BUILDING TRUST
CONSTRUIRE LA CONFIANCE

PRODUCT DATA SHEET

SikaEmaco® 440

(formerly MEmaco S 440)

Low dust, pourable, and pumpable pre-extended self-consolidating repair mortar

PRODUCT DESCRIPTION

SikaEmaco® 440 and SikaEmaco® 440 CI are low dust, one-component, shrinkage-compensated, self-consolidating repair mortars. They are designed for large volume repairs, including structural elements in applications from 38 mm (1.5 in) to full depth. SikaEmaco® 440 CI contains an integral corrosion inhibitor.

SikaEmaco® 440 MC is a low dust, one-component, shrinkage-compensated, self-consolidating repair mortar that can be installed in applications from 19 mm (0.75 in) to full depth.

WHERE TO USE

- Interior and exterior
- Large-volume structural repairs
- Repair or replacement of concrete elements
- Formed horizontal, vertical, and overhead repairs

Substrates

- Concrete

CHARACTERISTICS / ADVANTAGES

- The dual expansion system compensates for shrinkage in plastic and hardened states
- Low-dusting for added worker comfort and safety
- High early strength allows early form removal
- Low permeability protects against carbon dioxide and chloride intrusion
- Excellent freeze/thaw resistance for durability in cold, wet environments
- Flowability makes it ideal for placement by pumping or pouring into congested locations
- Self-consolidation minimizes honeycombing without vibration

PRODUCT INFORMATION

Composition / Manufacturing	SikaEmaco® 440, SikaEmaco® 440 CI and SikaEmaco® 440 MC are proprietary blends of cement, graded aggregate, shrinkage-compensating agents, and additives.
Packaging	25 kg (55 lb) polyethylene-lined bags
Shelf Life	1 year when properly stored
Storage Conditions	Store in unopened containers in cool, clean, dry conditions

Density	Fresh wet density 2,275kg/m³ (142lb/ft³)	(ASTM C 138)

TECHNICAL INFORMATION

Compressive Strength (ASTM C 109)

Age	440	440 CI	440 MC
1 day	17.2 MPa (2500 psi)	17.2 MPa (2500 psi)	17.2 MPa (2500 psi)
7 days	34.5 MPa (5000 psi)	36.5 MPa (5300 psi)	41.4 MPa (6000 psi)
28 days	41.4 MPa (6000 psi)	44.8 MPa (6500 psi)	51.7 MPa (7500 psi)

Tensile Strength in Flexure (ASTM C 348)

Age	440	440 CI	440 MC
28 days	7.9 MPa (1150 psi)	8.3 MPa (1200 psi)	7.3 MPa (1055 psi)

Shear Strength (ASTM C 882)*
* scrub coat

Age	440	440 CI	440 MC
28 days	20.7 MPa (3000 psi)	-	15.9 MPa (2300 psi)

Shrinkage (ASTM C 157*)
* demolded after 1 day

Age	440	440 CI	440 MC
28 days	0.061%	0.070%	0.048%

Coefficient of Thermal Expansion (CRD C 39)

Age	440	440 CI	440 MC
28 days	9.9 µm/m/°C (5.5 x 10^{-6} in/in/°F)	9.9 µm/m/°C (5.5 x 10^{-6} in/in/°F)	9.9 µm/m/°C (5.5 x 10^{-6} in/in/°F)

Chloride Ion Diffusion Resistance (ASTM C 1202)

Age	440	440 CI	440 MC
28 days	-	Low (1,000 - 2000 C)	Low (1,000 - 2000 C)

Design Considerations

Dust reduction for SikaEmaco® 440 and SikaEmaco® 440 CI vs. control	70%	(DIN55992-2)
Dust reduction for SikaEmaco® 440 MC vs. control	50%	(DIN55992-2)
Potential Alkali-Silica Reactivity	<0.10% Aggregate (Innocuous expansion)	(ASTM C 1260)

Freeze thaw resistance (ASTM C 666)
RDM @ 300 cycles

Age	440	440 CI	440 MC
28 days	100%	100%	96%

Splitting Tensile Strength (ASTM C 496)

Age	440	440 CI	440 MC
28 days	3.4 MPa (500 psi)	3.4 MPa (500 psi)	4.1 MPa (600 psi)

APPLICATION INFORMATION

Yield 0.012 m³ (0.43 ft³) per 25 kg (55 lb) bag

Flowability

	440	440 CI	440 MC	(ASTM C1611)
Slump Flow*	635 mm (25 in)	725 mm (28.5 in)	735 mm (29 in)	
Visual Stability Index	0 (Highly Stable - No Bleeding)	0 (Highly Stable - No Bleeding)	0 (Highly Stable - No Bleeding)	

	440	440 CI	440 MC	(ASTM C1621)
J-Ring Slump Flow*	625 mm (24.5 in)	715 mm (28 in)	725 mm (28.5 in)	
Passing Ability	10 mm (0.5 in) No visible blocking	10 mm (0.5 in) No visible blocking	10 mm (0.5 in) No visible blocking	

* Results were obtained using 2.75 L (0.69 US gal) of water for 440 and 440 CI and 3.31 L (0.88 US gal) of water for 440 MC 25 kg (55 lb) bag

BASIS OF PRODUCT DATA

Product properties are typically averages, obtained under laboratory conditions. Reasonable variations can be expected on-site due to local factors, including environment, preparation, application, curing and test methods.

ENVIRONMENT, HEALTH & SAFETY

User must read the most recent corresponding Safety Data Sheets (SDS) before using any products. The SDS provides information and advice on the safe handling, storage and disposal of chemical products and contains physical, ecological, toxicological and other safety-related data.

APPLICATION INSTRUCTIONS

NOTES ON INSTALLATION

- Minimum ambient, surface, and material temperature is 4 °C (40 °F) and rising.
- Do not mix for longer than 5 minutes.
- The minimum application thickness is 38 mm (1.5 in). When the depth is less than 38 mm (1.5 in), use SikaEmaco® 440 MC.
- Do not mix partial bags.
- Do not use to make overlay repairs where the surface of fresh, wet SikaEmaco® 440, SikaEmaco® 440 CI or SikaEmaco® 440 MC will remain unrestrained during cure.
- Do not vibrate
- Do not add plasticizers, accelerators, retarders, or other additives.
- For professional use only; not for sale to or use by the general public.
- Make certain the most current versions of the product data sheet and SDS are being used.
- Proper application is the responsibility of the user.

Field visits by Sika personnel are for the purpose of making technical recommendations only and not for supervising or providing quality control on the jobsite.

SURFACE PREPARATION

Concrete

1. Concrete must be structurally sound and fully cured (28 days).
2. Saw cut the perimeter of the area being repaired into a square with a minimum depth of 13 mm (0.5 in).
3. Refer to current ICRI Guideline no. 310.2R for surface prep requirements to permit proper bond.

Reinforcing Steel

1. Remove all oxidation and scale from the exposed reinforcing steel in accordance with ICRI Technical Guideline No. 310.1R.
2. For additional protection from future corrosion, coat the prepared reinforcing steel with SikaTop® Armatech® 110 EpoCem®.

MIXING

1. Ensure that SikaEmaco® 440, SikaEmaco® 440 CI or SikaEmaco® 440 MC are thoroughly mixed; a forced-action mixer is essential. Mixing in a suitably sized container using an appropriate paddle with a slow-speed (400–500 rpm) heavy-duty drill is acceptable. Do not use free-fall mixers.
2. Measure 2.6 L (0.69 US gal) of potable water for SikaEmaco® 440 or SikaEmaco® 440 CI and pour 2.3 L (0.61 US gal) into the mixer. With the machine in operation, add 1 full 25 kg (55 lb) bag of SikaEmaco® 440 or SikaEmaco® 440 CI and mix for 1 minute before adding the rest of the water. Always add powder to the water. The quantities mixed may be scaled up as required.
3. Measure 3.3 L (0.87 US gal) of potable water for SikaEmaco® 440 MC and pour 3 L (0.79 US gal) into the mixer. With the machine in operation, add 1 full 25 kg (55 lb) bag of SikaEmaco® 440 MC and mix for 1 minute before adding the rest of the water. Always add

powder to the water. The quantities mixed may be scaled up as required.
4. Mix for a further 2–3 minutes to obtain a smooth consistency.
5. When using the drill-and-paddle mixing method, place the total amount of recommended water in the mixing drum. With the paddle rotating, add 1 full 25 kg (55 lb) bag of SikaEmaco® 440, SikaEmaco® 440 CI or SikaEmaco® 440 MC and mix for 3 minutes to reach a smooth, even consistency.
6. Depending on the ambient temperatures and the desired consistency, additional water may be added. The total water content should not exceed 2.7 L (0.71 US gal) per 25 kg (55 lb) bag for SikaEmaco® 440 and SikaEmaco® 440 CI or 3.8 L (1 US gal) per 25 kg (55 lb) bag for SikaEmaco® 440 MC.

APPLICATION

1. Build forms in accordance with ACI 347R. Keep the unrestrained surface area of the repair to a minimum.
2. Saturate the prepared concrete substrate by filling the prepared formwork with clean water 24 hours before placement.
3. Immediately before the placement of SikaEmaco® 440, SikaEmaco® 440 CI or SikaEmaco® 440 MC, completely drain this water and seal the drainage outlets, leaving the substrate saturated surface-dry (SSD) with no ponded water remaining.
4. In jobsite circumstances where the formwork cannot be filled with water to achieve an SSD surface, the prepared concrete substrates must be thoroughly hosed down with clean water to achieve an equal level of saturation. Apply the repair material with sufficient pressure to ensure intimate contact with the substrate.
5. A long open-time bonding agent such as Sika® Armatec® -110 EpoCem® may be used in place of a saturated substrate. In such a case, place the SikaEmaco® 440, SikaEmaco® 440 CI or SikaEmaco® 440 MC before the bonding agent becomes tack-free.
6. Immediately after mixing, pump or pour the SikaEmaco® 440, SikaEmaco® 440 CI or SikaEmaco® 440 MC into the formed area. The material does not require vibrating.
7. The recommended application range of SikaEmaco® 440, SikaEmaco® 440 CI and SikaEmaco® 440 MC is from 4 °C to 29 °C (40 °F to 85 °F). Follow ACI 305 and 306 for hot or cold weather guidelines.

CURING TREATMENT

1. Leave the formwork in place until the compressive strength reaches 17.2 MPa (2500 psi) or a strength specified by the engineer.
2. Cure with an approved curing compound compliant with ASTM C 309 or preferably ASTM C 1315. If the repair area will receive a coating, wet curing is recommended.

CLEAN UP

Clean tools and equipment with clean water immediately after use. Cured material must be removed mechanically.

LOCAL RESTRICTIONS

Note that as a result of specific local regulations the declared data and recommended uses for this product may vary from country to country. Consult the local Product Data Sheet for exact product data and uses.

LEGAL NOTES

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