

G5 Adhesive

2006 IBC
Compliant
ICC-ES Report
No. 1137



High Strength Epoxy tested in accordance to ICC-ES AC308

The epoxy resin and hardener are completely mixed as they are dispensed from the dual cartridge through a static mixing nozzle, directly into the anchor hole. G5 can be used with threaded rod or rebar.

Compliant with 2003 IBC & 2006 IBC. Category 1 performance rating. One bond strength — no load reduction factors (Φ) required for installation conditions such as dry, water-saturated, water-filled, underwater, and submerged applications.



ADVANTAGES

FORMULATED FOR HOT OR WARM WEATHER

- Fire rated: tested up to 4hrs FRP
- High strength Epoxy
- 15 minute nozzle life at 70° degrees F.



International Standard Fire Resistance Performance

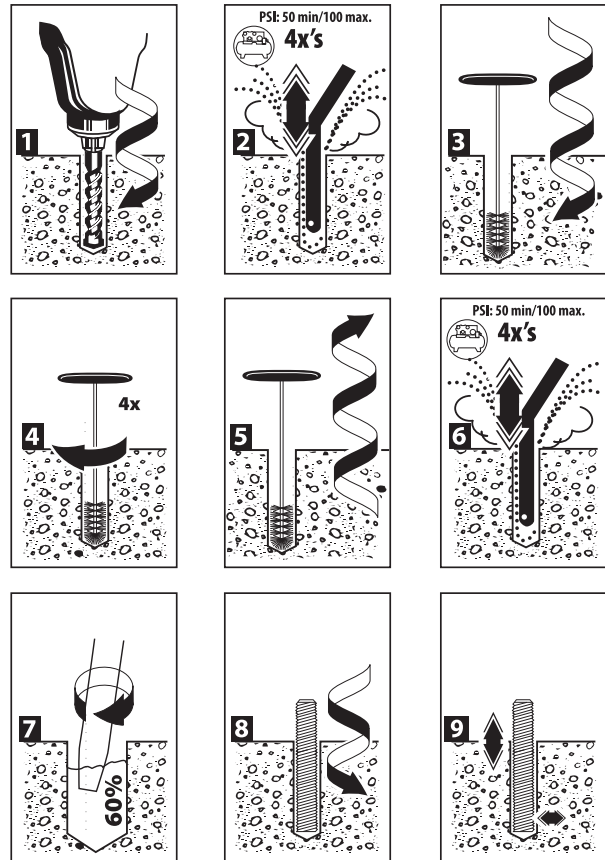
NON-OFFENSIVE ODOR

- Virtually odorless, can be used indoors

Curing Times

BASE MATERIAL (F°/C°)	WORKING TIME	FULL CURE TIME
110°/ 43°	9 minutes	24 hours
90°/ 32°	9 minutes	24 hours
70°/ 20°	15 minutes	24 hours
50°/ 10°	15 minutes	24 hours

INSTALLATION STEPS



*For ICC-ES cleaning method, please go online to www.icc-es.org or www.itwredhead.com.

APPROVALS/LISTINGS

Meets ASTM C881-02; Type IV; Grade 3; Class A, B, and C; with the exception of gel time and tensile strength
ICC Evaluation Service, Inc.— No. ESR 1137



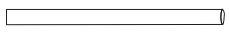
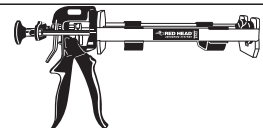
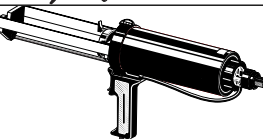
DOT Approvals

Miami-Dade County # 04-0405.01

Florida Building Code Approved

Patent No. 6,874,661

G5-22 FL. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX/BAG QTY	CARTON QTY
 G5-22	G5 Adhesive, 22 Fluid Oz. Cartridge	N/A	6
 E55	Mixing Nozzle for G5-22 and A7-28 Cartridge Nozzle diameter fits 3/8" to 5/8" holes (overall length of nozzle 14")	24	N/A
 E25-6	6-Foot Straight Plastic Extension Tubing (can be cut to proper size) (.39 in I.D. x .43 in. O.D.)	6	N/A
 E102	Hand Dispenser for G5-22 Cartridges — Dispenses both 18 oz. and 22 oz. Cartridges	1	1
 E202	Pneumatic Tool for G5-22 Cartridges	1	1

Plunger Repair Kit
 Available for E102 Dispenser
Part No. E102RKIT



ESTIMATING TABLE

G5 Number of Anchoring Installations Per Cartridge* 22 Fluid Ounce Cartridge Using Reinforcing Bar with G5 Adhesive in Concrete

REBAR	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES (mm)														
		1 (25.4)	2 (50.8)	3 (76.2)	4 (101.6)	5 (127.0)	6 (152.4)	7 (177.8)	8 (203.2)	9 (228.6)	10 (254.0)	11 (279.4)	12 (304.8)	13 (330.2)	14 (355.6)	15 (381.0)
# 3	1/2	388.9	194.5	129.6	97.2	77.8	64.8	55.6	48.6	43.2	38.9	35.4	32.4	29.9	27.8	25.9
# 4	5/8	293.8	146.9	97.9	73.5	58.5	49.0	42.0	36.7	32.6	29.4	26.7	24.5	22.6	21.0	19.6
# 5	3/4	225.4	112.7	75.1	56.3	45.1	37.6	32.2	28.2	25.0	22.5	20.5	18.8	17.3	16.1	15.0
# 6	7/8	182.0	91.0	60.7	45.5	36.4	30.3	26.0	22.7	20.2	18.2	16.5	15.2	14.0	13.0	12.1
# 7	1-1/8	87.2	43.6	29.1	21.8	17.4	14.5	12.5	10.9	9.7	8.7	7.9	7.3	6.7	6.2	5.8
# 8	1-1/4	77.6	38.8	25.9	19.4	15.5	12.9	11.1	9.7	8.6	7.8	7.1	6.5	6.0	5.5	5.2
# 9	1-3/8	81.0	40.5	27.0	20.2	16.2	13.5	11.6	10.1	9.0	8.1	7.4	6.7	6.2	5.8	5.4
# 10	1-1/2	66.2	33.1	22.1	16.6	13.2	11.0	9.5	8.3	7.4	6.6	6.0	5.5	5.1	4.7	4.4
# 11	1-3/4	40.5	20.2	13.5	10.1	8.1	6.7	5.8	5.1	4.5	4.0	3.7	3.4	3.1	2.9	2.7

ESTIMATING TABLE

CLAMPING FORCE PROVIDED ON PAGE 26

G5 Number of Anchoring Installations Per Cartridge* 22 Fluid Ounce Cartridge Using Threaded Rod with G5 Adhesive in Concrete

ROD In. (mm)	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES (mm)														
		1 (25.4)	2 (50.8)	3 (76.2)	4 (101.6)	5 (127.0)	6 (152.4)	7 (177.8)	8 (203.2)	9 (228.6)	10 (254.0)	11 (279.4)	12 (304.8)	13 (330.2)	14 (355.6)	15 (381.0)
1/4 (6.4)	5/16	721.2	360.6	240.4	180.3	144.2	120.2	103.0	90.2	80.1	72.1	65.6	60.1	55.5	51.5	48.1
3/8 (9.5)	7/16	417.6	208.8	139.2	104.4	83.5	69.6	59.7	52.2	46.4	41.8	38.0	34.8	32.1	29.8	27.8
1/2 (12.7)	9/16	300.5	150.3	100.2	75.1	60.1	50.1	42.9	37.6	33.4	30.1	27.3	25.0	23.1	21.5	20.0
5/8 (15.9)	3/4	153.8	76.9	51.3	38.4	30.8	25.6	22.0	19.2	17.1	15.4	14.0	12.8	11.8	11.0	10.3
3/4 (19.1)	7/8	121.7	60.8	40.6	30.4	24.3	20.3	17.4	15.2	13.5	12.2	11.1	10.1	9.4	8.7	8.1
7/8 (22.2)	1	100.9	50.5	33.6	25.2	20.2	16.8	14.4	12.6	11.2	10.1	9.2	8.4	7.8	7.2	6.7
1 (25.4)	1-1/8	83.0	41.5	27.7	20.7	16.6	13.8	11.9	10.4	9.2	8.3	7.5	6.9	6.4	5.9	5.5
1-1/4 (31.8)	1-3/8	62.8	31.4	20.9	15.7	12.6	10.5	9.0	7.8	7.0	6.3	5.7	5.2	4.8	4.5	4.2

* The number of anchoring installations is based upon calculations of hole volumes using ANSI tolerance carbide tipped drill bits, the nominal areas of the reinforcing bars and the stress areas of the threaded rods. These estimates do not account for waste.
 * Oversized holes acceptable but volume of adhesive will increase.

PACKAGING

1. Disposable, self-contained 22 ounce cartridge system capable of dispensing both epoxy components in the proper mixing ratio
2. Epoxy components dispensed through a static mixing nozzle that thoroughly mixes the material and places the epoxy at the base of the pre-drilled hole
3. Cartridge markings: Include manufacturer's name, batch number and best-used-by date, mix ratio by volume, ANSI hazard classification, and appropriate ANSI handling precautions

PERFORMANCE TABLE

 DRILL HOLE DIAMETERS
 PROVIDED ON PAGE 25

G5 Epoxy Adhesive

Average Ultimate Tension and Shear Loads^{1,2,3} for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	MAX. CLAMPING FORCE AFTER PROPER CURE Ft.-Lbs. (Nm)	EMBEDMENT CONCRETE In. (mm)	2000 PSI (13.8 MPa) CONCRETE		4000 PSI (27.6 MPa) CONCRETE	
			ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)	ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)
3/8 (9.5)	9 (12.2)	1-1/2 (38.1)	--	--	--	--
		3-3/8 (85.7)	5,060 (22.5)	6,227 (27.7)	8,396 (37.3)	6,227 (27.7)
		4-1/2 (114.3)	6,465 (28.8)	6,227 (27.7)	10,490 (46.7)	6,227 (27.7)
1/2 (12.7)	16 (21.6)	2 (50.8)	--	--	--	--
		4-1/2 (114.3)	10,484 (46.6)	12,016 (53.5)	13,476 (59.9)	12,016 (53.5)
		6 (152.4)	12,392 (55.1)	12,016 (53.5)	19,166 (85.3)	12,016 (53.5)
		7-1/2 (190.5)	--	--	12,016 (53.5)	20,572 (91.5)
5/8 (15.9)	47 (63.5)	2-1/2 (63.5)	--	--	--	--
		5-5/8 (142.9)	14,634 (65.1)	17,547 (78.1)	20,880 (92.9)	17,547 (78.1)
		7-1/2 (190.5)	20,182 (89.8)	17,547 (78.1)	27,939 (124.3)	17,547 (78.1)
		9-3/8 (238.1)	--	--	17,547 (78.1)	32,249 (143.5)
3/4 (19.1)	90 (121.5)	3 (76.2)	--	--	--	--
		6-3/4 (171.5)	18,966 (84.4)	24,918 (110.8)	29,019 (129.1)	24,918 (110.8)
		9 (228.6)	25,988 (115.6)	24,918 (110.8)	43,812 (194.9)	24,918 (110.8)
		11-1/4 (285.8)	--	--	24,918 (110.8)	47,927 (213.2)
1 (25.4)	276 (372.6)	4 (101.6)	--	--	--	--
		9 (228.6)	43,804 (194.9)	43,648 (194.2)	53,531 (238.1)	43,648 (194.2)
		12 (304.8)	45,351 (201.6)	43,648 (194.2)	64,022 (284.8)	43,648 (194.2)
		15 (381.0)	--	--	43,648 (194.2)	82,547 (367.2)

1 Allowable working loads for the single installations under static loading should not exceed 25% (an industry standard) capacity or the allowable load of the anchor rod.

2 Ultimate load values in 2000 and 4000 psi stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on the use of high strength threaded rod (ASTM A193 Gr. B7). The use of lower strength rods will result in lower ultimate tension and shear loads.

3 Linear interpolation may be used for intermediate spacing and edge distances.

PERFORMANCE TABLE

DRILL HOLE DIAMETERS
PROVIDED ON PAGE 25

G5 Epoxy Adhesive

Allowable Tension Loads^{1,2} for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	MIN. EMBEDMENT DEPTH In. (mm)	ALLOWABLE TENSION LOAD BASED ON EPOXY BOND STRENGTH		ALLOWABLE TENSION LOAD BASED ON STEEL STRENGTH		
		2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
3/8 (9.5)	3-3/8 (85.7)	1,265 (5.6)	2,092 (9.3)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
	4-1/2 (114.3)	1,616 (7.2)	2,622 (11.7)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
1/2 (12.7)	4-1/2 (114.3)	3,004 (13.4)	3,369 (15.0)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
	6 (152.4)	3,098 (13.8)	4,791 (21.3)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
5/8 (15.9)	5-5/8 (142.9)	3,659 (16.3)	5,220 (23.2)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
	7-1/2 (190.5)	5,046 (22.4)	6,985 (31.1)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
3/4 (19.1)	6-3/4 (171.5)	4,742 (21.1)	7,255 (32.3)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
	9 (228.6)	6,497 (28.9)	10,057 (44.7)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
1 (25.4)	9 (228.6)	10,951 (48.7)	11,209 (49.9)	15,180 (67.5)	31,620 (140.6)	26,560 (118.1)
	12 (304.8)	11,338 (50.4)	15,923 (70.8)	15,180 (67.5)	31,620 (140.6)	26,560 (118.1)

1 Use lower value of either bond or steel strength for allowable tensile load.

2 Linear interpolation may be used for intermediate spacing and edge distances.

PERFORMANCE TABLE

DRILL HOLE DIAMETERS
PROVIDED ON PAGE 25

G5 Epoxy Adhesive

Allowable Shear Loads^{1,2} for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	MIN. EMBEDMENT DEPTH In. (mm)	ALLOWABLE SHEAR LOAD BASED ON CONCRETE STRENGTH		ALLOWABLE SHEAR LOAD BASED ON STEEL STRENGTH		
		2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
3/8 (9.5)	3-3/8 (85.7)	1,557 (6.9)	1,557 (6.9)	1,040 (4.6)	2,170 (9.7)	1,995 (8.9)
1/2 (12.7)	4-1/2 (114.3)	3,004 (13.4)	3,004 (13.4)	1,870 (8.3)	3,895 (17.3)	3,585 (15.9)
5/8 (15.9)	5-5/8 (142.9)	4,387 (19.5)	4,387 (19.5)	2,940 (13.1)	6,125 (27.2)	5,635 (25.1)
3/4 (19.1)	6-3/4 (171.5)	6,230 (27.7)	6,230 (27.7)	4,250 (18.9)	8,855 (39.4)	7,440 (33.1)
1 (25.4)	9 (228.6)	10,912 (48.5)	10,912 (48.5)	7,590 (33.8)	15,810 (70.3)	13,285 (59.1)

1 Use lower value of either concrete or steel strength for allowable shear load.

2 Linear interpolation may be used for intermediate spacing and edge distances.

Combined Tension and Shear Loading— for G5 Adhesive Anchors

Allowable loads for anchors under tension and shear loading at the same time (combined loading) will be lower than the allowable loads for anchors subjected to 100% tension or 100% shear. Use the following equation to evaluate anchors in combined loading conditions:

$$\left(\frac{N_a}{N_s}\right) + \left(\frac{V_a}{V_s}\right) \leq 1$$

N_a = Applied Service Tension Load

V_a = Applied Service Shear Load

N_s = Allowable Tension Load

V_s = Allowable Shear Load

PERFORMANCE TABLE

 DRILL HOLE DIAMETERS
 PROVIDED ON PAGE 25

**G5
Epoxy Adhesive**
Average Ultimate Tension Loads^{1,2,3} for Reinforcing Bar Installed in Solid Concrete

REINFORCING BAR In. (mm)	EMBEDMENT IN CONCRETE In. (mm)	2000 PSI (13.8 MPa) IN CONCRETE ULTIMATE TENSION Lbs. (kN)	4000 PSI (27.6 MPa) IN CONCRETE ULTIMATE TENSION Lbs. (kN)	ULTIMATE TENSILE AND YIELD STRENGTH GRADE 60 REBAR	
				MINIMUM YIELD STRENGTH Lbs. (kN)	MINIMUM ULTIMATE TENSILE STRENGTH Lbs. (kN)
# 3 (9.5)	3-3/8 (85.7)	7,480 (33.3)	8,090 (35.9)	6,600 (29.4)	9,900 (44.0)
	4-1/2 (114.3)	-- --	10,488 (46.6)	6,600 (29.4)	9,900 (44.0)
# 4 (12.7)	4-1/2 (114.3)	-- --	14,471 (64.4)	12,000 (53.4)	18,000 (80.1)
	6 (152.4)	11,235 (50.0)	20,396 (90.7)	12,000 (53.4)	18,000 (80.1)
# 5 (15.9)	5-5/8 (142.9)	-- --	21,273 (94.6)	18,600 (82.7)	27,900 (124.1)
	7-1/2 (190.5)	18,108 (80.6)	31,863 (141.7)	18,600 (82.7)	27,900 (124.1)
# 6 (19.1)	6-3/4 (171.5)	-- --	27,677 (123.1)	26,400 (117.4)	39,600 (176.2)
	9 (228.6)	29,338 (130.5)	47,879 (212.9)	26,400 (117.4)	39,600 (176.2)
# 7 (22.2)	7-7/8 (200.0)	-- --	43,905 (195.3)	36,000 (160.1)	54,000 (240.2)
	10-1/2 (266.7)	-- --	52,046 (231.5)	36,000 (160.1)	54,000 (240.2)
# 8 (25.4)	9 (228.6)	-- --	55,676 (247.7)	47,400 (210.9)	71,100 (316.3)
	12 (304.8)	48,000 (213.5)	77,358 (344.1)	47,400 (210.9)	71,100 (316.3)
# 9 (28.6)	10-1/8 (257.2)	-- --	62,443 (277.8)	60,000 (266.9)	90,000 (400.4)
	13-1/2 (342.9)	-- --	71,959 (320.1)	60,000 (266.9)	90,000 (400.4)
# 10 (31.8)	11-1/4 (285.8)	-- --	70,165 (312.1)	76,200 (339.0)	114,300 (508.5)
	15 (381.0)	-- --	78,545 (349.4)	76,200 (339.0)	114,300 (508.5)

- Allowable working loads for the single installations under static loading should not exceed 25% ultimate capacity or the allowable load of the anchor rod.
- Ultimate load values in 2000 and 4000 psi stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on the use of minimum Grade 60 reinforcing bar. The use of lower strength rods will result in lower ultimate tension and shear loads.
- SHEAR DATA: Provided the distance from the rebar to the edge of the concrete member exceeds 1.25 times the embedment depth of the rebar, calculate the ultimate shear load for the rebar anchorage as 60% of the ultimate tensile strength of the rebar.

**G5 Adhesive Edge/Spacing Distance Load Factor Summary
for Installation of Threaded Rod and Reinforcing Bar^{1,2}**

LOAD FACTOR	DISTANCE FROM EDGE OF CONCRETE
Critical Edge Distance—Tension	
100% Tension Load	→ 1.25 x Anchor Embedment
Minimum Edge Distance—Tension	
70% Tension Load	→ 0.50 x Anchor Embedment
Critical Edge Distance—Shear	
100% Shear Load	→ 1.25 x Anchor Embedment
Minimum Edge Distance—Shear	
30% Shear Load	→ 0.30 x Anchor Embedment
LOAD FACTOR	DISTANCE FROM ANOTHER ANCHOR
Critical Spacing—Tension	
100% Tension Load	→ 1.50 x Anchor Embedment
Minimum Spacing—Tension	
75% Tension Load	→ 0.75 x Anchor Embedment
Critical Spacing—Shear	
100% Shear Load	→ 1.50 x Anchor Embedment
Minimum Spacing—Shear	
30% Shear Load	→ 0.50 x Anchor Embedment

- Use linear interpolation for load factors at edge distances or spacing distances between critical and minimum.
- Anchors are affected by multiple combination of spacing and/or edge distance loading and direction of the loading. Use the product of tension and shear loading factors in design.

G5 Chemical Resistance

G5		HIGH	MEDIUM	LOW
Chemical Resistance		Anchors installed with G5 could be submerged in these materials.	Intermittent exposure or temporary submersion due to splash or spill.	Exposure of G5 should be limited to splash and spill exposure followed by immediate cleanup.
Xylene		✓		
Gasoline		✓		
20% Caustic (NaOH)		✓		
Fresh Water		✓		
Salt Water		✓		
10% Sulfuric Acid (H ₂ SO ₄)			✓	
3.5% Hydrochloric Acid (HCL)			✓	
9% Phosphoric Acid			✓	
Toluene			✓	
10% Nitric Acid			✓	
8.5% Ammonium Hydroxide			✓	
5% Bleach				✓
Acetone				✓
Glacial Acetic Acid				✓
Methanol				✓
Methylene Chloride				✓

Important Note: This chemical resistance table above only applies when G5 epoxy is used for installing anchors into concrete in a conventional manner with recommended hole sizes. Installation of the anchor must always be done in a drilled hole which is completely cleaned of all concrete dust and is dry. Exposure to solvents, chemical and water, as listed above, should occur only after the G5 epoxy has full cured.