

Bulldog Bio
Safety Data Sheet (SDS)

1. Identification

Product Name	TaqDog TUFF Hot Start DNA Polymerase
	TFTD010
Cat No.	TFTD050
	TFTD001S
Synonyms	No information available
Recommended Use	For laboratory use only.
Restriction on Use	Not for food, drug, pesticide or biological product use. Not for human or animal drug use.
Company	Bulldog Bio, Inc.
	One New Hampshire Ave
Company Address	Suite 125
	Portsmouth, NH 03801
Emergency Telephone Number	603-570-4248
Email address	info@bulldog-bio.com

2. Hazard Identification

Classification

Not a dangerous substance or mixture according to the Globally Harmonized System (GHS)

Hazards not other classified (HNOC) None Identified

3. Composition/ Information on Ingredients

Mixture:

The product contains no substances which at their given concentrations, are considered to be hazardous to health.

Components	CAS-No.	Weight %
Glycerol	56-81-5	45 – 65
Water	7732-18-5	32 – 54.7
Chimeric TAQ DNA Polymerase	NA	0.1 - 1

4. First-aid Measures

General Advice

The appearance is a colorless liquid. Immediate medical attention is required. In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible). Remove from exposure, lie down. Do not breath dust/ fume/ gas/ mist/ vapors/ spray.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical

Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if the symptoms (irritation, pain or discomfort) occur.
Inhalation	Move to fresh open air. Get medical attention immediately.
Ingestion	Clean mouth with plenty of water and drink plenty of water afterwards. Get medicinal attention if the symptoms (irritation, pain or discomfort) occur
Most important symptoms and affects	No information available
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Use extinguishing media appropriate to surrounding fire conditions.
Unsuitable Extinguishing Media	CAUTION: Use of water spray when fighting fire may be inefficient.
Flash Point Method -	No information available
Autoignition Temperature	No information available
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	Not sensitive.
Sensitivity to Static Discharge	Not sensitive.
Specific Hazard Arising from the Chemical	Keep product and empty container away from heat and sources of ignition.
Hazardous Combustion Products	None known.
Protective Equipment and Precautions for Firefighters	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear

6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures	Avoid any contact with skin, eyes and clothing. Use personal protective equipment. Ensure adequate ventilation, especially in confined areas.
Environmental Precautions	The solution should not be released into the environment. See section 12 for additional ecological information.
Methods for Containment and Clean Up	Absorb with sand or vermiculite. Pick up and transfer to properly labeled containers. Ventilate area and wash spill site after material pickup is complete. Alternatively, you may sweep up or vacuum up spillage and collect in a suitable container for disposal. Put up appropriate signs to maintain a 2-meter diameter around the spillage to ensure minimal contamination to personal in vicinity.

7. Handling and Storage

Precautions for Safe Handling	Handle in accordance with good industrial hygiene and safety practice. Wear personal protective equipment (PPE): appropriate
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gloves, cotton lab-coat and protective eye-gear. Avoid contact with skin, eyes and clothing. Avoid ingestion and inhalation of the solution

Conditions for Safe Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

Incompatible Products No information available.

8. Exposure Controls/ Personal Protection

Exposure Guidelines This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region-specific regulatory bodies.

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Glycerol (CAS-No: 58-81-5)	-	TWA: 15 mg/m ³ mist, total TWA: 5 mg/ m ³ mist, respirable fraction (vacated) TWA: 10 mg/ m ³ mist, total particulate (vacated) TWA: 5 mg/ m ³ mist, respirable fraction	-

Engineering Measures Showers, eye wash station

Personal Protective Equipment:

Eye/face Protection Wear appropriate protective eyeglasses with side shields or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and Body Protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Use in well ventilated areas. If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with local regulations.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practices.

9. Physical and Chemical Properties

Physical State Liquid

Appearance	Colorless and clear
Odor	Mild
Odor Threshold	No information available
pH	8.0
Melting Point/Range	No data available
Boiling Point/ Range	No data available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid, gas)	Not applicable
Flammability or explosive limit	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Specific Gravity	No information available
Solubility	Miscible
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available

10. Stability and Reactivity

Reactive Hazard	None known, based on information available.
Stability	Stable under recommended normal conditions.
Conditions to Avoid	None known based on information supplied.
Incompatible Materials	Ignition sources. Heat
Hazardous Decomposition Products	Thermal decomposition can lead to the release of irritating and toxic gases and vapor. Carbon monoxide. Carbon dioxide.
Hazardous Polymerization	Hazardous polymerization has not been reported
Hazardous Reactions	Can react briskly with oxidizers – danger of explosion.

11. Toxicological Information

Information on Likely Routes of Exposure:

Inhalation

Avoid breathing vapors or mist. May cause irritation of respiratory tract

Eye Contact

Redness. May cause slight irritation.

Skin Contact

Prolonged contact may cause redness and irritation. Repeated exposure may cause skin dryness or cracking.

Ingestion

May cause drowsiness or dizziness. Ingestion causes burns of the upper digestive and respiratory tracts. Symptoms include burning sensation, coughing, wheezing, shortness of breath, headache, nausea, and vomiting.

Toxicologically Synergistic Products	No information available
Delayed and Immediate Effects as well as Chronic Effects from Short and Long-term Exposure	
Irritation	Mild
Serious eye damage/ eye irritation	Mild
Corrosivity	Mild
Skin corrosion/ irritation	Mild

Mutagenic Effects	No information available.
Reproductive Effects	No information available.
Developmental Effects	No information available.
Teratogenicity	No information available.
STOT – single exposure	None known
STOT – repeated exposure	None known
Aspiration Hazard	No information available.
Symptoms/ effects (both acute and delayed)	No information available.
Endocrine Disruptor Information	No information available.
Target Organ Effects	Eyes, kidneys, respiratory system, skin.
Other Adverse Effects	The toxicological properties have not been fully investigated

12. Ecological Information

Ecotoxicity
No information available

1.17302 % of the mixture consists of component(s) of known hazards to the aquatic environment.

Persistence and Degradability	Miscible with water. Persistence is unlikely based on information available
Bioaccumulation / Accumulation	No information available
Mobility	Will likely be mobile in the environment due to its water solubility
Other Adverse Effects:	
Ozone	No information available
Ozone Depletion Potential (ODP)	No information available

13. Disposal Considerations

Waste Disposal Considerations Keep out of drains, sewers, ditches and waterways.

Use a licensed professional waste disposal service to dispose of this product. Product may be dissolved in a combustible solvent or

Contaminated Packaging absorbed onto a combustible material and burned by a chemical incinerator.
Empty containers must be tripled rinsed prior to disposal.

14. Transport Information

DOT	Not regulated.
TDG	Not regulated.
IATA	Not regulated.
IMDG/IMO	Not regulated.

15. Regulator Information

International Inventories

TSCA (United States Toxic Substance Control Act Section 8(b) Inventory) Complies

US Federal Regulations

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the CWA (40 CFR 122.21 and 40 CFR 122.42)

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

US State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

Bulldog Bio
Safety Data Sheet (SDS)

1. Identification

Product Name	10X TUFF Reaction Buffer (Without MgSO ₄)
Cat No.	TFTD010 TFTD050 TFTD001S
Synonyms	No information available
Recommended Use	For laboratory use only.
Restriction on Use	Not for food, drug, pesticide or biological product use. Not for human or animal drug use.
Company	Bulldog Bio, Inc.
Company Address	One New Hampshire Ave Suite 125 Portsmouth, NH 03801
Emergency Telephone Number	603-570-4248
Email address	info@bulldog-bio.com

2. Hazard Identification

Classification

Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Hazards not other classified (HNOC) None Identified

3. Composition/ Information on Ingredients

Component	CAS-No	Weight (%)
DNase/RNase/Protease Free Water	7732-18-5	> 95
Tris (hydroxymethyl) aminomethane	77-86-1	1.0 – 3.0
Potassium Chloride	7447-40-7	1.0 – 3.0
Bovine Serum Albumin	9048-46-8	< 0.1
Ammonium Sulfate	7783-20-2	1.0 – 3.0

4. First-aid Measures

General Comments

The appearance is a colorless liquid.

CAUTION! May cause eye, skin and respiratory tract irritation. This is expected to be a low hazard for usual laboratory or industrial handling. Good laboratory practices are recommended when handling this

solution. The use of personal protection equipment's (PPE's), such as appropriate gloves, cotton lab-coat and protective eye-gear are required.

Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if the symptoms (irritation, pain or discomfort) occur.
Inhalation	Move to fresh open air. Get medical attention immediately.
Ingestion	Clean mouth with plenty of water and drink plenty of water afterwards. Get medicinal attention if the symptoms (irritation, pain or discomfort) occur
Most important symptoms and affects	None known
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Use extinguishing media appropriate to surrounding fire conditions
Unsuitable Extinguishing Media	No information available
Flash Point Method -	No information available
Autoignition Temperature	No information available
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	Not sensitive.
Sensitivity to Static Discharge	Not sensitive.
Specific Hazard Arising from the Chemical	Keep product and empty container away from heat and sources of ignition.
Hazardous Combustion Products	None known.
Protective Equipment and Precautions for Firefighters	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear

NFPA

Health	Flammability	Instability	Physical Hazards
1	0	0	N/A

6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures	Avoid any contact with skin, eyes and clothing. Use personal protective equipment. Ensure adequate ventilation
Environmental Precautions	The solution should not be released into the environment. See section 12 for additional ecological information.

Methods for Containment and Clean Up	Absorb with sand or vermiculite. Pick up and transfer to properly labeled containers. Ventilate area and wash spill site after material pickup is complete. Alternatively, you may sweep up or vacuum up spillage and collect in a suitable container for disposal. Put up appropriate signs to maintain a 2 meter diameter around the spillage to ensure minimal contamination to personal in vicinity.
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7. Handling and Storage

Precautions for Safe Handling	Wear personal protective equipment (PPE): appropriate gloves, cotton lab-coat and protective eye-gear. Avoid contact with skin, eyes and clothing. Avoid ingestion and inhalation of the solution Handle in accordance with good industrial hygiene and safety practice.
Conditions for Safe Storage	Keep containers tightly closed in a dry, cool and well-ventilated place.
Incompatible Products	No information available.

8. Exposure Controls/ Personal Protection

Exposure Guidelines	Avoid contact with skin, eyes and clothing. Avoid ingestion and inhalation of the solution Handle in accordance with good industrial hygiene and safety practice.
Engineering Measures	Showers Eye wash station Ventilation systems
<u>Personal Protective Equipment:</u>	
Eye/face Protection	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin and Body Protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with local regulations.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practices.

9. Physical and Chemical Properties

Physical State	Liquid
Appearance	Colorless and clear
Odor	No information available
Odor Threshold	No information available

pH	8.8 (10 %)
Melting Point/Range	No data available
Boiling Point/ Range	No data available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid, gas)	Not applicable
Flammability or explosive limit	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Specific Gravity	No information available
Solubility	Miscible
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available

10. Stability and Reactivity

Reactive Hazard	None known, based on information available.
Stability	Stable under recommended normal conditions.
Conditions to Avoid	Incompatible products. Excess heat.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	None under normal use conditions
Hazardous Polymerization	Hazardous polymerization has not been reported
Hazardous Reactions	None under normal processing.

11. Toxicological Information

Acute Toxicity

Product Information	Irritating to the eye, skin and respiratory system.
Oral LD50	Based on ATE data, the classification criteria are not met. ATE > 2000 mg/ kg
Dermal LD50	Based on ATE data, the classification criteria are not met. ATE > 2000 mg/ kg
Vapor LC50	Based on ATE data, the classification criteria are not met. ATE > 20 mg/ L

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Tris (hydroxymethyl) aminomethane	LD50 = 5900 mg/ kg (Rat)	Not listed	Not listed
Potassium Chloride	LD50 = 2600 mg/ kg (Rat)	Not listed	Not listed

Ammonium Sulfate	4000 - 5000 mg/kg	Not listed	Not listed
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No information available

Toxicologically Synergistic Products

Delayed and Immediate Effects as well as Chronic Effects from Short and Long-term Exposure

Irritation

No information available

Sensitization

No information available

Carcinogenicity

The table below indicates whether each agency has listed any ingredients as a carcinogen.

Component	CAS-No.	IARC	NTP	ACGIH	OSHA	Mexico
Tris (hydroxymethyl) aminomethane	77-86-1	Not listed	Not listed	Not listed	Not listed	Not listed
Potassium Chloride	7447-40-7	Not listed	Not listed	Not listed	Not listed	Not listed
Ammonium Sulfate	7783-20-2	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects

No information available.

Reproductive Effects

No information available.

Developmental Effects

No information available.

Teratogenicity

No information available.

STOT – single exposure

None known

STOT – repeated exposure

None known

Aspiration Hazard

No information available.

Symptoms/ effects (both acute and delayed)

No information available.

Endocrine Disruptor Information

No information available.

Other Adverse Effects

The toxicological properties have not been fully investigated

12. Ecological Information

Ecotoxicity

Components	CAS-No.	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Potassium Chloride	7447-40-7	EC50: 2500 mg/L/72h	<i>Lepomis macrochirus</i> : LC50: 1060 mg/L /96h <i>Pimephales promelas</i> : LC50: 750 - 1020 mg/L /96h	Not listed	EC50: 825 mg/L/48h
Ammonium Sulfate	7783-20-2	100 - 300 mg/L	500-1500 mg/L	EC50 = 300-800 mg/L	300-1000 mg/L

Persistence and Degradability

Miscible with water. Persistence is unlikely based on information available

Bioaccumulation / Accumulation No information available
Mobility Will likely be mobile in the environment due to its water solubility

13. Disposal Considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical or contaminated packaging is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3.

RCRA P-Series None listed.
RCRA U-Series None listed.

Contaminated Packaging Dispose of in accordance with all federal, state and local regulations

14. Transport Information

DOT Not regulated.
TDG Not regulated.
IATA Not regulated.
IMDG/IMO Not regulated.

15. Regulator Information

All of the components in the product are on the following inventory lists: X = listed
International Inventories

Component	CA S-No	TS CA	DS L	ND SL	EINEC S	ELIN CS	NL P	PICCS	EN CS	AIC S	IEC SC	KE CL
DNase/RNase/Protease Free Water	77-32-18-5	X	X	-	231-791-2	-		X	-	X	X	X
Tris (hydroxymethyl) aminomethane	77-86-1	X	X	-	201-064-4	-		X	X	X	X	X
Potassium Chloride	74-47-40-7	X	X	-	231-211-8	-		X	X	X	X	X
Ammonium Sulfate	77-83-20-2	X	X	-	232-633-3	-		X	X	X	X	X

Legend:

- X Listed
- E Indicates a substance that is the subject of a Section 5(e) Consent under order under TSCA.
- F Indicates a substance that is the subject of Section 5(f) Rule under TSCA.

- N Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
- P Indicates a commenced PMN substance
- R Indicates a substance that is the subject of a Section 6 risk management rule under TSCA
- S Indicates a substance that is identified in a proposed or final Significant New Use Rule
- T Indicates a substance that is the subject of a Section 4 test rule under TSCA

U.S. Federal Regulations

- TSCA** Not applicable.
- SARA** Not applicable.
- SARA 311/312 Hazard Categories** See Section 2 for more information
- CWA** Not applicable.
- Clean Air Act** Not applicable.
- OSHA** Not applicable.
- CERCLA** Not applicable.
- California Proposition 65** This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-

U.S. Department of Transportation

- Reportable Quantity (RQ):** N
- DOT Marine Pollutant** N
- DOT Severe Marine Pollutant** N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

- Mexico - Grade** No information available

Bulldog Bio
Safety Data Sheet (SDS)

16. Identification

Product Name	GC Extender
Cat No.	TFTD010 TFTD050 TFTD001S
Synonyms	No information available
Recommended Use	For laboratory use only.
Restriction on Use	Not for food, drug, pesticide or biological product use. Not for human or animal drug use.
Company	Bulldog Bio, Inc.
Company Address	One New Hampshire Ave Suite 125 Portsmouth, NH 03801
Emergency Telephone Number	603-570-4248
Email address	info@bulldog-bio.com

17. Hazard Identification

Classification

This is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Hazards not other classified (HNOC)**Signal Word**

Keep away from heat/sparks/open flames/ hot surfaces – No smoking

18. Composition/ Information on Ingredients

Component	CAS-No	Weight (%)
DNase/RNase/Protease Free Water	7732-18-5	100
Dimethyl Sulfoxide	67-68-5	2 - 5 %
Betaine	107-43-7	25 – 45 %

19. First-aid Measures

General Comments

The appearance is a colorless liquid.

CAUTION! May cause eye, skin and respiratory tract irritation. This is expected to be a low hazard for usual laboratory or industrial handling. Good laboratory practices are recommended when handling this solution. The use of personal protection equipment's (PPE's), such as appropriate gloves, cotton lab-coat and protective eye-gear are required.

Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention immediately.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if the symptoms (irritation, pain or discomfort) occur.
Inhalation	Move to fresh open air. Get medical attention immediately.
Ingestion	Clean mouth with plenty of water and drink plenty of water afterwards. Get medicinal attention if the symptoms (irritation, pain or discomfort) occur
Most important symptoms and affects	None known
Notes to Physician	Treat symptomatically

20. Fire-fighting measures

Suitable Extinguishing Media	Use extinguishing media appropriate to surrounding fire conditions
Unsuitable Extinguishing Media	No information available
Flash Point Method -	No information available
Autoignition Temperature	No information available
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	Not sensitive.
Sensitivity to Static Discharge	Not sensitive.
Specific Hazard Arising from the Chemical	Keep product and empty container away from heat and sources of ignition.
Hazardous Combustion Products	Hydrogen Chloride gas.
Protective Equipment and Precautions for Firefighters	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear

NFPA

Health	Flammability	Instability	Physical Hazards
1	0	0	N/A

21. Accidental Release Measures
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Personal Precautions, Protective Equipment and Emergency Procedures	Avoid any contact with skin, eyes and clothing. Use personal protective equipment. Ensure adequate ventilation
Environmental Precautions	The solution should not be released into the environment. See section 12 for additional ecological information.
Methods for Containment and Clean Up	Absorb with sand or vermiculite. Pick up and transfer to properly labeled containers. Ventilate area and wash spill site after material pickup is complete.

22. Handling and Storage

Precautions for Safe Handling	Wear personal protective equipment (PPE): appropriate gloves, cotton lab-coat and protective eye-gear. Avoid contact with skin, eyes and clothing. Avoid ingestion and inhalation of the solution. Handle in accordance with good industrial hygiene and safety practice.
Conditions for Safe Storage	Keep containers tightly closed in a dry, cool and well-ventilated place.
Incompatible Products	Strong oxidizing agents.

23. Exposure Controls/ Personal Protection

Exposure Guidelines	Avoid contact with skin, eyes and clothing. Avoid ingestion and inhalation of the solution. Handle in accordance with good industrial hygiene and safety practice.
Engineering Measures	Showers Eyewash stations Ventilation systems

Personal Protective Equipment:

Eye/face Protection	Wear appropriate safety goggles that are tightly fitting or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin and Body Protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with local regulations.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practices.

24. Physical and Chemical Properties

Physical State	Liquid
Appearance	Colorless and clear
Odor	No information available
Odor Threshold	No information available
pH	No data available
Melting Point/Range	No data available
Boiling Point/ Range	No data available

Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid, gas)	Not applicable
Flammability or explosive limit	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Specific Gravity	No information available
Solubility	Miscible
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available

25. Stability and Reactivity

Reactive Hazard	None known, based on information available.
Stability	Stable under recommended normal conditions.
Conditions to Avoid	None known based on information supplied.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	Hydrogen chloride gas.
Hazardous Polymerization	Hazardous polymerization has not been reported
Hazardous Reactions	None under normal processing.

26. Toxicological Information

There is no toxicity associated with this product

Mutagenic Effects	No information available.
Reproductive Effects	No information available.
Developmental Effects	No information available.
Teratogenicity	No information available.
STOT – single exposure	None known
STOT – repeated exposure	None known
Aspiration Hazard	No information available.
Symptoms/ effects (both acute and delayed)	No information available.
Endocrine Disruptor Information	No information available.
Other Adverse Effects	The toxicological properties have not been fully investigated

27. Ecological Information

There is no ecological toxicity associated with this product

28. Disposal Considerations

Waste Disposal Methods	Chemical waste generators must determine whether a discarded chemical or contaminated packaging is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3.
RCRA P-Series	None listed.
RCRA U-Series	None listed.
Contaminated Packaging	Dispose of in accordance with all federal, state and local regulations

29. Transport Information

DOT	Not regulated.
TDG	Not regulated.
IATA	Not regulated.
IMDG/IMO	Not regulated.

30. Regulator Information

All of the components in the product are on the following inventory lists: X = listed

International Inventories

Component	CA S- No.	TS CA	DS L	ND SL	EINEC S	ELIN CS	NL P	PIC CS	EN CS	AIC S	IEC SC	KE CL
DNase/RNase/Protease Free Water	773-2-18-5	X	X	-	231-791-2	-		X	-	X	X	X

Legend:

- X Listed
- E Indicates a substance that is the subject of a Section 5(e) Consent under order under TSCA.
- F Indicates a substance that is the subject of Section 5(f) Rule under TSCA.
- N Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
- P Indicates a commenced PMN substance
- R Indicates a substance that is the subject of a Section 6 risk management rule under TSCA
- S Indicates a substance that is identified in a proposed or final Significant New Use Rule
- T Indicates a substance that is the subject of a Section 4 test rule under TSCA

U.S. Federal Regulations

TSCA	Complies
SARA	Not applicable.
SARA 311/312 Hazard Categories	See Section 2 for more information

CWA	Not applicable.
Clean Air Act	Not applicable.
OSHA	Not applicable.
CERCLA	Not applicable.
California Proposition 65	This product does not contain any Proposition 65 chemicals

U.S. Department of Transportation	
Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade	No information available
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Bulldog Bio
Safety Data Sheet (SDS)

31. Identification

Product Name	Magnesium sulfate (MgSO ₄)
Cat No.	TFTD010 TFTD050 TFTD001S
Synonyms	No information available
Recommended Use	For laboratory use only.
Restriction on Use	Not for food, drug, pesticide or biological product use. Not for human or animal drug use.
Company	Bulldog Bio, Inc.
Company Address	One New Hampshire Ave Suite 125 Portsmouth, NH 03801
Emergency Telephone Number	603-570-4248
Email address	info@bulldog-bio.com

32. Hazard Identification

Classification Skin Irritant 2 Eye Irritant 2

Signal Word Warning



Hazard Statements:

H315 - Causes skin irritation

H319 - Causes serious eye irritation

H335 - May cause respiratory irritation

Precautionary Statements P280 - Wear protective gloves/protective clothing/eye protection/face protection
P302 + P352 - IF ON SKIN: Wash with plenty of soap and water
P304 + P340 – IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

33. Composition/ Information on Ingredients

Component	CAS-No	Weight (%)
DNase/RNase/Protease Free Water	7732-18-5	> 95
Magnesium Sulfate	7487-88-9	0.3 – 0.7

34. First-aid Measures

General Comments

The appearance is a colorless liquid.

CAUTION! May cause eye, skin and respiratory tract irritation. This is expected to be a low hazard for usual laboratory or industrial handling. Good laboratory practices are recommended when handling this solution. The use of personal protection equipment's (PPE's), such as appropriate gloves, cotton lab-coat and protective eye-gear are required.

Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention immediately.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if the symptoms (irritation, pain or discomfort) occur.
Inhalation	Move to fresh open air. Get medical attention immediately.
Ingestion	Clean mouth with plenty of water and drink plenty of water afterwards. Get medicinal attention if the symptoms (irritation, pain or discomfort) occur
Most important symptoms and affects	None known
Notes to Physician	Treat symptomatically

35. Fire-fighting measures

Suitable Extinguishing Media	Use extinguishing media appropriate to surrounding fire conditions
Unsuitable Extinguishing Media	No information available
Flash Point Method -	No information available
Autoignition Temperature	No information available
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	Not sensitive.
Sensitivity to Static Discharge	Not sensitive.
Specific Hazard Arising from the Chemical	Keep product and empty container away from heat and sources of ignition.
Hazardous Combustion Products	Hydrogen Chloride gas.
Protective Equipment and Precautions for Firefighters	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear

NFPA

Health	Flammability	Instability	Physical Hazards
1	0	0	N/A

36. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures	Avoid any contact with skin, eyes and clothing. Use personal protective equipment. Ensure adequate ventilation
Environmental Precautions	The solution should not be released into the environment. See section 12 for additional ecological information.
Methods for Containment and Clean Up	Absorb with sand or vermiculite. Pick up and transfer to properly labeled containers. Ventilate area and wash spill site after material pickup is complete.

37. Handling and Storage

Precautions for Safe Handling	Wear personal protective equipment (PPE): appropriate gloves, cotton lab-coat and protective eye-gear. Avoid contact with skin, eyes and clothing. Avoid ingestion and inhalation of the solution Handle in accordance with good industrial hygiene and safety practice.
Conditions for Safe Storage	Keep containers tightly closed in a dry, cool and well-ventilated place.
Incompatible Products	Strong oxidizing agents.

38. Exposure Controls/ Personal Protection

Exposure Guidelines	Avoid contact with skin, eyes and clothing. Avoid ingestion and inhalation of the solution Handle in accordance with good industrial hygiene and safety practice.
Engineering Measures	Showers Eyewash stations Ventilation systems

Personal Protective Equipment:

Eye/face Protection	Wear appropriate safety goggles that are tightly fitting or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin and Body Protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations.

Hygiene Measures

Respiratory protection must be provided in accordance with local regulations.
Handle in accordance with good industrial hygiene and safety practices.

39. Physical and Chemical Properties	
Physical State	Liquid
Appearance	Colorless and clear
Odor	No information available
Odor Threshold	No information available
pH	No data available
Melting Point/Range	No data available
Boiling Point/ Range	No data available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid, gas)	Not applicable
Flammability or explosive limit	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Specific Gravity	No information available
Solubility	Miscible
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available

40. Stability and Reactivity	
Reactive Hazard	None known, based on information available.
Stability	Stable under recommended normal conditions.
Conditions to Avoid	None known based on information supplied.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	Hydrogen chloride gas.
Hazardous Polymerization	Hazardous polymerization has not been reported
Hazardous Reactions	None under normal processing.

41. Toxicological Information	
<u>Acute Toxicity</u>	
Product Information	Irritating to the eye, skin and respiratory system.

**Component Information
Acute Toxicity**

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Magnesium Sulfate	> 2000 mg/kg (Rat)	Not listed	> 2000 mg/l (Rat)

**Toxicologically Synergistic Products
Chronic Toxicity**

No information available
No known effects based on information supplied
Central nervous system (CNS), kidneys.

Target Organ Effects

Delayed and Immediate Effects as well as Chronic Effects from Short and Long-term Exposure

Irritation

No information available

Sensitization

No information available

Carcinogenicity

The table below indicates whether each agency has listed any ingredients as a carcinogen.

Component	CAS-No.	IARC	NTP	ACGIH	OSHA	Mexico
Magnesium Sulfate	7487-88-9	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects

No information available.

Reproductive Effects

No information available.

Developmental Effects

No information available.

Teratogenicity

No information available.

STOT – single exposure

None known

STOT – repeated exposure

None known

Aspiration Hazard

No information available.

Symptoms/ effects (both acute and delayed)

No information available.

Endocrine Disruptor Information

No information available.

Other Adverse Effects

The toxicological properties have not been fully investigated

Components	CAS-No.	Freshwater Algae	Freshwater Fish	Water Flea
Magnesium Sulfate	7487-88-9	EC50 = 2700 mg/ L/ 72 h	<i>Pimephales promelas</i> : EC50 = 2.610 – 3.080 g/ L/ 96h	EC50 = 266.4 – 417.3 mg/ L/ 48 h

**Persistence and Degradability
Bioaccumulation /
Accumulation
Mobility**

42. Disposal Considerations

Waste Disposal Methods	Chemical waste generators must determine whether a discarded chemical or contaminated packaging is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3.
RCRA P-Series	None listed.
RCRA U-Series	None listed.
Contaminated Packaging	Dispose of in accordance with all federal, state and local regulations

43. Transport Information

DOT	Not regulated.
TDG	Not regulated.
IATA	Not regulated.
IMDG/IMO	Not regulated.

44. Regulator Information

All of the components in the product are on the following inventory lists: X = listed

International Inventories

Component	CA S- No.	TS CA	DS L	ND SL	EINEC S	ELIN CS	NL P	PICC S	EN CS	AIC S	IEC SC	KE CL
DNase/RNase/Protease Free Water	77-32-18-5	X	X	-	231-791-2	-		X	-	X	X	X
Magnesium Sulfate	74-87-88-9	X	X	-	232-094-6	-		X	X	X	X	X

Legend:

- X Listed
- E Indicates a substance that is the subject of a Section 5(e) Consent under order under TSCA.
- F Indicates a substance that is the subject of Section 5(f) Rule under TSCA.
- N Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
- P Indicates a commenced PMN substance
- R Indicates a substance that is the subject of a Section 6 risk management rule under TSCA
- S Indicates a substance that is identified in a proposed or final Significant New Use Rule
- T Indicates a substance that is the subject of a Section 4 test rule under TSCA

U.S. Federal Regulations

- TSCA Complies
- SARA Not applicable.

SARA 311/312 Hazard Categories

See Section 2 for more information

CWA

Not applicable.

Clean Air Act

Not applicable.

OSHA

Not applicable.

CERCLA

Not applicable.

California Proposition 65

This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ): N

DOT Marine Pollutant N

DOT Severe Marine Pollutant N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade

No information available