# ICC-ES Evaluation Report

**ESR-3852**

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| *Reissued March 2024* | *This report also contains:* |
| *Revised January 2025* | - **CA Supplement** |
| *Subject to renewal March 2026* | - **FL Supplement** |
| | - **City of LA Supplement** |



| DIVISION: 03 00 00—CONCRETE<br>Section: 03 16 00—Concrete Anchors<br>DIVISION: 05 00 00—METALS<br>Section: 05 05 19—Post-Installed Concrete Anchors | REPORT HOLDER:<br>COBRA ANCHORS CO., LTD.<br>ADDITIONAL LISTEE:<br>COBRA ANCHORS CORP. | EVALUATION SUBJECT:<br>COBRA ANCHORS PARAWEDGE EXPANSION ANCHORS FOR CRACKED AND UNCRACKED CONCRETE | |
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## 1.0 EVALUATION SCOPE

**Compliance with the following codes:**

- 2021, 2018, 2015 and 2012 *International Building Code*® (IBC)
- 2021, 2018, 2015 and 2012 *International Residential Code*® (IRC)

**Property evaluated:**

Structural

## 2.0 USES

The Parawedge expansion anchors are used to resist static, wind, and earthquake tension and shear loads in normal-weight 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). The $^1/_4$-inch-diameter (6.4 mm) is used in uncracked concrete applications (Seismic Design Categories A and B only); The $^3/_8$-, $^1/_2$-, $^5/_8$- and $^3/_4$-inch (9.5 mm, 12.7 mm, 15.9 mm and 19.1 mm) are used in uncracked and cracked concrete applications (Seismic Design Categories A through F).

The anchors comply with Section 1901.3 of the 2021, 2018 and 2015 IBC and Section 1909 of the 2012 IBC. The anchors are an alternative to cast-in-place anchors described in Section 1908 of the 2012 IBC. The anchors may also be used where an engineered design is submitted in accordance with Section R301.1.3 of the IRC.

Installation instructions and information are set forth in Section 4.3 and Figure 3 of this report.

## 3.0 DESCRIPTION

### 3.1 Parawedge Expansion Anchors:

Parawedge expansion anchors are torque-controlled, mechanical expansion anchors. The anchor consists of a cold formed bolt (anchor body), clip (expansion element), washer and nut.

Available diameters are $^1/_4$-, $^3/_8$-, $^1/_2$-, $^5/_8$- and $^3/_4$-inch (6.4 mm, 9.5 mm, 12.7 mm, 15.9 mm and 19.1 mm). The $^1/_4$-inch-diameter anchors are manufactured from C1018 carbon steel and have a minimum tensile strength of 80,000 psi (552 MPa). The $^3/_8$-, $^1/_2$-, $^5/_8$- and $^3/_4$-inch diameter anchors are manufactured from C1008 carbon steel and have a minimum tensile strength of 65,000 psi (448 MPa). All diameters are zinc plated with minimum 0.0002-inch-thick (5 µm) plating in accordance with ASTM B633, SC1, Type III. The Parawedge expansion anchor is illustrated in Figure 1.

The anchor stud is cold formed and consists of a threaded section with standard coarse bolt threads at one end and a parabolic shaped taper mandrel neck at the opposite end.

The tapered mandrel is enclosed by a wedge clip that freely moves around the mandrel. The 360 degree wedge clip is restrained by the mandrel taper lower and by a collar upper. The anchor is installed in a predrilled hole with a hammer. When torque is applied to the nut of the installed anchor on the threaded end of the anchor body, the parabolic mandrel at the opposite end of the anchor is pulled into the wedge clip, forcing it to expand within the predrilled hole.

**3.2 Concrete:**

Normal-weight and lightweight concrete must comply with Sections 1903 and 1905 of the IBC as applicable.

## 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 Section 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 strength of anchors complying with the 2012 IBC, as well as Section R301.1.3 of the 2012 IRC, must be determined in accordance with ACI 318-11 Appendix D and this report.

Design parameters provided in Tables 1, 3, 4 and 5, examples given in Figure 4, and references to ACI 318 are based on the 2021 IBC (ACI 318-19), 2018 and 2015 IBC (ACI 318-14) and 2012 IBC (ACI 318-11) unless noted otherwise in Sections 4.1.1 through 4.1.12 of this report.

The strength design of anchors must comply with ACI 318-19 17.5.1.2, ACI 318-14 17.3.1 or ACI 318-11 D.4.1, as applicable, except as required in ACI 318-19 17.10, ACI 318-14 17.2.3 or ACI 318-11 D.3.3, as applicable. Strength reduction factors, $\phi$, as given in ACI 318-19 17.5.3, ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable, and noted in Tables 4 and 5 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, 2015 and 2012 IBC and Section 5.3 of ACI 318 (-19 and -14) or Section 9.2 of ACI 318-11, as applicable. Strength reduction factors, $\phi$, described in ACI 318-11 D.4.4, must be used for load combinations calculated in accordance with ACI 318-11 Appendix C. The value of $f'_c$ used in calculations must be limited to 8,000 psi (55.2 MPa), maximum, in accordance with ACI 318-19 17.3.1, ACI 318-14 17.2.7 or ACI 318-11 D.3.7, as applicable.

**4.1.2 Requirements for Static Steel Strength in Tension, $N_{sa}$:** The nominal static steel strength of a single anchor in tension, $N_{sa}$, calculated in accordance with ACI 318-19 17.6.1.2, ACI 318-14 17.4.1.2 or ACI 318-11 D.5.1.2, as applicable, is given in Table 4 of this report. Strength reduction factors, $\phi$, corresponding to ductile steel elements may 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, ACI 318-14 17.4.2 or ACI 318-11 D.5.2, as applicable, with modifications as described in this section. The basic concrete breakout strength in tension, $N_b$, must be calculated in accordance with ACI 318-19 17.6.2.2, ACI 318-14 17.4.2.2 or ACI 318-11 D.5.2.2, as applicable, using the values of $h_{ef}$ and $k_{cr}$ as given in Table 4 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, ACI 318-14 17.4.2.6 or ACI 318-11 D.5.2.6, as applicable, must be calculated with the value of $k_{uncr}$ as given in Table 4 and with $\psi_{c,N} = 1.0$.

**4.1.4 Requirements for Static Pullout Strength in Tension, $N_{pn}$:** The nominal pullout strength of a single anchor in tension in accordance with ACI 318-19 17.6.3, ACI 318-14 17.4.3 or ACI 318-11 D.5.3, as applicable, in cracked and uncracked concrete, $N_{p,cr}$ and $N_{p,uncr}$, respectively, is given in Table 4. In lieu of ACI 318-19 17.6.3.3, ACI 318-14 17.4.3.6 or ACI 318-11 D.5.3.6, as applicable, $\psi_{c,P}$ = 1.0 for all design cases. In accordance with ACI 318-19 17.6.3.2.1, ACI 318-14 17.4.3.2 or ACI 318-11 D.5.3.2, as applicable, the nominal pullout strength in cracked concrete must be adjusted by calculation according to Eq-1:

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

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

where $f'_c$ is the specified concrete compressive strength, and whereby the exponent $n$ = 0.5 for the $^3/_8$-inch-diameter anchor. Pullout strength in cracked concrete does not control for the $^1/_2$-, $^5/_8$-, and $^3/_4$-inch-diameter anchors and need not be calculated.

In regions where analysis indicates no cracking in accordance with ACI 318-19 17.6.3.3, ACI 318-14 17.4.3.6 or ACI 318-11 D.5.3.6, as applicable, the nominal pullout strength in tension can be adjusted by calculations according to Eq-2:

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

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

where $f'_c$ is the specified concrete compressive strength, and whereby the exponent $n$ = 0.37 for the $^1/_4$-inch and $^3/_8$-inch-diameter anchors. Pullout strength in uncracked concrete does not control for the $^1/_2$-, $^5/_8$-, and $^3/_4$-inch-diameter anchors and need not be calculated.

**4.1.5 Requirements for Static Steel Strength in Shear, $V_{sa}$:** The nominal steel strength in shear, $V_{sa}$, of a single anchor in accordance with ACI 318-19 17.7.1.2, ACI 318-14 17.5.1.2 or ACI 318-11 D.6.1.2, as applicable, is given in Table 5 of this report and must be used in lieu of the values derived by calculation from ACI 318-19 Eq. 17.7.1.2b, ACI 318-14 Eq. 17.5.1.2b or ACI 318-11 Eq. D-29, as applicable. The strength reduction factor, $\phi$, corresponding to a ductile steel element must be used for all anchors, as described in Table 5 of this report.

**4.1.6 Requirements for Static Concrete Breakout Strength in Shear, $V_{cb}$ or $V_{cbg}$:** The nominal concrete breakout strength of a single anchor or group of anchors in shear, $V_{cb}$ or $V_{cbg}$, respectively, must be calculated in accordance with ACI 318-19 17.7.2, ACI 318-14 17.5.2 or ACI 318-11 D.6.2, as applicable, with modifications as described in this section. The basic concrete breakout strength of a single anchor in shear, $V_b$, must be calculated in accordance with ACI 318-19 17.7.2.2.1, ACI 318-14 17.5.2.2 or ACI 318-11 D.6.2.2, as applicable, using the values of $\ell_e$ and $d_a$ given in Table 5 of this report. $\ell_e$ must be taken as no greater than $h_{ef}$, and in no case must $\ell_e$ exceed $8d_a$.

**4.1.7 Requirements for Static Concrete Pryout Strength in Shear, $V_{cp}$ or $V_{cpg}$:** The nominal concrete pryout strength of a single anchor or group of anchors in shear, $V_{cp}$ or $V_{cpg}$, respectively, must be calculated in accordance with ACI 318-19 17.7.3, ACI 318-14 17.5.3 or ACI 318-11 D.6.3, as applicable, modified by using the value of $k_{cp}$ provided in Table 5 and the value of $N_{cb}$ or $N_{cbg}$ as calculated in Section 4.1.3 of this report.

**4.1.8 Requirements for Seismic Design:**

**4.1.8.1 General:** For load combinations including seismic loads, the design must be performed in accordance with ACI 318-19 17.10, ACI 318-14 17.2.3 or ACI 318-11 D.3.3, as applicable. Modifications to ACI 318-19 17.10, ACI 318-14 17.2.3 shall be applied under Section 1905.1.8 of the 2021, 2018 and 2015 IBC. For the 2012 IBC, Section 1905.1.9 must be omitted.

The anchors comply with ACI 318 (-19 and -14) 2.3 or ACI 318-11 D.1, as applicable, as ductile steel elements and must be designed in accordance with ACI 318-19 17.10.4, 17.10.5, 17.10.6 or 17.10.7 or ACI 318-14 17.2.3.4, 17.2.3.5, 17.2.3.6 or 17.2.3.7; ACI 318-11 D.3.3.4, D.3.3.5, D.3.3.6 or D.3.3.7, as applicable. Strength reduction factors, $\phi$, are given in Tables 4 and 5 of this report. The $^1/_4$-inch-diameter (6.4 mm) anchors must be limited to installation in structures assigned to IBC Seismic Design Categories A and B only. The $^3/_8$-, $^1/_2$-, $^5/_8$- and $^3/_4$-inch-diameter (9.5, 12.7, 15.9 and 19.1 mm) may be installed in structures assigned to IBC Seismic Design Categories A to F.

**4.1.8.2 Seismic Tension:** The nominal steel strength and nominal concrete breakout strength for anchors in tension must be calculated in accordance with ACI 318-19 17.6.1 and 17.6.2, ACI 318-14 17.4.1 and 17.4.2 or ACI 318-11 D.5.1 and D.5.2, respectively, as applicable, as described in Sections 4.1.2 and 4.1.3 of this report. In accordance with ACI 318-19 17.6.3.2.1, ACI 318-14 17.4.3.2 or ACI 318-11 D.5.3.2, as applicable, the appropriate value for pullout strength in tension for seismic loads, $N_{p,eq}$, described in Table 4, must be used in lieu of $N_p$. The values of $N_{p,eq}$ may be adjusted by calculations for concrete compressive strength in accordance with Eq-1 of this report.

**4.1.8.3 Seismic Shear:** The nominal concrete breakout strength and concrete pryout strength for anchors in shear must be calculated according with ACI 318-19 17.7.2 and 17.7.3, ACI 318-14 17.5.2 and 17.5.3 or ACI 318-11 D.6.2 and D.6.3, respectively, as applicable, as described in Sections 4.1.6 and 4.1.7 of this report. In accordance with ACI 318-19 17.7.1.2, ACI 318-14 17.5.1.2 or ACI 318-11 D.6.1.2, as applicable, the appropriate value for nominal steel strength in shear for seismic loads, $V_{sa,eq}$, described in Table 5 must be used in lieu of $V_{sa}$.

**4.1.9 Requirements for Interaction of Tensile and Shear Forces:** Anchors or groups of anchors that are subject to the effects of combined axial (tensile) and shear forces must be designed in accordance with ACI 318-19 17.8, ACI 318-14 17.6 or ACI 318-11 D.7, as applicable.

**4.1.10 Requirements for Critical Edge Distance:** In applications where $c < c_{ac}$ and supplemental reinforcement to control splitting of the concrete is not present, the concrete breakout strength in tension for uncracked concrete, calculated according to ACI 318-19 17.6.2, ACI 318-14 17.4.2 or ACI 318-11 D.5.2, as applicable, must be further multiplied by the factor $\psi_{cp,N}$ given by Eq-3:

$$\psi_{cp,N} = \frac{c}{c_{ac}} \qquad \text{(Eq-3)}$$

where the factor $\psi_{cp,N}$ need not be taken as less than $\frac{1.5h_{ef}}{c_{ac}}$. For all other cases, $\psi_{cp,N}$ = 1.0. In lieu of using ACI 318-19 17.9.5, ACI 318-14 17.7.6 or ACI 318-11 D.8.6, as applicable, values of $c_{ac}$ must comply with Table 1 of this report.

**4.1.11 Requirements for Minimum Member Thickness, Minimum Anchor Spacing and Minimum Edge Distance:** In lieu of ACI 318-19 17.9.2, ACI 318-14 17.7.1 and 17.7.3; or ACI 318-11 D.8.1 and D.8.3, respectively, as applicable, values of $c_{min}$ and $s_{min}$ as given in Table 1 of this report must be used.

In lieu of ACI 318-19 17.9.4, ACI 318-14 17.7.5 or ACI 318-11 D.8.5, as applicable, minimum member thicknesses, $h_{min}$, as given in Table 1 of this report must be used.

**4.1.12 Lightweight Concrete:** The use of anchors in lightweight concrete shall be recognized provided the modification factor $\lambda_a$ equal to 0.8λ is applied to all values of $\sqrt{f'_c}$ affecting $N_n$ and $V_n$.

For ACI 318-19 (2021 IBC), ACI 318-14 (2018 and 2015 IBC) and ACI 318-11 (2012 IBC), λ is determined in accordance with the corresponding version of ACI 318.

**4.2 Allowable Stress Design (ASD):**

**4.2.1 General:** Where design values for use with allowable stress design (working stress design) load combinations in accordance with Section 1605.1 of the 2021 IBC or Section 1605.3 of the 2018, 2015 and 2012 IBC are required these are calculated using Eq-4 and Eq-5 as follows:

$$T_{allowable,ASD} = \frac{\phi N_n}{\alpha} \qquad \text{(Eq-4)}$$

and

$$V_{allowable,ASD} = \frac{\phi V_n}{\alpha} \qquad \text{(Eq-5)}$$

where:

| | | |
|---|---|---|
| $T_{allowable,ASD}$ | = | Allowable tension load (lbf or kN) |
| $V_{allowable,ASD}$ | = | Allowable shear load (lbf or kN) |
| $\phi N_n$ | = | Lowest design strength of an anchor or anchor group in tension as determined in accordance with ACI 318 (-19 and -14) Chapter 17 and 2021, 2018 and 2015 Section 1905.1.8, ACI 318-11 Appendix D, and Section 4.1 of this report, as applicable (lbf or N). For the 2012 IBC, Section 1905.1.9 must be omitted. |
| $\phi V_n$ | = | Lowest design strength of an anchor or anchor group in shear as determined in accordance with ACI 318 (-19 and -14) Chapter 17 and 2021, 2018 and 2015 IBC Section 1905.1.8, ACI 318-11 Appendix D, and Section 4.1 of this report, as applicable (lbf or N). For the 2012 IBC, Section 1905.1.9 must be omitted. |

$\alpha$ = Conversion factor calculated as a weighted average of the load factors for the controlling load combination. In addition, $\alpha$ must include all applicable factors to account for nonductile failure modes and required over-strength.

The requirements for member thickness, edge distance and spacing, described in this report, must apply. An example of allowable stress design values for illustrative purposes is shown in Table 6 and Figure 4.

**4.2.2 Interaction of Tensile and Shear Forces:** The interaction must be calculated and consistent with ACI 318-19 17.8, ACI 318-14 17.6 or ACI 318 (-11, -08, -05) D.7 as follows:

For shear loads $V_{applied} \leq 0.2V_{allowable}$, ASD, the full allowable load in tension shall be permitted.

For tension loads $T_{applied} \leq 0.2T_{allowable}$, ASD, the full allowable load in shear shall be permitted.

For all other cases, Eq-6 applies:

$$\frac{T_{applied}}{T_{allowable,ASD}} + \frac{V_{applied}}{V_{allowable,ASD}} \leq 1.2 \qquad \text{(Eq-6)}$$

### 4.3 Installation:

Installation parameters are provided in Table 1 and Figure 2 of this report. Anchor locations must comply with this report and the plans and specifications approved by the code official. The Parawedge expansion anchors must be installed in accordance with the manufacturer's published installation instructions and this report. Anchors must be installed in holes drilled into the concrete using carbide-tipped, hammer-drill bits complying with ANSI B212.15. The nominal drill bit diameter must be equal to that of the Parawedge nominal diameter. The minimum drilled hole depth is given in Table 1 and Figure 2. Prior to anchor installation, the dust and debris must be removed from the predrilled hole using a hand pump, compressed air or vacuum. The anchor must be hammered into the predrilled hole until the proper nominal embedment depth is achieved. The nut must be tightened against the washer until the torque values specified in Table 1 are achieved. The installation described in this section is illustrated in Figure 3.

### 4.4 Special Inspection:

Periodic special inspection is required in accordance with Section 1705.1.1 and Table 1705.3 of the 2021, 2018, 2015 IBC and 2012 IBC, as applicable. The special inspector must make periodic inspections during anchor installation to verify anchor type, anchor dimensions, concrete type, concrete compressive strength, drill bit type, hole dimensions, hole cleaning procedure, concrete member thickness, anchor embedment, anchor spacing, edge distances, tightening torque and adherence to the manufacturer's printed installation instructions. The special inspector must be present as often as required in accordance with the "statement of special inspection."

## 5.0 CONDITIONS OF USE:

The Parawedge expansion anchors 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** The anchors must be installed in accordance with the manufacturers 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** The $^1/_4$-inch (6.4 mm) anchors must be installed in uncracked normal-weight or lightweight concrete; $^3/_8$-, $^1/_2$-, $^5/_8$- and $^3/_4$-inch (9.5 mm, 12.7 mm, 15.9 mm and 19.1 mm) anchors must be installed in cracked or uncracked normal-weight or lightweight concrete having specified compressive strength, $f'_c$, of 2,500 psi to 8,500 psi (17.2 MPa to 58.6 MPa).

**5.4** Anchors [except $^1/_4$-inch-diameter (6.4 mm)] 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.

**5.5** The $^1/_4$-inch-diameter (6.4 mm) anchors may be used to resist short-term loading due to wind forces, and for seismic load combinations limited to structures assigned to Seismic Design Categories A and B, under the IBC, subject to the conditions of this report. The $^3/_8$-, $^1/_2$-, $^5/_8$- and $^3/_4$-inch (9.5 mm, 12.7 mm, 15.9 mm and 19.1 mm) anchors may be used to resist short-term loading due to wind or seismic forces in structures assigned to Seismic Design Categories A through F, under the IBC, subject to the conditions of this report.

**5.6** The values of $f'_c$ used for calculation purposes must not exceed 8,000 psi (55.2 MPa).

**5.7** Strength design values must be established in accordance with Section 4.1 of this report.

**5.8** Allowable stress design values must be established in accordance with Section 4.2 of this report.

**5.9** Anchor spacing(s) and edge distance(s), as well as minimum member thickness, must comply with Table 1 and Figure 2 of this report, unless otherwise noted.

**5.10** 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.

**5.11** 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.

**5.12** Where not otherwise prohibited in the code, Parawedge expansion anchors are permitted for use with fire-resistance-rated construction provided that at least one of the following conditions is fulfilled:

- The anchors are used to resist wind or seismic forces only.
- Anchors that support 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** Use of carbon steel anchors is limited to dry, interior locations.

**5.14** Special inspection must be provided in accordance with Section 4.4 of this report.

**5.15** Anchors are manufactured by Cobra Anchors Corp. under an approved 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 July 2024, 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-3852) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.

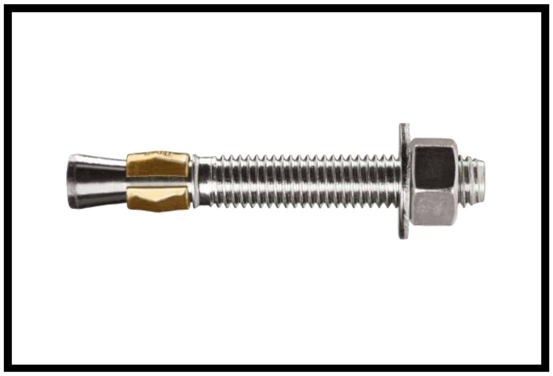
**7.2** In addition, the Parawedge expansion anchors are identified by packaging with manufacturer's contact information, anchor name, and anchor size. The Parawedge expansion anchor has a length identification code embossed on the exposed threaded end, which is visible after installation. Table 2 shows the length code identification system, in accordance with ICC-ES AC193.

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

**COBRA ANCHORS CO., LTD.**
**8051 METROPOLITAN BOULEVARD EAST**
**MONTREAL, QUEBEC H1J 1J8**
**CANADA**
**(514) 354-2240 or (800) 824-7717**
**www.cobraanchors.com**
**info@cobraanchors.com**

**7.4** The additional listee's contact information is the following:

**COBRA ANCHORS CORP.**
**504 MT. LAUREL AVENUE**
**TEMPLE, PENNSYLVANIA 19560**
**(610) 929-5764**



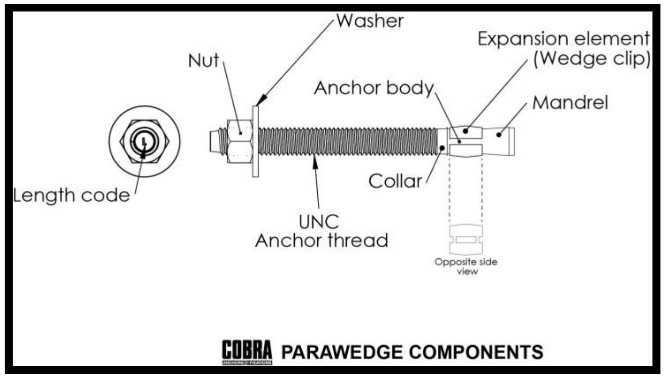



**FIGURE 1—PARAWEDGE ANCHOR ASSEMBLY**

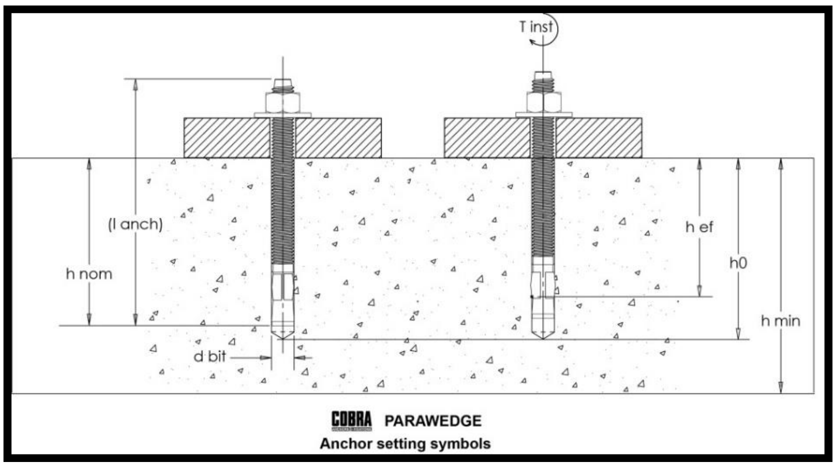



**FIGURE 2—PARAWEDGE ANCHOR DETAIL**

**TABLE 1—PARAWEDGE ANCHOR DESIGN AND INSTALLATION INFORMATION[1]**

| Setting and Design Information | Symbol | Units | Nominal anchor diameter | | | | |
|---|---|---|---|---|---|---|---|
| | | | $^1/_4$ | $^3/_8$ | $^1/_2$ | $^5/_8$ | $^3/_4$ |
| Anchor O.D. | $d_a$ | in. (mm) | 0.250 (6.4) | 0.375 (9.5) | 0.500 (12.7) | 0.625 (15.9) | 0.750 (19.1) |
| Nominal drill bit dia | $d_{bit}$ | in. (mm) | $^1/_4$ (6.4) | $^3/_8$ (9.5) | $^1/_2$ (12.7) | $^5/_8$ (15.9) | $^3/_4$ (19.1) |
| Nominal embedment depth | $h_{nom}$ | in. (mm) | $1^3/_4$ (44) | $2^1/_2$ (63) | $2^7/_8$ (73) | $3^1/_2$ (89) | 4 (102) |
| Effective min. embedment | $h_{ef}$ | in. (mm) | $1^1/_2$ (38) | 2 (51) | $2^1/_4$ (57) | $2^3/_4$ (70) | $3^1/_8$ (79) |
| Min. hole depth | $h_{hole}$ | in. (mm) | 2 (51) | $2^5/_8$ (67) | 3 (76) | $3^5/_8$ (92) | $4^1/_8$ (105) |
| Min. member thickness | $h_{min}$ | in. (mm) | 4 (102) | 4 (102) | $4^1/_2$ (114) | $5^1/_2$ (140) | 6 (152) |
| Critical edge distance | $c_{ac}$ | in. (mm) | $2^1/_2$ (64) | $5^1/_2$ (140) | 7 (178) | 6 (152) | 9 (229) |
| Min. edge distance | $c_{min}$ | in. (mm) | 2 (51) | $2^1/_2$ (64) | $3^1/_4$ (83) | $4^1/_2$ (114) | $4^3/_4$ (121) |
| Min. anchor spacing | $s_{min}$ | in. (mm) | 3 (76) | 3 (76) | $6^1/_2$ (165) | $5^1/_2$ (140) | $6^1/_4$ (159) |
| Installation torque | $T_{inst}$ | ft-lb (Nm) | 10 (14) | 30 (41) | 50 (68) | 70 (95) | 120 (163) |

For **SI:** 1 inch = 25.4 mm, 1lbf = 4.45 N, 1 psi = 0.006895 MPa. For **pound-in** units: 1 mm = 0.03937 inches.

[1]The information presented in this table is to be used in conjunction with the design criteria of ACI 318 (-19 or -14) Chapter 17 or ACI 318-11 Appendix D, as applicable.

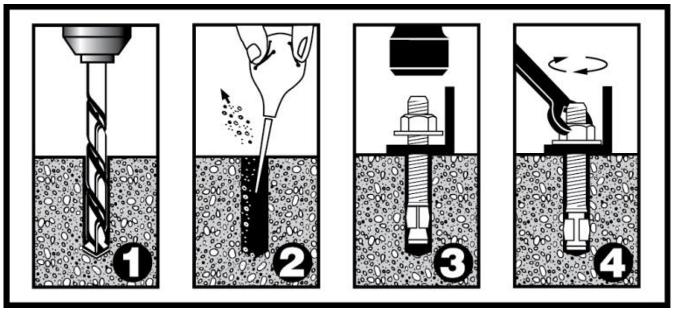
**TABLE 2—LENGTH IDENTIFICATION SYSTEM**

| Length marking on the bolt head | | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Length of anchor (in.) | From | $1^1/_2$ | 2 | $2^1/_2$ | 3 | $3^1/_2$ | 4 | $4^1/_2$ | 5 | $5^1/_2$ | 6 | $6^1/_2$ | 7 | $7^1/_2$ | 8 | $8^1/_2$ | 9 | $9^1/_2$ | 10 | 11 |
| | Up to but not including | 2 | $2^1/_2$ | 3 | $3^1/_2$ | 4 | $4^1/_2$ | 5 | $5^1/_2$ | 6 | $6^1/_2$ | 7 | $7^1/_2$ | 8 | $8^1/_2$ | 9 | $9^1/_2$ | 10 | 11 | 12 |

**TABLE 3—MEAN AXIAL STIFFNESS VALUES, β, FOR PARAWEDGE EXPANSION ANCHORS IN NORMAL-WEIGHT CONCRETE[1]**

| Concrete State | Units | Nominal anchor diameter | | | | |
|---|---|---|---|---|---|---|
| | | $^1/_4$ | $^3/_8$ | $^1/_2$ | $^5/_8$ | $^3/_4$ |
| Uncracked concrete | lb/in. (N/mm) | 208,000 (36,425) | 224,000 (39,230) | 319,000 (55,865) | 637,000 (111,555) | 336,000 (58,840) |
| Cracked concrete | lb/in. (N/mm) | NA | 34,000 (5,955) | 148,000 (25,920) | 126,000 (22,065) | 102,000 (1,785) |

[1]Mean values shown; actual stiffness varies considerably depending on concrete strength, loading and geometry of application.




#1 Hammer drill a hole using a standard drill bit complying with ANSI B212.15. Drill hole depth in accordance to Table 1 and Figure 2.

#2 Using a hand pump, compressed air or vacuum, remove dust and debris from the drilled hole.

#3 The Parawedge must be hammered into the hole to the nominal embedment (Table 1).

#4 Using the nut and washer provided, tighten the washer until the torque value specified in Table 1 is achieved.

**FIGURE 3—INSTALLATION OF PARAWEDGE ANCHOR**

**TABLE 4—TENSION DESIGN INFORMATION FOR PARAWEDGE ANCHORS[1,2]**

| DESIGN INFORMATION | Symbol | Units | Nominal anchor diameter | | | | |
|---|---|---|---|---|---|---|---|
| | | | $\frac{1}{4}$ | $\frac{3}{8}$ | $\frac{1}{2}$ | $\frac{5}{8}$ | $\frac{3}{4}$ |
| Anchor category | 1, 2 or 3 | - | 1 | | | | |
| Effective min. embedment | $h_{ef}$ | in. (mm) | $1\frac{1}{2}$ (38) | 2 (51) | $2\frac{1}{4}$ (57) | $2\frac{3}{4}$ (70) | $3\frac{1}{8}$ (79) |
| **STEEL STRENGTH IN TENSION** | | | | | | | |
| Min. specified yield strength | $f_{ya}$ | psi (N/mm²) | 55,000 (379) | 50,000 (345) | 50,000 (345) | 50,000 (345) | 50,000 (345) |
| Min. specified ult. Strength | $f_{uta}$ | psi (N/mm²) | 80,000 (552) | 65,000 (448) | 65,000 (448) | 65,000 (448) | 65,000 (448) |
| Effective tensile stress area (neck) | $A_{se}$ | in² (mm²) | 0.0254 (16.16) | 0.0556 (35.29) | 0.1018 (64.64) | 0.1810 (114.91) | 0.2697 (171.27) |
| Steel strength in tension[4] (neck) | $N_{sa}$ | lb (kN) | 2,035 (9.0) | 3,610 (16.0) | 6,615 (29.4) | 11,760 (52.3) | 17,530 (88.0) |
| Reduction factor $\phi$ for tension, steel strength[3] | | | 0.75 | | | | |
| **CONCRETE BREAKOUT STRENGTH IN TENSION** | | | | | | | |
| Effective min. embedment | $h_{ef}$ | in. (mm) | $1\frac{1}{2}$ (38) | 2 (51) | $2\frac{1}{4}$ (57) | $2\frac{3}{4}$ (70) | $3\frac{1}{8}$ (79) |
| Effectiveness factor $k_{uncr}$ uncracked concrete[2] | $k_{uncr}$ | - | 24 | 24 | 27 | 27 | 27 |
| Effectiveness factor $k_{cr}$ cracked concrete[2] | $k_{cr}$ | - | NA | 17 | 21 | 21 | 21 |
| Critical edge distance | $c_{ac}$ | in. (mm) | $2\frac{1}{2}$ (64) | $5\frac{1}{2}$ (140) | 7 (178) | 6 (152) | 9 (229) |
| Reduction factor $\phi$ for concrete breakout[3] | | | 0.65 | | | | |
| **PULLOUT STRENGTH IN TENSION** | | | | | | | |
| Pullout strength uncracked concrete (2,500 psi) | $N_{p,uncr}$ | lb (kN) | 1,795 (8.0) | 3,800 (16.9) | See Note 6 | See Note 6 | See Note 6 |
| Pullout strength cracked/ seismic concrete (2,500 psi)[5,7] | $N_{p,cr}$ $N_{eq}$ | lb (kN) | NA | 1,740 (7.7) | See Note 6 | See Note 6 | See Note 6 |
| Reduction factor $\phi$ for concrete pullout[3] (uncracked/cracked/seismic) | | | 0.65 | | | | |

For **SI:** 1 inch = 25.4 mm, 1lbf = 4.45 N, 1 psi = 0.006895 MPa. For **pound-in** units: 1 mm = 0.03937 inches.

[1]The data in this table is intended to be used with the design provisions of ACI 318 (-19 or -14) Chapter 17 or ACI 318 -11 Appendix D, as applicable; for anchors resisting seismic load combinations the additional requirements of ACI 318-19 17.10, ACI 318-14 17.2.3 or ACI 318-11 D.3.3, as applicable, must apply.
[2]Installation must comply with published instructions and details.
[3]The strength reduction factor applies when the load combinations from the IBC or ACI 318 are used and the requirements of ACI 318-19 17.5.3, ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable, are met. If the load combinations of ACI 318-11 Appendix C are used, the appropriate strength reduction factor must be determined in accordance with ACI 318-11 D.4.4.
[4]The carbon steel is a ductile steel element as defined by, ACI 318 (-19 or -14) 2.3 or ACI 318-11 D.1, as applicable.
[5]See Section 4.1.4 of this report, NA (not applicable) denotes that this value is not available for design.
[6]Pullout strength does not control design of indicated anchors.
[7]Tabulated values for characteristic pullout strength in tension are for seismic applications and based on test results in accordance with ACI 355.2, Section 9.5.

**TABLE 5—SHEAR DESIGN INFORMATION FOR PARAWEDGE ANCHORS[1,2]**

| DESIGN INFORMATION | Symbol | Units | Nominal anchor diameter | | | | |
|---|---|---|---|---|---|---|---|
| | | | $^1/_4$ | $^3/_8$ | $^1/_2$ | $^5/_8$ | $^3/_4$ |
| Anchor category | 1, 2 or 3 | - | 1 | | | | |
| Effective min. embedment | $h_{ef}$ | in. (mm) | $1^1/_2$ (38) | 2 (51) | $2^1/_4$ (57) | $2^3/_4$ (70) | $3^1/_8$ (79) |
| **STEEL STRENGTH IN SHEAR** | | | | | | | |
| Min. specified yield strength (thread) | $f_{ya}$ | psi (N/mm$^2$) | 55,000 (379) | 50,000 (345) | 50,000 (345) | 50,000 (345) | 50,000 (345) |
| Min. specified ult. strength (thread) | $f_{uta}$ | psi (N/mm$^2$) | 80,000 (552) | 65,000 (448) | 65,000 (448) | 65,000 (448) | 65,000 (448) |
| Effective shear stress area (thread) | $A_{se}$ | in$^2$ (mm$^2$) | 0.0276 (17.55) | 0.0693 (44.00) | 0.1283 (81.45) | 0.2058 (130.70) | 0.3073 (195.14) |
| Steel strength in shear[4] | $V_{sa}$ | lb (kN) | 910 (4.0) | 1,680 (7.5) | 2,860 (12.7) | 5,555 (24.7) | 10,660 (47.4) |
| Steel strength in shear, seismic[5] | $V_{sa,eq}$ | lb (kN) | NA | 1,680 (7.47) | 2,860 (12.7) | 5,555 (24.7) | 10,660 (47.4) |
| Reduction factor $\phi$ for shear, steel strength[3] | | | 0.65 | | | | |
| **CONCRETE BREAKOUT STRENGTH IN SHEAR** | | | | | | | |
| Anchor O.D. | $d_a$ | in. (mm) | 0.250 (6.4) | 0.375 (9.5) | 0.500 (12.7) | 0.625 (15.9) | 0.750 (19.1) |
| Load-bearing length of anchor (lesser of $h_{ef}$ or $8d_a$) | $\ell_e$ | in. (mm) | 1.75 (38) | 2.00 (51) | 2.25 (57) | 2.75 (70) | 3.125 (79) |
| Reduction factor $\phi$ for concrete breakout[3] | | | 0.70 | | | | |
| **PRYOUT STRENGTH IN SHEAR** | | | | | | | |
| Effective min. embedment | $h_{ef}$ | in. (mm) | $1^1/_2$ (38) | 2 (51) | $2^1/_4$ (57) | $2^3/_4$ (70) | $3^1/_8$ (79) |
| Coefficient for pryout strength (1.0 for $h_{ef}$< 2.5 in., 2.0 for $h_{ef} \geq$ 2.5 In.) | $k_{cp}$ | - | 1.0 | 1.0 | 1.0 | 2.0 | 2.0 |
| Reduction factor $\phi$ for concrete pryout[3] | | | 0.70 | | | | |

For **SI:** 1 inch = 25.4 mm, 1lbf = 4.45 N, 1 psi = 0.006895 MPa. For **pound-in** units: 1 mm = 0.03937 inches.

[1]The data in this table is intended to be used with the design provisions of ACI 318 (-19 or -14) Chapter 17 or ACI 318 -11 Appendix D, as applicable; for anchors resisting seismic load combinations the additional requirements of ACI 318-19 17.10, ACI 318-14 17.2.3 or ACI 318-11 D.3.3, as applicable, must apply.
[2]Installation must comply with published instructions and details.
[3]The strength reduction factor applies when the load combinations from the IBC or ACI 318 are used and the requirements of ACI 318-19 17.5.3, ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable, are met. If the load combinations of ACI 318-11 Appendix C are used, the appropriate strength reduction factor must be determined in accordance with ACI 318-11 D.4.4
[4]Tabulated values for steel strength in shear must be used for design. These tabulated values are based on test results per ACI 355.2, Section 9.4 and must be used for design.in lieu of calculation.
[5]Tabulated values for steel strength in shear are for seismic applications and based on test results in accordance with ACI 355.2, Section 9.6.

**TABLE 6—EXAMPLE ALLOWABLE STRESS DESIGN VALUES FOR ILLUSTRATIVE PURPOSES**

| Nominal Anchor diameter (in.) | Effective Embedment (in.) | Allowable tension (lbf) | Allowable tension (lbf) |
|---|---|---|---|
| | | ***Uncracked[2] f'c=2500 psi*** | ***Cracked f'c=2500 psi*** |
| $^1/_4$ | $1^1/_2$ | 790 | NA[10] |
| $^3/_8$ | 2 | 1,490 | 765 |
| $^1/_2$ | $2^1/_4$ | 2,000 | 1,555 |
| $^5/_8$ | $2^3/_4$ | 2,700 | 2,105 |
| $^3/_4$ | $3^1/_8$ | 3,275 | 2,550 |

For **SI:** 1 lbf = 4.45 N, 1 psi = 0.00689 MPa 1 psi = 0.00689 MPa. 1 inch = 25.4 mm.

[1]Single anchors with static tension load only.
[2]Concrete determined to remain uncracked for the life of the anchorage.
[3]Load combinations from ACI 318 (-19 or -14) Section 5.3 or ACI 318-11 Section 9.2, as applicable (no seismic loading).
[4]30% dead load and 70% live load, controlling load combination 1.2*D* + 1.6 *L*.
[5]Calculation of the weighted average for α = 0.3*1.2 + 0.7*1.6 = 1.48
[6]$f'_c$ = 2,500 psi (normal weight concrete)
[7]$c_{a1} = c_{a2} \geq c_{ac}$
[8]$h \geq h_{min}$
[9]Values are for Condition B (Supplementary reinforcement not present) in accordance with ACI 318-19 Table 17.5.3(b) or (c), ACI 318-14 17.3.3(c) or ACI 318-11 D.4.3(c), as applicable.
[10]See Section 4.1.4 of this report, NA (not applicable) denotes that this value is not available for design.

**Design assumptions:**
Two $^1/_2$" Parawedge anchors
$f'_c$ = 4,000 psi
*Condition B (supplementary reinforcement not present)*
*(ACI 318-19 Table 17.5.3(b) or (c), or ACI 318-14 17.3.3c)*
Cracked concrete, no seismic, no loading eccentricity
and a rigid plate

**Anchor parameters:**
$h_a$ = 5.0 in.
$h_{ef}$ = 2.25 in.
$s_a$ = 6.5 in.
$c_{a1} = c_{a,min}$ = 4.0 in.
$c_{a2} \geq 1.5c_{a1}$

| | |
|---|---|
| **Verify minimum member thickness, spacing and edge distance:**<br>$s_a$ = 6.5 in. ≥ $s_{min}$ = 6.5 in. ∴ OK<br>$c_{a,min}$ = 4.0 in. ≥ $c_{min}$ = 3.25 in. ∴ OK<br>$h_a$ = 5.0 in. ≥ $h_{min}$ = 4.5 in. ∴ OK | ACI 318-19 17.9 or<br>ACI 318-14 17.7<br>and Table 1 |
| **Check Steel strength of anchor group in tension:**<br>$N_{sag} = n \cdot N_{sa} = 2 \cdot 6{,}615$ lbs. = 13,230 lbs.<br>**Check Steel capacity:** (ACI 318-14 17.4.1.2)<br>$\phi N_{sag}$ = 0.75 • 13,230 lbs. = **9,923 lbs**. | ACI 318-19 17.6.1.2 or<br>ACI 318-14 17.4.1.2,<br>§4.1.2 and Table 2 |
| **Check Concrete breakout strength of anchor group in tension:**<br>$N_{cbg} = \frac{A_{Nc}}{A_{Nc0}} \psi_{ec,N} \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b$ | ACI 318-19 17.6.2.1 or<br>ACI 318-14 17.4.2.1<br>and §4.1.3 |
| **Check:** $A_{Nco}$ and $A_{Nc}$<br>$A_{Nco} = 9h_{ef}^2 = 9 \cdot (2.25)^2$ = **45.6 in.²**<br>$A_{nc} = (3.0\ h_{ef}) \cdot (3.0\ h_{ef} + s_a) = (3.0 \cdot 2.25) \cdot ((3.0 \cdot 2.25) + 6.5)$ = **89.4 in.²** | ACI 318-19 17.6.2.1 (b) or<br>ACI 318-14 17.4.2.1 (b)<br>and Table 1 |
| **Check:** $\psi_{ec,N} = \frac{1}{(1+\frac{2e'_N}{3h_{ef}})} \leq 1.0$ ; $e'_N = 0$ ∴ $\psi_{ec,N}$ = **1.0** | ACI 318-19 17.6.2.3.1 or<br>ACI 318-14 17.4.2.4 |
| **Check:** $\psi_{ed,N}$ = 1.0 if $c_{a,min} \geq 1.5h_{ef}$ ; $\psi_{ed,N} = 0.7 + 0.3\frac{c_{a,min}}{1.5h_{ef}}$ if $c_{a,min} < 1.5h_{ef}$<br>$c_{a,min}$ = 4.0 in. ≥ $1.5h_{ef}$ = 3.75 in. ∴ $\psi_{ed,N}$ = **1.0** | ACI 318-19 17.6.2.4 or<br>ACI 318-14 17.4.2.5<br>and Table 1 |
| **Check:** $\psi_{c,N}$ = **1.0** | ACI 318-19 17.6.2.5 or<br>ACI 318-14 17.4.2.6<br>and Table 2 |
| **Check:** $\psi_{cp,N}$ = **1.0** for cracked concrete | ACI 318-19 17.6.2.5 or<br>ACI 318-14 17.4.2.6 |
| **Check** $N_b = k_{cr} \lambda_a \sqrt{f'_c}\ h_{ef}^{1.5} = 21\ (1.0)\sqrt{4{,}000} \cdot 2.25^{1.5}$ = **4,483 lbs.** | ACI 318-19 17.6.2.2 or<br>ACI 318-14 17.4.2.2<br>and Table 2 |
| **Check concrete breakout strength of anchor group in tension:**<br>$N_{cbg}$ = (89.4/45.6) • 1.0 • 1.0 • 1.0 • 1.0 • 4,483 = 8,789 lbs.<br>Calculate concrete breakout capacity = $\phi N_{cbg}$ = 0.65 • 8,789 = **5,713 lbs.** | ACI 318-19 17.6.2.1 (b) or<br>ACI 318-14 17.4.2.1 (b)<br>and §4.1.3 |
| **Check nominal pullout strength of a single anchor in tension:**<br>$N_{pn} = \psi_{c,P} \cdot N_{pn,f'c}$ | ACI 318-19 17.6.3 or<br>ACI 318-14 17.4.3.1<br>§4.1.4 and Table 2 |
| **Check:** $\psi_{c,P}$ = **1.0** for cracked concrete | ACI 318-19 17.6.3.3 or<br>ACI 318-14 17.4.3.6<br>§4.1.10 and Table 2 |
| **Check:** $N_{pn,f'c} = N_{p,cr}\left(\frac{f'c}{2500}\right)^n$ , per Table 4 of the report, pullout does not control. | ACI 318-19 17.6.3.2.1<br>or ACI 318-14 17.4.3.2<br>§4.1.4 and Table 2 |
| **Check controlling resistance strength of the anchor group in tension:**<br>$\phi N_n = \min\left\|\phi N_{sag}, \phi N_{cbg}, n\phi N_{pn}\right\| = \phi N_{cbg}$ = **5,713 lbs.** | ACI 318-19 17.6.3.1 or<br>ACI 318-14 17.4.3.1<br>and §4.1.1 |
| **Check allowable stress design conversion factor:**<br>For load combination: 1.2*D* + 1.6*L* ; 50% Dead Load, 50% Live Load<br>α = 1.2(50%) + 1.6(50%) = **1.40**<br>**Final allowable stress design value:**<br>$T_{allowable,ASD} = \frac{\phi N_n}{\alpha} = \frac{5{,}713}{1.40}$ = **4,081 lbs.** | ACI 318-19 5.3 or<br>ACI 318-14 5.3<br>and §4.2.1 |

**FIGURE 4—DESIGN EXAMPLE**

# ICC-ES Evaluation Report

# ESR-3582 City of LA Supplement

*Issued January 2025*

*This report is subject to renewal March 2026*

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**DIVISION: 03 00 00—CONCRETE**
**Section: 03 16 00—Concrete Anchors**

**DIVISION: 05 00 00— METALS**
**Section: 05 05 19—Post-Installed Concrete Anchors**

**REPORT HOLDER:**

**COBRA ANCHORS CO., LTD.**

**EVALUATION SUBJECT:**

**COBRA ANCHORS PARAWEDGE EXPANSION ANCHORS FOR CRACKED AND UNCRACKED CONCRETE**

## 1.0 REPORT PURPOSE AND SCOPE

**Purpose:**

The purpose of this evaluation report supplement is to indicate that the Parawedge expansion anchors, described in ICC-ES evaluation report ESR-3852, have 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:**

- 2023 *City of Los Angeles Building Code* (LABC)
- 2023 *City of Los Angeles Residential Code* (LARC)

## 2.0 CONCLUSIONS

The Parawedge expansion anchors, described in Sections 2.0 through 7.0 of the evaluation report ESR-3852, comply with the LABC Chapter 19, and the LARC, and are subject to the conditions of use described in this supplement.

## 3.0 CONDITIONS OF USE

The Parawedge expansion anchors described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report ESR-3852.
- The design, installation, conditions of use and identification of the Parawedge expansion anchors are in accordance with the 2021 *International Building Code®* (IBC) and 2021 *International Residential Code®* (IRC) provisions, as applicable, noted in the evaluation report ESR-3852.
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, and City of Los Angeles Information Bulletin P/BC 2023-092, as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.
- The allowable and strength design values listed in the evaluation report and tables are for the connection of the anchors to the concrete. The connection between the anchors and the connected members shall be checked for capacity (which may govern).
- For use in wall anchorage assemblies to flexible diaphragm applications, anchors shall be designed per the requirements of City of Los Angeles Information Bulletin P/BC 2023-71.

This supplement expires concurrently with the evaluation report, reissued March 2024 and revised January 2025.

ICC EVALUATION SERVICE®

# ICC-ES Evaluation Report

# ESR-3852 CA Supplement

*Reissued March 2024*

*Revised January 2025*

*This report is subject to renewal March 2026.*

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**DIVISION: 03 00 00—CONCRETE**
**Section: 03 16 00—Concrete Anchors**

**DIVISION: 05 00 00— METALS**
**Section: 05 05 19—Post-Installed Concrete Anchors**

**REPORT HOLDER:**

**COBRA ANCHORS CO., LTD.**

**EVALUATION SUBJECT:**

**COBRA ANCHORS PARAWEDGE EXPANSION ANCHORS FOR CRACKED AND UNCRACKED CONCRETE**

## 1.0 REPORT PURPOSE AND SCOPE

**Purpose:**

The purpose of this evaluation report supplement is to indicate that Parawedge expansion anchors, described in ICC-ES evaluation report ESR-3852, have also been evaluated for compliance with the codes noted below.

**Applicable code editions:**

- 2022 *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 the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2022 *California Residential Code* (CRC)

## 2.0 CONCLUSIONS

### 2.1 CBC:

The Parawedge expansion anchors, described in Sections 2.0 through 7.0 of the evaluation report ESR-3852, comply with CBC Chapter 19, provided the design and installation are in accordance with the 2021 *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 Parawedge expansion anchors, described in Sections 2.0 through 7.0 of the evaluation report ESR-3852, comply with CRC Section R301.1.3, provided the design and installation are in accordance with the 2021 *International Residential Code®* (IRC) provisions noted in the evaluation report.

This supplement expires concurrently with the evaluation report, reissued March 2024 and revised January 2025.

**DIVISION: 03 00 00—CONCRETE**
**Section: 03 16 00—Concrete Anchors**

**DIVISION: 05 00 00—METALS**
**Section: 05 05 19—Post-Installed Concrete Anchors**

**REPORT HOLDER:**

**COBRA ANCHORS CO., LTD.**

**EVALUATION SUBJECT:**

**COBRA ANCHORS PARAWEDGE EXPANSION ANCHORS FOR CRACKED AND UNCRACKED CONCRETE**

## 1.0 REPORT PURPOSE AND SCOPE

**Purpose:**

The purpose of this evaluation report supplement is to indicate that the Cobra Anchors Parawedge Expansion Anchors in uncracked concrete only [$^1/_4$ inch (6.4 mm)] and in cracked and uncracked concrete [$^3/_8$-, $^1/_2$-, $^5/_8$- and $^3/_4$-inch (9.5 mm, 12.7 mm, 15.9 mm and 19.1 mm)], described in ICC-ES evaluation report ESR-3852, have also been evaluated for compliance with the codes noted below.

**Applicable code editions:**

- 2020 *Florida Building Code—Building* (FBC)
- 2020 *Florida Building Code—Residential* (FRC)

## 2.0 CONCLUSIONS

The Cobra Anchors Parawedge Expansion Anchors, described in Sections 2.0 through 7.0 of ICC-ES evaluation report ESR-3852, comply with the *Florida Building Code—Building* and the *Florida Building Code—Residential*, provided the design requirements are determined in accordance with the *Florida Building Code—Building* or the *Florida Building Code—Residential,* as applicable. The installation requirements noted in ICC-ES evaluation report ESR-3852 for the 2018 *International Building Code*® meet the requirements of the *Florida Building Code—Building* or the *Florida Building Code—Residential,* as applicable.

Use of the Cobra Anchors Parawedge Expansion Anchors in uncracked concrete only [$^1/_4$ inch (6.4 mm)] and in cracked and uncracked concrete [$^3/_8$-, $^1/_2$-, $^5/_8$- and $^3/_4$-inch (9.5 mm, 12.7 mm, 15.9 mm and 19.1 mm)], for compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and the *Florida Building Code—Residential*, has not been evaluated, and is outside the scope of this supplement.

For products falling under Florida Rule 61G20-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report, reissued March 2024 and revised January 2025.