



MAIN MENU



ABOUT US

EMU

Projectile Size & Suit Failure

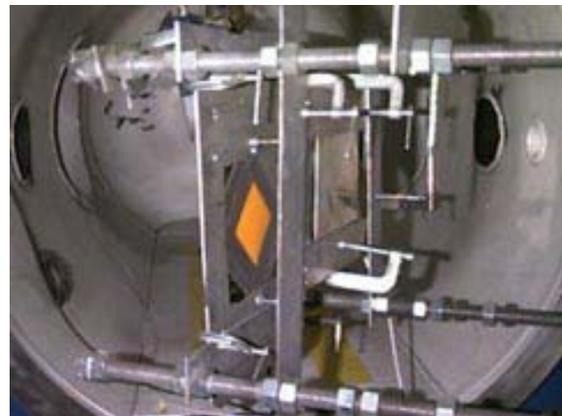
The primary objective for this test series was to determine projectile sizes that would result in threshold penetration failure of the suit material sample at various impact speeds and angles. Failure was defined as an impact that completely penetrates the final bladder layer of the sample layup, an impact that causes broken fibers or spall on the rear face of the bladder layer, or an impact that causes the bladder to leak air or oxygen. An additional goal was to learn how damage to the suit material samples increased with projectile size, for use in calibrating ballistic limit formulas for use in critical hole size probability calculations.



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Three types of target samples were tested: Basic Suit Layup samples, Glove Finger Layup samples, and Glove Gauntlet/Thermal Meteoroid Garment (TMG) Overlap Layup samples. The last category will also be referred to as "Glove Gauntlet Layups" or "Glove Overlap Layups". They represent the area of a space suit where the gauntlet portion of the suit overlaps the material in the arm. Each type of target was supplied as a panel 10.4 cm (4") square, made up of several thin layers of material, as shown mounted in the target chamber of the light gas gun at right.



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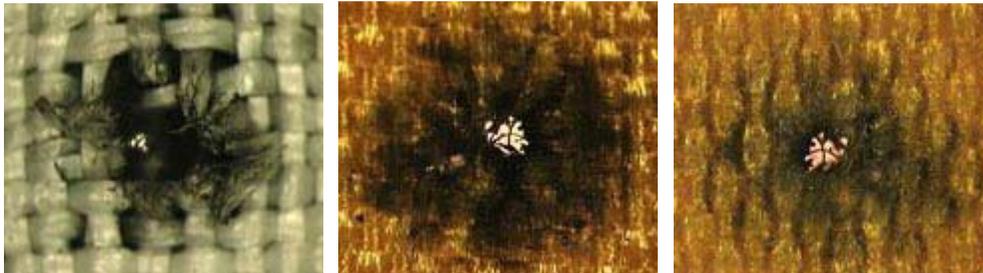
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Projectiles used in this test series were primarily aluminum spheres, ranging from 0.2 mm to 1.0 mm in diameter, plus some nylon, sapphire, and steel spheres. Impact angles ranged from normal (which we define as a 0° impact angle) up to 60°. Impact velocities were from less than 4 km/s up to approximately 7 km/s.

Projectile sizes (AI) required to cause target failure (at the velocities defined above) were between 0.5 and 0.6 mm for Basic Suit samples, approximately 0.3 mm for Glove Finger samples, and between 0.8 mm and 1.0 mm (for 0° impacts) on Glove Gauntlet samples.



Each type of EMU target was supplied as a panel 10.4 cm (4") square, made up of several thin layers of material.