

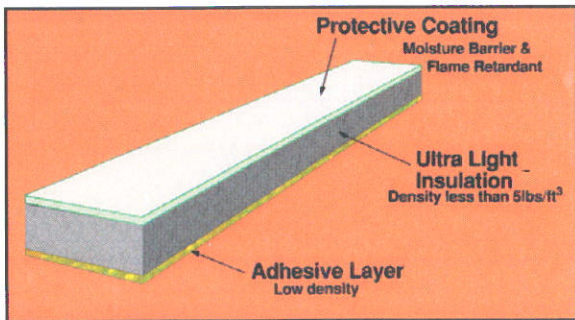
CTD's CryoCoat™ UL79

Robust, Lightweight, and Easy to Apply

The rigors of insulating cryogenic equipment with foam materials is demanding and costly, particularly when long-term or repetitive use is required. CryoCoat™ UL79 with a specific gravity of less than 0.1 g/cc (7lbs/ft²) has been demonstrated to meet these insulating demands. The CryoCoat UL79 cryogenic

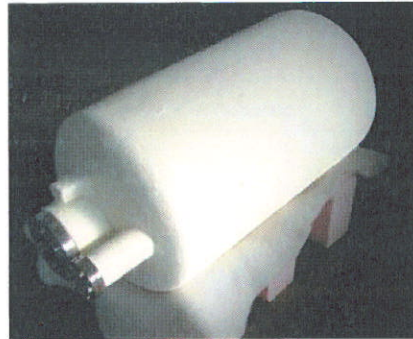


insulation is a three part system consisting of a modified syntactic foam insulating material, a specially designed high strain adhesive, and a moisture resistant outer protective coating. Designed initially to insulate the reusable cryogenic tanks planned for the X-33 reusable launch vehicle. This required excellent insulation and robust mechanical performance at temperatures ranging from liquid hydrogen (20 K/-423°F) upwards



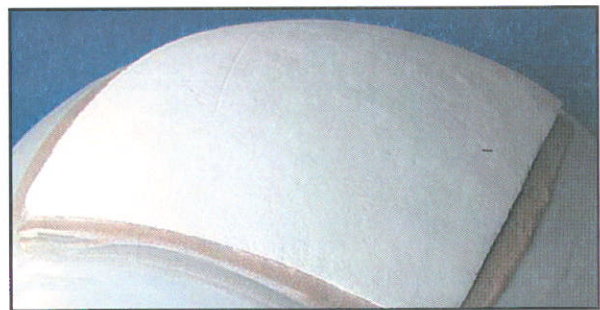
Layered cryogenic insulation system - each layer can be optimized to enhance system performance

to the re-entry temperatures anticipated for the tanks. In addition, CryoCoat™ UL79 can operate in a vacuum with negligible out-gassing and survives repeated autoclave cycles of 100 psi and 177°C with less than a 1% loss in weight or volume. CryoCoat™ UL79 has been qualified to fly on the space shuttle and the space station. It has been specified as a back-up safety insulation for the superconducting magnet planned for the Alpha Magnetic Spectrometer 2 (AMS 2) experiment scheduled to fly to the space station in 2007. The CryoCoat™ UL79 will slow the evolution of liquid helium to a manageable rate should there be a loss of the primary insulating vacuum protecting personnel on the ground or enabling a safe flight to orbit.



Alpha Magnetic Spectrometer 2 Helium vessel which will contain the superconducting magnet, shown insulated with 3mm of CryoCoat UL79 applied using the partially cured tile process

Most recently a cost-effective method of applying partially cured tiles of CryoCoat™ UL79 has been developed that provides excellent thickness control, as well as being a convenient way to insulate, large and complexly shaped equipment.



Application of a partially cured tile to a compound curved surface

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