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CAST-IN CONCRETE ANCHOR with CHUBBYNUT™ or HEAVYSET™ NUT IN CRACKED and UNCRACKED CONCRETE

CSI Section:

03 15 19 - Cast-in Concrete Anchors

1.0 RECOGNITION

The Cast-In Concrete Anchor with ChubbyNut™ or HeavySet™ nut has been evaluated for use as anchoring in concrete. The structural performance properties of the cast-in concrete anchor with ChubbyNut™ or HeavySet™ comply with the intent of the provisions of the following codes and regulations:

- 2021, 2018, 2015, and 2012 International Building Code® (IBC)
- 2021, 2018, 2015, and 2012, International Residential Code® (IRC)
- 2023 Florida Building Code – Building (FBC–Building) – attached Supplement
- 2023 Florida Building Code – Residential (FBC–Residential) – attached Supplement
- 2022 California Building Code (CBC) – attached Supplement
- 2022 California Residential Code (CRC) – attached Supplement
- 2023 Los Angeles Building Code (LABC) – attached Supplement
- 2023 Los Angeles Residential Code (LARC) – attached Supplement
- ACI 318-19, -14, and -11

2.0 LIMITATIONS

Use of the cast-in concrete anchors recognized in this report is subject to the following limitations:

2.1 Cast-in anchor sizes, dimensions, minimum embedment depths, and other installation parameters are as set forth in this report.

2.2 Cast-in anchors shall be installed in accordance with the manufacturer’s printed installation instructions (MPII) and this report, copies of which shall be available at each job site. In case of conflicts, this report governs.

2.3 Cast-in anchors shall be limited to use in cracked and uncracked normal-weight concrete, and lightweight concrete having a specified compressive strength, f'_c , of 2,500 psi to 10,000 psi (17.2 MPa to 68.9 MPa).

2.4 The values of f'_c used for calculation purposes shall not exceed 10,000 psi (68.9 MPa).

2.5 The concrete shall have achieved the specified minimum compressive strength prior to loading of the anchors.

2.6 Loads applied to the anchors shall be adjusted in accordance with Section 1605.2 of the IBC for strength design. Strength design values shall be established in accordance with Section 3.2.1 of this report.

2.7 Loads applied to the anchors shall be adjusted in accordance with Section 1605.3 of the IBC for allowable stress design. Allowable design values shall be established in accordance with Section 3.2.2 of this report.

2.8 Anchor spacing, edge distance, and minimum member thickness shall comply with ACI 318-19 17.9, ACI 318-14 17.7, or ACI 318-11 Section D.8 requirements, as applicable, for cast-in anchors.

2.9 Prior to installation, calculations and details demonstrating compliance with this report shall be submitted to the building official. The calculations and details shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

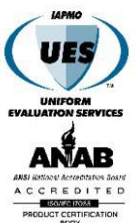
2.10 Cast-in anchors may be installed in regions of concrete where analysis indicates cracking may occur ($f_i > f_r$), subject to the conditions of this report.

2.11 Cast-in anchors may be used to resist short-term loading due to wind or seismic forces in locations designated as Seismic Design Categories A through F of the IBC, subject to the conditions of this report.

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

The product described in this Uniform Evaluation Service (UES) Report has been evaluated as an alternative material, design or method of construction in order to satisfy and comply with the intent of the provision of the code, as noted in this report, and for at least equivalence to that prescribed in the code in quality, strength, effectiveness, fire resistance, durability and safety, as applicable, in accordance with IBC Section 104.11. This document shall only be reproduced in its entirety.

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- Cast-in 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.
- Cast-in anchors are used to resist wind or seismic forces only.
- Cast-in anchors are used to support nonstructural elements.

2.13 Where required, special inspections shall be provided in accordance with Chapter 17 of the IBC. Duties of the special inspector shall include verification of the grade and size of the cast-in concrete anchor with ChubbyNut™ and HeavySet™ nut. Structural observations shall be provided where required in 2021, 2018, and 2015 IBC Section 1704.6, or 2012 IBC Section 1704.5.

2.14 To satisfy minimum concrete cover requirements specified in Section 20.6 of ACI 318-19, Section 20.7 of ACI 318-14, or Section 7.7 of ACI 318-11, the ChubbyNut™ or HeavySet™ nut is considered part of the cast-in anchor.

2.15 Steel anchor rods used with ChubbyNut™ anchor nuts and plates shall conform to ASTM A36, ASTM A307, or ASTM F1554, Grade 36 or 55.

2.16 Steel anchor rods used with HeavySet™ anchor nuts and plates shall conform to ASTM A449, ASTM A193, Grade B7, or ASTM F1554 Grade 105.

2.17 For the ChubbyNut™ system and HeavySet™ system, the limiting capacity shall be that of the anchor rod.

2.18 The design load values, as determined by the anchor rod, shall not be further increased for short-duration loading, such as wind and seismic.

2.19 The cast-in concrete anchors with ChubbyNut™ and HeavySet™ nut recognized in this report are produced by Earthbound Corporation in Monroe, Washington.

3.0 PRODUCT USE

3.1 General:

3.1.1 ChubbyNut™ and HeavySet™: The Cast-In Concrete Anchors with ChubbyNut™ or HeavySet™ nut are used to resist static, wind, and seismic (Seismic Design Categories A through F) tension and shear loads in cracked and uncracked normal weight or lightweight concrete having a specified compressive strength, f'_c , of 2,500 psi to 10,000 psi (17.2 MPa to 68.9 MPa).

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

3.1.2 SmackChair™, SmackFlat™, and SnapChair™ Bolt Stands: SmackChair™, SmackFlat™, and SnapChair™ bolt stands are non-structural injection-molded plastic anchor bolt stands used to affix the cast-in concrete anchor ChubbyNut™, HeavySet™ nut, or conventional hex (or heavy hex) nut to the concrete deck or podium forms with nails or screws prior to concrete placement. The use of the SmackChair™, SmackFlat™, or SnapChair™ anchor stands for affixing is optional. The selection details are presented in Table 2 of this report.

The SmackChair™, SmackFlat™, and SnapChair™ bolt stands are color-coded to indicate cast-in concrete anchor rod diameter. The SmackChair™, SmackFlat™, and SnapChair™ bolt stands have not been evaluated for structural properties and are included in this report for reference purposes only.

3.2 Design

3.2.1 Design Strength

3.2.1.1 General: The design strength of cast-in concrete anchors complying with the 2021 IBC and Section R301.1.3 of the 2021 IRC shall be determined in accordance with ACI 318-19 Chapter 17 and this report.

The design strength of cast-in concrete anchors complying with the 2018 and 2015 IBC and Section R301.1.3 of the 2018 and 2015 IRC shall be determined in accordance with ACI 318-14 Chapter 17 and this report.

The design strength of cast-in concrete anchors complying with the 2012 IBC and Section R301.1.3 of the 2012 IRC shall be determined in accordance with ACI 318-11 Appendix D and this report.

The strength design of cast-in concrete anchors shall comply with ACI 318-19 17.5.1.2, ACI 318-14 17.3.1, or ACI 318-11 D.4.1, 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, ϕ , as given in ACI 318-19 17.5.3, ACI 318-14 17.3.3, or ACI 318-11 D.4.3, as applicable, for cast-in headed anchors, shall be used for load combinations calculated in accordance with Section 1605.2 of the IBC, Section 5.3 of ACI 318-19 or -14, or Section 9.2 of ACI 318-11, as applicable. Strength reduction factors, ϕ , as given in ACI 318-11 D.4.4 shall be used for load combinations



calculated in accordance with ACI 318-11 Appendix C. The value of f_c used in the calculations shall be limited to a maximum of 10,000 psi (68.9 MPa), in accordance with ACI 318-19 17.3.1, ACI 318-14 17.2.7 or ACI 318-11 D.3.7, as applicable.

Requirements for Static Steel Strength in Tension: The nominal static steel strength in tension, N_{sa} , of a single cast-in concrete anchor with ChubbyNut™ or HeavySet™ nut, shall be 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, for the threaded rod, not to exceed the values of N_{sa} , in Table 1 of this report. The strength reduction factor, ϕ , corresponding to ductile steel shall be used.

3.2.1.2 Requirements for Static Concrete Breakout Strength in Tension: The nominal concrete breakout strength of a single cast-in concrete anchor or group of cast-in concrete anchors in tension, N_{cb} or N_{cbg} , respectively, shall 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, for cast-in headed bolts. The basic concrete breakout strength in tension, N_b , shall 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 with $k_c = 24$. The concrete breakout cone shall be considered a rectilinear geometrical prismatic shape in accordance with ACI 318-19 17.6.2.1.1, ACI 318-14 17.4.2.1, and ACI 318-11 D.5.2.1. 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, shall be calculated with $\Psi_{c,N} = 1.25$.

3.2.1.3 Static Pullout Strength in Tension: The pullout strength in tension for the cast-in concrete anchors with ChubbyNut™ or HeavySet™ nut does not control design and need not be calculated.

3.2.1.4 Requirements for Static Side-Face Blowout Strength in Tension: For the cast-in concrete anchors' side-face blowout strength, N_{sb} , shall be calculated in accordance with ACI 318-19 17.6.4, ACI 318-14 17.4.4.1, or ACI 318-11 D.5.4.1, as applicable, for the cast-in anchors.

3.2.1.5 Requirements for Static Steel Strength in Shear: For all applications that include resistance to shear loading, the nominal static steel strength of a single cast-in concrete anchor in shear, V_{sa} , is 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.

3.2.1.6 Requirements for Static Concrete Breakout Strength in Shear: For the cast-in concrete anchors, the nominal static concrete breakout strength of a single anchor or group of anchors in shear, V_{cb} , or V_{cbg} , respectively, shall

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. The basic concrete breakout strength, V_b , shall 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.

3.2.1.7 Requirements for Static Concrete Pryout Strength in Shear: For the cast-in concrete anchors, the nominal concrete pryout strength of a single anchor or group of anchors, V_{cp} or V_{cpg} , respectively, shall 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.

3.2.1.8 Requirements for Seismic Design:

3.2.1.8.1 General: For load combinations including seismic loads, the design calculations shall 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 and 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 shall be omitted. The cast-in anchors comply with ACI 318-19 or -14 2.3 or ACI 318-11 D.1 as ductile steel elements and are limited to the maximum load that can be delivered to the overall anchor assembly by the ductile shear wall system. For these anchors, the nominal steel strength, nominal concrete breakout strength, and nominal concrete side-face blowout strength for anchors in tension, and the nominal concrete breakout strength and pryout strength in shear (if applicable), shall be calculated in accordance with ACI 318-19 17.6 and 17.7, ACI 318-14 17.4 and 17.5, or ACI 318-11 D.5 and D.6, as applicable.

3.2.1.8.2 Seismic Tension: The nominal steel strength in tension, $N_{sa,eq}$, of a single anchor shall be calculated in accordance with ACI 318-19 17.6.1, ACI 318-14 17.4.1, or ACI 318-11 Section D.5.1, as applicable, for the threaded steel element. The nominal concrete breakout strength for anchors in tension shall 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, as described in Section 4.1.3 of this report; the nominal pullout strength need not be considered as noted in Section 4.1.4 of this report; the nominal concrete side-face blowout strength shall be calculated in accordance with ACI 318-19 17.6.4.1 and 17.6.4.2, ACI 318-14 17.4.4.1 and 17.4.4.2, or ACI 318-11 D.5.4.1 and D.5.4.2, as applicable.

3.2.1.8.3 Seismic Shear: The nominal concrete breakout strength and pryout strength in shear shall be calculated in accordance with ACI 318-19 17.7.2 and 17.5.3, or ACI 318-14 17.5.2 and 17.5.3, or ACI 318-11 D.6.2 and D.6.3, as applicable. 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 nominal steel strength for seismic loads, $V_{sa,eq}$, shall be taken as the threaded steel element strength.



3.2.1.9 Requirements for Interaction of Tensile and Shear Forces: For designs that include combined tension and shear, the interaction of tension and shear loads shall be calculated in accordance with ACI 318-19 17.8, ACI 318-14 17.6, or ACI 318-11 D.7, as applicable.

3.2.1.10 Requirements for Minimum Member Thickness, h_{min} , Minimum Anchor Spacing, s_{min} , and Minimum Edge Distance, c_{min} : Anchor edge distance, spacing, member thickness, and concrete strength shall be in accordance with the requirements in ACI 318 for cast-in bolts.

3.2.1.11 Requirements for Critical Edge Distance: The calculation of the critical edge distance, c_{ac} , is not required, since the modification factor $\Psi_{cp,N} = 1.0$ for cast-in anchors in accordance with ACI 318-19 17.6.2.7, ACI 318-14 17.4.2.7, or ACI 318-11 D.5.2.7, as applicable.

3.2.1.12 Lightweight Concrete: In lightweight concrete, the modification factor λ , for concrete breakout strength shall be in accordance with ACI 318-19 17.2.4.1 (2021 IBC), ACI 318-14 17.2.6 (2018 and 2015 IBC), or ACI 318-11 D.3.6 (2012 IBC).

3.2.2 Allowable Stress Design (ASD):

3.2.2.1 General: Design values for use with allowable stress design (working stress design) load combinations calculated in accordance with Section 1605.1 of the 2021 IBC or Section 1605.3 of the 2018, 2015, and 2012 IBC, shall be established as follows:

$$T_{allowable,ASD} = \frac{\phi N_n}{\alpha}$$

$$V_{allowable,ASD} = \frac{\phi V_n}{\alpha}$$

where:

$T_{allowable,ASD}$ = Allowable tension load (lbf or kN).

$V_{allowable,ASD}$ = Allowable shear load (lbf or kN).

ϕN_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 IBC Section 1905.1.8, or ACI 318-11 Appendix C, as applicable.

ϕV_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, or ACI 318-11 Appendix C, as applicable.

α = Conversion factor calculated as a weighted average of the load factors for the controlling load combination. In addition, α shall include all applicable factors to account for ductile failure modes.

The requirements for member thickness, edge distance, and spacing, described in this report, shall apply.

3.2.2.2 Interaction of Tensile and Shear Forces: For designs that include combined tension and shear, the interaction of tension and shear loads shall be calculated in accordance with ACI 318-19 17.8, ACI 318-14 17.6, or ACI 318-11 D.7, as applicable, 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:

$$\frac{T_{applied}}{T_{allowable,ASD}} + \frac{V_{applied}}{V_{allowable,ASD}} \leq 1.2$$

3.3 Installation

The cast-in concrete anchors with ChubbyNut™ and HeavySet™ shall be installed in accordance with the manufacturer's printed installation instructions (MPII) and this report, copies of which shall be available at each job site.

In general, each ChubbyNut™ and HeavySet™ nut shall be attached to the appropriate all-threaded rod diameter and grade as shown in Tables 1A and 1B of this report. To ensure proper thread engagement the cast-in concrete anchor rod shall be threaded hand or finger-tight into the ChubbyNut™ and HeavySet™ nuts. The torquing of the threaded rods is beyond the scope of this report.

To install the anchor bolt assembly to the SmackChair™, SmackFlat™, and SnapChair™, the Manufacturer's Published Installation Instructions (MPII) shall apply.

4.0 PRODUCT DESCRIPTION

4.1 Cast-In Concrete Anchors with ChubbyNut™ and HeavySet™ Nut:

4.1.1 General: The cast-in concrete anchors with ChubbyNut™ and HeavySet™ nut consist of an internally threaded steel body and a steel nut. The ChubbyNut™ forged model is manufactured from AISI C1045 steel Grade 5 nut



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material. Material specifications and model numbers are provided in Tables 1A and 1B of this report.

There are two types of ChubbyNut™ and HeavySet™ nut, the forged (CNx and HSx Series) and the machined (CNDx and HSDx Series).

There are six models for the forged ChubbyNut™ type: CN5, CN6, CN7, CN8, CN9, and CN10.

There are six models for the forged HeavySet™ nut type: HS6, HS7, HS8, HS9, HS10, and HS12.

There are eight models for the machined ChubbyNut™, type: CND4, CND5, CND6, CND7, CND8, CND9, CND10, and CND11.

There are seven models for the machined HeavySet™ nut type: HSD6, HSD7, HSD8, HSD9, HSD10, HSD11, and HSD12.

4.1.2 Ductility: In accordance with ACI 318-19 and -14 2.3 or ACI 318-11 D.1, in order for the threaded anchor rod to be considered ductile, the tensile test elongation shall be at least 14 percent and the reduction of the area shall be at least 30 percent. All threaded rods shown in Table 1 comply with this ductility requirement and the entire assembly of threaded rods with ChubbyNut™ or HeavySet™ nuts shall be considered ductile. Threaded rods used in the assembly with a tensile test elongation of less than 14 percent or a reduction of area less than 30 percent, or both, shall be considered brittle. Where values are nonconforming or unstated, the steel shall be considered brittle.

4.2 SmackChair™ and SmackFlat™ and SnapChair™ Anchor Stands: The SmackChair™ and SmackFlat™ are manufactured from Polypropylene. The SnapChair™ is manufactured from Nylon 66. Models and visual depictions are provided in Table 2 of this report.

4.3 Concrete: Normal-weight and lightweight concrete shall conform to Sections 1903 and 1905 of the IBC.

5.0 IDENTIFICATION

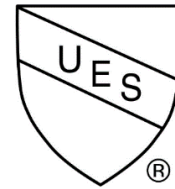
5.1 A manufacturer's identification symbol and model number are stamped or inscribed on each ChubbyNut™ and HeavySet™. Figure 3 of this report provides examples.

5.2 The marking is as follows: "x" = diameter of attached rod in eighths where "7" = 7/8 inch diameter, for example. A letter "G" in addition, at the end of the part number, designates the anchor nut can be used with hot-dipped galvanized anchor rods, i.e., CN6G is a ChubbyNut™ forged intended for HDG 3/4 inch threaded rod.

5.3 A manufacturer's color code on SmackChair™ and SmackFlat™ model number is molded on SnapChair™.

5.4 Package labeling: Packages containing ChubbyNut™, HeavySet™, SmackChair™, SmackFlat™, and SnapChair™ shall be labeled with the manufacturer's name and contact information, the model number and size, and evaluation report number (IAPMO UES ER-734).

5.5 The identification may also include the IAPMO Uniform Evaluation Service Mark of Conformity, as shown:



IAPMO UES ER-734

6.0 SUBSTANTIATING DATA

6.1 Data in accordance with AC446, Headed Cast-in Specialty Inserts in Concrete. The data included test reports, engineering reports, installation instructions, and quality documents.

6.2 Test reports are from laboratories in compliance with ISO/IEC 17025.

7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research completed by IAPMO Uniform Evaluation Service on Diverse Technologies LLC's ChubbyNut™ and HeavySet™ Nut to assess conformance to the codes shown in Section 1.0 of this report and serves as documentation of the product certification. Products are manufactured at locations noted in Section 2.19 of this report under a quality control program with periodic inspection under the supervision of IAPMO UES.

For additional information about this evaluation report please visit www.uniform-es.org or email us at info@uniform-es.org



TABLE 1A: CHUBBYNUT™ AND HEAVYSET™ SELECTION TABLE FOR STANDARD AND MID-GRADE STRENGTH THREADED RODS

Model # ¹	Type ²	Rod Diameter (in)	Threads (UNC)	Material	Nominal Dimensions			Anchor Rod Grades ^{4,5,6,7}	Max N _{sa} ⁸ (lbs)
					Height (in) (A)	Ledge (in) (B)	Effective Outer Diameter (in) ³ (C)		
CN4	FORGED	1/2	11	AISI C1045 GR 5	0.515	0.188	1.438	ASTM A36, A307, F1554 GR 36 & 55	7,980
CN5	FORGED	5/8	10	AISI C1045 GR 5	0.629	0.209	1.688	ASTM A36, A307, F1554 GR 36 & 55	12,710
CN6	FORGED	3/4	10	AISI C1045 GR 5	0.629	0.209	1.688	ASTM A36, A307, F1554 GR 36 & 55	18,810
CN7	FORGED	7/8	9	AISI C1045 GR 5	0.740	0.286	2.000	ASTM A36, A307, F1554 GR 36 & 55	25,970
CN8	FORGED	1	8	AISI C1045 GR 5	0.848	0.286	2.250	ASTM A36, A307, F1554 GR 36 & 55	34,070
CN9	FORGED	1 1/8	7	AISI C1045 GR 5	0.951	0.322	2.563	ASTM A36, A307, F1554 GR 36 & 55	42,930
CN10	FORGED	1 1/4	7	AISI C1045 GR 5	1.076	0.387	2.875	ASTM A36, A307, F1554 GR 36 & 55	54,510
HS12	FORGED	1 1/2	6	AISI C1045 GR 5	1.750	0.492	3.563	ASTM A36, A307, F1554 GR 36 & 55	79,050

CND4	MACHINED	1/2	13	ASTM A108-1144 / ASTM A311	0.407	0.111	0.972	ASTM A36, A307, F1554 GR 36 & 55	7,980
CND5	MACHINED	5/8	11	ASTM A108-1144 / ASTM A311	0.515	0.168	1.385	ASTM A36, A307, F1554 GR 36 & 55	12,710
CND6	MACHINED	3/4	10	ASTM A108-1144 / ASTM A311	0.629	0.203	1.681	ASTM A36, A307, F1554 GR 36 & 55	18,810
CND7	MACHINED	7/8	9	ASTM A108-1144 / ASTM A311	0.740	0.202	1.764	ASTM A36, A307, F1554 GR 36 & 55	25,970
CND8	MACHINED	1	8	ASTM A108-1144 / ASTM A311	0.848	0.259	2.177	ASTM A36, A307, F1554 GR 36 & 55	34,070
CND9	MACHINED	1 1/8	7	ASTM A108-1144 / ASTM A311	0.951	0.303	2.515	ASTM A36, A307, F1554 GR 36 & 55	42,930
CND10	MACHINED	1 1/4	7	ASTM A108-1144 / ASTM A311	1.076	0.314	2.678	ASTM A36, A307, F1554 GR 36 & 55	54,510
CND11	MACHINED	1 3/8	6	ASTM A108-1144 / ASTM A311	1.172	0.313	2.750	ASTM A36, A307, F1554 GR 36 & 55	64,960
HSD12	MACHINED	1 1/2	6	ASTM A108-1144 / ASTM A311	1.781	0.375	3.000	ASTM A36, A307, F1554 GR 36 & 55	79,050

TABLE 1B: HEAVYSET™ SELECTION TABLE FOR HIGH-STRENGTH THREADED RODS

Model # ¹	Type ²	Rod Dia (in)	Threads (UNC)	Material	Nominal Dimensions			Anchor Rod Grades ^{4,5,6,7}	Max N _{sa} ⁸ (lbs)
					Height (in) (A)	Ledge (in) (B)	Effective Outer Diameter (in) ³ (C)		
HS6	FORGED	3/4	10	AISI C1045 GR 5	0.953	0.212	2.620	ASTM A193B7, A449, F1554 GR105	31,360
HS7	FORGED	7/8	9	AISI C1045 GR 5	1.074	0.212	2.620	ASTM A193B7, A449, F1554 GR105	43,290
HS8	FORGED	1	8	AISI C1045 GR 5	1.192	0.212	2.620	ASTM A193B7, A449, F1554 GR105	56,790
HS9	FORGED	1 1/8	7	AISI C1045 GR 5	1.304	0.212	2.620	ASTM A193B7, A449, F1554 GR105	71,560
HS10	FORGED	1 1/4	7	AISI C1045 GR 5	1.440	0.270	2.875	ASTM A193B7, A449, F1554 GR105	90,850
HS12	FORGED	1 1/2	6	AISI C1045 GR 5	1.750	0.492	3.563	ASTM A193B7, A449, F1554 GR105	131,740

HSD6	MACHINED	3/4	10	ASTM A108-1144 / ASTM A311	1.007	0.217	2.635	ASTM A193B7, A449, F1554 GR105	31,360
HSD7	MACHINED	7/8	9	ASTM A108-1144 / ASTM A311	1.136	0.217	2.635	ASTM A193B7, A449, F1554 GR105	43,290
HSD8	MACHINED	1	8	ASTM A108-1144 / ASTM A311	1.262	0.217	2.635	ASTM A193B7, A449, F1554 GR105	56,790
HSD9	MACHINED	1 1/8	7	ASTM A108-1144 / ASTM A311	1.381	0.217	2.680	ASTM A193B7, A449, F1554 GR105	71,560
HSD10	MACHINED	1 1/4	7	ASTM A108-1144 / ASTM A311	1.526	0.275	3.000	ASTM A193B7, A449, F1554 GR105	90,850
HSD11	MACHINED	1 3/8	6	ASTM A108-1144 / ASTM A311	1.637	0.275	2.930	ASTM A193B7, A449, F1554 GR105	108,270
HSD12	MACHINED	1 1/2	6	ASTM A108-1144 / ASTM A311	1.781	0.375	3.000	ASTM A193B7, A449, F1554 GR105	131,740

Notes to Tables 1A and 1B on the next page.



TABLE 1A AND 1B NOTES:

For SI: 1 inch=25.4 mm, 1 lb. =4.45 N

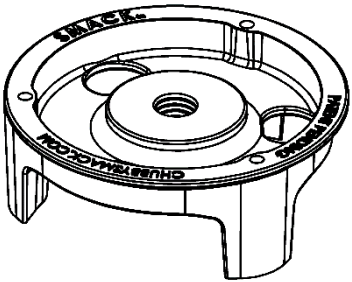
1. CN Series = ChubbyNut™, HS Series = HeavySet™, Additional G letter (CNxG or HSxG = Tapped for Hot Dipped Galvanized rods.)
2. Machined nuts will have an additional "D" in the Model #.
3. The outer diameter of the nuts used in ACI 318 calculations provides the basis for the effective bearing area.
4. ASTM A36/A307 and F1554 GR36 based on $F_y = 45$ ksi, $F_u = 60$ ksi.
5. ASTM F1554 GR55 based on $F_y = 55$ ksi, $F_u = 75$ ksi.
6. ASTM A449 based on $F_y = 105$ ksi, $F_u = 120$ ksi up to 1 inch diameter, otherwise > 1 inch: $F_y = 92$ ksi, $F_u = 105$ ksi.
7. ASTM A193 B7 and F1554 GR 105 based on $F_y = 105$ ksi, $F_u = 125$ ksi.
8. Per ACI 318-19 17.6.1.2 or ACI 318-14 17.4.1.2, a single cast-in anchor shall not exceed $N_{sa} = A_{se}f_{uta} \cdot \phi = 0.75$ per ACI 318-19 Table 17.5.3(a) or 17.3.3(a)(i)ACI 318-14 17.3.3(a)(i) for ductile steel in tension.

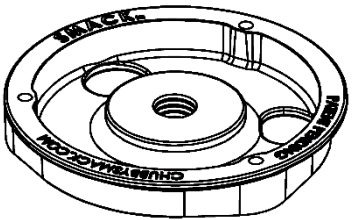


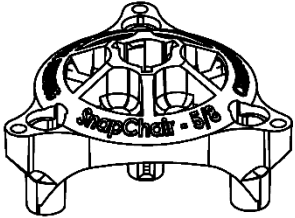
FIGURE 1: CHUBBYNUT™ and HEAVYSET™ NUT PARAMETERS



TABLE 2: SMACKCHAIR™, SMACKFLAT™ AND SNAPCHAIR™ SELECTION TABLE

<i>SMACKCHAIR™</i>	Model # ¹	Rod Dia. (in)	Color	Outer Diameter (in)	Height to base of Nut (in)	Clearance ² (in)
	SC4	1/2	TAN	4.50 in	1.45 in	1.00 in
	SC5	5/8	BLACK	4.50 in	1.45 in	1.00 in
	SC6	3/4	GRAY	4.50 in	1.45 in	1.00 in
	SC7	7/8	BLUE	4.50 in	1.45 in	1.00 in
	SC8	1	YELLOW	4.50 in	1.45 in	1.00 in
	SC9	1 1/8	WHITE	4.50 in	1.45 in	1.00 in
	SC10	1 1/4	GREEN	4.50 in	1.45 in	1.00 in
	SC11	1 3/8	PURPLE	4.50 in	1.45 in	1.00 in
	SC12	1 1/2	RED	4.50 in	1.45 in	1.00 in

<i>SMACKFLAT™</i>	Model # ¹	Rod Dia. (in)	Color	Outer Diameter (in)	Height to base of Nut (in)	Clearance ² (in)
	SF4	1/2	TAN	4.50 in	0.64 in	0.062 in
	SF5	5/8	BLACK	4.50 in	0.64 in	0.062 in
	SF6	3/4	GRAY	4.50 in	0.64 in	0.062 in
	SF7	7/8	BLUE	4.50 in	0.64 in	0.062 in
	SF8	1	YELLOW	4.50 in	0.64 in	0.062 in
	SF9	1 1/8	WHITE	4.50 in	0.64 in	0.062 in
	SF10	1 1/4	GREEN	4.50 in	0.64 in	0.062 in
	SC11	1 3/8	PURPLE	4.50 in	0.64 in	0.062 in
	SF12	1 1/2	RED	4.50 in	0.64 in	0.062 in

<i>SNAPCHAIR™</i>	Model # ¹	Rod Dia. (in)	Color	Outer Diameter (in)	Height to base of Nut (in)	Clearance ² (in)	
	SNAP4	1/2	GRAY	3.92 in	1.66 in	1.00 in	
	SNAP5	5/8	GRAY	3.92 in	1.66 in	1.00 in	
	SNAP6	3/4	GRAY	3.92 in	1.66 in	1.00 in	
	SNAPCHAIR™ ADJUSTABLE BOLT HEIGHT						
	SNAP4A	1/2	GRAY	3.92 in	2.65 in	1.00 in	
	SNAP5A	5/8	GRAY	3.92 in	2.65 in	1.00 in	
	SNAP6A	3/4	GRAY	3.92 in	2.65 in	1.00 in	

NOTES:

For SI: 1 inch=25.4 mm

1. SCx, SFx, SNAPX: x = Rod Diameter in eighths of an inch.
2. "Clearance" is the amount of concrete cover under the anchor chairs.

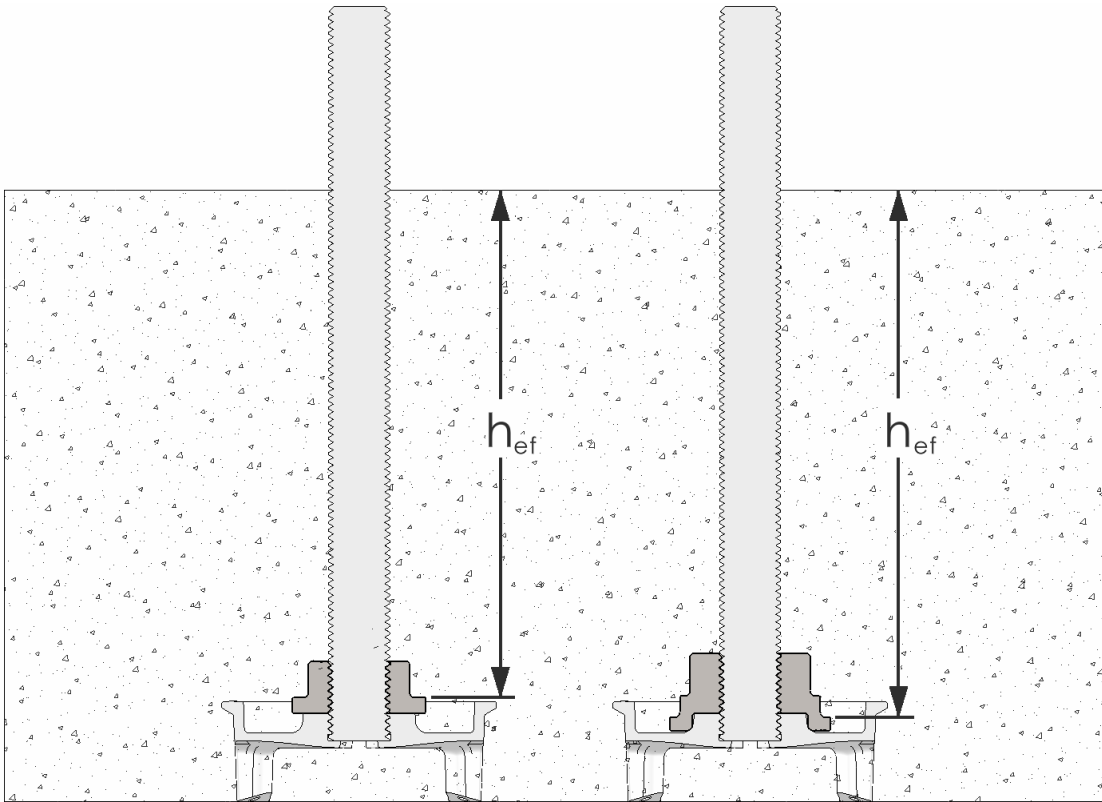


FIGURE 2: CHUBBYNUT™ and HEAVYSET™ NUT including SMACKCHAIR™ BOLT STANDS

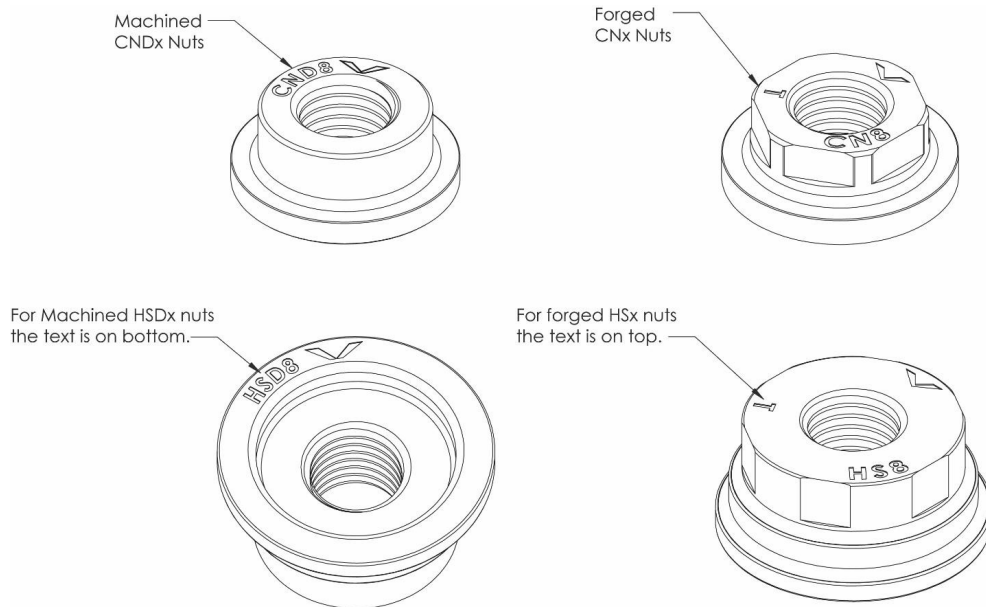


FIGURE 3: CHUBBYNUT™ and HEAVYSET™ NUT MARKINGS



FLORIDA BUILDING CODE SUPPLEMENT

DIVERSE TECHNOLOGIES, LLC
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www.chubbysmack.com

ADDITIONAL COMPANY:

EARTHBOUND CORPORATION
17361 Tye Street SE
Monroe, WA 98272

CAST-IN CONCRETE ANCHOR with CHUBBYNUT™ or HEAVYSET™ NUT in CRACKED and UNCRACKED CONCRETE

CSI Division: 03 00 00 – CONCRETE

CSI Sections: 03 15 19 - Cast-in Concrete Anchors

1.0 RECOGNITION

The Cast-In Concrete Anchors with ChubbyNut™ or HeavySet™ nut as evaluated and represented in IAPMO UES Evaluation Report ER-734 and with changes as noted in this supplement are satisfactory alternatives for use in buildings built under the following codes:

- 2023 Florida Building Code-Building (FBC-Building)
- 2023 Florida Building Code-Residential (FBC-Residential)

2.0 LIMITATIONS

Use of the cast-in concrete anchors with ChubbyNut™ or HeavySet™ nut recognized in ER-734 and this supplement is subject to the following limitations:

2.1 The design and installation of the cast-in concrete anchors with ChubbyNut™ or HeavySet™ nut shall be in accordance with the 2021 International Building Code and the 2021 International Residential Code as noted in ER-734.

2.2 Load combinations shall be in accordance with Sections 1605.1 or 1605.2 of the FBC-Building, as applicable.

2.3 Design wind loads shall be in accordance with Section 1609.3 of the FBC-Building or Section R301.2.1.1 of the FBC-Residential, as applicable, and Section 1620 of the

FBC-Building where used in High-velocity Hurricane Zones (HVHZ).

2.4 Use of cast-in concrete anchors with ChubbyNut™ or HeavySet™ nut in applications exposed to the weather within High-velocity Hurricane Zones (HVHZ) as set forth in FBC-Building and the FBC-Residential is beyond the scope of this supplement report.

2.5 Use of cast-in concrete anchors with ChubbyNut™ or HeavySet™ nut in High-velocity Hurricane Zones (HVHZ) as set forth in Section 2321.5.2 of the FBC-Building and Section 4409 of the FBC-Residential to resist wind uplift is permitted. The anchors shall be designed to resist the uplift forces as required in Section 1620 (HVHZ) of the FBC-Building or 700 pounds (3114 N), whichever is greater, per FBC-Building Section 2321.7.

2.6 For products falling under Subsection 5(d) of Florida Rule 61G20-3.008, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission (or the building official when the report holder does not possess an approval by the Commission) is required to provide oversight and determine that the products are being manufactured as described in this evaluation report to establish continual product performance.

2.7 This supplement expires concurrently with ER-734.

For additional information about this evaluation report please visit www.uniform-es.org or email us at info@uniform-es.org



CALIFORNIA SUPPLEMENT

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CAST-IN CONCRETE ANCHOR with CHUBBYNUT™ or HEAVYSET™ NUT in CRACKED and UNCRACKED CONCRETE

CSI Division: 03 00 00 – CONCRETE

CSI Sections: 03 15 19 - Cast-in Concrete Anchors

1.0 RECOGNITION

The Cast-In Concrete Anchor with ChubbyNut™ or HeavySet™ nut as evaluated and represented in IAPMO UES Evaluation Report ER-734 and with changes as noted in this supplement is a satisfactory alternative for use in buildings built under the following codes (and regulations):

- 2022 California Building Code (CBC)
- 2022 California Residential Code (CRC)

2.0 LIMITATIONS

Use of the Cast-In Concrete Anchor with ChubbyNut™ or HeavySet™ nut recognized in this report is subject to the following limitations:

2.1 The design and installation of the cast-in concrete anchors with ChubbyNut™ or HeavySet™ nut shall be in accordance with the 2021 International Building Code and the 2021 International Residential Code as noted in ER-734.

2.2 The seismic design of connections to the foundation shall comply with CBC Section Section 1617A.1.15 as applicable.

2.3 Anchorage of structural walls shall comply with CBC Section 1604A.8.2 as applicable.

2.4 Cast-In Concrete Anchors with ChubbyNut™ or HeavySet™ nut comply as prequalified specialty inserts in accordance with CBC Sections 1617A.1.19 and 1901.3.2.

Special inspections shall be in accordance with CBC Section 1704.2 or Sections 1701A.3 and 1704A.2, as applicable. Periodic special inspection shall be provided in accordance with Section 1705.3 and Table 1705.3, or Section 1705A.3, and Table 1705A.3 of the CBC, as applicable. Special inspection shall be conducted where special seismic certification for designated seismic systems is required in accordance with Section 1705.14.3.1, Section 1705A.13.4, and Section 1705A.14.3.1 of the CBC, as applicable.

2.5 This supplement expires concurrently with ER-734.

For additional information about this evaluation report please visit www.uniform-es.org or email us at info@uniform-es.org



CITY OF LOS ANGELES SUPPLEMENT

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CAST-IN CONCRETE ANCHOR with CHUBBYNUT™ or HEAVYSET™ NUT in CRACKED and UNCRACKED CONCRETE

CSI Division: 03 00 00 – CONCRETE

CSI Section: 03 15 19 - Cast-in Concrete Anchors

1.0 RECOGNITION

The cast-in-place concrete anchors ChubbyNut™ or HeavySet™ nut as evaluated and represented in IAPMO UES Evaluation Report ER-734 and with changes as noted in the California Supplement and this supplement are satisfactory alternatives for use in buildings built under the following codes:

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

2.0 LIMITATIONS

Use of the cast-in-place concrete anchors with ChubbyNut™ or HeavySet™ nut recognized in ER-734 and this supplement is subject to the following limitations:

2.1 The design, installation, conditions of use, and identification of the cast-in-place concrete anchors with ChubbyNut™ or HeavySet™ nut shall be in accordance with the 2021 International Building Code and the 2021 International Residential Code, as applicable, as noted in ER-734; and in accordance with the California Supplement, as applicable.

2.2 Prior to installation, calculations and details demonstrating compliance with this approval report, ACI 318 and the Los Angeles Building Code or Los Angeles Residential Code shall be submitted to the structural plan check section for review and approval. The calculations and details shall be prepared, stamped, and signed by a California registered design professional except as otherwise permitted by the Department of Building and Safety.

2.3 Plans and calculations shall bear the stamp and signature of a California registered civil or structural engineer or architect. Calculations shall consider:

- a. The code allowable value of anchor bolt or tension rod.
- b. The bearing area of the ChubbyNut™ and HeavySet™ anchor nuts.
- c. The calculated anchor embedment depth shall be between the exposed concrete surface and the effective perimeter of the ChubbyNut™ and HeavySet™ anchor nuts.

2.4 The design, installation, and inspection of the cast-in-place concrete anchors with ChubbyNut™ or HeavySet™ nut shall be in accordance with LABC Chapters 16 and 17, as applicable.

2.5 Periodic special inspection shall be provided by the Registered Deputy Inspector in accordance with Section 1705 of the LABC during installations of the cast-in-place concrete anchors with ChubbyNut™ or HeavySet™ nut.

2.6 Under the LARC, a design in accordance with Section R301.1.3 shall be submitted.

2.7 This supplement expires concurrently with ER-734.

For additional information about this evaluation report please visit www.uniform-es.org or email us at info@uniform-es.org