

3M Advanced Materials Division

3M™ Neutron Quench

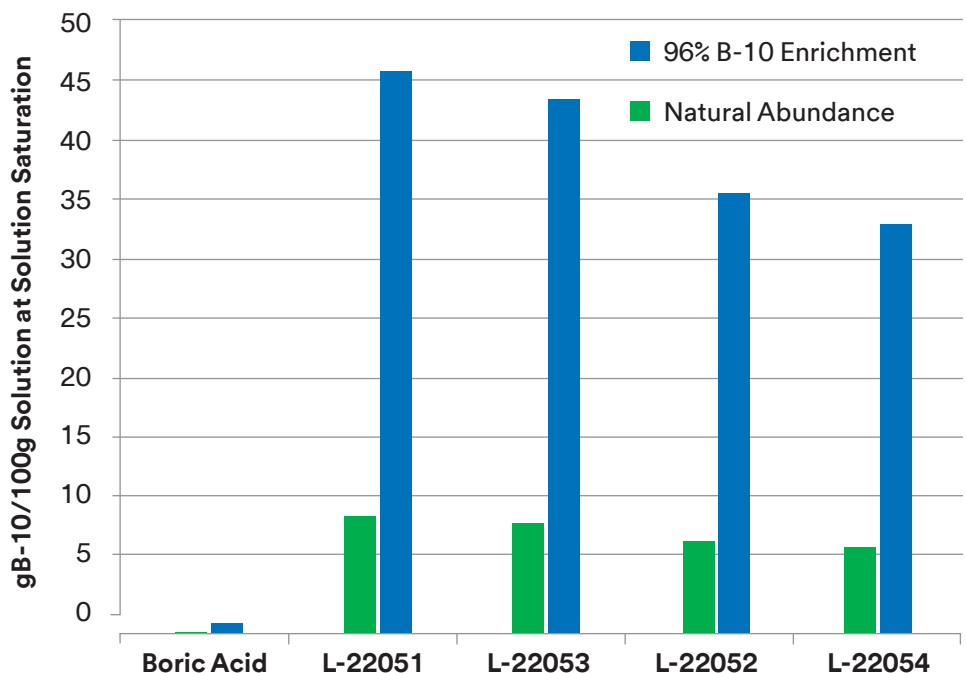
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Introduction

3M™ Neutron Quench is manufactured by 3M Technical Ceramics Inc. Developed for situations where criticality control exceeds normal control methods, this highly soluble boron-based compound enhances neutron absorption to elevated levels. 3M neutron quench may be injected into the reactor coolant to affect a complete core shutdown during emergency scenarios.

3M neutron quench may be dispersed in the fuel storage pools post-disruptive events, such as seismic incidents or mechanical failures, to maximize criticality safety margins when moving fuel under high levels of uncertainty. If used in a compact injection system that can be operated either in automated or manual configurations, this material may provide an effective option for mitigating uncontrollable scenarios.

¹⁰B Concentration at Saturation (298K)



Potential Advantages:

- Boron content up to 80 wt% (compared to 16 wt% for boric acid and sodium pentaborate)
- High water solubility allows smaller footprint for emergency shutdown pools
- High solubility may reduce crystallization and deposition in power plant systems, decreasing corrosion
- May reduce or eliminate need for pool heating and heat tracing of lines
- Thermally stable at temperatures >500°C
- pH neutral

Ongoing studies

- Physical property data of solids and solutions (pH, viscosity, solubility etc.)
- Decomposition data as solid and in solution
- Stability data as solid and in solution
- Corrosion studies

Product Storage, Handling & Safety

Storage: Keep all containers tightly closed when not in use. If this product is transferred into another container, only use portable containers and tools approved for the handling of toxic, acidic solids. Store containers in a cool, dry location, away from direct sunlight, or sources of intense heat. See product Safety Data Sheet (SDS) for additional information.

Handling: Wash thoroughly after handling this product. Avoid breathing dusts or particulates generated by this product. Use in well-ventilated location. Wipe-down area routinely to avoid the accumulation of dusts of this product. See product SDS for additional information.

Safety: This is an experimental material. Handling of this material may be hazardous. Avoid skin and eye contact. Avoid breathing of vapors, mists, or dusts. Keep away from all sources of ignition. Do not smoke when handling this material. See product SDS for additional information.

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

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