

Double Wall Framing - Code Compliance Brief

Overview:

Double stud wall wood framing is not specifically addressed in the International Residential Code (IRC) or International Energy Conservation Code (IECC); it is neither encouraged nor discouraged. Minimum code requirements for insulation, moisture, and air leakage are based on a typical 2x4 or 2x6 (16" or 24" on center) single stud wall. Minimum insulation R-values specified in the IRC and IECC are based on assuming a single stud wall (e.g., R-19 cavity insulation will completely fill a 2x6 single stud wall). Double stud wall wood framing can obtain much higher R-values. Moisture and air leakage are addressed in the codes for a single stud wall but not for a double wall. Recommendations of where the vapor retarder and air barrier should be placed, based on research and testing, are described below.

Plan Review:

- **Insulation:** Since these walls will have a much higher R-value of insulation than minimum code, review the proposed installed R-value and how the overall building is meeting compliance (prescriptively, trade-offs, or performance based). If the latter of the two are proposed, confirm that the credit given for these higher R-value walls was calculated correctly (correct credit was given). For example, per the 2012 IECC in Climate Zone 5, the minimum insulation required in a wood-frame wall is R-20 cavity or R-13 cavity plus R-5 continuous insulation or insulated siding. Double wall framing can obtain values around R-30 or higher for cavity insulation.
- **Moisture:** In a double stud wall, the recommendation, based on testing and studies performed by Building Science Corporation, is to install the vapor retarders on the exterior side of the interior wall, dependent upon climate zone.

In the 2012 IRC, vapor retarders are required dependent upon Climate Zone and vapor retarder class. Vapor retarders are required in colder climates. If installed, it should be located on the exterior side of the interior wall (see Description tab) and care should be taken that the insulation on both sides of the vapor retarder is fully aligned with the barrier the entire length of the wall. Note: the IRC (Section 702.7) states Class I or II vapor retarders are required on the interior side of the frame walls in Climate Zones 5, 6, 7, 8, and Marine 4 with some exceptions for basement walls, below grade portion of any wall, or construction where moisture or freezing will not damage the material. The IRC defines material vapor retarders into three classes:

- Class I: Sheet polyethylene, unperforated aluminum foil.
- Class II: Kraft-faced fiberglass batts.
- Class III: Latex or enamel paint.

Class III vapor retarders are permitted where any of the following conditions are met per Table R702.7.1 in the 2012 IRC.

Climate Zone	Class III Vapor Retarders Permitted for
4	Vented cladding over wood structural panels. Vented cladding over fiberboard. Vented cladding over gypsum. Insulated sheathing with R-value \geq 2.5 over 2 x 4 wall. Insulated sheathing with R-value \geq 3.75 over 2 x 6 wall.
	Vented cladding over wood structural panels. Vented cladding over fiberboard. Vented cladding over gypsum. Insulated sheathing with R-value \geq 5 over 2 x 4 wall. Insulated sheathing with R-value \geq 7.5 over 2 x 6 wall.
5	Vented cladding over wood structural panels. Vented cladding over fiberboard. Vented cladding over gypsum. Insulated sheathing with R-value \geq 5 over 2 x 4 wall. Insulated sheathing with R-value \geq 7.5 over 2 x 6 wall.
	Vented cladding over fiberboard. Vented cladding over gypsum. Insulated sheathing with R-value \geq 7.55 over 2 x 4 wall. Insulated sheathing with R-value \geq 11.25 over 2 x 6 wall.
6	Vented cladding over fiberboard. Vented cladding over gypsum. Insulated sheathing with R-value \geq 7.55 over 2 x 4 wall. Insulated sheathing with R-value \geq 11.25 over 2 x 6 wall.
7 and 8	Insulated sheathing with R-value \geq 10 over 2 x 4 wall. Insulated sheathing with R-value \geq 15 over 2 x 6 wall.

- Air Leakage: Confirm on the plans that a continuous air barrier is specified on the interior side of the interior wall.

Field Inspection:

- The insulation completely fills the cavity with no compression or gaps.

- Vapor retarder (if applicable) is installed on the exterior of the interior wall properly.
- Air barrier is installed on the interior of the interior wall properly. All seams, gaps, and holes are sealed properly. The 2012 IRC, Table N1102.4.1.1 and IECC, Table R402.4.1.1 require a continuous air barrier be installed. Confirm corners and headers are insulated and the junction of the foundation and sill plate sealed. The junction of the top plate and top of exterior walls are sealed. Confirm the exterior thermal envelope insulation for framed walls is installed in substantial contact and continuous alignment with the air barrier.

Technical Validation(s):

Building America Top Innovation Hall of Fame Profile

Vapor Barrier http://energy.gov/sites/prod/files/2014/01/f6/4_3b_ba_innov_vaporretarde... [1]