



## Manufactured Building

Wayne Goodwin, Commissioner of Insurance  
Rick McIntyre, Assistant State Fire Marshal

### MEMORANDUM

DATE: January 12, 2015 (revision of August 16, 2010 memo)

TO: NC Approved Modular Manufacturers and  
Third Party Certification Agencies

FROM: Alan D. Greene, P.E.  
Chief Building Code Consultant  
Manufactured Building Division

SUBJECT: Foam Plastic Adhesives

The use of foam plastic adhesives without mechanical fasteners has long been accepted for modular construction in North Carolina under “Alternate Materials and Methods of Construction”. A tragic fire in 2003 in a manufactured (HUD) home in Onslow County, NC resulted in the necessity of reexamining this practice with regard to modular construction. In the fire cited above, two infants were found under ceiling board and insulation which fell when the bonding material lost its holding ability due to increasing interior temperature. This memo will address the use of foam plastic adhesives for the attachment of gypsum board in both residential and commercial modular construction.

For residential modular construction, **Section R316.4, Thermal Barrier** in the *NC Residential Code, 2012 Edition*, states the following:

*Unless otherwise allowed in Section R316.5 or R316.6, foam plastic shall be separated from the interior of a building by an approved thermal barrier of minimum 0.5 inch gypsum wallboard or an approved finish material equivalent to a thermal barrier material that will limit the average temperature rise of the unexposed surface to no more than 250°F after 15 minutes of fire exposure complying with the ASTM E 119 or UL263 standard time temperature curve. The thermal barrier shall be installed in such a manner that it will remain in place for 15 minutes based on NFPA 286 with the acceptance criteria of R302.9.4, FM 4880, UL 1040 or UL 1715.*

Please note that **Section R318.1.2, Thermal Barrier** in the *NC Residential Code, 2002 Edition*, and **Section R314.1.2, Thermal Barrier** in the *NC Residential Code, 2006 Edition*, included the statements:

*The gypsum board shall be installed using a mechanical fastening system in accordance with Section R702.3.5. Reliance on adhesives to ensure that the gypsum board will remain in place when exposed to fire shall be prohibited.*

These statements did not appear in **Section R314.4, Thermal Barrier** in the *NC Residential Code, 2009 Edition*, and are not in **Section R316.4** of the *2012 NC Residential Code* (see above) which instead reads:

The thermal barrier **shall be installed in such a manner** that it will remain in place for 15 minutes based on NFPA 286 with the acceptance criteria of R302.9.4, FM 4880, UL 1040 or UL 1715.

**Section R316.6, Specific Approval**, in the *NC Residential Code, 2012 Edition*, states the following:

*Foam plastic not meeting the requirements of Sections R316.3 through R316.5 shall be specifically approved on the basis of one of the following approved tests: NFPA 286 with the acceptance criteria of R302.9.4, FM 4880, UL 1040 or UL 1715, or fire tests related to actual end-use configurations. The specific approval shall be based on the actual end use configuration and shall be performed on the finished foam plastic assembly in the maximum thickness intended for use. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use.*

For *commercial* modular construction, **Section 2603.4, Thermal Barrier**, in the *NC Building Code, 2012 Edition*, states the following:

*Except as provided for in Sections 2603.4.1 and 2603.9, foam plastic shall be separated from the interior of a building by an approved thermal barrier of 0.5-inch gypsum wallboard or equivalent thermal barrier material that will limit the average temperature rise of the unexposed surface to not more than 250°F after 15 minutes of fire exposure, complying with the standard time-temperature curve of ASTM E 119 or UL263. The thermal barrier shall be installed in such a manner that it will remain in place for 15 minutes based on FM 4880, UL 1040, NFPA 286 or UL 1715. Combustible concealed spaces shall comply with Section 717.*

**Section 2603.9** in the *NC Building Code, 2012 Edition* provides for, as in residential modular construction, the use of adhesives without mechanical fasteners when supported by documented testing in accordance with UL 1715.

Based on the above, the key to acceptance by the Manufactured Building Division of the use of foam plastic adhesives in residential or commercial modular construction, for the attachment of gypsum board without the use of mechanical fasteners, is that *a reproduction of the actual wall and ceiling assembly that a modular manufacturer will be producing in the plant passes the UL 1715 test*. Please note the following specific criteria:

1. In accordance with **Section R316.6, 2012 NC Residential Code** and **Section 2603.9, 2012 NC Building Code**, (see above), for both *wall* and *ceiling* applications ***the thickness of gypsum board that has passed the UL 1715 test is the only thickness that may be used by manufacturers.***
2. All UL 1715 specifications as to the size of wall studs and ceiling joists used in testing a particular configuration must be strictly followed.
3. The adhesives must be applied in strict accordance with the adhesive manufacturer's specifications.

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