



**Section I Product and Company Identification**

<b>Manufacturer</b>	Zyvex Technologies
<b>Address</b>	1255 Kinnear Road, Suite 100, Columbus, Ohio 43212 USA
<b>Telephone</b>	(614) 481-2222
<b>FAX</b>	(614) 481-2260
<b>Emergency</b>	Chemtrec (North America): 800.424.9300 Chemtrec (International): 703.527.3887
<b>Email</b>	cballard@zyvextech.com
<b>Product Name</b>	ZNT-boost (Solid)
<b>Chemical Name</b>	Carbon nanotube functionalized in fully reacted epoxy polymer
<b>Issue Date</b>	March 25, 2014
<b>Recommended Use /Restrictions</b>	For epoxy resin and composite applications.

**Section II Hazards Identification**

<b>Eye</b>	May be mildly irritating to eyes.
<b>Skin</b>	May cause skin sensitization and/or irritation. Contact with hot material can cause thermal burns which may result in permanent damage.
<b>Ingestion</b>	Not likely to be a relevant route of exposure.
<b>Inhalation</b>	Not likely to be a relevant route of exposure; however, under conditions where exposure to vapors or mists is possible, could irritate the respiratory tract.
<b>Classification</b>	 
<b>Environment</b>	Toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment.

**Section III Physical/Chemical Characteristics**

Substance	CAS Number	OSHA Permissible Exposure Limit	Carcinogenicity Classification	~ Wt %
-----------	------------	---------------------------------	--------------------------------	--------

Bisphenol-A/Epichlorohydrin resin	25068-38-6	None established	Not listed	50-60
O-Cresyl Glycidylether	2210-79-9	None established	Not listed	10-20
Carbon Nanotube	Proprietary	Total Dust: 15 mg/m <sup>3</sup> Respirable Fraction: 5 mg/m <sup>3</sup>	Not listed	<4%
Proprietary Ingredient	Proprietary	ACGIH: Not available OSHA: Not available	Not listed	<1%
Bisphenol-A-(epichlorohydrin) ; epoxy resin (number average mol. wt. $\approx$ 700)	25068-38-6	None established	Not listed	<15%
Oxirane, 2,2'-[(2,2-dimethyl-1,3-propanediyl)bis(oxymethylene)]bis-	17557-23-2	None established	Not listed	$\approx$ 5%

#### Section IV First Aid Measures

After Eye Contact	Flush with large amounts of water for at least 15 minutes, lifting the eyelids to separate them. Do not rub eyes or keep them closed. Seek medical assistance immediately.
After Skin Contact	Immediately wash with large amounts of soap and water, remove contaminated clothing, and seek medical assistance if needed. In case of contact with hot product, immediately flood the affected area with cold water. Wipe excess material from exposed area. Flush exposed skin with water and follow by washing with soap if available. Carefully remove clothing; if clothing is stuck to a burn area do not pull it off, but cut around it. Cover burn area with a clean material. Transport to nearest medical facility for additional treatment.
After Swallowing	Do not induce vomiting. Have victim rinse out mouth with water and then drink sips of water to remove taste from mouth. In general, no treatment is necessary unless large quantities of product are ingested. However, get medical advice. Be sure person does not aspirate into lungs. Seek medical assistance immediately.
After Inhalation	Remove to fresh air immediately and give oxygen if breathing is difficult. Get medical assistance. If not breathing, give artificial respiration.

#### Section V Fire-fighting Methods

Suitable extinguishing media	Alcohol resistant foam, CO <sub>2</sub> , powders, water spray.
Unsuitable extinguishing media	Water-jet.
Special protective equipment	Appropriate breathing apparatus may be required.
Special risk posed by the substance or by the actual preparation, its combustion products or gases discharged	Fire will produce dense black smoke. Exposure to decomposition products may cause a health hazard.
Additional information	Cool endangered containers with water in case of fire. Do not allow the quenching water into the sewage system.

#### Section VI Accidental Release Measures

Personal Precautions	Remove ignition sources. Provide for sufficient ventilation. Do not inhale the vapor. Refer to protective measures listed in Section VIII.
----------------------	--

<b>Environmental Precautions</b>	Do not empty into drains. If the product contaminates lakes, rivers or sewages, inform appropriate authorities in accordance with local regulations.
<b>Methods for cleaning-up/collecting</b>	Contain and collect spillage with non-combustible absorbent materials, e.g. sand, earth, vermiculite, diatomaceous earth and place in container for disposal according to local regulations (see Section XIII). Clean preferably with a detergent; avoid use of solvents.

### Section VII Handling and Storage

<b>Information on Safe Handling</b>	Avoid contact with skin and eyes. Do not eat or drink during work - no smoking. Comply with the health and safety at work-laws.
<b>Information about protection against explosions and fires</b>	No particular measures required.
<b>Requirements to be met by storerooms and containers</b>	Containers should be kept dry and sealed. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
<b>Information about separation of incompatible products</b>	Keep away from oxidizing agents, from strongly alkaline and strongly acid materials.
<b>Further information about storage conditions</b>	Always keep in containers of same material as the original one. See also instructions on the label. Avoid heating and direct sunlight.
<b>Storage Class (VCI)</b>	10

### Section VIII Exposure Controls/Personal Protection

<b>Additional information about engineering measures</b>	Avoid contact with skin and eyes. Do not eat or drink during work - no smoking. Comply with the health and safety at work-laws.
<b>Personal Protective Equipment (PPE)</b>	Adequate ventilation should be provided while working with this product. Avoid contact with skin. Protect hands with chemical resistant gloves when handling. Wear lab coat or other protective clothing. Remove and wash contaminated clothing upon exposure. Wear chemical safety goggles and full face shield if splashing is possible.
<b>Chemical Hygiene</b>	Wash hands after handling material to minimize the spread of undetected skin contamination. All applicable laboratory safety guidelines should be followed when using this material.

### Section IX Physical/Chemical Properties

<b>Appearance/Odor</b>	Black viscous liquid with a slight odor.
<b>Odor Threshold</b>	Not available
<b>pH</b>	Not available
<b>Melting point/Freezing point</b>	Not available
<b>Initial boiling point and boiling range</b>	> 149°C (300°F)
<b>Flash point</b>	>93.33°C (>199.99°F)
<b>Evaporation Point</b>	Not available
<b>Flammability (Solid, gas)</b>	Not available
<b>Upper/Lower flammability limits</b>	Not available
<b>Vapor Pressure</b>	0.03 mbar at 77°C (171°F)
<b>Vapor Density</b>	Negligible

Relative Density	Not available
Solubility	Negligible
Partition Coefficient (n-octanol/water)	Not available
Autoignition Temperature	Not available
Decomposition Temperature	Not available

#### Section X Stability and Reactivity Data

Stability	Stable under normal use conditions.
Incompatibility	Can react vigorously with strong oxidizing agents, strong Lewis or mineral acid, and strong mineral and organic bases. Avoid contact with water or liquids. Do not allow molten product to contact water or other liquids. This can cause violent eruptions, splatter hot material, or ignite flammable material.
Decomposition	Reaction with some curing agents may produce considerable heat and possible violent decomposition
Hazardous Polymerization	Will not occur.
Conditions to avoid	Avoid high temperatures. Stable under recommended storage and handling conditions (See Section VII).

#### Section XI Toxicological Information

Toxicity	* Toxicity tests have not been performed on Zyvex Technologies products. Treat with caution. Pre-existing skin or lung allergies increase the chance of allergic reaction to exposure.
Eye	May cause irritation. Carbon nanotube toxicity is not known in humans. CNTs were not toxic to rabbit eye in Draize test. Contact with hot product can cause thermal burns which may result in permanent damage or blindness
Skin	May cause skin sensitization and/or irritation. Contact with hot material can cause thermal burns which may result in permanent damage. Studies on the effects of dermal contact with carbon nanotubes are limited. Carbon nanotubes did not cause enzyme induction, increased DNA synthesis, or hyperplasia in the skin of allergy-susceptible people.
Ingestion	Not likely to be a relevant route of exposure. Toxicity of carbon nanotubes is unknown.
Inhalation	Not likely to be a relevant route of exposure; however, under conditions where exposure to vapors or mists is possible, could irritate the respiratory tract. Toxicity of carbon nanotubes is not known in humans. Carbon nanotubes may cause pulmonary irritation, inflammation, granuloma formation, and/or altered pulmonary function in laboratory animals. Inhaled particles may be transported to other area of the body.
Conditions aggravated by exposure	Product should be treated as a hazard. Existing skin and pulmonary diseases may be aggravated by skin or inhalation exposure to carbon nanotubes.

#### Section XII Ecological Information

Ecotoxicity (aquatic/terrestrial)	Not available
-----------------------------------	---------------

<b>Details on elimination (persistence / degradability)</b>	Not readily biodegradable.
<b>Bioaccumulative potential</b>	Not readily biodegradable.
<b>General Notes</b>	Do not empty into waters or drains. The product is difficult to biologically degrade.

### Section XIII Disposal Considerations

<b>Material Escape or Spills</b>	Shut off leaks, if possible without personal risk. Ventilate area. Prevent additional discharge of material, if possible to do so without hazard. For small spills implement cleanup procedures: Dike and contain. Avoid runoff into waterway and ground penetration. Absorb with inert material (i.e., clay or sand) and place into non-leaking container. Dispose of properly. Flush area with water to remove trace residue. Large spills: Use vacuum trucks or pump to storage vessels. Soak up residue with inert material (i.e., clay or sand) and place into non-leaking container. Dispose of properly. Flush area with water to remove trace residue
<b>Waste Disposal</b>	Cure resin at 200 °F until hard and dispose in accordance with applicable laws.
<b>Handling</b>	Use Personal Protective Equipment (see Section VIII) and proper ventilation.
<b>Storage</b>	Store in cool, dark, dry place with adequate ventilation. Keep away from ignition sources and high temperatures.

### Section XIV Transport Information

<b>DOT Proper Shipping Name</b>	NOT REGULATED FOR TRANSPORT
<b>DOT Hazard Class</b>	NOT REGULATED FOR TRANSPORT
<b>Identification Number</b>	NOT REGULATED FOR TRANSPORT
<b>Packaging Group</b>	NOT REGULATED FOR TRANSPORT

## Section XV Regulatory Information

<b>Occupational Safety and Health Act (OSHA)</b>	<b>This MSDS has been prepared in compliance with the federal OSHA Hazard Communication Standard 29 CFR 1910.1200. This product is considered to be a hazardous chemical under that standard.</b>
<b>Resource Conservation and Recovery Act (RCRA)</b>	<b>This product is not specifically listed as hazardous waste under RCRA (40 CFR 261). However, it is strongly recommended that this product be treated as a hazardous waste and disposed of accordingly.</b>
<b>SARA Title III: Section 313 Toxic Chemical List (TCL)</b>	<b>This product does not contain chemicals at levels which require reporting under this statute.</b>
<b>TSCA Section 8(b)-Inventory Status</b>	<b>Exempt per section 8(a), 710.2(f), and 704.5(a)</b>
<b>TSCA Section 12(b)-Export Notification</b>	<b>Export notification under 12b TSCA is not required due to exempt fully reacted solid polymer form.</b>

## Section XVI Special Precautions

**User acknowledges that Zyvex Technologies (ZT) product is sold solely for research and development, and that he/she will use the product in accordance with all applicable government regulations including, but not limited to those described within. The product will be used in accordance with the appropriate Material Safety Data Sheet (MSDS) and “Prudent Practices for Handling Hazardous Chemicals in Laboratories.”**

**User acknowledges that he/she is familiar with the provision of the TSCA exemption for research and development found in 40 CFR 720.36.**

**User agrees to notify ZT in writing if his/her use of ZT products is for manufacturing as defined in TSCA. User further agrees not to use ZT products in manufacturing unless and until user and ZT have ascertained that the product is listed on the TSCA inventory list or that a Pre Manufacturing Notice (PMN) has been filed and approved by the U.S. EPA.**

**THIS PRODUCT FROM ZYVEX TECHNOLOGIES IS SOLD FOR RESEARCH AND DEVELOPMENT PURPOSES ONLY.**

**This information is provided for in good faith and is believed to be correct. Zyvex Technologies; however, makes no representation as to the comprehensiveness or accuracy of this information. Final determination of the suitability of this product and its safe use is the sole responsibility of the user. Accordingly, Zyvex Technologies will not be responsible for damages of any kind resulting from the use of or reliance upon the provided information.**