

# ICC-ES Evaluation Report

**ESR-3920**

Issued January 2026

Subject to renewal January 2027

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|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>DIVISION: 03 00 00 — CONCRETE</b><br><br><b>Section: 03 20 00 — Concrete Reinforcing</b><br><br><b>Section: 03 21 00 — Reinforcement Bars</b> | <b>REPORT HOLDER:</b><br><br><b>REBARX USA, INC.</b> | <b>EVALUATION SUBJECT:</b><br><br><b>REBARX</b> |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------|

## 1.0 EVALUATION SCOPE

**Compliance with the following codes:**

- 2024, 2021, 2018, 2015, 2012 and 2009 [International Building Code® \(IBC\)](#)
- 2024, 2021, 2018, 2015, 2012 and 2009 [International Residential Code® \(IRC\)](#)

**Property evaluated:**

- Physical
- Structural
- Durability

## 2.0 USES

The RebarX Glass Fiber Reinforced Polymer (GFRP) reinforcing bars are used as tension reinforcements in flexural concrete members such as beams, shallow foundations, and one-way or two-way elevated slabs, and as vertical reinforcement in concrete columns and walls in normal-weight concrete. The RebarX GFRP reinforcing bars may also be used where an engineering design is submitted in accordance with IRC Section R301.1.3 and is approved by the building official in accordance with the 2024 IRC Section R104.2.2 (Section R104.11 of the 2021, 2018, 2015, 2012 and 2009 IRC).

## 3.0 DESCRIPTION

The RebarX bars are glass fiber-reinforced polymer (GFRP) reinforcing bars that are solid and have circular cross-sections composed of glass fibers embedded in a resin matrix. Available bar sizes and properties are provided in [Table 1](#) of this report.

## 4.0 DESIGN AND INSTALLATION

### 4.1 Design:

The RebarX GFRP reinforcing bars described in this report must be designed in accordance with ACI CODE 440.11-22 and Chapter 19 of the IBC (ACI 318-19 for the 2024 and 2021 IBC, ACI 318-14 for the 2018 and 2015 IBC, ACI 318-11 for the 2012 IBC, and ACI 318-08 for the 2009 IBC), as applicable. The registered design professional must be responsible for determining, through analysis, the strengths and demands of the structural elements, subject to the approval the building official.

The following limitations also apply:

1. The RebarX GFRP reinforcing bars are limited for use as (a) tension reinforcement in flexural concrete members; (b) vertical reinforcement in concrete columns and walls.
2. The RebarX GFRP reinforcing bars are limited to concrete members in normal-weight concrete.
3. The bond coefficient,  $K_b$  of the RebarX GFRP reinforcing bars must be 1.2.
4. Bent shapes, continuous closed stirrups, and ties (hoops) are outside the scope of this report.
5. There is no restriction for the shape of flexural concrete member cross-section (e.g., rectangular, T-shape, L-shape).
6. For flexural reinforcement, the use of multiple bar layers and bar bundling is permitted. For multiple bar layers, the relevant provisions for steel reinforcing bars in ACI 318 and ACI CODE 440.11-22 must apply to FRP bars. Because the FRP bars have no plastic region, the stress in each reinforcement layer varies depending on its distance from the neutral axis. Thus, the analysis of the flexural capacity must be based on a strain-compatibility approach. For bundled bars, all relevant provisions of ACI CODE 440.11-22 and ACI 318 apply.

#### 4.2 Installation:

The RebarX GFRP reinforcing bars must be installed in accordance with the approved drawings and specifications. Reinforcement details, including tolerances, reinforcement relation, concrete cover, and reinforcement supports, must comply with the applicable provisions in Part 3 of ACI SPEC 440.5-22.

#### 4.3 Special Inspection:

Special inspection is required in accordance with Table 1705.3 of the IBC. The special inspector must verify, but is not limited to, the following:

1. The RebarX GFRP reinforcing bars are of the types and sizes specified and are labeled in conformance with this report.
2. The RebarX GFRP reinforcing bars are placed within tolerances set forth in ACI SPEC 440.5-22 Section 3.2 and are adequately supported and secured to prevent displacement during concrete placement.
3. The minimum concrete cover is provided in accordance with ACI SPEC 440.5-22 Section 3.2.
4. The placement, quantity, and size of the RebarX GFRP reinforcing bars comply with the approved drawings and specifications.

### 5.0 CONDITIONS OF USE:

The RebarX GFRP reinforcing bars described in this report comply with, or are 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 Design and installation must be in accordance with this report, ACI CODE 440.11-22, the IBC, or the IRC, as applicable. In case of conflict, this report governs.
- 5.2 Complete construction documents, including plans and calculations verifying compliance with this 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.
- 5.3 The fire-resistance rating of the RebarX GFRP reinforcing bars in a reinforced concrete assembly has not been evaluated and is outside the scope of the evaluation report.
- 5.4 RebarX GFRP reinforcing bars used in reinforced concrete elements designed in accordance with ACI CODE 440.11-22 may be used in Types I, II, III, IV or V construction in accordance with IBC Section 603.1, Item 20, and any construction permitted under the IRC.
- 5.5 RebarX GFRP reinforcing bars must be stored above the surface of the ground on platforms, skids or other supports as close as possible to the point of placement. If stored outdoors, the RebarX GFRP reinforcing bars must be covered with opaque plastic or other types of cover that will protect the bars from ultraviolet rays.
- 5.6 Use of RebarX GFRP reinforcing bars in structural members for structures assigned in Seismic Design Categories B through F under the 2024 IBC (Seismic Design Categories C through F under the 2021, 2018, 2015, 2012 and 2009 IBC) are permitted when the following conditions are met: (1) structural

members are not considered part of the lateral force-resisting system, (2) structural members are not required to be designed to accommodate drifts and forces that occur as the building responds to a seismic event.

- 5.7 Special inspection must be provided in accordance with Section 4.3 of this report.
- 5.8 RebarX GFRP reinforcing 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 for Internal Reinforcement of Concrete Members AC454 \(24\)](#), dated April 2025, including fiber mass content, moisture absorption and alkaline 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-3920) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.
- 7.2 The report holder's contact information is the following:

**REBARX USA, INC.**  
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**TABLE 1—DIMENSIONS AND PROPERTIES**

| BAR DESIGNATION NUMBER | NOMINAL DIAMETER (in) | NOMINAL CROSS SECTIONAL AREA (in <sup>2</sup> ) | MEAN MEASURED CROSS SECTIONAL AREA (in <sup>2</sup> )* | GUARANTEED ULTIMATE TENSILE FORCE (kips) | MEAN TENSILE MODULUS OF ELASTICITY (ksi) | MEAN ULTIMATE TENSILE STRAIN (%) | GUARANTEED TRANSVERSE SHEAR STRENGTH (ksi) | GUARANTEED BOND STRENGTH (ksi) |
|------------------------|-----------------------|-------------------------------------------------|--------------------------------------------------------|------------------------------------------|------------------------------------------|----------------------------------|--------------------------------------------|--------------------------------|
| 4 (M13)                | 0.50                  | 0.20                                            | 0.187                                                  | 22.2                                     | 6,640                                    | 1.9                              | 20.5                                       | 1.3                            |

For SI: 1 inch = 25.4 mm, 1 kip = 4.45kN, 1 psi = 6.89 kPa, 1 ksi = 6.89 MPa, 1 in<sup>2</sup> = 645.2 mm<sup>2</sup>

\* Mean measured cross sectional area includes surface ribs.