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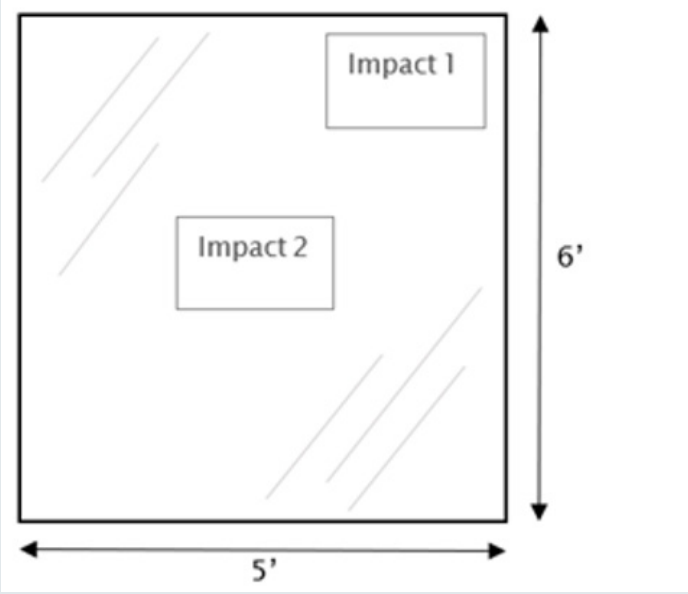
ACRYLITE® Soundstop
Impact Resistance Tests

Transparent Noise Barriers

Introduction
Sound Barriers are often subjected to impacts caused by stones and other debris thrown up by vehicle tires or even hurricane force winds. In some cases, even a vehiclular accident can impact the noise barrier. Therefore, it is important to construct a noise barrier from materials able to withstand these impact forces. The following test methods are used to evaluate the impact resistance of ACRYLITE® Soundstop noise barrier sheet:

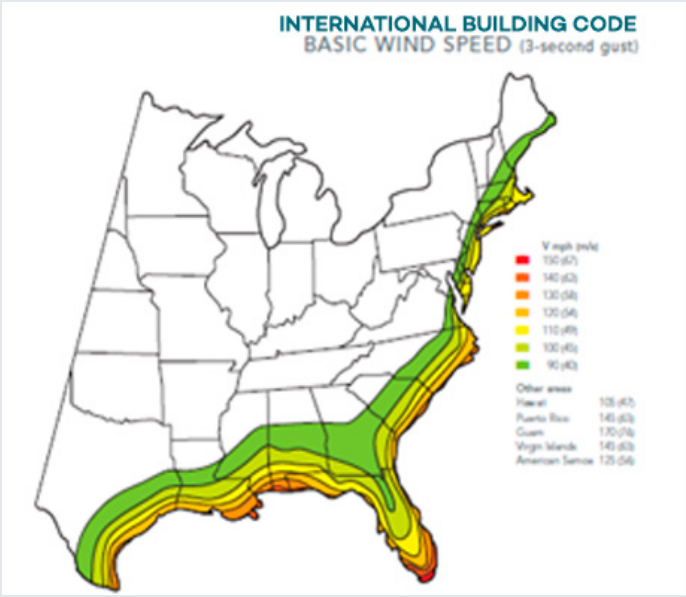
ASTM E1886 and ASTM E1996
Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes (also known as the Miami Dade County Large Missile Impact Test)

The panel is impacted by a piece of lumber weighing approximately 9 lbs, measuring 2" x 4" x 92" in size, and traveling at a speed of 50 feet per second (34 miles per hour). Multiple impacts are recorded with at least one impact in the approximate center of a 5' x 6' panel and another near a corner of the panel.



Miami Dade County Test Configuration – Panel is impacted in two locations as depicted

Test Results:
ACRYLITE® Soundstop XT (15mm) and ACRYLITE Soundstop GS CC (20mm) pass in accordance with the most recent E1996 standard, without sustaining damage. Greater thicknesses of ACRYLITE® Soundstop sheet would also be expected to pass with similar results.



Areas vulnerable to hurricanes are the US Atlantic Ocean and Gulf of Mexico coasts where the basic wind speed is greater than 90 mph as well as Hawaii, Puerto Rico, Guam, and the Virgin Islands.

European Standard EN 1794-1, Annex C
Road traffic noise reducing devices – Non-Acoustic performance. Part 1: Mechanical performance and stability requirements. Annex C: Impact of Stones

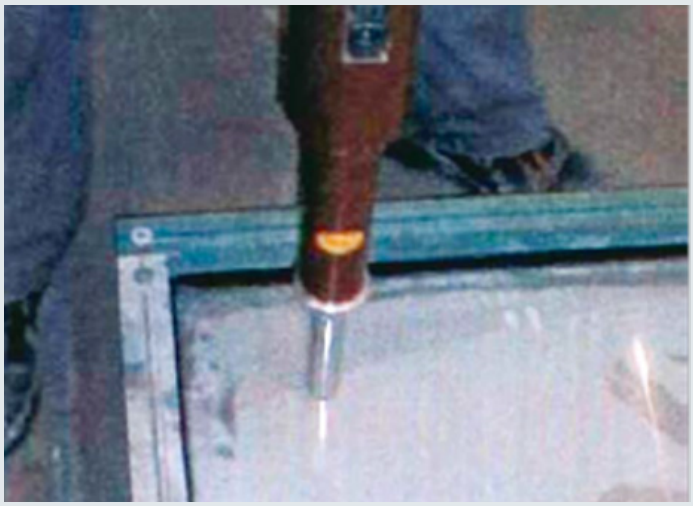
Testing with a mechanical hammer is used to simulate stone impacts. Three hammer strikes at 30 Nm ± 1 Nm (22 ft*lbs) are performed which are roughly equivalent to a 77 gram (0.17 lb) object that is traveling at 100 km/hr (60 mph). One of the test strikes must be near one corner of the test panel within a test area bounded by a margin of 125 mm (5") from the edge of the panel, one must be near the center of the test panel, and the third is chosen at random. The exact position of the point to be tested must

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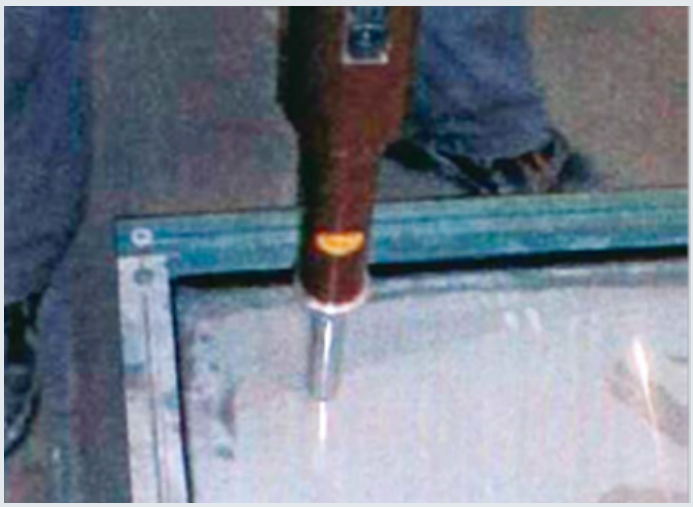
be chosen to be representative of the panel as a whole and avoid areas of local strength.

Test Results:
Three points of impact were marked on the panel of a 12mm ACRYLITE® Soundstop sheet. Point 1 is a corner point with a distance of 125 mm (5") from the upper edge and 125 mm (5") from the side edge. Point 2 is at the center of the sheet, and point 3 was chosen at random.

At the conclusion of the test there was no evidence of penetration, destruction, formation of cracks, or chipping on the ACRYLITE® Soundstop panels.



Point #1 – Edge impact with mechanical hammer



Point #2 – Center impact with mechanical hammer

European Standard EN 1794-2:2011, Annex B
European Standard EN 1794-2:2020, Annex A

Road traffic noise reducing devices – Non-Acoustic performance. Part 2: General safety and environmental requirements. Annex B: Secondary safety: danger of falling debris.

Testing consists of a symmetrical full steel double cone impactor weighing 400 kg (882 lbs) striking the center of the test specimen. The impactor shall swing on 2 wires fixed on 2 points 1.5 meters above the structure holding the specimen at 12.1 mph in order to reach the impact energy of 6.0 kJ.



ACRYLITE® Soundstop GS CC with framing system for EN 1794-2, Annex B test

Risks of falling debris - Pendelum Impact (>15mm):
Test Results

EN 1794-2:2023	Annex B	Pass — Class 5
EN 1794-2:2011	Annex B	Pass — Class 3
EN 1794-2:2020	Annex A	Pass — Class 3

Only the falling debris caused by the first impact shall be taken into account. Free pieces are then evaluated after completion of the test. Due to the fragment retention filaments contained in ACRYLITE® Soundstop GS CC sheet, falling of large fragments was prevented, thus obtaining a Class 3 certification.

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