

ICC-ES Evaluation Report

ESR-0000

Issued March 2023

This report also contains:

- CBC Supplement



Subject to renewal March 2024

- LABC Supplement



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<p>DIVISION: 03 00 00— CONCRETE</p> <p>Section: 03 16 00— Concrete Anchors</p> <p>DIVISION: 05 00 00— METALS</p> <p>Section: 05 05 19—Post- Installed Concrete Anchors</p>	<p>REPORT HOLDER: SAMPLE, INC.</p>  <p>SAMPLE</p>	<p>EVALUATION SUBJECT: SAMPLE SCREW ANCHORS FOR USE IN CRACKED AND UNCRACKED CONCRETE</p>	
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1.0 EVALUATION SCOPE

Compliance with the following codes:

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

For evaluation for compliance with codes adopted by the [Los Angeles Department of Building and Safety \(LADBS\)](#), see [ESR-0000 LABC and LARC Supplement](#).

Property evaluated:

Structural

2.0 USES

The Sample screw anchors are used as anchorage in cracked and uncracked normal-weight and lightweight concrete having a specified strength, f'_c , of 2,500 psi to 8,500 psi (17.2 MPa to 58.6 MPa); to resist static, wind and seismic (Seismic Design Categories A through F) tension and shear loads.

The Sample screw anchors are an alternative to anchors described in Section 1901.3 of the 2021, 2018 and 2015 IBC. The anchors may also be used where an engineered design is submitted in accordance with Section R301.1.3 of the IRC.

3.0 DESCRIPTION

3.1 Sample screw anchors

The Sample screw anchors are comprised of a body with hex washer head. The anchor is manufactured from carbon steel and is heat-treated. The anchoring system is available in a variety of lengths with nominal diameters of $\frac{3}{8}$ -inch and $\frac{1}{2}$ -inch. The Sample screw anchor is illustrated in [Figure 1](#).

3.2 Concrete:

Normal-weight and lightweight concrete must conform to Sections 1903 and 1905 of the IBC.

4.0 DESIGN AND INSTALLATION

4.1 Strength Design:

4.1.1 General: Design strength of anchors complying with the 2021 IBC as well as Section R301.1.3 of the 2021 IRC must be determined in accordance with ACI 318-19 Chapter 17 and this report.

Design strength of anchors complying with the 2018 and 2015 IBC, as well as Section R301.1.3 of the 2018 and 2015 IRC, must be determined in accordance with ACI 318-14 Chapter 17 and this report.

Design parameters provided in [Table 1](#) and [Table 2](#) of this report are based on the 2021 IBC (ACI 318-19), 2018 and 2015 IBC (ACI 318-14) unless noted otherwise in Sections 4.1.1 through 4.1.12.

The strength design of anchors must comply with ACI 318-19 17.5.1.2 or ACI 318-14 17.3.1, as applicable, except as required in ACI 318-19 17.10 or ACI 318-14 17.2.3, as applicable. Strength reduction factors, ϕ , as given in ACI 318-19 17.5.3 or ACI 318-14 17.3.3, as applicable, and noted in [Table 1](#) and [Table 2](#) of this report, must be used for load combinations calculated in accordance with Section 1605.1 of the 2021 IBC or Section 1605.2 of the 2018 and 2015 IBC and Section 5.3 of ACI 318 (-19 and -14), as applicable.

The value of f'_c used in the calculations must be limited to a maximum of 8,000 psi (55.2 MPa), in accordance with ACI 318-19 17.3.1 or ACI 318-14 17.2.7, as applicable.

4.1.2 Requirements for Static Steel Strength in Tension, N_{sa} : The nominal static steel strength, N_{sa} , of a single anchor in tension calculated in accordance with ACI 318-19 17.6.1.2 or ACI 318-14 17.4.1.2, as applicable, is given in [Table 1](#) and [Table 2](#) of this report. Strength reduction factors, ϕ , corresponding to brittle steel elements must be used.

4.1.3 Requirements for Static Concrete Breakout Strength in Tension, N_{cb} or N_{cbg} : The nominal concrete breakout strength of a single anchor or a group of anchors in tension, N_{cb} and N_{cbg} , respectively, must be calculated in accordance with ACI 318-19 17.6.2 or ACI 318-14 17.4.2, as applicable, with modifications as described in this section. The basic concrete breakout strength of a single anchor in tension, N_b , must be calculated in accordance with ACI 318-19 17.6.2.2 or ACI 318-14 17.4.2.2, as applicable, using the values of h_{ef} and k_{cr} as given in [Table 1](#) of this report. The nominal concrete breakout strength in tension in regions where analysis indicates no cracking in accordance with ACI 318-19 17.6.2.5 or ACI 318-14 17.4.2.6, as applicable, must be calculated with the value of k_{uncr} as given in [Table 1](#) with $\psi_{c,N} = 1.0$.

4.1.4 Requirements for Static Pullout Strength in Tension, N_p : The nominal pullout strength of a single anchor in accordance with ACI 318-19 17.6.3.1 and 17.6.3.2.1 or ACI 318-14 17.4.3.1 and 17.4.3.2, as applicable, in cracked and uncracked concrete, $N_{p,cr}$ and $N_{p,uncr}$, respectively, is given in [Table 1](#). In lieu of ACI 318-19 17.6.3.3 or ACI 318-14 17.4.3.6, as applicable, $\psi_{c,P} = 1.0$ for all design cases. In accordance with ACI 318-19 17.6.3 or ACI 318-14 17.4.3, as applicable, the nominal pullout strength in cracked concrete may be adjusted according to Eq.-1:

$$N_{p,f'_c} = N_{p,cr} \left(\frac{f'_c}{2,500} \right)^{0.5} \quad (\text{lb, psi}) \quad (\text{Eq-1})$$

$$N_{p,f'_c} = N_{p,cr} \left(\frac{f'_c}{17.2} \right)^{0.5} \quad (\text{N, MPa})$$

where f'_c is the specified concrete compressive strength.

In regions where analysis indicates no cracking in accordance with ACI 318-19 17.6.3.3 or ACI 318-14 17.4.3.6, as applicable, the nominal pullout strength in tension may be adjusted according to Eq-2:

$$N_{p,f'_c} = N_{p,uncr} \left(\frac{f'_c}{2,500} \right)^{0.5} \quad (\text{lb, psi}) \quad (\text{Eq-2})$$

$$N_{p,f'_c} = N_{p,uncr} \left(\frac{f'_c}{17.2} \right)^{0.5} \quad (\text{N, MPa})$$

where f'_c is the specified concrete compressive strength.

Where values for $N_{p,cr}$ or $N_{p,uncr}$ are not provided in [Table 1](#) of this report, the pullout strength in tension need not be considered.

4.1.5 Requirements for Static Steel Shear Capacity, V_{sa} : The nominal steel strength in shear, V_{sa} , of a single anchor in accordance with ACI 318-19 17.7.1.2 or ACI 318-14 17.5.1.2, as applicable is given in

5.0 CONDITIONS OF USE:

Sample concrete anchors described in this report are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The anchors must be installed in accordance with the manufacturer's published installation instructions and this report. In case of conflict, this report governs.
- 5.2 Anchor sizes, dimensions, and minimum embedment depths are as set forth in this report.
- 5.3 Anchors must be installed in accordance with Section 4.3 of this report in uncracked or cracked normal-weight concrete and lightweight concrete having a specified compressive strength, f'_c , of 2,500 psi to 8,500 psi (17.2 MPa to 58.6 MPa).
- 5.4 The value of f'_c used for calculation purposes must not exceed 8,000 psi (55.2 MPa).
- 5.5 Strength design values must be established in accordance with Section 4.1 of this report.
- 5.6 Allowable stress design values must be established in accordance with Section 4.2 of this report.
- 5.7 Anchor spacing(s) and edge distance(s), and minimum member thickness, must comply with [Table 1](#) of this report.
- 5.8 Prior to installation, calculations and details demonstrating compliance with this report must be submitted to the code official. The calculations and details must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.9 Since an ICC-ES acceptance criteria for evaluating data to determine the performance of anchors subjected to fatigue or shock loading is unavailable at this time, the use of these anchors under such conditions is beyond the scope of this report.
- 5.10 Anchors may be installed in regions of concrete where cracking has occurred or where analysis indicates cracking may occur ($f_t > f_r$), subject to the conditions of this report.
- 5.11 Anchors may be used to resist short-term loading due to wind or seismic forces, subject to the conditions of this report.
- 5.12 Anchors are not permitted to support fire-resistance-rated construction. Where not otherwise prohibited in the code, anchors are permitted for use with fire-resistance-rated construction provided that at least one of the following conditions is fulfilled:
 - Anchors are used to resist wind or seismic forces only.
 - Anchors that support gravity load-bearing structural elements are within a fire-resistance-rated envelope or a fire-resistance-rated membrane, are protected by approved fire-resistance-rated materials, or have been evaluated for resistance to fire exposure in accordance with recognized standards.
 - Anchors are used to support nonstructural elements.
- 5.13 Anchors have been evaluated for reliability against brittle failure and found to be not significantly sensitive to stress-induced hydrogen embrittlement.
- 5.14 Use of Sample carbon steel anchors are limited to dry, interior locations.
- 5.15 Special inspection must be provided in accordance with Sections 4.4.
- 5.16 Sample anchors 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 Mechanical Anchors in Concrete Elements \(AC193\)](#), dated October 2017 (editorially revised December 2020), which incorporates requirements in ACI 355.2-19 / ACI 355.2-07, for use in cracked and uncracked concrete; 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-0000) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.
- 7.2 Sample anchors are identified by packaging with the company name (Sample, Inc.), anchor name, anchor size, and evaluation report number (ESR-0000).
- 7.3 The report holder's contact information is the following:

SAMPLE, INC.
3060 SATURN STREET, SUITE 100
BREA, CALIFORNIA 92821
<https://icc-es.org/>

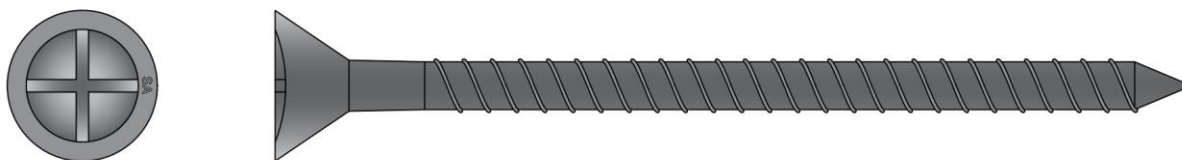
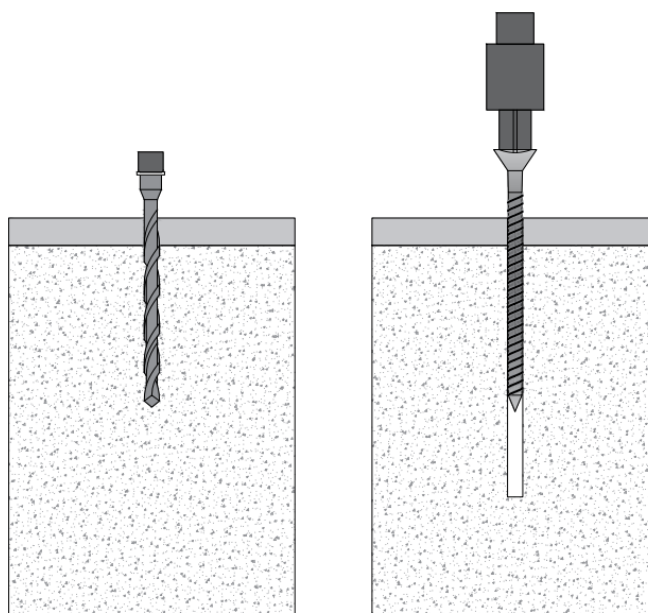


FIGURE 1—SAMPLE ANCHOR



Drill appropriate diameter
Clean the hole

Insert the screw
Tighten until secure

FIGURE 2—SAMPLE ANCHOR INSTALLATION