

GENERAL INFORMATION

CCU+™

Critical Connection Undercut Anchoring System

PRODUCT DESCRIPTION

The DEWALT Critical Connection Undercut (CCU+™) anchor is a post-installed structural anchor designed for static, dynamic and seismic loading in the tension zone of both cracked and uncracked concrete. The high capacity CCU+™ anchor can be loaded immediately following installation and is available in zinc plated ASTM A36 (F1554 Grade 36) mild carbon steel and ASTM A193 Grade B7 high strength carbon steel. For exterior applications or where high corrosion resistance is required, the CCU+™ is also available in ASTM A193 Grade 8BM, Class 2 high strength 316 stainless steel.

CCU+ anchors are installed into a fixed depth hole with a cone-shaped cavity at the bottom which is created in a secondary drilling operation using a specialty undercut drill bit supplied by DEWALT. The result is bottom-bearing post-installed anchor which keys into the base material with minimal expansive forces allowing for close edge distance and anchor spacing, similar to a cast-in-place headed stud. The heavy-wall expansion sleeve contributes to load transfer and improved shear capacities particularly for the throbolt version.

GENERAL APPLICATIONS AND USES

- Structural connections (e.g. beam, column)
- Safety related fastening and assemblies
- Bridge, tunnel and port structure attachments
- Water and wastewater treatment facility units
- Vessel, tank and containment wall anchorage
- Power generation plant / hydro dam anchors
- Industrial machine and equipment mounts
- Utility system bracing, hangers and supports
- Barriers, guards, fencing and railing
- Retrofit anchors for cast-in anchor bolts
- Tension zone / cracked concrete
- Seismic attachments (SDC A – F)

FEATURE AND BENEFITS

- + Load transfers to concrete through bearing not friction (similar to cast-in headed bolts)
- + Provides positive mechanical interlock into base material
- + Consistent predictable behavior and exceptional load capacities
- + Robust design minimizes anchor displacement under load
- + Anchor bearing area is more than two-and-a-half times the net tensile area of the anchor rod
- + Anchor rods can be designed for stretch length and ductile steel behavior for seismic loading
- + Close edge distance, anchor spacing, and slab thickness due to low expansive forces
- + Throbolt version provides significant increase in shear capacities and variable fixture thickness
- + Length ID code and material ID marking stamped on head of each anchor
- + Undercut cavity is created in seconds with durable undercutting tool
- + DEWALT dust removal drilling system (with HEPA dust extractor) can be used for an OSHA 1926.1153 Table 1 compliant solution
- + CCU+ undercut anchors made in USA at time of publication; product certifications available by request (anchors@DEWALT.com)

APPROVALS AND LISTINGS

- International Code Council, Evaluation Service (ICC-ES), ESR-4810 and ELC-4810 for cracked and uncracked concrete
- Code compliant with the 2021 IBC/IRC, 2018 IBC/IRC, 2015 IBC/IRC and 2012 IBC/IRC
- Tested in accordance with ACI 355.2/ASTM E488 and ICC-ES AC193 for use in structural concrete under the design provisions of ACI 318 (-19 and -14) Chapter 17, CSA A23.3-19 Annex D or ACI 318-11 Appendix D
- Evaluated and qualified by an accredited independent testing laboratory for recognition in cracked and uncracked concrete including seismic and wind loading (anchor category 1 for all sizes)
- City of Los Angeles, LABC Supplement (within ESR-4810)
- Florida Building Code, FBC Supplement including HVHZ (within ESR-4810)

GUIDE SPECIFICATIONS

CSI Divisions: 03 16 00 – Concrete Anchors and 05 05 19 – Post-Installed Concrete Anchors. Undercut anchors shall be CCU+ as supplied by DEWALT, Towson, MD. Anchors shall be installed in accordance with published instructions and the Authority Having Jurisdiction.

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CCU+ UNDERCUT PRESET (PS)



CCU+ UNDERCUT THROBOLT (TB)

THREAD VERSION

- UNC threaded stud (anchor rod)

ANCHOR SIZE RANGE (TYP.)

- 3/8" through 3/4" diameters (anchor rod diameter)

ANCHOR MATERIAL TYPE

- Zinc Plated Carbon Steel
- 316 Stainless Steel

ANCHOR VERSIONS

- Preset (PS)
- Throbolt (TB)

SUITABLE BASE MATERIALS

- Normal-weight concrete
- Lightweight concrete



MATERIAL SPECIFICATIONS

| Anchor Component | Anchor Designation / Material | |
|--------------------------------------|--|---|
| | Mild Carbon Steel High Strength Carbon Steel | High Strength Stainless Steel |
| Anchor Rod (Threaded Rod) | ASTM A36 (F1554, Grade 36) ASTM A193, Grade B7 | ASTM A193, Grade B8M, Class 2 (316 SS) |
| Expansion Sleeve | Carbon Steel | AISI 316 SS |
| Expansion Cone | Carbon Steel | AISI 316 SS |
| Hex Nut | 3/8" : SAE J955, Grade 8 1/2", 5/8" and 3/4" : ASTM A563, Grade C | 3/8" : ASTM F594, 316 SS, Alloy Group 2 1/2", 5/8" and 3/4" : ASTM A194, Grade 8M (S1) |
| Washer | ASTM F844; Meets ANSI/ASME B18.22.1, Type A plain (wide) | AISI 316 SS; meets ANSI/ASME B18.22.1, Type A plain (wide) |
| Plating (carbon steel components) | Zinc plating, ASTM B633, SC1 (Fe/Zn 5); min. plating requirement for Mild Service Condition | Not applicable |

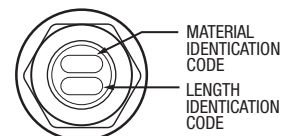
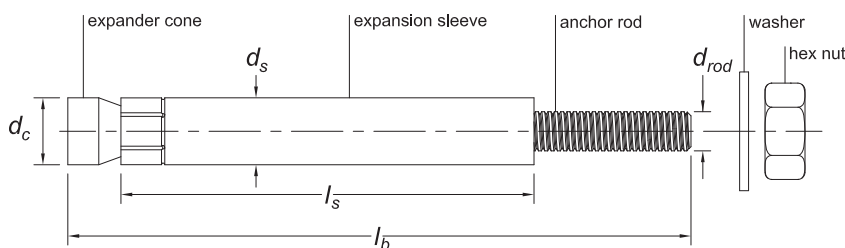
ANCHOR SPECIFICATIONS

CCU+ Undercut Anchor Nominal Dimensional Characteristics^{1,2,3}

| Anchor Description, Nominal Size and Length (in.) | Anchor Rod Designation (ASTM) | Anchor Version | Rod Diameter, d_{rod} (in.) | Anchor Length, l_b (in.) | Expansion Sleeve | | Expander Cone Dia., d_c (in.) | Max. Fixture Thickness, t_{max} (in.) |
|---|-------------------------------|----------------|-------------------------------|----------------------------|---------------------|----------------------|---------------------------------|---|
| | | | | | Length, l_s (in.) | Diameter d_s (in.) | | |
| 3/8 x 6 | ASTM A36 or A193, Grade B7 | Preset (PS) | 3/8 | 6 | 4 | 11/16 | 11/16 | 7/8 |
| | | Thrubolt (TB) | | | 4-7/8 | | | |
| | A193, Grade B8M (316 SS) | Preset (PS) | 3/8 | 6 | 4 | 11/16 | 11/16 | 7/8 |
| | | Thrubolt (TB) | | | 4-7/8 | | | |
| 1/2 x 7-1/2 | ASTM A36 or A193, Grade B7 | Preset (PS) | 1/2 | 7-1/2 | 5 | 13/16 | 13/16 | 1-1/4 |
| | | Thrubolt (TB) | | | 6-1/4 | | | |
| | A193, Grade B8M (316 SS) | Preset (PS) | 1/2 | 7-1/2 | 5 | 13/16 | 13/16 | 1-1/4 |
| | | Thrubolt (TB) | | | 6-1/4 | | | |
| 1/2 x 8-1/4 | ASTM A36 or A193, Grade B7 | Preset (PS) | 1/2 | 8-1/4 | 5 | 13/16 | 13/16 | 2 |
| | | Thrubolt (TB) | | | 7 | | | |
| | A193, Grade B8M (316 SS) | Preset (PS) | 1/2 | 8-1/4 | 5 | 13/16 | 13/16 | 2 |
| | | Thrubolt (TB) | | | 7 | | | |
| 5/8 x 10-3/4 | ASTM A36 or A193, Grade B7 | Preset (PS) | 5/8 | 10-3/4 | 7-1/2 | 1 | 1 | 1-5/8 |
| | | Thrubolt (TB) | | | 9-1/8 | | | |
| | A193, Grade B8M (316 SS) | Preset (PS) | 5/8 | 10-3/4 | 7-1/2 | 1 | 1 | 1-5/8 |
| | | Thrubolt (TB) | | | 9-1/8 | | | |
| 5/8 x 11-1/2 | ASTM A36 or A193, Grade B7 | Preset (PS) | 5/8 | 11-1/2 | 7-1/2 | 1 | 1 | 2-3/8 |
| | | Thrubolt (TB) | | | 9-7/8 | | | |
| | A193, Grade B8M (316 SS) | Preset (PS) | 5/8 | 11-1/2 | 7-1/2 | 1 | 1 | 2-3/8 |
| | | Thrubolt (TB) | | | 9-7/8 | | | |
| 3/4 x 14 | ASTM A36 or A193, Grade B7 | Preset (PS) | 3/4 | 14 | 10 | 1-1/4 | 1-1/4 | 2 |
| | | Thrubolt (TB) | | | 12 | | | |
| | A193, Grade B8M (316 SS) | Preset (PS) | 3/4 | 14 | 10 | 1-1/4 | 1-1/4 | 2 |
| | | Thrubolt (TB) | | | 12 | | | |
| 3/4 x 16 | ASTM A36 or A193, Grade B7 | Preset (PS) | 3/4 | 16 | 10 | 1-1/4 | 1-1/4 | 4 |
| | | Thrubolt (TB) | | | 14 | | | |
| | A193, Grade B8M (316 SS) | Preset (PS) | 3/4 | 16 | 10 | 1-1/4 | 1-1/4 | 4 |
| | | Thrubolt (TB) | | | 14 | | | |

1. Preset anchors are designed so the top of the expansion sleeve is approximately flush with the base material after setting. Thrubolt anchors are designed so the expansion sleeve can be set through and can engage the fixture. See CCU+ undercut anchor detail and installation specifications.
2. Anchor rod (threaded rod) conforming to ASTM F1554, Grade 105 is strength equivalent to the tabulated ASTM A193, Grade B7 designation.
3. The listed anchor lengths are based on the anchor sizes commercially available at the time of publication; custom lengths can be produced by request. Custom length anchors not long enough to meet the minimum embedment requirements are outside the scope of ICC-ES ESR-4810 and ELC-4810.

CCU+ Undercut Anchor Assembly



A36 = A36 anchor rod
B7 = A193 Grade B7 anchor rod
SS2 = A193 Gr. B8M (316 SS) anchor rod

CCU+
Critical Connection Undercut Anchoring System

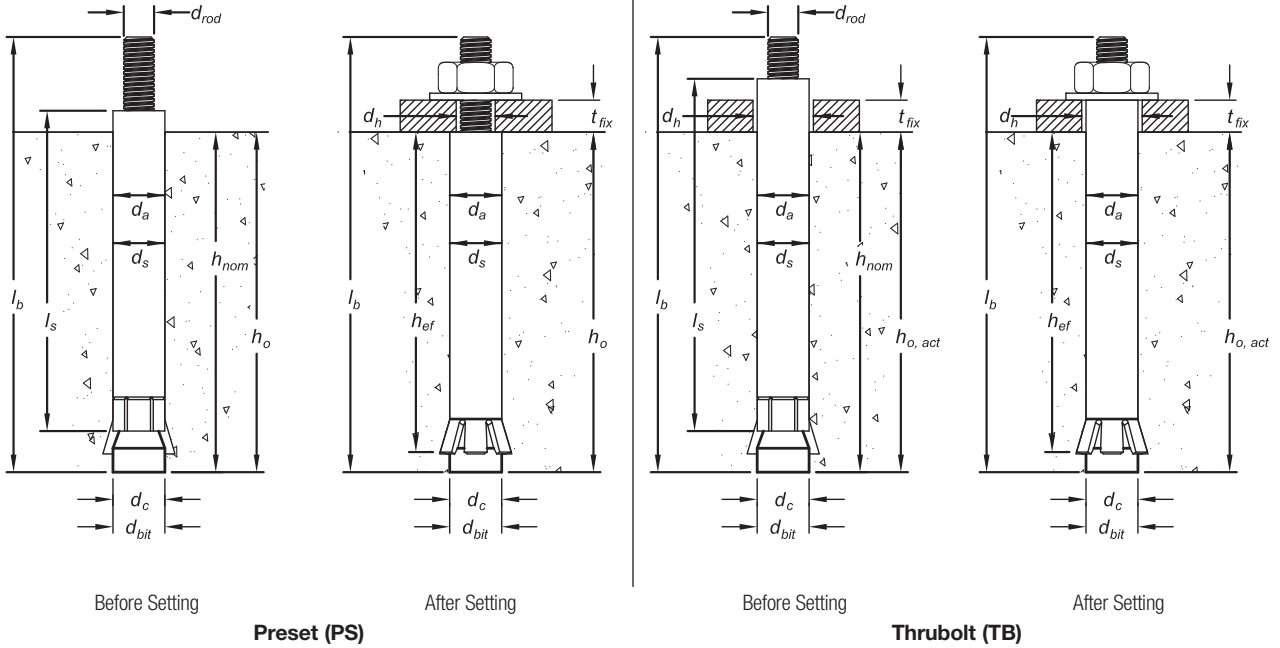
TECHNICAL GUIDE - CANADIAN SUPPLEMENT - MECHANICAL ANCHORS ©2024 DEWALT - REV. D

Anchor Length Code Identification System

| Length ID marking on anchor rod head | | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X |
|--------------------------------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----|----|----|----|----|----|----|
| Anchor Length, lb (inches) | 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 | 12 | 13 | 14 | 15 | 16 |
| | 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 | 13 | 14 | 15 | 16 | 17 |

INSTALLATION SPECIFICATIONS

CCU+ Undercut Anchor Detail



CCU+ Undercut Anchor Installation Specifications and Supplemental Information

| Anchor Property/ Setting Information | Notation | Units | Nominal Anchor Size / Rod Diameter, d_{rod} | | | | | | | | | | | | | | |
|--|--------------------------|--|---|------------------|------------------------------|-----------------------------|------------------|------------------------------|-------------------------|------------------|------------------------------|-----------------------------|------------------|------------------------------|---------|--|--|
| | | | 3/8 inch | | | 1/2 inch | | | 5/8 inch | | | 3/4 inch | | | | | |
| Anchor Rod Designation | ASTM | - | A36 | A193, Gr. B7 | A193, Gr. B8M (316 SS) | A36 | A193, Gr. B7 | A193, Gr. B8M (316 SS) | A36 | A193, Gr. B7 | A193, Gr. B8M (316 SS) | A36 | A193, Gr. B7 | A193, Gr. B8M (316 SS) | | | |
| Outside anchor diameter / expansion sleeve diameter | d_a / d_s | in. (mm) | 0.6875 (17.5) | | | 0.8125 (20.6) | | | 1.000 (25.4) | | | 1.25 (31.8) | | | | | |
| Nominal drill bit diameter (ANSI) | d_{bit} | in. | 11/16 | | | 13/16 | | | 1 | | | 1-1/4 | | | | | |
| Nominal embedment depth ¹ | h_{nom} | in. (mm) | 4-1/4 (108) | | | 5-3/8 (137) | | | 8 (203) | | | 10-5/8 (270) | | | | | |
| Effective embedment | h_{ef} | in. (mm) | 4 (102) | | | 5 (127) | | | 7-1/2 (191) | | | 10 (254) | | | | | |
| Minimum hole depth, preset version (see note 2 for thrubolt version) | h_o | in. (mm) | 4-1/4 (108) | | | 5-3/8 (137) | | | 8 (203) | | | 10-5/8 (270) | | | | | |
| Min. concrete member thickness, preset version (see note 3 for thrubolt version) | h_{min} | in. (mm) | 6 (152) | | | 7 (178) | | | 9-1/2 (241) | | | 12 (305) | | | | | |
| Minimum edge distance | c_{min} | in. (mm) | 2-1/2 (64) | | | 3 (76) | | | 4-1/2 (114) | | | 6 (152) | | | | | |
| Minimum spacing distance | s_{min} | in. (mm) | 3 (76) | | | 3-3/4 (95) | | | 5-5/8 (143) | | | 7-1/2 (191) | | | | | |
| Minimum diameter of clearance hole in fixture | Preset (PS) Version | in. (mm) | 7/16 (11.1) | | | 9/16 (14.3) | | | 11/16 (17.5) | | | 13/16 (20.6) | | | | | |
| | Thrubolt (TB) Version | | 3/4 (19.1) | | | 7/8 (22.2) | | | 1-1/8 (28.6) | | | 1-3/8 (34.9) | | | | | |
| Maximum thickness of fixture | t_{max} | in. | See nominal dimensional characteristics table (this is dependent on the selected anchor) | | | | | | | | | | | | | | |
| Installation torque | T_{inst} | ft.-lbf. (N-m) | 11 (15) | 37 (50) | 29 (40) | 70 (95) | 70 (95) | 118 (160) | 118 (160) | 221 (300) | | | | | | | |
| Torque wrench / socket size | - | in. | 9/16 | | | 7/8 | | | 1-1/16 | | | 1-1/4 | | | | | |
| Nut height | - | in. | 21/64 | | | 31/64 | | | 39/64 | | | 47/64 | | | | | |
| Washer O.D. | - | in. | 1 | | | 1-3/8 | | | 1-3/4 | | | 2 | | | | | |
| Effective tensile stress area (anchor rod) | A_{se} | in. ² (mm ²) | 0.078 (50) | | | 0.142 (91) | | | 0.226 (146) | | | 0.334 (215) | | | | | |
| Minimum specified ultimate strength ⁴ | f_{uta} | psi (N/mm ²) | 58,000 (400) | 125,000 (860) | 120,000 (827) | 58,000 (400) | 125,000 (860) | 110,000 (758) | 58,000 (400) | 125,000 (860) | 110,000 (758) | 58,000 (400) | 125,000 (860) | 110,000 (758) | | | |
| Minimum specified yield strength | f_{ya} | psi (N/mm ²) | 36,000 (248) | 105,000 (723) | 95,000 (655) | 36,000 (248) | 105,000 (723) | 95,000 (655) | 36,000 (248) | 105,000 (723) | 95,000 (655) | 36,000 (248) | 105,000 (723) | 95,000 (655) | | | |
| Strength length of the anchor rod ⁵ | - | in. | $h_{nom} - 11/16 + t_{fix}$ | | | $h_{nom} - 13/16 + t_{fix}$ | | | $h_{nom} - 1 + t_{fix}$ | | | $h_{nom} - 1-1/4 + t_{fix}$ | | | | | |
| Mean axial stiffness ⁶ | Uncracked concrete | β_{uncr} | lbf/in. | | | 595,000 | | | 1,705,000 | | | 356,000 | | | 446,000 | | |
| | cracked concrete | β_{cr} | lbf/in. | | | 398,000 | | | 744,000 | | | 445,000 | | | 354,000 | | |

For SI: 1 inch = 25.4 mm, 1 ft-lbf = 1.356 N-m.

- The embedment depth, h_{nom} , is measured from the outside surface of the concrete member to the embedded end of the anchor and equal to the hole depth.
- For thrubolt applications the actual hole depth, $h_{o,act}$ is dependent on the actual fixture thickness, t_{fix} . Actual hole depth for thrubolts is determined by taking the minimum hole depth plus the maximum thickness of fixture for the selected anchor less the actual fixture thickness being fastened to the base material ($h_{o,act} = h_o + t_{max} - t_{fix}$).
- For thrubolt applications the minimum concrete member thickness, $h_{min,act}$ is dependent on the actual fixture thickness, t_{fix} . Minimum concrete member thickness for thrubolts is determined by taking the minimum concrete member thickness plus the maximum thickness of fixture for the selected anchor less the actual fixture thickness being fastened to the base material ($h_{min,act} = h_{min} + t_{max} - t_{fix}$).
- The anchor rod for the 3/8-inch stainless steel anchors is manufactured with a minimum specified ultimate strength of 120 ksi (827 N/mm²).
- For CCU+ undercut anchors, the anchor rod, d_{rod} replaces the outside anchor diameter, d_a (i.e. expansion sleeve diameter, d_s) for determination of stretch length and stretch length ratio. Stretch lengths of the anchor rod (threaded rod) in anchor assemblies for embedments listed are greater than eight anchor rod diameters, $8d_{rod}$ which meets the prescriptive requirements as given in ACI 318-17 17.10.5.3(a), ACI 318-14 17.2.3.4.3(a) and ACI 318-11 D.3.3.4.3(a) and CSA A23.3-19, and CSA A23.3-19.
- Mean values shown, actual stiffness varies considerably depending on concrete strength, loading and geometry of application.

CCU+
Critical Connection Undercut Anchoring System

CCU+ Undercut Anchor Installation Accessories and Tools^{1,2}

| Nominal Anchor Size | Nominal Hole Diameter | Anchor Version | Primary Bit | | | Undercut Bit | | Rotary Hammer Drill | Setting Sleeves | |
|---------------------|-----------------------|----------------|---------------------|---------------------|---------------------------|----------------------|----------------------|-----------------------------|----------------------|-----------|
| | | | HSB | HB | Conventional | HUCB | UCB | | Powered | Manual |
| 3/8" | 11/16" | Preset (PS) | DFX11380 (SDS-Plus) | DWA54116 (SDS-Plus) | DW5808 4-Cutter (SDS-Max) | DFX21380 (SDS-Plus) | DFX21381 (SDS-Plus) | DCH416 or D25416 (SDS-Plus) | DFX313825 (SDS-Plus) | DFX313805 |
| | | Thrubolt (TB) | - | | | | | | | |
| 1/2" | 13/16" | Preset (PS) | DFX11120 (SDS-Plus) | DWA54316 (SDS-Plus) | DW5814 4-Cutter (SDS-Max) | DFX21120 (SDS-Plus) | DFX21121 (SDS-Plus) | DCH416 or D25416 (SDS-Plus) | DFX311230 (SDS-Plus) | DFX311210 |
| | | Thrubolt (TB) | - | | | | | | | |
| 5/8" | 1" | Preset (PS) | DFX11580 (SDS-Max) | DWA58001 (SDS-Max) | DW5852 4-Cutter (SDS-Max) | DFX21580* (SDS-Plus) | DFX21581* (SDS-Plus) | DCH614 or D25614 (SDS-Max) | DFX315835 (SDS-Max) | DFX315815 |
| | | Thrubolt (TB) | - | | | | | | | |
| 3/4" | 1-1/4" | Preset (PS) | DFX11340 (SDS-Max) | DWA58115 (SDS-Max) | DW5855 4-Cutter (SDS-Max) | DFX21340 (SDS-Max) | DFX21341 (SDS-Max) | DCH614 or D25614 (SDS-Max) | DFX313440 (SDS-Max) | DFX313420 |
| | | Thrubolt (TB) | - | | | | | | | |

*For rotary hammer drill connector options, designated drill bits can be considered for use with a DW5891 SDS-Max to SDS-Plus adapter.

1. The listed anchor installation accessories and tools are based on DEWALT equipment commercially available at the time of publication.
2. CCU+ dust removal drill bits (e.g. HSB, HB, HUCB) are used with a vacuum dust extractor (e.g. DWW010, DWW012, DWW015, DCV585).

CCU+ Dust Removal Drill Bits



Hollow Stop Bit (HSB)



Hollow Bit (HB)



Hollow Undercut Bit (HUCB)

CCU+ Customary Drill Bits



Conventional Bit



Undercut Bit (UCB)

CCU+ Setting Sleeves



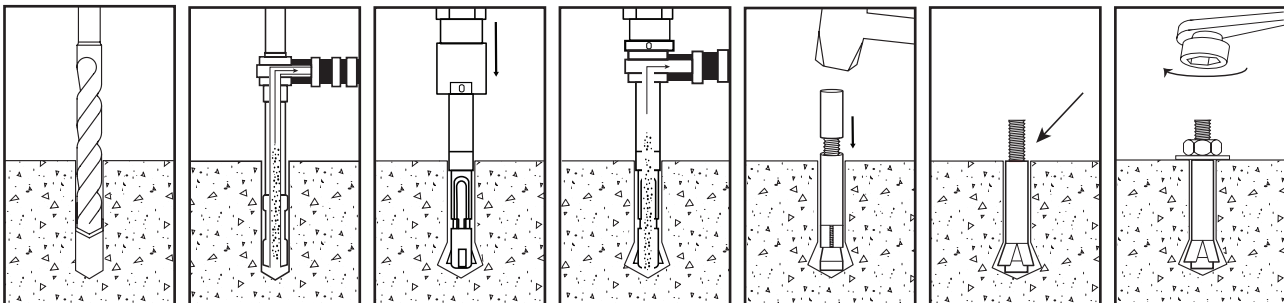
Powered Setting Sleeve



Manual Setting Sleeve

INSTALLATION INSTRUCTIONS

CCU+ Undercut Anchor Installation Instructions



1. Using the proper drill bit size, drill a hole into the base material to the required depth. The tolerances of the drill bit used should meet the requirements of ANSI Standard B212.15.
2. Remove dust and debris from the hole during drilling (e.g. hollow stop bit, hollow bit, dust extractor) or following drilling (e.g. suction, forced air) to extract loose particles created by drilling. Note: removing dust and debris after drilling is not required for overhead (ceiling) installations.
3. Insert the proper size undercut bit to the bottom of the hole. Start the rotary hammer (begin at a slow speed) and undercut the hole. Undercutting is complete when the stopper sleeve on the undercut bit is fully compressed (i.e. the gap is closed).
4. Remove dust and debris from the hole during undercutting (hollow undercut bit) or following undercutting (e.g. suction, forced air). Note: removing dust and debris after drilling is not required for overhead (ceiling) installations.
5. Insert anchor into the hole. Place setting sleeve over anchor rod and drive expansion sleeve over expander cone. Use the proper size powered setting sleeve or manual setting sleeve.
6. Verify that the setting mark is visible on the anchor rod (threaded rod) at or above the expansion sleeve.
7. Apply the proper installation torque to tighten the connection.

LIMIT STATES DESIGN INFORMATION

Design Information for CCU+ Undercut Anchor in Concrete (For use with CSA A23.3 (-19) Annex D)^{1,2}

| Anchor Property / Setting Information | Notation | Units | Nominal Anchor Diameter | | | | | | | | | | | | |
|--|---|--------------------|-------------------------|--------------|------------------------|------------|--------------|------------------------|------------|--------------|------------------------|------------|--------------|------------------------|-------|
| | | | 3/8" | | | 1/2" | | | 5/8" | | | 3/4" | | | |
| Anchor category | 1, 2 or 3 | - | 1 | | | 1 | | | 1 | | | 1 | | | |
| Anchor rod designation | - | - | A36 | A193, Gr. B7 | A193, Gr. B8M (316 SS) | A36 | A193, Gr. B7 | A193, Gr. B8M (316 SS) | A36 | A193, Gr. B7 | A193, Gr. B8M (316 SS) | A36 | A193, Gr. B7 | A193, Gr. B8M (316 SS) | |
| Outside diameter of anchor | d _a | mm | 17.5 | | | 20.6 | | | 25.4 | | | 31.8 | | | |
| Nominal embedment depth | h _{nom} | mm | 108 | | | 137 | | | 203 | | | 270 | | | |
| Effective embedment depth | h _{ef} | mm | 102 | | | 127 | | | 190 | | | 254 | | | |
| STEEL STRENGTH IN TENSION³, STEEL STRENGTH IN SHEAR³ AND STEEL STRENGTH IN SHEAR FOR SEISMIC APPLICATIONS³ | | | | | | | | | | | | | | | |
| Steel resistance of anchor in tension ⁴ | N _{sr} | kN | 20.1 | 43.4 | 41.6 | 36.6 | 79.0 | 69.5 | 58.3 | 125.7 | 110.6 | 86.2 | 185.7 | 163.4 | |
| Steel embedment material resistance factor for reinforcement | φ _s | - | 0.85 | | | | | | | | | | | | |
| Resistance modification factor for tension, ductile steel failure modes | R | - | 0.80 | | | | | | | | | | | | |
| Preset (PS) | Steel resistance of anchor in shear | V _{sa} | kN | 10.1 | 21.7 | 22.7 | 18.3 | 39.5 | 39.4 | 29.1 | 62.8 | 64.9 | 43.1 | 92.9 | 99.4 |
| | Steel resistance of anchor in shear, seismic ⁹ | V _{sa,eq} | kN | 7.0 | 19.5 | 20.5 | 12.8 | 35.5 | 36.2 | 20.4 | 56.6 | 58.5 | 30.2 | 83.6 | 89.4 |
| Thru-bolt (TB) | Steel resistance of anchor in shear | V _{sa} | kN | 10.1 | 63.2 | 79.2 | 18.3 | 83.3 | 107.7 | 29.1 | 128.9 | 172.6 | 43.1 | 185.2 | 256.9 |
| | Steel resistance of anchor in shear, seismic ⁹ | V _{sa,eq} | kN | 7.0 | 56.9 | 48.5 | 12.8 | 74.9 | 86.1 | 20.4 | 116.0 | 139.4 | 30.2 | 148.2 | 205.4 |
| Steel embedment material resistance factor for reinforcement | φ _s | - | 0.85 | | | | | | | | | | | | |
| Resistance modification factor for shear ³ | R | - | 0.75 | | | | | | | | | | | | |
| CONCRETE BREAKOUT STRENGTH IN TENSION⁶ | | | | | | | | | | | | | | | |
| Critical edge distance (uncracked concrete) | c _{ac} | mm | 152 | | | 191 | | | 241 | | | 305 | | | |
| Effectiveness factor in tension, uncracked concrete | k _{uncr} | - | 17 | | | 17 | | | 17 | | | 17 | | | |
| Effectiveness factor in tension, cracked concrete | k _{cr} | - | 10 | | | 10 | | | 10 | | | 10 | | | |
| Modification factor for cracked and uncracked concrete ⁶ | ψ _{c,N} | - | 1.00 | | | 1.00 | | | 1.00 | | | 1.00 | | | |
| Material resistance factor for concrete | φ _c | - | 0.65 | | | | | | | | | | | | |
| Resistance modification factor for tension, pullout strength, Condition B ³ | R | - | 1.00 | | | | | | | | | | | | |
| PULLOUT STRENGTH IN TENSION (NON SEISMIC-APPLICATIONS)⁵ AND PULLOUT STRENGTH IN TENSION FOR SEISMIC⁵ | | | | | | | | | | | | | | | |
| Factored pullout resistance, uncracked concrete (17 MPa) ⁶ | N _{p,uncr} | kN | see note 7 | | | see note 7 | | | see note 7 | | | see note 7 | | | |
| Factored pullout resistance, cracked concrete (17 MPa) ⁶ | N _{p,cr} | kN | see note 7 | | | see note 7 | | | see note 7 | | | see note 7 | | | |
| Factored pullout resistance, cracked concrete (17 MPa) ⁶ | N _{p,eq} | kN | see note 7 | | | see note 7 | | | see note 7 | | | see note 7 | | | |
| Material resistance factor for concrete | φ _c | - | 0.65 | | | | | | | | | | | | |
| Resistance modification factor for tension, pullout strength, Condition B ³ | R | - | 1.00 | | | | | | | | | | | | |
| CONCRETE BREAKOUT STRENGTH IN SHEAR⁷ AND PRYOUT STRENGTH IN SHEAR⁷ | | | | | | | | | | | | | | | |
| Load bearing length of anchor | ℓ _e | mm | 102 | | | 127 | | | 190 | | | 254 | | | |
| Coefficient for prying strength | k _{cp} | - | 2.0 | | | 2.0 | | | 2.0 | | | 2.0 | | | |
| Material resistance factor for concrete | φ _c | - | 0.65 | | | | | | | | | | | | |
| Resistance modification factor for prying strength ³ | R | - | 1.00 | | | | | | | | | | | | |
| <ol style="list-style-type: none"> The data in this table is intended to be used with the design provisions of CSA A23.3 (-19) Annex D, as applicable; for anchors resisting seismic load combinations the additional requirements of CSA A23.3 (-19) D.4.3, as applicable, must apply. Installation must comply with published instructions and details. All values of R for use with the load combinations of Division B, Part 4, Section 4.1.3 of the 2015 NBCC or 2010 NBCC, CSA A23.3 (-19) Annex C, as applicable, Condition B applies where supplementary reinforcement in conformance with CSA A23.3-19 D.3.3(c), as applicable, is not provided, or where pullout or prying strength governs. For cases where the presence of supplementary reinforcement can be verified, the strength reduction factors associated with Condition A may be used. The CCU+ undercut anchor is considered a ductile steel element as defined by CSA A23.3(-19) D.2, as applicable. For all design cases ψ_{c,N} = 1.0. The appropriate effectiveness factor for cracked concrete (k_{cr}) or uncracked concrete (k_{uncr}) must be used. For all design cases use ψ_{c,P} = 1.0. For the calculation of N_{pr}, see CSA A23.3 (-19) D.6.3. Pullout strength does not control design of indicated anchors. Do not calculate pullout strength for indicated sizes and embedment. Anchor is permitted to be used in lightweight concrete in accordance with CSA A23.3 (-19) D.4.6. 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), as referenced in CSA A23.3 (-19) Annex D, Section D.4.3.4. | | | | | | | | | | | | | | | |

MECHANICAL ANCHORS

CCU+TM
Critical Connection Undercut Anchoring System

TECHNICAL GUIDE - CANADIAN SUPPLEMENT - MECHANICAL ANCHORS ©2024 DEWALT - REV. 0

DESIGN STRENGTH TABLES (SD)

Factored Design Resistance (N, And V) calculated in accordance with CSA A23.3-19 Annex D:

Tension and Shear Design Strengths for CCU+ Preset Version (PS) Installed in Cracked Concrete^{1,2,3,4,5,6}



| Nominal Anchor Size / Rod Diameter (in.) | Nominal Embed. Depth h_{nom} (mm) | Minimum Concrete Compressive Strength | | | | | | | | | | | | | | | |
|--|-------------------------------------|---------------------------------------|--------------|-----------------|--------------|-------------------|--------------|-----------------|--------------|-------------------|--------------|-----------------|--------------|-------------------|--------------|-----------------|------|
| | | $f'_c = 20.7$ Mpa | | | | $f'_c = 27.6$ Mpa | | | | $f'_c = 41.4$ Mpa | | | | $f'_c = 55.2$ Mpa | | | |
| | | N. Tension (lbs.) | | V. Shear (lbs.) | | N. Tension (lbs.) | | V. Shear (lbs.) | | N. Tension (lbs.) | | V. Shear (lbs.) | | N. Tension (lbs.) | | V. Shear (lbs.) | |
| A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | | |
| 3/8 | 108 | 13.7 | 29.5 | 6.4 | 13.8 | 13.7 | 29.5 | 6.4 | 13.8 | 13.7 | 29.5 | 6.4 | 13.8 | 13.7 | 29.5 | 6.4 | 13.8 |
| 1/2 | 137 | 24.9 | 42.3 | 11.7 | 23.8 | 24.9 | 48.8 | 11.7 | 25.1 | 24.9 | 53.7 | 11.7 | 25.1 | 24.9 | 53.7 | 11.7 | 25.1 |
| 5/8 | 203 | 39.6 | 77.7 | 18.6 | 40.0 | 39.6 | 85.4 | 18.6 | 40.0 | 39.6 | 85.4 | 18.6 | 40.0 | 39.6 | 85.4 | 18.6 | 40.0 |
| 3/4 | 270 | 58.6 | 119.7 | 27.5 | 59.2 | 58.6 | 126.3 | 27.5 | 59.2 | 58.6 | 126.3 | 27.5 | 59.2 | 58.6 | 126.3 | 27.5 | 59.2 |

Anchor Pullout/Pryout Strength Controls Concrete Breakout Strength Controls Steel Strength Controls

Tension and Shear Design Strengths for CCU+ Preset Version (PS) Installed in Uncracked Concrete^{1,2,3,4,5,6}

| Nominal Anchor Size / Rod Diameter (in.) | Nominal Embed. Depth h_{nom} (mm) | Minimum Concrete Compressive Strength | | | | | | | | | | | | | | | |
|--|-------------------------------------|---------------------------------------|--------------|-----------------|--------------|-------------------|--------------|-----------------|--------------|-------------------|--------------|-----------------|--------------|-------------------|--------------|-----------------|------|
| | | $f'_c = 20.7$ Mpa | | | | $f'_c = 27.6$ Mpa | | | | $f'_c = 41.4$ Mpa | | | | $f'_c = 55.2$ Mpa | | | |
| | | N. Tension (lbs.) | | V. Shear (lbs.) | | N. Tension (lbs.) | | V. Shear (lbs.) | | N. Tension (lbs.) | | V. Shear (lbs.) | | N. Tension (lbs.) | | V. Shear (lbs.) | |
| A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | | |
| 3/8 | 108 | 13.7 | 29.5 | 6.4 | 13.8 | 13.7 | 29.5 | 6.4 | 13.8 | 13.7 | 29.5 | 6.4 | 13.8 | 13.7 | 29.5 | 6.4 | 13.8 |
| 1/2 | 137 | 24.9 | 53.7 | 11.7 | 25.1 | 24.9 | 53.7 | 11.7 | 25.1 | 24.9 | 53.7 | 11.7 | 25.1 | 24.9 | 53.7 | 11.7 | 25.1 |
| 5/8 | 203 | 39.6 | 85.4 | 18.6 | 40.0 | 39.6 | 85.4 | 18.6 | 40.0 | 39.6 | 85.4 | 18.6 | 40.0 | 39.6 | 85.4 | 18.6 | 40.0 |
| 3/4 | 270 | 58.6 | 126.3 | 27.5 | 59.2 | 58.6 | 126.3 | 27.5 | 59.2 | 58.6 | 126.3 | 27.5 | 59.2 | 58.6 | 126.3 | 27.5 | 59.2 |

Anchor Pullout/Pryout Strength Controls Concrete Breakout Strength Controls Steel Strength Controls

Tension and Shear Design Strengths for CCU+ Thrubolt Version (TB) Installed in Cracked Concrete^{1,2,3,4,5,6}

| Nominal Anchor Size / Rod Diameter (in.) | Nominal Embed. Depth h_{nom} (mm) | Minimum Concrete Compressive Strength | | | | | | | | | | | | | | | |
|--|-------------------------------------|---------------------------------------|--------------|-----------------|--------------|-------------------|--------------|-----------------|--------------|-------------------|--------------|-----------------|--------------|-------------------|--------------|-----------------|-------|
| | | $f'_c = 20.7$ Mpa | | | | $f'_c = 27.6$ Mpa | | | | $f'_c = 41.4$ Mpa | | | | $f'_c = 55.2$ Mpa | | | |
| | | N. Tension (lbs.) | | V. Shear (lbs.) | | N. Tension (lbs.) | | V. Shear (lbs.) | | N. Tension (lbs.) | | V. Shear (lbs.) | | N. Tension (lbs.) | | V. Shear (lbs.) | |
| A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | | |
| 3/8 | 108 | 13.7 | 29.5 | 6.4 | 19.2 | 13.7 | 29.5 | 6.4 | 22.1 | 13.7 | 29.5 | 6.4 | 27.1 | 13.7 | 29.5 | 6.4 | 31.3 |
| 1/2 | 137 | 24.9 | 42.3 | 11.7 | 28.1 | 24.9 | 48.7 | 11.7 | 32.5 | 24.9 | 53.7 | 11.7 | 39.8 | 24.9 | 53.7 | 11.7 | 46.0 |
| 5/8 | 203 | 39.7 | 77.7 | 18.6 | 49.2 | 39.7 | 85.4 | 18.6 | 56.9 | 39.7 | 85.4 | 18.6 | 69.6 | 39.7 | 85.4 | 18.6 | 80.4 |
| 3/4 | 270 | 58.6 | 119.7 | 27.5 | 73.8 | 58.6 | 126.3 | 27.5 | 85.2 | 58.6 | 126.3 | 27.5 | 104.3 | 58.6 | 126.3 | 27.5 | 118.1 |

Anchor Pullout/Pryout Strength Controls Concrete Breakout Strength Controls Steel Strength Controls

Tension and Shear Design Strengths for CCU+ Thrubolt Version (TB) Installed in Uncracked Concrete^{1,2,3,4,5,6}

| Nominal Anchor Size / Rod Diameter (in.) | Nominal Embed. Depth h_{nom} (mm) | Minimum Concrete Compressive Strength | | | | | | | | | | | | | | | |
|--|-------------------------------------|---------------------------------------|--------------|-----------------|--------------|-------------------|--------------|-----------------|--------------|-------------------|--------------|-----------------|--------------|-------------------|--------------|-----------------|-------|
| | | $f'_c = 20.7$ Mpa | | | | $f'_c = 27.6$ Mpa | | | | $f'_c = 41.4$ Mpa | | | | $f'_c = 55.2$ Mpa | | | |
| | | N. Tension (lbs.) | | V. Shear (lbs.) | | N. Tension (lbs.) | | V. Shear (lbs.) | | N. Tension (lbs.) | | V. Shear (lbs.) | | N. Tension (lbs.) | | V. Shear (lbs.) | |
| A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | | |
| 3/8 | 108 | 13.7 | 29.5 | 6.4 | 26.8 | 13.7 | 29.5 | 6.4 | 30.9 | 13.7 | 29.5 | 6.4 | 37.8 | 13.7 | 29.5 | 6.4 | 40.3 |
| 1/2 | 137 | 24.9 | 53.7 | 11.7 | 39.4 | 24.9 | 53.7 | 11.7 | 45.5 | 24.9 | 53.7 | 11.7 | 53.1 | 24.9 | 53.7 | 11.7 | 53.1 |
| 5/8 | 203 | 39.7 | 85.4 | 18.6 | 68.9 | 39.7 | 85.4 | 18.6 | 79.6 | 39.7 | 85.4 | 18.6 | 82.2 | 39.7 | 85.4 | 18.6 | 82.2 |
| 3/4 | 270 | 58.6 | 126.3 | 27.5 | 103.2 | 58.6 | 126.3 | 27.5 | 118.1 | 58.6 | 126.3 | 27.5 | 118.1 | 58.6 | 126.3 | 27.5 | 118.1 |

Anchor Pullout/Pryout Strength Controls Concrete Breakout Strength Controls Steel Strength Controls

- Tabular values are provided for illustration and are applicable for single anchors installed in normal-weight concrete with minimum slab thickness, $h_a = 1.5h_{min}$, and with the following conditions:
 - $C_{at} \geq 1.5h_{ef}$
 - $C_{az} \geq 1.5C_{at}$.
- Calculations were performed following methodology in CSA A23.3-19, Annex D. The load level corresponding to the failure mode listed (e.g. For tension: steel, concrete breakout and pullout; for shear: steel, concrete breakout and pryout). Furthermore, the capacities for concrete breakout strength in tension and pryout in shear are calculated using the effective embedment values, h_{ef} , for the selected anchors as noted in the design information tables. Please also reference the installation specifications for more information.
- Material Resistance factors (ϕ) are in accordance with CSA A23.3-19, Sections 8.4.2 and 8.4.3. Modification Factors (R) are in accordance with CSA A23.3-19 Annex D, Section D.5.3 Condition B; it is assumed that supplementary reinforcement not present. Material resistance factors for steel strength are taken as 0.85 for tension and shear; Modification factors are taken as 0.80 for Tension and 0.75 for Shear; values correspond to ductile steel elements.
- Tabular values are permitted for short-term static loads only, seismic loading is not considered with these tables.
- For designs that include combined tension and shear, the interaction of tension and shear loads must be calculated in accordance with CSA A23.3-19 Annex D, Section D.8.
- Interpolation is not permitted to be used with the tabular values. For intermediate base material compressive strengths, please see CSA A23.3 Annex D and information contained in this product supplement. For other design conditions including seismic considerations please see CSA A23.3 Annex D.

Tension and Shear Design Strengths for CCU+ Preset Version (PS) Installed in Cracked Concrete^{1,2,3,4,5,6}



| Nominal Anchor Size / Rod Diameter (in.) | Nominal Embed. Depth h_{nom} (mm) | Minimum Concrete Compressive Strength | | | | | | | |
|--|-------------------------------------|---------------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| | | $f'_c = 20.7$ Mpa | | $f'_c = 27.6$ Mpa | | $f'_c = 41.4$ Mpa | | $f'_c = 55.2$ Mpa | |
| | | N. Tension (lbs.) | V. Shear (lbs.) | N. Tension (lbs.) | V. Shear (lbs.) | N. Tension (lbs.) | V. Shear (lbs.) | N. Tension (lbs.) | V. Shear (lbs.) |
| | | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) |
| 3/8 | 108 | 28.3 | 14.5 | 28.3 | 14.5 | 28.3 | 14.5 | 28.3 | 14.5 |
| 1/2 | 137 | 42.3 | 25.1 | 47.2 | 25.1 | 47.2 | 25.1 | 47.2 | 25.1 |
| 5/8 | 203 | 75.2 | 41.4 | 75.2 | 41.4 | 75.2 | 41.4 | 75.2 | 41.4 |
| 3/4 | 270 | 111.1 | 63.3 | 111.1 | 63.3 | 111.1 | 63.3 | 111.1 | 63.3 |

■ - Anchor Pullout/Pryout Strength Controls ■ - Concrete Breakout Strength Controls ■ - Steel Strength Controls

Tension and Shear Design Strengths for CCU+ Preset Version (PS) Installed in Uncracked Concrete^{1,2,3,4,5,6}

| Nominal Anchor Size / Rod Diameter (in.) | Nominal Embed. Depth h_{nom} (mm) | Minimum Concrete Compressive Strength | | | | | | | |
|--|-------------------------------------|---------------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| | | $f'_c = 20.7$ Mpa | | $f'_c = 27.6$ Mpa | | $f'_c = 41.4$ Mpa | | $f'_c = 55.2$ Mpa | |
| | | N. Tension (lbs.) | V. Shear (lbs.) | N. Tension (lbs.) | V. Shear (lbs.) | N. Tension (lbs.) | V. Shear (lbs.) | N. Tension (lbs.) | V. Shear (lbs.) |
| | | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) |
| 3/8 | 108 | 28.3 | 14.5 | 28.3 | 14.5 | 28.3 | 14.5 | 28.3 | 14.5 |
| 1/2 | 137 | 47.2 | 25.1 | 47.2 | 25.1 | 47.2 | 25.1 | 47.2 | 25.1 |
| 5/8 | 203 | 75.2 | 41.4 | 75.2 | 41.4 | 75.2 | 41.4 | 75.2 | 41.4 |
| 3/4 | 270 | 111.1 | 63.3 | 111.1 | 63.3 | 111.1 | 63.3 | 111.1 | 63.3 |

■ - Anchor Pullout/Pryout Strength Controls ■ - Concrete Breakout Strength Controls ■ - Steel Strength Controls

Tension and Shear Design Strengths for CCU+ Thrubolt Version (TB) Installed in Cracked Concrete^{1,2,3,4,5,6}

| Nominal Anchor Size / Rod Diameter (in.) | Nominal Embed. Depth h_{nom} (mm) | Minimum Concrete Compressive Strength | | | | | | | |
|--|-------------------------------------|---------------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| | | $f'_c = 20.7$ Mpa | | $f'_c = 27.6$ Mpa | | $f'_c = 41.4$ Mpa | | $f'_c = 55.2$ Mpa | |
| | | N. Tension (lbs.) | V. Shear (lbs.) | N. Tension (lbs.) | V. Shear (lbs.) | N. Tension (lbs.) | V. Shear (lbs.) | N. Tension (lbs.) | V. Shear (lbs.) |
| | | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) |
| 3/8 | 108 | 28.3 | 19.2 | 28.3 | 22.1 | 28.3 | 27.1 | 28.3 | 31.3 |
| 1/2 | 137 | 42.3 | 28.1 | 47.2 | 32.5 | 47.2 | 39.8 | 47.2 | 46.0 |
| 5/8 | 203 | 75.2 | 49.2 | 75.2 | 56.9 | 75.2 | 69.6 | 75.2 | 80.4 |
| 3/4 | 270 | 111.1 | 73.8 | 111.1 | 85.2 | 111.1 | 104.3 | 111.1 | 120.4 |

■ - Anchor Pullout/Pryout Strength Controls ■ - Concrete Breakout Strength Controls ■ - Steel Strength Controls

Tension and Shear Design Strengths for Stainless Steel CCU+ Thrubolt Version (TB) Installed in Uncracked Concrete^{1,2,3,4,5,6,7}

| Nominal Anchor Size / Rod Diameter (in.) | Nominal Embed. Depth h_{nom} (mm) | Minimum Concrete Compressive Strength | | | | | | | |
|--|-------------------------------------|---------------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| | | $f'_c = 20.7$ Mpa | | $f'_c = 27.6$ Mpa | | $f'_c = 41.4$ Mpa | | $f'_c = 55.2$ Mpa | |
| | | N. Tension (lbs.) | V. Shear (lbs.) | N. Tension (lbs.) | V. Shear (lbs.) | N. Tension (lbs.) | V. Shear (lbs.) | N. Tension (lbs.) | V. Shear (lbs.) |
| | | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) |
| 3/8 | 108 | 28.3 | 26.8 | 28.3 | 30.9 | 28.3 | 37.8 | 28.3 | 43.7 |
| 1/2 | 137 | 47.2 | 39.4 | 47.2 | 45.5 | 47.2 | 57.7 | 47.2 | 64.4 |
| 5/8 | 203 | 75.2 | 68.9 | 75.2 | 79.6 | 75.2 | 97.4 | 75.2 | 110.0 |
| 3/4 | 270 | 111.1 | 103.2 | 111.1 | 119.2 | 111.1 | 146.1 | 111.1 | 163.7 |

■ - Anchor Pullout/Pryout Strength Controls ■ - Concrete Breakout Strength Controls ■ - Steel Strength Controls

- Tabular values are provided for illustration and are applicable for single anchors installed in normal-weight concrete with minimum slab thickness, $h_a = 1.5 \cdot h_{min}$, and with the following conditions:
 - $c_{a1} \geq 1.5 \cdot h_{ef}$
 - $c_{a2} \geq 1.5 \cdot c_{a1}$
- Calculations were performed following methodology in CSA A23.3-19, Annex D. The load level corresponding to the failure mode listed (e.g. For tension: steel, concrete breakout and pullout; For shear: steel, concrete breakout and pryout). Furthermore, the capacities for concrete breakout strength in tension and pryout in shear are calculated using the effective embedment values, h_{ef} , for the selected anchors as noted in the design information tables. Please also reference the installation specifications for more information.
- Material Resistance factors (ϕ) are in accordance with CSA A23.3-19, Sections 8.4.2 and 8.4.3. Modification Factors (R) are in accordance with CSA A23.3-19 Annex D, Section D.5.3 Condition B; it is assumed that supplementary reinforcement not present. Material resistance factors for steel strength are taken as 0.85 for tension and shear; Modification factors are taken as 0.80 for Tension and 0.75 for Shear; values correspond to ductile steel elements.
- Tabular values are permitted for short-term static loads only, seismic loading is not considered with these tables.
- For designs that include combined tension and shear, the interaction of tension and shear loads must be calculated in accordance with CSA A23.3-19 Annex D, Section D.8.
- Interpolation is not permitted to be used with the tabular values. For intermediate base material compressive strengths, please see CSA A23.3 Annex D and information contained in this product supplement. For other design conditions including seismic considerations please see CSA A23.3 Annex D.

CCU+™
Critical Connection Undercut Anchoring System

PERFORMANCE DATA (ASD)

Converted Allowable Loads for CCU+ Preset Version (PS) Installed in Cracked Concrete^{1,2}

| Nominal Anchor Size / Rod Diameter (in.) | Nominal Embed. Depth h_{nom} (mm) | Minimum Concrete Compressive Strength | | | | | | | | | | | | | | | |
|--|-------------------------------------|---|--------------|---------------------------------------|--------------|---|--------------|---------------------------------------|--------------|---|--------------|---------------------------------------|--------------|---|--------------|---------------------------------------|------|
| | | $f'c = 20.7$ Mpa | | | | $f'c = 27.6$ Mpa | | | | $f'c = 41.4$ Mpa | | | | $f'c = 55.2$ Mpa | | | |
| | | T _{allowable ASD} Tension (kN) | | V _{allowable ASD} Shear (kN) | | T _{allowable ASD} Tension (kN) | | V _{allowable ASD} Shear (kN) | | T _{allowable ASD} Tension (kN) | | V _{allowable ASD} Shear (kN) | | T _{allowable ASD} Tension (kN) | | V _{allowable ASD} Shear (kN) | |
| A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | | |
| 3/8 | 108 | 9.8 | 21.1 | 4.6 | 9.9 | 9.8 | 21.1 | 4.6 | 9.9 | 9.8 | 21.1 | 4.6 | 9.9 | 9.8 | 21.1 | 4.6 | 9.9 |
| 1/2 | 137 | 17.8 | 30.2 | 8.4 | 17.0 | 17.8 | 34.9 | 8.4 | 17.9 | 17.8 | 38.4 | 8.4 | 17.9 | 17.8 | 38.4 | 8.4 | 17.9 |
| 5/8 | 203 | 28.3 | 55.5 | 13.3 | 28.6 | 28.3 | 61.0 | 13.3 | 28.6 | 28.3 | 61.0 | 13.3 | 28.6 | 28.3 | 61.0 | 13.3 | 28.6 |
| 3/4 | 270 | 41.9 | 85.5 | 19.6 | 42.3 | 41.9 | 90.2 | 19.6 | 42.3 | 41.9 | 90.2 | 19.6 | 42.3 | 41.9 | 90.2 | 19.6 | 42.3 |

1. Allowable load values are calculated using a conversion factor, α , from the Factored Design Strength Tables and conditions shown previously.
2. Tabulated allowable load values assume 50% dead load and 50% live load, with controlling load combination 1.2D + 1.6L. Calculated weighted average for the conversion factor $\alpha: 1.2(0.5) + 1.6(0.5) = 1.4$.

Converted Allowable Loads for CCU+ Preset Version (PS) Installed in Uncracked Concrete^{1,2}

| Nominal Anchor Size / Rod Diameter (in.) | Nominal Embed. Depth h_{nom} (mm) | Minimum Concrete Compressive Strength | | | | | | | | | | | | | | | |
|--|-------------------------------------|---|--------------|---------------------------------------|--------------|---|--------------|---------------------------------------|--------------|---|--------------|---------------------------------------|--------------|---|--------------|---------------------------------------|------|
| | | $f'c = 20.7$ Mpa | | | | $f'c = 27.6$ Mpa | | | | $f'c = 41.4$ Mpa | | | | $f'c = 55.2$ Mpa | | | |
| | | T _{allowable ASD} Tension (kN) | | V _{allowable ASD} Shear (kN) | | T _{allowable ASD} Tension (kN) | | V _{allowable ASD} Shear (kN) | | T _{allowable ASD} Tension (kN) | | V _{allowable ASD} Shear (kN) | | T _{allowable ASD} Tension (kN) | | V _{allowable ASD} Shear (kN) | |
| A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | | |
| 3/8 | 108 | 9.8 | 21.1 | 4.6 | 9.9 | 9.8 | 21.1 | 4.6 | 9.9 | 9.8 | 21.1 | 4.6 | 9.9 | 9.8 | 21.1 | 4.6 | 9.9 |
| 1/2 | 137 | 17.8 | 38.4 | 8.4 | 17.9 | 17.8 | 38.4 | 8.4 | 17.9 | 17.8 | 38.4 | 8.4 | 17.9 | 17.8 | 38.4 | 8.4 | 17.9 |
| 5/8 | 203 | 28.3 | 61.0 | 13.3 | 28.6 | 28.3 | 61.0 | 13.3 | 28.6 | 28.3 | 61.0 | 13.3 | 28.6 | 28.3 | 61.0 | 13.3 | 28.6 |
| 3/4 | 270 | 41.9 | 90.2 | 19.6 | 42.3 | 41.9 | 90.2 | 19.6 | 42.3 | 41.9 | 90.2 | 19.6 | 42.3 | 41.9 | 90.2 | 19.6 | 42.3 |

1. Allowable load values are calculated using a conversion factor, α , from the Factored Design Strength Tables and conditions shown previously.
2. Tabulated allowable load values assume 50% dead load and 50% live load, with controlling load combination 1.2D + 1.6L. Calculated weighted average for the conversion factor $\alpha: 1.2(0.5) + 1.6(0.5) = 1.4$.

Converted Allowable Loads for CCU+ Thrubolt Version (TB) Installed in Cracked Concrete^{1,2}

| Nominal Anchor Size / Rod Diameter (in.) | Nominal Embed. Depth h_{nom} (mm) | Minimum Concrete Compressive Strength | | | | | | | | | | | | | | | |
|--|-------------------------------------|---|--------------|---------------------------------------|--------------|---|--------------|---------------------------------------|--------------|---|--------------|---------------------------------------|--------------|---|--------------|---------------------------------------|------|
| | | $f'c = 20.7$ Mpa | | | | $f'c = 27.6$ Mpa | | | | $f'c = 41.4$ Mpa | | | | $f'c = 55.2$ Mpa | | | |
| | | T _{allowable ASD} Tension (kN) | | V _{allowable ASD} Shear (kN) | | T _{allowable ASD} Tension (kN) | | V _{allowable ASD} Shear (kN) | | T _{allowable ASD} Tension (kN) | | V _{allowable ASD} Shear (kN) | | T _{allowable ASD} Tension (kN) | | V _{allowable ASD} Shear (kN) | |
| A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | | |
| 3/8 | 108 | 9.8 | 21.1 | 4.6 | 13.7 | 9.8 | 21.1 | 4.6 | 15.8 | 9.8 | 21.1 | 4.6 | 19.4 | 9.8 | 21.1 | 4.6 | 22.9 |
| 1/2 | 137 | 17.8 | 30.2 | 8.4 | 20.1 | 17.8 | 34.8 | 8.4 | 23.2 | 17.8 | 38.4 | 8.4 | 28.4 | 17.8 | 38.4 | 8.4 | 32.4 |
| 5/8 | 203 | 28.4 | 55.5 | 13.3 | 35.1 | 28.4 | 61.0 | 13.3 | 40.6 | 28.4 | 61.0 | 13.3 | 49.7 | 28.4 | 61.0 | 13.3 | 57.4 |
| 3/4 | 270 | 41.9 | 85.5 | 19.6 | 52.7 | 41.9 | 90.2 | 19.6 | 60.9 | 41.9 | 90.2 | 19.6 | 74.5 | 41.9 | 90.2 | 19.6 | 84.4 |

1. Allowable load values are calculated using a conversion factor, α , from the Factored Design Strength Tables and conditions shown previously.
2. Tabulated allowable load values assume 50% dead load and 50% live load, with controlling load combination 1.2D + 1.6L. Calculated weighted average for the conversion factor $\alpha: 1.2(0.5) + 1.6(0.5) = 1.4$.

Converted Allowable Loads for CCU+ Thrubolt Version (TB) Installed in Uncracked Concrete^{1,2}

| Nominal Anchor Size / Rod Diameter (in.) | Nominal Embed. Depth h_{nom} (mm) | Minimum Concrete Compressive Strength | | | | | | | | | | | | | | | |
|--|-------------------------------------|---|--------------|---------------------------------------|--------------|---|--------------|---------------------------------------|--------------|---|--------------|---------------------------------------|--------------|---|--------------|---------------------------------------|------|
| | | $f'c = 20.7$ Mpa | | | | $f'c = 27.6$ Mpa | | | | $f'c = 41.4$ Mpa | | | | $f'c = 55.2$ Mpa | | | |
| | | T _{allowable ASD} Tension (kN) | | V _{allowable ASD} Shear (kN) | | T _{allowable ASD} Tension (kN) | | V _{allowable ASD} Shear (kN) | | T _{allowable ASD} Tension (kN) | | V _{allowable ASD} Shear (kN) | | T _{allowable ASD} Tension (kN) | | V _{allowable ASD} Shear (kN) | |
| A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | A36 | A193, Gr. B7 | | |
| 3/8 | 108 | 9.8 | 21.1 | 4.6 | 19.1 | 9.8 | 21.1 | 4.6 | 22.1 | 9.8 | 21.1 | 4.6 | 27.0 | 9.8 | 21.1 | 4.6 | 28.8 |
| 1/2 | 137 | 17.8 | 38.4 | 8.4 | 28.1 | 17.8 | 38.4 | 8.4 | 32.5 | 17.8 | 38.4 | 8.4 | 37.9 | 17.8 | 38.4 | 8.4 | 37.9 |
| 5/8 | 203 | 28.4 | 61.0 | 13.3 | 49.2 | 28.4 | 61.0 | 13.3 | 56.9 | 28.4 | 61.0 | 13.3 | 58.7 | 28.4 | 61.0 | 13.3 | 58.7 |
| 3/4 | 270 | 41.9 | 90.2 | 19.6 | 73.7 | 41.9 | 90.2 | 19.6 | 84.4 | 41.9 | 90.2 | 19.6 | 84.4 | 41.9 | 90.2 | 19.6 | 84.4 |

1. Allowable load values are calculated using a conversion factor, α , from the Factored Design Strength Tables and conditions shown previously.
2. Tabulated allowable load values assume 50% dead load and 50% live load, with controlling load combination 1.2D + 1.6L. Calculated weighted average for the conversion factor $\alpha: 1.2(0.5) + 1.6(0.5) = 1.4$.

Converted Allowable Loads for CCU+ Preset Version (PS) Installed in Cracked Concrete^{1,2}

| Nominal Anchor Size / Rod Diameter (in.) | Nominal Embed. Depth h_{nom} (mm) | Minimum Concrete Compressive Strength | | | | | | | |
|--|-------------------------------------|---------------------------------------|---------------------------------|-----------------------------------|---------------------------------|-----------------------------------|---------------------------------|-----------------------------------|---------------------------------|
| | | $f'c = 20.7$ Mpa | | $f'c = 27.6$ Mpa | | $f'c = 41.4$ Mpa | | $f'c = 55.2$ Mpa | |
| | | $T_{allowable, ASD}$ Tension (kN) | $V_{allowable, ASD}$ Shear (kN) | $T_{allowable, ASD}$ Tension (kN) | $V_{allowable, ASD}$ Shear (kN) | $T_{allowable, ASD}$ Tension (kN) | $V_{allowable, ASD}$ Shear (kN) | $T_{allowable, ASD}$ Tension (kN) | $V_{allowable, ASD}$ Shear (kN) |
| | | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) |
| 3/8 | 108 | 20.2 | 10.4 | 20.2 | 10.4 | 20.2 | 10.4 | 20.2 | 10.4 |
| 1/2 | 137 | 30.2 | 17.9 | 33.7 | 17.9 | 33.7 | 17.9 | 33.7 | 17.9 |
| 5/8 | 203 | 53.7 | 29.6 | 53.7 | 29.6 | 53.7 | 29.6 | 53.7 | 29.6 |
| 3/4 | 270 | 79.4 | 45.2 | 79.4 | 45.2 | 79.4 | 45.2 | 79.4 | 45.2 |

1. Allowable load values are calculated using a conversion factor, α , from the Factored Design Strength Tables and conditions shown previously.
2. Tabulated allowable load values assume 50% dead load and 50% live load, with controlling load combination 1.2D + 1.6L. Calculated weighted average for the conversion factor $\alpha : 1.2(0.5) + 1.6(0.5) = 1.4$.

Converted Allowable Loads for CCU+ Preset Version (PS) Installed in Uncracked Concrete^{1,2}

| Nominal Anchor Size / Rod Diameter (in.) | Nominal Embed. Depth h_{nom} (mm) | Minimum Concrete Compressive Strength | | | | | | | |
|--|-------------------------------------|---------------------------------------|---------------------------------|-----------------------------------|---------------------------------|-----------------------------------|---------------------------------|-----------------------------------|---------------------------------|
| | | $f'c = 20.7$ Mpa | | $f'c = 27.6$ Mpa | | $f'c = 41.4$ Mpa | | $f'c = 55.2$ Mpa | |
| | | $T_{allowable, ASD}$ Tension (kN) | $V_{allowable, ASD}$ Shear (kN) | $T_{allowable, ASD}$ Tension (kN) | $V_{allowable, ASD}$ Shear (kN) | $T_{allowable, ASD}$ Tension (kN) | $V_{allowable, ASD}$ Shear (kN) | $T_{allowable, ASD}$ Tension (kN) | $V_{allowable, ASD}$ Shear (kN) |
| | | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) |
| 3/8 | 108 | 20.2 | 10.4 | 20.2 | 10.4 | 20.2 | 10.4 | 20.2 | 10.4 |
| 1/2 | 137 | 33.7 | 17.9 | 33.7 | 17.9 | 33.7 | 17.9 | 33.7 | 17.9 |
| 5/8 | 203 | 53.7 | 29.6 | 53.7 | 29.6 | 53.7 | 29.6 | 53.7 | 29.6 |
| 3/4 | 270 | 79.4 | 45.2 | 79.4 | 45.2 | 79.4 | 45.2 | 79.4 | 45.2 |

1. Allowable load values are calculated using a conversion factor, α , from the Factored Design Strength Tables and conditions shown previously.
2. Tabulated allowable load values assume 50% dead load and 50% live load, with controlling load combination 1.2D + 1.6L. Calculated weighted average for the conversion factor $\alpha : 1.2(0.5) + 1.6(0.5) = 1.4$.

Converted Allowable Loads for CCU+ Thrubolt Version (TB) Installed in Cracked Concrete^{1,2}

| Nominal Anchor Size / Rod Diameter (in.) | Nominal Embed. Depth h_{nom} (mm) | Minimum Concrete Compressive Strength | | | | | | | |
|--|-------------------------------------|---------------------------------------|---------------------------------|-----------------------------------|---------------------------------|-----------------------------------|---------------------------------|-----------------------------------|---------------------------------|
| | | $f'c = 20.7$ Mpa | | $f'c = 27.6$ Mpa | | $f'c = 41.4$ Mpa | | $f'c = 55.2$ Mpa | |
| | | $T_{allowable, ASD}$ Tension (kN) | $V_{allowable, ASD}$ Shear (kN) | $T_{allowable, ASD}$ Tension (kN) | $V_{allowable, ASD}$ Shear (kN) | $T_{allowable, ASD}$ Tension (kN) | $V_{allowable, ASD}$ Shear (kN) | $T_{allowable, ASD}$ Tension (kN) | $V_{allowable, ASD}$ Shear (kN) |
| | | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) |
| 3/8 | 108 | 20.2 | 13.7 | 20.2 | 15.8 | 20.2 | 19.4 | 20.2 | 22.4 |
| 1/2 | 137 | 30.2 | 20.1 | 33.7 | 23.2 | 33.7 | 28.4 | 33.7 | 32.9 |
| 5/8 | 203 | 53.7 | 35.1 | 53.7 | 40.6 | 53.7 | 49.7 | 53.7 | 57.4 |
| 3/4 | 270 | 79.4 | 52.7 | 79.4 | 60.9 | 79.4 | 74.5 | 79.4 | 86.0 |

1. Allowable load values are calculated using a conversion factor, α , from the Factored Design Strength Tables and conditions shown previously.
2. Tabulated allowable load values assume 50% dead load and 50% live load, with controlling load combination 1.2D + 1.6L. Calculated weighted average for the conversion factor $\alpha : 1.2(0.5) + 1.6(0.5) = 1.4$.

Converted Allowable Loads for CCU+ Thrubolt Version (TB) Installed in Uncracked Concrete^{1,2}

| Nominal Anchor Size / Rod Diameter (in.) | Nominal Embed. Depth h_{nom} (mm) | Minimum Concrete Compressive Strength | | | | | | | |
|--|-------------------------------------|---------------------------------------|---------------------------------|-----------------------------------|---------------------------------|-----------------------------------|---------------------------------|-----------------------------------|---------------------------------|
| | | $f'c = 20.7$ Mpa | | $f'c = 27.6$ Mpa | | $f'c = 41.4$ Mpa | | $f'c = 55.2$ Mpa | |
| | | $T_{allowable, ASD}$ Tension (kN) | $V_{allowable, ASD}$ Shear (kN) | $T_{allowable, ASD}$ Tension (kN) | $V_{allowable, ASD}$ Shear (kN) | $T_{allowable, ASD}$ Tension (kN) | $V_{allowable, ASD}$ Shear (kN) | $T_{allowable, ASD}$ Tension (kN) | $V_{allowable, ASD}$ Shear (kN) |
| | | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) | A193, Gr. B8M (316 SS) |
| 3/8 | 108 | 20.2 | 19.1 | 20.2 | 22.1 | 20.2 | 27.0 | 20.2 | 31.2 |
| 1/2 | 137 | 33.7 | 28.1 | 33.7 | 32.5 | 33.7 | 41.2 | 33.7 | 46.0 |
| 5/8 | 203 | 53.7 | 49.2 | 53.7 | 56.9 | 53.7 | 69.6 | 53.7 | 78.6 |
| 3/4 | 270 | 79.4 | 73.7 | 79.4 | 85.1 | 79.4 | 104.4 | 79.4 | 116.9 |

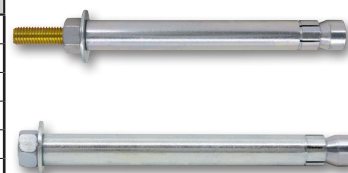
1. Allowable load values are calculated using a conversion factor, α , from the Factored Design Strength Tables and conditions shown previously.
2. Tabulated allowable load values assume 50% dead load and 50% live load, with controlling load combination 1.2D + 1.6L. Calculated weighted average for the conversion factor $\alpha : 1.2(0.5) + 1.6(0.5) = 1.4$.

CCU+™
Critical Connection Undercut Anchoring System

ORDERING INFORMATION

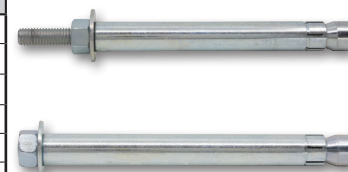
Carbon Steel CCU+ Undercut Anchors (ASTM A36 Anchor Rod)^{1,2,3}

| Cat. No. | Anchor Description, Nominal Size and Length (in.) | Anchor Version | Drill Hole Dia. (in.) | Max. Fixture Thickness, (in.) | Pack Qty. |
|------------|---|----------------|-----------------------|-------------------------------|-----------|
| DFM1311050 | 3/8 x 6 | Preset (PS) | 11/16 | 7/8 | 20 |
| DFM1311550 | | Thrubolt (TB) | | | 20 |
| DFM1311100 | 1/2 x 7-1/2 | Preset (PS) | 13/16 | 1-1/4 | 12 |
| DFM1311600 | | Thrubolt (TB) | | | 12 |
| DFM1311150 | 1/2 x 8-1/4 | Preset (PS) | 13/16 | 2 | 12 |
| DFM1311650 | | Thrubolt (TB) | | | 12 |
| DFM1311200 | 5/8 x 10-3/4 | Preset (PS) | 1 | 1-5/8 | 10 |
| DFM1311700 | | Thrubolt (TB) | | | 10 |
| DFM1311250 | 5/8 x 11-1/2 | Preset (PS) | 1 | 2-3/8 | 10 |
| DFM1311750 | | Thrubolt (TB) | | | 10 |
| DFM1311300 | 3/4 x 14 | Preset (PS) | 1-1/4 | 2 | 6 |
| DFM1311800 | | Thrubolt (TB) | | | 6 |
| DFM1311350 | 3/4 x 16 | Preset (PS) | 1-1/4 | 4 | 6 |
| DFM1311850 | | Thrubolt (TB) | | | 6 |



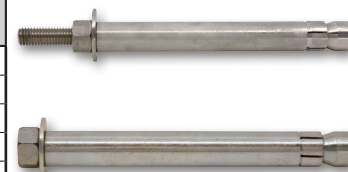
Carbon Steel CCU+ Undercut Anchors (ASTM A193, Grade B7 Anchor Rod)^{1,2,3}

| Cat. No. | Anchor Description, Nominal Size and Length (in.) | Anchor Version | Drill Hole Dia. (in.) | Max. Fixture Thickness, (in.) | Pack Qty. |
|------------|---|----------------|-----------------------|-------------------------------|-----------|
| DFM1371050 | 3/8 x 6 | Preset (PS) | 11/16 | 7/8 | 20 |
| DFM1371550 | | Thrubolt (TB) | | | 20 |
| DFM1371100 | 1/2 x 7-1/2 | Preset (PS) | 13/16 | 1-1/4 | 12 |
| DFM1371600 | | Thrubolt (TB) | | | 12 |
| DFM1371150 | 1/2 x 8-1/4 | Preset (PS) | 13/16 | 2 | 12 |
| DFM1371650 | | Thrubolt (TB) | | | 12 |
| DFM1371200 | 5/8 x 10-3/4 | Preset (PS) | 1 | 1-5/8 | 10 |
| DFM1371700 | | Thrubolt (TB) | | | 10 |
| DFM1371250 | 5/8 x 11-1/2 | Preset (PS) | 1 | 2-3/8 | 10 |
| DFM1371750 | | Thrubolt (TB) | | | 10 |
| DFM1371300 | 3/4 x 14 | Preset (PS) | 1-1/4 | 2 | 6 |
| DFM1371800 | | Thrubolt (TB) | | | 6 |
| DFM1371350 | 3/4 x 16 | Preset (PS) | 1-1/4 | 4 | 6 |
| DFM1371850 | | Thrubolt (TB) | | | 6 |



Stainless Steel CCU+ Undercut Anchors (ASTM A193, Grade B8M, Class 2 Anchor Rod - 316 SS)^{1,2,3}

| Cat. No. | Anchor Description, Nominal Size and Length (in.) | Anchor Version | Drill Hole Dia. (in.) | Max. Fixture Thickness, (in.) | Pack Qty. |
|------------|---|----------------|-----------------------|-------------------------------|-----------|
| DFM1361050 | 3/8 x 6 | Preset (PS) | 11/16 | 7/8 | 20 |
| DFM1361550 | | Thrubolt (TB) | | | 20 |
| DFM1361100 | 1/2 x 7-1/2 | Preset (PS) | 13/16 | 1-1/4 | 12 |
| DFM1361600 | | Thrubolt (TB) | | | 12 |
| DFM1361150 | 1/2 x 8-1/4 | Preset (PS) | 13/16 | 2 | 12 |
| DFM1361650 | | Thrubolt (TB) | | | 12 |
| DFM1361200 | 5/8 x 10-3/4 | Preset (PS) | 1 | 1-5/8 | 10 |
| DFM1361700 | | Thrubolt (TB) | | | 10 |
| DFM1361250 | 5/8 x 11-1/2 | Preset (PS) | 1 | 2-3/8 | 10 |
| DFM1361750 | | Thrubolt (TB) | | | 10 |
| DFM1361300 | 3/4 x 14 | Preset (PS) | 1-1/4 | 2 | 6 |
| DFM1361800 | | Thrubolt (TB) | | | 6 |
| DFM1361350 | 3/4 x 16 | Preset (PS) | 1-1/4 | 4 | 6 |
| DFM1361850 | | Thrubolt (TB) | | | 6 |



Notes for Anchor Ordering Information Tables:

- Standard preset anchors are designed so the top of the expansion sleeve is approximately flush with the base material after setting. Thrubolt anchors are designed so the expansion sleeve can be set through and can engage the fixture. See CCU+ undercut anchor detail and installation specifications.
- Undercut drill bits and setting sleeves are required for installation. See the available anchor installation accessories and tools commercially available from DEWALT at the time of publication.
- The listed anchor lengths are based on the anchor sizes commercially available at the time of publication; custom lengths can be produced by request.

Setting Sleeves

| Powered Cat. No. | Manual Cat. No. | Approximate Usable Sleeve Length, (in.) | Matching Nominal Anchor Size, (in.) | Pack Qty. |
|-------------------------|--------------------|--|--|-----------|
| DFX313825 (SDS-Plus) | - | 2-3/4 | 3/8 (11/16 O.D.) | 1 |
| - | DFX313805 | 5 | | 1 |
| DFX311230 (SDS-Plus) | - | 3-3/4 | 1/2 (13/16 O.D.) | 1 |
| - | DFX311210 | 5 | | 1 |
| DFX315835 (SDS-Max) | - | 4-3/4 | 5/8 (1 O.D.) | 1 |
| - | DFX315815 | 5-1/4 | | 1 |
| DFX313440 (SDS-Max) | - | 6-1/2 | 3/4 (1-1/4 O.D.) | 1 |
| - | DFX313420 | 7 | | 1 |

Note: powered or manual setting sleeves are required for the installation of CCU+ undercut anchors; see installation instructions. Manual setting sleeves may be stacked to create longer usable setting sleeve lengths.
O.D. = outside diameter



Rotary Hammer Drills

| Cat. No. | Nominal Drill Bit Diameter (in.) | Approximate Impact Energy (J) | Pack Qty. |
|--------------------------------|-------------------------------------|-------------------------------------|-----------|
| DCH416 or D25416 (SDS-Plus) | 11/16 | 4.5 | 1 |
| | 13/16 | | |
| DCH614 or D25614 (SDS-Max) | 1 | 10.5 | 1 |
| | 1-1/4 | | |



Drill Chuck Adapter

| Cat. No. | Shank Type | Pack Qty. |
|----------|-----------------------------|-----------|
| DW5891 | SDS-Max to SDS-Plus Adapter | 1 |



Hollow Stop Bits (HSB)

| Cat. No. | Nominal Drill Bit Diameter, (in.) | Max. Drilling Depth, (in.) | Shank Type | Pack Qty. |
|----------|--------------------------------------|-------------------------------|------------|-----------|
| DFX11380 | 11/16 | 4-1/4 | SDS-Plus | 1 |
| DFX11120 | 13/16 | 5-3/8 | SDS-Plus | 1 |
| DFX11580 | 1 | 8 | SDS-Max | 1 |
| DFX11340 | 1-1/4 | 10-5/8 | SDS-Max | 1 |

Stop drill bits create a drilled hole to the specified depth for standard preset version CCU+ Undercut anchors.
For thrubolt applications, see CCU+ undercut anchor detail and installation specifications.
HSB dust removal drill bits are used with a vacuum dust extractor (e.g. DWV010, DWV012, DWV015, DCV585).



Hollow Bits (HB)

| Cat. No. | Nominal Drill Bit Diameter, (in.) | Usable Length, (in.) | Shank Type | Pack Qty. |
|----------|--------------------------------------|----------------------|------------|-----------|
| DWA54116 | 11/16 | 9-3/4 | SDS-Plus | 1 |
| DWA54316 | 13/16 | 9-3/4 | SDS-Plus | 1 |
| DWA58001 | 1 | 15-3/4 | SDS-Max | 1 |
| DWA58115 | 1-1/4 | 15-3/4 | SDS-Max | 1 |

HB dust removal drill bits are used with a vacuum dust extractor (e.g. DWV010, DWV012, DWV015, DCV585).



Conventional Bits (4-Cutter)

| Cat. No. | Nominal Drill Bit Diameter, (in.) | Usable Length, (in.) | Shank Type | Pack Qty. |
|----------|--------------------------------------|----------------------|------------|-----------|
| DW5808 | 11/16 | 16 | SDS-Max | 1 |
| DW5814 | 13/16 | 16 | SDS-Max | 1 |
| DW5852 | 1 | 24 | SDS-Max | 1 |
| DW5855 | 1-1/4 | 24 | SDS-Max | 1 |



Hollow Undercut Bits (HUCB)

| Cat. No. | Nominal Drill Bit Diameter, (in.) | Max. Hole Depth, (in.) | Shank Type | Pack Qty. |
|-----------|-----------------------------------|------------------------|------------|-----------|
| DFX21380 | 11/16 | 6 | SDS-Plus | 1 |
| DFX21120 | 13/16 | 8 | SDS-Plus | 1 |
| DFX21580* | 1 | 11 | SDS-Plus* | 1 |
| DFX21340 | 1-1/4 | 15-1/4 | SDS-Max | 1 |

*For rotary hammer drill connector options, a DW5891 SDS-Max to SDS-Plus adapter can be considered.
HUCB dust removal drill bits are used with a vacuum dust extractor (e.g. DWV010, DWV012, DWV015, DCV585).
Note: HUCB or UCB are required for the installation of CCU+ undercut anchors; see installation instructions.



Undercut Bits (UCB)

| Cat. No. | Nominal Drill Bit Diameter, (in.) | Max. Hole Depth, (in.) | Shank Type | Pack Qty. |
|-----------|-----------------------------------|------------------------|------------|-----------|
| DFX21381 | 11/16 | 6 | SDS-Plus | 1 |
| DFX21121 | 13/16 | 8 | SDS-Plus | 1 |
| DFX21581* | 1 | 11 | SDS-Plus* | 1 |
| DFX21341 | 1-1/4 | 15-1/4 | SDS-Max | 1 |

*For rotary hammer drill connector options, a DW5891 SDS-Max to SDS-Plus adapter can be considered.
Note: HUCB or UCB are required for the installation of CCU+ undercut anchors; see installation instructions.



Replacement Cutter Blades for Undercut Bits

| Cat. No. | Nominal Drill Bit Diameter, (in.) | For Use With | | Pack Qty. |
|-----------|-----------------------------------|--------------|----------|-----------|
| | | HUCB | UCB | |
| DFX213825 | 11/16 | DFX21380 | DFX21381 | 1 |
| DFX211230 | 13/16 | DFX21120 | DFX21121 | 1 |
| DFX215835 | 1 | DFX21580 | DFX21581 | 1 |
| DFX213440 | 1-1/4 | DFX21340 | DFX21341 | 1 |

Replacement cutter blades can be used with both hollow undercut drill bits (HUCB) and undercut drill bits (UCB) as indicated.



Replacement Bow Jaws for Undercut Bits

| Cat. No. | Nominal Drill Bit Diameter, (in.) | For Use With | | Pack Qty. |
|-----------|-----------------------------------|--------------|----------|-----------|
| | | HUCB | UCB | |
| DFX213807 | 11/16 | DFX21380 | - | 1 |
| DFX213805 | | - | DFX21381 | 1 |
| DFX211212 | 13/16 | DFX21120 | - | 1 |
| DFX211210 | | - | DFX21121 | 1 |
| DFX215817 | 1 | DFX21580 | - | 1 |
| DFX215815 | | - | DFX21581 | 1 |
| DFX213422 | 1-1/4 | DFX21340 | - | 1 |
| DFX213420 | | - | DFX21341 | 1 |



Vacuums

| Cat. No. | Description | Pack Qty. |
|----------|---|-----------|
| DWV010 | 8 Gallon HEPA/RRP Dust Extractor | 1 |
| DWV015 | 10 Gallon Wet/Dry HEPA/RRP Dust Extractor | 1 |
| DCV585 | Flexvolt 60V Max Dust Extractor (Tool only) | 1 |

