ICC-ES Evaluation Report

ESR-4664

Reissued April 2026

Revised June 2026

This report remains under an active continuous compliance program through the end of March 2028.

This report also contains:

- City of LA Supplement
- CA Supplement

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DIVISION: 03 00 00—CONCRETE Section: 03 20 00—Concrete Reinforcing Section: 03 21 00—Reinforcement Bars	REPORT HOLDER: MST REBAR USA LLC	EVALUATION SUBJECT: 4EQ STRUCTURAL BAR™	

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2024, 2021, 2018 and 2015 *International Building Code®* (IBC)
- 2024, 2021, 2018 and 2015 *International Residential Code®* (IRC)

Properties evaluated:

- Physical
- Structural
- Durability

2.0 USES

The 4EQ Structural Bar™ is 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, as permitted by Section 104.2.3 of the 2024 IBC (Section 104.11 of the 2021, 2018 and 2015 IBC). The 4EQ Structural Bar™ may also be used where an engineering design is submitted in accordance with IRC Section R301.1.3 and where approved by the building official in accordance with Section R104.2.2 of the 2024 IRC (Section R104.11 of the 2021, 2018 and 2015 IRC).

3.0 DESCRIPTION

The 4EQ Structural Bar™ is fiber-reinforced polymer (FRP) bar that is solid and have circular cross section composed of glass fibers embedded in a resin matrix. Available bar size and properties are provided in Table 1 of this report.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The 4EQ Structural Bar™ must be designed in accordance with ACI CODE 440.11-22, and Chapter 19 of the IBC (ACI 318-19 for 2021 IBC and ACI 318-14 for the 2018 and 2015 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 of the building official.

The following limitations also apply:

1. The 4EQ Structural Bar™ is limited for use as (a) tension reinforcement in flexural concrete members; (b) vertical reinforcement in concrete columns and walls.
2. The 4EQ Structural Bar™ is limited to concrete members in normal-weight concrete.
3. The bond coefficient, K_b of the 4EQ Structural Bar™ 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 multiple bar layers, the relevant provisions for steel reinforcing bar in ACI 318 and ACI CODE 440.11-22 must also apply to FRP bars, because the FRP bars have no plastic region and the stress in each reinforcing 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.

4.2 Installation:

The 4EQ Structural Bar™ 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 are not limited to, the following:

1. The 4EQ Structural bar™ is of the type and size specified and is labeled in conformance with this report.
2. The 4EQ Structural Bar™ is placed within tolerances set forth in ACI SPEC 440.5-22 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.
4. The placement, quantity and size of the 4EQ Structural bar™ comply with the approved drawings and specifications.

5.0 CONDITIONS OF USE:

The 4EQ Structural Bar™ described in this report complies 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 Design and installation must be in accordance with this report, ACI CODE 440.11-22, and 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 4EQ Structural Bar™ in a reinforced concrete assembly is outside the scope of the evaluation report, and concrete assemblies with 4EQ Structural Bar™ are limited to Type VB construction under the IBC or IRC.

5.4 4EQ Structural Bar™ 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 4EQ Structural Bar™ must be covered with opaque plastic or other types of cover that will protect the bars from ultraviolet rays.

5.5 Use of 4EQ Structural Bar™ 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 and 2015 IBC) is 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.

5.6 Special inspection must be provided in accordance with Section 4.3 of this report.

5.7 4EQ Structural Bar™ is 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), dated October 2022, 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-4664) 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 4EQ Structural Bar™ is identified by packaging labeled with the company name (MST REBAR USA LLC) and contact information, product name, bar size and lot number.

7.3 The report holder's contact information is the following:

MST REBAR USA LLC
205 INDUSTRIAL DR
BLADENBORO, NC 28320
855-740-0377
www.mstbar.com
info@mstbarusa.com

TABLE 1—DIMENSIONS AND PROPERTIES

BAR DESIGNATION NUMBER	NOMINAL DIAMETER (in)	NOMINAL CROSS SECTIONAL AREA (in^2)	MEAN MEASURED CROSS SECTIONAL AREA (in^2)*	GUARANTEED ULTIMATE TENSILE FORCE (kips)	MEAN TENSILE MODULUS OF ELASTICITY (ksi)	MEAN ULTIMATE TENSILE STRAIN (%)	GUARANTEED TRANSVERSE SHEAR STRENGTH (ksi)	GUARANTEED BOND STRENGTH (ksi)
3 (M10)	0.375	0.110	0.160	18.1	9427	1.91	32.9	3.60

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

* Mean measured cross sectional area includes surface ribs

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

REPORT HOLDER:

MST REBAR USA LLC

EVALUATION SUBJECT:

4EQ STRUCTURAL BAR™

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the 4EQ Structural bar™, described in ICC-ES evaluation report ESR-4664, has also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2026* *City of Los Angeles Building Code* (LABC)
- 2026* *City of Los Angeles Residential Code* (LARC)

*For evaluation for compliance with the anticipated requirements of the 2026 LABC and LARC

2.0 CONCLUSIONS

The 4EQ Structural bar™, described in Sections 2.0 through 7.0 of the evaluation report ESR-4664, complies with the LABC and the LARC, and are subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The 4EQ Structural bar™ described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report ESR-4664.
- The design, installation, conditions of use and identification of the 4EQ Structural bar™ are in accordance with the 2024 *International Building Code®* (IBC) provisions noted in the evaluation report ESR-4664.
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17 and 19.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.

This supplement expires concurrently with the evaluation report, reissued April 2026 and revised June 2026.

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

REPORT HOLDER:

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4EQ STRUCTURAL BAR™

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that 4EQ Structural bar™, described in ICC-ES evaluation report ESR-4664, has also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2025 *California Building Code* (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2025 *California Residential Code* (CRC)

2.0 CONCLUSIONS

2.1 CBC:

The 4EQ Structural bar™, described in Sections 2.0 through 7.0 of the evaluation report ESR-4664, complies with CBC, provided the design and installation are in accordance with the 2024 *International Building Code®* (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapters 16, 17 and 19, as applicable.

2.1.1 OSHPD:

The applicable OSHPD Sections and Chapters of the CBC are beyond the scope of this supplement.

2.1.2 DSA:

The applicable DSA Sections and Chapters of the CBC are beyond the scope of this supplement.

2.2 CRC:

The 4EQ Structural bar™, described in Sections 2.0 through 7.0 of the evaluation report ESR-4664, complies with CRC Section R301.1.3, provided the design and installation are in accordance with the 2024 *International Residential Code®* (IRC) provisions noted in the evaluation report.

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