

# TECH TIPS

## Dual-Density Fiberglass Insulation

By Jerry Sipes, PH.D., P.E.

There are many different types of insulation/liners that can be used in terminal units. Each liner type has a different sound energy absorption and reflection, and may make a minor or major impact in room acoustics depending on terminal type, installation, and building type. Each liner type is available in different thicknesses, and thus, different R-values.

Dual-density fiberglass insulation is the most widely used insulation for HVAC applications due to low cost, availability, excellent sound absorption characteristics, and strong resistance to air velocity erosion. Using single density fiberglass with an exposed surface is not recommended for use in terminal units because of the severe air velocity erosion of the material and resulting glass fiber entrainment that may occur.

The porosity and inherent structure of the flame retardant glass fiber blankets are highly effective in reducing thermal transfer. The ease of cutting and the flexibility of this product make installation very easy compared to other insulation liners.

The combination of a high density skin and low density core provide superior acoustical absorption values in the high, mid, and low frequency ranges normally encountered in appliances and HVAC equipment. As a result of these considerations, dual-density fiberglass is the de facto liner for terminal unit construction for the AHRI 880 terminal unit certification program tests.

A common concern about the use of fiberglass insulation is the perceived risk of fiberglass exposure to humans in enclosed spaces. Several studies about the risk of fiberglass exposure

(vitreous fibers) and lung cancer or nonmalignant respiratory disease have been conducted and the results are summarized in the following documents.

In 2000, the U.S. National Academy of Sciences found “no significant association between fiber exposure and lung cancer or nonmalignant respiratory disease in the MVF (Man-made Vitreous Fibers) manufacturing environment.”<sup>3</sup>

In 2001, the World Health Organization’s International Agency for Research on Cancer (IARC) updated their list of possible carcinogens and removed insulation glass fibers. This was based on a review by an international panel of experts for which the IARC reported “. . . studies published during the 15 years since the previous IARC Monographs review of these fibers in 1988 provided no evidence of the increased risks of lung cancer or of mesothelioma (cancer of the lining of the body cavities) from occupational exposures during the manufacture of these materials, and inadequate evidence overall of any cancer risk.”

In this report, the IARC downgraded the classification of the insulation glass fibers from Group 2B (possible carcinogen) to Group 3 (not classifiable as to carcinogenicity in humans). This reclassification moved all glass wool fiber materials commonly used in thermal and acoustical insulation to the Group 3 classification<sup>1</sup>.

In 2004, the U.S. Department of Health and Human Services: Agency for Toxic Substance and Disease Registry (ATSDR) released the Toxicological Profile for Synthetic Vitreous Fibers. This profile reported that “exposure to SVFs [Synthetic Vitreous Fibers] are low [and] that

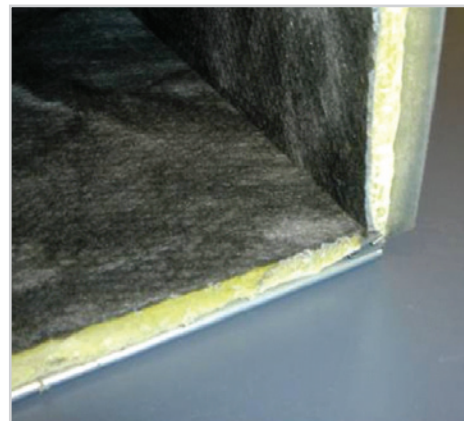


Figure 1: Dual Density Fiberglass Liner

epidemiological studies showed no consistent evidence of disease among groups of workers involved in the manufacture of SVFs.” This profile is consistent with the IARC’s studies<sup>2</sup>.

The above studies are consistent in their findings – fiberglass insulation does not pose a health risk in typical HVAC applications. Dual-density insulation provides excellent acoustics, thermal properties, and erosion resistance, and is therefore the insulation of choice in VAV terminals.

#### References

1. International Agency for Research on Cancer (IARC), Press Release No. 137: IARC Monographs on the Evaluation of Carcinogenic Risks to Humans: Man-Made Vitreous Fibres, WHO/IARC, Lyon, France, 2001.
2. U.S. Department of Health and Human Services, Agency for Toxic Substance and Disease Registry (ATSDR), Toxicological Profile for Synthetic Vitreous Fibers, ATSDR, Washington, DC, 2004.
3. U.S. National Academy of Sciences, Committee on Toxicology, Review of the U.S. Navy’s Exposure standard for Manufactured Vitreous Fibers, National Academy Press, Washington, D.C.,