

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

REPORT HOLDER:

SFTec, INC.

EVALUATION SUBJECT:

SFT-BAR®

1.0 EVALUATION SCOPE

Compliance with the following codes:

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

Properties evaluated:

- Physical
- Structural
- Durability

2.0 USES

The SFT-Bar® is used as tension reinforcement 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 104.11 of the IBC. The SFT-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 IRC Section R104.11.

3.0 DESCRIPTION

The SFT-Bar® is a fiber-reinforced polymer (FRP) bar that is solid and has a 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 SFT-Bar® must be designed in accordance with ACI CODE 440.11-22 and Chapter 19 of the 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 SFT-Bar® is limited for use as (a) tension reinforcement in flexural concrete members; (b) vertical reinforcement in concrete columns and walls.

2. The SFT-Bar® is limited to concrete members in normal-weight concrete.
3. The bond coefficient, K_b of the SFT-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 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 SFT-Bar® must be installed in accordance with the approved drawings and specifications. Reinforcement details, including preparation, 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 SFT-Bar® is of the type and size specified and is labeled in conformance with this report.
2. The SFT-Bar® is placed within tolerances set forth in ACI SPEC 440.5-22 and is 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 SFT-Bar® comply with the approved drawings and specifications.

5.0 CONDITIONS OF USE

The SFT-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 SFT-Bar® in a reinforced concrete assembly is outside the scope of the evaluation report, and concrete assemblies with SFT-Bar® are limited to Type VB construction under the IBC or IRC.
- 5.4 SFT-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 SFT-Bar® must be covered with opaque plastic or other types of cover that will protect the bars from ultraviolet rays.
- 5.5 Use of SFT-Bar® in structural members for structures assigned in Seismic Design Categories C through F 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 SFT-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-5081) along with the brand name, bar size, registered trademark, or registered logo of the report holder must be included in the product label.
- 7.2 In addition, identification includes the company name (SFTec Inc.) and contact information, diameter and production lot number. Only bundled bars are identified with ICC-ES ESR-5081 report number.
- 7.3 The report holder’s contact information is the following:

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TABLE 1—DIMENSIONS AND PROPERTIES FOR SFT-BAR®

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	0.11	0.142	16.0	10,900	1.6	31	1.3
4 (M13)	0.500	0.20	0.236	27.9	10,500	1.6	32	1.1
5 (M16)	0.625	0.31	0.324	34.9	8,700	1.5	27	1.5
6 (M19)	0.750	0.44	0.539	53.2	9,500	1.5	27	1.1

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.