

Control Joint Placement in Gypsum Board Assemblies

Terminology:

Accessories – Products fabricated for the purpose of forming corners, edges, control joints, or decorative effects.ⁱ There are many different types of trim accessories used to cover and finish the “control” or “expansion” joint, below are three of the common methods used.

- One-piece trim accessory – allows movement along the “X” axis, commonly referred to as a “093” or equal.
- Two-piece trim accessory – allows movement along the “X” and “Y” axis, commonly referred to as a “2-piece” or an “expansion” accessory or equal.
- Two separated trim accessories – provides unrestricted movement, commonly achieved by using independent trim pieces with the void filled with sealant or equal.

Construction Joint (Expansion Joint) – A designed separation of materials within construction that allows movement of all component parts of the building in any plane.ⁱⁱ

Control Joint – A Predetermined separation (space) installed or created between adjacent surfaces in large ceiling and wall areas to relieve stress caused by movement.ⁱⁱⁱ

General:

Control joints are predetermined separations that are designed to relieve internal stresses created by expansion and contraction of the gypsum board, commonly created from thermal or humidity movement, while external stresses are generally a result from physical movement of the structure.

There are two factors that can affect the thermal movement of the gypsum board. One is relative humidity (RH). If the RH increases from 10% to 50%, a gypsum board wall 300 ft long will have an unrestrained linear expansion of 1 - 1/32". The other is temperature. With an increase in temperature of 50 degrees, a gypsum board wall 100 ft long will have a linear expansion of an excess of 1/2"^{iv}.

Physical movement (structural forces) can be created from dimensional changes in framing that are related to thermal shock due to rapid and extreme changes in temperature/humidity during construction, curing of wood framing, live load deflection, story drift, settling etc.

A one-piece trim accessory can be used to finish (cover) the control joint where structural forces are anticipated. However, if the movement becomes greater than this trim accessory can handle, cracking could occur. In these locations, a trim accessory that allows for multiple movements should be specified and detailed.

The use of control joints is typically not a guarantee of a crack free wall; they help relieve some of the stresses commonly associated with cracking.

Installation:

ASTM C840-08 or GA-216-2013 provides the following requirements for installing control joints in gypsum board assemblies:

- Section 20.2 (GA 4.7.1.1 & GA 4.7.2) – Control joints shall be installed where indicated on the plans. Full height door frames shall be considered equivalent to a control joint
- Section 20.3 (GA 4.7.3) – Control joints in the gypsum board shall be specified by the architect or designer where any of the conditions described in 20.3.1-20.3.5 exist (GA 4.7.3.1 – 4.7.3.7)
 - Section 20.3.1 (GA 4.7.3.1) – A control joint shall be installed where a partition, wall, or ceiling traverses a construction joint (expansion, seismic or building control element) in the base building structure.
 - Section 20.3.2 (GA 4.7.3.2) – Control joints shall be installed where a wall or partition runs in an uninterrupted straight plane exceeding 30 linear feet (9100 mm)
 - Section 20.3.3 (GA 4.7.3.3) – Control joints in interior ceilings with perimeter relief shall be installed so that linear dimensions between control joints do not exceed 50 ft (15000 mm) and total area between control joints does not exceed 2500 sq ft (230 m²)
 - Section 20.3.4 (GA 4.7.3.4) – Control joints in interior ceilings without perimeter relief shall be installed so that linear dimensions between control joints do not exceed 30 ft (9100 mm) and total area between control joints does not exceed 900 sq ft (84 m²)
 - Section 20.3.5 (GA 4.7.3.5) – Control joints in exterior ceilings and soffits shall be installed so that linear dimensions between control joints do not exceed 30 ft (9100 mm) and total area between control joints does not exceed 900 sq ft (84 m²)
- Section 20.3.6 (GA 4.7.3.6) – A control joint or intermediate blocking shall be installed where ceiling framing members change direction
- Section 20.3.7 (GA 4.7.3.7) – Control joints shall be installed where specified by the architect or designer as a design accent or architectural feature
- Section 20.4 (GA 4.7.4) – Where a control joint occurs in an acoustical or fire-rated system, blocking shall be provided behind the control joint by using a backing material such as 5/8 in. (15.9 mm) type X gypsum board, mineral fiber, or other tested equivalent. See Figure 2

Non-Rated Assembly:

Where control joints are installed in non-rated assemblies and are parallel to the framing members, a framing member is required on each side of the opening (Figure 1). This requirement is for the attachment of gypsum board. Additional framing is not required for control joints that are installed perpendicular to the framing members with framing spacing up to 24" on center.

Rated Assembly:

Where control joints are installed in rated assemblies and are parallel to the framing members, a framing member is required on each side of the opening and shall be installed per Figure 2.

In rated assemblies, the control joint should be placed so that the "gypsum board strips" are continuous (per Figure 2), if the "gypsum board strips" cannot be continuous, an approved alternative shall be agreed upon before installing the control joint in the designed location.

Both Assemblies:

Control joints can be utilized to create a separation between adjacent surfaces on one side of the wall and may not be required at the same location on the other side of the wall (Figure 1), if the requirements in section 20.2 (GA-4.7.1.1) to section 20.4 (GA-4.7.4) exist. At a location where an expansion joint is designed, the expansion joint and the correct trim accessory shall be located in the same location on each side of the wall assembly.

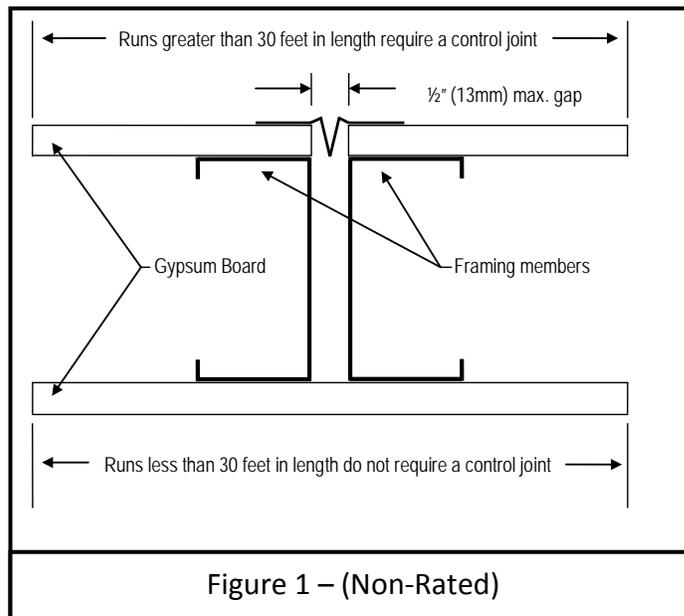


Figure 1 – (Non-Rated)

Additional Points of Commentary:

ASTM C 840 and GA-216 specifically state where control joints should be placed and clarifies that it is the responsibility of the design professional to specify the location for control joints and that those locations will be indicated on the plans. In some cases, the design professional may choose to abstain from the use of control joints because of the affect they may have on the finish appearance.

The Jobsite Specifications denote the type of product to be used and the Construction Drawings indicate the location and quantities. Provided the necessary information is explicit in both the specifications and drawings, the contractor is responsible to install the control joints as indicated. If the control joints are referenced in the specifications but are not indicated on the construction drawings, the anticipated quantity for the contractor is zero.

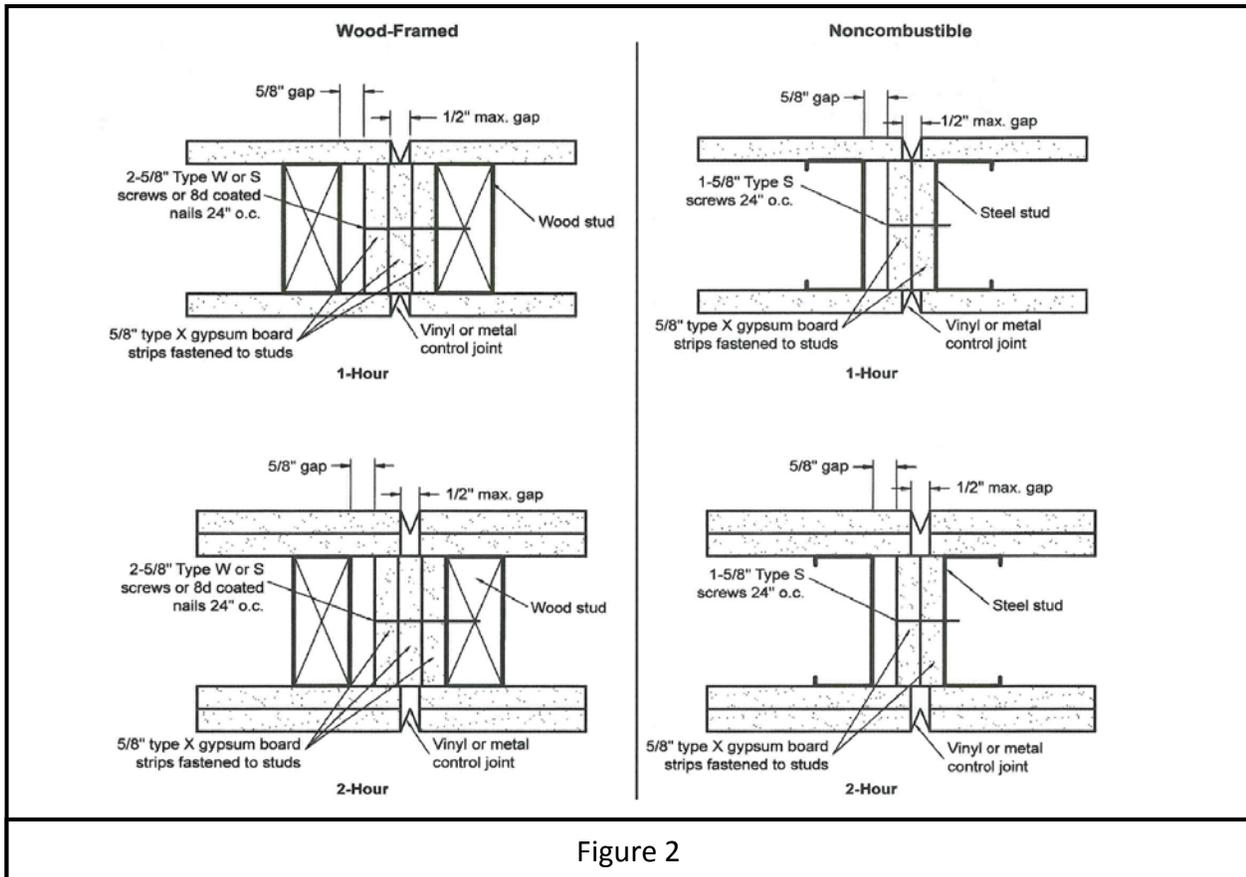


Figure 2

ⁱ ASTM C11 – Standard Terminology
ⁱⁱ The Gypsum Construction Handbook – Sixth Edition
ⁱⁱⁱ GA-505, Gypsum Board Terminology
^{iv} The Gypsum Construction Handbook – Sixth Edition