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ICC-ES Evaluation Report
ESR-4923

Issued June 2023

This report is subject to renewal June 2024.

DIVISION: 03 00 00—CONCRETE
Section: 03 20 00—Concrete Reinforcing
Section: 03 21 00—Reinforcement Bars

REPORT HOLDER:

PULTRALL, INC.

EVALUATION SUBJECT:

V-ROD™ Poly GLASS FIBER REINFORCED POLYMER (GFRP) BARS AS SHRINKAGE AND TEMPERATURE REINFORCEMENT

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021 *International Building Code*® (IBC)
- 2021 *International Residential Code*® (IRC)

Properties evaluated:

- Crack Control
- Physical

2.0 USES

The V-ROD™ Poly Glass Fiber Reinforced Polymer (GFRP) bar is used as an alternative to the shrinkage and temperature reinforcement specified in Section 24.4 of ACI 318-19 for plain concrete footings and for plain concrete slabs (as defined by ACI 360) supported directly on the ground.

The V-ROD™ Poly Glass Fiber Reinforced Polymer (GFRP) bar is also used as an alternative to horizontal temperature and shrinkage reinforcement in structural plain concrete walls covered in IBC Section 1901.2 of the 2021 IBC, IRC Sections R404.1.3 and R608.1, and ACI 332-20 Sections 9.2.1 and 9.2.7, excluding walls where vertical reinforcement is required.

3.0 DESCRIPTION

The V-ROD™ Poly Glass Fiber Reinforced Polymer (GFRP) bar is solid and has a circular cross section composed of glass fibers embedded in a resin matrix. Available bar sizes and properties are provided in Table 1 of this report.

4.0 INSTALLATION

The V-ROD™ Poly Glass Fiber Reinforced Polymer (GFRP) bars must be installed in accordance with this report, applicable provisions in ACI 440.5-08, and Pultrall's Handling and Safety Instructions (Installation).

5.0 CONDITIONS OF USE

The V-ROD™ Poly Glass Fiber Reinforced Polymer (GFRP) bars described in this report comply with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Installation of FRP bars used as temperature and shrinkage reinforcement for plain concrete footings, plain concrete slabs, and as horizontal reinforcement in plain concrete walls where vertical reinforcement is not required, must be in accordance with this evaluation report, and the report holder's Installation Manual. In case of conflict, this report governs.

5.2 V-ROD™ Poly Glass Fiber Reinforced Polymer (GFRP) bar designations of No. 3 and No. 4, as shown in Table 1 of this report, with a maximum spacing of 12 inches (300 mm) can be used as an alternative to conventional temperature and shrinkage reinforcement with maximum steel bar designations of No. 3 and No. 4 and minimum spacing of 12 inches (300 mm). Alternate spacings for V-ROD™ Poly FRP bar greater than 12 inches (300 mm) have not been evaluated and may be considered by a registered design professional to the satisfaction of the code official for each project.

5.3 Complete construction documents, including plans showing compliance with the evaluation report, must be submitted to the code official for each project at the time of permit application. The construction documents must be prepared and sealed by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.4 V-ROD™ Poly Glass Fiber Reinforced Polymer (GFRP) bars must be stored and protected during storage in accordance with the guidelines given in ACI 440.5-08.

5.5 Special inspection as required by Table 1705.3 of the IBC for steel-reinforced concrete construction is also applicable to FRP bars construction under this report.

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5.6 Use of FRP bars does not eliminate the requirement for joints specified in Section 14.3.4 of ACI 318 (IBC and IRC).

5.7 V-ROD™ Poly Glass Fiber Reinforced Polymer (GFRP) bars are manufactured under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Fiber-reinforced Polymer (FRP) Bars and Meshes for Internal Reinforcement of Non-structural Concrete Members (AC521), dated October 2020 (Editorially revised May 2021), including fiber mass content, moisture absorption, shrinkage crack resistance, and quality control documentation.

7.0 IDENTIFICATION

7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-4923) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.

7.2 In addition, The V-ROD™ Poly Glass Fiber Reinforced Polymer (GFRP) bars are identified by packaging labeled with the company name (Pultrall, Inc.) and contact information, product name, bar size, and lot number.

TABLE 1—V-ROD™ POLY GLASS FIBER REINFORCED (GFRP) BAR DIMENSIONS AND PROPERTIES

BAR DESIGNATION NUMBER	NOMINAL DIAMETER (in)	NOMINAL CROSS SECTIONAL AREA (in^2)	GUARANTEED ULTIMATE TENSILE FORCE (kip)	MEAN TENSILE MODULUS OF ELASTICITY (ksi)	MEAN ULTIMATE TENSILE STRAIN (%)
M10 (No. 3)	3/8	0.110	14.3	7,200	2.3
M12 (No. 4)	½	0.187	27.6	7,300	2.1

For **SI**: 1 inch = 25.4 mm, 1 kip = 4.45kN, 1 psi = 6.89 kPa, 1 ksi = 6.89 MPa