



REMR MATERIAL DATA SHEET CM-PC-1.22  
 CONCRETE PATCHING MATERIAL: FIVE STAR  
 HIGHWAY PATCH

## 1. NAME

Five Star Highway Patch

can be opened to highway traffic in  
 45 min.

## 2. MANUFACTURER

U. S. Grout Corporation  
 401 Stillson Road  
 Fairfield, CT 06430  
 Telephone: 203-336-7900

## 4. APPLICABLE SPECIFICATIONS

ASTM C 928-80, "Standard Specification  
 for Packaged, Dry, Rapid-Hardening  
 Cementitious Materials for Concrete  
 Repairs."

## 3. DESCRIPTION

Five Star Highway Patch is a patented,  
 cementitious mixture. It is a rapid-  
 setting, high-strength product which  
 is salt, oil, and gas resistant and

## 5. USES

Five Star Highway Patch provides very  
 rapid, permanent patching of concrete  
 highways and bridges, parking decks  
 and ramps, airport runways, floors and  
 joints, steps and sidewalks, and piers  
 and seawalls.

## 6. MANUFACTURER'S TECHNICAL DATA

<u>Properties</u>	<u>Time</u>	<u>Neat</u>	<u>60% Extension</u>
Compressive strength, psi ASTM C 109*	1 hr	2,500	2000
	3 hr	4,500	4000
	1 day	6,500	6000
	7 days	8,000	7500
Bond strength, psi ASTM C 882*	1 day	2,500	
	7 days	3,500	
Length change, percent ASTM C 157*	28 days wet	0.00	
	28 days dry	0.00	
Flexural strength, psi ASTM C 78	1 day	1,100	
	7 days	1,300	
Modulus of elasticity, psi ASTM C 469	1 day	$3.0 \times 10^6$	
	7 days	$3.5 \times 10^6$	

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<u>Properties</u>	<u>Time</u>	<u>Neat</u>	<u>60% Extension</u>
Freeze/Thaw resistance, ASTM C 666* (B)	300 cycles	96% durability	
Scaling resistance, ASTM C 672	50 cycles	0.1	
Set time, ASTM C 191	Initial	25 min	
	Final	35 min	
Yield per 50-lb bag	Neat	0.43 cu ft	
	60% extension	0.62 cu ft	

7. MANUFACTURER'S GUIDANCE FOR APPLICATION

Surface preparation: The existing concrete must be thoroughly cleaned of oil and any other deleterious substances. Remove all unsound or damaged concrete, leaving only sound, clean concrete exposed within the perimeter of a two-inch-minimum vertical saw cut. Remove all loose material by brushing, washing, and/or oil-free air jet. Then thoroughly saturate existing concrete to be patched with water. Remove standing water prior to patching.

Mixing: Five Star Highway Patch should be mixed in a mortar mixer. First wet the mixer; drain any excess water. Then, with the mixer running, add the minimum recommended water, followed by the Five Star Highway Patch and, if extending, the aggregate.

Amount of water required: Mixing time for the Five Star Highway Patch and water is 2-1/2 to 3 min per bag. For the maximum extension, 30 lb of 1/4- to 1/2-in. dry gravel, the mixing time is 2-3/4 to 3 min per bag. Mix from 2 to 5 min. Add more water only if

required. Do not exceed the maximum water. Do not mix more material than can be placed in 10 min. Five Star Highway Patch may be extended with clean, washed, 3/8-inch pea gravel or crushed stone. Do not extend with sand.

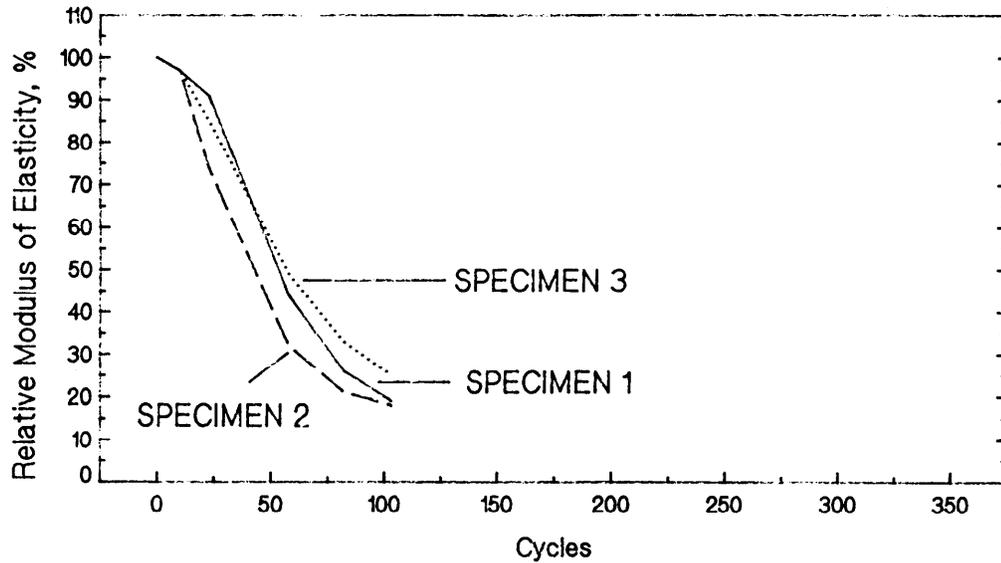
Placing: The product may be troweled or poured into the area to be patched. After being leveled, the patch can be broomed, brushed, or troweled to the desired finish. Do not place in lifts.

Cold and hot weather: When using the product at or near freezing temperatures, store it in as warm a place as possible. The patched area must be kept above 32° F until it has set. Summerset, a special retarder for the new patented cement, is recommended for extending the working time of Five Star Highway Patch in hot weather. For applications during extreme weather conditions, contact the Engineering and Technical Center of U.S. Highway Products.

Curing: As soon as the surface of the patch has hardened, flood it with sufficient water to keep the surface wet for at least 30 min.

8. CORPS OF ENGINEERS' EVALUATION

Rapid Freezing and Thawing, ASTM  
 C 666, Relative Dynamic Modulus of  
 Elasticity, %



Technical data:

<u>Performance Properties</u>	<u>Test Method</u>	<u>Results</u>
Compressive strength, psi	ASTM C 109	
	1 hr	910
	2 hr	2,880
	3 hr	3,680
	ASTM C 39	
	24 hr	3,820
Modulus of elasticity, psi	28 days	7,280
	ASTM C 469	
	24 hr	$4.27 \times 10^6$
Flexural strength, psi	28 days	$4.80 \times 10^6$
	ASTM C 78	
	3 hr	400
	24 hr	480
Bond to concrete, psi	28 days	1,170
	ASTM C 882	
	24 hr	2,120
	28 days	3,530

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<u>Performance Properties</u>	<u>Test Method</u>	<u>Results</u>
Shrinkage, percent	GR-83-10*	
	(unconfined condition) <sup>1</sup>	0.022
	(concrete patch) <sup>2</sup>	-0.008

\* Bureau of Reclamation Technical Report Standard.

<sup>1</sup> An exotherm of 24° F was reported on the shrinkage specimen having a mixture design of 50 lb of material, 25 lb of pea gravel, and 3 qt of water.

<sup>2</sup> An exotherm of 16° F was reported on the shrinkage specimen having a mixture design of 50 lb of material, 25 lb of pea gravel, and 3 qt of water.

## 9. ENVIRONMENTAL CONSIDERATIONS

Reasonable caution should guide the preparation, repair, and cleanup phases of activities involving potentially hazardous and toxic chemical substances. Manufacturer's recommendations to protect occupational health and environmental quality should be carefully followed. Material safety data sheets should be obtained from the manufacturers of such materials. In cases where the effects of a chemical substance on occupational health or environmental quality are unknown, chemical substances should be treated as potentially hazardous toxic materials.

## 10. AVAILABILITY AND COSTS

Availability: Five Star Highway Patch is manufactured throughout the United States and is available through a local Five Star dealer. For the nearest source, call 800-243-2206 or in CT 203-336-7900. For international availability, call International Construction Products Research at 203-336-7950.

Cost: The material sells for \$14 to \$15 per 50-lb bag.

## 11. TECHNICAL SERVICES

Call the manufacturer's home office for more technical information and help.