

USG DURACAL® BRAND CEMENT

Specially formulated above grade concrete patching material

- USG Duracal Cement sets in 20 to 35 minutes – and is strong enough to handle normal traffic one hour after set
- Ideal for pavement repairs on expressways, roads, ramps, bridges, streets, parking lots and commercial concrete floors
- Can be applied in a wide range of temperatures
- Stands up to freeze-thaw cycles, salt application and heavy traffic
- NTPEP-tested

DESCRIPTION

USG Duracal® Brand Cement is a specially formulated concrete patching material ideal for pavement repairs on expressways, roads, ramps and bridges and on interior and exterior parking lots and commercial concrete floors. It can be applied neat or extended (with aggregate and sand) and is strong enough to accept normal traffic just one hour after set. This durable cement is fast-setting and withstands freeze-thaw cycles, salt application and heavy traffic.

LIMITATIONS

1. Use above grade only.
2. Application, surface and slurry, must be at a minimum temperature of 32 °F (0 °C).
3. Consult a United States Gypsum Company representative or the structural design engineer on record for use in new structural construction.
4. Do not use in vertical applications.
5. Consult a United States Gypsum Company representative or call 800-874-4968 for applications not covered in this submittal.

SURFACE PREPARATION

Follow local and state recommendations and regulations to create and secure a safe workplace environment.

Consult *ICRI Guideline No. 310.2 Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlay* for surface preparation equipment and methods. Mark off damaged areas and make a 2 in. (51 mm) vertical cut with a concrete saw or other suitable equipment around the perimeter of the damaged area. Break out all material within the cut area and clean all debris from the hole. Edges should be slightly tapered outward. A structurally sound base is essential for ensuring a good repair job. Ensure that the application surface is clean, sound, and free from contaminants that may inhibit bond such as oil, wax, asphalt, acid, curing compound, dirt and loose debris. It is important to have the damaged areas prepared prior to mixing USG Duracal Cement. Note - the existing concrete does not require a bonding primer. Lightly dampen the surrounding concrete, especially in hot weather conditions. Apply USG Duracal Cement to saturated surface dry (SSD) substrate with no standing water.

NOTE *Per ACI CT-13 ACI Concrete Terminology Standard, saturated surface dry (SSD) is defined as the condition of an aggregate particle or other porous solid when the permeable pores are filled with water and no water is on the exposed surfaces.

EQUIPMENT

Use a standard concrete mixer for mixing the material. Per *ICRI Guideline No. 320.5R Pictorial Atlas of Concrete Repair Equipment*, the acceptable concrete mixers include: Type A Horizontal Shaft Mixer, Type B Tumble Mortar Mixer, and Type D Pan-Type Mortar Mixer. The batch size will be controlled by the size of the mixer. However, due to the rapid setting behavior of USG Duracal Cement, the total mix should be limited to a quantity that can be mixed and placed in about 15 minutes. Do not use high shear mixers that tend to entrap excessive amounts of air in the material.

TYPICAL MIXING PROPORTIONS

USG Duracal Cement is a fine cement powder packaged in 50 lb. (22.7 kg) bags. It can be used neat or extended with aggregate and a measured amount of water.

Neat Mix

- 50 lb. (22.7 kg) USG Duracal Cement
- 1-1/2 gallons (5.7 L) potable water

Extended Mix

- 50 lb. (22.7 kg) USG Duracal Cement
- 50 lb. (22.7 kg) fine aggregated (sand) meeting ASTM C33
- 50 lb. (22.7 kg) coarse aggregate meeting ASTM C33, ASTM size No. 8
- 1-3/4 gallons (6.6 L) potable water*

Note *Water usage is approximate and will be influenced by water content of sand/aggregate.

For an extended mix, use only size No. 8 (not to exceed 3/8 in. (9.5 mm)) clean, saturated surface dry (SSD) aggregates meeting ASTM C33 specification. When using wet aggregate, adjust water quantity for the aggregate moisture content.

The batch may be scaled up as long as the mixer capacity is not exceeded. Maintain the leading edge in workable consistency to ensure proper homogeneity of poured material from successive batches. Note that the material has a manufactured set time of about 25 to 35 minutes.

MIXING PROCEDURES

1. Introduce measured amount of water to mixer.
2. Add half the amount of aggregate into mixer (for mixes with aggregate extension).
3. Add USG Duracal Cement into mixer with mixer operating.
4. Slowly add the remainder of the aggregates into mixer (for mixes with aggregate extension).
5. Mix for one minute. Then, if necessary, add more water in small amounts during the second minute of mixing to obtain desired fluidity.
6. Mix until lump free, but not for more than five minutes.
7. Dump batch and immediately deliver the mixed material to the prepared pavement area. Clean mixer by adding water and allowing mixer to run. Dispose cleaning water in accordance with local storm water regulations before starting another batch.

Note Prior to placing USG Duracal Cement, the area to be repaired should be wetted with water to minimize water withdrawal from the material. The substrate must be in saturated surface dry condition and there should be no freestanding water in the cavity to be patched.
8. Level the USG Duracal Cement to the surrounding pavement with an appropriate screeding device, and before set, broom finish if necessary. If a smooth finish is desired, trowel lightly before set.
9. Allow USG Duracal Cement to develop strength for a minimum of one hour after set. After this time, traffic can resume over the patched area.

YIELD

USG Duracal Cement is available in 50 lb. (22.7 kg) and 100 lb. (45.4 kg) bags. The 50 lb. (22.7 kg) bag material when mixed with specified amount of water has a yield of about 0.45 cu. ft. (0.01 m³). The 50 lb. (22.7 kg) bag material when extended with 50 lbs. (22.7 kg) aggregate and 50 lbs. (22.7 kg) sand and mixed with specified amount of water has a yield of about 1.07 cu. ft. (0.03 m³).

PRECAUTIONS

- Damaged pavement must be completely removed, and the cavity cleared free of debris. Provide at least a vertical cut at the perimeter of the prepared area. Do not trowel USG Duracal Cement to a thin, feathered edge.
- Do not permit USG Duracal Cement mix to freeze before set has taken place. If USG Duracal Cement is to be used at near freezing temperatures, the following is recommended:
 - Keep materials and equipment as warm as possible.
 - Keep mortar and adjacent pavement above 32 °F (0 °C) until USG Duracal Cement has set.
- Under hot, windy conditions, use of an approved concrete curing membrane may be required to prevent surface dry out.
- If USG Duracal Cement is being used to patch an area adjacent to non-concrete materials such as control or expansion joints, a bonding agent approved by appropriate government regulatory agencies and used in accordance with manufacturer's recommendations is suggested.
- If area to be patched is less than 2-in. (51 mm) thick, a bonding agent may be required.
- Determine that the patch has set for at least one hour before allowing traffic to resume over patched area.
- Clean equipment with water according to manufacturer's recommendations after mixing each batch of material.

TECHNICAL DATA

PROPERTIES	STANDARD	NEAT MATERIAL FROM BAG USG Duracal: 50 lb. (22.7 kg) Water: 1-1/2 gallons (5.7 L)	MATERIAL WITH AGGREGATE EXTENSION USG Duracal: 50 lb. (22.7 kg) Coarse Aggregate ² : 50 lbs. (22.7 kg) Sand: 50 lbs. (22.7 kg) Water: 1-3/4 gallons (6.6 L)
Setting Time	ASTM C191	20-35 min.	20-35 min.
Length Change/Drying Shrinkage	ASTM C157 ³	-0.047%	-0.022%
Compressive Strength (2" Cubes)	ASTM C109 ¹	2 hours 3000 psi (20.7 MPa) 3 hours 3000 psi (20.7 MPa) 24 hours 5900 psi (40.7 MPa) 3 days 7000 psi (48.3 MPa) 28 days 9400 psi (64.8 MPa)	2 hours 1350 psi (9.3 MPa) 3 hours 1350 psi (9.3 MPa) 24 hours 2800 psi (19.3 MPa) 3 days 3600 psi (24.8 MPa) 28 days 4500 psi (31 MPa)
Compressive Strength (3"×6" Cylinders)	ASTM C39 ¹	2 hours 2000 psi (13.8 MPa) 3 hours 2000 psi (13.8 MPa) 24 hours 4000 psi (27.6 MPa) 3 days 4700 psi (32.4 MPa) 28 days 6300 psi (43.4 MPa)	2 hours 1200 psi (8.3 MPa) 3 hours 1200 psi (8.3 MPa) 24 hours 2400 psi (16.5 MPa) 3 days 3300 psi (22.8 MPa) 28 days 4100 psi (28.3 MPa)
Tensile Bond Strength to Concrete Substrates	ASTM C1583 ³	> 200 psi (> 1.4 MPa)	> 200 psi (> 1.4 MPa)
Freeze-Thaw Resistance	ASTM C666 ¹ (Procedure A)	300 Cycles	300 Cycles
	ASTM C215 ³	Relative Dynamic Modulus - 95%	Relative Dynamic Modulus - 97%
Chloride Permeability	ASTM C1202 ³	Permeability Class - Moderate	Permeability Class - Low
Yield (50 lb. Dry Powder)		0.45 cu.ft. (0.01 m ³)	1.07 cu.ft. (0.03 m ³)

- Samples dry cured at 50% relative humidity and 75 °F (24 °C) temperature.
- Manufacturer recommends ASTM C33 size No. 8 aggregate (not to exceed 3/8 in. (9.5 mm)).
- Numbers per NTPEP testing May 2015.

STORAGE AND USE

When properly used, USG Duracal Cement is easy to work with. Keep indoors at temperatures between 65 °F – 75 °F (18 °C – 24 °C) and 45% – 55% RH. Do not stack more than two pallets high. Keep from drafts. Rotate stock. USG Duracal Cement should be used within six months of the manufacturing date located on the package. Always follow handling and use directions and safety warnings on the package.

SUBMITTAL APPROVALS

Job Name	
Contractor	Date

PRODUCT INFORMATION

See usg.com for the most up-to-date product information.

LEED INFORMATION

For the most up-to-date information on LEED rating systems, project certification and the U.S. Green Building Council, please visit usgbc.org.

DANGER

Causes skin irritation. Causes serious eye damage. May cause cancer by inhalation of respirable crystalline silica. Do not handle until all safety precautions have been read and understood. Avoid breathing dust. Use only in a well-ventilated area, wear a NIOSH/MSHA-approved respirator. Wear protective gloves/protective clothing/eye protection. If swallowed, inhaled, or skin irritation occurs get medical attention. When mixed with water, this material hardens and becomes very hot sometimes quickly. DO NOT attempt to make a cast enclosing any part of the body using this material. If on skin: Wash with plenty of water. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses and continue rinsing. Wash contaminated clothing before reuse. Dispose of in accordance with local, state, and federal regulations. For more information call Product Safety: 800-507-8899 or see the SDS at usg.com
KEEP OUT OF REACH OF CHILDREN.

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NOTE

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NOTICE

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SAFETY FIRST!

Follow good safety/industrial hygiene practices during installation. Wear appropriate personal protective equipment. Read SDS and literature before specification and installation.

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