

MATERIAL SAFETY DATA SHEET

1. PRODUCT IDENTIFICATION

TRADE/MATERIAL NAME: IgG Elution Buffer
CHEMICAL NAMES, COMMON NAMES: Buffer Solution
PRODUCT USE: Purification of IgG Subclasses from Serum and Other Samples
SYNONYMS: Buffer Solution
MOLECULAR FORMULA: Not applicable
U.S. MANUFACTURER'S NAME: MOLECULAR BIO-PRODUCTS, INC.-THERMO FISHER SCIENTIFIC
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CHEMTREC: +1-703-527-3887 (Outside North America) [24-hours]

NOTE: ALL United States Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards, Canadian WHMIS [Controlled Products Regulations], and European Union [Regulation (EC) 1907/2006 Annex II] required information is included in appropriate sections based on the U.S. ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the countries listed above.

2. HAZARD IDENTIFICATION

EU LABELING/CLASSIFICATION: This product does not meet the definition of hazardous, as defined by the European Union Council Directive 67/548/EEC and subsequent Directives.

Classification: Not Applicable.

Risk Phrases: Not Applicable.

EMERGENCY OVERVIEW: Product Description: This product is an acidic, clear, colorless, odorless liquid. **Health Hazards:** The chief hazard in event of overexposure is irritation of contaminated skin or eyes. **Flammability Hazards:** This product is not flammable. **Reactivity Hazards:** This product is not reactive. **Environmental Hazards:** Negligible. **Emergency Considerations:** Emergency responders should wear appropriate protection for situation to which they respond.

3. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	EINECS #	% w/w	EU CLASSIFICATION FOR COMPONENTS
Water and other constituents. Each of the other constituents is present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).			Balance	None of the other constituents in this mixture contribute significantly to the hazards associated with this component.

See Section 15 for full EU classification information of product and components.

4. FIRST-AID MEASURES

If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Take a copy of label and MSDS to physician or health professional with the contaminated individual.

SKIN EXPOSURE: If adverse skin effects occur, discontinue use. Seek medical attention if adverse effect occurs after flushing.

EYE EXPOSURE: If this product contaminates the eyes, rinse eyes under gently running water. Use sufficient force to open eyelids and then "roll" eyes while flushing. Minimum flushing is for 20 minutes. The contaminated individual must seek medical attention if any adverse effect continues after rinsing.

INHALATION: If mists or sprays of this product are inhaled, causing irritation, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if adverse effect continues after removal to fresh air.

INGESTION: If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, DO NOT INDUCE VOMITING. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow. If victim is convulsing, maintain an open airway and obtain immediate medical attention.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing skin disorders may be aggravated by overexposures to this product.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate exposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %): Not applicable.

FIRE EXTINGUISHING MATERIALS: Fire extinguishing materials that can be used against fires of this product include carbon dioxide, dry chemical powder, halon, 'ABC' Class, or appropriate foam. Consideration for surrounding materials must be taken into account.

FIRE EXTINGUISHING MATERIALS NOT TO BE USED: None known.

UNUSUAL FIRE AND EXPLOSION HAZARDS: If involved in a fire, the components of this product may decompose and produce irritating vapors and toxic gases (e.g., carbon oxides and hydrogen chloride).

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus (SCBA) and full protective equipment. If protective equipment is contaminated by this product, it should be thoroughly washed with soapy water prior to removal of SCBA respiratory protection. Firefighters whose protective equipment becomes contaminated should thoroughly shower with warm, soapy water and should receive medical evaluation if they experience any adverse effects.

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Trained personnel using pre-planned procedures should respond to uncontrolled releases. Proper protective equipment should be used. In case of a spill, clear the affected area and protect people. The atmosphere must have levels of components lower than those listed in Section 8, (Exposure Controls and Personal Protective Equipment), if applicable, and have at least 19.5 percent oxygen before personnel can be allowed into the area without Self-Contained Breathing Apparatus.

Small Spills: In the event of an incidental release (e.g., under 1 L), wear gloves and goggles. Wipe up using a sponge or polypads.

Large Spills: Trained personnel following pre-planned procedures should handle non-incidental releases. Minimum Personal Protective Equipment should be rubber gloves, rubber boots, face shield, and Tyvek suit. Minimum level of personal protective equipment for releases in which the level of oxygen is less than 19.5% or is unknown must be **Level B: triple-gloves (rubber gloves and nitrile gloves over latex gloves), chemical resistant suit and boots, hard hat, and Self-Contained Breathing Apparatus.** Wipe up spilled material. Prevent material from entering sewer or confined spaces, waterways, soil, or public waters. Monitor area and confirm levels are below exposure limits given in Section 8 (Exposure Controls-Personal Protection), if applicable, before non-response personnel are allowed into the spill area.

Prevent material from entering sewer or confined spaces. Decontaminate the area thoroughly. Place all spill residue in an appropriate container and seal. If necessary, decontaminate spill-response equipment and spill area with soap and water solution. Do not mix with wastes from other materials. For spills on water, contain, minimize dispersion and collect. Dispose of recovered material and report spill per regulatory requirements. Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations).

7. HANDLING and USE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this material ON YOU or IN YOU. Do not eat, drink, smoke, or apply cosmetics while handling this product. Wash hands thoroughly after handling this product or equipment and containers of this product. Follow SPECIFIC USE INSTRUCTIONS supplied with product.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Use in a well ventilated location. Open containers slowly on a stable surface. Do not expose containers to extreme temperatures. Keep container tightly closed when not in use. Recommended Storage Temperature: 2 to 8°C (35 to 46°F). Store containers in a cool, dry location, away from direct sunlight or sources of intense heat. Store away from incompatible materials (see Section 10, Stability and Reactivity). Material should be stored in secondary containers as appropriate. Inspect all incoming containers before storage to ensure containers are properly labeled and not damaged. Post warning and "NO SMOKING" signs in storage and use areas, as appropriate. Empty containers may contain residual amounts of this product; therefore, empty containers should be handled with care.

SPECIFIC USE(S): Purification of IgG subclasses from serum and other samples. Follow all industry standards for use of this product.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: When cleaning non-disposable equipment, wear latex or butyl rubber gloves (double gloving is recommended), goggles, and lab coat. Wash equipment with soap and water. Collect all rinsates and dispose of according to applicable Federal, State, and local procedures standards.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation. During decontamination of work surfaces, workers should wear the same equipment recommended in Section 6 (Accidental Release Measures) of

this MSDS.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

EXPOSURE LIMITS/GUIDELINES: This product is primarily water and trace constituents; no exposure limits are applicable.

INTERNATIONAL OCCUPATIONAL EXPOSURE LIMITS: Currently, there are no other international exposure limits established for the components of this product.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132), equivalent standards of Canada (including CSA Standard Z94.4-02 and CSA Standard Z94.3-07), or standards of EU member states (including EN 529:2005 for respiratory PPE, CEN/TR 15419:2006 for hand protection, and CR 13464:1999 for face/eye protection). Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: Respiratory protection is not generally needed when using this product. Maintain airborne contaminant concentrations below limits listed above. In instances where inhalable mists or sprays of product may be generated and respiratory protection is necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-02, or European Standard EN 529:2005. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, SAR with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

EYE PROTECTION: Depending on the use of this product, splash goggles or safety glasses may be worn. Use goggles or safety glasses for spill response, as stated in Section 6 (Accidental Release Measures) of this MSDS. If necessary, refer to U.S. OSHA 29 CFR 1910.133, European Standard CR 13464:1999, or Canadian CSA Standard Z94.3-07 for further information.

HAND PROTECTION: Wear butyl rubber gloves for routine industrial use. Use triple gloves for spill response. If necessary, refer to U.S. OSHA 29 CFR 1910.138 appropriate Standards of Canada, or the European Standard CEN/TR 15419:2006.

BODY/SKIN PROTECTION: Use body protection appropriate for task (e.g., lab coat, coveralls, Tyvek suit). If necessary, refer to the OSHA Technical Manual (Section VII: Personal Protective Equipment), appropriate Standards of Canada, or the European Standard CEN/TR 15419:2006. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136 and the Canadian CSA Standard Z195-02, *Protective Footwear*.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE, ODOR and COLOR: This product is an acidic, clear, colorless, odorless liquid.

HOW TO DETECT THESE SUBSTANCES: Litmus paper will turn red on contact with this liquid.

pH: 2.7-2.9

FLASH POINT: Not applicable.

FLAMMABILITY: Not applicable.

EXPLOSIVE PROPERTIES: Not explosive

OXIDIZING PROPERTIES: Not oxidizers.

VAPOR PRESSURE: Not established.

SPECIFIC GRAVITY: Not established.

SOLUBILITY: Miscible in some organic solvents.

SOLUBILITY IN WATER: Completely soluble.

BOILING POINT: Not established.

MELTING/FREEZING POINT: Not established.

VISCOSITY: Not established.

RELATIVE VAPOR DENSITY (air = 1): Not established.

EVAPORATION RATE (*n*-BuAc = 1): Similar to water.

ODOR THRESHOLD: Not established.

COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Not established.

10. STABILITY and REACTIVITY

STABILITY: This product is stable when properly stored (see Section 7, Handling and Storage) at normal temperature.

DECOMPOSITION PRODUCTS: Combustion: If exposed to extremely high temperatures, thermal decomposition may generate irritating fumes and toxic gases (e.g., carbon oxides and hydrogen chloride). Hydrolysis: None.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This product is incompatible with water reactive materials.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid extreme temperatures and contact with incompatible chemicals.

11. TOXICOLOGICAL INFORMATION

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: The health hazard information provided below is pertinent to employees using this product in an occupational setting. The following paragraphs describe the symptoms of exposure by route of exposure.

INHALATION: Inhalation of vapors, mists, or sprays of this product can irritate the nose, throat, and lungs and cause coughing and sneezing. Symptoms are generally alleviated upon breathing fresh air.

CONTACT WITH SKIN or EYES: Contact with the skin or eyes can cause irritation, which is alleviated upon rinsing.

11. TOXICOLOGICAL INFORMATION (Continued)

SKIN ABSORPTION: Skin absorption is not a significant route of overexposure for this product.

INGESTION: Ingestion is not a significant route of occupational overexposure. If large volumes of this product are ingested, they may upset the digestive system.

INJECTION: Though not anticipated to be a significant route of overexposure for this product, injection (via punctures or lacerations by contaminated objects) may cause redness at the site of injection.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. Overexposure to this product may cause the following health effects:

Acute: Beyond irritation of the skin or eyes, contact with this product does not usually cause acute health effects.

Chronic: This product is not known to cause any significant chronic health effects.

TARGET ORGANS: Acute: Eyes, gastrointestinal tract. Chronic: None known.

TOXICITY DATA: Currently, there are no toxicity data for this product.

IRRITANCY OF PRODUCT: This product may cause irritation by eye contact.

SENSITIZATION OF PRODUCT: The components of this product are not known to cause human skin or respiratory sensitization.

CARCINOGENIC POTENTIAL: The components of this product are not found on the following lists: U.S. EPA, U.S. NTP, U.S. OSHA, U.S. NIOSH, GERMAN MAK, IARC, or ACGIH and therefore are neither considered to be nor suspected to be cancer-causing agents by these agencies.

SYNERGISTIC MATERIALS: No synergistic materials are known.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects the components of this product on human and animal reproductive systems.

Mutagenicity: The components of this product are not reported to cause human mutagenic effects.

Embryotoxicity: The components of this product are not reported to cause human embryotoxic effects.

Teratogenicity: The components of this product are not reported to cause human teratogenic effects.

Reproductive Toxicity: The components of this product are not reported to cause human reproductive effects.

A mutagen is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An embryo toxin is a chemical that causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical that causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance that interferes in any way with the reproductive process.

ACGIH BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, ACGIH Biological Exposure Indices (BEIs) have not been determined for the components of this product.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

MOBILITY: This product has not been tested for mobility in soil.

PERSISTENCE AND BIODEGRADABILITY: This product has not been tested for persistence and biodegradability.

BIO-ACCUMULATION POTENTIAL: This product has not been tested for bio-accumulation potential.

ECOTOXICITY: This product has not been tested for aquatic or animal toxicity. All release to terrestrial, atmospheric, and aquatic environments should be avoided.

OTHER ADVERSE EFFECTS: This product is not listed or expected to have having ozone depletion potential.

ENVIRONMENTAL EXPOSURE CONTROLS: Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHODS: Do NOT pour down the drain. It is the responsibility of the generator to determine at the time of disposal whether the product meets the criteria of a hazardous waste per regulations of the area in which the waste is generated and/or disposed of. Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Shipment of wastes must be done with appropriately permitted and registered transporters.

DISPOSAL CONTAINERS: Waste materials must be placed in and shipped in appropriate 5-gallon or 55-gallon poly or metal waste pails or drums. Permeable cardboard containers are not appropriate and should not be used. Ensure that any required marking or labeling of the containers be done to all applicable regulations.

PRECAUTIONS TO BE FOLLOWED DURING WASTE HANDLING: Wear proper protective equipment when handling waste materials. Dispose of in accordance with applicable Federal, State, and local procedures and standards.

EPA WASTE NUMBER: Not applicable.

EWC WASTE CODE: Wastes from research, diagnoses, treatment, or preventions of disease involving animals: chemicals other than containing dangerous substances: 18-02-06

14. TRANSPORTATION INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION REGULATIONS: This product is not classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101 and is not regulated per 49CFR 173.150(e)(2).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This product is not classified as Dangerous Goods, per regulations of Transport Canada.

INTERNATIONAL AIR TRANSPORT ASSOCIATION/ICAO (IATA/ICAO): This product is not classified as dangerous goods, per rules of IATA.

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): This product is not classified as dangerous goods, per the International Air Transport Association.

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO): This product is not classified as dangerous goods, per the International Maritime Organization and is not regulated per IMDG Chapter 3.3 Special Provision 144.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): This product is not classified by the United Nations Economic Commission for Europe to be dangerous goods.

15. REGULATORY INFORMATION

ADDITIONAL UNITED STATES REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: This product is not subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

U.S. TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): The components of this product are not on the California Proposition 65 Lists.

U.S. ANSI STANDARD LABELING (Precautionary Statements): CAUTION! MAY CAUSE SKIN AND EYE IRRITATION. MAY CAUSE DISCOMFORT IF SWALLOWED OR INHALED. Avoid eye contact. Avoid contact with skin and clothing. Avoid breathing mists or sprays. Keep container closed. Use only with adequate ventilation. Wash thoroughly after use. Wear gloves and goggles. **FIRST-AID:** In case of contact, immediately flush skin and eyes with plenty of water. Remove contaminated clothing and shoes. Get medical attention if irritation develops or persists. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, do not induce vomiting. Get medical attention. **IN CASE OF FIRE:** Use water fog, foam, dry chemical, or CO₂. **IN CASE OF SPILL:** Absorb spill with polypads and place in suitable container. Dispose of in accordance with International, National, State, and local hazardous waste disposal regulations. Consult Material Safety Data Sheet for additional information.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDL STATUS: The components of this product are listed on the DSL inventory.

OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION AGENCY (CEPA) PRIORITIES SUBSTANCES LIST: The components of this product are not on the Priority Substances Lists.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: Not applicable.

ADDITIONAL EUROPEAN REGULATIONS:

LABELING AND CLASSIFICATION: This product does not meet the definition of any hazard class as defined by the European Union Council Directive 67/548/EEC and subsequent Directives.

Classification: Not applicable.

Risk Phrases: Not applicable.

Safety Phrases: Not applicable.

Annex II Hazard Symbols: Not applicable.

16. OTHER INFORMATION

PREPARED BY:

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DATE OF PRINTING:

September 18, 2009