

BORATED POLYMER FOR THERMAL NEUTRON SHIELDING

BONES

MAIN FEATURES

- Ideal material for neutron shielding applications with excellent attenuation factor
- Easily cuttable and adaptable to surfaces
- Lightweight and resistant to high temperature
- Variable thickness and dimensions
- Boron concentrations variable on request, up to 25% in weight
- Surface finish: smooth plain or nylon impression
- Resistant to external deterioration agents



DESCRIPTION

BONES is a flexible, lightweight, easy to manipulate and heat resistant polymer, containing a variable concentration of natural Boron, up to 25% in weight. Boron (in particular the Boron-10 isotope, whose natural abundance is 20%) has a high capture cross-section for thermal neutrons (3835 barn), which means that **BONES** has an excellent attenuation factor for thermal neutrons, up to 300.

Thanks to these features, **BONES** is a shielding material highly suitable for applications where the stray radiation fields are characterized by a non-negligible neutron component. The shielding power of **BONES** is maximized when it is directly coupled to concrete walls: the impinging neutrons are first thermalized by the concrete walls and then captured by the boron atoms contained in **BONES**. The attenuation factor is clearly proportional to both the **BONES** thickness and its Boron concentration.

The main applications are:

- Shielding for bunkers and access mazes of radiotherapy vaults, to minimize radiation leaks, to contain the secondary neutron dose absorbed by the patients, and to reduce the neutron activation of the components of the linear accelerator and the bunker itself
- Shielding for particle accelerators, for both industrial and research applications
- Shielding for electronic devices that must be protected from potential radiation induced failures caused by cosmic rays

BONES takes the form of sheets of variable dimensions and thickness, according to the customer's specific needs.

BONES can be easily manipulated and installed by non-specialized personnel; it can also be easily cut and shaped with common scissors.

The sheets are ready to be installed on concrete, metal or other material surfaces, using standard mounting techniques.

TECHNICAL SPECIFICATIONS

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| • Attenuation factor for thermal neutrons: 300 (data for 4 mm thickness, 25% boron enrichment) | • Available thickness: from 3 mm to 25 mm |
| • Boron atomic density per cm ³ : up to 1.6×10^{22} | • Bent radius: 12.7 mm |
| • Density: 1.16 ± 0.05 g/cm ³ | • Appearance and odor: <ul style="list-style-type: none"> ◦ State: rubbery solid ◦ Color: grayish black ◦ Odor: mild rubbery odor |
| • Temperature range: resistant up to 150° C | • Solubility in water: negligible |
| • Available dimensions: <ul style="list-style-type: none"> ◦ Width 50 cm x Length 50, 100 or 200 cm ◦ Width 100 cm x Length 100 or 200 cm | • Resistant to: oxidation, sunlight aging, heat |