



MATERIAL SAFETY DATA SHEET

Based on U.S. Department of Labor
Occupational Safety and Health Administration
Form OMB NO. 1218-0072

TELEPHONE NUMBER OF INFORMATION: 1-800-606-6246
EMERGENCY TELEPHONE NUMBER: 1-760-929-9911
DATE PREPARED: May 11, 2010

TRADE NAME: PowerLyzer™ UltraClean® Tissue & Cells RNA Isolation Kit
DATE OF ISSUE: May 11, 2010
DATE OF REVIEW: January 05, 2012

SECTION 1 - MATERIAL IDENTIFICATION

CHEMICAL NAME: 2.8 mm Ceramic Beads
TRADE NAME: PowerLyzer™ Ceramic Bead Tubes, 2.8 mm

SECTION 2 - COMPOSITION/IDENTITY INFORMATION

CAS No.: N/A
Molecular Weight: N/A
Chemical Name: Ceramic Beads
Synonyms: Bead Tubes, Ceramic Bead Tubes

SECTION 3 – HAZARDS INFORMATION

Hazardous Material: None

SECTION 4 – FIRST AID MEASURES

Emergency and First Aid: As with any granular material
Effects of Overexposure: N/A

SECTION 5 - FIRE AND EXPLOSION HAZARD DATA

Material is a non-flammable solid.

SECTION 6 –STABILITY AND REACTIVITY DATA

Stability: INERT
Conditions to Avoid: This material is an inert, stable solid needing no special handling in normal use.
Incompatibility (Materials to Avoid): None known.
Hazardous Decomposition or Byproducts: None known.
Hazardous Polymerization: Will not occur

SECTION 7 – PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT AT 1 ATM, DEG F:	N/A
SOLUBILITY IN WATER:	insoluble
APPEARANCE AND ODOR:	White-opaque
SPECIFIC GRAVITY (H2O = 1):	N/A

SECTION 8 –ACCIDENTAL RELEASE MEASURES

No special precautions are necessary. Always wear appropriate personal protective equipment as needed. Sweep or vacuum up spills for recovery or disposal and place in a closed container.

SECTION 9 – HANDLING AND STORAGE

No special precautions are necessary for handling and storage.



SECTION 10 – EXPOSURE CONTROLS / PERSONAL PROTECTION

Airborne Exposure Limits: N/A

Ventilation System: Treat as with any granular material. Refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Protection: Wear protective clothing appropriate for the lab environment.

SECTION 11 – DISPOSAL CONSIDERATIONS

Follow local, state and federal guidelines for disposal of inert solid waste. **Note:** Material contaminated in use may require special handling.

SECTION 12 – TRANSPORT INFORMATION

Not regulated.

SECTION 13 – TOXICOLOGICAL INFORMATION

None available.

SECTION 14 – ECOLOGICAL INFORMATION

None available.

SECTION 15 – REGULATORY INFORMATION

None available.

SECTION 16 – OTHER INFORMATION

DATE OF PREPARATION: May 11, 2010

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SECTION 1 - MATERIAL IDENTIFICATION

CHEMICAL NAME: Aqueous solution of Guanidine thiocyanate
TRADE NAME: Solution TR1

SECTION 2 - COMPOSITION/IDENTITY INFORMATION

HAZARDOUS COMPONENTS (SPECIFIC CHEMICAL IDENTITY: COMMON NAMES)
Health Rating: 2-Moderate
Flammability Rating: 0-None
Reactivity Rating: 1-Slight
Contact Rating: 2-Moderate
Protective Lab Equipment Recommended: Safety Goggles, Lab Coat, Vent Hood, Proper Gloves
Storage Color Code: Orange (General Storage)

SECTION 3 – HAZARD INFORMATION

POTENTIAL HEALTH EFFECTS
Inhalation: Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath.
Ingestion: May cause psychosis, vomiting, disorientation, weakness, low blood pressure, convulsions and death which may be delayed. The possible lethal dose is >1 ml.
Skin Contact: Causes irritation to skin. Symptoms include redness, itching and pain.
Eye Contact: Causes irritation, redness and pain.
Chronic Exposure: Prolonged or repeated skin exposure may cause dermatitis. Repeated ingestion of small amounts may cause weakness, confusion, central nervous system effects, nausea and skin eruptions.
Aggravation of Pre-existing Conditions: No information available.

SECTION 4 – FIRST AID MEASURES

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion: Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.
Skin Contact: Wipe off excess material from skin then immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

SECTION 5 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): N/A
AUTOIGNITION TEMP: N/A
FLAMMABILITY LIMITS IN AIR: N/A
FIRE EXTINGUISHING MEDIA: Water spray, dry chemical, alcohol foam or carbon dioxide
FIRE:
EXPLOSION:
SPECIAL FIRE FIGHTING PROCEDURES: In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode.
UNUSUAL FIRE AND EXPLOSION HAZARDS: In the event of a fire, this product may emit toxic and/or flammable fumes.

SECTION 6 –STABILITY AND REACTIVITY DATA

STABILITY: Stable under ordinary conditions of use and storage.
CONDITIONS TO AVOID: Heat, flames, ignition sources and incompatibles.
INCOMPATIBILITY (MATERIALS TO AVOID): Iron and oxidizing agents
HAZARDOUS DECOMPOSITION PRODUCTS: Burning may produce fumes of cyanide, carbon monoxide, carbon dioxide, nitrogen oxides and sulfur oxides.
HAZARDOUS POLYMERIZATION: Will not occur.



SECTION 7 – PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT AT 1 ATM, DEG F:	N/A
VAPOR PRESSURE (mm Hg):	N/A
VAPOR DENSITY (AIR = 1):	N/A
SOLUBILITY IN WATER:	Soluble
APPEARANCE AND ODOR:	Clear and colorless liquid, slight smell
SPECIFIC GRAVITY (H ₂ O = 1):	N/A
MELTING POINT:	N/A
EVAPORATION RATE (Bu Ac = 1)	N/A
VOLATILES, % BY VOLUME:	N/A
MOLECULAR WEIGHT:	N/A

SECTION 8 – ACCIDENTAL RELEASE MEASURES

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8, Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container.

SECTION 9 – HANDLING AND STORAGE

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Isolate from incompatible substances. Isolate from oxidizing materials. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for this product.

SECTION 10 – EXPOSURE CONTROLS / PERSONAL PROTECTION

Airborne Exposure Limits: None established.

Ventilation System: A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved): For conditions, of use where exposure to dust or mist is apparent and engineering controls are not feasible, a particulate respirator (NIOSH type N95 or better filters) may be worn. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection: Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection: Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain an eye wash fountain and quick-drench facilities in work area.

SECTION 11 – DISPOSAL CONSIDERATIONS

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

SECTION 12 – TRANSPORT INFORMATION

Not Regulated.

SECTION 13 – TOXICOLOGICAL INFORMATION

No LD50/LC50 information found relating to normal routes of occupational exposure.

NTP Carcinogen: Known: NO Anticipated: NO TARC Category: None

SECTION 14 – ECOLOGICAL INFORMATION

Environmental Fate: No information found

Environmental Toxicity: No information found

SECTION 15 – REGULATORY INFORMATION

Chemical Inventory Status:

TSCA: Yes EC: Yes Japan: No Australia: Yes
Korea: No Canada: DSL: Yes Canada: NDSL: No Phil.: Yes



Federal, State and International Regulations:

SARA302 SARA313
RQ: No TPQ: No List: No Chemical Catalog: No
CERCLA: No RCRA: 261.33: No TSCA: 8(d): No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure/Solid)

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.

SECTION 16 – OTHER INFORMATION

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CHEMICAL NAME: Aqueous solution of ethanol
TRADE NAME: Solution TR2

SECTION 2 - COMPOSITION/IDENTITY INFORMATION

CAS #: 64-17-5
Molecular Weight: 46.07 and DI water
Chemical Formula: C₂H₅OH and DI water
Synonyms: Anhydrous Ethyl Alcohol, Dehydrated Alcohol
Chemical Characterization: Alcohol family

SECTION 3 – HAZARD INFORMATION

Emergency Overview: Flammable / Nervous System Depressant
Potential Health Effects:
Inhalation: Exposure to over 1000ppm may cause headache, drowsiness and lassitude, loss of appetite, and inability to concentrate. Irritation of the throat.
Ingestion: Can cause depression of the central nervous system, nausea, vomiting, and diarrhea.
Skin Contact: May cause irritation and defatting of skin on prolonged contact.
Eye Contact: Liquid or vapor may cause irritation.
Chronic Exposure: No information available.
Aggravation of Pre-existing Conditions: No information available.

SECTION 4 – FIRST AID MEASURES

Inhalation: Immediately remove victim to fresh air. If victim has stopped breathing, give artificial respiration, preferable mouth-to-mouth. Get medical attention immediately.
Ingestion: If victim is conscious and able to swallow, have victim drink water or milk to dilute. Never give anything by mouth if victim is unconscious or having convulsions. Call a physician or poison control immediately. Induce vomiting only if advised by physician or poison control.
Skin Contact: Immediately flush affected area with plenty of cool water. Remove and wash contaminated clothing before reuse. Get medical attention if needed.
Eye Contact: Eyes should be flushed with plenty of water for at least 15 minutes. Get medical attention immediately.

SECTION 5 - FIRE AND EXPLOSION HAZARD DATA

Flash Point: (100% ethanol) 56°C ASTM D-56 (Tag closed cup)
Auto-Ignition Temperature: (100% ethanol) 685°F
Flammable Limits in Air, % by volume: (100% ethanol) Lower: 3.3 Upper: 19
Fire: Flammable.
Explosion: Upon build up of vapors when exposed to an ignition source.
Extinguishing Media: Use dry chemical, "alcohol" foam, or carbon dioxide; water may be ineffective, but water should be used to keep fire-exposed containers cool.
Fire Fighting Procedures: (Note: Individuals should perform only those fire-fighting procedures for which they have been trained.) If a spill or leak has not ignited, use water spray to disperse the vapors and to protect men attempting to stop a leak. Water spray may be used to flush spills away from exposures and to dilute spills to nonflammable mixtures.
Unusual Fire & Explosion Hazards: Firefighters should wear self-contained breathing apparatus in the positive pressure mode with a full face piece when there is a possibility of exposure to smoke, fumes, or hazardous decomposition products.

SECTION 6 –STABILITY AND REACTIVITY DATA

Stability: Stable under normal conditions of storage and use.
Incompatibilities: acetyl chloride, oxidizing agents.
Hazardous Decomposition Products: No information available.



Hazardous Polymerization: Not likely to occur.

Conditions to Avoid: Contact with acetyl chloride and a wide range of oxidizing agents may react violently. Avoid all ignition sources.

SECTION 7 – PHYSICAL/CHEMICAL CHARACTERISTICS

PHYSICAL STATE / FORM:	liquid
COLOR:	clear and colorless
ODOR:	characteristic alcohol odor
pH FACTOR:	N/A
VISCOSITY:	N/A
MELTING POINT:	~-173°F
BOILING POINT:	~-173°F
SPECIFIC GRAVITY:	~0.7940 @ 60°/60°F
SOLUBILITY:	complete
VAPOR PRESSURE (mm Hg):	~44.6mm Hg @ 68°F
VAPOR DENSITY (Air=1):	~1.59
% VOLATILES BY VOLUME:	N/A
EVAPORATION RATE (BuAc = 1):	N/A

SECTION 8 – ACCIDENTAL RELEASE MEASURES

Spill or leak procedures: Wear appropriate respiratory protection and protective clothing as describe in section 10. Contain spilled material. Transfer to secure containers. Where necessary, collect using absorbent media. In the event of an uncontrolled release of this material, the user should determine if the release is reportable under the applicable laws and regulations.

SECTION 9 – HANDLING AND STORAGE

Protect container against physical damage. Detached or outside storage is preferred. Inside storage should be in an NFPA approved flammable liquid storage room or cabinet. All ignition sources should be eliminated. Smoking should be prohibited in the storage and usage areas. Electrical installations should be in accordance with Article 501 of the National Electric Code. NFPA 30, Flammable and Combustible Liquids Code, should be followed for all storage and handling. Frequent careful leakage inspections should be done. Automatic sprinkler system should be provided. Isolate from oxidizers, chemicals capable of spontaneous heating, materials reacting with air or moisture to liberate heat, ignition sources and explosives. Consult local fire codes for additional storage information.

Keep material packaged in drums or bottles out of sun and away from heat. Remove closure carefully; internal pressure may be present. Keep closure on to prevent leakage.

Container may be hazardous when empty. Since emptied containers retain residual product (vapor and liquid), all precautions described on this MSDS must be observed.

CAUTION: For research and industrial use only. Not for household use.

SECTION 10 – EXPOSURE CONTROLS / PERSONAL PROTECTION

Airborne Exposure Limits: (for 100% ethanol) PEL / TLV: 1000ppm

Ventilation System: Handle in the presence of adequate ventilation.

Personal Respirators (NIOSH Approved): Where exposure is likely to exceed acceptable criteria, use NIOSH / MSHA approved respiratory protection equipment. Respirators should be selected based on the form and concentration of contaminant in air and in accordance with OSHA (29 CFR 1910.134).

Skin Protection: Wear gloves and protective clothing which are impervious to the product for the duration of the anticipated exposure if there is potential for prolonged or repeated skin contact.

Eye Protection: Wear safety glasses meeting the specifications of ANSI Standard Z87.1 where no contact with the eye is anticipated. Chemical Safety goggles meeting the specifications of ANSI Standard Z87.1 should be worn whenever there is the possibility of splashing or other contact with the eyes.

SECTION 11 – DISPOSAL CONSIDERATIONS

All recovered material should be packaged, labeled, transported, and disposed of, or reclaimed in conformance with applicable laws and regulations and in conformance with good engineering practices.

SECTION 12 – TRANSPORT INFORMATION

When contents are being transferred, the metallic container must be bonded to the receiving container and grounded to avoid static discharges. Never use pressure to empty. Replace closure securely after each opening.



SECTION 13 – TOXICOLOGICAL INFORMATION

No information found.

SECTION 14 – ECOLOGICAL INFORMATION

Environmental Precautions: Avoid uncontrolled release of this material. Where spills are possible, a comprehensive spill response plan should be developed and implemented.

SECTION 15 – REGULATORY INFORMATION

ATF Distilled Spirits Act: Use of ethyl alcohol without prior payment of applicable excise tax is strictly controlled by regulation promulgated and enforced by the Bureau of Alcohol, Tobacco, and Firearms (ATF), Department of Treasury. Governing regulations have been defined in Title 27, Code of Federal Regulations.

Toxic Substance Control Act (TSCA): 100% Ethanol is listed in the TSCA Inventory of Chemical Substances.

SECTION 16 – OTHER INFORMATION

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SECTION 1 - MATERIAL IDENTIFICATION

CHEMICAL NAME: Aqueous ethanol solution of guanidine thiocyanate
TRADE NAME: Solution TR3

SECTION 2 - COMPOSITION/IDENTITY INFORMATION

Cas #: 593-84-0
MF: N/A
EC NO: N/A
RTECS #: Not known.

CAS#: 64-17-5
MF: CH3-CH2-OH
EC NO: N/A
RTECS #: Not known.

SYNONYMS: Wash, Thyocanic acid, compounded with guanidine (1:1); Guanidine monothiocyanate; Guanidium thiocyanate
CHEMICAL CHARACTERIZATION: Aqueous solution guanidine thiocyanate and 50% Ethyl Alcohol.
HAZARDOUS COMPONENT: Ethyl Alcohol and guanidine thiocyanate.

WARNING: Flammable. Keep away from heat, sparks, flame, and all other ignition sources. Vapor may form flammable mixtures with air. Keep container closed whenever possible. Use with adequate ventilation. EXCESSIVE EXPOSURES MAY BE HARMFUL OR FATAL. MAY DEPRESS CENTRAL NERVOUS SYSTEM. MAY CAUSE DAMAGE TO BRAIN OR LIVER. May irritate body tissues. Avoid breathing vapors. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling.

SECTION 3 – HAZARD INFORMATION

Flammable Liquid

Lab Protective Equip. Goggles, Lab Coat, Vent Hood, Proper Gloves

Irritating to eyes, respiratory system and skin. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing.

INHALATION: Exposure over 1000 ppm may cause headache, drowsiness and lassitude, loss of appetite, inability to concentrate and irritation of the throat. No evidence of teratogenicity(birth defects) was noted following inhalation exposure by pregnant rats of airborne vapor concentrations of up to 16,000 ppm for 7 hours on days 1 through 19 of gestation. In the same study, pregnant rats exposed to 20,000 ppm showed severe narcosis; offspring of these rats did not show clear evidence of increased incidence of abnormalities.

SWALLOWING: Effects of ethyl alcohol ingestion depend on the amount and rate of consumption. Short term overexposure can cause drunkenness, depression of the central nervous system, nausea, vomiting, diarrhea, liver damage, and death. Long term exposure can also cause loss of appetite, weight loss, nervousness, memory loss, and mental retardation. The Internal Agency for Research on Cancer (IARC) has reported a relationship between drinking alcoholic beverages and cancer of the oral cavity, pharynx, larynx, esophagus, and liver. Ingestion of alcoholic beverages by pregnant women is associated with "fetal alcohol syndrome" in offspring.

EYE CONTACT: Ethyl alcohol, either as a liquid or vapor, may cause eye irritation.

SKIN CONTACT: Ethyl alcohol may cause irritation.

SECTION 4 – FIRST AID MEASURES

Eye Contact: Causes irritation, redness, pain. Immediately flush eyes with copious amounts of water for at least 15 minutes. Do not permit victim to rub eyes. Get medical attention immediately.

Skin Contact: Causes irritation, redness, pain. Immediately wash skin with soap and copious amounts of water.

Inhalation: Causes irritation to the respiratory tract. Remove to fresh air. If not breathing, give artificial respiration. Get Medical attention immediately.

Respiration: If breathing is difficult, give oxygen.

Ingestion: May cause psychosis, vomiting, disorientation, weakness, low blood pressure, convulsions and death. Induce vomiting immediately as directed by medical personnel. Never give anything by mouth if victim is unconscious or having convulsions. Induce vomiting only if advised by physician or Poison Control Center. Call a physician or Poison Control Center immediately.

SECTION 5 - FIRE AND EXPLOSION HAZARD DATA

EXTINGUISHING MEDIA: Use dry chemical, “alcohol resistant” foam, or carbon dioxide; water may be ineffective, but water applied as a spray can absorb some of the fire’s heat and should be used to keep fire-exposed containers cool. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect personnel attempting to stop a leak. Water spray must be used to flush spills away from exposures and to dilute spills to nonflammable mixtures..

Special firefighting procedures: In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. May emit toxic and flammable fumes of cyanide if involved in a fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Ethanol vapors are heavier than air and may travel a considerable distance to a source of ignition and flashback.

SECTION 6 –STABILITY AND REACTIVITY DATA

Incompatibilities: Iron, oxidizing agents. Generally stable, not likely for hazardous polymerization. Avoid contact with Acetyl chloride or other oxidizing agents may result in violent reaction.

Hazardous Combustion or Decomposition Products: Burning may produce fumes of cyanide, carbon monoxide, carbon dioxide, nitrogen oxides and sulfur oxides. Carbon monoxide and carbon dioxide can form upon combustion.

Conditions to Avoid: Heat, flames, ignition sources and incompatibilities.

SECTION 7 – PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT AT 1 ATM, DEG F:	N/A
VAPOR PRESSURE (mm Hg):	N/A
VAPOR DENSITY (AIR = 1):	N/A
SOLUBILITY IN WATER:	Soluble
APPEARANCE AND ODOR:	Clear and colorless liquid, Characteristic
SPECIFIC GRAVITY (H₂O = 1):	N/A
MELTING POINT:	N/A
EVAPORATION RATE (Bu Ac = 1)	N/A
FLASHPOINT:	81.0°F
MOLECULAR WEIGHT:	N/A

SECTION 8 –ACCIDENTAL RELEASE MEASURES

Wear respirator, chemical safety goggles, rubber boots and heavy rubber gloves. Turn off or remove all ignition sources. Contain spill material. Where necessary collect using an absorbent media. Ventilate area and wash spill site after material pickup is complete.

SECTION 9 – HANDLING AND STORAGE

Refer to section 8 & 10.

STORAGE: Protect container against physical damage. Detached or outside storage is preferred. Inside storage should be in a NFPA approved flammable liquids storage room or cabinet. All ignition sources should be eliminated. Smoking should be prohibited in storage areas. Electrical installations should be in accordance with Article 501 of the National Electrical Code. NFPA 30, Flammable and Combustible Liquids Code, should be followed for all storage and handling. Frequent careful leakage inspection should be done. Automatic sprinkler system should be provided. Isolate from oxidizers, chemicals capable of spontaneous heating, materials reacting with air or moisture to liberate heat, ignition sources and explosives. Consult local fire codes for additional storage information.

HANDLING: When containers are being transferred, the metallic container must be bonded to the receiving container and grounded to avoid static discharges. Never use pressure to empty. Replace closure securely after opening. Keep packaged material out of sun or away from heat. Remove closure carefully; internal pressure may be present. Keep closure up to prevent leakage. Containers hazardous when emptied. Since emptied containers retain residual product(vapor or liquid), all precautions described on this MSDS must be observed.

USAGE: For industrial use only. Not for household use. Not intended or permitted for drinking beverage purposes.

SECTION 10 – EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS: PEL (OSHA Permissible Exposure Limit): No OSHA PEL for this product as a whole. TLV (ACGIH Threshold Limit Value): No ACGIH TLV for this product as a whole.

PERSONAL PROTECTION: Control Measures: Engineering controls should be used whenever feasible to maintain concentrations below acceptable exposure criteria, including but not limited to enclosures, local ventilation and dilution ventilation. Respiratory Protection: Where engineering controls are not feasible or sufficient to achieve full conformance with acceptable criteria, use NIOSH/MSHA approved respiratory



protection equipment. Respirators should be selected based on the form and concentration of contaminant in the air in accordance with OSHA (29 CFR 1910.134). Protective Clothing: Wear gloves and protective clothing which are impervious to this product for the duration of anticipated exposure if there is potential for skin contact. Eye Protection: Wear safety glasses meeting the specifications of ANSI Standard 287.1 where no contact with the eye is anticipated. Chemical safety goggles meeting the specifications of ANSI Standard 287.1 should be worn whenever there is a possibility of splashing or other contact with eyes.

SECTION 11 – DISPOSAL CONSIDERATIONS

Whatever cannot be saved for recovery or recycled should be managed in an appropriate and approved waste disposal facility. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

SECTION 12 – TRANSPORT INFORMATION

DEPARTMENT OF TRANSPORTATION (DOT):

DOT Classification: Class 3- flammable liquid

DOT Proper Shipping Name: Ethyl Alcohol

Other DOT Information: Identification No. UN1170

Packing Group II

Emergency Response Guide No. 26

For further information see Title 49, Code of Federal Regulations, parts 172 and 173.

SECTION 13 – TOXICOLOGICAL INFORMATION

Inhalation: LC50 (10 hours)=20,000ppm (rat)

LC50 (4 hours)=39 g/m³ (mouse)

LDLo = 21,900 ppm (guinea pig)

Swallowing: Acute oral LD50= 7,060 mg/kg (rat)

Acute oral LD50= 3,450 mg/kg (mouse)

Acute oral LD50= 6,300 mg/kg (rabbit)

Acute oral LD50= 5,560 mg/kg (guinea pig)

Acute oral LDLo= 6000 mg/kg (cat)

Acute oral LDLo=1,400 mg/kg (human)

SECTION 14 – ECOLOGICAL INFORMATION

Avoid uncontrolled releases of this material. Where spills are possible, a comprehensive spill response plan should be developed and implemented.

SECTION 15 – REGULATORY INFORMATION

Guanidine Thiocyanate:

TSCA: Yes EC: Yes Japan: No Australia: Yes Korea: No DSL: Yes NDSL: No Phil: Yes RQ: No TPQ: No List: No Chemical Catg: No CERCLA: No

RCRA 261.33: No TSCA 8 (d): No

Chemical Weapons Convention: No TSCA 12 (b): No CDTA: No SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No Reactivity: No

Ethyl Alcohol:

TOXIC SUBSTANCE CONTROL ACT (TSCA): This product is (or if a mixture, the components of this product are) listed in the TSCA Inventory of Chemical Substances.

SARA TITLE III (SECTIONS 311/312) HAZARD CATEGORIES:

Immediate/Acute Health Hazard: yes

Delayed Chronic Health Hazard: yes

Fire Hazard: yes

Sudden Release of Pressure: no

Reactive: no

SARA TITLE III (SECTION 313): This product contains no SARA 313 "toxic chemicals" above threshold levels.

ATF DISTILLED SPIRITS ACT: Use of ethyl alcohol without prior payment of applicable excise tax is strictly controlled by regulations promulgated and enforced by the Bureau of Alcohol, Tobacco and Firearms, Dept. of Treasury. Governing regulations have been defined in Title 27, Code of Federal Regulations.

NEW JERSEY RIGHT TO KNOW: Ethyl alcohol is listed as a special hazard.

PENNSYLVANIA RIGHT TO KNOW: Ethanol is listed.

MASSACHUSETTS RIGHT TO KNOW: Ethyl alcohol is listed.

CALIFORNIA PROPOSITION 65: This product contains less than 0.5 ppm of benzene (CAS RN=71-43-2) which has been listed as being "known to the State of California to cause cancer"

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS): Ethanol is listed (threshold=0.1%)



NOTE: The regulatory information presented here should not necessarily be considered as being all-inclusive. Other local, state, federal, and international regulations may also apply.

SECTION 16 – OTHER INFORMATION

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SECTION 1 - MATERIAL IDENTIFICATION

CHEMICAL NAME: Aqueous solution of Ethanol
TRADE NAME: Solution TR4

SECTION 2 - COMPOSITION/IDENTITY INFORMATION

CAS#: 64-17-5
MF: CH₃-CH₂-OH
EC NO: N/A
RTECS #: Not known.

SYNONYMS: Wash

CHEMICAL CHARACTERIZATION: Aqueous solution Tris(hydroxymethyl) aminomethane/Hydrochloric Acid, Ethylenediaminetetraacetic Acid, Sodium chloride, 50% Ethyl Alcohol.

HAZARDOUS COMPONENT: Ethyl Alcohol.

WARNING: Flammable. Keep away from heat, sparks, flame, and all other ignition sources. Vapor may form flammable mixtures with air. Keep container closed whenever possible. Use with adequate ventilation. EXCESSIVE EXPOSURES MAY BE HARMFUL OR FATAL. MAY DEPRESS CENTRAL NERVOUS SYSTEM. MAY CAUSE DAMAGE TO BRAIN OR LIVER. May irritate body tissues. Avoid breathing vapors. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling.

SECTION 3 – HAZARDS INFORMATION

Flammable liquid.

HEALTH HAZARD DATA:

INHALATION: Exposure over 1000 ppm may cause headache, drowsiness and lassitude, loss of appetite, inability to concentrate and irritation of the throat. No evidence of teratogenicity(birth defects) was noted following inhalation exposure by pregnant rats of airborne vapor concentrations of up to 16,000 ppm for 7 hours on days 1 through 19 of gestation. In the same study, pregnant rats exposed to 20,000 ppm showed severe narcosis; offspring of these rats did not show clear evidence of increased incidence of abnormalities.

SWALLOWING: Effects of ethyl alcohol ingestion depend on the amount and rate of consumption. Short term overexposure can cause drunkenness, depression of the central nervous system, nausea, vomiting, diarrhea, liver damage, and death. Long term exposure can also cause loss of appetite, weight loss, nervousness, memory loss, and mental retardation. The Internal Agency for Research on Cancer (IARC) has reported a relationship between drinking alcoholic beverages and cancer of the oral cavity, pharynx, larynx, esophagus, and liver. Ingestion of alcoholic beverages by pregnant women is associated with "fetal alcohol syndrome" in offspring.

EYE CONTACT: Ethyl alcohol, either as a liquid or vapor, may cause eye irritation.

SKIN CONTACT: Ethyl alcohol may cause irritation and defatting of skin upon prolonged contact.

SECTION 4 – FIRST AID MEASURES

Ingestion: If victim is conscious and able to swallow, have victim drink water to dilute. Never give anything by mouth if victim is unconscious or having convulsions. Induce vomiting only if advised by physician or Poison Control Center. Call a physician or Poison Control Center immediately.

Inhalation: Remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Skin Contact: Immediately flush affected area with plenty of water while removing contaminated clothing before reuse.

Eye Contact: Immediately flush eyes with plenty of cool water for at least 15 minutes. Do not permit victim to rub eyes. Get medical attention immediately.

SECTION 5 - FIRE AND EXPLOSION HAZARD DATA

EXTINGUISHING MEDIA: Use dry chemical, "alcohol resistant" foam, or carbon dioxide; water may be ineffective, but water applied as a spray can absorb some of the fire's heat and should be used to keep fire-exposed containers cool. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect personnel attempting to stop a leak. Water spray must be used to flush spills away from exposures and to dilute spills to nonflammable mixtures..



SPECIAL FIREFIGHTING PROCEDURES: Firefighters should wear full firefighting turn out gear(full bunker gear). They should use self-contained breathing apparatus operating in the positive pressure mode and equipped with full eye protection and full face piece when there is a possibility of exposure to smoke, fumes or hazardous decomposition products.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Ethanol vapors are heavier than air and may travel a considerable distance to a source of ignition and flashback.

SECTION 6 –STABILITY AND REACTIVITY DATA

SUBSTANCES TO BE AVOIDED: Generally stable, not likely for hazardous polymerization. Avoid contact with Acetyl chloride or other oxidizing agents may result in violent reaction.

HAZARDOUS, COMBUSTION, OR DECOMPOSITION PRODUCTS: Carbon monoxide and carbon dioxide can form upon combustion.

SECTION 7 – PHYSICAL/CHEMICAL CHARACTERISTICS

PHYSICAL STATE / FORM:	Liquid
COLOR:	Colorless
ODOR:	Characteristic
pH-FACTOR:	(20°C) 7.2-7.6
VISCOSITY:	(20°C) N/A
MELTING POINT:	N/A
BOILING POINT:	N/A
IGNITION TEMPERATURE:	N/A
FLASHPOINT:	81.0°F
FLAMMABLE LIMITS IN AIR, % BY VOLUME:	
LOWER:	N/A
UPPER:	N/A
VAPOR PRESSURE:	N/A
SPECIFIC GRAVITY:	N/A
SOLUBILITY IN WATER:	(20°C) Soluble

SECTION 8 –ACCIDENTAL RELEASE MEASURES

PRECAUTIONARY MEASURES: Wear self-contained breathing apparatus, chemical safety goggles, rubber boots, and heavy rubber gloves.

CLEAN-UP PROCEDURES: Wear appropriate respiratory protection and protective clothing as described in PRECAUTIONARY MEASURES above. Turn off or remove all ignition sources. Contained spilled material. Transfer to secure containers. Where necessary, collect using absorbent media. In the event of an uncontrolled release of this material, the user should determine if the release is reportable under the applicable laws and regulations.

SECTION 9 – HANDLING AND STORAGE

STORAGE: Protect container against physical damage. Detached or outside storage is preferred. Inside storage should be in a NFPA approved flammable liquids storage room or cabinet. All ignition sources should be eliminated. Smoking should be prohibited in storage areas. Electrical installations should be in accordance with Article 501 of the National Electrical Code. NFPA 30, Flammable and Combustible Liquids Code, should be followed for all storage and handling. Frequent careful leakage inspection should be done. Automatic sprinkler system should be provided. Isolate from oxidizers, chemicals capable of spontaneous heating, materials reacting with air or moisture to liberate heat, ignition sources and explosives. Consult local fire codes for additional storage information.

HANDLING: When containers are being transferred, the metallic container must be bonded to the receiving container and grounded to avoid static discharges. Never use pressure to empty. Replace closure securely after opening. Keep packaged material out of sun or away from heat. Remove closure carefully; internal pressure may be present. Keep closure up to prevent leakage. Containers hazardous when emptied. Since emptied containers retain residual product(vapor or liquid), all precautions described on this MSDS must be observed.

USAGE: For industrial use only. Not for household use. Not intended or permitted for drinking beverage purposes.

SECTION 10 – EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS: PEL (OSHA Permissible Exposure Limit): No OSHA PEL for this product as a whole. TLV (ACGIH Threshold Limit Value): No ACGIH TLV for this product as a whole.

PERSONAL PROTECTION: Control Measures: Engineering controls should be used whenever feasible to maintain concentrations below acceptable exposure criteria, including but not limited to enclosures, local ventilation and dilution ventilation. Respiratory Protection: Where engineering controls are not feasible or sufficient to achieve full conformance with acceptable criteria, use NIOSH/MSHA approved respiratory protection equipment. Respirators should be selected based on the form and concentration of contaminant in the air in accordance with OSHA (29 CFR 1910.134). Protective Clothing: Wear gloves and protective clothing which are impervious to this product for the duration of anticipated exposure if there is potential for skin contact. Eye Protection: Wear safety glasses meeting the specifications of ANSI Standard 287.1 where no contact with the eye is anticipated. Chemical safety goggles meeting the specifications of ANSI Standard 287.1 should be worn whenever there is a possibility of splashing or other contact with eyes.



SECTION 11 – DISPOSAL CONSIDERATIONS

All recovered material should be packaged, labeled, transported and disposed of or reclaimed in conformance with applicable laws and regulations and in conformance with good engineering practices. Reclaim where possible.

SECTION 12 – TRANSPORT INFORMATION

DEPARTMENT OF TRANSPORTATION (DOT):

DOT Classification: Class 3- flammable liquid

DOT Proper Shipping Name: Ethyl Alcohol

Other DOT Information: Identification No. UN1170

Packing Group II

Emergency Response Guide No. 26

For further information see Title 49, Code of Federal Regulations, parts 172 and 173.

SECTION 13 – TOXICOLOGICAL INFORMATION

TOXICITY DATA:

Inhalation: LC50 (10 hours)=20,000ppm (rat)
LC50 (4 hours)=39 g/m³ (mouse)
LDLo = 21,900 ppm (guinea pig)
Swallowing: Acute oral LD50= 7,060 mg/kg (rat)
Acute oral LD50= 3,450 mg/kg (mouse)
Acute oral LD50= 6,300 mg/kg (rabbit)
Acute oral LD50= 5,560 mg/kg (guinea pig)
Acute oral LDLo= 6000 mg/kg (cat)
Acute oral LDLo=1,400 mg/kg (human)

SECTION 14 – ECOLOGICAL INFORMATION

Avoid uncontrolled releases of this material. Where spills are possible, a comprehensive spill response plan should be developed and implemented.

SECTION 15 – REGULATORY INFORMATION

TOXIC SUBSTANCE CONTROL ACT (TSCA): This product is (or if a mixture, the components of this product are) listed in the TSCA Inventory of Chemical Substances.

SARA TITLE III (SECTIONS 311/312) HAZARD CATEGORIES:

Immediate/Acute Health Hazard: yes

Delayed Chronic Health Hazard: yes

Fire Hazard: yes

Sudden Release of Pressure: no

Reactive: no

SARA TITLE III (SECTION 313): This product contains no SARA 313 "toxic chemicals" above threshold levels.

ATF DISTILLED SPIRITS ACT: Use of ethyl alcohol without prior payment of applicable excise tax is strictly controlled by regulations promulgated and enforced by the Bureau of Alcohol, Tobacco and Firearms, Dept. of Treasury. Governing regulations have been defined in Title 27, Code of Federal Regulations.

NEW JERSEY RIGHT TO KNOW: Ethyl alcohol is listed as a special hazard.

PENNSYLVANIA RIGHT TO KNOW: Ethanol is listed.

MASSACHUSETTS RIGHT TO KNOW: Ethyl alcohol is listed.

CALIFORNIA PROPOSITION 65: This product contains less than 0.5 ppm of benzene (CAS RN=71-43-2) which has been listed as being "known to the State of California to cause cancer"

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS): Ethanol is listed (threshold=0.1%)

NOTE: The regulatory information presented here should not necessarily be considered as being all-inclusive. Other local, state, federal, and international regulations may also apply.

SECTION 16 – OTHER INFORMATION

DATE OF PREPARATION: May 11, 2010

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. MO BIO Laboratories, Inc. shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. License granted to make unlimited paper copies for internal use only.



MATERIAL SAFETY DATA SHEET

Based on U.S. Department of Labor
Occupational Safety and Health Administration
Form OMB NO. 1218-0072

TELEPHONE NUMBER OF INFORMATION: 1-800-606-6246

EMERGENCY TELEPHONE NUMBER: 1-760-929-9911

DATE PREPARED: May 11, 2010

SECTION 1 - MATERIAL IDENTIFICATION

CHEMICAL NAME: Sterile, Nuclease-free Water

TRADE NAME: Solution TR5

MF: H₂O

SYNONYMS: Water

Solution TR5 contains no hazardous or toxic substances that would require us to distribute a Material Safety Data Sheet according to the Federal OSHA requirements. General good lab procedures should be used when using this reagent.

DATE OF PREPARATION: May 11, 2010

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