

BORATED ALUMINUM

PRODUCT CAPABILITIES

CUSTOM MATERIAL

¹⁰B NEUTRON ABSORBER PROPERTIES

Boron Products, LLC has produced a true alloy incorporating boron as a second phase in standard aluminum compositions. Current programs utilize one of two alloys in several spent fuel storage and transportation applications. Non-structural applications typically use 1100 alloy + boron which are available in a variety of sheet and plate forms. Applications requiring structural alloys most frequently use 6351 + boron which combines the neutron absorption of ¹⁰B with the strength and thermal conductivity of standard alloy. Additional information on these products follows:

	<u>Physical Properties</u>	
	Alloy 1100 + B	Alloy 6351 + B
Typical Total Boron	0.5 to 4.5%	0.5 to 2.5%
Minimum ¹⁰ B Enrichment	95%	95%
Equivalent Natural Boron	2.7 to 24.6 %	2.7 to 13.6 %
Press Quenched Heat Treatment	Not Applicable	T5
Surface finish	Ra= 125 μ in.(3.2 μm)	
Dimensional Tolerances	Aluminum Association Standards	

NEUTRONIC PROPERTIES

Real time neutron transmittance and radiography are used to determine product acceptance. The minimum areal density based on the customer's requirements and the material thickness is determined by the following formula:

$$A = W \rho ET$$

Where A = Areal Density, g ¹⁰B/cm²
 W = Weight Percent total Boron
 ρ = Density, 2.7 g/cm³
 E = Enrichment, Weight % ¹⁰B
 T = Thickness, cm

Acceptance is based on direct comparison with established neutron transmittance standards. Overall distribution is confirmed by luminescence where a void as small as 1/32" (0.8mm) can be detected.

Typical 6351 + B Mechanical Properties

	Room Temp.	200 °C	Units
Ultimate Tensile Strength	45(32)	31(22)	KSI(kgf/mm ²)
.2% Yield Strength	40(28)	28(20)	KSI(kgf/mm ²)
% Elongation	10	12	

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