

CONVERTING A SHIELDED ENCLOSURE TO AN ANECHOIC CHAMBER

The purpose of this article is to describe an alternative method for the construction of shielded, microwave, anechoic chambers. Currently, the practice is to place an order covering the materials and construction of absorber lined chambers, including shielding materials, installation, and testing when required. A point of interest worth considering is that, in most cases, the shielding materials are provided as a completely pre-fabricated package, requiring standard tools for on site installation; however, unfortunately, this concept is not normally followed for the microwave absorber when included. Suppliers commonly provide absorber material in 24 inch x 24 inch blocks which require, in many cases, considerable ingenuity to cut and fit the interior of a chamber. This problem becomes quite complex when the size and shape of the absorber approach those required for operation at lower frequencies. In addition, the increased manpower, tooling, and space to perform such operations can place additional burdens on facilities with limited space and budget constraints.

Most construction projects require that workers, performing many functions, be present and that a coordination of efforts is necessary to assure a timely completion with minimum interference between construction crews.

The concept of providing a complete, pre-cut, anechoic chamber kit, including all necessary parts and supplies, would minimize most potential problems. Consider a packaged kit which provides all necessary absorber pieces, pre-cut, painted, and numbered in accordance with an approved drawing, along with the necessary adhesive, packaged in boxes which identify the contents to the drawing numbers. The installation drawing is made from measurements of the chamber's interior dimensions which are usually submitted, by the customer, prior to any factory cutting of absorber material. In this way, any questionable areas can be defined and resolved, minimizing installation problems. This concept also provides any installer a method of planning the absorber installation which could include the determination of a storage sequence to allow for the systematic removal of absorber material from the storage area, in accordance with a planned procedure. One can readily realize the resulting advantage during installation, especially in a confined area.

Additional advantages include the flexibility of using relatively unskilled labor, since the need to measure, prepare cutting jigs, cutting, re-painting cut surfaces, and fitting is eliminated. One detail requiring serious consideration is the marking of the chamber's interior surfaces in accordance with the installation drawing. This normally involves marking the chamber's internal

surfaces with, for example, chalk lines in basic 24 inch x 24 inch squares and numbering special shapes and areas.

This can be very useful in cases where the interior dimensions are not uniform and require special complex cuts or mating pieces.

Take, for example, the covering of a 20 x 20 foot receive wall with 24 inch pyramids which must mate to an adjacent wall designed with 8 inch pyramids. To assure a good mechanical fit, and an electrically reflection free corner, a block of 8 inch pyramid would be pre-cut into a special wedge assembly which mates into the 24 inch pyramid, taking into consideration a four inch base thickness of the 24 inch pyramid. This allows the second block out to be a standard 8 inch pyramid and begin at a desired 24 inch distance from the back wall.

An additional advantage is the ease of replacement of specific absorber pieces at a future date, due to nominal wear and other factors. One only has to determine the part from the installation drawing and order a replacement.

Following acceptance of the chamber's installation drawing, the responsibility to assure that all required cut assemblies meet the drawing's dimensions, rests with the absorber manufacturer. The buyer's only need is to place his order for the list of material specified on the installation drawing. Any allowance for extras would be for standard pieces only, since rejects which could, and do, occur during "in house" measurement and cutting need not be considered.

This concept can be especially useful for updating existing shielded rooms or facilities since it would allow for the complete determination of the cost of a specific absorber design quickly and accurately.

Size and shape is not a constraint. To date, the concept has been successfully used in various chamber designs from a 3 x 3 x 3 foot cube to a 35 x 35 x 55 foot rectangular room to a 70 foot tapered design, which included a pre-cut transition from pyramidal to circular within the 50 foot tapered portion of the chamber.

The Anechoic Chamber Kit is applicable to any chamber configuration, including rectangular and tapered designs, and has been successfully utilized in many applications throughout the world.

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