

Standard Operating Procedure

Epoxy Resin

Laboratory Safety Manual and Chemical Hygiene Plan.

Department:	Mechanical Engineering
Date SOP was written:	11/4/2015
Date SOP was approved by PI/lab supervisor:	11/5/2015
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Location(s) covered by this SOP:	Olin 413, Olin 515

Type of SOP: ☐ Process ☒ Hazardous Chemical ☐ Hazardous Class

Purpose

Epoxy is a term used to denote both the basic components and the cured end products of epoxy resins, as well as a colloquial name for the epoxidefunctional group. Epoxy resins, also known as polyepoxides are a class of reactive prepolymers and polymers which contain epoxide groups. Epoxy resins may be reacted (cross-linked) either with themselves through catalytic homopolymerisation, or with a wide range of co-reactants including polyfunctional amines, acids (and acid anhydrides), phenols, alcohols and thiols. These co-reactants are often referred to as hardeners or curatives, and the cross-linking reaction is commonly referred to as curing. Reaction of polyepoxides with themselves or with polyfunctional hardeners forms a thermosetting polymer, often with high mechanical properties, temperature and chemical resistance. Epoxy has a wide range of applications, including metal coatings, use in electronics / electrical components, high tension electrical insulators, fiber-reinforced plastic materials and structural adhesives.

Physical & Chemical Properties/Definition of Chemical Group

PHYSICAL STATE: LIQUID

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ODOR: BLAND

COLOR: AMBER

pH: NEUTRAL

SP. GR: 1.14

DENSITY: 9.5 lbs. / gal.

VAPOR PRESSURE: NEGLIGIBLE

Potential Hazards/Toxicity

Hazard statements

Causes serious eye irritation. May be harmful if swallowed. Causes skin irritation. May cause an allergic skin reaction. Toxic to aquatic life with long lasting effects.

Precautionary statements : Do not handle until all safety precautions have been read/understood. Avoid breathing dust/fume/gas/mist/vapours/spray. Do not eat, drink or smoke when using this product. Use personal protective equipment as required. In case of inadequate ventilation wear respiratory protection. Avoid release to the environment.

NO.	CANCER	REPRO-TOX	TARGET ORGANS	ACGIH/TLV	OSHA/PEL
P	NO	NO	UNKNOWN	N.A.mg/M ³	N.A.mg/M ³
2	NO	NO	UNKNOWN	N.A.mg/M ³	N.A.mg/M ³

NOTE: CONTAINS MATERIAL(S) REGULATED AS DUST HAZARDS, DISPERSED IN A NON-HAZARDOUS FORM. IF DUST IS RECREATED, APPROPRIATE RESPIRATORY AND/OR EXPLOSION PRECAUTIONS MUST STILL BE USED.

Personal Protective Equipment (PPE)

- **RESPIRATORY PROTECTION:** NOT NORMALLY NECESSARY UNLESS THE MATERIAL IS BEING USED IN SUCH A WAY AS TO PRODUCE DUST, MIST, VAPOR, FUMES, OR SMOKE, IN WHICH CASE NIOSH APPROVED RESPIRATORY PROTECTION SHOULD BE USED.
- **VENTILATION:** SHOULD BE SUFFICIENT TO CONTROL ANY DUST, MIST, VAPOR OR FUMES PRODUCED BY PROCESSING OR HANDLING METHOD. BREATHING OF VAPOR MUST BE AVOIDED.
- **HAND PROTECTION:** IMPERVIOUS GLOVES, NEOPRENE OR NITRILE RUBBER GLOVES.
- **EYE PROTECTION:** SPLASH PROOF GOGGLES OR SAFETY GLASSES WITH SIDE SHIELDS.
- **OTHER PROTECTIVE EQUIPMENT:** CLEAN, BODY COVERING CLOTHING AND FOOTWEAR.

First Aid Procedures

EMERGENCY AND FIRST AID PROCEDURES:

- **EYES:** IMMEDIATELY FLUSH EYES WITH LARGE AMOUNTS OF WATER FOR 15 MINUTES. GET MEDICAL ATTENTION.
- **SKIN:** WASH AFFECTED AREA IMMEDIATELY WITH LARGE AMOUNTS OF SOAP AND WATER. REMOVE AND WASH CONTAMINATED CLOTHING BEFORE REUSE. CONTACT A PHYSICIAN IF IRRITATION OCCURS.
- **INHALATION:** REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GET MEDICAL ATTENTION.
- **INGESTION:** DO NOT INDUCE VOMITING. GIVE LARGE QUANTITIES OF WATER. CALL A PHYSICIAN IMMEDIATELY. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

Potential Health Effects

EFFECTS OF OVEREXPOSURE:

ACUTE:

- **EYES:** PRODUCT IS MODERATELY IRRITATING TO THE EYES.
- **SKIN:** PRODUCT IS MODERATELY IRRITATING TO THE SKIN AND MAY CAUSE SKIN SENSITIZATION.
- **INHALATION:** BECAUSE OF ITS LOW VOLATILITY THIS PRODUCT IS NOT LIKELY TO BE AN INHALATION HAZARD.
- **INGESTION:** PRODUCT IS CONSIDERED TO HAVE A LOW ORDER OF ACUTE ORAL TOXICITY.

CHRONIC:

- NO SPECIFIC HAZARDS KNOWN. PREEXISTING EYE, SKIN, OR LUNG DISORDERS MAY BE AGGRAVATED BY EXPOSURE TO THIS PRODUCT.

Special Handling and Storage Requirements

- AVOID SKIN AND EYE CONTACT.
- AVOID BREATHING VAPOR, MIST OR FUMES.
- ENSURE THAT ALL CONTAINERS ARE PROPERLY LABELED TO PREVENT ACCIDENTAL INGESTION OR IMPROPER DISPOSAL.
- RESEAL PARTLY USED CONTAINERS.
- WASH WITH SOAP AND WATER BEFORE EATING, DRINKING OR USING TOILET FACILITIES.
- STORE UNDER COOL, DRY CONDITIONS AND AWAY FROM OPEN FLAMES AND HIGH TEMPERATURES.
- OBSERVE CONDITIONS OF GOOD INDUSTRIAL HYGIENE AND SAFE WORKING PRACTICE.

Spill and Accident Procedure

- IF MATERIAL IS SPILLED: AVOID CONTACT WITH MATERIAL. PERSONS NOT WEARING PROPER PROTECTIVE EQUIPMENT (SEE BELOW) SHOULD BE EXCLUDED FROM THE AREA UNTIL CLEAN UP IS COMPLETE. DIKE AREA TO

PREVENT SPILL SPREADING AND SCOOP UP EXCESS TO RECOVERY CONTAINERS. ABSORB REMNANT ON NONCOMBUSTIBLE MATERIAL SUCH AS CLAY AND SHOVEL INTO CONTAINERS FOR DISPOSAL.

- **WASTE DISPOSAL METHOD:** DISPOSE OF ANY WASTE(S) GENERATED ABOVE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS.

Medical Emergency Dial 911

Decontamination/Waste Disposal Procedure

Waste disposal methods: Dispose of in accordance with all applicable local, state and federal regulations. Do not discharge effluent containing this product into lakes, streams, ponds or estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit, and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA. Dispose of in accordance with all applicable local, state and federal regulations.

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Procedure/Use	Scale	Engineering Controls/Equipment	PPE (eye, face, gloves, clothes)	Procedure Steps and Precautions
1. General Bonding	Use no more epoxy resin than is needed for the application	<p>Work with polyester resin should never be performed alone.</p> <p>Eliminate ignition sources such as open flames, hot surfaces, steam baths, static electricity, and operation of mechanical and electrical equipment that is not intrinsically safe.</p> <p>Fumes are dangerous. Work in a well-ventilated lab and keep the fume hood on.</p> <p>Use Brushes and Popsicle sticks for application and stirring</p>	<p>Eye protection: Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses.</p> <p>Gloves: Nitrile gloves</p> <p>Clothing: Close toes shoes and no exposed skin below waist</p>	<ol style="list-style-type: none"> 1. Ensure PPE and ventilation 2. Carefully weigh desired amount of epoxy resin in clean glass or non-reactive measuring cup <p>Avoid contact with skin and inhalation of fumes</p> <ol style="list-style-type: none"> 3. weight desired amount of hardener for application 4. Mix resin and hardener 5. Apply to bonding surfaces. 6. Dispose in compliance with above disposal section.

Documentation of Training (signature of all users is required)

- Prior to conducting any work with polyester resin, designated personnel must provide training to his/her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.
- The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and a copy of the SDS provided by the manufacturer.
- The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training within the last one year.

I have read and understand the content of this SOP:

Name	Signature	Identification	Date
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