dry mouth, metallic taste, loss of appetite, respiratory difficulties, garlic-like breath odor, garlic-like perspiration (Dimethylarsinic acid). Blood disorders, Cough, Shortness of breath, Headache, Nausea, Vomiting (Cobalt dichloride).

Synergistic effects

no data available

Additional Information

RTECS: CH7525000 (Dimethylarsinic acid)

RTECS: GF9800000 (Cobalt dichloride)

12. ECOLOGICAL INFORMATION**Toxicity**Sodium cacodylate: Toxicity to fish LC50 - *Lepomis macrochirus* - > 180 mg/l - 96 hCobalt dichloride: Toxicity to fish LC50 - *Cyprinus carpio* (Carp) - 0.33 mg/l - 96 h

Cobalt dichloride: Toxicity to daphnia and other aquatic invertebrates mortality

NOEC - *Daphnia* - < 0.05 mg/l - 7 d EC50 - *Daphnia magna* (Water flea) - 1.1 -

1.6 mg/l - 48 h

Cobalt dichloride: Toxicity to algae EC50 - *Chlorella vulgaris* (Fresh water algae)

- 0.52 mg/l - 96 h

Persistence and degradabilitySodium cacodylate: Bioaccumulation *Gambusia affinis* (Mosquito fish) -

32 d Bioconcentration factor (BCF): 21

Biodegradation

no information available

Mobility in soil

no information available

Results of PBT and vPvB assessment

no information available

Other adverse effects

Very toxic to aquatic life with long lasting effects. An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Additional information

no information available

13. DISPOSAL CONSIDERATIONS

Do not dispose product directly into sewage. Consult local state or national regulation for proper disposal.

14. TRANSPORT INFORMATION**IATA, IMDG, DOT (US)**

not dangerous good during transportation

UN number none

UN proper shipping name none

Transport hazard class none

Packing group none

Environmental hazards none

Special precaution for user none

15. REGULATION INFORMATION**US Federal Regulations**

Us Toxic Substances Control Act (TSCA): Not listed

SARA 302: No chemicals were found.

SARA 313: No chemicals were found.

SARA 311/312 Hazards : No chemicals were found.

16. OTHER INFORMATION

Classification according to Regulation (EC) Nr. 1272/2008

Prepared by: Regulatory Department
Biotium Inc.

Version no. 2

Reason for revision Application of CLP labeling and corresponding requirements

The information provided above is believed to be correct to our best knowledge, but does not purport to be all inclusive, and shall be used only as a guide. This material is sold for research purposes only and is not required to appear on the TSCA inventory. It is not intended for food, drug, household, agricultural or cosmetic use. Its use must be supervised by a technically qualified individual experienced in handling potentially hazardous chemicals. Biotium shall not be held liable for any damage resulting from handling or contact with the above product.

MATERIAL SAFETY DATA SHEET

Date Revised: July 15, 2013

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: TdT Enzyme
Catalog Number: 99964
Unit Size: 50 uL
Manufacturer/Supplier: Biotium, Inc.
 46117 Landing Parkway, Fremont, CA 94538, USA
 Phone: 1-510-265-1027, Fax: 1-510-265-1352
 Web: <http://www.biotium.com>

2. HAZARDS IDENTIFICATION

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

None

Classification according to Directive 1999/45/EC

None

Labelling according to Regulation (EC) No 1272/2008[CLP]**Hazard pictogram** GHS07, GHS09, GHS05**Signal word** Danger**Hazard statements** H302 Harmful if swallowed; H315 Causes skin irritation; H318 Causes serious eye damage; H411 Toxic to aquatic life with long lasting effects**Precautionary statements** P264 Wash hands thoroughly after handling, P270 Do not eat, drink or smoke when using this product, P301+P312 IF SWALLOWED: call a POISON CENTER or doctor/physician IF you feel unwell, P330 Rinse mouth, P280 Wear protective gloves/protective clothing/eye protection/face protection, P302+P352 IF ON SKIN: wash with plenty of soap and water, P332+P313 IF SKIN irritation occurs: Get medical advice/attention, P362 Take off contaminated clothing and wash before reuse, P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing, P310 Immediately call a POISON CENTER or doctor/physician, P273 Avoid release to the environment, P501 Dispose of contents/container to hazardous waste**HMIS Classification** (Triton X-100, glycerol)

Health hazard: 2

Flammability: 1

Physical hazards: 0

NFPA Rating (Triton X-100, glycerol)

Health hazard: 2

Fire: 1

Reactivity Hazard: 0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Name	CAS No.	EC No.	Index No.	Weight %	Classification according to 67/548/EEC	Classification according to regulation (EC)No1278/2008
Potassium phosphate, monobasic	7778-77-0	231-913-4	N/A	<1%	N/A	Not classified
Potassium chloride	7447-40-7	231-211-8	N/A	<2%	N/A	Not classified
Triton X-100	9002-93-1	N/A	N/A	<1%	N/A	Acute Tox. 4 Skin Irrit. 2

						Eye Dam. 1 Aquatic Chronic 2
Glycerol	56-81-5	200-289-5	N/A	50%	N/A	Not classified
TdT Enzyme	N/A	N/A	N/A	<1%	N/A	Not classified

4. FIRST-AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Suitable extinguishing media

carbon dioxide, dry chemical extinguishers, foam extinguishers or water.

Special protective equipment for firefighters

Wear self contained breathing apparatus for firefighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Avoid breathing vapors, mist or gas. Remove all sources of ignition.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up

Contain spillage. Soak up spilled substance with inert absorbent material. . Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling

Avoid inhalation of vapor or mist.

Avoid direct contact with substance.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place.

Store at -20 °C.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Substance: Glycerol

CAS no. 56-81-5

country	Austria	Belgium	Denmark	European Union	France	Germany
Limit value, 8hours	--	10 mg/m ³	--	--	10 mg/m ³	50 mg/m ³ inhalable aerosol (DFG)
Limit value, short term	--	--	--	--	--	100 mg/m ³ inhalable aerosol (DFG)

country	Hungary	Italy	Poland	Spain	Sweden	Netherlands	United Kingdom
Limit value, 8hours	--	--	10 mg/m ³	10 mg/m ³	--	--	10 mg/m ³
Limit value, short term	--	--		--	--	--	

country	United Kingdom	USA-NIOSH	USA-OSHA	Australia	Canada	Japan	South Korea
Limit value, 8hours	10 mg/m ³	IDLH: Immediately Dangerous to Life or Health	(Vacated) TWA: 10 mg/m ³ (Vacated) TWA: 5 mg/m ³ TWA: 15 mg/m ³ TWA: 5 mg/m ³	10 mg/m ³	Ontario TWA: 10 mg/m ³ Quebec TWA: 10 mg/m ³	--	10 mg/m ³
Limit value, short term	--	--	--	--	--	--	--

Personal protective equipment

Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Respiratory protection

Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Eye protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Chemical Name	TdT Enzyme
Appearance	Clear solution
Odor	No data available
Odor threshold	No data available
pH	7.2
Melting point/freezing point	No data available

Boiling point	No data available
Flash point	No data available
Evaporate rate	No data available
Flammability	No data available
Explosive limits	No data available
Vapor pressure	No data available
Vapor density	No data available
Relative density	No data available
Solubility	Water soluble
Partition coefficient:n-octanol/water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity	No data available
Explosive properties	No data available
Oxidising properties	No data available

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

No data available

Conditions to avoid

Heat, flames and sparks.

Materials to avoid

No data available

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50 Glycerol-rat - 12,600 mg/kg

Inhalation LC50 no data available

Dermal LD50 Glycerol-rabbit - > 10,000 mg/kg

Other information on acute toxicity no data available

Skin corrosion/irritation Glycerol-rabbit - Mild skin irritation - 24 h

Serious eye damage/eye irritation Glycerol-rabbit - Mild eye irritation - 24 h

Respiratory or skin sensitization no data available

Germ cell mutagenicity no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

no data available

Potential health effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.

Ingestion May be harmful if swallowed.

Skin May be harmful if absorbed through skin. May cause skin irritation.

Eyes May cause eye irritation.

Additional Information

RTECS: TC6615500 (Potassium phosphate, monobasic), TS8050000 (Potassium chloride), MD0907700 (Triton X-100), MA8050000 (glycerol)

12. ECOLOGICAL INFORMATION**Toxicity** no information available**Persistence and degradability** no information available**Biodegradation** no information available**Mobility in soil** no information available**Results of PBT and vPvB assessment** no information available**Other adverse effects** no information available**Additional information** no information available

13. DISPOSAL CONSIDERATIONS

Do not dispose product directly into sewage. Consult local state or national regulation for proper disposal.

14. TRANSPORT INFORMATION**IATA, IMDG, DOT (US)** not dangerous good during transportation

UN number none

UN proper shipping name none

Transport hazard class none

Packing group none

Environmental hazards none

Special precaution for user none

15. REGULATION INFORMATION**US Federal Regulations**

Us Toxic Substances Control Act(TSCA): Not listed

SARA 302: No chemicals were found .

SARA 313: No chemicals were found.

SARA 311/312 Hazards : No chemicals were found.

16. OTHER INFORMATION

Classification according to Regulation (EC) Nr. 1272/2008

Prepared by: Regulatory Department
Biotium Inc.

Version no. 2

Reason for revision Application of CLP labeling and corresponding requirements

The information provided above is believed to be correct to our best knowledge, but does not purport to be all inclusive, and shall be used only as a guide. This material is sold for research purposes only and is not required to appear on the TSCA inventory. It is not intended for food, drug, household, agricultural or cosmetic use. Its use must be supervised by a technically qualified individual experienced in handling potentially hazardous chemicals. Biotium shall not be held liable for any damage resulting from handling or contact with the above product.