GYPSUM ASSOCIATION

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# RECOMMENDATIONS FOR THE PREVENTION OF CEILING CRACKING

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Every building material undergoes some amount of dimensional change from temperature (thermal coefficient of expansion) and moisture content (hygrometric coefficient of expansion). As a result, all building assemblies undergo dimensional changes (i.e., shrinkage and expansion) as the moisture content and temperature of the material changes over time. The thermal and hygrometric coefficients of expansion are not the same for all materials, so the amount of dimensional change will be different for different materials. When two materials with significantly different coefficients of expansion, such as gypsum board and wood framing, are rigidly attached to each other stresses will build up in the materials as their moisture contents and/or temperatures change.

In many cases, the amount of dimensional change, as a percent of the material's original dimension, is insignificant and uneventful. However, the actual amount of dimensional change is a function of the size of the individual elements. When framing spans approach or exceed 15 feet, the differences between the expansion coefficients of these two materials become significant. Typically, the result can be ceiling cracks at gypsum board joints located near the centerline of the span.

One effective method of minimizing centerline cracks is to use resilient channels to create a less rigid attachment of the gypsum board to wood framing. By isolating these two materials with resilient channel, the potential for cracking is reduced. This isolation allows each material to shrink or expand independently of the other.

Some general areas where you should consider using Resilient Channels:

- Large ceiling areas where framing members span more than 15 feet.
- Change in framing member span direction, such as girder truss and standard hip construction.
- Adjacent parallel framing members within the same ceiling area having different span lengths or different stiffness or rigidity.
- Areas with large temperature and humidity variation such as garages, etc.
- Interior areas of construction that may be left unconditioned over long periods of time.
- Improper placement of bottom chord splices of floor and ceiling joists. In-line bottom chord splices typically cause problems.

**Using resilient channels to minimize centerline joint cracking and ridging in large span ceilings**

1. Attach resilient channels perpendicular to the framing and then attach the gypsum panel product to the channels. This creates a ceiling system that provides better structural isolation between the framing and the gypsum panels. A portion of the movement inherent in the framing is absorbed in the metal leg of the channel without creating this same stress on the board joints. When the layout of the system does not allow for perpendicular placement, cross bracing should be utilized to facilitate the continuation of the resilient channels. Perpendicular placement of the resilient channels serves to isolate structural movement and allows the openings in the resilient channel web to be placed across the joists for optimal sound dissipation.
2. Orienting resilient channel perpendicular to the trusses results in the taped edge joints of the gypsum panel products being oriented parallel to the long dimension of the ceiling where the joints are not subjected to the compressive and tensile forces created as the trusses or joists deflect.
3. Resilient channels are spaced 16" o.c., as compared to the 24" o.c. spacing of the trusses or joists. This provides additional framing support for the attachment of drywall thereby improving the strength of the system which helps minimize the occurrence of ridging and cracking.
4. Where trusses or joists change direction the resilient channels should be installed to run in one direction on ceilings by adding a small amount of blocking. The resulting drywall joints will span truss direction changes and lead to a more uniform finish.

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