Multi-crystalline Admixture for Improving Concrete Durability and Performance

CHEM-CRETE® MCE™

1% Dosage

PRODUCT DESCRIPTION

Chem-Crete® MCE™ (MCE™) is a multi-crystalline admixture and an innovative concrete waterproofing material. It is a significant step forward in increasing long-term concrete performance and durability that functions effectively with both Portland Cement Concrete (PPC) and 1L (Limestone) Cement Concrete (PLC). MCE™ is a multi-compound aqueous solution that is mixed into fresh concrete during the batching process resulting in a uniform distribution throughout the cement paste. MCE™ cures within cement hydration stages forming a network of hygroscopic and hydrophilic crystals (pore blocking) coupled with integrated compounds (pore lining) that become an integral part of concrete structure. MCE™ is a Type S Permeability Reducing Admixture for Hydrostatic Pressure (PRAH). The porosity and permeability of resulting concrete structure is significantly decreased leading to concrete protection against nearly all types of water-related attacks and thereby enhances both the concrete durability and structure sustainability. MCE™ extends the usable lifespan of the concrete, as well as significantly reduces lifecycle costs.

A key feature of MCE™ is its ability to actively manage water in the concrete thereby minimizing or eliminating moisture-related damage including freeze/thaw cycling and alkali silica reactivity (ASR). In addition, by controlling the amount of water entering the concrete, chloride intrusion is minimized, mold growth is inhibited, and overall concrete sustainability is greatly enhanced. Furthermore, MCE™ improves the workability, enhances the hydration of the cement, and increases the strength of fully cured concrete.

FIELDS OF APPLICATION

- ☐ Highways, Streets, Roads and Manholes
- ☐ Bridges, Tunnels and Retaining Walls
- ☐ Slabs-on-Grade and Below Grade Structures
- ☐ Precast/tilt-up and Cast-in-Place Concrete
- ☐ Concrete Parking Lots, Sidewalks and Driveways
- ☐ Dams, Reservoirs, Canals and Waterways
- ☐ Water Tanks and Treatment Plants
- ☐ Secondary Containment Structures
- ☐ Sea Walls and Port Facilities
- ☐ Commercial and Residential Structures
- ☐ Parking Structures (Above and Below Grade)
- ☐ Basements, Foundations, Floors, Patios and Pools

PRODUCT FEATURES

- ☐ Chloride-free
- ☐ Ammonia-free
- ☐ No-VOC (Volatile Organic Compound)
- ☐ Can be added to the concrete at time of batching and therefore it is not subject to climatic restraints
- ☐ Simple and efficient application process. Liquid product facilitates accurate measurement
- ☐ Compatible with all cements and supplementary cementitious materials
- ☐ Compatible with other types of admixtures
- ☐ A long-term internal waterproofing which becomes an integral part of the concrete
- ☐ Enhanced concrete durability
- ☐ A dynamic crystallization system that interacts with water in its three phases (vapor, liquid and ice) which enhances water management
- ☐ Maintained concrete breathability with reduced internal humidity eliminating the conditions for concrete attacks which usually require high levels of internal humidity e.g. 80-90%
- ☐ Sustainable and cost effective

PRODUCT PERFORMANCE

- ☐ Functions effectively with both 1L (Limestone) Cement and Portland Cement
- ☐ Reduces capillary porosity and water permeability (by 3-5 orders of magnitudes, over 99% reduction). MCE™ produces virtually impermeable concrete
- ☐ Reduction in moisture emission
- ☐ Reduces surface wettability and water absorption.
- ☐ Reduces jet fuel and oil penetration through concrete surfaces.
- ☐ Manages thermal effects by decreasing the initial rate of heat release and extending the induction period of cement hydration.
- ☐ Manages heat release in mass concrete
- ☐ Promotes concrete curing under extreme hot and dry conditions by reducing water losses at early ages
- ☐ Increases heat capacity of concrete and decreasing thermal conductivity
- ☐ Reduces ice adhesion and hence reduced consumption of deicing salts & agents
- ☐ Improves freeze-thaw durability
- ☐ Reduces chloride ion penetration from deicing salts and associated steel corrosion and paste degradation
- ☐ Reduces Alkali Silica Reactions (ASR) problems and silicate dusting
- ☐ Reduces fungal and microbial growth according to anti-fungal and microbial test method MIL-SDD810G (reduces mold associated problems)
- ☐ Enhances pumpability, workability and finishability
- ☐ Enhances cement hydration by increasing calcium-silicate-hydrate (C-S-H)) and reducing encapsulation of cement
- ☐ Enhances concrete consolidation which leads to better mechanical properties (compressive and flexural strengths and abrasion resistance)
- ☐ Reduces concrete shrinkages and surface cracking
- ☐ Self-healing - seal hairline cracks up to 0.5 mm
- ☐ Reduces ingress of sulfates

- ☐ Reduces carbonation
- ☐ Protects concrete against sewage and industrial wastes
- ☐ Reduces leaching
- ☐ Helps concrete stay whiter & brighter (Albedo Surface)

PACKAGING

Product	Packaging
CHEM-CRETE MCE™	5 GAL (18.925 LITER) PAIL
	55 GAL (208 LITER) DRUM
	265 GAL (1000 LITER) TOTE

TECHNICAL DATA

PROPERTY	VALUE
Specific Gravity @ 77°F/25°C (ASTM, D1475)	1.1 – 1.13
Viscosity, Brookfield	2.4 centipoises
Freezing Point	24ºF (-4.4°C)
Color	Violet
Environmental Hazards	None
Odor	None
Toxicity	None
Fumes	None
Flammability	None

Product Performance is tested according to the following test standards:

- ☐ CRD-48-92 US Army Corps of Engineers Standard Test Method for Water Permeability of Concrete
- ☐ ASTM D6489-99 Determining the Water Absorption of Hardened Concrete Treated with a Water Repelling Coating.
- ☐ ASTM C642-97 Standard Test Method for Density, Absorption, and Voids in Hardened Concrete
- ☐ ASTM C1202-91 Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration
- ☐ ASTM C672-98 Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals
- ☐ ASTM C457-98 Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete.
- ☐ MIL-STD-810G Fungal Resistance According to Test Method Standard for Environmental Engineering Considerations and Laboratory Tests
- ☐ ASTM C666-97 Resistance of Concrete to Rapid Freezing & Thawing
- ☐ ASTM C1260-23 Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
- ☐ ASTM C1293 Standard Test Method for Determination of Length Change of Concrete Due to Alkali-Silica Reaction
- ☐ ASTM C39/C39M-21 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- ☐ ASTM C779/C779M-12 Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces
- ☐ ASTM F2170-19a: Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
- ☐ ASTM F1869-22 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
- ☐ ASTM F2659-23: Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and Other Floor Slabs and Screeds Using a Non-Destructive Electronic Moisture Meter
- ☐ ASTM C157/C157M-17 Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete

APPLICATION DATA

Method of Application: MCE™ is shipped in a ready-to-use state. The product is simply mixed with the concrete at the time of batching and is applicable to both ready-mixed and central mix production.

Blending: MCE™ can be added to a concrete mix at a batching plant or at a job site similar to adding typical chemical admixtures.

The method of incorporating the material into the concrete during the batching process is somewhat dependent on the specific batching equipment. MCE™ is generally added at the time of mixed water incorporation.

Consumption/Dosage: 1% of the cementitious materials weight.

CLEANING

Clean all equipment and tools with clean water immediately after use.

STORAGE

Two-year shelf life when stored in its original, unopened container, in a cool, dry place. **DO NOT ALLOW PRODUCT TO FREEZE.** Repeated freezing and thawing may cause damage to 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. Contacted areas should be washed thoroughly with clean running water and soap. Always wear protective goggles and gloves. In case of eye contact, flush for fifteen minutes with warm water. If eye irritation persists, seek medical attention. In case of ingestion or swallowing, drink two glasses of clean water and seek medical attention. **KEEP OUT OF REACH OF CHILDREN.**

TECHNICAL ASSISTANCE

Contact International Chem-Crete for Technical Personnel.

WARRANTY

LIMITED WARRANTY: International Chem-Crete warrants that, at the time of shipment, our materials will be of good quality and will conform to our published specifications recognized on the date of 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 cannot, under any circumstances, make any guarantee of results or assume any obligation or liability in connection with the use of this information.

As International Chem-Crete has no control over product usage, it is recommended that the product be tested to determine suitability for a specific application and/or that our information is valid in a particular circumstance. Responsibility remains with the architect or engineer, contractor and owner for the design, application and proper installation of each product. Specifier and user shall determine the suitability of products for specific application and assume all responsibilities in connection therewith. Any liability is limited to the replacement of material if proven faulty. AM051025-06.

Manufactured By:

International Chem-Crete Inc.
800 Security Row, Suite 1, Richardson, TX 75081, U.S.A
Tel: (972) 671-6477, Fax: (972) 238-0307
contact-us@chem-crete.com ● www.chem-crete.com

Chem-Crete Europe, s.r.o.
Stanicna 13, 90851 Holic, Slovakia
Tel: +421 34 668 3181 Fax: +421 34 668 3119
www.chem-crete.sk ● info@chem-crete.sk