

ENRICHED SODIUM PENTABORATE

GENERAL CHARACTERISTICS

Boron Products, LLC developed enriched sodium pentaborate to meet the needs of the boiling water reactor operators. An NRC ruling in the United States required boiling water reactor operators to upgrade their standby liquid control systems. Enriched boron offered them an easy cost-effective solution that did not include redesign / retrofit of existing facilities or systems. Boron Products' ability to produce enriched sodium pentaborate customized for each reactor's conditions eliminated the need for costly and confusing mixing of enriched boric acid and natural borax at the reactor site.

More recently, the use of higher fuel enrichments and the popularity of MOX fuels have placed further demands on reactivity controls at boiling water reactor sites. Enriched sodium pentaborate provides an excellent solution for these new requirements.

Boron Products has the ability to tailor and produce the exact enriched boron product for each customer's needs. Enriched sodium pentaborate and its related products have found application in various areas of the nuclear power industry. The company manufactures a standard grade of highly enriched sodium pentaborate for use in most reactor applications where operators wish to blend on site to achieve final enrichment. For those customers desiring custom enrichments, non-standard materials are available.

A summary of Boron Products' specifications and capabilities for enriched sodium pentaborate is presented on the following pages. A short summary of the physical properties of enriched sodium pentaborate follows below:

Physical Properties of Sodium Pentaborate

Form	White Crystals
Enrichment	To 99% at% ¹⁰ Boron
Formula	Na ₂ O•5B ₂ O ₃ •10H ₂ O
Specific Gravity	1.71 grams/cc(natural)
Boron Content	17.21% @ 99% ¹⁰ B
Thermal (n,∞) Cross Section (Barns)	3837

Solubility in Water

(natural isotopic composition)	
Temperature (°C)	% anhydrous salt by weight
0	6.28
10	8.10
20	10.55
30	12.20
40	17.40
50	21.80
60	26.90
70	32.25
80	37.84
90	43.80
100	50.30

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