



The Chemical Company

PRODUCT DATA

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Maintenance of Concrete

SET® 45 AND SET® 45 HW

Chemical-action repair mortar

Description

Set® 45 is a one-component magnesium phosphate-based patching and repair mortar. This concrete repair and anchoring material sets in approximately 15 minutes and takes rubber-tire traffic in 45 minutes. It comes in two formulations: Set® 45 Regular for ambient temperatures below 85° F (29° C) and Set® 45 Hot Weather for ambient temperatures ranging from 85 to 100° F (29 to 38° C).

Yield

A 50 lb (22.7 kg) bag of mixed with the required amount of water produces a volume of approximately 0.39 ft³ (0.011 m³); 60% extension using 1/2" (13 mm) rounded, sound aggregate produces approximately 0.58 ft³ (0.016 m³).

Packaging

50 lb (22.7 kg) multi-wall bags

Color

Dries to a natural gray color

Shelf Life

1 year when properly stored

Storage

Store in unopened containers in a clean, dry area between 45 and 90° F (7 and 32° C).

Features

- Single component
- Reaches 2,000 psi compressive strength in 1 hour
- Wide temperature use range
- Superior bonding
- Very low drying shrinkage
- Resistant to freeze/thaw cycles and deicing chemicals
- Only air curing required
- Thermal expansion and contraction similar to Portland cement concrete
- Sulfate resistant

Benefits

- Just add water and mix
- Rapidly returns repairs to service
- From below freezing to hot weather exposures
- Bonds to concrete and masonry without a bonding agent
- Improved bond to surrounding concrete
- Usable in most environments
- Fast, simple curing process
- More permanent repairs
- Stable where conventional mortars degrade

Where to Use

APPLICATION

- Heavy industrial repairs
- Dowel bar replacement
- Concrete pavement joint repairs
- Full-depth structural repairs
- Setting of expansion device nosings
- Bridge deck and highway overlays
- Anchoring iron or steel bridge and balcony railings
- Commercial freezer rooms
- Truck docks
- Parking decks and ramps
- Airport runway-light installations

LOCATION

- Horizontal and formed vertical or overhead surfaces
- Indoor and outdoor applications

How to Apply

Surface Preparation

1. A sound substrate is essential for good repairs. Flush the area with clean water to remove all dust.
2. Any surface carbonation in the repair area will inhibit chemical bonding. Apply a pH indicator to the prepared surface to test for carbonation. If carbonation is present, abrade surface to a depth that is not carbonated.
3. Refer to International Concrete Repair Institute publication #s 03730 and 03732 for further surface preparation suggestions.



Technical Data

Composition

Set® 45 is a magnesium-phosphate patching and repair mortar.

Test Data

PROPERTY	RESULTS				TEST METHODS
Typical Compressive Strengths* , psi (MPa)					ASTM C 109, modified
	Plain Concrete 72° F (22° C)	Set® 45 Regular 72° F (22° C)	Set® 45 Regular 36° F (2° C)	Set® 45 HW 95° F (35° C)	
1 hour	—	2,000 (13.8)	—	—	
3 hour	—	5,000 (34.5)	—	3,000 (20.7)	
6 hour	—	5,000 (34.5)	1,200 (8.3)	5,000 (34.5)	
1 day	500 (3.5)	6,000 (41.4)	5,000 (34.5)	6,000 (41.4)	
3 day	1,900 (13.1)	7,000 (48.3)	7,000 (48.3)	7,000 (48.3)	
28 day	4,000 (27.6)	8,500 (58.6)	8,500 (58.6)	8,500 (55.2)	
NOTE: Only Set® 45 Regular formula, tested at 72° F (22° C), obtains 2,000 psi (13.8 MPa) compressive strength in 1 hour.					
Modulus of Elasticity , psi (MPa)					ASTM C 469
		7 days	28 days		
Set® 45 Regular		4.18 x 10 ⁶ (2.88 x 10 ⁴)	4.55 x 10 ⁶ (3.14 x 10 ⁴)		
Set® 45 Hot Weather		4.90 x 10 ⁶ (3.38 x 10 ⁴)	5.25 x 10 ⁶ (3.62 x 10 ⁴)		
Freeze/thaw durability test , % RDM, 300 cycles, for Set® 45 and Set 45® HW					80 ASTM C 666, Procedure A (modified**)
Scaling resistance to deicing chemicals , Set® 45 and Set 45® HW					ASTM C 672
5 cycles			0		
25 cycles			0		
50 cycles			1.5 (slight scaling)		
Sulfate resistance					ASTM C 1012
Set® 45 length change after 52 weeks, %			0.09		
Type V cement mortar after 52 weeks, %			0.20		
Typical setting times , min, for Set® 45 at 72° F (22° C), and Set® 45 Hot Weather at 95° F (35° C)					Gilmore ASTM C 266, modified
Initial set			9 – 15		
Final set			10 – 20		
Coefficient of thermal expansion ,*** both Set® 45 Regular and Set® 45 Hot Weather coefficients					CRD-C 39 7.15 x 10 ⁻⁶ /° F (12.8 x 10 ⁻⁶ /° C)
Flexural Strength , psi (MPa), 3 by 4 by 16" (75 by 100 by 406 mm) prisms, 1 day strength,					ASTM C 78, modified
Set® 45 mortar			550 (3.8)		
Set® 45 mortar with 3/8" (9 mm) pea gravel			600 (4.2)		
Set® 45 mortar with 3/8" (9 mm) crushed angular noncalcareous hard aggregate			650 (4.5)		

* All tests were performed with neat material (no aggregate)

**Method discontinues test when 300 cycles or an RDM of 60% is reached.

***Determined using 1 by 1 by 11" (25 mm by 25 mm by 279 mm) bars. Test was run with neat mixes (no aggregate).
Extended mixes (with aggregate) produce lower coefficients of thermal expansion.

Test results are averages obtained under laboratory conditions. Expect reasonable variations.

Mixing

1. Set® 45 must be mixed, placed, and finished within 10 minutes in normal temperatures (72° F [22° C]). Only mix quantities that can be placed in 10 minutes or less.
2. Do not deviate from the following sequence; it is important for reducing mixing time and producing a consistent mix. Use a minimum 1/2" slow-speed drill and mixing paddle or an appropriately sized mortar mixer. Do not mix by hand.
3. Pour clean (potable) water into mixer. Water content is critical. Use a maximum of 4 pts (1.9 L) of water per 50 lb (22.7 kg) bag of Set® 45. Do not deviate from the recommended water content.
4. Add the powder to the water and mix for approximately 1 – 1-1/2 minutes.
5. Use neat material for patches from 1/2 – 2" (6 – 51 mm) in depth or width. For deeper patches, extend a 50 lb (22.7 kg) bag of Set® 45 HW by adding up to 30 lbs (13.6 kg) of properly graded, dust-free, hard, rounded aggregate or noncalcareous crushed angular aggregate, not exceeding 1/2" (6 mm) in accordance with ASTM C 33, #8. If aggregate is damp, reduce water content accordingly. Special procedures must be followed when angular aggregate is used. Contact your local BASF representative for more information. (Do not use calcareous aggregate made from soft limestone. Test aggregate for fizzing with 10% HCL).

Application

1. Immediately place the mixture onto the properly prepared substrate. Work the material firmly into the bottom and sides of the patch to ensure good bond.
2. Level the Set® 45 and screed to the elevation of the existing concrete. Minimal finishing is required. Match the existing concrete texture.

Curing

No curing is required, but protect from rain immediately after placing. Liquid-membrane curing compounds or plastic sheeting may be used to protect the early surface from precipitation, but never wet cure Set® 45.

For Best Performance

- Color variations are not indicators of abnormal product performance.
- Regular Set® 45 will not freeze at temperatures above -20° F (-29° C) when appropriate precautions are taken.
- Do not add sand, fine aggregate, or Portland cement to Set® 45.
- Do not use Set® 45 for patches less than 1/2" (13 mm) deep. For deep patches, use Set® 45 Hot Weather formula extended with aggregate, regardless of the temperature. Consult your BASF representative for further instructions.
- Do not use limestone aggregate.
- Water content is critical. Do not deviate from the recommended water content printed on the bag.
- Precondition these materials to approximately 70° F (21° C) for 24 hours before using.
- Protect repairs from direct sunlight, wind, and other conditions that could cause rapid drying of material.
- When mixing or placing Set® 45 in a closed area, provide adequate ventilation.
- Do not use Set® 45 as a precision machinery grout.
- Never featheredge Set® 45; for best results, always sawcut the edges of a patch.
- Prevent any moisture loss during the first 3 hours after placement. Protect Set® 45 with plastic sheeting or a curing compound in rapid-evaporation conditions.
- Do not wet cure.
- Do not place Set® 45 on a hot (90° F [32° C]), dry substrate.

- When using Set® 45 in contact with galvanized steel or aluminum, consult your local BASF sales representative.
- Make certain the most current versions of product data sheet and MSDS are being used; call Customer Service (1-800-433-9517) to verify the most current versions.
- Proper application is the responsibility of the user. Field visits by BASF personnel are for the purpose of making technical recommendations only and not for supervising or providing quality control on the jobsite.

Health and Safety

SET® 45

WARNING!

Contains silica, crystalline quartz, fly ash, magnesium oxide, phosphoric acid, monoammonium salt, iron oxide, silica, amorphous, aluminum oxide, sulfur trioxide.

Risks

Product is alkaline on contact with water and may cause injury to skin or eyes. Ingestion or inhalation of dust may cause irritation. Contains small amount of free respirable quartz which has been listed as a suspected human carcinogen by NTP and IARC. Repeated or prolonged overexposure to free respirable quartz may cause silicosis or other serious and delayed lung injury.

Precautions

Avoid contact with skin, eyes and clothing. Prevent inhalation of dust. Wash thoroughly after handling. Keep container closed when not in use. DO NOT take internally. Use only with adequate ventilation. Use impervious gloves, eye protection and if the TLV is exceeded or used in a poorly ventilated area, use NIOSH/MSHA approved respiratory protection in accordance with applicable Federal, state and local regulations.

First Aid

In case of eye contact, flush thoroughly with water for at least 15 minutes. In case of skin contact, wash affected areas with soap and water. If irritation persists, SEEK MEDICAL ATTENTION. Remove and wash contaminated clothing. If inhalation causes physical discomfort, remove to fresh air. If discomfort persists or any breathing difficulty occurs or if swallowed, SEEK IMMEDIATE MEDICAL ATTENTION.

Waste Disposal Method

This product when discarded or disposed of is not listed as a hazardous waste in federal regulations. Dispose of in a landfill in accordance with local regulations.

For additional information on personal protective equipment, first aid, and emergency procedures, refer to the product Material Safety Data Sheet (MSDS) on the job site or contact the company at the address or phone numbers given below.

Proposition 65

This product contains material listed by the State of California as known to cause cancer, birth defects or other reproductive harm.

VOC Content

0 g/L or 0 lbs/gal less water and exempt solvents.

**For medical emergencies only,
call ChemTrec (1-800-424-9300).**

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