

# SOUTHWEST RESEARCH INSTITUTE®

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## **FIRE PERFORMANCE EVALUATION OF KINETICS NOISE CONTROL'S WAVE HANGER NON-RESTRAINED, LOAD-BEARING FLOOR/CEILING ASSEMBLY TESTED IN ACCORDANCE WITH ASTM E 119-08a, STANDARD TEST METHODS FOR FIRE TESTS OF BUILDING CONSTRUCTION AND MATERIALS**


**FINAL REPORT**  
Consisting of 24 Pages

**SwRI® Project No. 01.15014.01.004**  
**Test Date: March 4, 2010**  
**Report Date: March 16, 2010**


Prepared for:

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## OBJECTIVE

The objective of the test described in this report was to evaluate the fire resistance of a non-restrained load-bearing floor/ceiling assembly constructed with Kinetics Noise Control's Wave Hanger.

## TEST METHOD

The ASTM E 119-08a test method is intended to evaluate the duration for which a building element will contain a fire, or retain its structural integrity, or display both properties dependent upon the type of building element involved, during a predetermined fire exposure time. The test exposes a specimen to a standard fire controlled to achieve specified temperatures throughout a specified period. When required, the fire exposure is followed by the application of a specified standard fire hose stream applied in accordance with ASTM E 2226.

This standard is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled laboratory conditions, but does not by itself incorporate all factors required for fire hazard or fire risk assessment of the materials, products, or assemblies under actual fire conditions.

This report describes the test results obtained for a non-restrained load-bearing floor/ceiling assembly constructed with Kinetics Noise Control's Wave Hanger. The performance of the assembly is expressed in terms of the transmission of heat and hot gases during the standard fire exposure to the unexposed side while sustaining the applied load during the classification period. The results presented in this report apply specifically to the materials tested, in the manner tested, and not to the entire production of these or similar materials, nor to the performance when used in combination with other materials.

## TEST ASSEMBLY

<b>Materials:</b>	<b>Provided By:</b>	<b>Received On:</b>
• Bosie Cascade 9-1/2-in. wood I-joists (BCI® 5000s-1.8 SP) and 1-1/2 VERSA-LAM	Client	February 19, 2010
• Kinetics Noise Control's Wave Hangers 22 and 44 Design	Client	January 19, 2010
• 3/4-in. thick T&G structural wood panels	SwRI	-
• 5/8-in. thick Type "C" gypsum	SwRI	-
• 0.5-pcf fiberglass insulation (24 in. wide × 96 in. long × 6-1/4 in.)	SwRI	-
• 7/8-in. tall, 20-ga, metal drywall furring channel	SwRI	-

### Sample Description and Construction:

See Appendix A for Client-provided drawings (construction details).

## RESULTS

<b>Test Date:</b>	March 4, 2010
<b>Test Witnesses:</b>	Mr. Matt Golden, representing Kinetics Noise Control Mrs. Angela Waters, representing Kinetics Noise Control Mr. Andre Garabedian, representing Garabedian Associates Mr. Guy Anderson, representing BCI Mr. Jeffery Olson, representing BCI
<b>Ambient Temperature:</b>	60 °F

**Relative Humidity:**

52%

**Instrumentation:**

The floor/ceiling system was instrumented with a total of 28 thermocouples (TCs.) Nine TCs designed in accordance with ASTM E 119-08a were positioned on the unexposed surface of the floor system with one TC located approximately at the center of the floor system, four located approximately at the center of each quarter section, and four placed intermediately between each quarter section. The assembly was also instrumented with nineteen engineering TCs. Twelve of the engineering TCs were located on the bottom surface of the wooden I-joists and the other seven TCs were located on the unexposed surface of the base gypsum layer. One displacement transducer was used to measure deflection at approximately the center of the assembly. Nine furnace probes designed in accordance with ASTM E 119-08a requirements were used to measure the furnace temperature environment and a pressure transducer was used to measure the furnace pressure.

**Load:**

A 45-psf load was applied using SwRI's hydraulic load frame equipped with nine cylinders and distributed equally over 18 contact points. Joists 2 and 8 of the floor assembly were each loaded with seven concrete blocks weighing nominally 65 lb for a total nominal pre-load of 455-lb per joist. The total combined loading of the hydraulic jacks and concrete blocks was 50-psf. This load was applied over 180 ft<sup>2</sup> for a total nominal load of 9000 lb. The resulting pretest deflection from the total load was 0.25 in. After determining the pretest deflection, the deflection reading was zeroed. Loading with the hydraulic jacks was verified using a calibrated load cell. See Appendix A for drawings of the hydraulic jack layout and block locations.

**Observations:**

Observations made during the test are located in Table 1. Observations of the exposed surface of the system were made using an internal furnace camera.

**TABLE 1. OBSERVATIONS.**

<b>Time (min:s)</b>	<b>Observations</b>
Pretest	Pretest deflection is 0.25 in. under pretest load.
00:00	Furnace burners ignited.
01:28	Paper surface of gypsum flashes.
04:38	Additional paper flashing.
10:00	Engineering TCs registering temperature increase.
20:00	Deflection is 0.155 in. Gypsum joints on exposed surface are visible.
30:00	No visible flaming.
40:00	Deflection is 0.345 in.
50:00	No flaming observed at exposed surface gypsum joints.
60:00	Deflection is 0.500 in. Temperature criteria met. Test continued for engineering data.
62:00	Increase in flaming observed at exposed gypsum joints.
65:00	Flaming further increases at exposed gypsum joints.
66:00	Exposed gypsum layer is beginning to fall away from exposed side of ceiling system.
68:00	More gypsum falls away from exposed side of system. Test terminated.

**Hose Stream Test:** Not required for floor/ceiling assemblies.

**Rating Obtained:** 1 h

**Results:** The floor/ceiling assembly successfully sustained the applied load for the 1-h fire-exposure period and the unexposed surface of the floor system met the ASTM E 119-08a temperature rise criteria. The acquired data is located in Appendix B in graphical form. Photographic documentation is included in Appendix C.

**Surveillance:** A third-party surveillance was conducted on Kinetics Noise Control's Wave Hanger 22 and 44 design. Copies of the surveillance report are on file at SwRI. The presence of the third-party inspector's markings located on the boxes of Wave Hangers received for testing was verified upon receipt by SwRI. (See Appendix C, Figure C-4).

**Deviations:** None

### CONCLUSION

Based on the test results, the floor/ceiling assembly constructed with Kinetics Noise Control's Wave Hangers obtained a 1-h fire-endurance rating while subjected to a 50-psf load, and tested in accordance with ASTM E 119-08a.