# ET-3G™ Epoxy Anchoring Adhesive

SIMPSON Strong-Tie®

## Ideal for general doweling and threaded rod applications

Introducing Simpson Strong-Tie® ET-3G epoxy anchoring adhesive, the latest addition to our line of adhesive anchoring solutions. ET-3G is ideal for general rebar doweling and threaded rod applications.

ET-3G is code listed for cracked and uncracked concrete and engineered to meet the vast majority of general doweling needs for commercial, residential and infrastructure projects. It has a long working time — 50 min at 70°F (21°C) , and can be applied in dry or damp conditions. With an in-service temperature range of –40°F (–40°C) to 150°F (65°C), ET-3G is suitable for most geographic areas.

Easy to install, it has a simple hole-cleaning procedure that requires no power brushing, saving time and effort at the jobsite. ET-3G is made in the USA, widely available, and backed by expert service and support.

ET-3G Adhesive

### Features

- Suitable for use under static and seismic loading conditions in cracked and uncracked concrete and masonry
- Ideal for general doweling and threaded rod applications
- Two-year shelf life for unopened cartridges stored between 45°F (7°C) and 90°F (32°C)

### Test Criteria

ET-3G has been tested in accordance with ICC-ES AC308, AC58, ACI 355.4 and applicable ASTM test methods.

### Code Reports, Standards and Compliance

Concrete — ICC-ES ESR-5334 (including post-installed rebar connections, City of LA and Florida Building Code); FL15730.

Masonry — ICC-ES ESR pending.

ASTM C881 and AASHTO M235 — Types I/IV and II/V, Grade 3, Class C.

UL Certification — CDPH Standard Method v1.2.

NSF/ANSI/CAN 61 (216 in.²/ 1,000 gal.)

For DOT Approvals - see **strongtie.com**, Resource Center, choose Code Report Finder

### ET-3G Cure Schedule

| Base Material Temperature | | Gel Time (minutes) | Cure Time (hr.) |
|---|---|---|---|
| °F | °C | | |
| 50 | 10 | 100 | 72 |
| 60 | 16 | 75 | 48 |
| 70 | 21 | 50 | 24 |
| 90 | 32 | 30 | 24 |
| 110 | 43 | 18 | 24 |

For water-saturated concrete, the cure times must be doubled.

### Product Information

| | |
|---|---|
| Mix Ratio/Type | 1:1 epoxy |
| Mixed Color | Teal |
| Base Materials | Concrete and masonry — cracked and uncracked |
| Base Material Conditions | Dry, water-saturated |
| Anchor Type | Threaded rod or rebar |
| Substrate Installation Temperature | 50°F (10°C) to 110°F (43°C) |
| In-Service Temperature Range | -40°F (-40°C) to 150°F (65°C) |
| Storage Temperature | 45°F (7°C) to 90°F (32°C) |
| Shelf Life | 24 months |
| Volatile Organic Compound (VOC) | 3 g/L |
| Chemical Resistance | See **strongtie.com** |
| Manufactured in the USA using global materials | |

## ET-3G Applications and Packaging

Foundation/Road Extension

### Key Applications

- Section Enlargement
- Concrete Roadway Splicing
- General Rebar Doweling
- Misplaced Rebar
- Foundation Repair
- Anchoring of Nonstructural Components
- Ornamental Iron and Railing
- Highway Barriers
- Anchoring and Doweling into Masonry


Hollow CMU Install with Opti-Mesh Screen


Section Enlargement


Rebar Wall Extension

### ET-3G Cartridge System

| | Model No. | Capacity (ounces) | Cartridge Type | Carton Quantity | Dispensing Tool(s) | Mixing Nozzle[3] |
|---|---|---|---|---|---|---|
| NEW | ET3G10[4] | 8.5 | Single | 12 | CDT10S | EMN22I |
| NEW | ET3G22-N[4] | 22 | Side-by-Side | 8 | EDT22S, EDTA22P, EDTA22CKT | |
| NEW | ET3G56 | 56 | Side-by-Side | 6 | EDTA56P | |

1. Cartridge estimation guidelines are available at **strongtie.com/softwareandwebapplications/category**.
2. Detailed information on dispensing tools, mixing nozzles and other adhesive accessories is available at **strongtie.com**.
3. Use only Simpson Strong-Tie® mixing nozzles in accordance with Simpson Strong-Tie instructions. Modification or improper use of mixing nozzle may impair ET-3G adhesive performance.
4. One EMN22I mixing nozzle and one nozzle extension are supplied with each cartridge.
5. Use of rodless pneumatic tools to dispense single-tube, coaxial adhesive cartridges is prohibited.

## Nylon Brush — Standard Embedment

| Model No. | Hole Diameter (in.) | Anchor Diameter (in.) | Rebar Size | Usable Length (in.) | Carton Quantity |
|---|---|---|---|---|---|
| ETB4 | ⅜ – 7⁄16 | ¼ – 5⁄16 | — | 7 | 24 |
| ETB6 | ½ – ¾ | ⅜ – ⅝ | #3 – #5 | 15 | 24 |
| ETB8 | 13⁄16 – ⅞ | ¾ | #6 | 15 | 24 |
| ETB8L | 13⁄16 – ⅞ | ¾ | #6 | 23 | 24 |
| ETB10 | 1 – 1⅛ | ⅞ – 1 | #7 – #8 | 28 | 24 |
| ETB12 | 13⁄16 – 1⅜ | 1¼ | #10 | 33 | 24 |

1. All standard nylon brushes are one-piece which includes a twisted wire handle.

## Nylon Brush — Rebar/Deep Embedments

| Model No. | Hole Diameter (in.) | Rebar Size | Usable Length (in.) | Carton Quantity |
|---|---|---|---|---|
| ETB6R | ½ – ¾ | #3 – #5 | 6 | 25 |
| ETB8R | ⅞ | #6 | 6 | 25 |
| ETB10R | 1 – 1⅛ | #7 – #8 | 8 | 25 |
| ETB12R | 1⅜ | #10 | 8 | 25 |
| ETB14R | 1¾ | #11 | 7 | 25 |
| ETBR-EXT | T-handle and extension | | 35¼ | 25 |

1. ETBR-EXT is required for use with all sizes of rebar nylon brushes.
2. To obtain total usable length, add the usable length for each part used.
3. Brushes are used when rebar is installed to replace cast-in-place bar for lap splices and development length.

## Opti-Mesh Adhesive-Anchoring Screen Tubes

| For Rod Diameter (in.) | Hole Size (in.) | Length (in.) | EWSP Model No. for ET-3G™ | Carton Quantity |
|---|---|---|---|---|
| ⅜ | 9⁄16 | 3½ | EWS373P | 150 |
| | | 6 | EWS376P | 150 |
| | | 10 | EWS3710P | 100 |
| ½ | ¾ | 3½ | EWS503P | 100 |
| | | 6 | EWS506P | 100 |
| | | 10 | EWS5010P | 50 |
| ⅝ | ⅞ | 3½ | EWS623P | 50 |
| | | 6 | EWS626P | 50 |
| | | 10 | EWS6210P | 25 |
| ¾ | 1 | 8 | EWS758P | 25 |
| | | 13 | EWS7513P | 25 |

**Plastic Screen Tube**

For use in base materials that are hollow or contain voids

## Steel Adhesive-Anchoring Screen Tubes

| For Rod Diameter (in.) | Hole Size (in.) | ETS Carbon Steel Screen Tubes for ET-3G | | Carton Quantity |
|---|---|---|---|---|
| | | Actual Screen Size O.D./Length (in.) | Model No. | |
| ¾ | 1 | 31⁄32 x 8 | ETS758 | 25 |
| | | 31⁄32 x 13 | ETS7513 | 25 |
| | | 31⁄32 x 17 | ETS7517 | 25 |
| | | 31⁄32 x 21 | ETS7521 | 25 |

**Screen Tube**

Screen tubes are for use in unreinforced brick masonry applications.

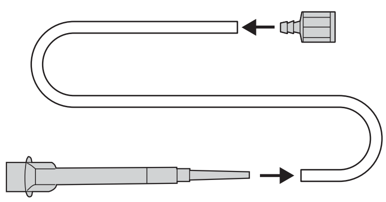
## Adhesive Piston Plug Delivery System

For consistent dispensing of anchoring adhesives in any installation orientation, the Simpson Strong-Tie® Adhesive Piston Plug Delivery System offers you an easy-to-use, more reliable and less time-consuming means to dispense adhesive into drilled holes for threaded rod and rebar dowel installations at overhead, upwardly inclined and horizontal orientations.

The matched tolerance design between the piston plug and drilled hole virtually eliminates the formation of voids and air pockets during adhesive dispensing.

**Adhesive Piston Plug Family**

**Piston Plug Delivery System**



**Mixing Nozzle with Delivery System**

SIMPSON Strong-Tie

## ET-3G Typical Properties

| Property | | Class C (>60°F) | Test Method |
|---|---|---|---|
| Consistency | | Non-sag | ASTM C881 |
| Bond Strength, Slant Shear | Hardened to Hardened Concrete, 2-Day Cure[1] | 2,600 psi | ASTM C882 |
| | Hardened to Hardened Concrete, 14-Day Cure[1] | 2,900 psi | |
| | Fresh to Hardened Concrete, 14-Day Cure[2] | 2,000 psi | |
| Compressive Yield Strength, 7-Day Cure[1] | | 13,000 psi | ASTM D695 |
| Compressive Modulus, 7-Day Cure[1] | | 580,000 psi | ASTM D695 |
| Heat Deflection Temperature, 7-Day Cure[2] | | 132°F (56°C) | ASTM D648 |
| Glass Transition Temperature, 7-Day Cure[2] | | 124°F (51°C) | ASTM E1356 |
| Decomposition Temperature, 24-Hour Cure[2] | | 500°F (260°C) | ASTM E2550 |
| Water Absorption, 24-Hours, 7-Day Cure[2] | | 0.15% | ASTM D570 |
| Shore D Hardness, 24-Hour Cure[2] | | 84 | ASTM D2240 |
| Linear Coefficient of Shrinkage, 7-Day Cure[2] | | 0.002 in./in. | ASTM D2566 |
| Coefficient of Thermal Expansion[2] | | $2.4 \times 10^{-5}$ in./in.°F | ASTM C531 |

1. Material and curing conditions: 60° ± 2°F.
2. Material and curing conditions: 73° ± 2°F.

## ET-3G Installation Information and Additional Data for Threaded Rod and Rebar[1]

IBC LW

| Characteristic | | Symbol | Units | Nominal Anchor Diameter (in.) / Rebar Size | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ⅜ / #3 | ½ / #4 | ⅝ / #5 | ¾ / #6 | ⅞ / #7 | 1 / #8 | 1¼ / #10 |
| **Installation Information** | | | | | | | | | | |
| Drill Bit Diameter | | $d_{hole}$ | in. | ½ | ⅝ | ¾ | ⅞ | 1 | 1⅛ | 1⅜ |
| Maximum Tightening Torque | | $T_{inst}$ | ft.-lb. | 10 | 20 | 30 | 45 | 60 | 80 | 125 |
| Permitted Embedment Depth Range | Minimum | $h_{ef}$ | in. | 2⅜ | 2¾ | 3⅛ | 3½ | 3¾ | 4 | 5 |
| | Maximum | $h_{ef}$ | in. | 7½ | 10 | 12½ | 15 | 17½ | 20 | 25 |
| Minimum Concrete Thickness | | $h_{min}$ | in. | $h_{ef} + 5d_{hole}$ | | | | | | |
| Critical Edge Distance[2] | | $c_{ac}$ | in. | See footnote 2 | | | | | | |
| Minimum Edge Distance | | $c_{min}$ | in. | 1¾ | | | | | | 2¾ |
| Minimum Anchor Spacing | | $s_{min}$ | in. | 3 | | | | | | 6 |

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-19, ACI 318-14 and ACI 318-11.
2. $c_{ac} = h_{ef} (\tau_{k,uncr}/1,160)^{0.4} \times [3.1 - 0.7(h/h_{ef})]$, where:
   $[h/h_{ef}] \le 2.4$
   $\tau_{k,uncr}$ = the characteristic bond strength in uncracked concrete, given in the tables that follow $\le k_{uncr} ((h_{ef} \times f'_c)^{0.5}/(\pi \times d_{hole}))$
   $h$ = the member thickness (inches)
   $h_{ef}$ = the embedment depth (inches)

## Software and Web Application Technology

For innovative, cost-effective product and design recommendations for any project, please visit our Software and Web Applications page at **strongtie.com/softwareandwebapplications/category**.

**Anchor Designer™** (AD)

Perform anchorage design in accordance with the strength design provision of ACI 318 or CSA A23.3 for cracked and uncracked concrete conditions.

**Adhesive Cartridge Estimator** (ACE)

Easily estimate how much adhesive you will need for your project, including threaded rod and rebar doweling and crack injection.

**Rebar Development Length Calulator** (RDLC)

Calculate ACI 318 tension and compression development lengths for desiging post-installed rebar in concrete conditions.

## ET-3G Tension Strength Design Data for Threaded Rod[1,11]

| Characteristic | | | Symbol | Units | Nominal Anchor Diameter (in.) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ⅜ | ½ | ⅝ | ¾ | ⅞ | 1 | 1¼ |
| **Steel Strength in Tension** | | | | | | | | | | | |
| Threaded Rod | Minimum Tensile Stress Area | | $A_{se}$ | in² | 0.078 | 0.142 | 0.226 | 0.334 | 0.462 | 0.606 | 0.969 |
| | Tension Resistance of Steel — ASTM F1554, Grade 36 | | $N_{sa}$ | lb. | 4,525 | 8,235 | 13,110 | 19,370 | 26,795 | 35,150 | 56,200 |
| | Tension Resistance of Steel — ASTM A193, Grade B7 | | | | 9,750 | 17,750 | 28,250 | 41,750 | 57,750 | 75,750 | 121,125 |
| | Tension Resistance of Steel — Type 410 Stainless (ASTM A193, Grade B6) | | | | 8,580 | 15,620 | 24,860 | 36,740 | 50,820 | 66,660 | 106,590 |
| | Tension Resistance of Steel — Types 304 and 316 Stainless (ASTM A193, Grade B8 and B8M) | | | | 4,445 | 8,095 | 12,880 | 19,040 | 26,335 | 34,540 | 55,235 |
| | Strength Reduction Factor — Steel Failure | | $\phi$ | — | 0.75[7] | | | | | | |
| **Concrete Breakout Strength in Tension (2,500 psi ≤ $f'_C$ ≤ 8,000 psi)[10]** | | | | | | | | | | | |
| Effectiveness Factor — Uncracked Concrete | | | $k_{uncr}$ | — | 24 | | | | | | |
| Effectiveness Factor — Cracked Concrete | | | $k_{cr}$ | — | 17 | | | | | | |
| Strength Reduction Factor — Breakout Failure | | | $\phi$ | — | 0.65[7] | | | | | | |
| **Bond Strength in Tension (2,500 psi ≤ $f'_C$ ≤ 8,000 psi)[10]** | | | | | | | | | | | |
| Uncracked Concrete[2,3,4] | Characteristic Bond Strength[5] | | $\tau_{k,uncr}$ | psi | 739 | 1,116 | 1,049 | 951 | 876 | 782 | 614 |
| | Permitted Embedment Depth Range | Minimum | $h_{ef}$ | in. | 2⅜ | 2¾ | 3⅛ | 3½ | 3¾ | 4 | 5 |
| | | Maximum | | | 7½ | 10 | 12½ | 15 | 17½ | 20 | 25 |
| Cracked Concrete[2,3,4] | Characteristic Bond Strength[5,8,9] | | $\tau_{k,cr}$ | psi | 571 | 495 | 431 | 377 | 351 | 342 | 342 |
| | Permitted Embedment Depth Range | Minimum | $h_{ef}$ | in. | 3 | 4 | 5 | 6 | 7 | 8 | 10 |
| | | Maximum | | | 7½ | 10 | 12½ | 15 | 17½ | 20 | 25 |
| **Bond Strength in Tension — Bond Strength Reduction Factors for Continuous Special Inspection** | | | | | | | | | | | |
| Strength Reduction Factor — Dry Concrete | | | $\phi_{dry,ci}$ | — | 0.65[7] | | | | | | |
| Strength Reduction Factor — Water-Saturated Concrete — $h_{ef} \leq 12d_a$ | | | $\phi_{sat,ci}$ | — | 0.55[7] | 0.45[7] | | | | | |
| Additional Factor for Water-Saturated Concrete — $h_{ef} \leq 12d_a$ | | | $K_{sat,ci}$[6] | — | 1 | | | | | 0.84 | |
| Strength Reduction Factor — Water-Saturated Concrete — $h_{ef} > 12d_a$ | | | $\phi_{sat,ci}$ | — | 0.45[7] | | | | | | |
| Additional Factor for Water-Saturated Concrete — $h_{ef} > 12d_a$ | | | $K_{sat,ci}$[6] | — | 0.57 | | | | | | |
| **Bond Strength in Tension — Bond Strength Reduction Factors for Periodic Special Inspection** | | | | | | | | | | | |
| Strength Reduction Factor — Dry Concrete | | | $\phi_{dry,pi}$ | — | 0.55[7] | | | | | | |
| Strength Reduction Factor — Water-Saturated Concrete — $h_{ef} \leq 12d_a$ | | | $\phi_{sat,pi}$ | — | 0.45[7] | | | | | | |
| Additional Factor for Water-Saturated Concrete — $h_{ef} \leq 12d_a$ | | | $K_{sat,pi}$[6] | — | 1 | 0.93 | | | | 0.71 | |
| Strength Reduction Factor — Water-Saturated Concrete — $h_{ef} > 12d_a$ | | | $\phi_{sat,pi}$ | — | 0.45[7] | | | | | | |
| Additional Factor for Water-Saturated Concrete — $h_{ef} > 12d_a$ | | | $K_{sat,pi}$[6] | — | 0.48 | | | | | | |

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-19, ACI 318-14 and ACI 318-11.
2. Temperature Range: Maximum short-term temperature = 150°F, Maximum long-term temperature = 110°F.
3. Short-term concrete temperatures are those that occur over short intervals (diurnal cycling).
4. Long-term temperatures are roughly constant over significant periods of time.
5. For anchors that only resist wind or seismic loads, bond strengths may be increased by 72%.
6. In water-saturated concrete, multiply $\tau_{k,uncr}$ and $\tau_{k,cr}$ by $K_{sat}$.
7. The tabulated value of $\phi$ applies when the load combinations from the IBC® or ACI 318 are used and the requirements of ACI 318-19 17.5.3, ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable, are met. If the load combinations of ACI 318-11 Appendix C are used, refer to ACI 318-11 D.4.4 to determine the appropriate value of $\phi$.
8. For anchors installed in regions assigned to Seismic Design Category C, D, E or F, the bond strength values for ⅞" anchors must be multiplied by $\alpha_{N,seis}$ = 0.80.
9. For anchors installed in regions assigned to Seismic Design Category C, D, E or F, the bond strength values for 1" anchors must be multiplied by $\alpha_{N,seis}$ = 0.92.
10. The values of $f'_c$ used for calculation purposes must not exceed 8,000 psi (55.1 MPa) for uncracked concrete. The value of $f'_c$ used for calculation purposes must not exceed 2,500 psi (17.2 MPa) for tension resistance in cracked concrete.
11. For lightweight concrete, the modification factor for bond strength shall be as given in ACI 318-19 17.2.4, ACI 318-14 17.2.6 or ACI 318-11 D.3.6, as applicable, where applicable.

## ET-3G Tension Strength Design Data for Rebar[1,9]

| Characteristic | | | Symbol | Units | Rebar Size | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | #3 | #4 | #5 | #6 | #7 | #8 | #10 |
| **Steel Strength in Tension** | | | | | | | | | | | |
| Rebar | Minimum Tensile Stress Area | | $A_{se}$ | in² | 0.11 | 0.2 | 0.31 | 0.44 | 0.6 | 0.79 | 1.23 |
| Rebar | Tension Resistance of Steel — Rebar (ASTM A615 Grade 60) | | $N_{sa}$ | lb. | 9,900 | 18,000 | 27,900 | 39,600 | 54,000 | 71,100 | 110,700 |
| Rebar | Strength Reduction Factor — Steel Failure | | $\phi$ | — | 0.65[7] | | | | | | |
| **Concrete Breakout Strength in Tension (2,500 psi ≤ $f'_c$ ≤ 8,000 psi)[8]** | | | | | | | | | | | |
| Effectiveness Factor — Uncracked Concrete | | | $k_{uncr}$ | — | 24 | | | | | | |
| Effectiveness Factor — Cracked Concrete | | | $k_{cr}$ | — | 17 | | | | | | |
| Strength Reduction Factor — Breakout Failure | | | $\phi$ | — | 0.65[7] | | | | | | |
| **Bond Strength in Tension (2,500 psi ≤ $f'_c$ ≤ 8,000 psi)[8]** | | | | | | | | | | | |
| Uncracked Concrete[2,3,4] | Characteristic Bond Strength[5] | | $\tau_{k,uncr}$ | psi | 886 | 696 | 693 | 697 | 700 | 693 | 691 |
| Uncracked Concrete[2,3,4] | Permitted Embedment Depth Range | Minimum | $h_{ef}$ | in. | 2⅜ | 2¾ | 3⅛ | 3½ | 3¾ | 4 | 5 |
| Uncracked Concrete[2,3,4] | Permitted Embedment Depth Range | Maximum | $h_{ef}$ | in. | 7½ | 10 | 12½ | 15 | 17½ | 20 | 25 |
| Cracked Concrete[2,3,4] | Characteristic Bond Strength[5] | | $\tau_{k,cr}$ | psi | 361 | 588 | 541 | 502 | 453 | 396 | 264 |
| Cracked Concrete[2,3,4] | Permitted Embedment Depth Range | Minimum | $h_{ef}$ | in. | 3 | 4 | 5 | 6 | 7 | 8 | 10 |
| Cracked Concrete[2,3,4] | Permitted Embedment Depth Range | Maximum | $h_{ef}$ | in. | 7½ | 10 | 12½ | 15 | 17½ | 20 | 25 |
| **Bond Strength in Tension — Bond Strength Reduction Factors for Continuous Special Inspection** | | | | | | | | | | | |
| Strength Reduction Factor — Dry Concrete | | | $\phi_{dry,ci}$ | — | 0.65[7] | | | | | | |
| Strength Reduction Factor — Water-Saturated Concrete – $h_{ef} \le 12d_a$ | | | $\phi_{sat,ci}$ | — | 0.55[7] | | 0.45[7] | | | | |
| Additional Factor for Water-Saturated Concrete – $h_{ef} \le 12d_a$ | | | $K_{sat,ci}$[6] | — | 1 | | | | | 0.84 | |
| Strength Reduction Factor — Water-Saturated Concrete – $h_{ef} > 12d_a$ | | | $\phi_{sat,ci}$ | — | 0.45[7] | | | | | | |
| Additional Factor for Water-Saturated Concrete – $h_{ef} > 12d_a$ | | | $K_{sat,ci}$[6] | — | 0.57 | | | | | | |
| **Bond Strength in Tension — Bond Strength Reduction Factors for Periodic Special Inspection** | | | | | | | | | | | |
| Strength Reduction Factor — Dry Concrete | | | $\phi_{dry,pi}$ | — | 0.55[7] | | | | | | |
| Strength Reduction Factor — Water-Saturated Concrete – $h_{ef} \le 12d_a$ | | | $\phi_{sat,pi}$ | — | 0.45[7] | | | | | | |
| Additional Factor for Water-Saturated Concrete – $h_{ef} \le 12d_a$ | | | $K_{sat,pi}$[6] | — | 1 | | 0.93 | | | 0.71 | |
| Strength Reduction Factor — Water-Saturated Concrete – $h_{ef} > 12d_a$ | | | $\phi_{sat,pi}$ | — | 0.45[7] | | | | | | |
| Additional Factor for Water-Saturated Concrete – $h_{ef} > 12d_a$ | | | $K_{sat,pi}$[6] | — | 0.48 | | | | | | |

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-19, ACI 318-14 and ACI 318-11.
2. Temperature Range: Maximum short-term temperature = 150°F, Maximum long-term temperature = 110°F.
3. Short-term concrete temperatures are those that occur over short intervals (diurnal cycling).
4. Long-term temperatures are roughly constant over significant periods of time.
5. For anchors that only resist wind or seismic loads, bond strengths may be increased by 72%.
6. In water-saturated concrete, multiply $\tau_{k,uncr}$ and $\tau_{k,cr}$ by $K_{sat}$.
7. The tabulated value of $\phi$ applies when the load combinations from the IBC® or ACI 318 are used and the requirements of ACI 318-19 17.5.3, ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable, are met. If the load combinations of ACI 318-11 Appendix C are used, refer to ACI 318-11 D.4.4 to determine the appropriate value of $\phi$.
8. The values of $f'_c$ used for calculation purposes must not exceed 8,000 psi (55.1 MPa) for uncracked concrete. The value of $f'_c$ used for calculation purposes must not exceed 2,500 psi (17.2 MPa) for tension resistance in cracked concrete.
9. For lightweight concrete, the modification factor for bond strength shall be as given in ACI 318-19 17.2.4, ACI 318-14 17.2.6 or ACI 318-11 D.3.6, as applicable, where applicable.

## ET-3G Shear Strength Design Data for Threaded Rod[1]

| Characteristic | | Symbol | Units | Nominal Anchor Diameter (in.) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ⅜ | ½ | ⅝ | ¾ | ⅞ | 1 | 1¼ |
| **Steel Strength in Shear** | | | | | | | | | | |
| Threaded Rod | Minimum Shear Stress Area | $A_{se}$ | in.$^2$ | 0.078 | 0.142 | 0.226 | 0.334 | 0.462 | 0.606 | 0.969 |
| | Shear Resistance of Steel — ASTM F1554, Grade 36 | $V_{sa}$ | lb. | 2,260 | 4,940 | 7,865 | 11,625 | 16,080 | 21,090 | 33,720 |
| | Shear Resistance of Steel — ASTM A193, Grade B7 | | | 4,875 | 10,650 | 16,950 | 25,050 | 34,650 | 45,450 | 72,675 |
| | Shear Resistance of Steel — Type 410 Stainless (ASTM A193, Grade B6) | | | 4,290 | 9,370 | 14,910 | 22,040 | 30,490 | 40,000 | 63,955 |
| | Shear Resistance of Steel — Types 304 and 316 Stainless (ASTM A193, Grade B8 & B8M) | | | 2,225 | 4,855 | 7,730 | 11,420 | 15,800 | 20,725 | 33,140 |
| | Reduction for Seismic Shear — ASTM F1554, Grade 36 | $\alpha_{V,seis}$[3] | — | 0.87 | 0.78 | 0.68 | | | | 0.65 |
| | Reduction for Seismic Shear — ASTM A193, Grade B7 | | | 0.87 | 0.78 | 0.68 | | | | 0.65 |
| | Reduction for Seismic Shear — Stainless (ASTM A193, Grade B6) | | | 0.69 | 0.82 | 0.75 | | | 0.83 | 0.72 |
| | Reduction for Seismic Shear — Stainless (ASTM A193, Grade B8 & B8M) | | | 0.69 | 0.82 | 0.75 | | | 0.83 | 0.72 |
| | Strength Reduction Factor — Steel Failure | $\phi$ | — | 0.65[2] | | | | | | |
| **Concrete Breakout Strength in Shear** | | | | | | | | | | |
| Outside Diameter of Anchor | | $d_o$ | in. | 0.375 | 0.5 | 0.625 | 0.75 | 0.875 | 1 | 1.25 |
| Load Bearing Length of Anchor in Shear | | $\ell_e$ | in. | Min. of $h_{ef}$ and 8 times anchor diameter | | | | | | |
| Strength Reduction Factor — Breakout Failure | | $\phi$ | — | 0.70[2] | | | | | | |
| **Concrete Pryout Strength in Shear** | | | | | | | | | | |
| Coefficient for Pryout Strength | | $k_{cp}$ | — | 1.0 for $h_{ef} < 2.50"$; 2.0 for $h_{ef} \geq 2.50"$ | | | | | | |
| Strength Reduction Factor — Pryout Failure | | $\phi$ | — | 0.70[2] | | | | | | |

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-19, ACI 318-14 and ACI 318-11.
2. The tabulated value of $\phi$ applies when the load combinations from the IBC® or ACI 318 are used and the requirements of ACI 318-19 17.5.3, ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable, are met. If the load combinations of ACI 318-11 Appendix C are used, refer to ACI 318-11 D.4.4 to determine the appropriate value of $\phi$.
3. The values of $V_{sa}$ are applicable for both cracked concrete and uncracked concrete. For anchors installed in regions assigned to Seismic Design Category C, D, E or F, $V_{sa}$ must be multiplied by $\alpha_{V,seis}$ for the corresponding anchor steel type.

## ET-3G Shear Strength Design Data for Rebar[1]

| Characteristic | | Symbol | Units | Rebar Size | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | #3 | #4 | #5 | #6 | #7 | #8 | #10 |
| **Steel Strength in Shear** | | | | | | | | | | |
| Rebar | Minimum Shear Stress Area | $A_{se}$ | in$^2$ | 0.11 | 0.2 | 0.31 | 0.44 | 0.6 | 0.79 | 1.23 |
| | Shear Resistance of Steel — Rebar (ASTM A615 Grade 60) | $V_{sa}$ | lb. | 4,950 | 10,800 | 16,740 | 23,760 | 32,400 | 42,660 | 66,420 |
| | Reduction for Seismic Shear — Rebar (ASTM A615 Grade 60) | $\alpha_{V,seis}$[3] | — | 0.85 | 0.88 | 0.84 | | 0.77 | | 0.59 |
| | Strength Reduction Factor — Steel Failure | $\phi$ | — | 0.60[2] | | | | | | |
| **Concrete Breakout Strength in Shear** | | | | | | | | | | |
| Outside Diameter of Anchor | | $d_o$ | in. | 0.375 | 0.5 | 0.625 | 0.75 | 0.875 | 1 | 1.25 |
| Load-Bearing Length of Anchor in Shear | | $\ell_e$ | in. | Min. of $h_{ef}$ and 8 times anchor diameter | | | | | | |
| Strength Reduction Factor — Breakout Failure | | $\phi$ | — | 0.70[2] | | | | | | |
| **Concrete Pryout Strength in Shear** | | | | | | | | | | |
| Coefficient for Pryout Strength | | $k_{cp}$ | — | 1.0 for $h_{ef} < 2.50"$; 2.0 for $h_{ef} \geq 2.50"$ | | | | | | |
| Strength Reduction Factor — Pryout Failure | | $\phi$ | — | 0.70[2] | | | | | | |

1. The information presented in this table is to be used in conjunction with the design criteria of ACI 318-19, ACI 318-14 and ACI 318-11.
2. The tabulated value of $\phi$ applies when the load combinations from the IBC or ACI 318 are used and the requirements of ACI 318-19 17.5.3, ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable, are met. If the load combinations of ACI 318-11 Appendix C are used, refer to ACI 318-11 D.4.4 to determine the appropriate value of $\phi$.
3. The values of $V_{sa}$ are applicable for both cracked concrete and uncracked concrete. For anchors installed in regions assigned to Seismic Design Category C, D, E or F, $V_{sa}$ must be multiplied by $\alpha_{V,seis}$.

## ET-3G Development Length for Rebar Dowels

| Rebar Size | Drill Bit Diameter (in.) | Clear Cover in. (mm) | Development Length, in. (mm) | | | | |
|---|---|---|---|---|---|---|---|
| | | | f'c = 2,500 psi (17.2 MPa) Concrete | f'c = 3,000 psi (20.7 MPa) Concrete | f'c = 4,000 psi (27.6 MPa) Concrete | f'c = 6,000 psi (41.4 MPa) Concrete | f'c = 8,000 psi (55.2 MPa) Concrete |
| #3 (9.5) | ½ | 1½ (38) | 12 (305) | 12 (305) | 12 (305) | 12 (305) | 12 (305) |
| #4 (12.7) | ⅝ | 1½ (38) | 14.4 (366) | 14 (356) | 12 (305) | 12 (305) | 12 (305) |
| #5 (15.9) | ¾ | 1½ (38) | 18 (457) | 17 (432) | 14.2 (361) | 12 (305) | 12 (305) |
| #6 (19.1) | ⅞ | 1½ (38) | 21.6 (549) | 20 (508) | 17.1 (434) | 14 (356) | 13 (330) |
| #7 (22.2) | 1 | 3 (76) | 31.5 (800) | 29 (737) | 25 (635) | 21 (533) | 18 (457) |
| #8 (25.4) | 1⅛ | 3 (76) | 36 (914) | 33 (838) | 28.5 (724) | 24 (610) | 21 (533) |
| #9 (28.7) | 1⅜ | 3 (76) | 40.5 (1,029) | 38 (965) | 32 (813) | 27 (686) | 23 (584) |
| #10 (32.3) | 1⅜ | 3 (76) | 45 (1,143) | 42 (1,067) | 35.6 (904) | 30 (762) | 26 (660) |
| #11 (35.8) | 1¾ | 3 (76) | 51 (1,295) | 47 (1,194) | 41 (1,041) | 33 (838) | 29 (737) |

1. Tabulated development lengths are for static, wind and seismic load cases in Seismic Design Category A and B. Development lengths in SDC C through F must comply with ACI 318-19 and ACI 318-14 Chapter 18 or ACI 318-11 Chapter 12, as applicable. The value of $f'_c$ used to calculate development lengths shall not exceed 2,500 psi in SDC C through F.
2. Rebar is assumed to be ASTM A615 Grade 60 or A706 ($f_y$ = 60,000 psi). For rebar with a higher yield strength, multiply tabulated values by $f_y$ / 60,000 psi.
3. Concrete is assumed to be normal-weight concrete. For lightweight concrete, multiply tabulated values by 1.33.
4. Tabulated values assume bottom cover of less than 12" cast below rebars ($\Psi_t$ = 1.0).
5. Uncoated rebar must be used.
6. The value of $K_{tr}$ is assumed to be 0. Refer to ACI 318-19 Section 25.4.2.4, ACI 318-14 Section 25.4.2.3 or ACI 318-11 Section 12.2.3.

## ET-3G Epoxy Anchor Installation Information — Fully Grouted CMU Construction — Face of Wall

| Installation Information | Symbol | Units | Nominal Rod Diameter / Rebar Size | | | |
|---|---|---|---|---|---|---|
| | | | ⅜" / #3 | ½" / #4 | ⅝" / #5 | ¾" / #6 |
| Drill Bit Diameter — Threaded Rod | $d_o$ | in. | 7⁄16 | 9⁄16 | 11⁄16 | ⅞ |
| Drill Bit Diameter — Rebar | $d_o$ | in. | ½ | ⅝ | ¾ | ⅞ |
| Minimum Embedment Depth | $h_{ef,min}$ | in. | 3 | 3 | 3 | 3 |

## ET-3G Epoxy Anchor Installation Information — Fully Grouted CMU Construction — Top of Wall

| Installation Information | Symbol | Units | Nominal Rod Diameter / Rebar Size | | |
|---|---|---|---|---|---|
| | | | ½" / #4 | ⅝" / #5 | ⅞" |
| Drill Bit Diameter — Threaded Rod | $d_o$ | in. | 9⁄16 | 11⁄16 | 1 |
| Drill Bit Diameter — Rebar | $d_o$ | in. | ⅝ | ¾ | — |
| Minimum Embedment Depth | $h_{ef,min}$ | in. | 3 | 3 | 3 |

## ET-3G Epoxy Anchor Installation Information — Ungrouted CMU Construction

| Installation Information | Symbol | Units | Nominal Rod Diameter | | |
|---|---|---|---|---|---|
| | | | ⅜" | ½" | ⅝" |
| Drill Bit Diameter | $d_o$ | in. | 9⁄16 | ¾ | ⅞ |
| Embedment Depth | $h_{ef,min}$ | in. | 3½ | 3½ | 3½ |

Please see the ET-3G product page at **strongtie.com** and ICC-ES ESR Report for load data.



F-A-ET3G23 7/23 exp. 12/25

(800) 999-5099
strongtie.com