



**ZYMO RESEARCH**  
*The Beauty of Science is to Make Things Simple*

## Material Safety Data Sheet

Zymo Research advises each customer or recipient of this MSDS to study it carefully to become aware of and understand the hazards associated with the product. The reader should consider consulting reference works or individuals who are experts in ventilation, toxicology, and fire prevention, as necessary or appropriate to use and understand the data contained in this MSDS.

To promote safe handling, each customer or recipient should: (1) notify its employees, agents, contractors and others whom it knows or believes will use this material or the information in this MSDS and any other information regarding hazards or safety; (2) furnish this same information to each of its customers for the product; and (3) request its customers to notify their employees, customers, and other users of the product of this information.

### Section 1 – Product and Company Information

**Reagent/Buffer Name:** Solution 1-Digestion Buffer  
**Catalog Number:** D2001-1-15, D2004-1-10

**Company:** Zymo Research Corp.  
**Street Address:** 17062 Murphy Ave.  
**City, State, Zip Code, Country:** Irvine, CA 92614 US  
**Phone:** 949-679-1190  
**Fax:** 949-266-9452

### Section 2 – Ingredient Information/Composition

**Description:** Mixture of the substances listed below with nonhazardous additions.

Dangerous Components Name	CAS #	EINEC No.	Formula	Percent
Tris(hydroxymethyl)aminomethane / Hydrochloric Acid	1185-53-1	214-684-5	C <sub>4</sub> H <sub>11</sub> NO <sub>3</sub> .HCL	≤ 1%
Ethylenediaminetetraacetic Acid, pH 8.0	6381-92-6	205-358-3	C <sub>10</sub> H <sub>14</sub> N <sub>2</sub> Na <sub>2</sub> O <sub>8</sub> •2H <sub>2</sub> O	≤ 1%

According to the OSHR 29 CFR§1910\_1200, a mixture that contains less than one percent by weight or volume of a non-carcinogenic hazardous component is not considered hazardous, unless there is evidence to the contrary. We do not consider this product to be hazardous; however we recommend the use of gloves, lab coats and eye protection when working with these or any chemical reagents.

### Section 3 – Hazard Identification

**NFPA Ratings (scale 0 - 4) :**  
Health = 0  
Fire = 0  
Reactivity = 0

**HMIS Ratings (scale 0 – 4) :**  
Health = 0  
Fire = 0  
Reactivity = 0

**OSHA Hazard:** No known OSHA hazards

**Potential Acute Health Effects:**  
Eyes: May cause eye irritation.  
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.

## Section 4 – First Aid Measures

<b>In Case of</b>	
<b>Eye Contact:</b>	Flush contaminated eye(s) with large volumes of water for at least 15 minutes. Get medical attention if eye(s) remain irritated.
<b>Skin Contact:</b>	Wash contaminated areas with large volumes of soap and water.
<b>Ingestion:</b>	Wash out mouth with water provided person is conscious.
<b>Inhalation:</b>	Remove victim to fresh air. Give oxygen if breathing becomes difficult. Should breathing stop, give artificial respiration.

## Section 5 – Fire Fighting Measures

<b>Extinguishing Media:</b>	Noncombustible. Use extinguishing media appropriate to surrounding fire conditions.
<b>Special Fire Fighting Procedures:</b>	Wear self-contained breathing apparatus and protective garments to prevent contact with skin and eyes.

## Section 6 – Accidental Release Measures

<b>General Information:</b>	Wear self-contained breathing apparatus, chemical safety goggles, rubber boots, and heavy rubber gloves. Avoid breathing vapors, mist or gas.
<b>Spills / Leaks:</b>	Keep in suitable, closed containers for disposal.

## Section 7 – Handling and Storage

<b>Storage:</b>	Store tightly closed in a dry and well-ventilated place.
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## Section 8 – Exposure Controls / Personal Protection

Whenever workplace conditions warrant a respirator use, wear tested and approved NIOSH (US) or CEN (EU) respirators and components. Wear protective gloves and safety goggles. Provide safety shower and eyewash station. Keep tightly closed. Wash thoroughly after handling.

## Section 9 – Physical and Chemical Properties

<b>Physical States / Form:</b>	Liquid
<b>Color:</b>	Colorless
<b>pH-Factor:</b>	(20°C) 8.0
<b>Specific Gravity:</b>	(20°C) 0.990 g/cm <sup>2</sup>
<b>Solubility In Water:</b>	(20°C) Soluble

## Section 10 – Stability and Reactivity

<b>Substances To Be Avoided:</b>	Strong oxidizing agents.
<b>Hazardous, Combustion, Or Decomposition Products:</b>	Hazardous decomposition products formed under fire conditions. Nature of decomposition products not known.

## Section 11 – Toxicological Information

<b>Acute Effects</b>	
<b>Inhalation:</b>	May be harmful by inhalation. May cause respiratory tract irritation.
<b>Eye Contact:</b>	May cause eye irritation.
<b>Skin Contact:</b>	May cause skin irritation. May cause skin irritation.
<b>Ingestion:</b>	May be harmful if swallowed.
<b>Signs and Symptoms of Exposure:</b>	Caution! The toxicological properties of this mixture have not been fully investigated. Follow good laboratory practices when handling.
<b>RTECS Number:</b>	Mixture not listed.
<b>Additional Information:</b>	The product should be handled with the normal caution accorded to chemical handling. Additional harmful properties cannot be ruled out.

## Section 12 – Ecological Information

No information available.

## Section 13 – Disposal Considerations

Observe all federal, state, and local environmental regulations.

## Section 14 – Transport Considerations

<b>DOT Regulations:</b>	Not dangerous goods. Not regulated.
<b>IMDG:</b>	Not dangerous goods. Not regulated.
<b>IATA:</b>	Not dangerous goods. Not regulated.

## Section 15 – Regulatory Information

<b>SARA:</b>	
Section 302	No products were found.
Section 313	No products were found.
SARA 311/312 Hazards	No SARA Hazards.
<b>California Prop. 65 Components:</b>	This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.
<b>OSHA Hazards:</b>	No known OSHA hazards.
<b>DSL Status:</b>	All components of this product are on the Canadian DSL list.

## Section 16 – Other Information

The above information is believed to be correct, but does not purport to be all-inclusive and should be used only as a guide. Zymo Research shall not be held liable for any damage or other consequences resulting from handling or from contact with the above product. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall Zymo Research be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Zymo Research has been advised or the possibility of such damages. All materials supplied by Zymo Research Corp are intended to be used by trained professionals and are for research use only.



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### Section 1 – Product and Company Information

**Reagent/Buffer Name:** Solution 2 - Lysis Buffer (Component A)  
**Catalog Number:** D2001-2-15, D2004-2-10

**Company:** Zymo Research Corp.  
**Street Address:** 17062 Murphy Ave.  
**City, State, Zip Code, Country:** Irvine, CA 92614 US  
**Phone:** 949-679-1190  
**Fax:** 949-266-9452

### Section 2 – Ingredient Information/Composition

**Description:** Mixture of the substances listed below with nonhazardous additions.

Dangerous Components Name	CAS #	Formula	Percent
Sodium Dodecyl Sulfate	151-21-3	C <sub>12</sub> H <sub>25</sub> O <sub>4</sub> SNa	≥ 1%

### Section 3 – Hazard Identification

**NFPA Ratings (scale 0 - 4) :**  
Health = 2  
Fire = 1  
Reactivity = 0

**HMIS Ratings (scale 0 – 4) :**  
Health = 2  
Fire = 1  
Reactivity = 0  
Personal Protection = E

**OSHA Hazard:** Irritant

**Potential Acute Health Effects:** Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (sensitizer), of ingestion. Severe over-exposure can result in death.

**Potential Chronic Health Effects:** Slightly hazardous in case of skin contact (sensitizer).  
Carcinogenic Effects: Not available.  
Mutagenic Effects: Mutagenic for bacteria and/or yeast.  
Teratogenic Effects: Not available.  
Developmental Toxicity: Not available. The substance may be toxic to upper respiratory tract, skin, and eyes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

## Section 4 – First Aid Measures

<b>In case of Eye Contact:</b>	Rinse eyes with plenty of water for at least 15 minutes and consult a physician.
<b>Skin Contact:</b>	Wash off with soap and plenty of water. Remove contaminated clothing and shoes. Consult a physician.
<b>Serious Skin Contact:</b>	Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.
<b>Inhalation:</b>	Provide fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Consult a doctor.
<b>Ingestion:</b>	Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Rinse mouth with water. Consult a physician

## Section 5 – Fire Fighting Measures

<b>Flammability Of The Product:</b>	May be combustible at high temperature.
<b>Products Of Combustion:</b>	These products are carbon oxides (CO, CO <sub>2</sub> ), sulfur oxides (SO <sub>2</sub> , SO <sub>3</sub> ...).
<b>Fire Hazards In Presence Of Various Substances:</b>	Slightly flammable to flammable in presence of heat.
<b>Explosion Hazards In Presence Of Various Substances:</b>	Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks.
<b>Fire Fighting Media And Instructions:</b>	Small Fire: Use dry chemical powder. Large Fire: Use water spray, fog or foam. Do not use water jet.
<b>Special Remarks On Fire Hazards:</b>	When heated to decomposition it emits toxic fumes of sulfur oxides, and sodium oxide.

## Section 6 – Accidental Release Measures

<b>Procedure(s) Of Personal Precaution(s) :</b>	Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation.
<b>Methods For Cleaning Up:</b>	Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

## Section 7 – Handling and Storage

<b>Handling:</b>	Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.
<b>Storage:</b>	Keep container tightly closed. Keep container in a cool, well-ventilated area.

## Section 8 – Exposure Controls / Personal Protection

<b>Personal Protection Equipment:</b>	Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.
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<b>Engineering Controls:</b>	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
<b>Components With Limit Values That Require Monitoring At The Workplace:</b>	Not available

## Section 9 – Physical and Chemical Properties

<b>Physical State And Appearance:</b>	Solid
<b>Color:</b>	White to yellowish
<b>Boiling Point:</b>	Not available.
<b>Melting Point:</b>	204°C (399.2°F) - 207 C
<b>Flash Point:</b>	Not available
<b>pH (1% soln/water) :</b>	9.5
<b>Auto Igniting:</b>	Not available
<b>Solubility In Water</b>	Soluble in cold water, hot water. Solubility in water: 1g/10 ml water

## Section 10 – Stability and Reactivity

<b>Conditions Of Instability:</b>	Excess heat, dust generation, incompatible materials.
<b>Incompatibility With Various Substances:</b>	Reactive with oxidizing agents.
<b>Stability:</b>	The product is stable.
<b>Polymerization:</b>	Will not occur

## Section 11 – Toxicological Information

<b>Toxicological Data on Ingredients:</b>	ORAL Rat (LD50): Acute: 1288 mg/kg DUST Rat (LC50): Acute: >3900 mg/m <sup>3</sup> 1 hour
<b>Chronic Effects on Humans:</b>	Mutagenic Effects: Mutagenic for bacteria and/or yeast. May cause damage to the following organs: upper respiratory tract, skin, eyes.
<b>Other Toxic Effects on Humans:</b>	Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (sensitizer), of ingestion.
<b>Special Remarks on Toxicity to Animals:</b>	Lowest Published Lethal Dose: LDL [Rabbit] - Route: Skin; Dose: 10000 mg/kg
<b>Special Remarks on Chronic Effects on Humans:</b>	May cause adverse reproductive effects based on animal test data. No human data found.
<b>Special Remarks on other Toxic Effects on Humans:</b>	Acute Potential Health Effects: Skin: Causes mild to moderate skin irritation. May produce a drying effect on the skin. May cause defatting of the skin. May cause allergic reaction (dermatitis). Eyes: Causes moderate eye irritation. Inhalation: Material is irritating to mucous membranes and upper respiratory tract. Symptoms may include sore throat, coughing, shortness of breath and delayed lung edema. May cause allergic respiratory reaction.  Ingestion: May be harmful if swallowed. Causes gastrointestinal tract irritation with nausea, vomiting, intestinal bloating, hypermotility, diarrhea. May also affect behavior (ataxia, somnolence), and cardiovascular system.

Chronic Potential Health Effects:  
Skin: Prolonged or repeated skin contact may cause allergic dermatitis and defatting of the skin.  
Ingestion: Prolonged or repeated ingestion may affect the liver.  
Inhalation: Prolonged or repeated inhalation may cause allergic respiratory reaction (asthma) and may lead to decreased pulmonary function.

## Section 12 – Ecological Information

No data available.

## Section 13 – Disposal Considerations

Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Do not dispose with household garbage.

## Section 14 – Transport Considerations

**DOT Regulations:** Not a DOT controlled material (United States).

## Section 15 – Regulatory Information

**Federal and State Regulations:** TSCA 8(b) inventory: Sodium lauryl sulfate

**California Proposition 65 Warnings:** California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: No products were found.

California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: No products were found.

**Other Regulations:** OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 910.1200).  
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**WHMIS (Canada):** CLASS D2B: Material causing other toxic effects (TOXIC).

**DSCL (EEC):** R22- Harmful if swallowed.  
R36/38- Irritating to eyes and skin.  
R43- May cause sensitization by skin contact.  
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.  
S36/37- Wear suitable protective clothing and gloves.

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### Section 1 – Product and Company Information

**Reagent/Buffer Name:** Solution 2- Lysis Buffer (Component B)  
**Catalog Number:** D2001-2-15, D2004-2-10

**Company:** Zymo Research Corp.  
**Street Address:** 17062 Murphy Ave.  
**City, State, Zip Code, Country:** Irvine, CA 92614 US  
**Phone:** 949-679-1190  
**Fax:** 949-266-9452

### Section 2 – Ingredient Information/Composition

**Description:** Mixture of the substances listed below with nonhazardous additions.

Dangerous Components Name	CAS #	EINEC No.	Formula	Concentration
Sodium Hydroxide	1310-73-2	215-185-5	NaOH	200mM to 2M
Water	7732-18-5	231-791-2	H <sub>2</sub> O	

### Section 3 – Hazard Identification

**Emergency Overview:** OSHA Hazards: Corrosive

**HMIS Classification:** Health hazard: 3  
Flammability: 0  
Physical hazards: 1

**NFPA Ratings (scale 0 - 4) :** Health = 3  
Fire = 0  
Reactivity = 1

### Section 4 – First Aid Measures

In Case of

**Eye Contact:** Flush contaminated eye(s) with large volumes of water for at least 15 minutes. Get medical attention.

**Skin Contact:** Wash contaminated areas with soap and large volumes of water as contaminated clothing is removed. Do not wear contaminated clothing until after it has been properly cleaned. Get medical attention.



**Ingestion:** If swallowed, do NOT induce vomiting. Rinse mouth with water. Never give anything by mouth to an unconscious person. Get medical aid.

**Inhalation:** Remove victim to fresh air. Give oxygen if breathing becomes difficult. Should breathing stop-give artificial respiration. Get medical attention.

## Section 5 – Fire Fighting Measures

**Extinguishing Media:** Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**Special Fire Fighting Procedures:** Wear self-contained breathing apparatus and protective garments to prevent contact with skin and eyes.

## Section 6 – Accidental Release Measures

**General Information:** Provide adequate ventilation. Use personal protective equipment. Avoid breathing vapors, mist or gas. Evacuate personnel to safe areas.

**Spills / Leaks:** Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

## Section 7 – Handling and Storage

**Handling:** Wash thoroughly after handling. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Provide adequate ventilation.

**Storage:** Keep container tightly closed in a cool, well-ventilated area. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

## Section 8 – Exposure Controls / Personal Protection

Provide appropriate ventilation or local exhaust. Wear protective gloves, safety glasses, lab coat. Provide safety showers and eye stations proximal to the work-station location. Be sure to use an approved/certified respirator or equivalent. Do not breathe vapor. Avoid contact with eyes, skin and clothing. Avoid prolonged or repeated exposure. Keep tightly closed. Wash thoroughly after handling.

<b>Exposure Limits:</b>	ACGIH: C 2 mg/m <sup>3</sup> OSHA Final-PELs: TWA 2 mg/m <sup>3</sup> Consult local authorities for acceptable exposure limits.
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## Section 9 – Physical and Chemical Properties

**Physical States / Form:** Liquid

**Color:** Colorless

**pH-Factor:** 12-13

**Boiling Point:** N/A

**Melting Point:** N/A

**Flash Point:** N/A

**Ignition Temperature:** N/A

**Solubility In Water:** Soluble

## Section 10 – Stability and Reactivity

<b>Substances To Be Avoided:</b>	Acids; organic materials; metals-corrosive to metals.
<b>Hazardous, Combustion, Or Decomposition Products:</b>	Hazardous decomposition products formed under fire conditions. - Sodium oxides

## Section 11 – Toxicological Information

<b>Acute Effects</b>	
<b>Inhalation:</b>	May be harmful by inhalation. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
<b>Eye Contact:</b>	Causes eye irritation.
<b>Skin Contact:</b>	Causes skin irritation. May be harmful by skin adsorption.
<b>Ingestion:</b>	May be harmful if swallowed. Causes burns.
<b>Prolonged Exposure:</b>	N/A
<b>Chronic Effects:</b>	N/A
<b>Acute Toxicity Data:</b>	N/A
<b>Irritation and Corrosion:</b>	N/A
<b>Additional Information:</b>	The product should be handled with the normal caution accorded to chemical handling. Additional harmful properties cannot be ruled out.

## Section 12 – Ecological Information

No information available.

## Section 13 – Disposal Considerations

Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Do not dispose with household garbage. Do not allow product to reach sewage system.

## Section 14 – Transport Considerations

<b>DOT:</b>	Shipping Name: Sodium Hydroxide, Solution Hazard Class: 8 UN/NA: UN1824 Packing Group: III Marine pollutant: No Poison Inhalation Hazard: No
<b>IATA:</b>	Shipping Name: Sodium Hydroxide, Solution Hazard Class: 8 UN/NA: UN1824 Packing Group: III
<b>Canada TDG:</b>	Shipping Name: Sodium Hydroxide, Solution Hazard Class: 8 UN/NA: UN1824 Packing Group: III

## Section 15 – Regulatory Information

<b>OSHA Hazards:</b>	Corrosive
<b>SARA: Section 313:</b>	This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.
Section 302:	No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 311/312 Hazards:	Acute Health Hazard
<b>STATE:</b>	Present on state lists from CA, PA, MA, NJ.
<b>California Prop. 65 Components</b>	This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.
<b>European Labeling Hazard Symbols:</b>	C
<b>Risk Phrases:</b>	R 35 Causes severe burns.
<b>Safety Phrases:</b>	S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S 37/39 Wear suitable gloves and eye/face protection. S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
<b>WGK (Water Danger / Protection):</b>	CAS No.: 1310-73-2: 1
<b>Canada:</b>	Listed on Canada's DSL/NDSL List. This product has a WHMIS Classification of E. Listed on Canada's Ingredient Disclosure List.

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### Section 1 – Product and Company Information

**Reagent/Buffer Name:** Solution 3-Neutralization Buffer  
**Catalog Number:** D2001-3-15

**Company:** Zymo Research Corp.  
**Street Address:** 17062 Murphy Ave.  
**City, State, Zip Code, Country:** Irvine, CA 92614 US  
**Phone:** 949-679-1190  
**Fax:** 949-266-9452

### Section 2 – Ingredient Information/Composition

**Description:** Mixture of the substances listed below with nonhazardous additions.

Dangerous Components Name	CAS #	Formula	Concentration
Potassium Acetate /Acetic Acid, pH 5.5	64-19-7	C <sub>2</sub> H <sub>4</sub> O <sub>2</sub>	2-3M

### Section 3 – Hazard Identification

**Warning:** Corrosive. Flammable liquid and vapor.

**Health Hazard Data:** Causes severe eye and skin burns. Causes severe digestive and respiratory tract burns.

**Potential Health Effects:**

Eye: Causes severe eye irritation. Contact with liquid or vapor causes severe burns and possible irreversible eye damage.

Skin: Causes skin burns. May be harmful if absorbed through the skin. Contact with the skin may cause blackening and hyperkeratosis of the skin of the hands.

Ingestion: May cause severe and permanent damage to the digestive tract. Causes severe pain, nausea, vomiting, diarrhea, and shock. May cause polyuria, oliguria (excretion of a diminished amount of urine in relation to the fluid intake) and anuria (complete suppression of urination). Rapidly absorbed from the gastrointestinal tract.

Inhalation: Effects may be delayed. Causes chemical burns to the respiratory tract. Exposure may lead to bronchitis, pharyngitis, and dental erosion. May be absorbed through the lungs.

Chronic: Chronic exposure to acetic acid may cause erosion of dental enamel, bronchitis, eye irritation, darkening of the skin, and chronic inflammation of the respiratory tract. Acetic acid can cause occupational asthma. One case of a delayed asthmatic response to glacial acetic acid has been reported in a person with bronchial asthma. Skin sensitization to acetic acid is rare, but has occurred.

## Section 4 – First Aid Measures

<b>In Case of</b>	
<b>Eye Contact:</b>	Flush contaminated eye(s) with large volumes of water for at least 15 minutes. Get medical attention.
<b>Skin Contact:</b>	Wash contaminated areas with soap and large volumes of water as contaminated clothing is removed. Do not wear contaminated clothing until after it has been properly cleaned. Get medical attention.
<b>Ingestion:</b>	Do NOT induce vomiting. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person.
<b>Inhalation:</b>	Remove victim to fresh air. Give oxygen if breathing becomes difficult. Should breathing stop, give artificial respiration. Get medical attention.

## Section 5 – Fire Fighting Measures

<b>Flash Point:</b>	39 °C ( 102.20 °F)
<b>Autoignition Temperature:</b>	426 °C ( 798.80 °F)
<b>Explosion Limits:</b>	Lower: 4.0 vol % Upper: 19.9 vol %
<b>Extinguishing Media:</b>	Use water spray, dry chemical, "alcohol resistant" foam, or carbon dioxide.
<b>Special Fire Fighting Procedures:</b>	Wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Reacts with most metals to form highly flammable hydrogen gas which can form explosive mixtures with air. Flammable liquid and vapor. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

## Section 6 – Accidental Release Measures

<b>General Information:</b>	Use proper personal protective equipment as indicated in Section 8.
<b>Spills / Leaks:</b>	Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Ventilate area and wash spill site after material pickup is complete. Remove all sources of ignition. Use a spark-proof tool. Spill may be carefully neutralized with soda ash (sodium carbonate).

## Section 7 – Handling and Storage

<b>Handling:</b>	Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Do not get in eyes, on skin, or on clothing. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame. Do not breathe vapor or mist. Ground and bond containers when transferring material. Use corrosion-resistant transfer equipment when dispensing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous.
<b>Storage:</b>	Store tightly closed in a cool, dry, well-ventilated area away from incompatible substances. Keep away from heat, sparks, and flame. Keep from contact with oxidizing materials. Do not store near alkaline substances.

## Section 8 – Exposure Controls / Personal Protection

**Engineering Controls:** Eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Use a corrosion-resistant ventilation system.

**OSHA Vacated PELs:** Acetic acid: 10 ppm TWA; 25 mg/m<sup>3</sup> TWA

**Personal Protective Equipment:** Eyes: Wear chemical splash goggles and face shield.  
Skin: Wear appropriate gloves to prevent skin exposure.  
Clothing: Wear appropriate protective clothing to prevent skin exposure.  
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

### Exposure Limits:

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Acetic acid	10 ppm TWA; 15 ppm STEL	10 ppm TWA; 25 mg/m <sup>3</sup> TWA 50 ppm IDLH	10 ppm TWA; 25 mg/m <sup>3</sup> TWA

## Section 9 – Physical and Chemical Properties

**Physical States / Form:** Liquid

**Color:** Colorless

**Odor:** Characteristic

**pH-Factor:** <.01

**Boiling Point:** 117 - 118 °C

**Freezing/Melting Point:** 16.6 °C

**Decomposition Temperature:** Not available

**Vapor Pressure:** 11.4 mm Hg at 20°C

**Vapor Density:** 2.10

**Evaporation Rate:** 0.97

**Viscosity:** 1.22 cP

**Specific Gravity:** 1.05

**Solubility In Water:** Soluble

## Section 10 – Stability and Reactivity

**Stability:** Stable at room temperature in closed containers under normal storage and handling conditions.

**Conditions To Be Avoided:** Ignition sources, excess heat, freezing temperatures, confined spaces.

**Substances To Be Avoided:** Metals, strong oxidizing agents, bases, chlorine trifluoride, nitric acid, acetaldehyde, chlorosulfonic acid, oleum, bromine pentafluoride, perchloric acid, potassium tert-butoxide, ethyleneimine, 2-aminoethanol, ethylene diamine, phosphorus trichloride, phosphorus isocyanate, chromic acid.

**Hazardous, Combustion, Or Decomposition Products:** Carbon monoxide, carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Will not occur.

## Section 11 – Toxicological Information

<b>RTECS Number:</b>	AF1225000
<b>LD50/LC50:</b>	Draize Test Skin Rabbit 50 mg/24H Mild Inhalation Mouse LC50: 5620 ppm/1H Oral Rat LD50: 3310 mg/kg Skin Rabbit LD50: 1060 uL/kg
<b>Carcinogenicity:</b>	Not listed by ACGIH, IARC, NTP, or CA Prop 65.
<b>Epidemiology:</b>	No information available.
<b>Teratogenicity:</b>	No teratogenic effects were observed among the offspring of mice, rats, or rabbits that had been given very large doses of apple cider vinegar (containing acetic acid) during pregnancy. Acetic acid treatment of suckling rats (via maternal administration) was associated with abnormalities of behavioral testing.
<b>Reproductive Effects:</b>	Intratesticular, rat: TDLo = 400 mg/kg (male 1 day(s) pre-mating) Fertility - male fertility index (e.g. # males impregnating females per # males exposed to fertile nonpregnant females).
<b>Mutagenicity:</b>	Sister Chromatid Exchange: Human, Lymphocyte = 5 mmol/L.; Unscheduled DNA Synthesis: Administration onto the skin, mouse = 79279 ug/kg.; Cytogenetic Analysis: Hamster, Ovary = 10 mmol/L.
<b>Neurotoxicity:</b>	No information available.
<b>Additional Information:</b>	The product should be handled with the normal caution accorded to chemical handling. Additional harmful properties cannot be ruled out.

## Section 12 – Ecological Information

<b>Environmental:</b>	If released to the atmosphere, it is degraded in the vapor-phase by reaction with photochemically produced hydroxyl radicals (estimated typical half-life of 26.7 days). It occurs in atmospheric particulate matter in acetate form and physical removal from air can occur via wet and dry deposition.
<b>Physical:</b>	Natural waters will neutralize dilute solutions to acetate salts.
<b>Ecotoxicity:</b>	If released to water or soil, acetic acid will biodegrade readily. Evaporation from dry surfaces is likely to occur. When spilled on soil, the liquid will spread on the surface and penetrate into the soil at a rate dependent on the soil type and its water content. Acetic acid shows no potential for biological accumulation or food chain contamination.

## Section 13 – Disposal Considerations

Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 – Transport Considerations

<b>US DOT:</b>	Shipping Name: Acetic Acid, Glacial Hazard Class: 8 UN Number: UN2789 Packing Group: II
<b>Canada TDG:</b>	Shipping Name: Acetic Acid, Glacial Hazard Class: 8(3) UN Number: UN2789 Packing Group: II

## Section 15 – Regulatory Information

<b>US Federal TSCA:</b>	Listed on the TSCA inventory.
<b>Health &amp; Safety Reporting List:</b>	None of the chemicals are on the Health & Safety Reporting List.
<b>Chemical Test Rules:</b>	None of the chemicals in this product are under a Chemical Test Rule.
<b>Section 12b:</b>	None of the chemicals are listed under TSCA Section 12b.
<b>TSCA Significant New Use Rule:</b>	None of the chemicals in this material have a SNUR under TSCA.
<b>CERCLA Hazardous Substances And Corresponding RQs:</b>	5000 lb final RQ; 2270 kg final RQ
<b>SARA Section 302 Extremely Hazardous Substances:</b>	None of the chemicals in this product have a TPQ.
<b>SARA Codes:</b>	Immediate, delayed, fire.
<b>Section 313:</b>	No chemicals are reportable under Section 313.
<b>Clean Air Act:</b>	This material does not contain any hazardous air pollutants, any Class 1 Ozone depleters or any Class 2 Ozone depleters.
<b>Clean Water Act:</b>	Listed as a Hazardous Substance under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA or as Toxic Pollutants under the CWA.
<b>OSHA:</b>	None of the chemicals in this product are considered highly hazardous by OSHA.
<b>STATE:</b>	CAS# 64-19-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
<b>California Prop 65:</b>	California No Significant Risk Level: None of the chemicals in this product are listed.
<b>European/International Regulations Hazard Symbols:</b>	C
<b>Risk Phrases:</b>	R 10 Flammable. R 35 Causes severe burns.
<b>Safety Phrases:</b>	S 23 Do not inhale gas/fumes/vapour/spray. S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
<b>WGK (Water Danger/Protection):</b>	CAS# 64-19-7: 1
<b>Canada - DSL/NDSL:</b>	Listed on Canada's DSL List.



**Canada – WHMIS:** This product has a WHMIS classification of E, B3.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List:** Listed on the Canadian Ingredient Disclosure List.

## Section 16 – Other Information

The above information is believed to be correct, but does not purport to be all-inclusive and should be used only as a guide. Zymo Research shall not be held liable for any damage or other consequences resulting from handling or from contact with the above product. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall Zymo Research be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Zymo Research has been advised or the possibility of such damages. All materials supplied by Zymo Research Corp are intended to be used by trained professionals and are for research use only.



**ZYMO RESEARCH**  
*The Beauty of Science is to Make Things Simple*

## Material Safety Data Sheet

Zymo Research advises each customer or recipient of this MSDS to study it carefully to become aware of and understand the hazards associated with the product. The reader should consider consulting reference works or individuals who are experts in ventilation, toxicology, and fire prevention, as necessary or appropriate to use and understand the data contained in this MSDS.

To promote safe handling, each customer or recipient should: (1) notify its employees, agents, contractors and others whom it knows or believes will use this material or the information in this MSDS and any other information regarding hazards or safety; (2) furnish this same information to each of its customers for the product; and (3) request its customers to notify their employees, customers, and other users of the product of this information.

### Section 1 – Product and Company Information

**Reagent/Buffer Name:** Zymolyase Storage Buffer  
**Catalog Number:** E1004, E1005, E1006

**Company:** Zymo Research Corp.  
**Street Address:** 17062 Murphy Ave.  
**City, State, Zip Code, Country:** Irvine, CA 92614 US  
**Phone:** 949-679-1190  
**Fax:** 949-266-9452

### Section 2 – Ingredient Information/Composition

**Description:** Mixture of the substances listed below with nonhazardous additions.

Dangerous Components Name	CAS #	EINECS No.	Formula	Percent
Beta-Mercaptoethanol	60-24-2	200-464-6	HOCH <sub>2</sub> CH <sub>2</sub> SH	0.1% to 0.9%

### Section 3 – Hazard Identification

**Emergency Overview:** OSHA Hazards:  
Highly toxic by skin absorption  
Toxic by inhalation and ingestion  
Combustible  
Corrosive  
Environmental hazard

**Target Organs:** Pulmonary System, Gastrointestinal System

**NFPA Ratings (scale 0 - 4) :** Health = 3  
Fire = 2  
Reactivity = 1

**HMIS Ratings (scale 0 – 4) :** Health = 3  
Fire = 2  
Physical Hazard = 1

## Section 4 – First Aid Measures

<b>In Case of</b>	
<b>Eye Contact:</b>	Flush contaminated eye(s) with large volumes of water for at least 15 minutes. Get medical attention.
<b>Skin Contact:</b>	Flush contaminated areas with large volumes of water for at least 15 minutes as contaminated clothing is removed. Do not wear contaminated clothing until after it has been properly cleaned. Get medical attention.
<b>Ingestion:</b>	Do not induce vomiting. Wash out mouth with water provided person is conscious. Get medical attention.
<b>Inhalation:</b>	Remove victim to fresh air. Give oxygen if breathing becomes difficult. Should breathing stop, give artificial respiration. Get medical attention.

## Section 5 – Fire Fighting Measures

<b>Extinguishing Media:</b>	Water spray. Carbon dioxide, dry chemical powder, or alcohol-resistant foam.
<b>Special Fire Fighting Procedures:</b>	Wear self-contained breathing apparatus and protective garments. If possible, have this product removed from the fire scene.

## Section 6 – Accidental Release Measures

<b>General Information:</b>	Evacuate the area. Wear self-contained breathing apparatus, chemical safety goggles, rubber boots, and heavy rubber gloves. Provide appropriate ventilation. Avoid breathing vapors.
<b>Spills / Leaks:</b>	Cover with an inert absorbent material and keep in suitable, closed containers for waste disposal. Do not let product enter drains, sewers, surface or ground water. Avoid discharge into the environment. Ventilate area.

## Section 7 – Handling and Storage

<b>Handling:</b>	Avoid contact with skin and eyes. Avoid inhalation of vapors or mist.
<b>Storage:</b>	Store tightly closed in a dry and well-ventilated place.

## Section 8 – Exposure Controls / Personal Protection

Provide appropriate ventilation or local exhaust. Under conditions where exposure to the substance is apparent and/or engineering controls are not feasible, wear an appropriate approved/certified air-purifying respirator. Wear, protective gloves, and safety goggles. Provide safety showers and eye stations proximal to the work-station location. Do not breathe vapor. Avoid contact with eyes, skin and clothing. Keep tightly closed. Wash thoroughly after handling.

<b>WEEL:</b>	0.2 ppm , Skin
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## Section 9 – Physical and Chemical Properties

<b>Physical States / Form:</b>	Liquid
<b>Color:</b>	Colorless
<b>pH:</b>	4.0 - 6 at 20 °C (68 °F)
<b>Boiling Point:</b>	157 °C (315 °F)
<b>Melting Point:</b>	< -50 °C (< -58 °F)

**Flashpoint:** 77 °C (171 °F) closed cup

**Explosion Level:** Upper: 18%  
Lower: 2.3%

**Vapor Pressure:** 0.76 hPa (0.57 mmHg) at 20 °C (68 °F)

**Specific Gravity:** 1.114 g/cm<sup>3</sup>

**Solubility In Water:** Soluble

## Section 10 – Stability and Reactivity

**Stability:** Stable

**Substances To Be Avoided:** Oxidizing agents, moisture, contact with metals.

**Hazardous, Combustion, Or Decomposition Products:** Sulfur oxides, carbon monoxide, and carbon dioxide.

## Section 11 – Toxicological Information

**Acute Effects**

**Inhalation:** Toxic if inhaled. Extremely destructive to the tissue of the mucous membranes and upper respiratory tract.

**Eye Contact:** Causes eye burns.

**Skin Contact:** Causes skin burns. May be fatal if absorbed through skin.

**Ingestion:** Toxic if swallowed. Causes burns.

**Symptoms Of Exposure:** May include burning sensation, coughing, wheezing, laryngitis, shortness of breath, weakness, headache, nausea and vomiting.

**RTECS Number:** KL5600000

**Toxicity Data:**

Route	Organism	Dose	Reference
Oral	Mouse	LD50: 190 mg/kg	GTPZAB 15 (2), 56, 1971
Inhalation	Mouse	LC50: 13200 mg/m <sup>3</sup>	GTPZAB 15 (2), 56, 1971
Intraperitoneal	Mouse	LD50: 200 mg/kg	NITS AD277-689
Unreported	Mouse	LD50: 480 mg/kg	JPMSAE 62, 237, 1973
Oral	Rat	LD50: 244 mg/kg	GTPZAB 15 (2), 56, 1971
Skin	Rabbit	LD50: 150 ul/kg	UCDS 3/23/1973
Skin	Guinea Pig	LD50: 300 ul/kg	JIHTAB 26, 269, 1944

**Irritation Data:**

Route	Organism	Dose	Reference
Eye	Rabbit	2 mg severe	AJOPAA 29, 1363, 1946

**Additional Information:** The product should be handled with the normal caution accorded to chemical handling. Additional harmful properties cannot be ruled out.

## Section 12 – Ecological Information

Toxic to aquatic organisms. Water hazard class 3 (Assessment by list): extremely hazardous for water. Do not let product enter drains, sewers, surface or ground water. Avoid discharge into the environment.

## Section 13 – Disposal Considerations

Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Do not dispose with household garbage. Do not allow product to reach sewage system.

## Section 14 – Transport Considerations

<b>DOT:</b>	Shipping Name: Thioglycol Hazard Class: 6.1 UN/NA: UN2966 Packing Group: II Label: 6.1
<b>IMDG:</b>	Class: 6.1 UN/NA: UN2966 Packing Group: II EMS Number: F-A, S-A Label: 6.1 Marine Pollutant: No
<b>IATA:</b>	Shipping Name: Thioglycol Hazard Class: 6.1 UN/NA: UN2966 Packing Group: II Label: 6.1

## Section 15 – Regulatory Information

### Hazard Symbols:

T+: Very toxic  
N: Dangerous for the environment

### Risk Phrases:

R27: Very toxic in contact with skin  
R25: Toxic if swallowed  
R34: Causes burns  
R51: Toxic to aquatic organisms

### Safety Phrases:

S36/37/39: Wear suitable protective clothing, gloves and eye/face protection  
S45: In case of accident or if you feel unwell seek medical advice immediately

<b>TSCA Status:</b>	Substance is listed.
<b>SARA 302:</b>	Substance is not listed.
<b>SARA 313:</b>	Substance is not listed.
<b>SARA 311/312 Hazards:</b>	Acute Health Hazard, Fire Hazard
<b>SARA 355:</b>	Substance is not listed.
<b>DSL Status:</b>	All components of this product are on the Canadian DSL list.
<b>California Prop. 65 Components:</b>	This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.
<b>OSHA Hazards:</b>	Corrosive, highly toxic by skin absorption, toxic by inhalation and ingestion, combustible.

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