



REMR MATERIAL DATA SHEET CM-PC-1.28

CONCRETE PATCHING MATERIALS: RP-6414 MORTAR

1. NAME

RP-6414 Ren:C:O-Thane™ Polyurethane
Elastomer

2. MANUFACTURER

Ren Plastics
CIBA-GEIGY Corporation
4917 Dawn Avenue
East Lansing, MI 48823
Telephone: 517-351-5900

3. DESCRIPTION

RP-6414 is an extremely effective, semi-rigid, amber, two-component polyurethane elastomer for applications in which wear resistance is critical. It develops excellent physical properties when cured at room temperature without containing methylene chloroaniline or toluene diisocyanate. It is rigid in thick sections and flexible in thin sections.

4. USES

RP-6414 mortar is typically used as a topping for remedial maintenance and as a new installation over concrete surfaces subject to heavy wear and/or impact. Typical installations include offloading for heavy equipment and areas subjected to traffic of heavily loaded steel-wheeled carts. It may be used in stilling basins, tunnels, and other hydraulic structures to resist abrasion and/or mild cavitation.

5. MANUFACTURER'S TECHNICAL DATA

<u>Property</u>	<u>Test Method</u>	<u>Value</u>
Density	ASTM D 792	1.09 g/cc
Hardness (durometer)	ASTM C 2240	60 ± 5 Shore D
Tensile strength	ASTM D 638 @ 20"/min	17.9 MPa (2,600 psi)
Ultimate elongation	ASTM D 638 @ 20"/min	300%
Tear strength	ASTM D 624 DIE C @ 20"/min	87.5 kH/m (500 ppi)
Compress set	ASTM D 395B Method B	72%
Linear shrinkage	ASTM D 2566 1.125" deep	0.001 m/m (0.001 in./ in.)
Flexural strength	ASTM D 790	14.4 MPa (2,100 psi)
Flexural modulus	ASTM D 790 @/min	343 MPa (50,000 psi)
Taber wear index	ASTM D 1044 Wheel H-18	226 mg (100 cycles)

Typical handling properties:

Resin/Hardener ratio (weight)	100/60	
Viscosity @ 77 °F/25 °C Brookfield	resin	10,000-15,000 cP
	hardener	75-125 cP
Color	resin	light yellow
	hardener	dark amber
Pot life and Viscosity profile (4 fl oz) @ 77 °F	Time (min)	Viscosity (cP)
	5	3,000
	15	6,500
	20	gelled
Demold time @ 77 °F (for most applications)	within 24 hr	
Cure time @ 77 °F (for ultimate properties)	7 days	

Packaging: RP-6414 is available in quarts, gallons, 5-gallon pails, and drums.

Storage: Store both resin and hardener component at temperature between 70 and 100 °F.

6. MANUFACTURER'S GUIDANCE FOR APPLICATION

Mixing: Use only metal or plastic mixing containers and spatulas. Paper tubs and wooden stir sticks have been known to contaminate the ingredients during mixing. Weigh the resin and hardener components accurately. Do not attempt to use the package weights as preweighed amounts.

Mix for one to two minutes or until components are thoroughly blended. Mechanical mixers can be used but

should not create a deep vortex at the mixing shaft, since this can draw too much air into the system. After the materials are thoroughly mixed, it is wise to transfer the material into a second pouring container to assure casting fully mixed material.

In large use applications, it is advisable to consider automatic metering and mixing equipment. Follow the equipment instructions, especially those pertaining to purging of the mixing chamber.

RP-870 PRIMER is a two-component liquid primer designed for improving the adhesion of REN:C:O-THANE elastomers to a variety of metal surfaces, including iron, steel, aluminum, galvanized iron and stainless steel.

Curing: Demolding time can be accelerated by heating the resin and hardener components and/or by heating the mold prior to mixing and casting. Normal room temperature cure (77 °F) for seven days will develop a high percentage of physical properties, but accelerated cure schedules can be recommended by a Ren Technical Representative. Typical physical properties are achieved after first gelling at room temperature, then post-curing for sixteen hours at 180 °F.

Urethane elastomers can be cured directly by subjecting the liquid casting to a heat cure. Normally, this will increase the shrinkage. The least shrinkage is encountered when the casting is gelled firmly at room temperature prior to heat curing.

Thickness (cross-section) and configuration of the casting will also influence the amount of shrinkage. Shrinkage may be calculated by using values supplied on the individual data sheets as guidelines.

Safety: Because of the hazard potential of MOCA (4,4' methylene bis 2-chloroaniline), and of TDI (various forms of toluene diisocyanate), Ren

offers the complete REN:C:O-THANE line free of these two chemicals. Nevertheless, certain precautions must be observed when using these or other chemical products. Ren Plastics has also formulated a new line of REN:C:O-THANE elastomers. These products give maximum cured properties plus ease of handling at room temperature. Like all polyurethane elastomers, these systems can react with atmospheric moisture to produce foaming during cure.

Mist or vapor can cause eye and skin irritation and possible allergic respiratory reaction. Use only with adequate ventilation such as paint spray booth, fume hoods, exhaust fans, etc.

Contact with skin can cause irritation. Use protective rubber apron, clothing, gloves, face shield or other items as required. In case of skin contact, immediately wash thoroughly with mild soap and water. Effects may be delayed; get medical attention.

Use goggles, face shield, safety glasses or other items as required. In case of eye contact, immediately flush with water for at least 15 min and obtain medical aid.

Keep containers closed when not in use. Do not use in areas where spillage can be exposed to heat or open flame. For resin spills, soak up with absorbent compounds, place in an open container and dilute with a water-ethanol solution prior to discarding. For hardener spills, handle in a normal manner.

Do not expose to high temperature. Extinguish any fires with CO₂ or dry chemical-type extinguishers.

First aid: If inhaled, remove individual to fresh air. Administer oxygen or artificial respiration if necessary. Call a physician. If ingested, give the person water if conscious. Induce vomiting by

touching back of throat with finger. Call a physician. Immediately remove contaminated clothing and launder before reuse, or discard.

7. CORPS OF ENGINEERS' EVALUATION

Mixture design data: WES used RP-6414 Mortar as a repair material for cavitation resistance testing with 1 part epoxy to 3 parts laboratory sand.

Mixture Design Data Mortar 1:3 by Volume

<u>Material</u>	<u>Amount</u>
Resin	100 grams
Hardener	60 grams
Sand, ASTM C 109	1,200 grams

Technical data:

<u>Property</u>	<u>Test Method</u>	<u>Value</u>
Compressive strength	ASTM C 39	2,900 psi
Unit weight		117 lb/ft ³

A Venturi-type cavitation facility at WES was used to evaluate the cavitation resistance. This facility operates at a velocity of about 120 ft/sec through the Venturi and causes a moderate to moderate-severe cavitation. Results of these tests are compared to those of conventional concrete with 9,000 psi compressive strength in Figure 1.

8. CORPS OF ENGINEERS' GUIDANCE APPLICATION

Use ACI and manufacturer's recommendation for surface preparation of concrete. Corps' usage shows that an epoxy primer will provide excellent bond between the polyurethane mortar and concrete. The primer is necessary to prevent bond failure.

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 must 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 & COST

Availability: The material (RP-6414) is available from the manufacturer (1-800-248-1650). Cost: FOB \$96.60 per gallon kit (1 gal of resin and 1/2 gal of hardener).

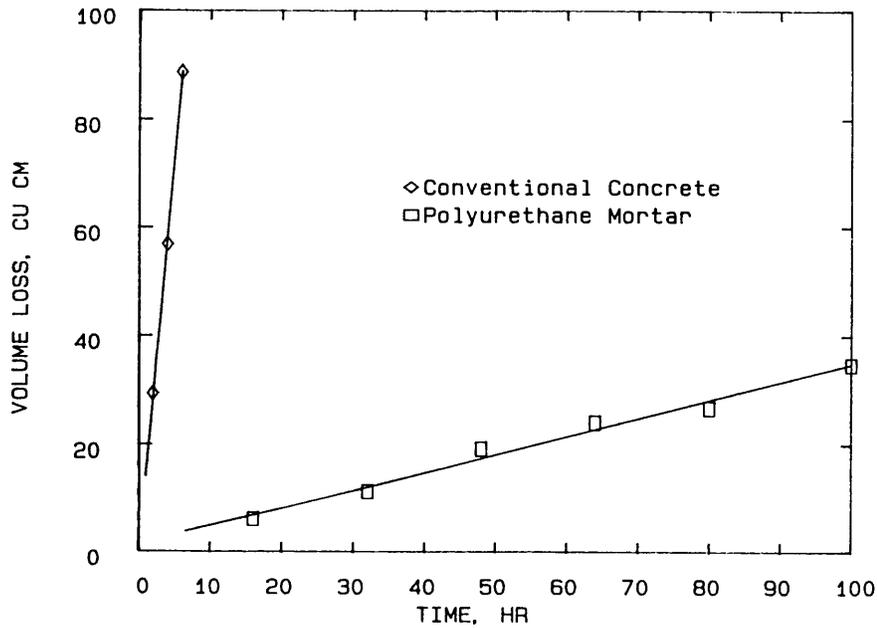


Figure 1. Cavitation tests results