



# FIVE STAR STRUCTURAL CONCRETE® ES

Fast, High Strength Permanent Repair

## PRODUCT DESCRIPTION

Five Star Structural Concrete® ES (Extended Set) is a high strength, single component, permanent concrete repair material which provides a 45 minute working time. The extended set facilitates deep/large volume pours up to six cubic yards in a single lift. Five Star Structural Concrete ES produces a repair which is dimensionally stable, develops an integral bond to the existing concrete, and restores structural integrity within hours of placement. Resistant to many chemicals, Five Star Structural Concrete ES is very effective in equipment foundation rebuilds, and mass pours and can be coated in less than 24 hours.

## ADVANTAGES

- 45 minute working time
- One component
- Deep, large volume pours up to six cubic yards
- High six hour strengths
- Coarse aggregate extension up to 100%
- Excellent Sulfate Resistance
- Provides permanent concrete and equipment/ machinery foundation repair
- Can be coated in under 24 hours
- Facilitates equipment rebuilds in under 24 hours
- Pumpable
- High bond strength

## USES

- Deep, large volume repair of concrete structures and machinery foundations
- Concrete floor toppings and overlays
- Hot weather concrete repair
- Heavy industrial repairs and retrofits

## TECHNICAL SUPPORT

Five Star Products maintains the industry's foremost Technical Support Group:

- Over 30 years of experience in concrete repair
- Technical Center staffed with experienced engineers available for consultation
- Design-A-Spec™ for engineering specification assistance
- Experienced representatives for field service
- Corporate research laboratory available to customize products for unique applications

## PACKAGING AND YIELD

Five Star Structural Concrete ES is packaged in heavy-duty polyethylene lined bags or plastic pails each containing 50 lb (22.7 kg) yielding 0.42 cubic feet (11.9 liters) at maximum water or 0.60 cubic feet (17.0 liters) with a 60% extension of 3/8" pea gravel. Also available in 3000 lb (1360 kg) bulk bags.

## SHELF LIFE

One year in bags and two years in pails in original unopened packaging when stored in dry conditions. Higher humidity will reduce shelf life.

TYPICAL PROPERTIES AT 73°F (23°C)	
Working Time	45 Minutes
Compressive Strength, ASTM C 109	
6 Hours	3000 psi (20.7 MPa)
1 Day	4500 psi (31.0 MPa)
7 Days	6000 psi (41.4 MPa)
Bond Strength, ASTM C 882	
1 Day	2000 psi (13.8 MPa)
7 Days	2500 psi (17.3 MPa)
Length Change, extended with pea gravel, ASTM C 157	
28 Days Wet	+0.03%
28 Days Dry	-0.05%
Thermal Coefficient of Expansion, ASTM C 531	5.0 x 10 <sup>-6</sup> in/in/°F (9.0 x 10 <sup>-6</sup> mm/mm/°C)
Chloride Ion Permeability, ASTM C 1202	
3 Days	Very Low ( <1000 Coulombs)
28 Days	Very Low ( <1000 Coulombs)

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



## PLACEMENT GUIDELINES

1. **SURFACE PREPARATION:** All surfaces in contact with Five Star Structural Concrete® ES shall be free of oil, grease, laitance, and other contaminants. Concrete must be clean, sound and rough to ensure a good bond. Remove all oxidation from exposed reinforcing steel and for additional protection coat reinforcing steel with Five Star® AC Coat. Featheredging is not desirable for structural repairs. A perimeter edge and minimum depth of 1/4 inch (6 mm) should be provided for a durable repair. Soak concrete surfaces prior to application with liberal quantities of potable water, leaving the concrete saturated and free of standing water. Surfaces shall be conditioned to between 35°F and 90°F (2°C and 32°C) at the time of placement.
2. **MIXING:** Wet down mortar mixer before using and drain any excess water. With the mixer running, add approximately 90% of premeasured potable water to the mixer. While mixing, slowly add Five Star Structural Concrete ES and mix to a uniform consistency. To achieve desired consistency, add remaining water as necessary. Do not exceed maximum water as stated on product packaging or in an amount that will cause segregation. Mix thoroughly for approximately five minutes. Do not mix more material than can be placed within 45 minutes. Addition of coarse aggregate should be used for pours greater than two inches (50 mm) in depth. Add clean damp coarse aggregate meeting ASTM C 33 before final water adjustment.
3. **PLACEMENT PROCEDURES:** Firmly work Five Star Structural Concrete ES into substrate and place full depth from one side of the repair to the other. Where this is not practical, placement must be continuous to prevent cold joints between pours. Finish as necessary. For pumping procedures, contact the Five Star Products Technical Center.  
**SPECIAL CONDITIONS:** For use in cold temperatures, Five Star Structural Concrete ES must be maintained at a temperature of at least 35°F (2°C). Protect from freezing until a compressive strength of at least 1000 psi (6.9 MPa) is obtained. Faster strength gain will occur when the Five Star Structural Concrete ES, mixing water and coarse aggregate have been conditioned to a higher temperature prior to placement. In hot temperatures, Five Star Structural Concrete ES should be kept as cool as possible, but not exceeding 90°F (32°C). Ice cold water should be used for mixing to help maintain sufficient working time.
4. **POST-PLACEMENT PROCEDURES:** Five Star Structural Concrete ES shall be kept wet for one to 24 hours, depending on the volume, depth and temperature of the placement. Wet curing shall begin as soon as the material is hard.  
**NOTE: PRIOR TO APPLICATION, READ ALL PRODUCT PACKAGING THOROUGHLY.** For more detailed placement procedures, refer to Design-A-Spec™ or call the Five Star Products Technical Center at (800) 243-2206.

## LIMITATIONS

- Never exceed the maximum water content as stated on the package or add an amount that will cause segregation.
- Temperature of surfaces must be between 35°F and 90°F (2°C and 32°C) at time of placement. For cold and hot weather placement, refer to Design-A-Spec™.
- Substrate shall be free of frost and ice.
- Repair material shall be protected from freezing until it reaches 1000 psi (6.9 MPa).
- For pours exceeding six cubic yards, contact the Five Star Products Technical Center.
- Not to be used for grouting beneath baseplates.
- Placement shall be continuous to avoid cold joints.
- When capping Five Star Structural Concrete ES with either cement or epoxy grout, surface temperature shall have cooled down to 90°F (32°C) maximum.

## CAUTION

Contains cementitious material and crystalline free silica. International Agency for Research on Cancer has evaluated that there is sufficient evidence for the carcinogenicity of inhaled crystalline silica to humans. Take appropriate measures to avoid breathing dust. Avoid contact with eyes and contact with skin. In case of contact with eyes, immediately flush with plenty of water for at least 15 minutes. Immediately call a physician. Wash skin thoroughly after handling. 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 Technical Center at (800) 243-2206.



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

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