



# **RS ANCHOR GEL**

Rapid Setting Epoxy Gel Adhesive

## **PRODUCT DESCRIPTION**

Five Star RS Anchor Gel is a rapid setting, two component, 100% solids structural epoxy for anchoring rods, bars and bolts in concrete, as well as filling cracks and setting ports for epoxy injection. Five Star RS Anchor Gel is a non-sag, moisture insensitive epoxy adhesive that can be used for both vertical and horizontal installations. This system offers chemical resistance, excellent adhesion and rapid strength gain. Five Star RS Anchor Gel meets the requirements of ASTM C 881 Types I and IV, Class B and C, Grade 3 and also meets USDA specifications for use in food processing areas.

## **ADVANTAGES**

- VOC compliant
- Excellent adhesion to masonry, concrete, wood, steel and most structural materials
- Fast strength gain
- Gel consistency ideal for vertical, overhead and non-mating surfaces
- Moisture insensitive, can be used in damp environments
- Convenient 1:1 mixing ratio
- Convenient cartridge and bulk packaging
- Low odor

## **USES**

- Sealing cracks and setting ports for pressure injection
- Structural crack repairs to 1/2 inch (12 mm width)
- Surface repair of non-moving cracks on new or existing structures
- Anchoring of bolts, dowels, pins and special fasteners
- A pick-proof sealant around windows, doors, lock-ups and inside correctional facilities
- General purpose, fast-setting structural adhesive

## **PACKAGING AND YIELD**

Five Star RS Anchor Gel is available in either 600 ml (22 fl. oz.) dual component cartridges yielding approximately 37 cubic inches of material, or in a one gallon ( 3.7 liter) unit yielding approximately 231 cubic inches of material.

## **SHELF LIFE**

One year in original unopened packaging when stored in dry conditions at 45°F - 90°F (5°C - 35°C).

<b>TYPICAL PROPERTIES AT 70°F (21°C)</b>	
<b>Color</b>	Gray
<b>Viscosity</b>	Gel
<b>Water Absorption, ASTM D 570</b>	0.29%
<b>Bond Strength, ASTM C 882</b>	
2 Day Cure	2900 psi (20.0 MPa)
14 Day Cure	3700 psi (25.5 MPa)
<b>Shrinkage, ASTM D 2566</b>	0.0009 in/in (mm/mm)
<b>Heat Deflection Temperature, ASTM D 648</b>	145°F (63°C)
<b>Compressive Properties, ASTM D 695</b>	
Compressive Strength	11,700 psi (80.7 MPa)
Compressive Modulus	3.20 x 10 <sup>5</sup> psi (2200 MPa)
<b>Elongation at Break, ASTM D 638</b>	1.0%
<b>Gel Time, ASTM C 881</b>	8 minutes

*The data shown above reflects typical results based on laboratory testing under controlled conditions. Reasonable variations from the data shown may result. Test methods are modified where applicable.*

## PLACEMENT GUIDELINES

- 1. SURFACE PREPARATION:** Surfaces must be clean and sound. For best results surfaces should be dry. Remove dust, laitance, grease, curing compounds, impregnations, waxes, foreign particles and disintegrated materials. Concrete may be sandblasted or prepared by other approved mechanical means. Steel should be sandblasted to a SSPC-SP6 commercial finish. For anchoring dowels, pins and bolts, drill hole into sound concrete leaving a clean, rough finish on sides of hole. Hole diameter and embedment length are determined by diameter and strength of the anchor. Ensure that hole is clean of all loose material and dust by use of a stiff bristle brush. Any contamination must be completely removed by appropriate means, including sandblasting or other mechanical abrasion. Blow out all surfaces using oil free compressed air.
- 2. DUAL CARTRIDGE MIXING:** Condition cartridges to between 70°F and 80°F (21°C to 26°C). Remove plugs from cartridge ends. Slide retaining nut over static mixer and secure static mixer to cartridge firmly. For easier gunning, static mixer tip may be cut off to second or third notch. Place cartridge into gun and extrude epoxy until a uniform color is achieved. Discard material that is not uniform in color.
- 3. BULK MIXING:** Material should be preconditioned to between 70°F and 80°F (21°C and 26°C) before using. Proportion equal parts by volume of Component A and Component B. Mix thoroughly by hand with a paddle or with a slow speed drill and paddle mixer to avoid air entrapment. Do not mix more material than can be placed in 5 minutes at 70°F (21°C).
- 4. METHODS OF PLACEMENT:**

**Structural adhesive** - Apply Five Star RS Anchor Gel to the mating or non-mating prepared substrates. Work into the substrates for positive adhesion. Secure the bonded unit firmly into place until the adhesion has cured. Glue line should not exceed 1/4 inch (6 mm).

**To seal cracks for injection grouting** - Place the mixed material over the cracks to be pressure injected and around each injection port, extending 1/2 inch (12 mm) wider than crack width and 1/8 - 1/16 inch (2 - 4 mm) thick. Allow sufficient time to set before pressure injecting. Be sure not to clog ports with adhesive.

**Pick-proof sealant** - Use proper equipment or cartridge to dispense an appropriate size bead around area to be sealed. Tool material into joint to create seal.

**Anchoring (dual cartridge system)** - Dispense and waste gel until a uniform gray color is discharged. Insert tip of mixer to back of hole and partially fill with adhesive to prevent air pockets. For best results, coat anchor with adhesive, insert and rotate slowly into hole. In colder temperatures, carefully heat hole with torch prior to filling with gel. To obtain full strengths, the installation should be kept at a minimum of 50°F (10°C ) until fully cured.
- 5. CLEAN-UP:** Use an appropriate solvent to clean uncured material. Cured material can only be removed mechanically.

**NOTE: PRIOR TO APPLICATION, READ ALL PRODUCT PACKAGING THOROUGHLY.** For more detailed placement procedures, refer to Design-A-Spec™ installation guidelines or call the Five Star Engineering and Technical Service Center at (800) 243-2206.

## CONSIDERATIONS

- Minimum age of concrete must be 21 to 28 days, depending on curing and drying conditions prior to application.
- Minimum surface temperature 40°F (5°C) and rising. Low temperatures adversely affect flowability and strength gain.
- Cold temperatures lengthen gel time, hot temperatures decrease gel time.
- For cracks over 1/2 inch (12 mm) call the Five Star Engineering and Technical Service Center at (800) 243-2206.
- Do not thin with solvents.
- Do not use for sealing moving or leaking cracks.
- Material is a vapor barrier after cure.

## CAUTION

Irritant, toxic, strong sensitizer. Contains epoxy resin and amine. This product may cause skin irritation. Do not inhale vapors. Provide adequate ventilation. Protect against contact with skin and eyes. Wear rubber gloves, long sleeve shirt, goggles with side shields. In case of contact with eyes, flush repeatedly with water and contact a physician. Areas of skin contact should be promptly washed with soap and water. Do not take internally. Keep product out of reach of children. **PRIOR TO USE, REFER TO MATERIAL SAFETY DATA SHEET.**

For worldwide availability, additional product information and technical support, contact your local Five Star distributor, local sales representative, or you may call Five Star's Engineering and Technical Service Center at (800) 243-2206.

**WARRANTY:** "FIVE STAR PRODUCTS INC. (FSP) PRODUCTS ARE MANUFACTURED TO BE FREE OF MANUFACTURING DEFECTS AND TO MEET FSP'S CURRENT PUBLISHED PHYSICAL PROPERTIES WHEN APPLIED IN ACCORDANCE WITH FSP'S DIRECTIONS AND TESTED IN ACCORDANCE WITH ASTM AND FSP STANDARDS. HOWEVER, SHOULD THERE BE DEFECTS OF MANUFACTURING OF ANY KIND, THE SOLE RIGHT OF THE USER WILL BE TO RETURN ALL MATERIALS ALLEGED TO BE DEFECTIVE, FREIGHT PREPAID TO FSP, FOR REPLACEMENT. THERE ARE NO OTHER WARRANTIES BY FSP OF ANY NATURE WHATSOEVER, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IN CONNECTION WITH THIS PRODUCT. FSP SHALL NOT BE LIABLE FOR DAMAGES OF ANY SORT, INCLUDING PUNITIVE, ACTUAL, REMOTE, OR CONSEQUENTIAL DAMAGES, RESULTING FROM ANY CLAIMS OF BREACH OF CONTRACT, BREACH OF ANY WARRANTY, WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR FROM ANY OTHER CAUSE WHATSOEVER. FSP SHALL ALSO NOT BE RESPONSIBLE FOR USE OF THIS PRODUCT IN A MANNER TO INFRINGE ON ANY PATENT HELD BY OTHERS."

**Five Star Products, Inc.**  
**Corporate Headquarters**  
750 Commerce Drive  
Fairfield, CT 06825 USA  
Tel: 203-336-7900 • Fax: 203-336-7930  
<http://www.fivestarprouducts.com>



©2009 Five Star® Products, Inc. (09/22/09)  
American Owned & Operated



# RS ANCHOR GEL

**Table 1: TENSILE LOAD (LB)  
THREADED ROD INSTALLED IN NORMAL WEIGHT CONCRETE 1,2,3,4,5,6**

Anchor Diameter (inches)	Bit Diameter (inches)	Embedment (inches)	Ultimate Bond Strength (lb) Concrete Strength, f'c				Allowable Steel Load (lb)		
			2500 psi	3000 psi	4000 psi	5500 psi	A36 A307	A193 B7	300 Series Stainless
3/8	7/16	1 1/16	—	5450	—	—	2100	4550	3630
3/8	7/16	3 3/8	7300	—	8250	9200	2110	4550	3630
3/8	9/16	3 3/8	9560	—	—	—	2110	4550	3630
3/8	7/16	5 5/8	10980	—	11360	11740	2110	4550	3630
1/2	9/16	2 1/4	—	7495	—	—	3750	8100	6470
1/2	9/16	4 1/2	10540	—	11730	12920	3750	8100	6470
1/2	11/16	4 1/2	14640	—	—	—	3750	8100	6470
1/2	9/16	7 1/2	14660	—	17010	19360	3750	8100	6470
5/8	3/4	2 13/16	—	13665	—	—	5870	12655	10130
5/8	3/4	5 5/8	14800	—	18870	22940	5870	12655	10130
5/8	7/8	5 5/8	23340	—	—	—	5870	12655	10130
5/8	3/4	9 3/8	21560	—	26260	30960	5870	12655	10130
3/4	7/8	3 3/8	—	17825	—	—	8460	18220	12400
3/4	7/8	6 3/4	22380	—	25870	29360	8460	18220	12400
3/4	1	6 3/4	29850	—	—	—	8460	18220	12400
3/4	7/8	11 1/4	30320	—	34340	38360	8460	18220	12400
7/8	1	3 15/16	—	21390	—	—	11500	24800	16860
7/8	1	7 7/8	43280	—	—	—	11500	24800	16860
1	1 1/8	4 1/2	—	27419	—	—	15020	32400	22020
1	1 1/8	9	55650	—	—	—	15020	32400	22020

**Table 2: SHEAR AND TENSILE LOADS (LB) FOR  
REINFORCING STEEL INSTALLED IN NORMAL WEIGHT CONCRETE 1,2,3,4,5,6**

Anchor Diameter (inches)	Bit Diameter (inches)	Embedment (inches)	Ultimate Bond Strength (lbs) Concrete Strength, f'c			Allowable Steel Load Tensile or Shear (lbs)	
			2500 psi	4000 psi	5500 psi	Grade 40	Grade 60
#3	1/2	3 3/8	7080	9050	11020	2200	2640
#4	5/8	4 1/2	12300	14730	17160	4000	4800
#5	3/4	5 5/8	16000	18810	21620	6200	7440
#6	1	6 3/4	39035			8800	10560
#7	1 1/8	7 7/8	36740			12000	14400
#8	1 1/4	9	42670			15600	18720

1. The tabulated shear and tensile loads are for anchors installed in normal weight concrete having reached the designated ultimate compressive strength at the time of installation. Linear interpolation may be used for concrete strengths between those listed.
2. Spacing and edge distance shall be in accordance with Table number 4.
3. For other steel grades, compare allowable tensile load with ultimate bond strength and use the lesser. Allowable stainless steel loads are based on ASTM F 593, cold weather condition strength.
4. Allowable loads may be increased by 33-1/3% for short term loading due to earthquakes or wind.
5. 2000 psi ultimate load were determined in accordance with Section 7.5 of ICBO-ES AC-58, by multiplying 2500 psi test results by a reduction factor of  $(2000 \div 2500)^{1/2} = 0.894$ .
6. Five Star RS Anchor Gel is recommended for installation in damp holes, for use in locations subject to severe exterior weathering conditions and for resisting tensile and shear loads due to earthquake and wind.



**Table 3: ALLOWABLE SHEAR LOAD FOR  
THREADED ROD INSTALLED IN MINIMUM 2000 PSI CONCRETE** <sup>1,2,3,4,5</sup>

Anchor Diameter (inches)	Bit Diameter (inches)	Embedment (inches)	Allowable Steel Load (lb)		
			A 36 A 307	1 193 B 7	300 Series Stainless
3/8	7/16	3 3/8	1080	2350	1870
1/2	9/16	4 1/2	1930	4170	3330
5/8	3/4	5 5/8	3030	6520	5220
3/4	7/8	6 3/4	4360	9390	—
7/8	1	7 7/8	5930	12780	8680
1	1 1/8	9	7740	16690	11340
1 1/4	1 3/8	11 1/4	12100	26070	17730

1. The shear and tensile loads are for anchors installed in normal weight concrete having reached a minimum ultimate compressive strength  $f'c$  of 13.79 MPa at the time of installation.
2. Spacing and edge distance shall be in accordance with Table number 4.
3. Allowable stainless steel loads are based on ASTM F 593, cold worked condition strength.
4. Allowable loads may be increased by 33-1/3% for short term loading due to earthquakes or wind. A 36 & A 307 values must be used instead of listed loads for higher strength steels for these conditions.
5. Five Star RS Anchor Gel is recommended for installation in damp holes, for use in locations subject to severe exterior weathering conditions and for resisting tensile and shear loads due to earthquake and wind.

**Table 4: ALLOWABLE SPACING AND EDGE DISTANCE (D = ANCHOR DIAMETER)**

	DISTANCE FOR FULL ANCHOR CAPACITY (Critical Distance) <sup>1</sup>	DISTANCE FOR REDUCED ANCHOR CAPACITY	REDUCTION FACTOR <sup>2</sup>
Spacing between Anchors	24 D	8D	0.90
Edge Distance:			
Tension Loads	12 D	4D	0.70
Shear Loads — Threaded Rod	12 D	4D	0.21
Shear Loads — Smooth Dowels	12D	4D	0.21
Shear Loads — Rebar	16 D	4D	0.15

1. The minimum distances required to obtain the load values in table numbers 1, 2 & 3.
2. Load values in the tables are multiplied by the reduction factor when anchors are installed at the reduced distances. Use linear interpolation for spacing and edge distances between listed values.

**Example 1:** 2,500 psi concrete, 7/8 inch diameter hole, A193 B-7 threaded rod:

Anchor Diameter (inches)	Embedment Depth (inches)	Edge Distance (inches)	Ultimate Load
5/8	5 5/8	12D (7 1/2)	23,340 lb (from Table number 1)
5/8	5 5/8	4D (2 1/2)	1. 16,340 lb (23,340) from table number 1 x 0.70 reduction factor from table number 4)
			2. $16,340 \div 4$ (safety factor) = 4085 lb, divide Calculated ultimate load by safety factor (typically 4). Compare this number to the allowable steel load and use the lower number.