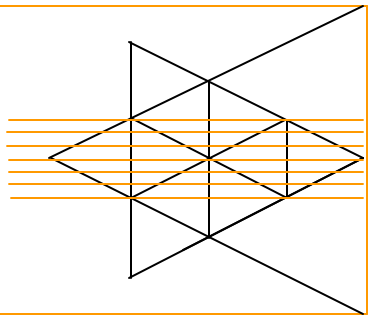
CUMING MICROWAVE CORPORATION

Technical Data



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APPLICATION NOTE 300-2

ABSORBER INSTALLATION USING CONTACT ADHESIVE

1.0 Installation Procedures

This installation procedure presents a systematic method for installing microwave absorber materials in an anechoic chamber. While this presents a step-by-step approach, the procedure requires experience and we encourage you to speak with our Technical Service Department with specific questions you may have. The following guidelines suggest techniques for layout, chalking reference lines, adhesive application, safety consideration, material application, and special absorber field cuts to allow doors, lights, and HVAC penetrations to be adequately shielded.

1.1 Layout and Chalking Chamber Reference Lines

1. Become familiar with the room and the absorber layout.

2. Erect adequate, movable and, above all, safe scaffolding inside the chamber.

3. Measure the room verifying the room dimensions against the absorber layout drawing dimensions.

4. If dimensional variations exist, locate the physical center of all the walls and ceiling by snapping diagonal corner-to-corner chalk lines.

5. Transfer the height or distance of the center locations to all vertical and horizontal corners.

6. From the center location, using a chalk line, snap a centerline horizontally and vertically on all walls and the ceiling.

7. Locate all absorber transitional areas, i.e., any areas where pyramidal and wedge absorbers meet. Using a chalk line, snap the layout outline of the transitional area.

8. Repeat the above procedures on all walls and ceiling.

9. Take special precautions to clean the scaffolding planks and the chamber floor thoroughly to prevent smearing of the absorber surfaces with excess chalk.

1.2 Absorber Application

1.2.1 General

It is desirable to start the absorber installation on the ceiling. This helps eliminate damage to any material on the sidewalls by the movement of the scaffolding or moving man lift. All surfaces should be as clean and smooth as possible. The recommended method of installation is to start at the middle of the ceiling or wall, and proceed toward the corners.

Because the absorber is not perfectly square, due to the fabrication techniques, special attention must be given to insure the match between adjacent pieces has minimal gaps or crowding. The piece has some flexibility and it can be squeezed into place to form a tight seam with adjacent pieces.

1.2.2 Adhesive Selection, Safety Considerations, Required Equipment

The absorber can easily be applied using a contact adhesive, such as Stabond N-134 or Cambond 934.

The solvent used in Stabond N-134 is trichloroethane, which, while nonflammable and the least toxic of the chlorinated solvents, it is nevertheless somewhat toxic. The Material Safety Data Sheet recommends a working environment of less than 350 ppm maximum. Because of the small working area of absorber application, (usually less than 20 square feet at a time) the concentration of 1-1-1 trichloroethane rarely exceeds 50 ppm and can easily be tolerated by using a respirator approved the MSHA (Mining Safety Health Administration) and NIOSH (National Institute for Occupation Safety and Health) for the above mentioned material. A 3M NO.8712 Organic Vapor Respirator, or equivalent, will provide adequate worker protection of the absorber installers. Workers not in the immediate installation area will not require respirators due to the low concentrations of solvent vapors, when adequate ventilation is provided.

1.2.3 Application Instructions for Wedge Materials

1. Beginning in the center of the ceiling or wall, roll a 2-by-6 foot area of adhesive insuring that the roller evenly distributes adhesive on the surface.

2. Apply the adhesive to the backside of the absorber material in a similar manner taking care not to damage the pointed tips. Touching each adhesive surface will easily show when adhesion is ready. Should the allowable work time go beyond the 90-second period, or the surface does not appear tacky, a quick application of adhesive with the roller will renew the bonding surface.

3. Gently pick up the absorber piece and manually position the absorber.

4. Start contact at one edge, making certain that the horizontal and vertical edges of the absorber are parallel. Attach the remaining surface to the ceiling/wall and push the absorber in place in a number of areas for positive adhesion over the entire surface area. Care should be taken while pushing the absorber in place, not to damage the fragile absorber tips.

5. Repeat steps 1-4 for each piece of absorber until material covers the ceiling and wall surfaces.

6. Variances in the compressibility of the absorber material, may require a chalk line at either 24 inches or one-eighth to one-quarter less than 24 inches, from the previously applied line absorber.

7. Repeat steps 1-4 for each piece of absorber insuring that the absorber is aligned.

8. Repeat this procedure toward the corners until the entire surface area is covered.

1.2.4 Application Instructions for Pyramidal Material

1. Follow all instructions contained within Section 1.2.1, substituting 2-by-2 foot.

2. Care should be taken to obtain a snug compression fit between adjacent pieces of absorber.

1.3 Door/Pit Material Installation

1. At the door location, check the swing and radius, and calculate the angle cut on the absorber required for the door swing. After this completed, allow at least another 1.5 inches on the angle cut for additional clearance.

2. If the opening permits, install the absorber across the opening, and cut and trim the opening as shown in Figure 1.

3. If the entire cut cannot be made with the absorber installed, attach each piece of absorber and mate very lightly with the door closed.

4. Open and close the door to provide assurance the door out and installation is properly achieved to allow the door to function without the absorber rubbing, binding, or catching on any existing chamber structure.

5. Repeat the above procedure for each individual door opening.

6. After all door cuts are made and the absorber is properly adhered, spray paint the exposed cuts with latex paint. This should be allowed to dry 2 to 4 hours.

1.4 Light Openings

1. Cut all light openings in the field as directed by the absorber application supervisor. The openings will vary depending on the location of the light. The cuts should flare away from the reflector surface to minimize diffraction from the light opening.

2. Cover the first 3 to 4 inches adjacent to the light fixture with fire retardant sheeting to prevent possible absorber charring. One recommended material is Nomex sheeting Type 410. This material is heat resistant as well as fire retardant, and should be bonded to the cut absorber surface.

3. Paint the remainder of the cut surface as described in paragraph 3.6, Step. 5.

1.5 Ventilation Openings

1. All ventilation duct penetrations, through the walls into the chamber, will be approximately 2 ft. x 2 ft. openings.

2. A 2 ft. x 4 ft. piece of vent foam will be applied over this opening by applying Velcro around the metal opening.

3. The backside of the absorber will have Velcro strips attached.

1.6 Sprinkler Openings

All sprinkler opening cutouts will be made in the field under the coordination of the absorber application supervisor and the fire detector contractor.

Most local and state fire codes require the head of the sprinkler to protrude down past the ends of the tips of the absorber, which is attached to the ceiling. This is satisfactory in many cases and we can supply special lossy foam hollow tubes to snap around the shaft of the sprinkler, similar to water pipe insulation.

Alternately, it may be desirable to use telescoping “pop-out” sprinkle heads, which remain recessed within the absorber, but push a plug of absorber out as they extended during use. Cuming Corporation can provide more details on the approach.