

Lab Work Request # **DCAE-68U3TU**
Laboratory Location: Columbus, OH

SUBJECT: **Accelerated Aging of Panels**

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OBJECTIVE

Subject steel skinned SIP panels to 15 cycles of ASTM 1183C to generate durability data.

SUMMARY

Test specimens were aged in accordance with ASTM 1183 section C. Specimens were tested every 3 cycles. After 15 cycles there was no decrease in performance relative to the original control specimens. ICC AC05 requires 80% strength retention after 3 cycles. Specimens tested in this study retained 100% of the original control strength after 15 cycles.

SAMPLE IDENTIFICATION

Metals USA submitted metal skinned SIP Panel sections and EPS foam. OSB was laminated to the submitted foam to simulate an OSB skinned SIP. Two inch square test specimens were cut from the submitted and laminated panel sections.

EXPERIMENTAL

Test specimens were randomized, and sorted into 6 groups of ten per panel type. One group was tested as a control. The remaining five groups were subjected to accelerated aging in accordance with ASTM 1183 test condition C. One aging cycle consists of:

- 48 hours in an oven at 160°F
- 48 hours immersed in water at 72°F
- 8 hours in a freezer at -70°F
- 64 hours in an environmental chamber at 101°F and 100% relative humidity

Every three cycles a group of 10 specimens was removed and conditioned at 72°F and 50% relative humidity until they attained a constant weight. Samples were then tested in accordance with ASTM C297 (Test Method for Tensile Strength of Flat Sandwich Constructions in Flatwise

Plane). The ultimate strength and percent substrate failure were recorded. At the end of 15 cycles the final group was allowed to condition at 72°F and 50% relative humidity and tested.

RESULTS AND DISCUSSION

The metal skinned specimens tested retained 100% of their initial strength after 15 cycles of accelerated aging. The OSB on the OSB skinned specimens began to deteriorate immediately, and were untestable after 6 cycles. This was expected because the OSB was not protected from the moisture in the aging method.

ICC Acceptance Criteria 05 requires adhesives to maintain 80% of their original strength after 3 cycles to be considered durable enough for use in sandwich panels. 100% strength retention after 15 cycles demonstrates the exceptional durability of the tested panels.

Metal Skinned Panels			OSB Skinned Panels		
Aging Cycles	Average Tensile Stress (psi)	Substrate Failure	Aging Cycles	Average Tensile Stress (psi)	Substrate Failure
Control (0)	34	100% Foam	Control (0)	35	100% Foam
3	33	100% Foam	3	17	100% OSB
6	34	100% Foam	6	n/a	
9	34	100% Foam	9	n/a	
12	31	100% Foam	12	n/a	
15	34	100% Foam	15	n/a	