

3M Advanced Materials Division

# 3M™ Castable Ceramics

## Introduction

3M™ Castable Ceramics are chemically bonded phosphate ceramic products manufactured by 3M Technical Ceramics Inc., for use as a neutron poison, shielding material, encapsulant and in waste immobilization applications. These products quickly harden to a tough, high-strength ceramic upon casting and are provided either as a powder blend that can be mixed and cast at the point of use, or as pre-cast form. 3M castable ceramics can be customized with various formulations and additives to provide application-specific characteristics.

## 3M™ Castable Ceramic – Radiation Shielding

A derivative of 3M castable ceramics, 3M™ Castable Ceramic – Radiation Shielding has been used for neutron shielding and criticality control. This formulation contains 4 wt% boron carbide. The material can be provided in blended powder or cast forms. Other grades with higher or lower boron carbide loadings can be made to suit specific application needs.

## Typical Physical Properties

(Not for specification purposes)

3M™ Castable Ceramic – Radiation Shielding	
Appearance	Gray to white ceramic
Density	119 – 125 lb./ft <sup>3</sup>
Compressive Strength	3000 – 7000 psi
Water Content	25 – 27%
Aggregate Loading	Up to 50 wt%

## Stability Data, High Temperature

Condition	Response
Exposure 60°C, 133 days (vented mold)	No significant water loss
Exposure 120°C, 127 days (vented mold)	75% water loss

## Boron Enrichment Capabilities

3M Technical Ceramics is a leading global commercial processor of enriched boron, and is one of the largest boron isotope enrichment facilities in the world today. We focus on manufacturing optimized materials with an emphasis on stable boron isotopes. Our proprietary manufacturing processes allow <sup>10</sup>B and <sup>11</sup>B enrichment from natural occurring ratios up to levels exceeding 99% isotopic purity. We offer secure supply, consistent product quality and the ability to custom engineer products for your unique applications. Our specialists are experts at solving materials-related problems in the demanding nuclear and semiconductor industries. For more information, contact us at [boron@mmm.com](mailto:boron@mmm.com).

## Analytical Services

As a manufacturer of specialty, high purity chemical and isotopic products, 3M Technical Ceramics maintains sophisticated analytical and testing capabilities at its manufacturing facility in Quapaw, OK. Our analytical laboratories support on-site production activities and provide our customers with data and evidence



that the products they receive meet or exceed their requirements. Our laboratories are fully equipped with current-generation instruments to perform a full range of testing procedures, including: inductively coupled plasma mass spectrometry; atomic absorption spectroscopy; ion and gas chromatography; carbon/sulfur and oxygen/nitrogen analysis; particle size analysis and BET surface area measurement.

## Product Storage, Handling and Safety

**Storage:** See product Safety Data Sheet (SDS) for additional information.

**Handling:** Do not eat, drink or smoke when using this product. Wash thoroughly after handling. See product SDS for additional information.

**Safety:** See product SDS for additional information.

**Product is manufactured and sold by 3M Technical Ceramics Inc.**

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