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Product Brief

Toshiba WHA (Tungsten Heavy Alloy) Material for Multi-Leaf Collimators

Highlights

- Requires only two-thirds the thickness of lead while delivering the same shielding properties.
- Very high density (17-18g/cm^3) making it ideal for shielding applications or collimating energetic x- and γ-radiation.
- Good thermal conductivity with minimal thermal expansion.
- Maintains its strength even in high temperatures.
- Exhibits high resistance to oxidization and corrosion.

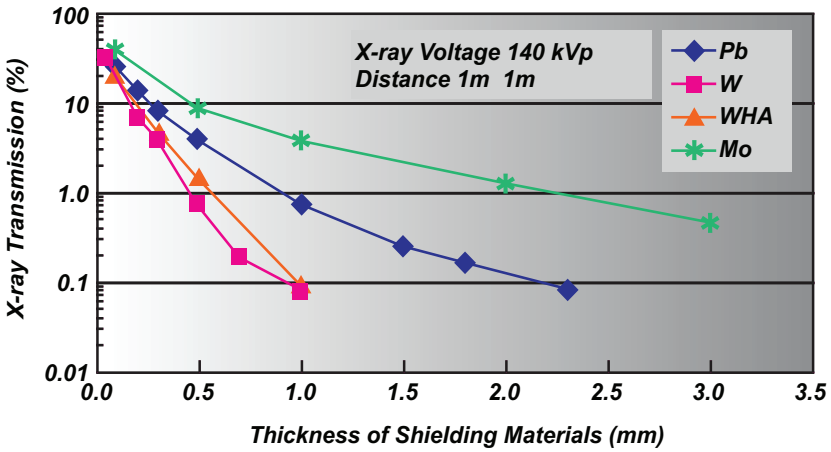
Description

Toshiba Tungsten Heavy Alloy (WHA) is ideal for shielding against X-rays and gamma radiation. It reduces the physical size of shielding components without reducing their effectiveness and requires only two-thirds the thickness of lead while delivering the same shielding results.

This is extremely important in linear accelerator medical systems, which utilize Multi-Leaf Collimators (MLC) to regulate the beam. The sophisticated shielding properties of WHA potentially increases the number of leafs in a collimator and enables a greater precision beam that targets only the area of the patient that requires treatment.

The chart below compares the thickness of WHA to tungsten (W), lead (Pb), and molybdenum (Mo), illustrating that thinner leafs can be used to obtain the same shielding properties as thicker leafs, enabling more leafs in the same space which improves beam precision.

Shielding Thickness Comparison



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Physical/Mechanical Properties of Toshiba WHA:

Characteristic	*Item*	*WHA–H60*
Density	*g/cm^3*	*18.0*
Thermal Conducitivity	*W/k • m (cal/cm • sec • °C)*	*130 (0.31)*
Thermal Expansion Coefficient	*$x10^{-6}/°C$*	*4.7*
Thermal Resistibility	*Ω cm*	*7.2×10^{-6}*
Extended Force	*N/mm^2*	*780*
Yield Point	*N/mm^2*	*710*
Elongation	*%*	*2*
Hardness	*HRA*	*59~66*
Transverse Rupture Strength	*N/mm^2*	*1670*

Cold Isostatic Pressing (CIP) and Pressing (molding) are the two methods used to form the material. The method is chosen based on final dimensions and the most efficient way to form the final shape. There are no differences in the characteristics of the material processed by either method.

The following dimensions are the largest dimensions that Toshiba can manufacture by each method:

CIP Formed: Dia. 250 x 250L
Mold: 175 square x 30
Dia. 200 x 30

All dimensions are in millimeters (mm).

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