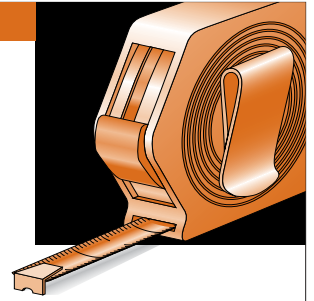


APA Rim Board® in Fire Rated Assemblies



To slow or prevent the spread of fire, building codes require fire-resistant or fire-rated assemblies in certain locations, occupancies, and types of buildings. When fire-rated walls and/or floor/ceiling assemblies are required, a fire barrier over the walls is typically necessary to prevent flames from escaping the confinement provided by the wall or ceiling assembly. The barrier may be in the form of continuous Rim Board on top of the wall and parallel with the floor joists or as continuous Rim Board along the top of the wall and perpendicular to the joists. A fire barrier can also be made by inserting individual sections of snugly fit rated material over the wall and between the floor joists and carefully sealed against fire passage. This last method is more labor intensive, particularly when wood I-joists or trusses are used to support the floor.

Because the flammability and ignitability of the adhesive used in the Rim Boards is less than that of the wood, the adhesive does not melt prior to ignition. The wood itself determines the flammability of the Rim Boards.

The assemblies diagrammed in this publication are based on char rates of APA trademarked Rim Boards as determined by the United States Forest Service, Forest Products Laboratory in Madison, Wisconsin. The Rim Boards in this brochure were subjected to fire tests that met the requirements of ASTM E 119 and CAN/ULC-S101.

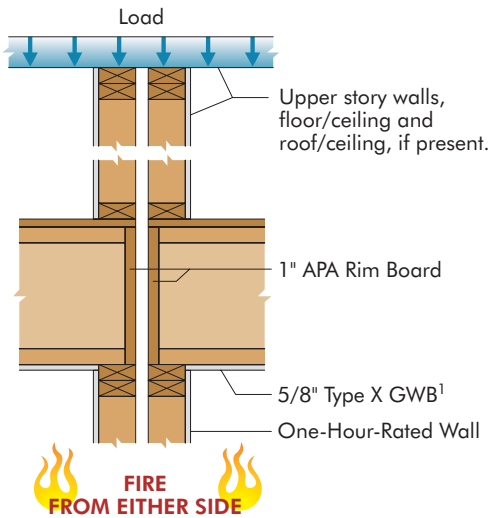
FIRE-RESISTANT RIM BOARD ASSEMBLIES¹⁻¹⁰

The following Rim Board assemblies will achieve the fire resistances shown. The assemblies are grouped by time of endurance and the distribution of load. In the first group of double-walled, one-hour-rated assemblies (Numbers 1-3), the load carried by the fire-exposed Rim Board is assumed to transfer to the adjacent Rim Board if the fire-exposed Rim Board fails. In the second set of one-hour, double-wall assemblies (Numbers 4-7), the load is assumed to not transfer to the adjacent Rim Board. The two-hour, double-wall assemblies show both cases: load transferred (Number 9) and load not transferred (Number 10).

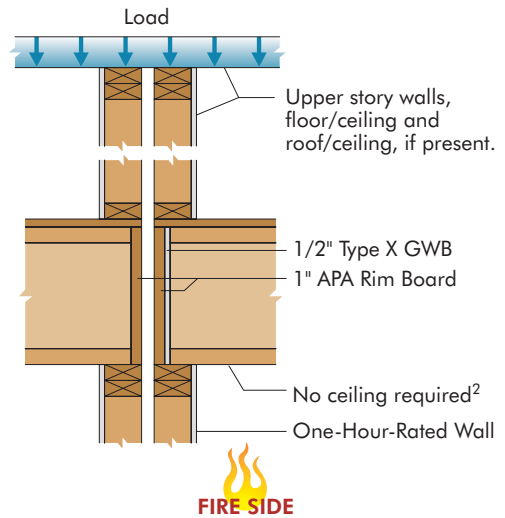
Rim Board® is a registered trademark of APA – The Engineered Wood Association.

ONE-HOUR RIM BOARD ASSEMBLIES – LOAD TRANSFER

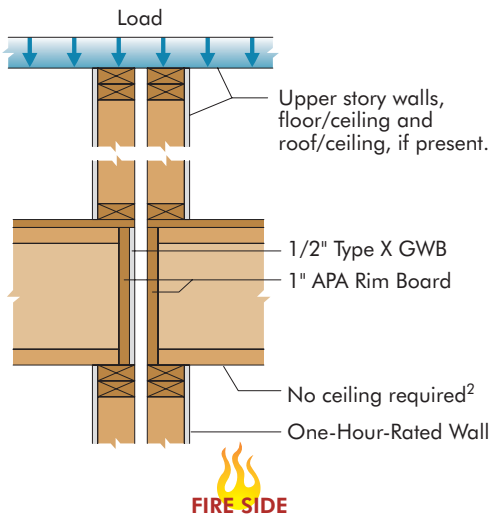
Assembly No. 1



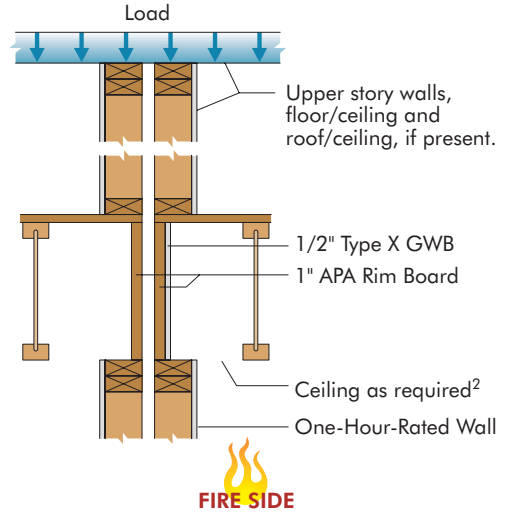
Assembly No. 2



Assembly No. 3

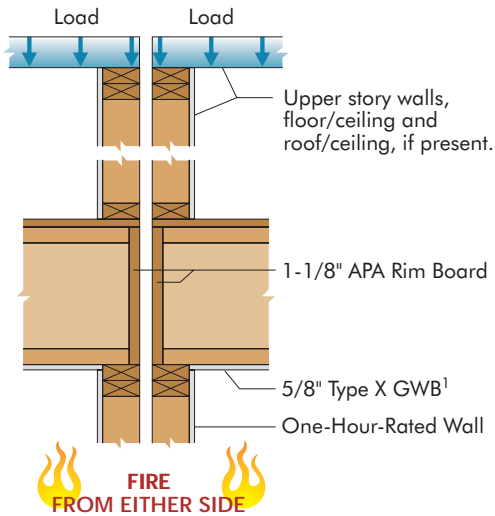


Example Configuration of Assemblies 1-3 with I-joists Parallel to Rim Board

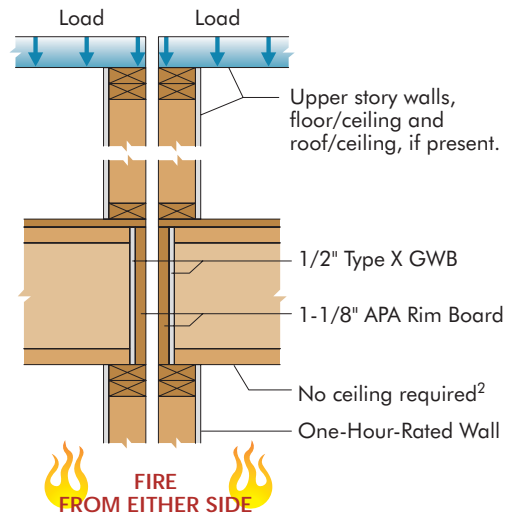


ONE-HOUR RIM BOARD ASSEMBLIES – NO LOAD TRANSFER

Assembly No. 4

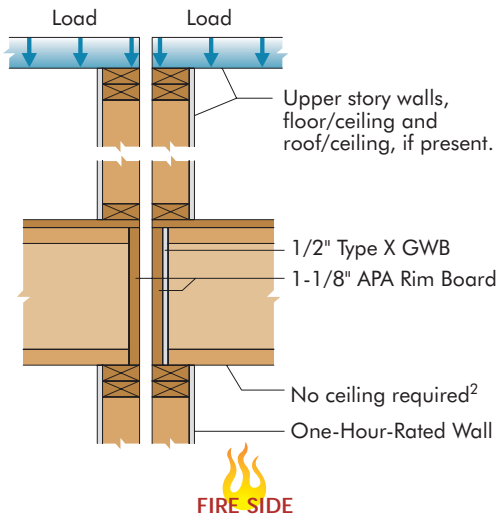


Assembly No. 5



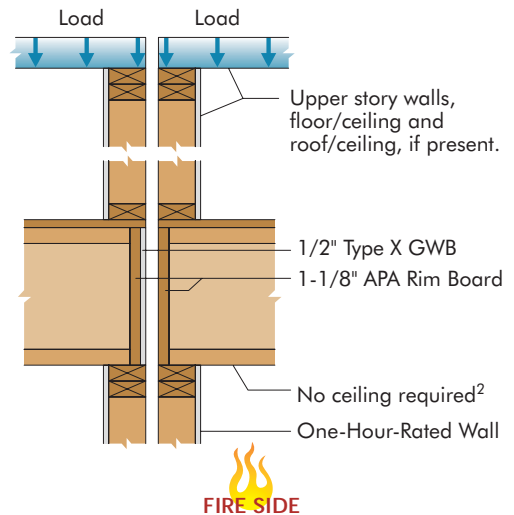
Note: One-inch APA Rim Board may be used when 5/8-inch Type X GWB is substituted for the 1/2-inch GWB shown or when 1/2-inch Type X GWB is added as a ceiling membrane.

Assembly No. 6



Note: One-inch APA Rim Board may be used when 5/8-inch Type X GWB is substituted for the 1/2-inch GWB shown or when 1/2-inch Type X GWB is added as a ceiling membrane.

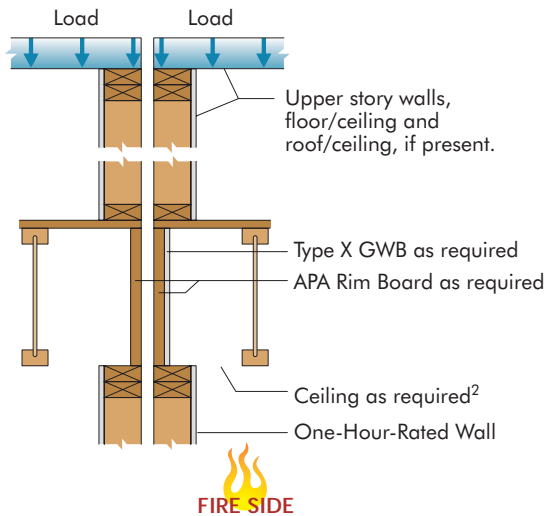
Assembly No. 7



Note: One-inch APA Rim Board may be used when 5/8-inch Type X GWB is substituted for the 1/2-inch GWB shown or when 1/2-inch Type X GWB is added as a ceiling membrane.

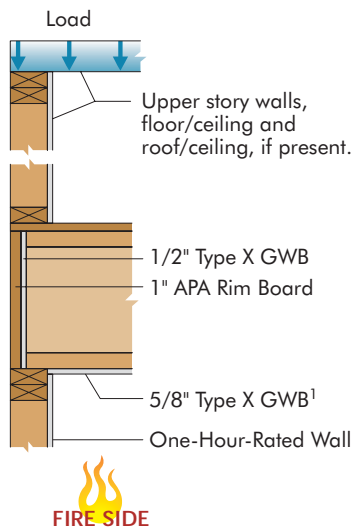
ONE-HOUR RIM BOARD ASSEMBLIES – NO LOAD TRANSFER (Continued)

Example Configuration of Assemblies 4-7 with I-joists Parallel to Rim Board

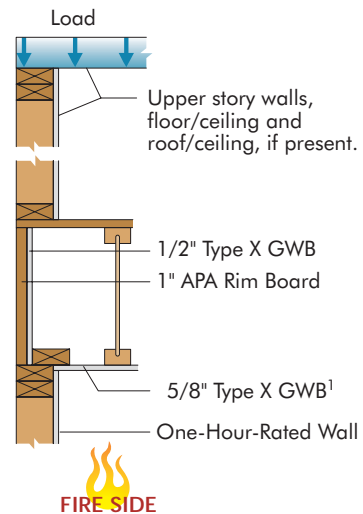


ONE-HOUR SINGLE WALL RIM BOARD ASSEMBLY

Assembly No. 8

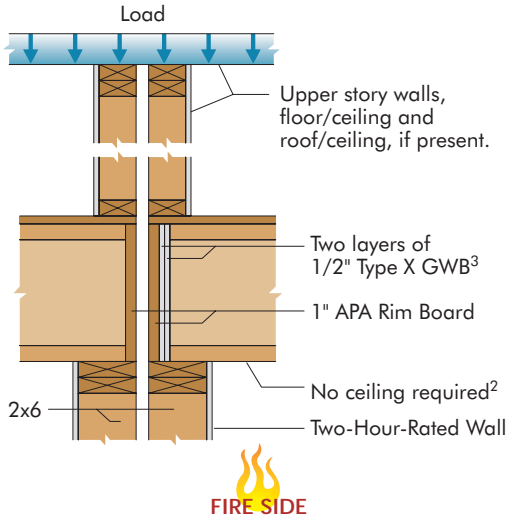


Example Configuration of Assembly 8 with I-joists Parallel to Rim Board

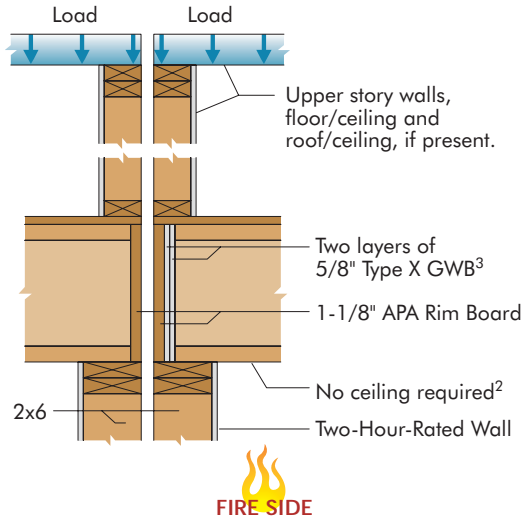


TWO-HOUR RIM BOARD ASSEMBLIES

Assembly No. 9
(Load Transfer)

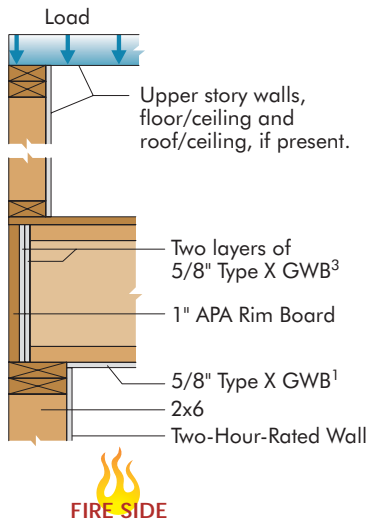


Assembly No. 10
(No Load Transfer)

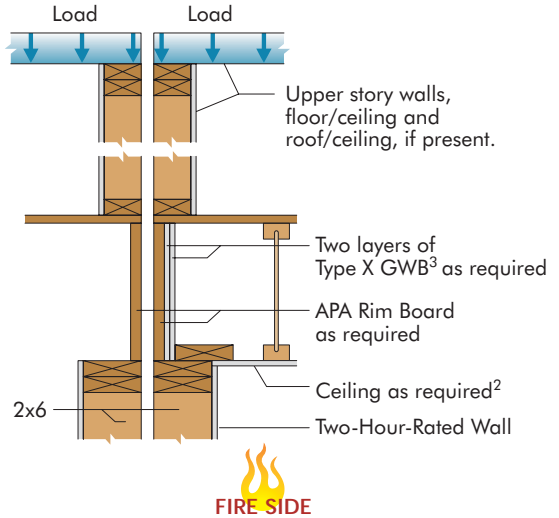


Note: One-inch APA Rim Board may be used when 1/2-inch Type X GWB is added as a ceiling membrane.

Assembly No. 11



Example Configuration of Assemblies 9-11 with I-joists Parallel to Rim Board



Notes:

- 1.** GWB (gypsum wallboard) shown on the ceiling is to protect the Rim Board only. It does not necessarily cause the floor assembly to be rated as one- or two-hour. A recognized fire-rated floor/ceiling assembly must be used to provide one- or two-hour protection for the floor/ceiling assembly when such protection is required.
- 2.** One- or two-hour-rated floor/ceiling assembly may be required even though no ceiling membrane is required to provide protection to the Rim Board.
- 3.** When two layers of gypsum wallboard are used, I-joist end nails passing through the Rim Board and GWB should be 16d box.
- 4.** The fire rating of APA Rim Board assemblies will frequently be required for both sides. When fire is shown on only one side of a double-wall assembly, a two-sided fire rating may be achieved by duplicating the "fire side" construction on the opposite wall to provide the indicated resistance from either side.
- 5.** Attach 1/2" Type X GWB to APA Rim Boards with 1-1/2" Type W drywall screws spaced 12" o.c. Attach 5/8" Type X GWB to APA Rim Boards with 2" Type W drywall screws spaced 12" o.c.
- 6.** The APA Rim Board and GWB thicknesses listed are minimums necessary to provide specified fire resistance. Thicker APA Rim Boards or GWB may be substituted for shown thicknesses and Type C GWB may be substituted for Type X GWB.
- 7.** Provide minimum 1-3/4" bearing length for wood I-joists.
- 8.** Unrated GWB (ordinary GWB not classified to be fire resistant by any recognized standard) will provide some fire resistance but the amount of that resistance may be more variable than that provided by GWB that is classified as fire resistant. It is therefore recommended that only those gypsum wallboards classified X or C be used.
- 9.** Assembly Nos. 1, 4, 5, 6, 7, 8, 10 and 11, or one of their variations, utilize the finish-rating contributions of the ceiling GWB as listed in the 2000 UL Fire Resistance Directory to achieve their rating.
- 10.** Rim Board assemblies analyzed for temperature increases, burn-through, char depth and residual axial compressive load capacity.

APPENDIX: COMMONLY USED TERMS DESCRIBING FIRE PROTECTION

Burn Through:

“Burn through,” or fire endurance, is the measure of how long a material or assembly can resist a standard, increasing temperature gradient as supplied by a gas flame. Standards of this type are ASTM E 119 and CAN/ULC-S101, which specify a time-temperature curve and define the possible failure points. This endurance is dependent upon the material itself and its thickness. The failure points:

- A.** Structural failure of the assembly or material if under load.
- B.** Burn-through of the assembly or material so that flaming is visible on the side opposite the fire.
- C.** A temperature rise of 250°F on the unexposed side of the assembly or material.
- D.** The ignition of cotton waste (fuzz) placed on the unexposed side of the assembly or material.

The test, while simulating a severe fire and providing information useful for comparison purposes, does not precisely predict how long an assembly or material will endure in an actual structure fire. Total load on a floor/ceiling or wall, distribution of the load, rate of progression of the fire, total fuel load, availability of air to feed the fire, location of the seat of the fire, flammability of furnishings, construction materials, etc., all combine to make reliable prediction of fire endurance in an actual fire impossible.

The primary value of the standard ASTM E 119 and CAN/ULC-S101 fire test is that it can compare one assembly's or material's fire performance to that of another in a manner that is consistent from test-to-test and laboratory-to-laboratory.

Char Rate:

The rate at which the fire zone advances through the material. Thicker materials tend to have a slower average char rate because the charred material insulates against the heat. The rate of char-front advancement is therefore not linear. The char rate of APA Rim Boards is very similar to the char rate of sawn lumber.

Component Additive Method or Calculated Method:

A method where the tabulated resistances of individual materials are added together in a prescribed manner to estimate a fire-resistance time. The 1997 Uniform Building Code (UBC), the 2006 International Building Code (IBC) and the 2006 International Residential Code (IRC) permit the use of the additive method for calculating the fire-resistance rating of assemblies up to one hour.

Curtain Wall:

In its most fundamental form, it is a nonbearing exterior wall. In fire-rated construction, however, a curtain wall fire-containment system typically consists of a fire-rated floor assembly in conjunction with an unrated exterior wall or “curtain wall.” The space that often exists between the unrated exterior wall and the fire-rated floor assembly is usually filled with a rated assemblage containing mineral wool to prevent fire and smoke from getting past the floor-ceiling assembly into the room above.

Draft Stopping:

A material or device installed to restrict air movement through openings in concealed spaces. The 2006 IBC, 2006 IRC and 1997 UBC permit minimum 3/8-inch-thick wood structural panels where draft stopping is required.

Fire Barrier:

A fire-resistance-rated material or assembly that is designed to restrict the spread of fire.

Fire Blocking:

A material or device installed to prevent the free spread of flames through concealed spaces. No specific endurance time is associated with prescriptive fire blocking. The 2006 IBC, 2006 IRC and 1997 UBC permit minimum 23/32" wood structural panels as prescriptive fire blocking. The 2005 National Building Code (NBC) permits 12.5 mm phenolic-bonded wood structural panels.

Fire Endurance:

Related to the amount of time that an assembly or material will resist the passage of fire. "Fire Endurance" may be time quantified, as with a "Fire-Rated Assembly," (one-hour, two-hour, etc.) or simply refer to a material's relative resistance to fire penetration (e.g., thicker wood structural panels provide greater "fire endurance" than thinner wood structural panels).

Fire Partition:

A vertical assembly of materials designed to prevent the spread of fire in which openings in that assembly are protected.

Fire-Rated Assembly:

A specific combination of materials that has been tested according to a recognized standard (typically ASTM E 119) and has met all of the standard's requirements for fire endurance for the specified amount of time.

Fire Resistance Rating:

The amount of time that an assembly or material will resist fire penetration as defined by the ASTM E 119 and CAN/ULC-S101 test standards. The time-to-failure of an assembly or material in an actual structure fire cannot be accurately predicted due to the many variables involved.

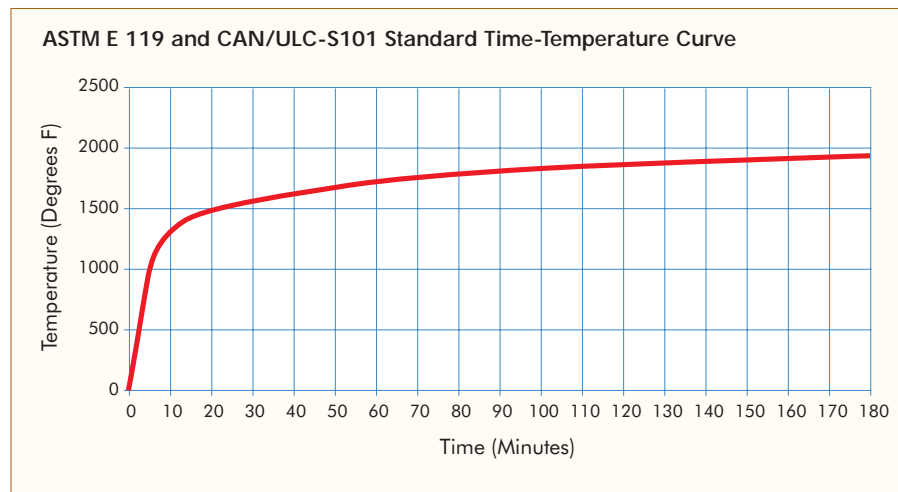
Flame Spread:

“Flame spread” is a term used to describe how rapidly the flame front can travel across the surface of a material. Also known as interior finish rating, it is typically measured using the ASTM E 84 (tunnel) test. The units of flame spread range from zero to 200 with zero meaning that unsupported flame will not spread. The rate of flame advance on red oak is defined as 100. The term has little relationship to the resistance to “burn-through” that a material or assembly presents, how fast it chars or how long it takes fire to burn through the material.

The flame spread rating of untreated APA Rim Boards is Class III or Class C (depending on an individual code’s classification terminology), meaning that its flame spread is between 76 and 200. This is the same flame spread classification as for sawn lumber. This factor is seldom an issue with Rim Boards because they are usually not in locations where flame spread is regulated.

Time-Temperature Curve:

ASTM E 119 and CAN/ULC-S101 prescribe a standard relationship between the test furnace temperature and the time it takes to reach a prescribed temperature. The temperature reaches 1000° F at five minutes. The relationship is shown graphically below.



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