



HJ3 Composite Technologies, LLC
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HJ3 Glass Fiber Composite (GF-510)

Description

The HJ3 Glass Fiber Composite is a Glass fiber fabric used to strengthen structural elements. The fabric is composed of Glass fibers that will be field laminated using one of the following HJ3 saturating epoxies (SRS-400, SRW-400)

TYPICAL DATA FOR HJ3 Glass Fiber Composite	
STORAGE CONDITIONS	Store dry at 40°F-95°F
COLOR	White

Suggested Uses

- Increasing the ductility and shear capacity of concrete columns
- Strengthening to increase the flexural and shear capacities of concrete beams & slabs
- Confining and strengthening wood girders
- Increasing the flexural and shear capacity of concrete and masonry walls
- Restoring the integrity of damaged steel/concrete pipes and pressure vessels and increasing their pressure ratings to desired levels

PHYSICAL STRENGTHS	TYPICAL VALUES	DESIGN VALUES	ASTM TEST METHOD
Tensile Strength (ksi)	36.9	33.9	D3039
Modulus of Elasticity (ksi)	1,924	1,669	D3039
Effective Ply Thickness (in.)	.044		

Advantages

- Corrosion resistant – minimizing costs and wear
- Adds only a 1/16th of an inch to the repaired surface
- Light weight (½ the weight of aluminum)
- Reduces installation time since heavy equipment and welding is eliminated
- Low thermal expansion
- Flexible wrap conforms to any shape
- Minimal change to structure's shape, weight and appearance
- Used for increasing strength, stiffness, fatigue resistance of damaged structure up to, and at times beyond its initial design value
- Minimal disruption and noise
- Economical

Shipping Information

*Shipped FOB Tucson, AZ or through authorized distributors.

Surface Preparation

The preparation of surfaces to receive the HJ3 Composite Reinforcing System must be given careful attention, as **the bonding capability of the epoxy for a given application is primarily dependent on proper surface preparation.** Concrete surfaces must be structurally sound and free from contaminants such as dust, oil or dirt. Surfaces must be shot blasted or mechanically abraded to achieve a minimum 3-mil profile. Remove fins, sharp edges, and protrusions that may trap air behind the installed wrap. Coated surfaces must be mechanically cleaned and abraded to the equivalent of 60-80 mesh sandpaper. Repair all damaged concrete, spalls and irregular surfaces and fill uneven surfaces with HJ3 putty mix (PM-100 Series).

Mixing Epoxy

Thorough and complete mixing is critical. **WARNING: Epoxies develop heat during mixing and curing.** To keep temperature rise to a minimum, a high surface area to volume ratio during mixing is recommended. For manual mixing, each mix volume should be kept to 5 gallons or less.

Proportion each component at their specified ratios and mix using a slow-speed drill with jiffy paddle at 400-600 RPM for 3-5 minutes until a consistent color is achieved. No stripes, streaks or color variation should be visible. Use an up and down motion,

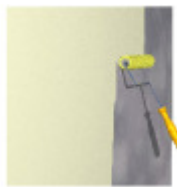
scraping the mixing container sides and bottom. **Mix no more material than may be applied within the specified pot life of the epoxy (Please reference the technical data sheet for the specific HJ3 resin).**

Application of Wraps

FOR DRY LAY-UP:

(See Images Below) STEP 1: Using a roller or sprayer, apply a coat of HJ3 primer (HJ3's PC-200 Series) onto the prepared surface. **STEP 2:** Apply a coat of saturating resin (HJ3's SR-400 Series) to the still tacky primed surface (For applications requiring Tack Coat): Apply the tack coat (HJ3's TC-300 Series) to the surface using a trowel or putty knife, filling out all pores and leaving a 60 to 80-mil thick coating (measured wet) of the tack coat on the surface. **STEP 3:** Press the dry reinforcing material onto the tacky substrate and apply additional saturating resin (HJ3's SR-400). Using a roller, apply pressure to the surface of the fabric to ensure good bonding to the substrate and to roll out any entrapped air before the epoxy sets. Smooth the fabric from center to the edge to remove air pockets. Good saturation of the fabric is indicated by some epoxy oozing out to the external face of the fabric and wetting the fibers on the external face. **STEP 4:** Apply a final coat of saturating resin on top of the fabric using a roller to assure full saturation. **STEP 5:** Apply paint or protective coating if desired while the final resin coat is still tacky. Fully cured resin must be scuffed for optimum bonding to the paint or protective coating.

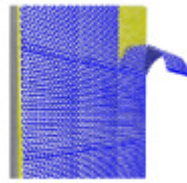
When multi-layer wraps are used, each individual layer shall be firmly bedded and adhered to the preceding layer or the substrate before the epoxy on the preceding layer is fully cured and is still tacky.



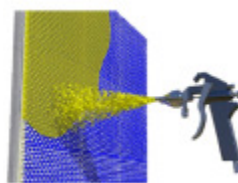
STEP 1



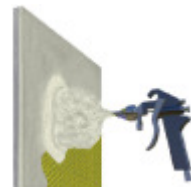
STEP 2



STEP 3



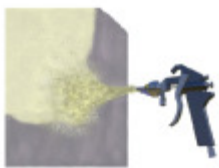
STEP 4



STEP 5

FOR WET LAY-UP:

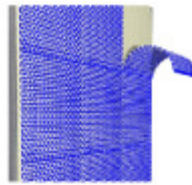
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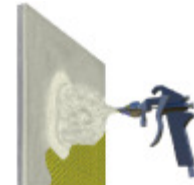
STEP 1



STEP 2



STEP 3



STEP 4

Curing of Wraps

Curing times and temperature for wrap shall be maintained for the designated formulation used, according to the instructions supplied with the epoxy. The cured composite should have a uniform thickness and density, and lack porosity.

Procedure Modifications

Due to environmental factors affecting quality of work, installation procedures may be modified to achieve maximum results. Procedure modifications shall be discussed with and approved by the Engineer of record prior to implementing the modifications.

Conditions to Avoid

- Do not apply to concrete with temperature outside of application temperature range
- Do not apply to concrete less than 30 days old
- Do not apply to concrete with curing or sealing membranes
- Do not apply to base concrete at a temperature less than 45 °F

**MATERIAL DATA SAFETY SHEET (MSDS)
for HJ3 Glass Fiber Composite (GF-510)**

REV DATE: 1 Jan 2008
REVISION: 2

Section 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **GF-510**
SYNONYMS: All product grades
CHEMICAL FAMILY: Fibrous Glass
MFR'S NAME: HJ3 Composite Technologies, LLC, 4100 S. Fremont Ave., Tucson, AZ 85714
EMERGENCY PHONE: 800/535-5053 (Infotrac) GENERAL INFORMATION: 877/303-0453 (HJ3)

Section 2: COMPOSITION, INFORMATION ON INGREDIENTS

OSHA REGULATED COMPONENTS

Component	Chemical Name	CAS No.	Wt. %
Fiber Glass Continuous Filament (non respirable)	Fibrous Glass	65997-17-3	94-100
Sizing	Sizing	None	0-2
Polyester Yarn	Polyester Yarn	None	0-4

Note: See Section 8 of MSDS for exposure limit data for these ingredients.

Section 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: No unusual emergency conditions are expected from this product.

APPEARANCE AND ODOR: White/off-white colored solid with no odor.

PRIMARY ROUTE(S) OF EXPOSURE: Inhalation, skin, eye

POTENTIAL HEALTH EFFECTS:

- Acute (short term): Fiberglass continuous filament is a mechanical irritant. Breathing dusts and fibers may cause short-term irritation of the mouth, nose, and throat. Skin contact with dust and fibers may cause itching and short-term irritation. Eye contact with dust and fibers may cause short-term mechanical irritation. Ingestion may cause short-term mechanical irritation of the stomach and intestines. See Section 8 for exposure controls.
- Chronic (long term): There is no known health effects connected with long term use or contact with this product. See Section 11 of MSDS for more toxicological data.

MEDICAL CONDITION AGGRAVATED BY EXPOSURE: Those with long term breathing or skin conditions that are aggravated by mechanical irritants may be at a higher risk for worsening from use or contact with this product.

Section 4: FIRST AID MEASURES

EYE:

- In case of eye contact, immediately irrigate with plenty of water for 15 minutes. Seek medical attention if irritation persists.

SKIN:

- Wash with mild soap and running water. Use a washcloth to help remove fibers. To avoid more irritation, do not rub or scratch affected areas. Rubbing or scratching may force fibers into skin. Seek medical attention if irritation persists.

INGESTION:

- Ingestion of this material is unlikely. If it does occur, seek immediate medical attention.

INHALATION:

- Move person to fresh air. Seek medical attention if irritation persists.

Section 5: FIRE FIGHTING MEASURES

FLASH POINT: None.

FLAMMABLE LIMITS (% BY VOL): None.

AUTOIGNITION TEMP: Not applicable.

EXTINGUISHING MEDIA: Water, foam, CO₂ or dry chemical

UNUSUAL FIRE AND EXPLOSION HAZARDS: None Known.

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FIRE FIGHTING INSTRUCTIONS: Use self-contained breathing apparatus (SCBA) in a sustained fire.

HAZARDOUS COMBUSTION PRODUCTS: Primary combustion products are carbon monoxide, carbon dioxide and water. Other undetermined compounds could be released in small quantities.

Section 6: ACCIDENTAL RELEASE MEASURES

LAND SPILL: Scoop up material and put into suitable container for disposal as a non-hazardous waste.

WATER SPILL: This material will sink and disperse along the bottom of waterways and ponds. It can not easily be removed after it is waterborne; however, the material is non-hazardous in water.

AIR RELEASE: This material will settle out of the air. If concentrated on land it can then be scooped up for disposal as a non-hazardous waste.

Section 7: HANDLING AND STORAGE

STORAGE TEMPERATURE: Not applicable.

STORAGE PRESSURE: Not applicable.

GENERAL: No special storage or handling procedures are required for this material.

Section 8: EXPOSURE CONTROLS, PERSONAL PROTECTION

Ingredient	OSHA PEL (8-hr TWA)	ACGIH TLV (8-hr TWA)
Fiber Glass Continuous Filament	5 mg/m ³ (respirable dust) 15 mg/ m ³ (total dust) 1 fiber/cc (proposed)	10 mg/ m ³ (inhalable) 3 mg/ m ³ (respirable)
Sizing	None Established	None Established
Polyester Yarn	5 mg/ m ³ (respirable dust) 15 mg/ m ³ (total dust)	10 mg/ m ³ (inhalable) 3 mg/ m ³ (respirable)

VENTILATION: General dilution ventilation and or/local exhaust ventilation should be provided as necessary to maintain exposures below regulatory limits.

PERSONAL PROTECTION:

RESPIRATORY PROTECTION: A properly fitted NIOSH/MSHA approved disposable dust respirator such as the 3M model 8210 (or 8710) or model 9900 (in high humidity environments) or equivalent should be used when: high dust levels are encountered; the level of glass fibers in the air exceeds the OSHA permissible limits; or if irritation occurs. Use respiratory protection program, local regulations and OSHA regulations under 29 CFR 1910.134.

SKIN PROTECTION: Loose fitting long sleeved shirt that covers to the base of the neck, long pants and gloves. Skin irritation is known to occur chiefly at pressure points such as around neck, wrist, and between fingers.

EYE PROTECTION: Safety glasses or goggles.

WORK AND HYGIENIC PRACTICES: Handle using good industrial hygiene and safety practices. Avoid unnecessary contact with dusts and fibers by using good local exhaust ventilation. Remove material from the skin and eyes after contact. Remove material from clothing using vacuum equipment (never use compressed air and always wash work clothes separately from other clothing. Wipe out the washer or sink to prevent loose glass fibers from getting on other clothing). Keep the work area clean of dusts and fibers (avoid sweeping or using compressed air as these techniques re-suspend dusts and fibers into the air). Have access to safety showers and eye wash stations.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

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APPEARANCE: White/off-white
 PHYSICAL STATE: Solid
 ODOR: None
 VAPOR PRESS: Not applicable
 VAPOR DENSITY: Not applicable
 BOILING PT: Not applicable
 SPECIFIC GRAVITY: 2.60
 SOLUBILITY IN H₂O: Insoluble
 EVAPORATION RATE: Not applicable
 VISCOSITY: Not applicable
 % VOLATILE (BY WT): Not applicable
 pH: Not applicable

Section 10: STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable.
 INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID: None known.
 HAZARDOUS POLYMERIZATION: Will not occur.
 HAZARDOUS DECOMPOSITION: Sizings or bindings may decompose in a fire. See Section 5 of MSDS for combustion products statement.

Section 11: TOXICOLOGICAL INFORMATION

CARCINOGENICITY: The table below indicates whether or not each agency has listed each ingredient as a carcinogen:

Ingredient	ACGIH	IARC	NTP	OSHA
Fiber Glass Continuous Filament	A4	3	No	No
Sizing	No	No	No	No
Polyester Yarn	No	No	No	No
	LD ₅₀ Oral (g/kg)	LD ₅₀ Dermal (g/kg)	LC ₅₀ Inhalation (ppm, 8 hrs.)	
Fiber Glass Continuous Filament	Not Available	Not Available	Not Available	
Sizing	Not Available	Not Available	Not Available	
Polyester Yarn	Not Available	Not Available	Not Available	

FIBER GLASS CONTINUOUS FILAMENT: The International Agency for Research on Cancer (IARC) in June, 1987, categorized fiber glass continuous filament as not classifiable with respect to human carcinogenicity (Group 3). The evidence from human as well as animal studies was evaluated by IARC as insufficient to classify fiberglass continuous filament as a possible, probable, or confirmed cancer causing material.

Section 12: ECOLOGICAL INFORMATION

This material is not expected to cause harm to animals, plants, or fish.

Section 13: DISPOSAL CONSIDERATIONS

RCRA HAZARD CLASS: Non-hazardous

Section 14: TRANSPORT INFORMATION (U.S. & Canada)

DOT SHIPPING NAMES: Not regulated
 HAZARD CLASS OF DIVISION: None
 IDENTIFICATION NO.: None
 LABEL(S) REQUIRED (if not accepted): None
 SPECIAL PROVISIONS: None
 NON-BULK PACKAGING: None

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EPA HAZARDOUS SUBSTANCES: None
 QUANTITY LIMITATIONS: None
 MARINE POLLUTANTS: None
 FREIGHT DESCRIPTION: None
 HAZARDOUS MATERIAL SHIPPING DESCRIPTION: None
 SECONDARY: None
 PACKAGING GROUP: None
 PACKAGING EXCEPTIONS: None
 BULK PACKAGING: None
 RQ: None

Section 15: REGULATORY INFORMATION

TSCA STATUS:	Each ingredient is on the Inventory
NSR STATUS (Canada):	Each ingredient is on the DSL
SARA Title III:	Hazard Categories: Acute Health: Yes Chronic Health: No Fire Hazard: No Pressure Hazard: No Reactivity Hazard: No Reportable Ingredients: Sec. 302/304: None Sec. 313: None
California Proposition 65:	No ingredient is listed.
Clean Air Act:	No ingredient is listed
WHMIS (Canada):	Status: Not Controlled WHMIS Classification(s): None

Section 16: Other Information

HMIS AND NFPA HAZARD RATING:	Category	HMIS	NFPA
	Acute Health	1	1
	Flammability	0	0
	Reactivity	0	0

NFPA Unusual Hazards: None.
HMIS Personal Protection: To be supplied by user depending upon use.

END OF MSDS

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HJ3 Glass Fiber Composite (GF-512)

Description

The HJ3 Glass Fiber Composite is a glass fiber fabric used to strengthen structural elements. The fabric is composed of glass fibers that will be field laminated using one of the following HJ3 saturating epoxies (SRS-400, SRW-400)

TYPICAL DATA FOR HJ3 Glass Fiber Composite	
STORAGE CONDITIONS	Store dry at 40°F-95°F
COLOR	White

Suggested Uses

- Increasing the ductility and shear capacity of concrete columns
- Strengthening to increase the flexural and shear capacities of concrete beams & slabs
- Confining and strengthening wood girders
- Increasing the flexural and shear capacity of concrete and masonry walls
- Restoring the integrity of damaged steel/concrete pipes and pressure vessels and increasing their pressure ratings to desired levels

PHYSICAL STRENGTHS	TYPICAL VALUES	DESIGN VALUES	ASTM TEST METHOD
Tensile Strength (ksi)	44.8	35.2	D3039
Modulus of Elasticity (ksi)	2,245	1,536	D3039
Effective Ply Thickness (in.)	.053		

Advantages

- Corrosion resistant – minimizing costs and wear
- Adds only a 1/16th of an inch to the repaired surface
- Light weight (Less than 4 ounces per square foot)
- Reduces installation time since heavy equipment and welding is eliminated
- Low thermal expansion
- Flexible wrap conforms to any shape
- Minimal change to structure's shape, weight and appearance
- Used for increasing strength, stiffness, fatigue resistance of damaged structure up to, and at times beyond its initial design value
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Mixing Epoxy

Thorough and complete mixing is critical. **WARNING: Epoxies develop heat during mixing and curing.** To keep temperature rise to a minimum, a high surface area to volume ratio during mixing is recommended. For manual mixing, each mix volume should be kept to 5 gallons or less.

Proportion each component at their specified ratios and mix using a slow-speed drill with jiffy paddle at 400-600 RPM for 3-5 minutes until a consistent color is achieved. No stripes, streaks or color variation should be visible. Use an up and down motion, scraping the mixing container sides and bottom. **Mix no more material than may be applied within the specified pot life of the epoxy (Please reference the technical data sheet for the specific HJ3 resin).**

Application of Wraps

FOR DRY LAY-UP:

(See Images Below) STEP 1: Using a roller or sprayer, apply a coat of HJ3 primer (HJ3's PC-200 Series) onto the prepared surface. **STEP 2:** Apply a coat of saturating resin (HJ3's SR-400 Series) to the still tacky primed surface (For applications requiring Tack Coat): Apply the tack coat (HJ3's TC-300 Series) to the surface using a trowel or putty knife, filling out all pores and leaving a 60 to 80-mil thick coating (measured wet) of the tack coat on the surface. **STEP 3:** Press the dry reinforcing material onto the tacky substrate and apply additional saturating resin (HJ3's SR-400). Using a roller, apply pressure to the surface of the fabric to ensure good bonding to the substrate and to roll out any entrapped air before the epoxy sets. Smooth the fabric from center to the edge to remove air pockets. Good saturation of the fabric is indicated by some epoxy oozing out to the external face of the fabric and wetting the fibers on the external face. **STEP 4:** Apply a final coat of saturating resin on top of the fabric using a roller to assure full saturation. **STEP 5:** Apply paint or protective coating if desired while the final resin coat is still tacky. Fully cured resin must be scuffed for optimum bonding to the paint or protective coating.

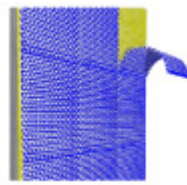
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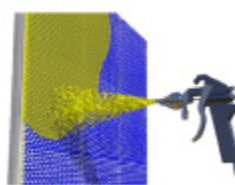
STEP 1



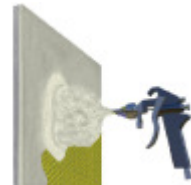
STEP 2



STEP 3



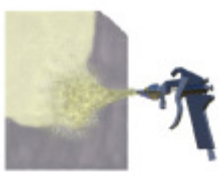
STEP 4



STEP 5

FOR WET LAY-UP:

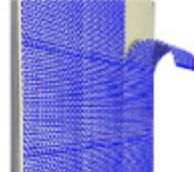
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STEP 1



STEP 2



STEP 3



STEP 4

Curing of Wraps

Curing times and temperature for wrap shall be maintained for the designated formulation used, according to the instructions supplied with the epoxy. The cured composite should have a uniform thickness and density, and lack porosity.

Procedure Modifications

Due to environmental factors affecting quality of work, installation procedures may be modified to achieve maximum results. Procedure modifications shall be discussed with and approved by the Engineer of record prior to implementing the modifications.

Conditions to Avoid

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**MATERIAL DATA SAFETY SHEET (MSDS)
for HJ3 Glass Fiber Composite (GF-512)**

REV DATE: 1 Jan 2008
REVISION: 2

Section 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **GF-512**
SYNONYMS: All product grades
CHEMICAL FAMILY: Fibrous Glass
MFR'S NAME: HJ3 Composite Technologies, LLC, 4100 S. Fremont Ave., Tucson, AZ 85714
EMERGENCY PHONE: 800/535-5053 (Infotrac) GENERAL INFORMATION: 877/303-0453 (HJ3)

Section 2: COMPOSITION, INFORMATION ON INGREDIENTS

OSHA REGULATED COMPONENTS

Component	Chemical Name	CAS No.	Wt. %
Fiber Glass Continuous Filament (non respirable)	Fibrous Glass	65997-17-3	94-100
Sizing	Sizing	None	0-2
Polyester Yarn	Polyester Yarn	None	0-4

Note: See Section 8 of MSDS for exposure limit data for these ingredients.

Section 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: No unusual emergency conditions are expected from this product.

APPEARANCE AND ODOR: White/off-white colored solid with no odor.

PRIMARY ROUTE(S) OF EXPOSURE: Inhalation, skin, eye

POTENTIAL HEALTH EFFECTS:

- Acute (short term): Fiberglass continuous filament is a mechanical irritant. Breathing dusts and fibers may cause short-term irritation of the mouth, nose, and throat. Skin contact with dust and fibers may cause itching and short-term irritation. Eye contact with dust and fibers may cause short-term mechanical irritation. Ingestion may cause short-term mechanical irritation of the stomach and intestines. See Section 8 for exposure controls.
- Chronic (long term): There is no known health effects connected with long term use or contact with this product. See Section 11 of MSDS for more toxicological data.

MEDICAL CONDITION AGGRAVATED BY EXPOSURE: Those with long term breathing or skin conditions that are aggravated by mechanical irritants may be at a higher risk for worsening from use or contact with this product.

Section 4: FIRST AID MEASURES

EYE:

- In case of eye contact, immediately irrigate with plenty of water for 15 minutes. Seek medical attention if irritation persists.

SKIN:

- Wash with mild soap and running water. Use a washcloth to help remove fibers. To avoid more irritation, do not rub or scratch affected areas. Rubbing or scratching may force fibers into skin. Seek medical attention if irritation persists.

INGESTION:

- Ingestion of this material is unlikely. If it does occur, seek immediate medical attention.

INHALATION:

- Move person to fresh air. Seek medical attention if irritation persists.

Section 5: FIRE FIGHTING MEASURES

FLASH POINT: None.

FLAMMABLE LIMITS (% BY VOL): None.

AUTOIGNITION TEMP: Not applicable.

EXTINGUISHING MEDIA: Water, foam, CO₂ or dry chemical

UNUSUAL FIRE AND EXPLOSION HAZARDS: None Known.

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FIRE FIGHTING INSTRUCTIONS: Use self-contained breathing apparatus (SCBA) in a sustained fire.

HAZARDOUS COMBUSTION PRODUCTS: Primary combustion products are carbon monoxide, carbon dioxide and water. Other undetermined compounds could be released in small quantities.

Section 6: ACCIDENTAL RELEASE MEASURES

LAND SPILL: Scoop up material and put into suitable container for disposal as a non-hazardous waste.

WATER SPILL: This material will sink and disperse along the bottom of waterways and ponds. It can not easily be removed after it is waterborne; however, the material is non-hazardous in water.

AIR RELEASE: This material will settle out of the air. If concentrated on land it can then be scooped up for disposal as a non-hazardous waste.

Section 7: HANDLING AND STORAGE

STORAGE TEMPERATURE: Not applicable.

STORAGE PRESSURE: Not applicable.

GENERAL: No special storage or handling procedures are required for this material.

Section 8: EXPOSURE CONTROLS, PERSONAL PROTECTION

Ingredient	OSHA PEL (8-hr TWA)	ACGIH TLV (8-hr TWA)
Fiber Glass Continuous Filament	5 mg/m ³ (respirable dust) 15 mg/ m ³ (total dust) 1 fiber/cc (proposed)	10 mg/ m ³ (inhalable) 3 mg/ m ³ (respirable)
Sizing	None Established	None Established
Polyester Yarn	5 mg/ m ³ (respirable dust) 15 mg/ m ³ (total dust)	10 mg/ m ³ (inhalable) 3 mg/ m ³ (respirable)

VENTILATION: General dilution ventilation and or/local exhaust ventilation should be provided as necessary to maintain exposures below regulatory limits.

PERSONAL PROTECTION:

RESPIRATORY PROTECTION: A properly fitted NIOSH/MSHA approved disposable dust respirator such as the 3M model 8210 (or 8710) or model 9900 (in high humidity environments) or equivalent should be used when: high dust levels are encountered; the level of glass fibers in the air exceeds the OSHA permissible limits; or if irritation occurs. Use respiratory protection program, local regulations and OSHA regulations under 29 CFR 1910.134.

SKIN PROTECTION: Loose fitting long sleeved shirt that covers to the base of the neck, long pants and gloves. Skin irritation is known to occur chiefly at pressure points such as around neck, wrist, and between fingers.

EYE PROTECTION: Safety glasses or goggles.

WORK AND HYGIENIC PRACTICES: Handle using good industrial hygiene and safety practices. Avoid unnecessary contact with dusts and fibers by using good local exhaust ventilation. Remove material from the skin and eyes after contact. Remove material from clothing using vacuum equipment (never use compressed air and always wash work clothes separately from other clothing. Wipe out the washer or sink to prevent loose glass fibers from getting on other clothing). Keep the work area clean of dusts and fibers (avoid sweeping or using compressed air as these techniques re-suspend dusts and fibers into the air). Have access to safety showers and eye wash stations.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

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APPEARANCE: White/off-white
 PHYSICAL STATE: Solid
 ODOR: None
 VAPOR PRESS: Not applicable
 VAPOR DENSITY: Not applicable
 BOILING PT: Not applicable
 SPECIFIC GRAVITY: 2.60
 SOLUBILITY IN H₂O: Insoluble
 EVAPORATION RATE: Not applicable
 VISCOSITY: Not applicable
 % VOLATILE (BY WT): Not applicable
 pH: Not applicable

Section 10: STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable.
 INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID: None known.
 HAZARDOUS POLYMERIZATION: Will not occur.
 HAZARDOUS DECOMPOSITION: Sizings or bindings may decompose in a fire. See Section 5 of MSDS for combustion products statement.

Section 11: TOXICOLOGICAL INFORMATION

CARCINOGENICITY: The table below indicates whether or not each agency has listed each ingredient as a carcinogen:

Ingredient	ACGIH	IARC	NTP	OSHA
Fiber Glass Continuous Filament	A4	3	No	No
Sizing	No	No	No	No
Polyester Yarn	No	No	No	No
	LD ₅₀ Oral (g/kg)	LD ₅₀ Dermal (g/kg)	LC ₅₀ Inhalation (ppm, 8 hrs.)	
Fiber Glass Continuous Filament	Not Available	Not Available	Not Available	
Sizing	Not Available	Not Available	Not Available	
Polyester Yarn	Not Available	Not Available	Not Available	

FIBER GLASS CONTINUOUS FILAMENT: The International Agency for Research on Cancer (IARC) in June, 1987, categorized fiber glass continuous filament as not classifiable with respect to human carcinogenicity (Group 3). The evidence from human as well as animal studies was evaluated by IARC as insufficient to classify fiberglass continuous filament as a possible, probable, or confirmed cancer causing material.

Section 12: ECOLOGICAL INFORMATION

This material is not expected to cause harm to animals, plants, or fish.

Section 13: DISPOSAL CONSIDERATIONS

RCRA HAZARD CLASS: Non-hazardous

Section 14: TRANSPORT INFORMATION (U.S. & Canada)

DOT SHIPPING NAMES: Not regulated
 HAZARD CLASS OF DIVISION: None
 IDENTIFICATION NO.: None
 LABEL(S) REQUIRED (if not accepted): None
 SPECIAL PROVISIONS: None
 NON-BULK PACKAGING: None

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EPA HAZARDOUS SUBSTANCES: None
 QUANTITY LIMITATIONS: None
 MARINE POLLUTANTS: None
 FREIGHT DESCRIPTION: None
 HAZARDOUS MATERIAL SHIPPING DESCRIPTION: None
 SECONDARY: None
 PACKAGING GROUP: None
 PACKAGING EXCEPTIONS: None
 BULK PACKAGING: None
 RQ: None

Section 15: REGULATORY INFORMATION

TSCA STATUS:	Each ingredient is on the Inventory
NSR STATUS (Canada):	Each ingredient is on the DSL
SARA Title III:	Hazard Categories: Acute Health: Yes Chronic Health: No Fire Hazard: No Pressure Hazard: No Reactivity Hazard: No Reportable Ingredients: Sec. 302/304: None Sec. 313: None
California Proposition 65:	No ingredient is listed.
Clean Air Act:	No ingredient is listed
WHMIS (Canada):	Status: Not Controlled WHMIS Classification(s): None

Section 16: Other Information

HMIS AND NFPA HAZARD RATING:	Category	HMIS	NFPA
	Acute Health	1	1
	Flammability	0	0
	Reactivity	0	0

NFPA Unusual Hazards: None.
HMIS Personal Protection: To be supplied by user depending upon use.

END OF MSDS

ATTENTION: No representation is made as to the accuracy or correctness of the information contained herein, other than to state that it is presented by this organization in good faith and we believe it to be correct and accurate per the limits of our understanding and training as of the date of first publication. The user or handler of this product is warned to take the most conservative and safest interpretation possible of all information contained herein and to use the most extreme personal protection measures and exposure limitations prudently dictated by the specific usage or handling situation, this MSDS information and good industrial safety and hygiene practices.



HJ3 Composite Technologies, LLC
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 Web: www.HJ3.com
 E-mail: info@HJ3.com

HJ3 Glass Fiber Composite (GF-514)

Description

The HJ3 Glass Fiber Composite is a Glass fiber fabric used to strengthen structural elements. The fabric is composed of Glass fibers that will be field laminated using one of the following HJ3 saturating epoxies (SRS-400, SRW-400)

TYPICAL DATA FOR HJ3 Glass Fiber Composite	
STORAGE CONDITIONS	Store dry at 40°F-95°F
COLOR	White

Suggested Uses

- Increasing the ductility and shear capacity of concrete columns
- Strengthening to increase the flexural and shear capacities of concrete beams & slabs
- Confining and strengthening wood girders
- Increasing the flexural and shear capacity of concrete and masonry walls
- Restoring the integrity of damaged steel/concrete pipes and pressure vessels and increasing their pressure ratings to desired levels

PHYSICAL STRENGTHS	TYPICAL VALUES	DESIGN VALUES	ASTM TEST METHOD
Tensile Strength (ksi)	92.4	65.4	D3039
Modulus of Elasticity (ksi)	3,690	2,992	D3039
Effective Ply Thickness (in.)	.042		

Advantages

- Corrosion resistant – minimizing costs and wear
- Adds only a 1/16th of an inch to the repaired surface
- Light weight (½ the weight of aluminum)
- Reduces installation time since heavy equipment and welding is eliminated
- Low thermal expansion
- Flexible wrap conforms to any shape
- Minimal change to structure's shape, weight and appearance
- Used for increasing strength, stiffness, fatigue resistance of damaged structure up to, and at times beyond its initial design value
- Minimal disruption and noise
- Economical

Shipping Information

*Shipped FOB Tucson, AZ or through authorized distributors.

Surface Preparation

The preparation of surfaces to receive the HJ3 Composite Reinforcing System must be given careful attention, as **the bonding capability of the epoxy for a given application is primarily dependent on proper surface preparation.** Concrete surfaces must be structurally sound and free from contaminants such as dust, oil or dirt. Surfaces must be shot blasted or mechanically abraded to achieve a minimum 3-mil profile. Remove fins, sharp edges, and protrusions that may trap air behind the installed wrap. Coated surfaces must be mechanically cleaned and abraded to the equivalent of 60-80 mesh sandpaper. Repair all damaged concrete, spalls and irregular surfaces and fill uneven surfaces with HJ3 putty mix (PM-100 Series).

Mixing Epoxy

Thorough and complete mixing is critical. **WARNING: Epoxies develop heat during mixing and curing.** To keep temperature rise to a minimum, a high surface area to volume ratio during mixing is recommended. For manual mixing, each mix volume should be kept to 5 gallons or less.

Proportion each component at their specified ratios and mix using a slow-speed drill with jiffy paddle at 400-600 RPM for 3-5 minutes until a consistent color is achieved. No stripes, streaks or color variation should be visible. Use an up and down motion, scraping the mixing container sides and bottom. **Mix no more material than may be applied within the specified pot life of the epoxy (Please reference the technical data sheet for the specific HJ3 resin).**

Application of Wraps

FOR DRY LAY-UP:

(See Images Below) **STEP 1:** Using a roller or sprayer, apply a coat of HJ3 primer (HJ3's PC-200 Series) onto the prepared surface. **STEP 2:** Apply a coat of saturating resin (HJ3's SR-400 Series) to the still tacky primed surface (For applications requiring Tack Coat): Apply the tack coat (HJ3's TC-300 Series) to the surface using a trowel or putty knife, filling out all pores and leaving a 60 to 80-mil thick coating (measured wet) of the tack coat on the surface. **STEP 3:** Press the dry reinforcing material onto the tacky substrate and apply additional saturating resin (HJ3's SR-400). Using a roller, apply pressure to the surface of the fabric to ensure good bonding to the substrate and to roll out any entrapped air before the epoxy sets. Smooth the fabric from center to the edge to remove air pockets. Good saturation of the fabric is indicated by some epoxy oozing out to the external face of the fabric and wetting the fibers on the external face. **STEP 4:** Apply a final coat of saturating resin on top of the fabric using a roller to assure full saturation. **STEP 5:** Apply paint or protective coating if desired while the final resin coat is still tacky. Fully cured resin must be scuffed for optimum bonding to the paint or protective coating.

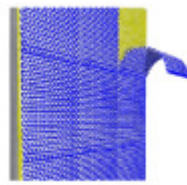
When multi-layer wraps are used, each individual layer shall be firmly bedded and adhered to the preceding layer or the substrate before the epoxy on the preceding layer is fully cured and is still tacky.



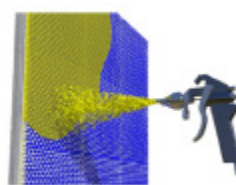
STEP 1



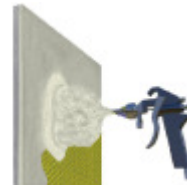
STEP 2



STEP 3



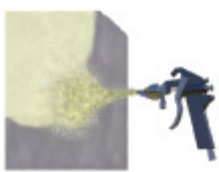
STEP 4



STEP 5

FOR WET LAY-UP:

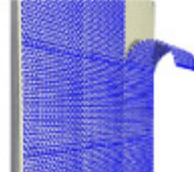
(See Images Below) **STEP 1:** Using a roller or sprayer, apply a coat of HJ3 primer (HJ3's PC-200 Series) onto the prepared surface. **STEP 2 (For applications requiring Tack Coat):** Apply the tack coat (HJ3's TC-300 Series) to the surface using a trowel or putty knife, filling out all pores and leaving a 60 to 80-mil thick coating (measured wet) of the tack coat on the surface. **STEP 3:** Saturate the reinforcing material with the HJ3 SR-400 Series of Saturants. Press the resin-saturated fabric on to the substrate and using a roller apply pressure to the surface of the fabric to ensure good bonding to the substrate and to roll out any trapped air before the epoxy sets. Smooth the fabric from center to the edge to remove air pockets. **STEP 4:** Apply paint or protective coating (HJ3's HCRC-600 Series), if desired while the final resin coat is still tacky. Dry resin must be scuffed for optimum bonding to the paints or protective coatings.



STEP 1



STEP 2



STEP 3



STEP 4

Curing of Wraps

Curing times and temperature for wrap shall be maintained for the designated formulation used, according to the instructions supplied with the epoxy. The cured composite should have a uniform thickness and density, and lack porosity.

Procedure Modifications

Due to environmental factors affecting quality of work, installation procedures may be modified to achieve maximum results. Procedure modifications shall be discussed with and approved by the Engineer of record prior to implementing the modifications.

Conditions to Avoid

- Do not apply to concrete with temperature outside of application temperature range
- Do not apply to concrete less than 30 days old
- Do not apply to concrete with curing or sealing membranes
- Do not apply to base concrete at a temperature less than 45 °F

**MATERIAL DATA SAFETY SHEET (MSDS)
for HJ3 Glass Fiber Composite (GF-514)**

REV DATE: 1 Jan 2008
REVISION: 2

Section 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **GF-514**
SYNONYMS: All product grades
CHEMICAL FAMILY: Fibrous Glass
MFR'S NAME: HJ3 Composite Technologies, LLC, 4100 S. Fremont Ave., Tucson, AZ 85714
EMERGENCY PHONE: 800/535-5053 (Infotrac) GENERAL INFORMATION: 877/303-0453 (HJ3)

Section 2: COMPOSITION, INFORMATION ON INGREDIENTS

OSHA REGULATED COMPONENTS

Component	Chemical Name	CAS No.	Wt. %
Fiber Glass Continuous Filament (non respirable)	Fibrous Glass	65997-17-3	94-100
Sizing	Sizing	None	0-2
Polyester Yarn	Polyester Yarn	None	0-4

Note: See Section 8 of MSDS for exposure limit data for these ingredients.

Section 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: No unusual emergency conditions are expected from this product.

APPEARANCE AND ODOR: White/off-white colored solid with no odor.

PRIMARY ROUTE(S) OF EXPOSURE: Inhalation, skin, eye

POTENTIAL HEALTH EFFECTS:

- Acute (short term): Fiberglass continuous filament is a mechanical irritant. Breathing dusts and fibers may cause short-term irritation of the mouth, nose, and throat. Skin contact with dust and fibers may cause itching and short-term irritation. Eye contact with dust and fibers may cause short-term mechanical irritation. Ingestion may cause short-term mechanical irritation of the stomach and intestines. See Section 8 for exposure controls.
- Chronic (long term): There is no known health effects connected with long term use or contact with this product. See Section 11 of MSDS for more toxicological data.

MEDICAL CONDITION AGGRAVATED BY EXPOSURE: Those with long term breathing or skin conditions that are aggravated by mechanical irritants may be at a higher risk for worsening from use or contact with this product.

Section 4: FIRST AID MEASURES

EYE:

- In case of eye contact, immediately irrigate with plenty of water for 15 minutes. Seek medical attention if irritation persists.

SKIN:

- Wash with mild soap and running water. Use a washcloth to help remove fibers. To avoid more irritation, do not rub or scratch affected areas. Rubbing or scratching may force fibers into skin. Seek medical attention if irritation persists.

INGESTION:

- Ingestion of this material is unlikely. If it does occur, seek immediate medical attention.

INHALATION:

- Move person to fresh air. Seek medical attention if irritation persists.

Section 5: FIRE FIGHTING MEASURES

FLASH POINT: None.

FLAMMABLE LIMITS (% BY VOL): None.

AUTOIGNITION TEMP: Not applicable.

EXTINGUISHING MEDIA: Water, foam, CO₂ or dry chemical

UNUSUAL FIRE AND EXPLOSION HAZARDS: None Known.

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FIRE FIGHTING INSTRUCTIONS: Use self-contained breathing apparatus (SCBA) in a sustained fire.

HAZARDOUS COMBUSTION PRODUCTS: Primary combustion products are carbon monoxide, carbon dioxide and water. Other undetermined compounds could be released in small quantities.

Section 6: ACCIDENTAL RELEASE MEASURES

LAND SPILL: Scoop up material and put into suitable container for disposal as a non-hazardous waste.

WATER SPILL: This material will sink and disperse along the bottom of waterways and ponds. It can not easily be removed after it is waterborne; however, the material is non-hazardous in water.

AIR RELEASE: This material will settle out of the air. If concentrated on land it can then be scooped up for disposal as a non-hazardous waste.

Section 7: HANDLING AND STORAGE

STORAGE TEMPERATURE: Not applicable.

STORAGE PRESSURE: Not applicable.

GENERAL: No special storage or handling procedures are required for this material.

Section 8: EXPOSURE CONTROLS, PERSONAL PROTECTION

Ingredient	OSHA PEL (8-hr TWA)	ACGIH TLV (8-hr TWA)
Fiber Glass Continuous Filament	5 mg/m ³ (respirable dust) 15 mg/ m ³ (total dust) 1 fiber/cc (proposed)	10 mg/ m ³ (inhalable) 3 mg/ m ³ (respirable)
Sizing	None Established	None Established
Polyester Yarn	5 mg/ m ³ (respirable dust) 15 mg/ m ³ (total dust)	10 mg/ m ³ (inhalable) 3 mg/ m ³ (respirable)

VENTILATION: General dilution ventilation and or/local exhaust ventilation should be provided as necessary to maintain exposures below regulatory limits.

PERSONAL PROTECTION:

RESPIRATORY PROTECTION: A properly fitted NIOSH/MSHA approved disposable dust respirator such as the 3M model 8210 (or 8710) or model 9900 (in high humidity environments) or equivalent should be used when: high dust levels are encountered; the level of glass fibers in the air exceeds the OSHA permissible limits; or if irritation occurs. Use respiratory protection program, local regulations and OSHA regulations under 29 CFR 1910.134.

SKIN PROTECTION: Loose fitting long sleeved shirt that covers to the base of the neck, long pants and gloves. Skin irritation is known to occur chiefly at pressure points such as around neck, wrist, and between fingers.

EYE PROTECTION: Safety glasses or goggles.

WORK AND HYGIENIC PRACTICES: Handle using good industrial hygiene and safety practices. Avoid unnecessary contact with dusts and fibers by using good local exhaust ventilation. Remove material from the skin and eyes after contact. Remove material from clothing using vacuum equipment (never use compressed air and always wash work clothes separately from other clothing. Wipe out the washer or sink to prevent loose glass fibers from getting on other clothing). Keep the work area clean of dusts and fibers (avoid sweeping or using compressed air as these techniques re-suspend dusts and fibers into the air). Have access to safety showers and eye wash stations.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

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APPEARANCE: White/off-white
 PHYSICAL STATE: Solid
 ODOR: None
 VAPOR PRESS: Not applicable
 VAPOR DENSITY: Not applicable
 BOILING PT: Not applicable
 SPECIFIC GRAVITY: 2.60
 SOLUBILITY IN H₂O: Insoluble
 EVAPORATION RATE: Not applicable
 VISCOSITY: Not applicable
 % VOLATILE (BY WT): Not applicable
 pH: Not applicable

Section 10: STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable.
 INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID: None known.
 HAZARDOUS POLYMERIZATION: Will not occur.
 HAZARDOUS DECOMPOSITION: Sizings or bindings may decompose in a fire. See Section 5 of MSDS for combustion products statement.

Section 11: TOXICOLOGICAL INFORMATION

CARCINOGENICITY: The table below indicates whether or not each agency has listed each ingredient as a carcinogen:

Ingredient	ACGIH	IARC	NTP	OSHA
Fiber Glass Continuous Filament	A4	3	No	No
Sizing	No	No	No	No
Polyester Yarn	No	No	No	No
	LD ₅₀ Oral (g/kg)	LD ₅₀ Dermal (g/kg)	LC ₅₀ Inhalation (ppm, 8 hrs.)	
Fiber Glass Continuous Filament	Not Available	Not Available	Not Available	
Sizing	Not Available	Not Available	Not Available	
Polyester Yarn	Not Available	Not Available	Not Available	

FIBER GLASS CONTINUOUS FILAMENT: The International Agency for Research on Cancer (IARC) in June, 1987, categorized fiber glass continuous filament as not classifiable with respect to human carcinogenicity (Group 3). The evidence from human as well as animal studies was evaluated by IARC as insufficient to classify fiberglass continuous filament as a possible, probable, or confirmed cancer causing material.

Section 12: ECOLOGICAL INFORMATION

This material is not expected to cause harm to animals, plants, or fish.

Section 13: DISPOSAL CONSIDERATIONS

RCRA HAZARD CLASS: Non-hazardous

Section 14: TRANSPORT INFORMATION (U.S. & Canada)

DOT SHIPPING NAMES: Not regulated
 HAZARD CLASS OF DIVISION: None
 IDENTIFICATION NO.: None
 LABEL(S) REQUIRED (if not accepted): None
 SPECIAL PROVISIONS: None
 NON-BULK PACKAGING: None

ATTENTION: No representation is made as to the accuracy or correctness of the information contained herein, other than to state that it is presented by this organization in good faith and we believe it to be correct and accurate per the limits of our understanding and training as of the date of first publication. The user or handler of this product is warned to take the most conservative and safest interpretation possible of all information contained herein and to use the most extreme personal protection measures and exposure limitations prudently dictated by the specific usage or handling situation, this MSDS information and good industrial safety and hygiene practices.

EPA HAZARDOUS SUBSTANCES: None
 QUANTITY LIMITATIONS: None
 MARINE POLLUTANTS: None
 FREIGHT DESCRIPTION: None
 HAZARDOUS MATERIAL SHIPPING DESCRIPTION: None
 SECONDARY: None
 PACKAGING GROUP: None
 PACKAGING EXCEPTIONS: None
 BULK PACKAGING: None
 RQ: None

Section 15: REGULATORY INFORMATION

TSCA STATUS:	Each ingredient is on the Inventory
NSR STATUS (Canada):	Each ingredient is on the DSL
SARA Title III:	Hazard Categories: Acute Health: Yes Chronic Health: No Fire Hazard: No Pressure Hazard: No Reactivity Hazard: No Reportable Ingredients: Sec. 302/304: None Sec. 313: None
California Proposition 65:	No ingredient is listed.
Clean Air Act:	No ingredient is listed
WHMIS (Canada):	Status: Not Controlled WHMIS Classification(s): None

Section 16: Other Information

HMIS AND NFPA HAZARD RATING:	Category	HMIS	NFPA
	Acute Health	1	1
	Flammability	0	0
	Reactivity	0	0

NFPA Unusual Hazards: None.
HMIS Personal Protection: To be supplied by user depending upon use.

END OF MSDS

ATTENTION: No representation is made as to the accuracy or correctness of the information contained herein, other than to state that it is presented by this organization in good faith and we believe it to be correct and accurate per the limits of our understanding and training as of the date of first publication. The user or handler of this product is warned to take the most conservative and safest interpretation possible of all information contained herein and to use the most extreme personal protection measures and exposure limitations prudently dictated by the specific usage or handling situation, this MSDS information and good industrial safety and hygiene practices.



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 Web: www.HJ3.com
 E-mail: info@HJ3.com

HJ3 Glass Fiber Composite (GF-528)

Description

The HJ3 Glass Fiber Composite is a Glass fiber fabric used to strengthen structural elements. The fabric is composed of Glass fibers that will be field laminated using one of the following HJ3 saturating epoxies (SRS-400, SRW-400)

TYPICAL DATA FOR HJ3 Glass Fiber Composite	
STORAGE CONDITIONS	Store dry at 40°F-95°F
COLOR	White

Suggested Uses

- Increasing the ductility and shear capacity of concrete columns
- Strengthening to increase the flexural and shear capacities of concrete beams & slabs
- Confining and strengthening wood girders
- Increasing the flexural and shear capacity of concrete and masonry walls
- Restoring the integrity of damaged steel/concrete pipes and pressure vessels and increasing their pressure ratings to desired levels

PHYSICAL STRENGTHS	TYPICAL VALUES	DESIGN VALUES	ASTM TEST METHOD
Tensile Strength (ksi)	36.5	27.8	D3039
Modulus of Elasticity (ksi)	1,975	1,675	D3039
Effective Ply Thickness (in.)	0.041		

Advantages

- Corrosion resistant – minimizing costs and wear
- Adds only a 1/16th of an inch to the repaired surface
- Light weight (½ the weight of aluminum)
- Reduces installation time since heavy equipment and welding is eliminated
- Low thermal expansion
- Flexible wrap conforms to any shape
- Minimal change to structure's shape, weight and appearance
- Used for increasing strength, stiffness, fatigue resistance of damaged structure up to, and at times beyond its initial design value
- Minimal disruption and noise
- Economical

Shipping Information

*Shipped FOB Tucson, AZ or through authorized distributors.

Surface Preparation

The preparation of surfaces to receive the HJ3 Composite Reinforcing System must be given careful attention, as **the bonding capability of the epoxy for a given application is primarily dependent on proper surface preparation.** Concrete surfaces must be structurally sound and free from contaminants such as dust, oil or dirt. Surfaces must be shot blasted or mechanically abraded to achieve a minimum 3-mil profile. Remove fins, sharp edges, and protrusions that may trap air behind the installed wrap. Coated surfaces must be mechanically cleaned and abraded to the equivalent of 60-80 mesh sandpaper. Repair all damaged concrete, spalls and irregular surfaces and fill uneven surfaces with HJ3 putty mix (PM-100 Series).

Mixing Epoxy

Thorough and complete mixing is critical. **WARNING: Epoxies develop heat during mixing and curing.** To keep temperature rise to a minimum, a high surface area to volume ratio during mixing is recommended. For manual mixing, each mix volume should be kept to 5 gallons or less.

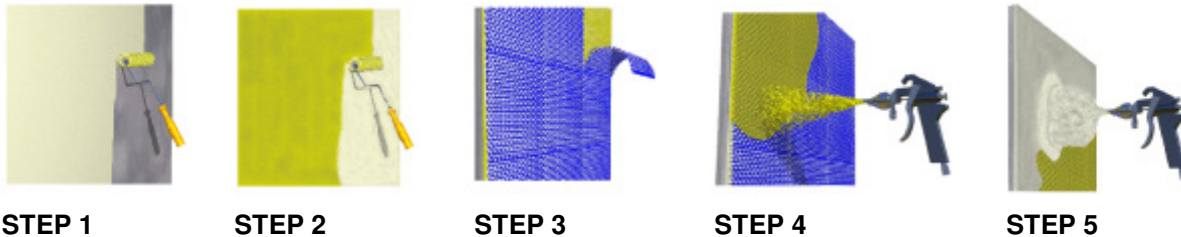
Proportion each component at their specified ratios and mix using a slow-speed drill with jiffy paddle at 400-600 RPM for 3-5 minutes until a consistent color is achieved. No stripes, streaks or color variation should be visible. Use an up and down motion, scraping the mixing container sides and bottom. **Mix no more material than may be applied within the specified pot life of the epoxy (Please reference the technical data sheet for the specific HJ3 resin).**

Application of Wraps

FOR DRY LAY-UP:

(See Images Below) STEP 1: Using a roller or sprayer, apply a coat of HJ3 primer (HJ3's PC-200 Series) onto the prepared surface. **STEP 2:** Apply a coat of saturating resin (HJ3's SR-400 Series) to the still tacky primed surface (For applications requiring Tack Coat): Apply the tack coat (HJ3's TC-300 Series) to the surface using a trowel or putty knife, filling out all pores and leaving a 60 to 80-mil thick coating (measured wet) of the tack coat on the surface. **STEP 3:** Press the dry reinforcing material onto the tacky substrate and apply additional saturating resin (HJ3's SR-400). Using a roller, apply pressure to the surface of the fabric to ensure good bonding to the substrate and to roll out any entrapped air before the epoxy sets. Smooth the fabric from center to the edge to remove air pockets. Good saturation of the fabric is indicated by some epoxy oozing out to the external face of the fabric and wetting the fibers on the external face. **STEP 4:** Apply a final coat of saturating resin on top of the fabric using a roller to assure full saturation. **STEP 5:** Apply paint or protective coating if desired while the final resin coat is still tacky. Fully cured resin must be scuffed for optimum bonding to the paint or protective coating.

When multi-layer wraps are used, each individual layer shall be firmly bedded and adhered to the preceding layer or the substrate before the epoxy on the preceding layer is fully cured and is still tacky.



STEP 1

STEP 2

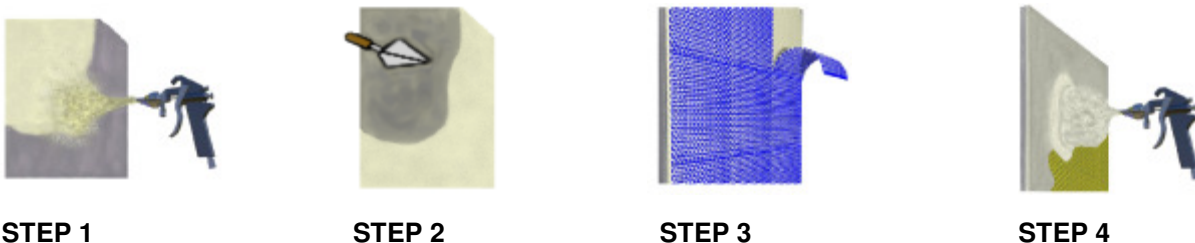
STEP 3

STEP 4

STEP 5

FOR WET LAY-UP:

(See Images Below) STEP 1: Using a roller or sprayer, apply a coat of HJ3 primer (HJ3's PC-200 Series) onto the prepared surface. **STEP 2 (For applications requiring Tack Coat):** Apply the tack coat (HJ3's TC-300 Series) to the surface using a trowel or putty knife, filling out all pores and leaving a 60 to 80-mil thick coating (measured wet) of the tack coat on the surface. **STEP 3:** Saturate the reinforcing material with the HJ3 SR-400 Series of Saturants. Press the resin-saturated fabric on to the substrate and using a roller apply pressure to the surface of the fabric to ensure good bonding to the substrate and to roll out any trapped air before the epoxy sets. Smooth the fabric from center to the edge to remove air pockets. **STEP 4:** Apply paint or protective coating (HJ3's HCRC-600 Series), if desired while the final resin coat is still tacky. Dry resin must be scuffed for optimum bonding to the paints or protective coatings.



STEP 1

STEP 2

STEP 3

STEP 4

Curing of Wraps

Curing times and temperature for wrap shall be maintained for the designated formulation used, according to the instructions supplied with the epoxy. The cured composite should have a uniform thickness and density, and lack porosity.

Procedure Modifications

Due to environmental factors affecting quality of work, installation procedures may be modified to achieve maximum results. Procedure modifications shall be discussed with and approved by the Engineer of record prior to implementing the modifications.

Conditions to Avoid

- Do not apply to concrete with temperature outside of application temperature range
- Do not apply to concrete less than 30 days old
- Do not apply to concrete with curing or sealing membranes
- Do not apply to base concrete at a temperature less than 45 °F

**MATERIAL DATA SAFETY SHEET (MSDS)
for HJ3 Glass Fiber Composite (GF-528)**

REV DATE: 1 Jan 2008
REVISION: 2

Section 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **GF-528**
SYNONYMS: All product grades
CHEMICAL FAMILY: Fibrous Glass
MFR'S NAME: HJ3 Composite Technologies, LLC, 4100 S. Fremont Ave., Tucson, AZ 85714
EMERGENCY PHONE: 800/535-5053 (Infotrac) GENERAL INFORMATION: 877/303-0453 (HJ3)

Section 2: COMPOSITION, INFORMATION ON INGREDIENTS

OSHA REGULATED COMPONENTS

Component	Chemical Name	CAS No.	Wt. %
Fiber Glass Continuous Filament (non respirable)	Fibrous Glass	65997-17-3	94-100
Sizing	Sizing	None	0-2
Polyester Yarn	Polyester Yarn	None	0-4

Note: See Section 8 of MSDS for exposure limit data for these ingredients.

Section 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: No unusual emergency conditions are expected from this product.

APPEARANCE AND ODOR: White/off-white colored solid with no odor.

PRIMARY ROUTE(S) OF EXPOSURE: Inhalation, skin, eye

POTENTIAL HEALTH EFFECTS:

- Acute (short term): Fiberglass continuous filament is a mechanical irritant. Breathing dusts and fibers may cause short-term irritation of the mouth, nose, and throat. Skin contact with dust and fibers may cause itching and short-term irritation. Eye contact with dust and fibers may cause short-term mechanical irritation. Ingestion may cause short-term mechanical irritation of the stomach and intestines. See Section 8 for exposure controls.
- Chronic (long term): There is no known health effects connected with long term use or contact with this product. See Section 11 of MSDS for more toxicological data.

MEDICAL CONDITION AGGRAVATED BY EXPOSURE: Those with long term breathing or skin conditions that are aggravated by mechanical irritants may be at a higher risk for worsening from use or contact with this product.

Section 4: FIRST AID MEASURES

EYE:

- In case of eye contact, immediately irrigate with plenty of water for 15 minutes. Seek medical attention if irritation persists.

SKIN:

- Wash with mild soap and running water. Use a washcloth to help remove fibers. To avoid more irritation, do not rub or scratch affected areas. Rubbing or scratching may force fibers into skin. Seek medical attention if irritation persists.

INGESTION:

- Ingestion of this material is unlikely. If it does occur, seek immediate medical attention.

INHALATION:

- Move person to fresh air. Seek medical attention if irritation persists.

Section 5: FIRE FIGHTING MEASURES

FLASH POINT: None.

FLAMMABLE LIMITS (% BY VOL): None.

AUTOIGNITION TEMP: Not applicable.

EXTINGUISHING MEDIA: Water, foam, CO₂ or dry chemical

UNUSUAL FIRE AND EXPLOSION HAZARDS: None Known.

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FIRE FIGHTING INSTRUCTIONS: Use self-contained breathing apparatus (SCBA) in a sustained fire.

HAZARDOUS COMBUSTION PRODUCTS: Primary combustion products are carbon monoxide, carbon dioxide and water. Other undetermined compounds could be released in small quantities.

Section 6: ACCIDENTAL RELEASE MEASURES

LAND SPILL: Scoop up material and put into suitable container for disposal as a non-hazardous waste.

WATER SPILL: This material will sink and disperse along the bottom of waterways and ponds. It can not easily be removed after it is waterborne; however, the material is non-hazardous in water.

AIR RELEASE: This material will settle out of the air. If concentrated on land it can then be scooped up for disposal as a non-hazardous waste.

Section 7: HANDLING AND STORAGE

STORAGE TEMPERATURE: Not applicable.

STORAGE PRESSURE: Not applicable.

GENERAL: No special storage or handling procedures are required for this material.

Section 8: EXPOSURE CONTROLS, PERSONAL PROTECTION

Ingredient	OSHA PEL (8-hr TWA)	ACGIH TLV (8-hr TWA)
Fiber Glass Continuous Filament	5 mg/m ³ (respirable dust) 15 mg/ m ³ (total dust) 1 fiber/cc (proposed)	10 mg/ m ³ (inhalable) 3 mg/ m ³ (respirable)
Sizing	None Established	None Established
Polyester Yarn	5 mg/ m ³ (respirable dust) 15 mg/ m ³ (total dust)	10 mg/ m ³ (inhalable) 3 mg/ m ³ (respirable)

VENTILATION: General dilution ventilation and or/local exhaust ventilation should be provided as necessary to maintain exposures below regulatory limits.

PERSONAL PROTECTION:

RESPIRATORY PROTECTION: A properly fitted NIOSH/MSHA approved disposable dust respirator such as the 3M model 8210 (or 8710) or model 9900 (in high humidity environments) or equivalent should be used when: high dust levels are encountered; the level of glass fibers in the air exceeds the OSHA permissible limits; or if irritation occurs. Use respiratory protection program, local regulations and OSHA regulations under 29 CFR 1910.134.

SKIN PROTECTION: Loose fitting long sleeved shirt that covers to the base of the neck, long pants and gloves. Skin irritation is known to occur chiefly at pressure points such as around neck, wrist, and between fingers.

EYE PROTECTION: Safety glasses or goggles.

WORK AND HYGIENIC PRACTICES: Handle using good industrial hygiene and safety practices. Avoid unnecessary contact with dusts and fibers by using good local exhaust ventilation. Remove material from the skin and eyes after contact. Remove material from clothing using vacuum equipment (never use compressed air and always wash work clothes separately from other clothing. Wipe out the washer or sink to prevent loose glass fibers from getting on other clothing). Keep the work area clean of dusts and fibers (avoid sweeping or using compressed air as these techniques re-suspend dusts and fibers into the air). Have access to safety showers and eye wash stations.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

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APPEARANCE: White/off-white
 PHYSICAL STATE: Solid
 ODOR: None
 VAPOR PRESS: Not applicable
 VAPOR DENSITY: Not applicable
 BOILING PT: Not applicable
 SPECIFIC GRAVITY: 2.60
 SOLUBILITY IN H₂O: Insoluble
 EVAPORATION RATE: Not applicable
 VISCOSITY: Not applicable
 % VOLATILE (BY WT): Not applicable
 pH: Not applicable

Section 10: STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable.
 INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID: None known.
 HAZARDOUS POLYMERIZATION: Will not occur.
 HAZARDOUS DECOMPOSITION: Sizings or bindings may decompose in a fire. See Section 5 of MSDS for combustion products statement.

Section 11: TOXICOLOGICAL INFORMATION

CARCINOGENICITY: The table below indicates whether or not each agency has listed each ingredient as a carcinogen:

Ingredient	ACGIH	IARC	NTP	OSHA
Fiber Glass Continuous Filament	A4	3	No	No
Sizing	No	No	No	No
Polyester Yarn	No	No	No	No
	LD ₅₀ Oral (g/kg)	LD ₅₀ Dermal (g/kg)	LC ₅₀ Inhalation (ppm, 8 hrs.)	
Fiber Glass Continuous Filament	Not Available	Not Available	Not Available	
Sizing	Not Available	Not Available	Not Available	
Polyester Yarn	Not Available	Not Available	Not Available	

FIBER GLASS CONTINUOUS FILAMENT: The International Agency for Research on Cancer (IARC) in June, 1987, categorized fiber glass continuous filament as not classifiable with respect to human carcinogenicity (Group 3). The evidence from human as well as animal studies was evaluated by IARC as insufficient to classify fiberglass continuous filament as a possible, probable, or confirmed cancer causing material.

Section 12: ECOLOGICAL INFORMATION

This material is not expected to cause harm to animals, plants, or fish.

Section 13: DISPOSAL CONSIDERATIONS

RCRA HAZARD CLASS: Non-hazardous

Section 14: TRANSPORT INFORMATION (U.S. & Canada)

DOT SHIPPING NAMES: Not regulated
 HAZARD CLASS OF DIVISION: None
 IDENTIFICATION NO.: None
 LABEL(S) REQUIRED (if not accepted): None
 SPECIAL PROVISIONS: None
 NON-BULK PACKAGING: None

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EPA HAZARDOUS SUBSTANCES: None
 QUANTITY LIMITATIONS: None
 MARINE POLLUTANTS: None
 FREIGHT DESCRIPTION: None
 HAZARDOUS MATERIAL SHIPPING DESCRIPTION: None
 SECONDARY: None
 PACKAGING GROUP: None
 PACKAGING EXCEPTIONS: None
 BULK PACKAGING: None
 RQ: None

Section 15: REGULATORY INFORMATION

TSCA STATUS:	Each ingredient is on the Inventory
NSR STATUS (Canada):	Each ingredient is on the DSL
SARA Title III:	Hazard Categories: Acute Health: Yes Chronic Health: No Fire Hazard: No Pressure Hazard: No Reactivity Hazard: No Reportable Ingredients: Sec. 302/304: None Sec. 313: None
California Proposition 65:	No ingredient is listed.
Clean Air Act:	No ingredient is listed
WHMIS (Canada):	Status: Not Controlled WHMIS Classification(s): None

Section 16: Other Information

HMIS AND NFPA HAZARD RATING:	Category	HMIS	NFPA
	Acute Health	1	1
	Flammability	0	0
	Reactivity	0	0

NFPA Unusual Hazards: None.
HMIS Personal Protection: To be supplied by user depending upon use.

END OF MSDS

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