

MATERIAL SAFETY DATA SHEET

West System Inc.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:..... G/flex® 655 Epoxy Resin.
PRODUCT CODE:..... 655
CHEMICAL FAMILY:..... Epoxy Resin.
CHEMICAL NAME: Bisphenol A based epoxy resin.
FORMULA: Not applicable.

MANUFACTURER:
West System Inc.
102 Patterson Ave.
Bay City, MI 48706, U.S.A.
Phone: 866-937-8797 or 989-684-7286
www.westsystem.com

EMERGENCY TELEPHONE NUMBERS:
Transportation
CHEMTREC:.....800-424-9300 (U.S.)
703-527-3887 (International)
Non-transportation
Poison Hotline:800-222-1222

2. COMPOSITION/INFORMATION ON HAZARDOUS INGREDIENTS

<u>INGREDIENT NAME</u>	<u>CAS #</u>	<u>CONCENTRATION</u>
Bisphenol-A type epoxy resin	25085-99-8	> 50%
Bisphenol-F type epoxy resin	28064-14-4	< 50%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

HMIS Hazard Rating: **Health - 2** **Flammability - 1** **Reactivity - 0**

CAUTION! May cause allergic skin response in certain individuals. May cause moderate irritation to the skin.
Cloudy-white gel with mild odor.

PRIMARY ROUTE(S) OF ENTRY:..... Skin contact.

POTENTIAL HEALTH EFFECTS:

ACUTE INHALATION: Not likely to cause acute effects unless heated to high temperatures. If product is heated, vapors generated can cause headache, nausea, dizziness and possible respiratory irritation if inhaled in high concentrations.

CHRONIC INHALATION: Not likely to cause chronic effects. Repeated exposure to high vapor concentrations may cause irritation of pre-existing lung allergies and increase the chance of developing allergy symptoms to this product.

ACUTE SKIN CONTACT: May cause allergic skin response in certain individuals. May cause moderate irritation to the skin such as redness and itching.

CHRONIC SKIN CONTACT: May cause sensitization in susceptible individuals. May cause moderate irritation to the skin.

EYE CONTACT: May cause irritation.

INGESTION: Low acute oral toxicity.

SYMPTOMS OF OVEREXPOSURE: Possible sensitization and subsequent allergic reactions usually seen as redness and rashes. Repeated exposure is not likely to cause other adverse health effects.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Pre-existing skin and respiratory disorders may be aggravated by exposure to this product. Pre-existing lung and skin allergies may increase the chance of developing allergic symptoms to this product.

4. FIRST AID MEASURES:

FIRST AID FOR EYES Flush immediately with water for at least 15 minutes. Consult a physician.

FIRST AID FOR SKIN Remove contaminated clothing. Wipe excess from skin. Remove with waterless skin cleaner and then wash with soap and water. Consult a physician if effects occur.

FIRST AID FOR INHALATION Remove to fresh air if effects occur.

FIRST AID FOR INGESTION No adverse health effects expected from amounts ingested under normal conditions of use. Seek medical attention if a significant amount is ingested.

5. FIRE FIGHTING MEASURES:

FLASH POINT: >200°F (Tag Closed Cup)

EXTINGUISHING MEDIA: Foam, carbon dioxide (CO₂), dry chemical.

SPECIAL FIRE FIGHTING PROCEDURES:

Wear a self-contained breathing apparatus and complete full-body personal protective equipment. Closed containers may rupture (due to buildup of pressure) when exposed to extreme heat.

6. ACCIDENTAL RELEASE MEASURES:

SPILL OR LEAK PROCEDURES Soak up in absorbent material or scrape up. Residual can be removed with non-flammable solvent, but solvent should be used sparingly and with appropriate precautions.

7. HANDLING AND STORAGE:

STORAGE TEMPERATURE (min./max.): 40°F (4°C) / 120°F (49°C)

STORAGE: Store in cool, dry place. Store in tightly sealed containers to prevent moisture absorption and loss of volatiles. Excessive heat over long periods of time will degrade the resin.

HANDLING PRECAUTIONS: Avoid prolonged or repeated skin contact. Wash thoroughly after handling. Launder contaminated clothing before reuse. Avoid inhalation of vapors from heated product. Precautionary steps should be taken when curing product in large quantities. When mixed with epoxy curing agents this product causes an exothermic, which in large masses, can produce enough heat to damage or ignite surrounding materials and emit fumes and vapors that vary widely in composition and toxicity.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

EYE PROTECTION GUIDELINES: Safety glasses with side shields or chemical splash goggles.

SKIN PROTECTION GUIDELINES:..... Wear liquid-proof, chemical resistant gloves (nitrile-butyl rubber, neoprene, butyl rubber or natural rubber) and full body-covering clothing.

RESPIRATORY/VENTILATION GUIDELINES:

Good room ventilation is usually adequate for most operations. Wear a NIOSH/MSHA approved respirator with an organic vapor cartridge whenever exposure to vapor in concentrations above applicable limits is likely.

ADDITIONAL PROTECTIVE MEASURES: Practice good caution and personal cleanliness to avoid skin and eye contact. Avoid skin contact when removing gloves and other protective equipment. Wash thoroughly after handling.

OCCUPATIONAL EXPOSURE LIMITS: Not established for product as whole. Refer to OSHA's Permissible Exposure Level (PEL) or the ACGIH Guidelines for information on specific ingredients.

9. PHYSICAL AND CHEMICAL PROPERTIES:

PHYSICAL FORM: Gel.

COLOR: Cloudy-white.

ODOR: Mild.

BOILING POINT: > 400°F.

MELTING POINT/FREEZE POINT: No data.

VISCOSITY: 336,000 cP.

pH: No data.

SOLUBILITY IN WATER:..... Slight.

SPECIFIC GRAVITY: 1.18

BULK DENSITY: 9.9 pounds/gallon.

VAPOR PRESSURE: < 1 mmHg @ 20°C.

VAPOR DENSITY:..... Heavier than air.

% VOLATILE BY WEIGHT:..... EPA Method 24, as described in 40 CFR Part 60, was used to determine the Volatile Matter Content of mixed epoxy resin and hardener. This method states that two-component coating systems should be tested by mixing the individual components together at the proper ratio. Refer to the hardener's MSDS for information about the total volatile content of the resin/hardener system.

10. REACTIVITY:

STABILITY: Stable.

HAZARDOUS POLYMERIZATION:..... Will not occur by itself, but a mass of more than one pound of product plus an aliphatic amine will cause irreversible polymerization with significant heat buildup.

INCOMPATIBILITIES: Strong acids, bases, amines and mercaptans can cause polymerization.

DECOMPOSITION PRODUCTS: Carbon monoxide and carbon dioxide fumes may be produced when heated to decomposition.

11. TOXICOLOGICAL INFORMATION:

No specific oral, inhalation or dermal toxicology data is known for this product. Specific toxicology information for a bisphenol-A based epoxy resin present in this product is indicated below:

Oral:..... LD₅₀ >5000 mg/kg (rats)

Inhalation:..... No Data.

Dermal:..... LD₅₀ = 20,000 mg/kg (skin absorption in rabbits)

TERATOLOGY:.....Diglycidyl ether 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.

Ethylene glycol monobutyl ether (present at < 0.3 %) causes harm to the fetus in laboratory animal studies. Harm to the fetus occurs at exposure levels that harm the pregnant animal. The relevance of these findings to humans is uncertain.

REPRODUCTIVE EFFECTS:DGEBPA, in animal studies, has been shown not to interfere with reproduction.

MUTAGENICITY: DGEBPA in animal mutagenicity studies were negative. In vitro mutagenicity tests were negative in some cases and positive in others.

CARCINOGENICITY:

NTP..... Product not listed.

IARC Product not listed.

OSHA..... Product not listed.

Many studies have been conducted to assess the potential carcinogenicity of diglycidyl ether of bisphenol-A. 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. 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.

Epichlorohydrin, an impurity in this product (<5 ppm) has been reported to produce cancer in laboratory animals and to produce mutagenic changes in bacteria and cultured human cells. It has been established by the International Agency for Research on Cancer (IARC) as a probable human carcinogen (Group 2A) based on the following conclusions: human evidence – inadequate; animal evidence – sufficient. It has been classified as an anticipated human carcinogen by the National Toxicology Program (NTP).

12. ECOLOGICAL INFORMATION:

Prevent entry into sewers and natural waters. May cause localized fish kill.

Movement and Partitioning:

Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Kow between 3 and 5).

Degradation and Transformation:

Theoretical oxygen demand is calculated to be 2.35 p/p. 20-day biochemical oxygen demand is <2.5%.

Ecotoxicology:

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

13. DISPOSAL CONSIDERATIONS:

WASTE DISPOSAL METHOD:..... Evaluation of this product using RCRA criteria shows that it is not a hazardous waste, either by listing or characteristics, in its purchased form. It is the responsibility of the user to determine proper disposal methods.

Incinerate, recycle (fuel blending) or reclaim may be preferred methods when conducted in accordance with federal, state and local regulations.

14. TRANSPORTATION INFORMATION:

D.O.T. SHIPPING NAME:..... Not regulated by DOT.
TECHNICAL SHIPPING NAME: Not applicable.
D.O.T. HAZARD CLASS: Not applicable.
U.N./N.A. NUMBER: Not applicable.
PACKING GROUP: Not applicable.

15. REGULATORY INFORMATION:

OSHA STATUS: Slight irritant; possible sensitizer.
TSCA STATUS: All components are listed on TSCA inventory.
SARA TITLE III:
SECTION 313 TOXIC CHEMICALS None (de minimus).

STATE REGULATORY INFORMATION:

The following chemicals are specifically listed or otherwise regulated by individual states. For details on your regulatory requirements you should contact the appropriate agency in your state.

<u>COMPONENT NAME</u> <u>/CAS NUMBER</u>	<u>CONCENTRATION</u>	<u>STATE CODE</u>
Epichlorohydrin 106-89-8	< 5ppm	¹ CA
Phenyl glycidyl ether 122-60-1	<5ppm	¹ CA

¹. These substances are known to the state of California to cause cancer or reproductive harm, or both.

16. OTHER INFORMATION:

REASON FOR ISSUE: New product.
PREPARED BY: G. M. House
APPROVED BY: G. M. House
TITLE: Health, Safety & Environmental Manager
APPROVAL DATE: April 26, 2007
SUPERSEDES DATE: NA
MSDS NUMBER: 655A-07a

Note: The Hazardous Material Indexing System (HMIS), cited in the Emergency Overview of Section 3, uses the following index to assess hazard rating: 0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; and 4 = Severe.

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of West System Inc. The data on this sheet is related only to the specific material designated herein. West System Inc. assumes no legal responsibility for use or reliance upon these data.

MATERIAL SAFETY DATA SHEET

West System Inc.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:..... G/flex® 655 Epoxy Hardener
PRODUCT CODE:..... 655
CHEMICAL FAMILY:..... Amine.
CHEMICAL NAME: Modified polyamine.
FORMULA: Not applicable.

MANUFACTURER:
West System Inc.
102 Patterson Ave.
Bay City, MI 48706, U.S.A.
Phone: 866-937-8797 or 989-684-7286
www.westsystem.com

EMERGENCY TELEPHONE NUMBERS:
Transportation
CHEMTREC:.....800-424-9300 (U.S.)
703-527-3887 (International)
Non-transportation
Poison Hotline: 800-222-1222

2. COMPOSITION/INFORMATION ON HAZARDOUS INGREDIENTS

<u>INGREDIENT NAME</u>	<u>CAS #</u>	<u>CONCENTRATION</u>
Amine terminated copolymer	68683-29-4	< 50%
Phenalkamine	868765-93-9	< 25%
2-hydroxyethyl ethers	232268-65-4	< 15%
Trade Secret		< 10%
Triethylenetetramine (TETA)	112-24-3	< 5%
Tris-2,4,6-(dimethylaminomethyl)phenol	90-72-2	< 5%
Aminoethylpiperazine	140-31-8	< 3%
1,3-benzenedimethanamine	1477-55-0	< 3%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

HMIS Hazard Rating: **Health - 2** **Flammability - 1** **Reactivity - 0**

WARNING! Irritant. Eye irritant. Skin irritant. Respiratory irritant when heated. May cause skin sensitization. Caramel colored gel with ammonia odor.

PRIMARY ROUTE(S) OF ENTRY:..... Skin contact, inhalation, eye contact.

POTENTIAL HEALTH EFFECTS:

ACUTE INHALATION: Exposure to high concentrations of vapor from heated product can cause irritation to the respiratory tract or lightheadedness.

CHRONIC INHALATION: Can cause respiratory tract irritation or central nervous system symptoms, such as lightheadedness or headaches.

ACUTE SKIN CONTACT: Moderate irritant to skin tissue. Contact may cause skin irritation and possible allergic reaction.

CHRONIC SKIN CONTACT:..... May cause persistent irritation, dermatitis and sensitization.

EYE CONTACT: Moderate to severe irritant to eye tissues. Vapors may cause blurred vision when absorbed into eye tissue.

INGESTION: May cause irritation of the mouth and throat. May pose an aspiration hazard. No additional effects due to ingestion are known.

SYMPTOMS OF OVEREXPOSURE: Persistent skin irritation or dermatitis, sensitization or allergic reaction. Irritation to the respiratory tract, headache, nausea. Redness and irritation of the eye.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Existing skin and respiratory conditions (allergies, dermatitis, asthma, bronchitis).

4. FIRST AID MEASURES:

FIRST AID FOR EYES: Immediately flush with water for at least 15 minutes. Get prompt medical attention.

FIRST AID FOR SKIN: Remove contaminated clothing. Immediately wash skin with waterless hand cleaner.

FIRST AID FOR INHALATION: If symptoms occur as noted in Section 3, remove to fresh air. Get medical attention if symptoms persist or worsen.

FIRST AID FOR INGESTION: Give conscious person at least 2 glasses of water. Do not induce vomiting. If vomiting should occur spontaneously, keep airway clear. Treat symptomatically.

5. FIRE FIGHTING MEASURES:

FLASH POINT: > 300°F.

EXTINGUISHING MEDIA: Water spray, dry chemical, foam and carbon dioxide (CO₂).

FIRE AND EXPLOSION HAZARDS: Burning will generate toxic fumes. Hot vapor or mists may be susceptible to spontaneous combustion when mixed with air. Ignition temperatures decrease with increasing vapor volume and vapor/air contact time and are influenced by pressure changes. Therefore, ignition may occur below published ignition temperatures. Use of this product in processes involving elevated temperatures, vacuum if subject to sudden ingress of air, sudden escape of vapor or mist, etc., must be thoroughly evaluated to assure safe operation.

SPECIAL FIRE FIGHTING PROCEDURES: Use full-body protective gear and a self-contained breathing apparatus. If spill has ignited, use water spray to disperse vapors and protect personnel attempting to stop leak. Use water to cool fire-exposed containers.

6. ACCIDENTAL RELEASE MEASURES:

SPILL OR LEAK PROCEDURES: Stop leak without additional risk. Wear proper personal protective equipment. Dike and contain spill. Ventilate area. Large spill - dike and pump into appropriate container for recovery. Small spill - dilute with water and recover or use inert, non-combustible absorbent material (e.g., sand) and shovel into suitable container. Do not use sawdust, wood chips or other cellulosic materials to absorb the spill, as the possibility for spontaneous combustion exists. Residue from spill area can leave surface slippery. Wash spill residue with warm, soapy water if necessary.

7. HANDLING AND STORAGE:

STORAGE TEMPERATURE (min./max.): 40°F (4°C) / 90°F (32°C).

STORAGE: Minimum feasible handling temperatures should be maintained. If stored above 100°F, nitrogen atmosphere is recommended. Keep containers tightly closed.

HANDLING PRECAUTIONS:..... Use only with adequate ventilation. Do not breath vapors or mists from heated material. Avoid contact with skin and eyes. Wash thoroughly after handling. When mixed with epoxy resin this product causes an exothermic reaction, which in large masses, can produce enough heat to damage or ignite surrounding materials and emit fumes and vapors that vary widely in composition and toxicity.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

EYE PROTECTION REQUIREMENTS: A minimum of safety glasses with side shields or chemical splash goggles.

SKIN PROTECTION GUIDELINES:..... Wear liquid-proof, chemical resistant gloves (nitrile-butyl rubber, neoprene, butyl rubber or natural rubber) and full body-covering clothing.

RESPIRATORY/VENTILATION REQUIREMENTS:

General mechanical or local exhaust ventilation. In the absence of adequate ventilation controls, use a NIOSH approved air purifying respirator with an organic vapor cartridge.

ADDITIONAL PROTECTIVE MEASURES: Provide proper wash/cleanup facilities for proper hygiene.

OCCUPATIONAL EXPOSURE LIMITS: Not established for product as whole. Refer to OSHA's Permissible Exposure Level (PEL) or the ACGIH Guidelines for information on specific ingredients.

9. PHYSICAL AND CHEMICAL PROPERTIES:

PHYSICAL FORM Gel.

COLOR Amber.

ODOR..... Slight amine.

BOILING POINT > 480°F.

MELTING POINT/FREEZE POINT..... No data.

pH..... No data.

SOLUBILITY IN WATER Appreciable.

SPECIFIC GRAVITY..... 0.99.

BULK DENSITY 8.31 pounds/gallon.

VAPOR PRESSURE..... < 1 mmHg @ 20°C.

VAPOR DENSITY Heavier than air.

VISCOSITY 237,000 cP.

% VOLATILE BY WEIGHT..... EPA Method 24, as described in 40 CFR Part 60, was used to determine the Volatile Matter Content of mixed epoxy resin and hardener. This method states that two-component coating systems should be tested by determining weight loss after mixing the individual components together at the proper ratio, dissolving them in an appropriate solvent, and subjecting them to a temperature of 230°F. 655 Resin and 655 Hardener, mixed together at 1.2:1 by weight, has a density of 1080 g/L (9.01 lbs/gal). The combined VOC content for 655 Resin/655 Hardener is 6.6 g/L (0.06 lbs/gal).

10. REACTIVITY:

STABILITY: Stable.

HAZARDOUS POLYMERIZATION:..... Will not occur.

INCOMPATIBILITIES:..... Strong oxidants, acids and reducing agents.

DECOMPOSITION PRODUCTS: Burning will produce toxic fumes.

11. **TOXICOLOGICAL INFORMATION:**

Oral:..... No specific data.

Inhalation:..... No specific data.

Dermal:..... No specific data.

Little, if any, vapor can be produced from this product at room temperature.

CARCINOGENICITY:

NTP..... No.

IARC..... No.

OSHA..... No.

This product contains no known carcinogens in concentrations greater than 0.1%.

12. **ECOLOGICAL INFORMATION:**

Wastes from this product may present long term environmental hazards. Do not allow into sewers, on the ground or in any body of water.

13. **DISPOSAL CONSIDERATIONS:**

WASTE DISPOSAL METHOD:..... Evaluation of this product using RCRA criteria shows that it is not a hazardous waste, either by listing or characteristics, in its purchased form. It is the responsibility of the user to determine proper disposal methods.

Incinerate, recycle (fuel blending) or reclaim may be preferred methods when conducted in accordance with federal, state and local regulations.

14. **TRANSPORTATION INFORMATION:**

D.O.T. SHIPPING NAME:..... Not regulated.

TECHNICAL SHIPPING NAME: Not applicable.

D.O.T. HAZARD CLASS:..... Not applicable.

U.N./N.A. NUMBER:..... Not applicable.

PACKING GROUP:..... Not applicable.

15. **REGULATORY INFORMATION:**

OSHA STATUS: Irritant; sensitizer.

TSCA STATUS:..... All components are listed on TSCA inventory or are in compliance with TSCA regulations.

SARA TITLE III:

SECTION 313 TOXIC CHEMICALS:..... None.

STATE REGULATORY INFORMATION:

The following chemicals are specifically listed or otherwise regulated by individual states. For details on your regulatory requirements you should contact the appropriate agency in your state.

<u>COMPONENT NAME</u>	<u>CONCENTRATION</u>	<u>STATE CODE</u>
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None known.

16. OTHER INFORMATION:

REASON FOR ISSUE: New product.
PREPARED BY: Glenn House
APPROVED BY: Glenn House
TITLE: E,H&S Manager
APPROVAL DATE: April 26, 2007
SUPERSEDES DATE:..... NA
MSDS NUMBER:..... 655B-07a

Note: The Hazardous Material Indexing System (HMIS), cited in the Emergency Overview of Section 3, uses the following index to assess hazard rating: 0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; and 4 = Severe.

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of West System Inc. The data on this sheet is related only to the specific material designated herein. West System Inc. assumes no legal responsibility for use or reliance upon these data.