



City of Seattle
**Department of Construction and
Inspections**

2012 SBC Code Solution

SBC Section 714.4
Penetrations of Horizontal Assemblies
Release Date: August 22, 2016
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The following interpretation, policy or code alternate is intended to provide guidance to staff for consistency of review and is subject to change without notice. Application of this interpretation, policy or code alternate to specific projects may vary.

Code Issue:

Under the Seattle Building Code penetrations of horizontal fire-resistance-rated floor/ceiling or roof/ceiling assemblies that are not required to be enclosed in a shaft by Section 712.1 need to be protected as required in Sections 714.4.1 through 714.4.1.3.

These sections identify how to protect penetrations by items such as steel, ferrous or copper conduits, pipes tubes, vents, electrical boxes and fire sprinklers. The code is not entirely clear about how to protect membrane penetrations by items such as recessed lighting, ceiling exhaust fans or diffusers, and associated duct work.

Code Alternate:

When approved by the building official, the assemblies shown in the following tables satisfy the requirements of Section 714.4.1.2.

For questions about whether this code solution applies to your project:

- *If you have submitted a permit application, contact the Building Code plan reviewer assigned to your application*
- *If you have not submitted an application, send us a question through the SDCI website <http://www.seattle.gov/dpd/toolsresources/sendusaquestion/default.htm> or in person at the Applicant Services Center. Visit the Applicant Services Center website for more information about hours and location <http://www.seattle.gov/dpd/aboutus/whoweare/applicantservicescenter/default.htm>*



Construction Review & Inspection Quality
Jonathan Siu, Principal Engineer

PROTECTION REQUIRED

Use this table when openings are 100 square inches or less, and the aggregate area of openings are 100 square inches or less in any 100 square feet. The specified materials are intended to provide draftstops.

Opening Type	Framing Type		
	Solid Sawn	Plywood Web joists	Metal Plate Connected Wood Trusses
<u>Recessed Light</u> ^b	In floor joists, solid block each side of light with 2 inch framing or 5/8 inch gypsum wallboard or box the light (four sides and top) with 3 ½ inch fiberglass or 1 ½ inch high-density mineral fiber insulation. In dropped soffits, pre-rock bottom of floor joists above with 5/8 inch gypsum wallboard. See figure A.	Box the light (four sides and top) with 5/8 inch gypsum wallboard, 3 ½ inch fiberglass or 1 ½ inch high-density mineral fiber insulation. See figure C.	Box the light (four sides and top) with 5/8 inch gypsum wallboard, 3 ½ inch fiberglass or 1 ½ inch high-density mineral fiber insulation. See figure E.
<u>HVAC</u> ^{a,b}	Solid block each side of fan or diffuser with 2 inch framing or 5/8 inch gypsum wallboard or box the fan or diffuser (four sides and top) with 3 inch (0.75 PCF) fiberglass duct wrap or 1 ½ inch high-density mineral fiber, and wrap duct completely with 3 inch (0.75 PCF) fiberglass duct wrap or 1 ½ inch high-density mineral fiber insulation, or line joist cavity with 5/8 inch fire-taped gypsum wallboard. See figure B.	Box the fan or diffuser (four sides and top) with 5/8 inch gypsum wallboard, 3 inch (0.75 PCF) fiberglass duct wrap or 1 ½ inch high-density mineral fiber, and wrap duct completely with 3 inch (0.75 PCF) fiberglass duct wrap or 1 ½ inch high-density mineral fiber insulation, or line joist cavity with 5/8 inch fire-taped gypsum wallboard. See figure D.	Box the fan or diffuser (four sides and top) with 5/8 inch gypsum wallboard, 3 inch (0.75 PCF) fiberglass duct wrap or 1 ½ inch high-density mineral fiber, and wrap duct completely with 3 inch (0.75 PCF) fiberglass duct wrap or 1 ½ inch high-density mineral fiber insulation, or line cavity with 5/8 inch fire-taped gypsum wallboard. See figure F.

PROTECTION REQUIRED

Use this table when openings exceed 100 square inches, or the aggregate area of openings exceeds 100 square inches in any 100 square feet. The specified materials are intended to maintain the fire-resistance-rating of the assembly.

Opening Type	Framing Type		
	Solid Sawn	Plywood Web joists	Metal Plate Connected Wood Trusses
<u>Recessed Light</u> ^{b,c}	In floor joists, box the light (four sides and top) with 5/8 inch gypsum wallboard. In dropped soffits, pre-rock bottom of floor joists above with 5/8 inch gypsum wallboard. See figure A.	Box the light (four sides and top) with 5/8 inch gypsum wallboard. See figure C.	Box the light (four sides and top) with 5/8 inch gypsum wallboard. See figure E.
<u>HVAC</u> ^{a,b,c}	Box the fan or diffuser (four sides and top) with 5/8 inch gypsum wallboard, and wrap duct completely with 1 ½ inch (6 PCF) high-density duct fire wrap, or line joist cavity with 5/8 inch fire-taped gypsum wallboard. See figure B.	Box the fan or diffuser (four sides and top) with 5/8 inch gypsum wallboard, and wrap duct completely with 1 ½ inch (6 PCF) high-density duct fire wrap, or line joist cavity with 5/8 inch fire-taped gypsum wallboard. See figure D.	Box the fan or diffuser (four sides and top) with 5/8 inch gypsum wallboard, and wrap duct completely with 1 ½ inch (6 PCF) high-density duct fire wrap, or line cavity with 5/8 inch fire-taped gypsum wallboard. See figure F.



Footnotes

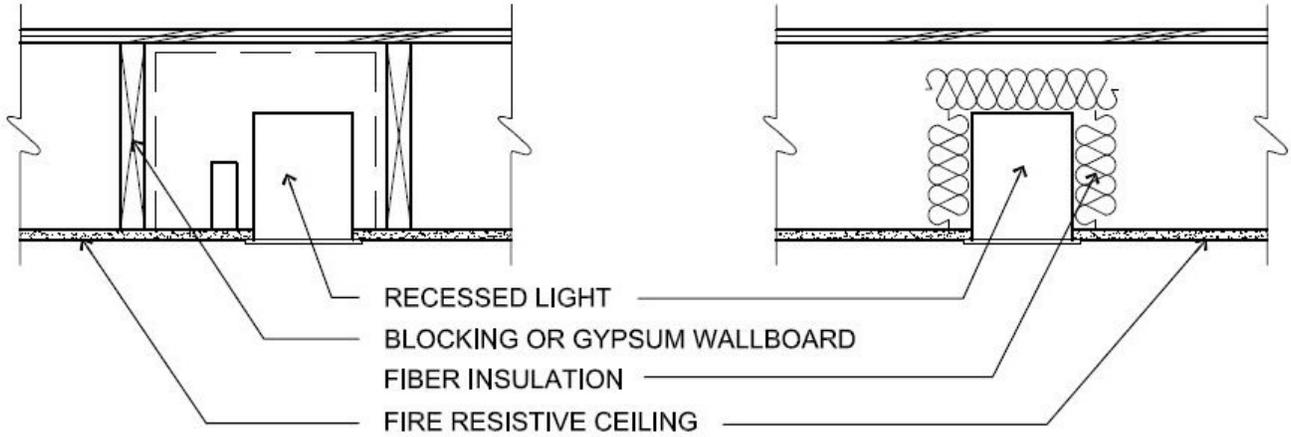
- a. Ventilation fan box or diffuser grill and associated metal duct.
- b. See additional requirements for recessed light and HVAC penetrations.
- c. Opening protection shall match the type, and number of layers of gypsum wallboard as the ceiling.

Additional Requirements for Recessed Light and HVAC Penetrations

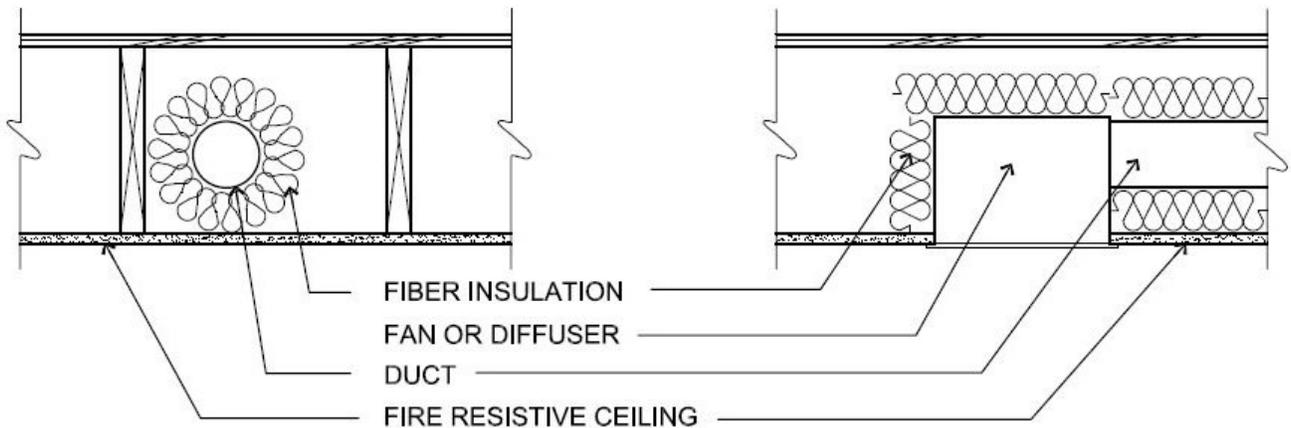
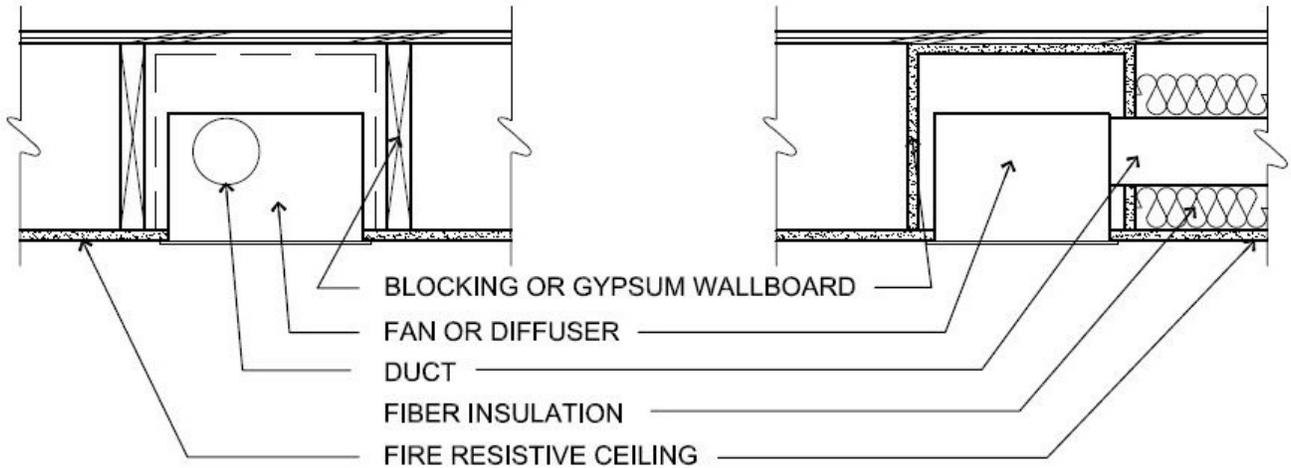
1. Install fixtures and equipment according to their listing.
2. Install HVAC systems under permit and according to plan.
3. Fixtures protected with insulation are required to be steel and IC rated.
4. In buildings equipped with fire sprinkler systems, protect ducts a minimum of 10 feet from the opening.
5. Openings for ducts through framing members or blocking shall be limited to the diameter of the duct plus 2 inches, to a maximum opening diameter of 8 inches. Maximum size and location of openings through engineered wood products must also comply with the product listing.
6. At duct penetrations through framing, fit duct insulation tight against the framing members or blocking.
7. Where there are penetrations of both the floor and ceiling membranes within the same joist cavity, solid block between the openings with 2 inch framing or 5/8 inch gypsum wallboard.
8. Where dryer exhausts enter directly into ceilings, wrap duct completely similar to HVAC penetrations.
9. Ventilation ducts in attics shall be wrapped completely with 1 ½ inch high-density mineral fiber insulation.
10. Fiberglass insulation complying with the requirements of the energy code may be used to box recessed lights, fans or diffusers at roof/ceiling penetrations.
11. Securely fit and fasten all materials in place.



A. RECESSED LIGHT WITH SOLID SAWN



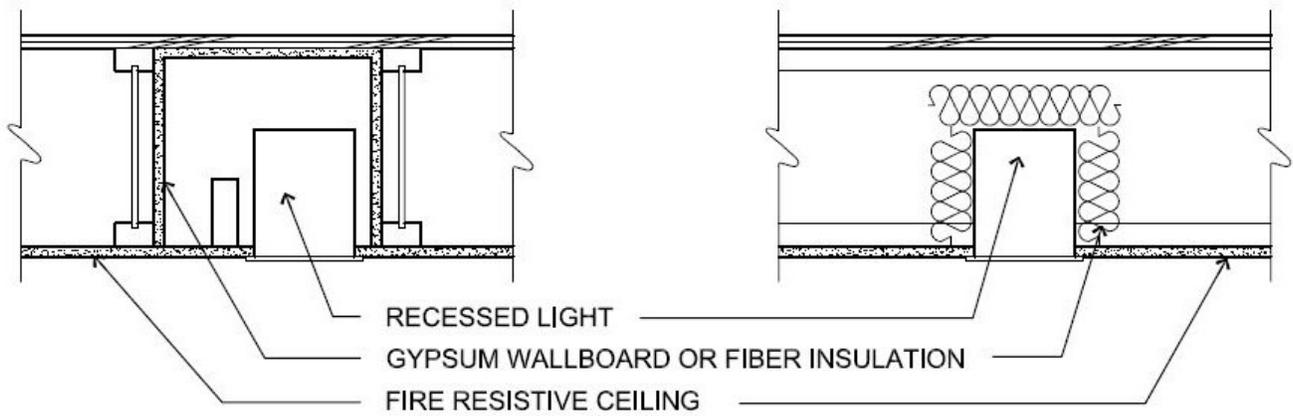
B. HVAC WITH SOLID SAWN



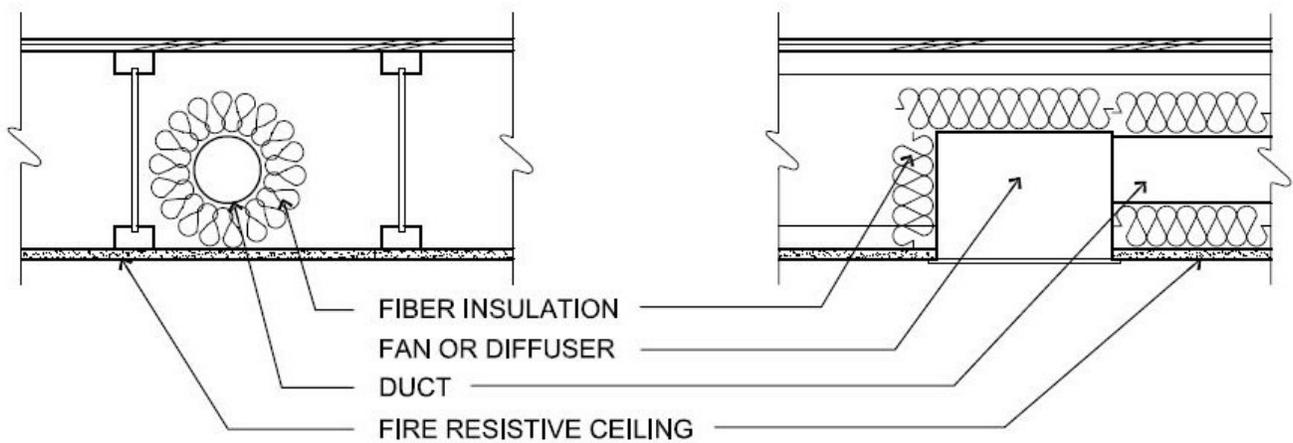
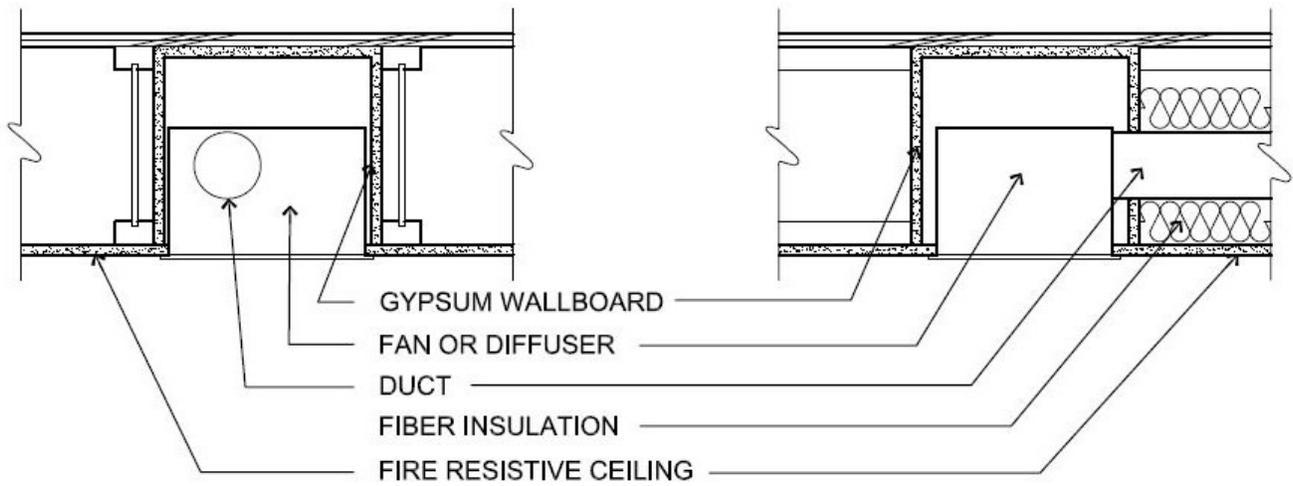
The dashed lines in figures A and B represent the 5/8 inch gypsum wallboard required where openings exceed 100 square inches, or aggregate area of openings exceeds 100 square inches in 100 square feet.



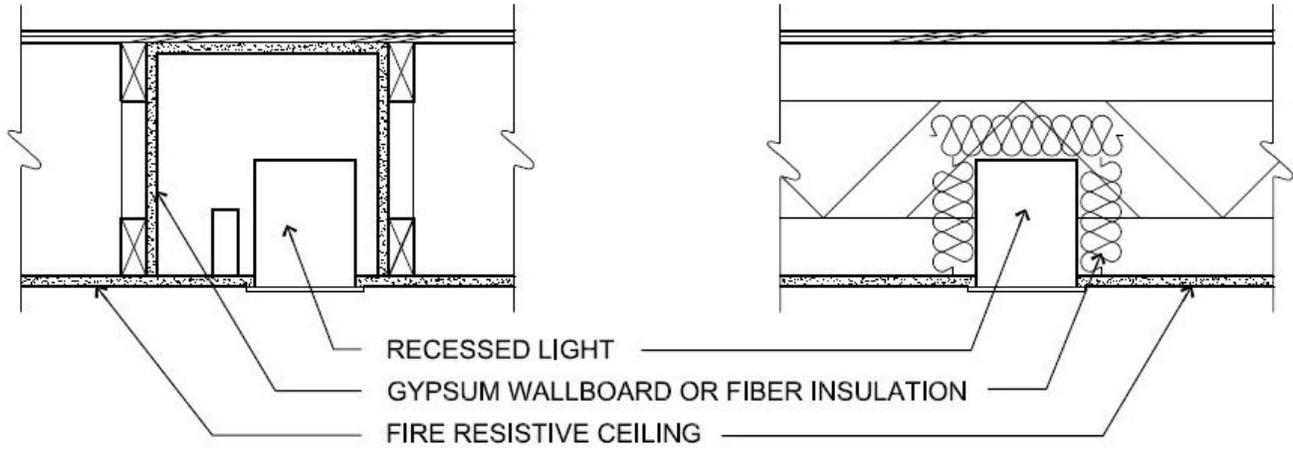
C. RECESSED LIGHT WITH PLYWOOD WEB JOISTS



D. HVAC WITH PLYWOOD WEB JOISTS



E. RECESSED LIGHT WITH METAL PLATE CONNECTED TRUSSES



F. HVAC WITH METAL PLATE CONNECTED TRUSSES

