Combustible Components in Exterior Walls

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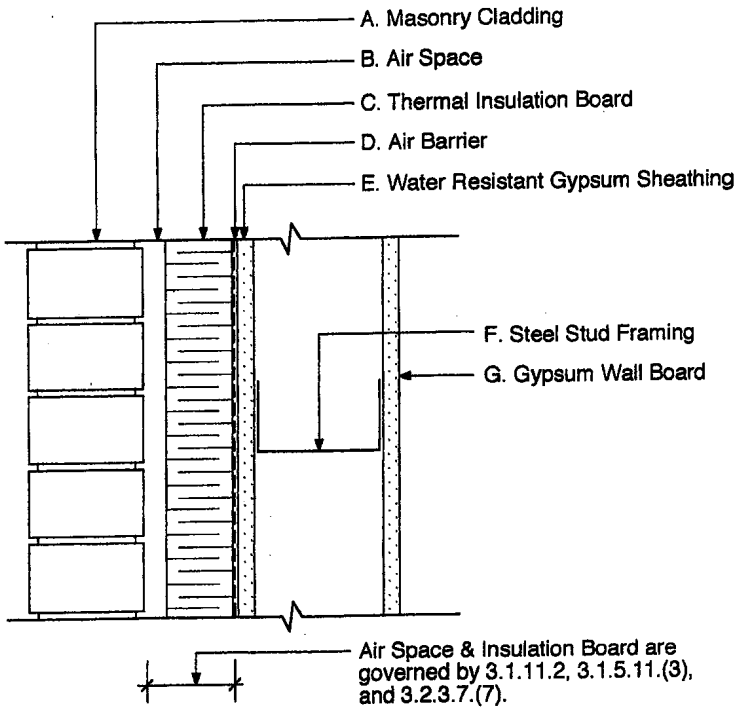
Combustible Components in Exterior Walls

- Current Requirements – 3.1.5.5., 3.1.5.12., 3.2.3.8.
- History of Code Development
- BC Building Code Interpretation Committee – 98-0012
- Appeal Board Ruling – BCAB #1682
- What Next?

Current Requirements

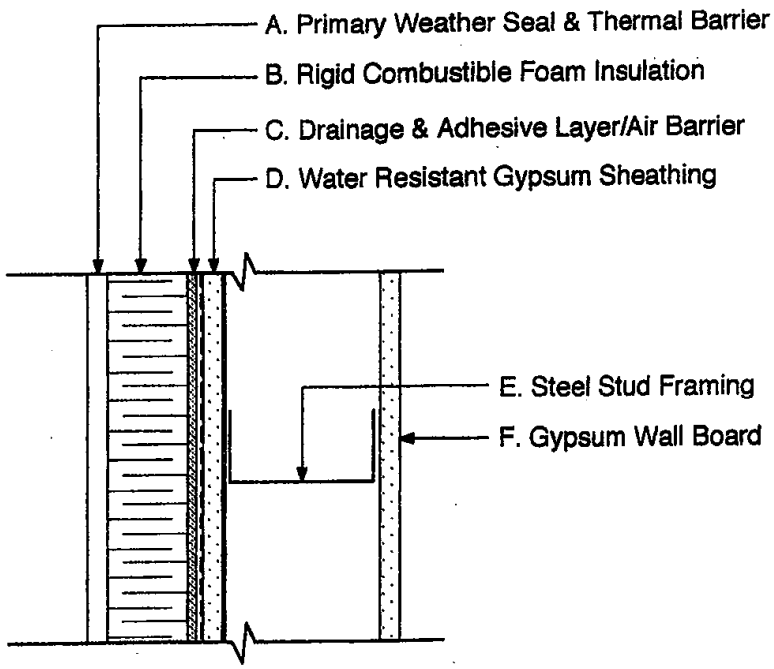
- 3.1.5.5. – to limit flame spread up the vertical exterior surface of a building from a fire within the building which blows out the exterior window openings
- 3.1.5.12. – to protect the interior of a building from a fire hazard caused by combustible insulation, including foamed plastic insulation
- 3.2.3.8. – to protect the exterior building face to limit the spread of fire from an inside fire to an adjacent building, and to limit the potential for fire spread from an outside fire from an adjacent building

Brick Veneer – Not Tested



Generic Rain Screen Wall Assembly
C, D, E, G have combustible components as permitted by 3.1.5.2 to 3.1.5.19.

Tested Assembly



Proprietary Exterior Wall System Conforming to CAN/ULC-S134
A, B, C, D, F have combustible components.

Article 3.1.5.5.

- Only applies to buildings that are “required” to be noncombustible construction as determined by Subsection 3.2.2.
- Only applies to non-loadbearing exterior walls
- Applies to unsprinklered buildings not more than 3 storeys in building height
- Applies to sprinklered buildings of any height
- Cannot be used when spatial separation requirements of Subsection 3.2.3. restrict the area of unprotected openings to less than 10%

Article 3.1.5.5. What does it say?

- If Article 3.1.5.5. is read in isolation as a stand alone requirement, here is what it says:
- If an exterior non-loadbearing wall in a building that is required to be noncombustible construction contains “any” combustible components located anywhere within the wall assembly – then the wall must be tested to CAN/ULC S134 (full scale fire test)
- WOW !!!!!

Article 3.1.5.1. What is Non-combustible?

- Defined in Article 1.1.4.2. of Division A as meeting the acceptance criteria of CAN4-S114 – Determination of Non-Combustibility in Building Materials
- As per Sentence 3.1.5.1.(2) other materials are permitted to be used in a noncombustible building when tested in accordance with ULC-S135 and meets various criteria -note these materials are "combustible"
- As per Sentence 3.1.5.11.(1) gypsum board can be used in a noncombustible building when paper layer is not more than 1 mm thick and FSR < 25 (combustible)

CAN4-S114

What is Non-combustible?

- 3 samples are put in a small furnace at 750 degrees C for 15 minutes
- The material must not burn after 30 seconds
- The material must not lose more than 20% of its mass
- The material must not exceed a temperature rise of more that 36 degrees C higher than the mean temperature of the furnace

Article 3.1.5.5. What could this mean?

- Article 3.1.5.5. does not explicitly exempt the usual combustible components that are listed in Article 3.1.5.2. or Sentences 3.1.5.1.(2) and 3.1.5.11.(1)
  - Paint, mastics and caulking, including foamed plastic air sealants, adhesives, vapour barriers, sheathing papers
- If 3.1.5.5. is read in isolation - Exterior non-loading bearing walls that contain 6 mil poly vapour barrier, or peel & stick membranes, or gypsum board, or fiberglass insulation would have to be tested to CAN/ULC S134

Other Combustible Materials Permitted in Noncombustible Buildings

- 3.1.5.2. – Minor combustible components
- 3.1.5.6. – Nailing elements
- 3.1.5.10. – Combustible interior finishes
- 3.1.5.11. – Gypsum board
- 3.1.5.15. – Combustible ducts
- 3.1.5.16. – Combustible piping
- 3.1.5.18. – Combustible wiring
- 3.1.5.21. – Decorative Wood Cladding

Article 3.1.5.5. History

- Article 3.1.5.5. was originally introduced in the 1990 NBCC entitled “Combustible Cladding”
- It permitted the use of combustible cladding on non-loadbearing exterior walls in noncombustible buildings when tested to CAN/ULC S134
- The wording of Article 3.1.5.5. was amended in the 1995 NBCC to read “Combustible Components for Exterior Walls
- The Appendix Note A-3.1.5.5. in the 1995 NBCC was still entitled “Combustible Cladding”

Article 3.1.5.5. History

- The original intent of Article 3.1.5.5. was to permit combustible cladding, including EIFS, on non-loadbearing exterior walls in noncombustible buildings if the cladding system is tested to CAN/ULC S134
- The change in wording in the 1995 NBCC was not included in the list of proposed changes to the 1990 NBCC
- This change of wording has caused a great deal of aggravation since 1995

Article 3.1.5.5. Load Bearing Walls

- Article 3.1.5.5. does not apply to load bearing walls
- The use of combustible insulation in exterior load bearing walls is regulated by Sentence 3.1.5.12.(3) – i.e. a thermal barrier is required on the inside face
- The use of foamed plastic insulation in the exterior wall of any building more than 3 storeys in building height is regulated by Article 3.2.3.8. – the outside face is protected with 25 mm on concrete or masonry, or another noncombustible material that meets certain criteria when tested to CAN/ULC S101.

Article 3.1.5.5. Spatial Separation Walls

- When Subsection 3.2.3. restricts the area of unprotected openings to less than 10%, the exterior wall is required to be noncombustible construction with noncombustible cladding.
- Article 3.1.5.5. cannot be used for such walls.
- The original intent was to preclude the use of any combustible cladding on walls close to the property line, even when such walls comply with CAN/ULC S134.

Article 3.1.5.5. Ontario Building Code

- The Ontario Building Code amended the 2005 NBCC to say that if an exterior wall complies with Article 3.2.3.8., then it is deemed to also comply with Article 3.1.5.5.
- Although many AHJs agree with this concept, the NBCC and BCBC do not explicitly state this.

Sentence 3.1.5.12.(3) Protects the inside face only

- Fires originating inside the building
- Applies to both combustible insulation and foamed plastic insulation with FSR > 25 and < 500
- Only protects the inside face of an exterior wall
- Does not address protection of the outside face
- Thermal barrier to be 12.7 mm gypsum board, lath & plaster, 25 mm thick concrete or masonry, or noncombustible material that meets CAN/ULC S101-M

Article 3.2.3.8. Spatial Separations

- Protection of exterior building face only
- Does not address protection of the interior face
- Only applies when the exterior wall contains foamed plastic insulation
- To limit fire spread from a fire that originates inside the building to a neighbouring building on an adjacent property
- To limit fire spread from a fire that originates in a neighbouring building to the exterior building face of the building on our property

Article 3.2.3.8. Protection of Exterior Building Face

- Only applies to buildings > 3 storeys
- 25 mm concrete or masonry, or
- Noncombustible material that meets certain criteria when tested to CAN/ULC S101
- If an exterior wall meets 3.1.5.5. then it is deemed to also meet 3.2.3.8.

History

	3.1.5.5.	3.1.5.12.	3.2.3.8.	
1977 NBCC	no	yes	no	
1980 NBCC	no	yes	yes	
1985 NBCC	no	yes	yes	
1990 NBCC	yes	yes	yes	combustible cladding
1995 NBCC	yes	yes	yes	combustible components
2005 NBCC	yes	yes	yes	combustible components

History

	3.1.5.5.	3.1.5.12.	3.2.3.8.	
1985 BCBC	no	yes	yes	
1992 BCBC	yes	yes	yes	combustible cladding
1998 BCBC	yes	yes	yes	combustible components
2006 BCBC	yes	yes	yes	combustible components

BCBC Interpretation Committee 98-0012

- Question - Does Article 3.1.5.5. apply to the entire exterior non-loadbearing wall assembly?
- Answer – yes – the entire wall assembly must be tested because the performance of some exterior cladding systems may depend on the wall assembly to which they are attached

BCBC Interpretation Committee 98-0012

- Question - If the exterior non-loadbearing wall assembly contains combustible components that are otherwise permitted by Subsection 3.1.5., is the wall assembly required to comply with Article 3.1.5.5.
- Answer – No – the Committee considered that Article 3.1.5.5. was one of many options available to designers to use combustible components in exterior walls.
- Problem – this previous interpretation is being reviewed by the Committee in response to BCAB #1682 since 3.1.5.5. and 3.1.5.12. deal with different fire scenarios.

Building Code Appeal Board BCAB #1682 – Exterior Wall

- Sheet steel cladding
- Weather barrier (air gap)
- Foamed plastic insulation (25<FSR<500)
- 15.9 mm Type X GWB (exterior grade)
- 203 mm steel stud framing
- 15.9 mm Type X GWB (interior grade)

BCAB #1682
Appellant's Position

- The wall assembly complies with Sentence 3.1.5.12.(3)
- Since 3.1.5.12.(3) permits the use of combustible insulation, including foamed plastic insulation, there is no need to also comply with Article 3.1.5.5.
- The scope of Article 3.1.5.5. is limited to combustible cladding as indicated by the title of Appendix Note A-3.1.5.5.
- This interpretation is consistent with BCIC 98-0012

BCAB #1682
Building Official's Position

- Article 3.1.5.5. does not include any exemptions for Articles 3.1.5.2. (minor combustible content), 3.1.5.11. (gypsum board) or 3.1.5.12.(combustible insulation)
- Article 3.1.5.5. is a stand alone requirement that must be met in addition to all of the other provisions of Subsection 3.1.5.

BCAB #1682
Ruling of the Board

- Both Articles 3.1.5.5. and 3.1.5.12. apply to the use of combustible insulation in exterior non-loadbearing walls in a building that is required to be noncombustible construction
- Since Article 3.1.5.12. only provides thermal protection on the inside face, it does not address the spread of fire on the exterior face of the building

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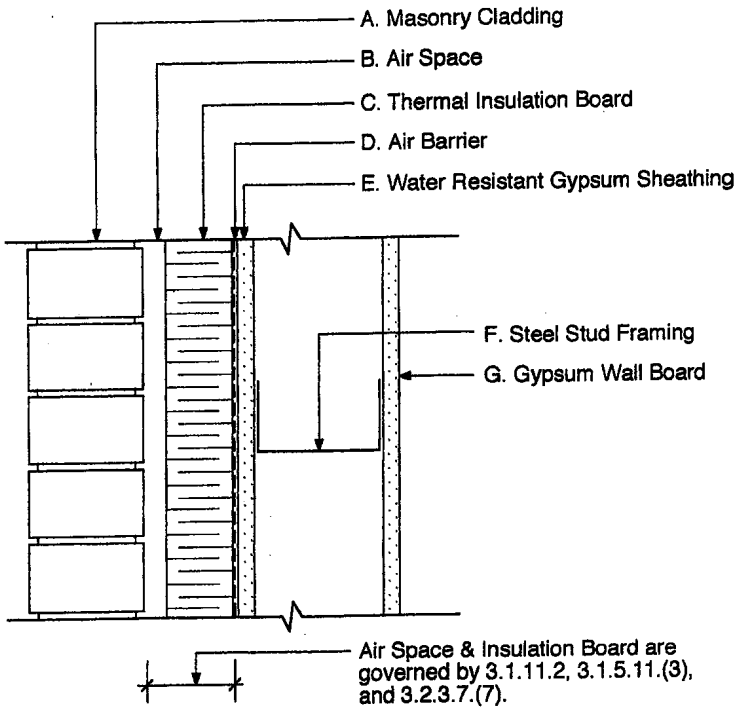

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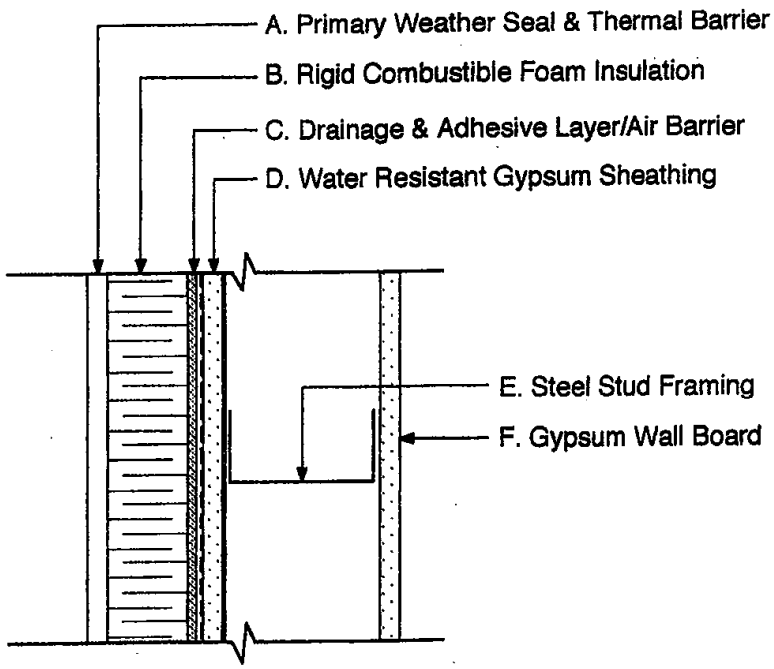

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What Next?

- We need a code change to the NBCC, BCBC and VBBL
- Article 3.1.5.5. should go back to the original intent in dealing with combustible cladding rather than combustible components within the entire wall assembly
- If you comply with Article 3.2.3.8., you need not comply with Article 3.1.5.5.
- Combustible materials as described in 3.1.5.1.(2), 3.1.5.2., 3.1.5.6., 3.1.5.10., 3.1.5.11., 3.1.5.16, 3.1.5.18. and 3.1.5.21. should be permitted in exterior walls

Questions?