



## **X-Rok Product Information**

X-Rok is a high-strength, water-activated, eco-safe chemically-bonded ceramic cement material that effectively shields all types of radiation, including RF, microwave, X-ray, Gamma & Neutron emissions. X-Rok stabilizes, solidifies, encapsulates and contains all levels of harmful radiation. The results are uniquely effective, sustainable and secure, providing a wide range of cost-effective hazardous and radiated waste solutions. Different formulations are used to solve different dangerous waste problems.

X-Rok consists of dry, cement-like powders and aggregate mixtures that are activated by mixing with water to create crystalline chemical bonding at the molecular level. X-Rok bonds to virtually any substrate, including mineral, metal and cellulosic materials. X-Rok does not deteriorate with exposure to moisture, extreme temperature variations, or corrosive elements such as saltwater. X-Rok is produced and applied using conventional concrete production / application technologies.

### **Primary Applications**

X-Rok has a wide range of applications from radioactive waste management systems to radiation shielding products for industrial, military, medical and domestic end uses.

- Hazardous Waste Applications
  - Waste Management (emissions blocking, long lasting containment or solidification)
  - Waste Transport
  - Remediation (Superfund sites, failing containment systems, etc)
- Radiation shielding for industrial, commercial and residential applications. May be applied to walls, container surfaces, equipment cases, movable panels, tiles, etc.
  - EMP event radiation shielding
  - Electromagnetic radiation, RF and EMI shielding (data centers, radar towers for airfields)
  - Energy generation, storage, and transport facilities
  - High frequency RF transmission protection
  - Hospital radiation shielding (x-ray, proton, MRI, CT scans, etc)
  - Building materials (ceramic roof tiles, wall panels, etc)

### **Features / Benefits**

- Shields all types of radiation, including RF, microwave, X-ray, Gamma & Neutron emissions
- Bonds at the molecular level to mineral, metal and cellulose (wood, plant fiber, etc)
- Can be mixed with a wide range of aggregate / fibrous materials depending on the end use. Can be customized for maximum efficacy for the specific application.
- High Compressive Strength (8,000 to 15,000 PSI depending on formula configuration)
- Extremely durable. High resistance to solar, temperature, water, and chemical degradation (salts, acids and other corrosives)
- Superior freeze/ thaw resistance
- Low expansion / contraction / cracking
- Extremely hard surface with smooth finish
- High Heat and Fire Resistance > 2,700 degrees
- Mold proof and waterproof.

### **Shelf Life**

- 12 months after opening (store well-sealed in a cool dry place)

## Specifications / Compliances

- Each batch independently tested by CRH Oldcastle ( <https://oldcastleinfrastructure.com> )
- ASTM Certified ([www.hpnw.com](http://www.hpnw.com))
- INL testing report 2013.02.01: "... The neutron shielding modeling results indicated large reductions in the transmitted neutron flux due to the composition of the ceramic cements " (Full Report Available Under NDA)
- 45 patents granted in 28 countries, others pending

## Packaging

- 50 lb pails
- 250-2,000 lb Supersacks

## Directions for Use

C3 recommends that all customers watch the training video prior to first use. Note that custom mixes have different water requirements and set times, which will be provided with the product. Product is compatible with standard cement mixing equipment.

- Stir dry mix to ensure well blended.
  - If purchased in pails, product can be mixed in the supplied pail. If purchased in supersacks, product must be transferred to an appropriately sized mixing container.
  - For smaller applications (mixing in a pail, mortar tub, wheel barrow), use a mortar mixer or an electric hand drill & paddle to achieve uniform blend.
  - For larger applications, product may be mixed with standard cement mixing equipment.
- Measure and add water.
  - Standard mix requires 13% water, 3.25 qts. per 50 lbs of dry mix.
  - For custom mixes, water amount will be specified for the specific mix (varies based on absorption rate of chosen aggregate, up to 22% water).
- Mix for 3 to 5-min, working the mix with a trowel or hoe until the mix reaches a uniform, workable consistency.
- Prepare surfaces
  - Surfaces should be clean and minimally damp to dry. Product bonds to dry and minimally damp surfaces, important to blow or brush away any excess moisture to maintain water-mixing ratios.
- Apply material
  - Standard mix sets in 15minutes. Custom mixes can prolong set time up to 60 minutes.
  - For larger applications, mix in batches based on set timing, until project is complete.

## Removal / Clean Up

Clean all tools and equipment immediately after use with water.

Note: X-Rok meets and exceeds all EPA concrete run off/clean up regulations. If end user adds fly ash and/or other toxic-laden aggregates, follow clean up standards for the introduced material.

## Precautions / Limitations

Mix formula is precise, requiring careful material handling and mixing.

Store well sealed in cool and dry facility.

Material forms powerful bonds to most surfaces, clean well prior to setting.

## Manufacturing & Distribution

C3 products are mixed and packaged globally by CRH/Old Castle for Ceramic Cement Corporation.

Contact C3 for information on distribution in your region.

## Customer Service

Please visit [www.ceramiccement.com](http://www.ceramiccement.com) for more information, or contact us directly:

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## Sales Inquiries

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