

## Glass fabric system for structural strengthening

### DESCRIPTION:

V-Wrap EG-50 is a unidirectional E-Glass fiber fabric oriented in the 0° direction. Epoxies (Type 1 or Type 2) are two-component 100% solids, moisture-tolerant, high strength, high modulus, self-priming structural epoxy adhesives. Type 2 may also be used as filler putty. Material is field laminated using Type 1 or Type 2 epoxy to form a glass fiber reinforced polymer (GFRP) system used for upgrading structural elements.

### WHERE TO USE:

- **Loading increases**  
Increasing the live load capacity of floor systems  
Increasing shear and flexural strengths of reinforced and prestressed bridge girders
- **Increasing the axial capacity and ductility of columns**  
Increasing the live load capacity of parking garages
- **Seismic strengthening**  
Column confinement for ductility improvement  
Masonry shear walls strengthening
- **Damage to structural parts**  
Correct strength deficiency due to deterioration and corrosion  
Restore strength of structural elements damaged by fire
- **Change in structural system**  
Load redistribution due to removal of walls or columns  
Removal of slab sections for openings
- **Design or construction defects**  
Insufficient amount of shear or flexural reinforcement  
Insufficient size and/or layout of reinforcements  
Insufficient reinforcing bar or lap splice length

### ADVANTAGES:

- Non-corrosive reinforcement system
- Lightweight flexible fabric can be wrapped around complex shapes
- Used for shear, confinement or flexural strengthening
- High strength
- Light weight
- Low aesthetic impact

### Typical Data for V-Wrap EG-50

|                                 |                                 |
|---------------------------------|---------------------------------|
| <b>Storage Conditions:</b>      | Store dry at 40°F – 95°F        |
| <b>Color:</b>                   | White                           |
| <b>Primary Fiber Direction:</b> | 0° (unidirectional)             |
| <b>Weight per Square Yard:</b>  | 27.0 oz (900 g/m <sup>2</sup> ) |
| <b>Shelf life:</b>              | 10 years                        |

### Cured Laminate Properties (Design Value)

|                                 |   |
|---------------------------------|---|
| <b>Tensile Strength:</b>        | 81,000 psi (558 N/mm <sup>2</sup> )                   |
| <b>Modulus of Elasticity:</b>   | 3.5 x 10 <sup>6</sup> psi (24,400 N/mm <sup>2</sup> ) |
| <b>Elongation at Break:</b>     | 2.2%  |
| <b>Thickness:</b>               | 0.04 in. (1.0 mm)                                     |
| <b>Strength per Inch Width:</b> | 2,100 lbs./layer (9.3 kN)                             |

### Fiber Properties

|                          |   |
|--------------------------|---|
| <b>Tensile Strength:</b> | 330,000 psi (2,270 N/mm <sup>2</sup> )                  |
| <b>Tensile Modulus:</b>  | 10.5 x 10 <sup>6</sup> psi (234,000 N/mm <sup>2</sup> ) |
| <b>Elongation:</b>       | 4.0%  |
| <b>Density:</b>          | 0.092 lbs/in <sup>3</sup> (2.54 g/cc)                   |

### Epoxy Material Properties

|                               | Type 1   | Type 2   |
|-------------------------------|--|--|
| <b>Tensile Strength:</b>      | 8,000 psi (55 N/mm <sup>2</sup> )                        | 4,300 psi (30 N/mm <sup>2</sup> )                    |
| <b>Modulus of Elasticity:</b> | 5.0 x 10 <sup>5</sup> psi (3,450 N/mm <sup>2</sup> )     | 5.5 x 10 <sup>5</sup> psi (3,800 N/mm <sup>2</sup> ) |
| <b>Elongation at Break:</b>   | 3.0%   | 1.5%   |
| <b>Pot Life:</b>              | 4 hrs  | 30 Min.  |
| <b>Color:</b>                 | Clear  | Light gray   |
| <b>Shelf life (unopened):</b> | 2 years  | 2 years  |
| <b>Mixing:</b>                | Mix entire unit component A with entire unit component B |  |

\* Design and specification values will vary based on individual project requirements and applicable safety factors. Contact VSL Engineers to determine appropriate specification values.

### PACKAGING:

|               |  |
|---------------|--|
| Fabric:       | 50 in. x 150ft. [625 ft <sup>2</sup> ] Rolls |
| Type 1 Resin: | 4-gallon units                               |
| Type 2 Resin: | 1-gallon units                               |

### COVERAGE:

|                           |                           |
|---------------------------|---------------------------|
| <b>Type 1 Resin:</b>      |                           |
| As a sealer/primer:       | 100 ft <sup>2</sup> /gal. |
| As an impregnating resin: | 60 ft <sup>2</sup> /gal.  |
| Final coat:               | 140 ft <sup>2</sup> /gal. |
| <b>Type 2 Resin:</b>      |                           |
| As a putty filler/primer: | 40 ft <sup>2</sup> /gal.  |
| As an impregnating resin: | 100 ft <sup>2</sup> /gal. |
| Final coat:               | 120 ft <sup>2</sup> /gal. |

### DESIGN:

Design should comply with ACI 440 or recognized design/specification entity, and is typically based on CFRP contribution determined by detailed analysis. Design

values will vary based on project requirements and applicable environmental and strength reduction factors. Contact VSL Engineers to determine applicable reduction factors.

### SURFACE PREPARATION:

Surfaces to receive V-Wrap EG-50 must be clean and sound. It must be dry and free of frost. All dust, laitance, grease, curing compounds, waxes, deteriorated materials, and other bond inhibiting materials must be removed from the surface prior to application. Existing uneven surfaces must be filled with appropriate epoxy filler or repair mortar. Sandblast, pressure wash, shotblast or use other approved mechanical means to achieve an open-pore texture with a concrete surface profile of CSP 3 or better (ICRI). In certain applications and at the engineer's discretion, the intimate contact between the substrate and the fabric may be determined to be non-critical

## Glass fabric system for structural strengthening

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(such as in column confinement applications). All corners must be rounded to 1/2" radius minimum. A minimum overlap [or lap splice] of 6" is required to achieve continuity. The adhesive strength of the concrete may be verified after surface preparation by random pull-off testing (ACI 503R) at the discretion of the engineer. Minimum tensile strength of 200 psi must be achieved.

### APPLICATION:

Prior to placing the fabric, the concrete surface is primed and sealed using epoxy resin. Material can be applied by trowel or roller. V-Wrap EG-50 can be impregnated using either type 1 or type 2 epoxy. For small projects, the fabric may saturate by hand using a roller prior to placement. On larger projects, the impregnation process may be accomplished using a mechanically driven fabric saturator. Installation of the V-Wrap EG-50 strengthening system should be performed only by a specially trained, approved contractor.

### CUTTING V-Wrap EG-50:

Fabric can be cut to appropriate length by using a commercial quality heavy-duty scissors.

### LIMITATIONS:

- Design calculations must be made and certified by an independent licensed professional engineer.
- System is a vapor barrier. Concrete should not be encapsulated in areas of freeze/thaw.
- Concrete deterioration and steel corrosion must be resolved prior to application.
- Minimum application temperature is 40°F.

### CAUTION:

#### Type 1 Resin:

##### Component 'A' - Irritant; Sensitizer:

Contains epoxy resin. Skin and eye irritant. May cause sensitization after prolonged or repeated contact. High concentrations of vapor may cause respiratory irritation. Harmful if swallowed. Avoid skin contact. Use only with adequate ventilation. Use of safety goggles and chemical resistant gloves is recommended.

In case of exceedance of PELs, use an appropriate, properly fitted NIOSH/MSHA approved respirator. Remove contaminated clothing. Consult MSDS for more detailed information.

HMIS Rating: H-2, F-1, R-0, P-B

##### Component 'B' - Corrosive; Sensitizer:

Contains amines. Contact with eyes or skin causes severe burns. Can cause sensitization after prolonged or repeated contact. Skin and eye irritant. High concentrations of vapor may cause respiratory irritation. Harmful if swallowed.

HMIS Rating: H-3, F-1, R-0, P-C

### FIRST AID:

Skin: Wash immediately and thoroughly with soap and water. Eyes: Flush immediately with plenty of water for at least 15 minutes; contact physician immediately. Inhalation: Remove person to fresh air. Ingestion: Do not induce vomiting. Contact a physician. In all cases, contact physician if symptoms persist. Avoid contact. Wear chemical resistant clothing/gloves/goggles. Ventilate area. In absence of adequate ventilation, use properly fitted NIOSH respirator.

### HANDLING AND STORAGE:

Avoid direct contact. Use chemical resistant clothing/gloves/goggles. Use only with adequate general and local ventilation. In absence of adequate ventilation, use properly fitted NIOSH respirator. Wash thoroughly after handling product. Remove contaminated clothing and launder before reuse. Store at 40°-95°F (4°-35°C) under dry conditions. Condition material to 65°-75°F before using. Keep container tightly closed.

### CLEAN UP:

Confine spill. Collect with absorbent material and transfer to sealed containers. Uncured material can be removed with approved solvent. Follow solvent manufacturer's handling and safety instructions. Cured material can only be removed mechanically. Dispose of in accordance with current, applicable local, state,

and federal regulations. Cured material can only be removed mechanically.

### Type 2 Resin:

##### Component 'A' - Irritant; Sensitizer:

Contains epoxy resin. Can cause sensitization after prolonged or repeated contact. Skin and eye irritant. High concentrations of vapor may cause respiratory irritation. Avoid skin contact. Use only with adequate ventilation. Use of safety goggles and chemical resistant gloves is recommended. In case of exceedance of PELs, use an appropriate, properly fitted NIOSH/MSHA approved respirator. Remove contaminated clothing. Consult MSDS for more detailed information.

##### Component 'B' - Corrosive; Sensitizer:

Contains amines. Contact with eyes or skin may cause severe burns. Can cause sensitization after prolonged or repeated contact. Skin and eye irritant. High concentrations of vapor may cause respiratory irritation. Avoid skin contact. Use only with adequate ventilation. Use of safety goggles and chemical resistant gloves is recommended. In case of exceedance of PELs, use an appropriate NIOSH/MSHA approved respirator. Remove contaminated clothing. Consult MSDS for more detailed information.

### FIRST AID:

In case of skin contact, wash immediately and thoroughly with soap and water. For eye contact, flush immediately with plenty of water for at least 15 minutes; contact physician immediately. For respiratory problems, remove person to fresh air. Wash clothing before reuse.

### CLEAN UP:

Ventilate area. Confine spill. Collect with absorbent material. Dispose of in accordance with current, applicable local, state, and federal regulations. Uncured material can be removed with approved solvent. Cured material can only be removed mechanically.

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