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### Swifter Constructed – High Energy Efficient with Thermomass® Building System (Approval: Z-21.8-1878)

#### ANSI/UL 263 FOUR HOUR FIRE TEST

The THERMOMASS® Building System was invented in 1980 and has been used successfully around the world for the past 15 years. However, from time to time there have been questions as to how the THERMOMASS Building System would perform in a fire situation.

In 1989, Underwriters Laboratory (UL) conducted a fire test utilizing ANSI/UL Procedure 263 on behalf of Composite Technologies Corporation (CTC) and Dow Chemical, Styrofoam\* Group. The test specimen was constructed of a 15 cm interior wythe, 5 cm of Dow Styrofoam brand insulation, and a 5 cm exterior wythe of concrete, held together with **CTC's fiber-composite PC connectors**, placed at 40 cm on center. The 5 cm concrete wythe was completely suspended outside the fire test area by the Styrofoam and CTC's fiber-composite PC connectors.

At the beginning of the test, the 5 cm external concrete wythe's surface temperature registered 20,3°C. The interior test chamber was heated to 926,7°C at the end of one (1) hour. At the end of two (2) hours, the interior chamber was recorded a temperature of 1010,0°C. At the end of four (4) hours, the temperature was 1093,3°C. This followed the standard UL time/temperature profile. At the completion of the four (4) hour test, the internal temperatures of the 15 cm concrete wythe of the test specimens reached 392,4°C in the area surrounding fiber-composite connectors. The surface temperature next to the Styrofoam was 206,6°C. **The average external surface temperature of the 5 cm concrete wythe was only 41,2°C, which was 100,2°C below the acceptable temperature for four hour rating.** Thus showing a temperature rise of only 3,17°C at the end of four (4) hours, while the opposite side of the test panel was recording a temperature reading of 1093,3°C.

After the 4 hour exposure, the test specimen was removed from the test chamber and according to UL procedure and was subjected to a water stream from a fire hose at 45 psi (3,17 kg/cm<sup>2</sup>) for 45 seconds. The entire test specimen maintained its integrity without cracking.

A portion of the test specimen's fascia cover was removed. The 5 cm Styrofoam brand insulation contracted to 2,54 cm on the side exposed to the heat and a dead air space of approximately 2,54 cm was observed. CTC's fiber-composite PC connector remained fully intact with only the non structural red collar distorted due to the heat. An attempt was made to pull the fiber-composite PC connectors from the concrete, but they could not be removed.

The above fire tests have once again proven CTC's commitment to provide a quality product with confidence, the THERMOMASS Building System.