



MATERIAL SAFETY DATA SHEET

PRODUCT NAME: TYFO TC
MSDS NUMBER: TC-A-02

COMPONENT A
DATE: February 11, 2014

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SUPERSEDES: 4/06/10

SECTION I: MATERIAL AND MANUFACTURER IDENTIFICATION

MANUFACTURER:
FYFE CO., LLC
8380 Miralani Drive
San Diego, CA 92126

EMERGENCY TELEPHONE NUMBER:
800-424-9300 or 703-527-3887

INFORMATION TELEPHONE NUMBER:
858-642-0694

PRODUCTION IDENTIFICATION NUMBER: TYFO® TC, Component A

CHEMICAL FAMILY: Filler Epoxy Resin

SECTION II: INGREDIENTS

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200).

MATERIAL OR COMPONENT	CAS NUMBER	% BY WEIGHT	OSHA(PEL)	ACGIH(TLV)
PROPRIETARY RESIN	Proprietary	94-99	Not Determined	Not Determined
PROPRIETARY FILLER	Proprietary	1-6	15 mg/m ³ (Total) 5 mg/m ³ (Respirable)	10 mg/m ³ (Total) 3 mg/m ³ (Respirable)

THE EXPOSURE LIMITS EXPRESSED ARE FOR EACH INDIVIDUAL MATERIAL OR COMPONENT AND NOT FOR THE TOTAL PRODUCT.

SECTION III: HAZARD IDENTIFICATION

EMERGENCY OVERVIEW:

APPEARANCE AND ODOR:

Amber colored, viscous liquid with slight odor.

STATEMENTS OF HAZARD:

CAUTION! MAY CAUSE SKIN AND EYE IRRITATION AND SKIN SENSITIZATION.
CONTACT AT ELEVATED TEMPERATURES CAN RESULT IN THERMAL BURNS.

PRIMARY ROUTES OF EXPOSURE:

EYES--YES SKIN CONTACT--YES INHALATION--NO INGESTION--NO

HMIS RATING:

HEALTH--2 FLAMMABILITY--1 REACTIVITY--0 SPECIAL--NONE

POTENTIAL HEALTH EFFECTS:

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EYE CONTACT: May cause eye irritation. Corneal injury is unlikely

SKIN CONTACT: Prolonged contact may cause skin irritation with local redness. Repeated contact may cause skin irritation with local redness.

SKIN ABSORPTION: Prolonged skin contact is unlikely to result in absorption of harmful amounts.

SKIN SENSITIZATION: Has caused allergic skin reactions in humans. Contains component(s) which have demonstrated the potential for contact allergy in mice.

INHALATION: At room temperature, exposure to vapor is minimal due to low volatility. Vapor from heated material, mist or aerosols may cause respiratory irritation.

INGESTION: Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Preexisting conditions such as eye disease, asthma, allergies. Eczema and other lung and skin disorders may be aggravated by exposure to the product.

CANCER INFORMATION: Many studies have been conducted to assess the potential carcinogenicity of diglycidyl ether of bisphenol A (DGEBA). Indeed, the most recent review of the available data by the International Agency for Research on Cancer (IARC) has concluded that DGEBA is not classified as a carcinogen. Although some weak evidence of carcinogenicity has been reported in animals, when all of the data are considered, the weight of evidence does not show that DGEBA is carcinogenic.

OTHER: Dust from machining the cured product may cause mechanical irritation of eyes, skin, nose, throat and upper respiratory tract.

EXPOSURE LIMITS FOR CURED PRODUCT DUST:	OSHA(PEL)	ACGIH(TLV)
		15 mg/m ³ (Total)
	5 mg/ m ³ (Respirable)	3 mg/ m ³ (Respirable)

SECTION IV: FIRST AID MEASURES

EYES: In case of eye contact, immediately flush eyes with large amounts of water for at least 15 minutes, keeping the eyelids open. Seek medical attention.

SKIN CONTACT: In case of contact, immediately wash skin with soap and plenty of water. Wash contaminated clothing before re-use and destroy contaminated shoes.

INHALATION: If inhaled, remove to fresh air, If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, qualified personnel may administer oxygen. Seek medical attention.

INGESTION: Ingestion of this material is unlikely. If swallowed, get medical attention immediately. Do not induce vomiting.

GENERAL: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), no additional symptoms and effects are anticipated.

INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED

No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

SECTION V: FIRE FIGHTING MEASURES

FLASH POINT/METHOD OF DETERMINATION: Not determined

MEANS OF EXTINCTION: Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective. Water fog, applied gently may be used as a blanket for fire extinguishment.

EXTINGUISHING MEDIA TO AVOID: Do not use direct water stream. May spread fire.

SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE

HAZARDOUS COMBUSTION PRODUCTS: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Phenolics. Carbon monoxide. Carbon dioxide.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Dense smoke is emitted when burned without sufficient oxygen.

ADVICE FOR FIREFIGHTERS

FIRE FIGHTING PROCEDURES: Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of re-ignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container.

Do not use direct water stream. May spread fire. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Water fog, applied gently may be used as a blanket for fire extinguishment. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the "Accidental Release Measures" and the "Ecological Information" sections of this MSDS.

SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective firefighting clothing (includes firefighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during firefighting operations. If contact is likely, change to full chemical resistant firefighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

SECTION VI: ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Refer to Section 7, Handling, for additional precautionary measures.

ENVIRONMENTAL PRECAUTIONS: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP: Contain spilled material if possible. Absorb with materials such as: Sand. Polypropylene fiber products. Polyethylene fiber products. Remove residual with soap and hot water. Collect in suitable and properly labeled containers. Residual can be removed with solvent. Solvents are not recommended for clean-up unless the recommended exposure guidelines and safe handling practices for the specific solvent are followed. Consult appropriate solvent Safety Data Sheet for handling information and exposure guidelines. See Section 13, Disposal Considerations, for additional information.

SECTION VII: HANDLING AND STORAGE

General Handling: Avoid prolonged or repeated contact with skin. Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Avoid use of electric band heaters. Failures of electric band heaters have been reported to cause drums of liquid epoxy resin to explode and catch fire. Application of a direct flame to a container of liquid epoxy resin can also cause explosion and/or fire.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Store in a cool, dry place with adequate ventilation (35F – 109F). Store in closed containers. Keep sealed from dirt and moisture. Keep away from open flames and high temperatures.

SECTION VIII: EXPOSURE CONTROLS/PERSONAL PROTECTION

EYE/FACE PROTECTION: Use safety glasses (with side shields).

SKIN PROTECTION: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

HAND PROTECTION: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Butyl rubber. Ethyl vinyl alcohol laminate ("EVAL"). Nitrile/butadiene rubber ("nitrile" or "NBR"). Neoprene. Polyvinyl chloride ("PVC" or "vinyl"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

RESPIRATORY PROTECTION: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. For most conditions, no respiratory protection should be needed; however, if material is heated or sprayed, use an approved air-purifying respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

INGESTION: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

ENGINEERING CONTROLS

VENTILATION: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations.

SECTION IX: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR	Amber colored, viscous liquid with slight odor
BOILING POINT (°F/°C)	Not determined
MELTING POINT (°F/°C)	Not determined
SPECIFIC GRAVITY (WATER=1)	Not determined
pH OF UNDILUTED PRODUCT	Not determined
VAPOR PRESSURE (MM Hg.)	Not determined
VAPOR DENSITY (AIR-1)	Not determined
VISCOSITY	Not determined
PERCENT (%) VOC	0.0%; Tested per ASTM D2369-95 with TYFO® TC, Component A and Component B mixed together.
SOLUBILITY IN WATER	Not determined

SECTION X: STABILITY AND REACTIVITY

STABILITY: Stable under normal handling and storage conditions.

INCOMPATIBLE MATERIALS: Avoid contact with strong oxidizing agents, strong Lewis or mineral acids and strong mineral and organic bases especially primary and secondary aliphatic amines.

POSSIBILITY OF HAZARDOUS REACTIONS: Polymerization will not occur by itself. Masses of more than one pound (0.5 kg) of product plus an aliphatic amine will cause irreversible polymerization with heat build-up.

CONDITIONS TO AVOID: Avoid short term exposures to temperatures above 300 °C (572 °F). Avoid prolonged exposure to temperatures above 250 °C (482 °F). Potentially violent decomposition can occur above 350 °C (662 °F). Generation of gas during decomposition can cause pressure in closed systems. Pressure build-up can be rapid.

INCOMPATIBLE MATERIALS: Avoid contact with oxidizing materials. Avoid contact with: Acids. Bases. Avoid unintended contact with amines.

HAZARDOUS DECOMPOSITION PRODUCTS: Decomposition products depend upon temperature, air supply and the presence of other materials. Gases are released during decomposition. Uncontrolled exothermic reaction of epoxy resins release phenolics, carbon monoxide, and water.

SECTION XI: TOXICOLOGICAL INFORMATION

MATERIAL OR COMPONENT TOXICITY DATA:

MEDIAN LETHAL DOSE (SPECIES):

ORAL (LD ₅₀)	Proprietary epoxy resin	>5,000 mg/kg (Rat)
	Proprietary filler	>5,000 mg/kg (Rat)
INHALATION (LD ₅₀)	Proprietary epoxy resin	No deaths in saturated Air, 8 hours
	Proprietary filler	Mechanical nuisance dust irritation
DERMAL (LD ₅₀)	Proprietary epoxy resin	>6,000 mg/kg (Rabbit)

IRRITATION INDEX, ESTIMATION OF IRRITATION (SPECIES):

SKIN	Proprietary epoxy resin	Moderate irritation
	Proprietary filler	Mechanical nuisance dust irritation
EYES	Proprietary epoxy resin	Slight irritation
	Proprietary filler	Mechanical nuisance dust irritation
SENSITIZATION	Proprietary epoxy resin	Possible sensitization

OTHER:

Repeated Doses Toxicity

Except for skin sensitization, repeated exposures to low molecular weight epoxy resins of this type are not anticipated to cause any significant adverse effects.

Chronic Toxicity and Carcinogenicity

Many studies have been conducted to assess the potential carcinogenicity of diglycidyl ether of bisphenol A (DGEbPA). Indeed, the most recent review of the available data by the International Agency for Research on Cancer (IARC) has concluded that DGEbPA is not classified as a carcinogen. Although some weak evidence of carcinogenicity has been reported in animals, when all of the data are considered, the weight of evidence does not show that DGEbPA is carcinogenic.

Developmental Toxicity

Resins based on the diglycidyl ether of bisphenol A (DGEbPA) did not cause birth defects or other adverse effects on the fetus when pregnant rabbits were exposed by skin contact, the most likely route of exposure, or when pregnant rats or rabbits were exposed orally.

Reproductive Toxicity

In animal studies, did not interfere with reproduction.

Genetic Toxicology

In vitro genetic toxicity studies were negative in some cases and positive in other cases. Animal genetic toxicity studies were negative.

SECTION XII: ECOLOGICAL INFORMATION**Toxicity**

Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

LC50, *Oncorhynchus mykiss* (rainbow trout), semi-static test, 96 h: 2 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, *Daphnia magna* (Water flea), static test, 48 h, immobilization: 1.8 mg/l

Aquatic Plant Toxicity

ErC50, *Scenedesmus capricornutum* (fresh water algae), static test, Growth rate inhibition, 72 h: 11 mg/l

Toxicity to Micro-organisms

IC50; Bacteria, 18 h: > 42.6 mg/l

Aquatic Invertebrates Chronic Toxicity Value

Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, NOEC: 0.3 mg/l

Persistence and Degradability

Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions.

Bioaccumulative potential

Bioaccumulation: Bioconcentration potential is moderate

SECTION XIII: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHODS: Material for disposal should be placed in appropriate sealed containers to avoid potential human and environmental exposure. It is the responsibility of the generator to comply with all federal, state, provincial and local laws and regulations. We recommend that you contact an appropriate waste disposal contractor and environmental agency for relevant laws and regulations. Under the US, Resource Conservation and Recovery Act (RCRA), it is the responsibility of the user of the product to determine at the time of disposal, whether the product meets relevant waste classification and to assure proper disposal.

SECTION XIV: TRANSPORTATION INFORMATION**DOT Non-Bulk**

NOT REGULATED

DOT Bulk

NOT REGULATED

IMDG

Proper Shipping Name: Environmentally hazardous substance, liquid, n.o.s. (Epoxy resin)
Hazard Class: CLASS 9 **ID Number:** UN 3082 **Packing Group:** PG III
EMS Number: F-A,S-F
Marine pollutant.: Yes

ICAO/IATA

Proper Shipping Name: Environmentally hazardous substance, liquid, n.o.s. (Epoxy resin)
Hazard Class: CLASS 9 **ID Number:** UN3082 **Packing Group:** PG III
Cargo Packing Instruction: 964
Passenger Packing Instruction: 964
Additional Information
MARINE POLLUTANT

SECTION XV: REGULATORY INFORMATION**SARA TITLE III:**

SECTION 302/304 EXTREMELY HAZARDOUS SUBSTANCE: None

SECTION 311 HAZARDOUS CATEGORIZATION: Proprietary mixture, Class 1 (Acute)

SECTION 313 TOXIC CHEMICALS: None

CERCLA SECTION 102(a) HAZARDOUS SUBSTANCE:

This product is not listed as a Hazardous Substance in 40 CFR, Part 302.4, but may contain trace amounts of listed substances.

RCRA INFORMATION: Currently, this product is not listed in federal hazardous waste regulations 40 CFR, Part 261.33, paragraphs (e) or (f), i.e. chemical products that are considered hazardous if they become waste. It does not exhibit any of the hazardous characteristics listed in 40 CFR, Part 261, Subpart C. State of local hazardous waste regulations may apply if they are different from the federal regulation. It is the responsibility of the user of the product to determine at the time of disposal, whether the product meets relevant waste classification and to assure proper disposal.

WHMIS (CANADA): CLASSIFICATION: Class D, Division 2, Subdivision B, Toxic

INGREDIENT DISCLOSURE LIST: This product is not listed, but it may contain trace amounts of listed ingredients at below de minimus concentrations (%).

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (PROPOSITION 65):

WARNING! THE STATE OF CALIFORNIA HAS DETERMINED THAT THE FOLLOWING LISTED MATERIAL OR COMPONENT CHEMICALS IN THIS PRODUCT MAY CAUSE CANCER, BIRTH DEFECTS OF OTHER REPRODUCTIVE HARM:

Acrylonitrile (CAS # 107-13-1), known to cause cancer, trace amount
Butadiene (CAS # 106-99-0), known to cause cancer, trace amount
Epichlorohydrin (CAS # 106-89-8), known to cause cancer, trace amount
Phenyl Glycidyl Ether (CAS # 122-60-1), known to cause cancer, trace amount

ALL MATERIALS OF COMPONENTS OF THIS PRODUCT ARE EITHER LISTED OR ARE NOT REQUIRED TO BE LISTED IN THE EPA TSCA INVENTORY.

THIS PRODUCT DOES NOT CONTAIN OR IS NOT MANUFACTURED WITH OZONE DEPLETING SUBSTANCES AS IDENTIFIED IN THE TITLE VI, CLEAN AIR ACT "STRATOSPHERIC OZONE PROTECTION" AND THE REGULATIONS SET FORTH IN 40 CFR, PART 82.

SECTION XVI: OTHER INFORMATION**Hazard Rating System:**

HMIS **Health** 2 **Flammability** 1 **Physical Hazard** 0 **Special** None

SPECIAL PRECAUTIONS: Empty containers will retain some of the product residue. When handling or disposing of them, follow all label warnings, other instructions and waste disposal procedures.

EXPLANATION AND DISCLAIMER: Wherever such words or phrases as "hazardous," "toxic," "carcinogen," etc. appear herein, they are used as defined or described under state employee right-to-know laws, Federal OSHA laws or the direct sources for these laws such as the International Agency for Research on Cancer (ISRC), the National Toxicology Program (NTP), etc. The use of such words or phrases should not be taken to mean that we deem or imply any substance or exposure to be toxic, hazardous or otherwise harmful. ANY EXPOSURE CAN ONLY BE UNDERSTOOD WITHIN THE ENTIRE CONTEXT OF ITS OCCURRENCE, WHICH INCLUDES SUCH FACTORS AS THE SUBSTANCE'S CHARACTERISTICS AS DEFINED IN THE MSDS, AMOUNT AND DURATION OF EXPOSURES, OTHER CHEMICALS PRESENT AND PREEXISTING INDIVIDUAL DIFFERENCES IN RESPONSE TO THE EXPOSURE.

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