

# Summary of Testing in Support of International Building Code Code Change Proposal, G165

By American Wood Council

G165-PC 2 proposes a special occupancy provision for a Group R-1 or Group R-2 building of Type IV-Heavy Timber construction, similar to the existing Type IIA (1-hour) special occupancy provision found in Section 510.6 of the IBC. It permits a height increase from 85' to 100', and an increase in the number of stories from five to nine over current Type IV limits. G165-PC2 requires a 2-hour fire resistance rating in accordance with ASTM E119 for all loadbearing elements and not less than two layers of 5/8-inch Type X gypsum on all heavy timber surfaces.

AWC conducted two demonstration fire tests of a typical residential occupancy at Southwest Research Institute, San Antonio, TX, showing how protected Cross Laminated Timber (CLT) fares under a compartment fire estimated at the 95<sup>th</sup> percentile of modern residential fuel content loading.

CLT used for the tests complied with ANSI/APA PRG 320 and was composed of five laminations, about 6<sup>5</sup>/<sub>8</sub>" thick, which is typical of taller CLT structures. A nail laminated timber ceiling was used for one of the tests. In both tests, the floor/ceiling assembly was loaded to a uniform 40 psf.

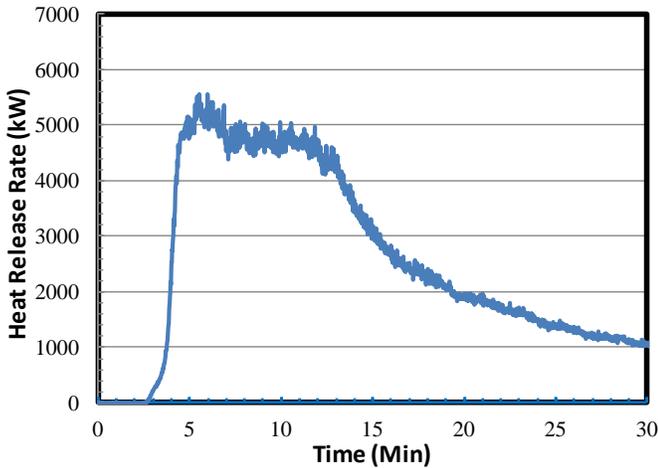


Room after 60 minutes

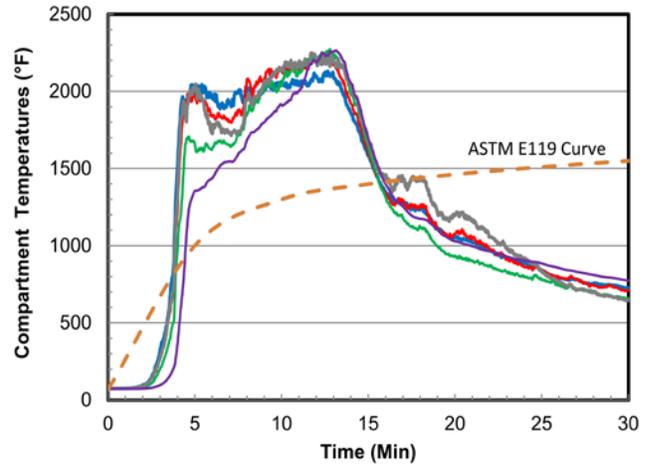


Room after drywall removed following the  
three-hour test

As shown in the photo above, with the exception of a few localized areas, the CLT remained below the charring temperature of wood throughout the test. The figures below show the heat release rate grew rapidly to 5 MW in about 4 minutes, and began a gradual decline at about 14 minutes. Hot gases in the compartment reached a temperature of about 2000°F at about 4 minutes, dropping to 700°F by about 30 minutes. The temperature rise in the compartment for the first 15 minutes far exceeded that required by a standardized E119 test. The contents fire consumed nearly all of the available fuel and had practically self-extinguished after three hours. G165-PC 2 will provide adequate fire performance in residential construction even under the extreme scenario in which the required automatic fire sprinklers fail and the fire service response is compromised.



**Heat Release Rate**



**Compartment Temperature**

A complete report and video presentation are available at: <http://awc.org/Code-Officials/2015-IBC-Code-Changes> or by using the links for Code Officials on AWC's home page, [www.awc.org](http://www.awc.org).