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| SSMA | **INDUSTRY TECHNICAL NOTE**<br>**COLD FORMED STEEL CONSTRUCTION** | **4**<br>**NOV 2001** |

# INTERIOR NON-STRUCTURAL 30 MIL FRAMED WALLS

## INTRODUCTION

Non-Structural interior walls framed with cold-formed steel studs were tested in order to determine limiting wall heights based on the composite action between the gypsum sheathing attached to each stud flange. The SSMA "Product Technical Information" catalog has composite non-structural interior wall tables with a minimum base steel thickness range of 18 mils to 68 mils (.0179 in to .0677 in) except for 30 mil thickness steels which in certain geographic regions is considered a drywall stud (20 ga).

The member companies of SSMA selected Professor Tom Miller at Oregon State University, to complete a series of 30 mil test panels with various stud depths for determining the limiting wall heights for interior applications. These tests were initiated to complement the testing completed by OSU for steel with a thickness of 18 mil to 68 mil for determining the limiting height wall tables incorporated in ASTM A754.

## OBSERVATIONS

The testing was completed to determine the limiting height based on deflection, flexural stress, or web crippling. It was generally observed that the deflection is the controlling criteria for limiting the wall height for a given applied uniform pressure.

The test assemblies were constructed using 30 mil thick steel C-sections that complied with the dimensional properties established by SSMA. Each face of the stud and track flanges received ½" gypsum board attached with screws spaced at 12 in o.c. in the field and ends.

The track sections used were the same thickness as the studs. When the studs were engaged into the track at each end of the wall assembly, the only attachment being made to secure the stud and track together was the screws installed through the gypsum board into each framing member.

There was no positive screw attachment between the track and stud to simulate field conditions.

The various assemblies were tested in a vacuum chamber with incremental pressures applied and deflection data recorded. The tested assemblies were tested in a vertical orientation to simulate field service conditions. Gypsum board used in the test matrix was obtained from different manufactures and randomly selected for fabrication of the test panels.

Based on information supplied by the Gypsum Association in the original series of tests, regular gypsum board provided the least increase stiffness and strength when compared to other types of wall board (i.e., moisture-resistant board, type x, etc.)

All testing was completed in accordance with ICBO Evaluation Service AC86 "Acceptance Criteria for Determining Heights of Composite Walls Constructed of Gypsum Board and Steel Studs."

## LIMITING HEIGHT

The data recorded from the tested assemblies was normalized for dimensional differences; thicknesses measuring differently than 30 mil base metal thickness and yield strength differing from a minimum yield of 33 ksi.

The limiting heights shown in Table 1 are based on a minimum yield stress of 33 ksi. The section properties used for normalizing the calculated flexural stress and web crippling, was based on the 1996 American Iron and Steel Institute's "Specification for Designing Cold-Formed Steel Members."

**TABLE 1**
**MAXIMUM STUD HEIGHT [1, 2, 3]**

| Stud Size | Frame Spacing (in) o.c. | 5 psf | | | 7.5 psf | | | 10 psf | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | L/120 | L/240 | L/360 | L/120 | L/240 | L/360 | L/120 | L/240 | L/360 |
| 162S125-30 | 12 | 12' 5" | 9' 11" | - | 10' 10" | - | - | 9' 11" | - | - |
| 162S125-30 | 16 | 11' 6" | 9' 2" | - | 10' 1" | - | - | 9' 2" | - | - |
| 162S125-30 | 24 | 10' 5" | 8' 3" | - | 9' 2" | - | - | 8' 3" | - | - |
| 250S125-30 | 12 | 16' 8" | 13' 2" | 11' 6" | 14' 7" | 11' 6" | 10' 0" | 13' 2" | 10' 5" | 9' 1" |
| 250S125-30 | 16 | 15' 4" | 12' 1" | 10' 6" | 13' 4" | 10' 6" | 9' 2" | 12' 1" | 9' 6" | 8' 4" |
| 250S125-30 | 24 | 13' 9" | 10' 9" | 9' 4" | 11' 11" | 9' 4" | 8' 1" | 10' 9" | 8' 6" | 7' 4" |
| 350S125-30[4] | 12 | 21' 8" | 17' 1" | 14' 10" | 18' 11" | 14' 10" | 12' 10" | 17' 1" | 13' 5" | 11' 8" |
| 350S125-30[4] | 16 | 19' 11" | 15' 8" | 13' 7" | 17' 5" | 13' 7" | 11' 9" | 15' 8" | 12' 3" | 10' 7" |
| 350S125-30[4] | 24 | 17' 9" | 14' 0" | 12' 0" | 15' 6" | 12' 0" | 10' 5" | 14' 0" | 10' 10" | 9' 4" |
| 400S125-30 | 12 | 24' 0" | 19' 0" | 16' 6" | 20' 11" | 16' 6" | 14' 4" | 19' 0" | 14' 11" | 12' 11" |
| 400S125-30 | 16 | 22' 0" | 17' 6" | 15' 2" | 19' 3" | 15' 2" | 13' 1" | 17' 6" | 13' 8" | 11' 10" |
| 400S125-30 | 24 | 19' 8" | 15' 7" | 13' 5" | 17' 1"f | 13' 5" | 11' 7" | 14' 9"f | 12' 1" | 10' 5" |
| 600S125-30 | 12 | 32' 1" | 25' 6" | 22' 3" | 28' 0" | 22' 3" | 19' 5" | 24' 7"f | 20' 3" | 17' 6" |
| 600S125-30 | 16 | 29' 2" | 23' 2" | 20' 3" | 24' 9"f | 20' 3" | 17' 8" | 21' 5"f | 18' 4" | 15' 10" |
| 600S125-30 | 24 | 25' 1"f | 20' 3" | 17' 8" | 20' 6"f | 17' 8" | 15' 5" | 17' 9"f | 16' 0" | 13' 8" |

f Flexural stress controls allowable height.

1 Based on tests conducted with ½" gypsum board attached with screws spaced 12 in o.c. to framing members.

2 Maximum stud heights also applicable to walls sheathed with gypsum board greater than ½" thick and multiple layout of gypsum.

3 Runner track flanges need not be fastened to stud flanges except at doorjambs, window frames, partition intersections, and corners.

4 Also applicable to 3-5/8"stud depth 362S125-30.