



03 01 00	Maintenance of Concrete
03 30 00	Cast in Place Concrete
03 40 00	Precast Concrete
03 70 00	Mass Concrete

MCI® Grenade™, Patented/Metric MCI® Grenade™, Patented/ MCI® Grenade™ XL, Patented

DESCRIPTION

MCI® Grenades consist of powder Migrating Corrosion Inhibitors (MCI®) packaged in water-soluble PVA bags. MCI® Grenades are convenient to use and are available in three sizes for easy dosing.

When incorporated into concrete, MCI® Grenades form a protective, molecular layer on embedded metals that inhibits corrosion. In new construction, this is quantified by an increase in critical chloride threshold and subsequent reduction in corrosion rates when corrosion does initiate. In repair, MCI® Grenades not only reduce corrosion on metals within the patch area, but are also able to migrate into undisturbed concrete adjacent to the repair to protect reinforcement already in place near the patch.

UFI: DD11-N0UV-S009-1JJJ

PACKAGING & STORAGE

MCI® Grenades are available in 1.1 lb (500 g) bags (40 per drum). MCI® Metric Grenades are available in 1.43 lb (650 g) bags (32 per drum). MCI® Grenades XL are available in 5 lb (2.3 kg) bags (10 per drum). Please see MCI® Mini Grenades if you need sizes for bags of repair mortar.

To ensure best product performance, store in original packaging, indoors, and out of direct sunlight at 40-100 °F (4-38 °C).

Shelf life: 1 year



HOW IT WORKS

MCI® Grenades are organic corrosion inhibitors that dissolve easily when in contact with water in the concrete mix. During mixing, the bag will completely dissolve and the MCI® compounds will disperse throughout the mix.

MCIs protect reinforcing steel, galvanized steel, and other metals embedded in concrete from corrosion induced by carbonation, chlorides, atmospheric attack, and other corrosives. MCI® Grenades are considered ambiodic (mixed) inhibitors, meaning they protect both anodic and cathodic areas within a corrosion cell. MCI® Grenades contain a blend of amine salts of carboxylic acid, which form a protective, molecular layer on embedded reinforcing steel they come into contact with.

MCI® Grenades are effective at enhancing durability and extending the useful service life of both new construction and repairs exposed to corrosive environments.

WHERE TO USE

- Reinforced concrete including precast, prestressed, and post-tensioned structures
- Corrosive environments including exposure to deicing salts, marine environments, saline groundwater, airborne chlorides, and carbonation
- Structures such as concrete bridges, highways, parking garages, balconies, pools, storage tanks, pilings, substructures, pillars, pipes, and utility poles
- Restoration and repair of all reinforced concrete commercial and civil engineered structures

ADVANTAGES

- Premeasured and prepacked: easy to dose and handle in plant or onsite
- Lower toxicity and environmental impact than traditional corrosion inhibiting admixtures such as calcium nitrite
- Low dosage rate with minimal effect on concrete properties (i.e., workability, strength, air entrainment, etc.)

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- Dosage rate independent of expected chloride exposure
- Ability to migrate through porous substrates (concrete, masonry, limestone, etc.) by capillary action, vapor diffusion, and ionic attraction
- Lab and field tested worldwide

PHYSICAL PROPERTIES

Appearance	White to off-white powder packed in water-soluble PVA bag
pH	11.5-13% (1% aqueous solution)

DOSAGE

Add to concrete mix, repair mortar, or grout at a rate of:

- One 1.1 lb (500 g) MCI® Grenade™ per 1 yd³ of concrete
- One Metric MCI® Grenade™ per 1 m³ of concrete
- One 5 lb (2.3 kg) MCI® Grenade™ XL per 5 yd³ (3.8 m³) of concrete

APPLICATION

MCI® Grenades can be added to concrete at the ready-mix plant, directly to the ready-mix truck drum, or to portable mixers. For best results, add the MCI® Grenades to the mix water before addition to cementitious materials. Allow the bag and the powder to dissolve prior to addition of the other components. Continue adding cementitious materials and mix as directed by manufacturer/supplier.

MCI® Grenades can be post-added to mixing concrete as long as they dissolve and a uniform mix is achieved. When adding MCI® Grenades onsite into a concrete mix truck, add to the mixer at the recommended dosage rate and mix for at least 30 revolutions before dispensing the concrete to ensure uniformity. If the truck contains hard concrete or worn fins, mixing time should be increased to ensure even dispersion of the MCI® Grenades throughout the concrete.

STANDARD TEST RESULTS

ASTM C494 Data*			
		Control	MCI® Grenades
Initial Set (Minutes)		304	365
Final Set (Minutes)		394	457
Length Change (%)		-0.022	-0.023
Freeze/Thaw Durability (%)		98.3	98.8
Compressive Strength (psi)	3 day	3263	3357
	7 day	4027	4173
	28 day	5057	5163
	6 month	5813	6177
	1 year	6430	6767
Flexural Strength (psi)	3 day	607	586
	7 day	663	651
	28 day	768	734

*Based on data within report #09145 from Tourney Consulting Group.

CONSIDERATIONS

Concrete properties are always best determined in a trial using the actual mix components. Cortec® recommends a trial batch anytime you are using MCI® Grenades with new mix components. Consult with Cortec's Technical Service department for further guidance if necessary.



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