SET-3G[™] High-Strength Epoxy Adhesive

SET-3G Cure Schedule^{1,2}

| Concrete Te | emperature | Gel Time | Cure Time |
|-------------|------------|-----------|-----------|
| (°F) | (°C) | (minutes) | (hr.) |
| 40 | 4 | 120 | 192 |
| 50 | 10 | 75 | 72 |
| 60 | 16 | 50 | 48 |
| 70 | 21 | 35 | 24 |
| 90 | 32 | 25 | 24 |
| 100 | 38 | 15 | 24 |

For SI: 1°F = (°C x %) + 32.

1. For water-saturated concrete, submerged concrete and water-filled holes, the cure times shall be doubled.

2. For installation of anchors in concrete where the temperature is below 70°F (21°C),

the adhesive must be conditioned to a minimum temperature of 70°F (21°C).

SET-3G Typical Properties

| | Descent | Class B | Class C | Test | |
|--|---|---------------|------------------------|------------|--|
| | Property | (40°–60°F) | (>60°F) | Method | |
| Consistency | | Non-sag | Non-sag | ASTM C881 | |
| | Hardened to Hardened Concrete, 2-Day Cure ¹ | 3,700 psi | 3,300 psi | | |
| Bond Strength, Slant Shear | Hardened to Hardened Concrete, 14-Day Cure ¹ | 3,850 psi | 3,350 psi | ASTM C882 | |
| | Fresh to Hardened Concrete, 14-Day Cure ² | 2,750 psi | 2,750 psi |] | |
| Compressive Yield Strength, 7-Day Cure ² | | 13,000 psi | 15,350 psi | ASTM D695 | |
| Compressive Modulus, 7-Day Cure ² | | 650,000 psi | 992,000 psi | ASTM D695 | |
| Heat Deflection Temperature, | 7-Day Cure ² | 147°F (64°C) | | ASTM D648 | |
| Glass Transition Temperature, | 7-Day Cure ² | 149°F | (65°C) | ASTM E1356 | |
| Decomposition Temperature, | 24-Hour Cure ² | 500°F | (260°C) | ASTM E2550 | |
| Water Absorption, 24-Hours, 7-Day Cure ² | | 0.1 | 3% | ASTM D570 | |
| Shore D Hardness, 24-Hour Cure ² | | 8 | 4 | ASTM D2240 | |
| Linear Coefficient of Shrinkage, 7-Day Cure ² | | 0.002 in./in. | | ASTM D2566 | |
| Coefficient of Thermal Expansion ² | | 2.3 x 10 | ⁵ in./in.°F | ASTM C531 | |

1. Material and curing conditions: Class B at 40° ± 2°F, Class C at 60° ± 2°F.

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

SET-3G Installation Information and Additional Data for Threaded Rod and Rebar¹

| Chamatariatia | Cumbel | Units | Nominal Anchor Diameter da (in.) / Rebar Size | | | | | | | |
|-------------------------------------|----------------------|----------|---|----------|-------|-------|--------------------------------------|------|--------|--|
| Characteristic | Symbol | | <u>%</u> /#3 | 1/2 / #4 | %/#5 | 34/#6 | <i>‰∣</i> #7 | 1/#8 | 1¼/#10 | |
| | | Installa | ation Informa | ation | | | | | | |
| Drill Bit Diameter for Threaded Rod | d _{hole} | in. | 7/16 | %16 | 11/16 | 7/8 | 1 | 11/8 | 1% | |
| Drill Bit Diameter for Rebar | d _{hole} | in. | 1/2 | 5/8 | 3⁄4 | 7/8 | 1 | 11/8 | 1% | |
| Maximum Tightening Torque | Tinst | ftlb. | 15 | 30 | 60 | 100 | 125 | 150 | 200 | |
| Minimum Embedment Depth | h _{ef, min} | in. | 23⁄8 | 23⁄4 | 31⁄8 | 31⁄2 | 3¾ | 4 | 5 | |
| Maximum Embedment Depth | h _{ef, max} | in. | 71/2 | 10 | 121⁄2 | 15 | 17½ | 20 | 25 | |
| Minimum Concrete Thickness | h _{min} | in. | h _{ef} - | + 11⁄4 | | | h _{ef} + 2d _{hole} | | | |
| Critical Edge Distance | C _{ac} | in. | See footnote 2 | | | | | | | |
| Minimum Edge Distance | Cmin | in. | 1¾ 2 | | | | | | 23⁄4 | |
| Minimum Anchor Spacing | Smin | in. | 1 | 21/2 | | | 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 $\leq k_{uncr} ((h_{ef} \times f'_c)^{0.5} / (\pi \times d_a))$

h = the member thickness (inches)

 h_{ef} = the embedment depth (inches)

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SET-3G[™] Design Information — Concrete

| | | | | 1 | | | Nominal | Rod Dian | neter (in) | | |
|-----------------------|--|--|-----------------------|----------|-------------------------|-----------------|---------|----------|-------------|--------|----------|
| | Chan | acteristic | Symbol | Units | 3%8 | 1/2 | 5% | 3/4 | 7/8 | 1 | 11/4 |
| - | | Steel Stren | nth in Tens | ion | | | | | | | |
| Min | imum Tensile Stress Area | 01001 01101 | A _{se} | in.2 | 0.078 | 0.142 | 0.226 | 0.334 | 0.462 | 0.606 | 0.96 |
| | sion Resistance of Steel — ASTM F | 1554. Grade 36 | 1,26 | | 4,525 | 8,235 | 13,110 | 19,370 | 26,795 | 35,150 | 56.2 |
| | sion Resistance of Steel — ASTM F | international second | | | 5,850 | 10,650 | 16,950 | 25,050 | 34,650 | 45,450 | 72,6 |
| | sion Resistance of Steel — ASTM A | and the second | | | 9,750 | 17,750 | 28,250 | 41,750 | 57,750 | 75,750 | 121, |
| Tens | | Steel ASTM A193, Grade B8 and B8M | N _{sa} | lb. | 4,445 | 8,095 | 12,880 | 19,040 | 26,335 | 34,540 | 55,2 |
| Ten | sion Resistance of Steel — Stainles | s Steel ASTM F593 CW (Types 304 and 316) | | | 7,800 | 14,200 | 22,600 | 28,390 | 39,270 | 51,510 | 82,3 |
| Ten | sion Resistance of Steel — Stainles | s Steel ASTM A193, Grade B6 (Type 410) | | | 8,580 | 15,620 | 24,860 | 36,740 | 50,820 | 66,660 | 106, |
| Stre | ngth Reduction Factor for Tension - | – Steel Failure | φ | - | | | | 0.755 | | | |
| | | Concrete Breakout Strength in Te | ension (2,5 | 00 psi : | ≤ f' _c ≤ 8,0 |)00 psi) | | | | | |
| Effe | ctiveness Factor for Cracked Concre | | k _{c.cr} | _ | | | | 17 | | | |
| Effe | ctiveness Factor for Uncracked Con | crete | k _{c.uncr} | - | | | | 24 | | | |
| Stre | ngth Reduction Factor — Concrete | Breakout Failure in Tension | φ | - | | | | 0.655 | | | |
| | | Bond Strength in Tension (| 2,500 psi < | f'c ≤ 8 | .000 psi) ⁶ | 5 | | | | | |
| Min | imum Embedment | - | h _{ef.min} | in. | 2% | 23/4 | 31/8 | 31/2 | 3¾ | 4 | 5 |
| Max | imum Embedment | | h _{ef,max} | in. | 71/2 | 10 | 121/2 | 15 | 171/2 | 20 | 25 |
| | Temperature Range A ^{2,4} | Characteristic Bond Strength in Cracked Concrete ⁸ | Tk,cr | psi | 1,448 | 1,402 | 1,356 | 1,310 | 1,265 | 1,219 | 1,1 |
| uo | ionporataro nango A | Characteristic Bond Strength in Uncracked Concrete ⁸ | τ _{k,uncr} | psi | 2,357 | 2,260 | 2,162 | 2,064 | 1,967 | 1,868 | 1,6 |
| Continuous Inspection | Temperature Range B ^{3,4} | Characteristic Bond Strength in Cracked Concrete ⁸ | TK,CF | psi | 1,201 | 1,163 | 1,125 | 1,087 | 1,050 | 1,012 | 93 |
| ul suo | Anabas Ostanani | Characteristic Bond Strength in Uncracked Concrete ⁸ | τ _{k,uncr} | psi | 1,957 | 1,876 | 1,795 | 1,713 | 1,632 | 1,551 | 1,3 |
| tinu | Anchor Category | Dry Concrete | | | | | | 0.655 | | | |
| Con | Strength Reduction Factor Anchor Category | Dry Concrete Water-Saturated Concrete, Water-Filled Hole or Submerged Concrete | Фdry,ci | _ | | 3 | | °C0.U | 2 | | |
| 8 | Strength Reduction Factor | Water-Saturated Concrete, Water-Filled Hole or Submerged Concrete | φ _{wet,ci} | - | 0. | 45 ⁵ | | | 0.555 | | _ |
| | Tomportus Dongo A24 | Characteristic Bond Strength in Cracked Concrete ⁸ | τ _{k,cr} | psi | 1,346 | 1,304 | 1,356 | 1,310 | 1,265 | 1,219 | 1,1 |
| | Temperature Range A ^{2,4} | Characteristic Bond Strength in Uncracked Concrete ⁸ | τ _{k,uncr} | psi | 2,192 | 2,102 | 2,162 | 2,064 | 1,967 | 1,868 | 1,6 |
| ection | Temperature Range B ^{3,4} | Characteristic Bond Strength in Cracked Concrete ⁸ | τ _{k,cr} | psi | 1,117 | 1,082 | 1,125 | 1087 | 1,050 | 1,012 | 93 |
| Periodic Inspe | | Characteristic Bond Strength in Uncracked Concrete ⁸ | τ _{k,uncr} | psi | 1,820 | 1,744 | 1,795 | 1,713 | 1,632 | 1,551 | 1,3 |
| riod | Anchor Category | Dry Concrete | 1 | | | 2 | | | 1 | | |
| Ре | Strength Reduction Factor | Dry Concrete | ф _{dry,pi} | | 0. | 555 | | | 0.655 | | |
| 102.00 | Anchor Category | Water-Saturated Concrete, Water-Filled Hole or Submerged Concrete Water-Saturated Concrete, Water-Filled | | - | | | | 3 | | | _ |
| | Strength Reduction Factor | Water-Saturated Concrete, Water-Filled Hole or Submerged Concrete | φ _{wet,pi} | - | | | | 0.455 | | | <u> </u> |
| Ked | uction Factor for Seismic Tension | | $\alpha_{N,seis}^{g}$ | - | 1.0 | 0.9 | 1.0 | 1.0 | 1.0 | 1.0 | 1 |

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 A: Maximum short-term temperature = 160°F, Maximum long-term temperature = 110°F.

3. Temperature Range B: Maximum short-term temperature = 176°F, Maximum long-term temperature = 110°F.

4. Short-term concrete temperatures are those that occur over short intervals (diurnal cycling). Long-term temperatures are roughly constant over significant periods of time.

5. The tabulated value of ϕ 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 ϕ .

6. Bond strength values shown are for normal-weight concrete having a compressive strength of f'_C = 2,500 psi. For higher compressive strengths up to 8,000 psi, the tabulated characteristic bond strength may be increased by a factor of (f'_G/2,500)^{0.35} for uncracked concrete and a factor of (f'c/2,500)024 for cracked concrete.

7. 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.

8. Characteristic bond strength values are for sustained loads, including dead and live loads.

9. For anchors installed in regions assigned to Seismic Design Category C, D, E or F, the bond strength values must be multiplied by c_{M,seis}.

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SET-3G[™] Design Information — Concrete

| | | | | | 0 | | | haber Of | - | | |
|------------|------------------------------------|--|----------------------------------|---------------|--------------------------|-----------------|--------|-----------------|--------|--------|--------|
| | | Characteristic | Symbol | Units | #3 | #4 | #5 | Rebar Siz #6 | | #8 | #10 |
| | | Steel St | rength in Te | nsion | #5 | #4 | #9 | #0 | #7 | #0 | #10 |
| Mini | mum Tensile Stress Area | | Ase | in.2 | 0.11 | 0.20 | 0.31 | 0.44 | 0.60 | 0.79 | 1.27 |
| Tens | sion Resistance of Steel — | Rebar (ASTM A615 Grade 60) | | | 9,900 | 18,000 | 27,900 | 39,600 | 54,000 | 71,100 | 114,30 |
| | | Rebar (ASTM A706 Grade 60) | - N _{sa} | lb. | 8,800 | 16,000 | 24,800 | 35,200 | 48,000 | 63,200 | 101,60 |
| Stre | ngth Reduction Factor for T | ension — Steel Failure | φ | - | 0.755 | | | | | | |
| (979), (94 | 5 | Concrete Breakout Strength | in Tension (| 2,500 psi | i ≤ f' _c ≤ 8, | ,000 psi) | | 246.073 | | | |
| Effec | ctiveness Factor for Cracke | | K _{c,cr} | · | | | | 17 | | | |
| Effec | ctiveness Factor for Uncrac | ked Concrete | k _{c,uncr} | 3 <u></u> | | | | 24 | | | |
| Stre | ngth Reduction Factor — C | Concrete Breakout Failure in Tension | φ | · | | | | 0.655 | | | |
| | | Bond Strength in Tens | ion (2,500 p | si≤f'c≤ | 8,000 ps | i) ⁶ | | - | | | |
| Mini | mum Embedment | | h _{ef,min} | in. | 2% | 2¾ | 31⁄8 | 31⁄2 | 3¾ | 4 | 5 |
| Max | imum Embedment | | h _{ef,max} | in. | 71⁄2 | 10 | 121⁄2 | 15 | 171⁄2 | 20 | 25 |
| | Temperature Range A ^{2,4} | Characteristic Bond Strength in Cracked Concrete [®] | τ _{k,cr} | psi | 1,448 | 1,402 | 1,356 | 1,310 | 1,265 | 1,219 | 1,128 |
| | emperature hange A | Characteristic Bond Strength in Uncracked Concrete ⁸ | τ _{k,uncr} | psi | 2,269 | 2,145 | 2,022 | 1,898 | 1,774 | 1,651 | 1,403 |
| | Temperature Range B ^{3,4} | Characteristic Bond Strength in Cracked Concrete ⁸ | τ _{k,cr} | psi | 1,201 | 1,163 | 1,125 | 1,087 | 1,050 | 1,012 | 936 |
| | emperature nange o | Characteristic Bond Strength in Uncracked Concrete ⁸ | τ _{k,uncr} | psi | 1,883 | 1,781 | 1,678 | 1,575 | 1,473 | 1,370 | 1,165 |
| | Anchor Category | Dry Concrete | D - | | | | | 1 | | | |
| | Strength Reduction Factor | Dry Concrete | φ _{dry,ci} | | | | | 0.655 | | | |
| A | Anchor Category | Water-Saturated Concrete, Water-Filled Hole or Submerged Concrete | | - | 3 | 3 | | | 2 | | |
| S | Strength Reduction Factor | Water-Saturated Concrete, Water-Filled Hole or Submerged Concrete | φ _{wet,ci} | - | 0.4 | 455 | | | 0.555 | | |
| | Temperature Range A ^{2,4} | Characteristic Bond Strength in Cracked Concrete ⁸ | τ _{k,cr} | psi | 1,346 | 1,304 | 1,356 | 1,310 | 1,265 | 1,219 | 1,128 |
| 1 | emperature hange A | Characteristic Bond Strength in Uncracked Concrete ⁸ | τ _{k,uncr} | psi | 2,110 | 1,995 | 2,022 | 1,898 | 1,774 | 1,651 | 1,403 |
| | Temperature Range B ^{3,4} | Characteristic Bond Strength in Cracked Concrete [®] | τ _{k,cr} | psi | 1,117 | 1,082 | 1,125 | 1,087 | 1,050 | 1,012 | 936 |
| | emperature hange b | Characteristic Bond Strength in Uncracked Concrete ⁸ | τ _{k,uncr} | psi | 1,751 | 1,656 | 1,678 | 1,575 | 1,473 | 1,370 | 1,165 |
| | Anchor Category | Dry Concrete | <u></u> | <u> </u> | | 2 | 1 | | | | |
| | Strength Reduction Factor | Dry Concrete | фdry,pi | s | 0. | 555 | | | 0.655 | | |
| A | Anchor Category | Water-Saturated Concrete, Water-Filled Hole or Submerged Concrete | <u></u> | | | | | 3 | | | |
| S | Strength Reduction Factor | Water-Saturated Concrete, Water-Filled Hole or Submerged Concrete | φ _{wet,pi} | 34 <u></u> | | | | 0.455 | | | |
| Redu | uction Factor for Seismic Te | nsion | α _{N,seis} ⁹ | | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |

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 A: Maximum short-term temperature = 160°F, Maximum long-term temperature = 110°F.

3. Temperature Range B: Maximum short-term temperature = 176°F, Maximum long-term temperature = 110°F.

4. Short-term concrete temperatures are those that occur over short intervals (diurnal cycling). Long-term temperatures are roughly constant over significant periods of time.

5. The tabulated value of ϕ 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 ϕ .

6. Bond strength values shown are for normal-weight concrete having a compressive strength of f_c = 2,500 psi. For higher compressive strengths up to 8,000 psi, the tabulated characteristic bond strength may be increased by a factor of $(f_c^2/2,500)^{0.24}$ for uncracked concrete and a factor of $(f_c^2/2,500)^{0.24}$ for cracked concrete.

7. 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.

8. Characteristic bond strength values are for sustained loads, including dead and live loads.

9. For anchors installed in regions assigned to Seismic Design Category C, D, E or F, the bond strength values must be multiplied by $\alpha_{M, sels}$.

SET-3G[™] Design Information — Concrete

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| | | | Nominal Rod Diameter (in.) | | | | | | | |
|--|-----------------------|--------------|---|--------|---------------------------|-------------------|----------------------|--------|--------|--|
| Characteristic | Symbol | Units | 3%8 | 1/2 | 5% | 3⁄4 | 7/8 | 1 | 1¼ | |
| | Steel St | rength in S | hear | | | | | | | |
| 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 | | | 2,715 | 4,940 | 7,865 | 11,625 | 16,080 | 21,090 | 33,720 | |
| Shear Resistance of Steel — ASTM F1554, Grade 55 | V _{sa} | lb. | 3,510 | 6,390 | 10,170 | 15,030 | 20,790 | 27,270 | 43,605 | |
| Shear Resistance of Steel — ASTM A193, Grade B7 | | | 5,850 | 10,650 | 16,950 | 25,050 | 34,650 | 45,450 | 72,675 | |
| Reduction factor for Seismic Shear — Carbon Streel | $\alpha_{V,seis}{}^3$ | - | | | 0.75 | | | 1 | .0 | |
| Shear Resistance of Steel — Stainless Steel ASTM A193, Grade B8 and B8M (Types 304 and 316) | | | 2,665 | 4,855 | 7,730 | 11,425 | 15,800 | 20,725 | 33,140 | |
| Shear Resistance of Steel — Stainless Steel ASTM F593 CW (Types 304 and 316) | Vsa | lb. | 4,680 | 8,520 | 13,560 | 17,035 | 23,560 | 30,905 | 49,420 | |
| Shear Resistance of Steel — Stainless Steel ASTM A193, Grade B6 (Type 410) | | | 5,150 | 9,370 | 14,915 | 22,040 | 30,490 | 40,000 | 63,955 | |
| Reduction factor for Seismic Shear — Stainless Steel | α _{V,seis} ³ | <u></u> 21 | 0. | .80 | | 0.75 | | 1 | .0 | |
| Strength Reduction Factor for Shear — Steel Failure | φ | 2 | | | | 0.65 ² | | | | |
| | Concrete Brea | kout Streng | th in Shear | | | | | | | |
| Outside Diameter of Anchor | da | in. | 0.375 | 0.5 | 0.625 | 0.75 | 0.875 | 1 | 1.25 | |
| Load-Bearing Length of Anchor in Shear | le | in. | Min. of h _{ef} and 8 times anchor diameter | | | | | | | |
| Strength Reduction Factor for Shear — Breakout Failure | φ | | | | | 0.70 ² | | | | |
| | Concrete Pry | out Strengtl | n in Shear | | | | | | | |
| Coefficient for Pryout Strength | k _{cp} | in. | | 1. | 0 for h _{ef} < 2 | 2.50"; 2.0 f | for $h_{ef} \ge 2.5$ | 0" | | |
| Strength Reduction Factor for Shear — Breakout Failure | φ | | | 0.702 | | | | | | |

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 ϕ 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 ϕ .

 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 α_{Vsels} for the corresponding anchor steel type.

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SET-3G[™] Design Information — Concrete

| Characteristic | 0 | 11-14-2 | Rebar Size | | | | | | | |
|---|-----------------------------------|----------------------|--|--------|--------------------------------|-------------------|------------|--------|--------|--|
| Characterisuc | Symbol | Units | #3 | #4 | #5 | #6 | #7 | #8 | #10 | |
| s | teel Strength | in Shear | | | | | | | | |
| Minimum Shear Stress Area | Ase | in.2 | 0.110 | 0.200 | 0.310 | 0.440 | 0.600 | 0.790 | 1.270 | |
| Shear Resistance of Steel — Rebar (ASTM A615 Grade 60) | | - V _{sa} Ib | | 10,800 | 16,740 | 23,760 | 32,400 | 42,660 | 68,580 | |
| Shear Resistance of Steel — Rebar (ASTM A706 Grade 60) | Vsa | ID. | 5,280 | 9,600 | 14,880 | 21,120 | 28,800 | 37,920 | 60,960 | |
| Reduction Factor for Seismic Shear — Rebar (ASTM A615 Grade 60) | | | 0.60 0.8 | | | | .8 | | | |
| Reduction Factor for Seismic Shear — Rebar (ASTM A706 Grade 60) | α. _{V,seis} ³ | -0 | 1 | | 0.60 | | | 0 | .8 | |
| Strength Reduction Factor for Shear — Steel Failure | φ | - | | | | 0.65 ² | | | | |
| Concret | e Breakout S | trength ir | n Shear | w | | | | | 7) | |
| Outside Diameter of Anchor | da | in. | 0.375 | 0.5 | 0.625 | 0.75 | 0.875 | 1 | 1.25 | |
| Load-Bearing Length of Anchor in Shear | l _e | in. | | Min | . of <i>h_{ef}</i> and | l 8 times a | nchor diam | eter | | |
| Strength Reduction Factor for Shear — Breakout Failure | φ | | | | | 0.70 ² | | | | |
| Concre | ete Pryout Str | ength in | Shear | | | | | | | |
| Coefficient for Pryout Strength | K _{cp} | in. | 1.0 for $h_{ef} < 2.50$ "; 2.0 for $h_{ef} \ge 2.50$ " | | | | | | | |
| Strength Reduction Factor for Shear — Breakout Failure | φ | | 0.702 | | | | | | | |

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 ϕ 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 ϕ .

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 α_{Vsels} for the corresponding anchor steel type.

For additional load tables, visit strongtie.com/set3g.



Anchor Designer[™] Software for ACI 318, ETAG and CSA

Simpson Strong-Tie[®] Anchor Designer software accurately analyzes existing design or suggests anchor solutions based on user-defined design elements in cracked and uncracked concrete conditions.

SET-3G[™] Design Information — Concrete

IBC Strain Two

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SET-3G Development Length for Rebar Dowel

| | Drill Bit | Clear Cover, | | 1 | Development Length in. (mm) |) | |
|---------------|-------------------|---------------|---|---|---|---|---|
| Rebar Size | Diameter (in.) | 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 | 1/2 | 1.125 (29) | 12 (305) | 12 (305) | 12 (305) | 12 (305) | 12 (305) |
| #4 | 5%8 | 1.125 (29) | 14.4 (366) | 14 (356) | 12 (305) | 12 (305) | 12 (305) |
| #5 | 3/4 | 1.125 (29) | 18 (457) | 17 (432) | 14.2 (361) | 12 (305) | 12 (305) |
| #6 | 7/8 | 1.125 (29) | 21.6 (549) | 20 (508) | 17.1 (434) | 14 (356) | 13 (330) |
| #7 | 1 | 2.30 (58) | 31.5 (800) | 29 (737) | 25 (635) | 21 (533) | 18 (457) |
| #8 | 11% | 2.30 (58) | 36 (914) | 33 (838) | 28.5 (724) | 24 (610) | 21 (533) |
| #9 | 1% | 2.30 (58) | 40.5 (1,029) | 38 (965) | 32 (813) | 27 (686) | 23 (584) |
| #10 | 1% | 2.30 (58) | 45 (1,143) | 42 (1,067) | 35.6 (904) | 30 (762) | 26 (660) |
| #11 | 13⁄4 | 2.30 (58) | 51 (1,295) | 47 (1,194) | 41 (1,041) | 33 (838) | 29 (737) |

 Tabulated development lengths are for static, wind and seismic load cases in Seismic Design Category A and B. Development lengths in Seismic Design Category C through F must comply with ACI 318-19 and ACI 318-14 Chapter 18 or ACI 318-11 Chapter 21, as applicable.

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 less that 12" cast below rebars ($\Psi_1 = 1.0$).

5. Uncoated rebar must be used.

*See p. 14 for an explanation of the load table icons.

6. The value of Ktr is assumed to be 0. Refer to ACI 318-19 Section 25.4.2.4, ACI 319-14 Section 25.4.2.3 or ACI 318-11 Section 12.2.3.

SET-3G[™] Design Information — Masonry

SET-3G Epoxy Anchor Installation Information – Fully Grouted CMU Construction – Face of Wall

| | 0b-i | 0-2- | Ne | neter / Rebar S | ize | |
|-----------------------------------|---------------------|-------|----------------------|-----------------|-----------------|-----------------|
| Installation Information | Symbol | Units | 3 %" / #3 | 1⁄2" / #4 | %" / # 5 | 34" / #6 |
| Drill Bit Diameter — Threaded Rod | d _o | in. | 7⁄16 | 9⁄16 | 11/16 | 7/8 |
| Drill Bit Diameter — Rebar | do | in. | 1/2 | 5%8 | 3⁄4 | 7/ ₈ |
| Minimum Embedment Depth | h _{ef,min} | in. | 3 | 3 | 3 | 3 |

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

| Installation lafe metion | Cumbal | Ibiba | Nominal Rod Diameter / Rebar Size | | | | |
|-----------------------------------|---------------------|---------|-----------------------------------|-------------------|------|--|--|
| Installation Information | Symbol | Units - | 1⁄2" / #4 | % "/#5 | 7⁄8" | | |
| Drill Bit Diameter — Threaded Rod | d _o | in. | 9⁄16 | 11/16 | 1 | | |
| Drill Bit Diameter — Rebar | do | in. | 5%8 | 3⁄4 | - | | |
| Minimum Embedment Depth | h _{ef,min} | in. | 3 | 3 | 3 | | |

SET-3G Epoxy Anchor Installation Information – Ungrouted CMU Construction

| h | Ormhal | 11-3- | Nominal Rod Diameter | | r |
|--------------------------|---------------------|---------|----------------------|------|------|
| Installation Information | Symbol | Units – | % " | 1⁄2" | %" |
| Drill Bit Diameter | d _o | in. | 9/16 | 3⁄4 | 7/8 |
| Embedment Depth | h _{ef,min} | in. | 31⁄2 | 31⁄2 | 31⁄2 |

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

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