EFFECTIVE DATE: 1/1/2012

MATERIAL SAFETY DATA SHEET

SECTION 1: PRODUCT IDENTIFICATION

NAME: Multi-arm Polyethylene Glycol Derivative
Item Number / Product Name
(HO)2-4ARMPEG20K-(NH2)2/4arm PEG, 2arm-Hydroxyl, 2arm-Amine, HCl salt, MW 20000

CAS No.: 25322-68-3
Molecular Weight: Average Molecular Weight 20,000 Da
Chemical Formula: Not applicable to mixtures.

SECTION 2: COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient	CAS No	Percent	Hazardous
Polyethylene Glycol	25322-68-3	> 95%	No

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
As part of good industrial and personal hygiene and safety procedure, avoid all unnecessary exposure to the chemical substance and ensure prompt removal from skin, eyes and clothing.

HEALTH RATING:	1 - Slight
FLAMMABILITY RATING:	1 - Slight
REACTIVITY RATING:	1 - Slight
CONTACT RATING:	0 - None
LAB PROTECTIVE EQUIP:	GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
STORAGE COLOR CODE:	Green (General Storage)

POTENTIAL HEALTH EFFECTS

INHALATION:	No adverse health effects expected from inhalation. (May be a mechanical irritant.)
INGESTION:	Large doses of the lower molecular weight products may cause gastro-intestinal upset.
SKIN CONTACT:	No adverse effects expected.
EYE CONTACT:	No adverse effects expected.
CHRONIC EXPOSURE:	No information found.
AGGRAVATION OF PRE-EXISTING CONDITIONS:	Damaged skin.

SECTION 4: FIRST AID MEASURES

INHALATION:	Not expected to require first aid measures.
INGESTION:	If large amounts were swallowed, give water to drink and get medical advice.
SKIN CONTACT:	In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Get medical attention if irritation develops or persists.
EYE CONTACT:	In case of contact, flush eyes with plenty of water for at least 15 minutes. Get medical advice if irritation develops.

SECTION 5: FIRE FIGHTING MEASURES

FIRE:	As with most organic solids, fire is possible at elevated temperatures or by contact with an ignition source. Flash point: 182- 287 ℃.
EXPOSION:	Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.
FIRE EXTINGUISHING MEDIA:	Water spray, dry chemical, alcohol foam, or carbon dioxide.

SPECIAL INFORMATION:	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.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in section 8.

Solid 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.

Liquid Spills: Absorb with vermiculite, dry sand, earth or similar material and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer.

SECTION 7: HANDLING AND STORAGE

Keep in a tightly closed container filled with nitrogen or argon, stored in a cool, dry, ventilated area. Store at -20℃ for long time storage. Protect against physical damage. When sample is withdrawn, product should be warmed up slowly to room temperature and then opened to avoid moisture. After sample is withdrawn, the bottle containing the product should be filled again with nitrogen or argon. Product should always be kept away from light.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

AIRBORNE EXPOSURE LIMITS:
AIHA Workplace Environmental Exposure Level (WEEL): Polypropylene glycols: 8-hour TWA: 10 mg/m3, as an aerosol

VENTILATION SYSTEM:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. 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 use with solids (not required for liquids): If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece particulate respirator (NIOSH type N100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. 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-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

SKIN PROTECTION:	Wear protective gloves and clean body-covering clothing.
EYE PROTECTION:	Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	White solid / powder.
ODOR:	Mild odor.
SOLUBILITY:	Soluble in water.
DENSITY:	Range: 1.0 to 1.2
pH:	No information found.
% VOLATILES BY VOLUME @ 21C (70F):	No information found.
BOILING POINT:	No information found.
MELTING POINT:	60-63°C
VAPOR DENSITY (AIR=1):	No information found.

VAPOR PRESSURE (MM HG): Very low
EVAPORATION RATE (BUAC=1): No information found.

SECTION 10: STABILITY AND REACTIVITY

STABILITY: Stable under ordinary conditions of use and storage.
HAZARDOUS DECOMPOSITION PRODUCTS:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
HAZARDOUS POLYMERIZATION: Will not occur.
INCOMPATIBILITIES: Incompatible with polymerization catalysts (peroxides, persulfates) and accelerators, strong oxidizers, strong bases and strong acids.
CONDITIONS TO AVOID: Incompatibles.

SECTION 11: TOXICOLOGICAL INFORMATION

Oral Rat LD50 for:
PEG 200 = 28gm/kg; PEG 300 = 27.5gm/kg; PEG 400 = 30.2gm/kg; PEG 600 = 30gm/kg; PEG 1000 = 32gm/kg; PEG 1450 = > 4gm/kg; PEG 4000 = 50gm/kg; PEG 6000 = > 50gm/kg; PEG 20000 = 31.6gm/kg
Polyethylene glycol has been investigated as a mutagen; PEG 1000 has been investigated as a tumorigen.

Cancer Lists

Ingredient	NTP Carcinogen Known	Anticipated	IARC Category
Polyethylene Glycol (25322-68-3)	No	No	None

SECTION 12: ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE: No information found.
ENVIRONMENTAL TOXICITY: No information found.

SECTION 13: 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 14: TRANSPORT INFORMATION

Not regulated.

SECTION 15: REGULATORY INFORMATION

Chemical Inventory Status - Part 1

Ingredient	TSCA	EC	Japan	Australia
Polyethylene Glycol (25322-68-3)	No	No	Yes	Yes

Chemical Inventory Status - Part 2

Ingredient	Canada Korea	DSL	NDSL	Phil.
Polyethylene Glycol (25322-68-3)	Yes	Yes	No	Yes

Federal, State & International Regulations - Part 1

	SARA 302		SARA 313	
Ingredient	RQ	TPQ	List	Chemical Catg.
Polyethylene Glycol (25322-68-3)	No	No	No	No

Federal, State & International Regulations - Part 2

Ingredient	CERCLA	RCRA 261.33	TSCA 8(d)
Polyethylene Glycol (25322-68-3)	No	No	No

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

AUSTRALIAN HAZCHEM CODE: None allocated.
POISON SCHEDULE: None allocated.
WHMIS: This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

SECTION 16: OTHER INFORMATION

NFPA RATINGS:	Health: 0 Flammability: 1 Reactivity: 0
LABEL HAZARD WARNING:	As part of good industrial and personal hygiene and safety procedure, avoid all unnecessary exposure to the chemical substance and ensure prompt removal from skin, eyes and clothing.
LABEL PRECAUTIONS:	None.
LABEL FIRST AID:	Not applicable.
PRODUCT USE:	Laboratory Reagent.

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