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Borated Polyethylene Sheet Installation Instructions & Best Practices

Used for neutron shielding, borated polyethylene is an easy to work, non-toxic, and can be easily cut, drilled, or glued with ease of installation. Standard woodworking tools and machines can be used. Scrap can be safely disposed of by regular means. The standard weight at 1" thickness is ~5 lbs. per square foot. A 48" x 96" x 1" thick sheet will weight ~160 lbs.

Care should be taken to avoid radiation streaming at butted joints of the material. This can be accomplished easily by staggering the joints (where two or more layers are used in the installation), or by beveling the edges at 45 degrees with a standard circular saw. Consideration should be given to the location of the radiation source so as they are not in a straight-line orientation with the bevelled edges.

When the material is to be fastened to a concrete wall, the borated polyethylene can be bolted to the wall with one-quarter inch bolts. A "Fender" washer should be used with the bolts to help distribute the load on the borated polyethylene panel. Holes should not be countersunk, if possible, to avoid stress concentrations. The panels should be overlapped or beveled as mentioned above. The mounting bolts can be placed approximately four inches from each corner. When the borated polyethylene is mounted on a wood-stud type wall, then one-quarter inch woodscrews can be used for mounting in a manner similar to the concrete walls. Again, care should be taken that the edges are beveled or the sheets are overlapped to counter any radiation streaming.

In some installations, a sheetrock wall may already be constructed. In this case, the borated polyethylene panels can be mounted directly over the sheetrock, however the through-screws should always connect to the studs on the other side of the sheetrock. Installation to duct work takes a little bit more planning. The shielding weighs about five pounds per square foot (per inch of thickness @ 1" thick), so care must be taken to calculate the loading of the sheets on the duct work if they are mounted directly to the duct Since it may be undesirable to penetrate the duct work with screws, a wood frame may be built around the duct work. The borated polyethylene can then be fastened with wood screws to the framework. An alternate method would be to strap the shielding material directly to the ducting using metal strapping if the duct can withstand the additional weight.

Floor Installation

This material can be bolted to sub-flooring using one of the above-mentioned approaches. Additional flooring can be put over the borated polyethylene so that a finished tile-type flooring can be applied. It is important to note, however, that it is very difficult to cement

or glue any materials to the borated polyethylene, so such materials as tile cannot be cemented directly to a floor consisting of borated polyethylene. The compressive strength of Type 201 (5% Borated Polyethylene) material is 800 PSI.

Celling Mounting

In the case of ceiling mounting, the procedure would be similar to that of mounting to studs, however, it is suggested that screws be used at approximately 18" intervals to help distribute the load. The method of handling the material would be the same as with ordinary 4' x 8' sheetrock. Again, provision should be provided for overlapping, providing 45-degree beveled edges, or staggered butt joints. The material may also be suspended by ceiling hangers that can handle the weight.