



# CHEM-CRETE® Heritage CCC110

Topical Treatment for Renovation and Protection of Heritage Structures by Pore Blocking and Lining Against Water, Moisture & Ice

## PRODUCT DESCRIPTION

Chem-Crete® Heritage CCC110 is a multi-functional crystalline penetrating colorless sealer for the renovation and protection of heritage structures. It is an invisible treatment that does not change the color, texture, and archeological appearance of treated surfaces. It is a water-based and environmentally friendly protection technology that customizes the chemistry of Chem-Crete waterproofing technologies (proven over the past decades) for applications onto all types of surfaces of historical buildings. Chem-Crete® Heritage CCC110 can be applied on the exterior and interior surfaces including limestone, granite, marble, cementitious structures, and lime-based mortars, plasters, and renders. It enhances structural sustainability and appearance which dramatically reduces its maintenance costs and positively affects its life cycle.

The low viscosity of Chem-Crete® Heritage CCC110 allows it to penetrate within treated surfaces without leaving any surface residuals. The functionality of the technology is based on a series of reactions of calcium tartrate crystals and alkali organosilicon compounds within pores. The results of these reactions transform the treated surfaces into hydrophobic and fill their pores with hygroscopic and hydrophilic crystals. The crystals function as pore blockers against water penetration while the pores remain partially open for vapor transport. The protection property of Chem-Crete® Heritage CCC110 takes place through three mechanisms: First, it provides the treated surface with an excellent repelling feature that restricts water and dissolved contaminants from penetrating into the treated surface. Secondly, it blocks water permeation through pores via the pore-blocking crystallization process. Thirdly, it maintains the pores partially open for securing the breathability of the treated structure. Under wet conditions, and upon contact with moisture, the hydrophilic behavior allows the crystals to swell any penetrated water and hence fill the pores with larger crystals preventing further moisture from permeation through. Simultaneously, the hygroscopic property of the crystals provides continual crystal growth through vapor adsorption towards the source of moisture which ensures structure dryness. By maintaining the internal humidity below the saturation humidity (required for mold growth and other durability attacks), the structure is preserved against all moisture-related problems. Under dry surrounding conditions, the crystals release moisture in a desorption process that makes the crystals shrink to their original size. The released moisture is transported towards the surface through the partially open pores while the crystals occupy less volume fraction of the pores. Such a dynamic swelling /desorption /shrinking process of the crystals will allow treated structures to continually breathe. Overall, Chem-Crete® Heritage CCC110 reduces water permeability with little or no effect on vapor permeability. Chem-Crete® Heritage CCC110 responds to the requirements of many historical buildings which rely on permitting the moisture (which may be absorbed) to evaporate back from the surface: This is achieved through its unique characteristics of maintaining open structure for vapor transportation and through its unique dynamic water management mechanisms utilizing reversible growth mechanism (vapor adsorption onto hygroscopic crystals).

The product performance had been proven through laboratory and field testing. The following images compare untreated with treated similar surfaces.



Before treatment



Post treatment

Fig. 1: Daniel Boone Grave Marker. Frankfort, Kentucky USA.

## FIELDS OF APPLICATION

Chem-Crete® Heritage CCC110 can be used as a treatment, protection and preservation for heritage buildings & structures build with:

- Limestone, Lime mortar, Sandstone, Claystone, Marble stone, and Slatestone
- Archeological structures
- Heritage monuments
- Statues
- Tomb stones

## PRODUCT FEATURES

- 100% green, environmentally friendly, safe & non-toxic.
- Non-film-forming treatment that maintains the natural look of the treated surfaces.
- Can be applied to different types of surfaces such as Limestone, Sandstone, Lime mortar, claystone, Marble stone and Slate stone and repair cementitious materials in all types of heritage structures.
- Can be applied vertically, horizontally and overhead.
- Provides long-lasting surface and internal waterproofing and moisture blocking and hence solves many types of water-associated problems in heritage structures.
- Provides treated surfaces with hydrophobicity: excellent water-repelling which reduces water absorption and other liquids (such as acid rain and other contaminants) from wetting and saturating the surfaces of the heritage structures, i.e., it makes water contact angle for treated surfaces over 90°, see Fig. 2.

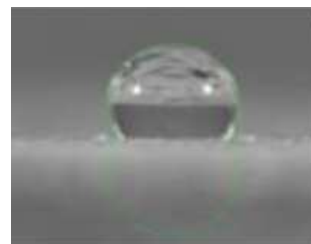


Fig. 2: Water contact angles ( $\theta=120^\circ$ ) for a cementitious surface treated with Chem-Crete® Heritage CCC110 (it made the treated surface over hydrophobic).

Note: the drop spread over the control (untreated) surface and hence measuring the contact angle was not possible.

- Reduces the growth of fungal, mildew, bacterial and microbial organisms as confirmed by testing according to the U.S. Military Standard MIL-SDD810G test method. See Fig. 3.



Before treatment Post treatment  
 Fig. 3: Grava Monument for Kentucky governor Letcher 1848-1852. Frankfort, KY Cemetery

- Reduces water permeability through cement-based structures by 2-3 orders of magnitudes when tested @ 200 psi (1.38 MPa) according to CRD-48-92.
- Reduces webbing fluorescence from repeating wetting and drying cycles.
- Reduces damage caused by repeated freezing and thawing cycles and minimizes dusting.
- Reduces damage caused by Salt decay, Sodium sulphate, Potassium sulphate, Calcium sulphate and Sodium chloride (common Salt).
- Reduces scaling
- Seal cracks up to 1/16<sup>th</sup> inch (1.5 mm).
- Reduces frost damage.
- Reduces ice adhesion (shear testing) by up to 90%.

### PACKAGING

Product	Packaging
Chem-Crete® Heritage CCC110	1 GAL (3.785 LITER) JUG
	5 GAL (18.925 LITER) PAIL
	55 GAL (208 LITER) DRUM

### TECHNICAL DATA

#### Physical Properties @ 77 °F (25 °F)

Viscosity	<10 centipoises
Freezing Point	26°F (-3.33°C)
Boiling Point	220°F (104°C)
Color	Clear
Environmental Hazards	None
Drying Time @ 77°F (25°C)	2 – 3 hours
Odor	None
Toxicity	None
Fumes	None
Flammability	None

**Product Performance** is tested according to the following test standards:

- MIL-STD-810G Fungal Resistance According to Test Method Standard for Environmental Engineering Considerations and Laboratory Tests.

### APPLICATION DATA

**Application:** Chem-Crete® Heritage CCC110 can be applied to stone, cementitious surfaces and lime/earth renders without prior cleaning, however, cleaning is preferred and can greatly improve the product's performance; proper cleaning will open the surface pores and capillaries to enhance the penetration process. Compressed air can be used to remove dust and loose particles from the surface. Flushing the area to be treated with water can improve the cleaning process. For heavily contaminated areas, it is recommended to use compatible and nonharmful cleaning agents such as Chem-Crete's Heritage Cleaner which helps remove contaminants, dirt, and carbonation from those areas.



Application of Chem-Crete® Heritage CCC110 Treated area 3 years later

Fig. 4: Kentucky State Capital Building

**Application tools:** Chem-Crete® Heritage CCC110 can be applied using handheld sprayers, commercial sprayers, rollers, or paint brushes.

**Coverage:** Apply only one coat at an average coverage rate of:

Limestone: 125-150 ft<sup>2</sup>/gallon (3.1 – 3.7 m<sup>2</sup>/liter)  
 Lime mortar: 125-150 ft<sup>2</sup>/gallon (3.1 – 3.7 m<sup>2</sup>/liter)  
 Sandstone: 100-125 ft<sup>2</sup>/gallon (2.4 – 3.1 m<sup>2</sup>/liter)  
 Clay stone: 100-125 ft<sup>2</sup>/gallon (2.4 – 3.1 m<sup>2</sup>/liter)  
 Marble stone: 200-250 ft<sup>2</sup>/gallon (4.9 – 6.1 m<sup>2</sup>/liter)  
 Slate stone: 200-250 ft<sup>2</sup>/gallon (4.9 – 6.1 m<sup>2</sup>/liter)

Coverage rate is dependent on surface porosity and conditions severeness.

**Limitations:** Do not apply Chem-Crete® Heritage CCC110 in the following cases:

- If the surface temperature falls below 36°F (2°C).
- If the area has been previously treated with sealing agents unless the sealers are completely removed.

### CLEANING

All tools and equipment must be cleaned with clean water immediately after use.

### STORAGE

Two years shelf life when stored in cool, dry place in its original unopened container. Always agitate or stir the product's container before using. **DO NOT ALLOW PRODUCT TO FREEZE.** Repeated freezing & thawing might cause damage for the product.

### SAFETY PRECAUTIONS

As with all construction chemical products, adequate precautions and care must be taken during usage and storage. Avoid direct contact with foodstuff, eyes, skin, and mouth. Any direct contact with skin, eyes, etc. should be washed thoroughly with clean running water and soap.

Always wear protective goggles and gloves. In case of eye contact, flush for 15 minutes with warm water. If eye irritation persists, seek medical attention. In case of ingestion or swallowing, drink 2 glasses of clean water and seek medical attention. **KEEP OUT OF REACH OF CHILDREN.**

### TECHNICAL ASSISTANCE

Please contact International Chem-Crete Corporation for Technical Personnel.

### WARRANTY

**LIMITED WARRANTY:** International Chem-Crete Inc. warrants that, at the time and place we make shipment, our materials will be of good quality and will conform to our published specifications in force on the date of acceptance of the order.

**DISCLAIMER:** The information contained herein is included for illustrative purposes only and, to the best of our knowledge, is accurate and reliable. International Chem-Crete Inc. is not under any circumstances liable in connection with the use of information. As International Chem-Crete Inc. has no control over the use to which others may put its products, it is recommended that the products be tested to determine their suitability

for specific applications and/or that our information is valid in particular circumstances. Responsibility remains with the architect or engineer, contractor, and owner of the design, application, and proper installation of

each product. Specifier and user shall determine the suitability of the product for a specific application and assume all responsibility in connection therewith. MJ181122-6

### **Manufactured By:**



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