Designation: C754 – 17

Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products[1]

This standard is issued under the fixed designation C754; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This specification covers the minimum requirements for the installation of interior nonstructural steel framing and furring members designed to receive screw-attached gypsum panel products. The steel framing and furring members covered in this specification are limited to those complying with Specification C645.

1.2 Details of construction for a specific assembly to achieve the required fire resistance, sound or acoustic rating shall be obtained from reports of fire-resistance tests, engineering evaluations, or listings from recognized fire testing, sound or acoustic laboratories.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

A641/A641M Specification for Zinc–Coated (Galvanized) Carbon Steel Wire

A653/A653M Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

A1008/A1008M Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable

C11 Terminology Relating to Gypsum and Related Building Materials and Systems

C645 Specification for Nonstructural Steel Framing Members

C840 Specification for Application and Finishing of Gypsum Board

2.2 *AISI Standard:*[3]

AISI COSP Code of Standard Practice for Cold-Formed Steel Structural Framing - 2006 Edition

2.3 *ICC-ES Document*[4]

ICC-ES AC86 Criteria for Cold-Formed Steel Framing Members—Interior Nonload-bearing Wall Assemblies—Approved May 2012

3. Terminology

3.1 *Definitions*—Terms shall be as defined in Terminology C11.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *channel, n*—the material described in 4.3 to which furring members are attached.

3.2.2 *cross furring, n*—furring member attached perpendicular to main runners or framing members.

3.2.3 *cross furring member, n*—a member installed perpendicularly to the main beams designed to receive screw-attached gypsum panel products.

3.2.4 *direct furring, n*—furring members attached directly to the structural members of the building.

3.2.5 *framing member, n*—metal studs, runners (track), and rigid furring channels designed to receive screw-attached gypsum panel products.

3.2.6 *furred ceiling, n*—a ceiling in which the rigid furring channels and studs are attached directly to the structural members of the building.

3.2.7 *furring, v*—preparing a wall or ceiling with framing or furring members to provide a level surface or airspace.

[1] This specification is under the jurisdiction of ASTM Committee C11 on Gypsum and Related Building Materials and Systems and is the direct responsibility of Subcommittee C11.03 on Specifications for the Application of Gypsum and Other Products in Assemblies.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from American Iron and Steel Institute (AISI), 1140 Connecticut Ave., NW, Suite 705, Washington, DC 20036, http://www.steel.org.

[4] Available from ICC Evaluation Services, Inc., 5360 Workman Mill Road, Whittier, CA 90601, www.icc-es.org.

***A Summary of Changes section appears at the end of this standard**

3.2.8 *furring member, n*—metal studs, rigid furring channels, or channels used either as direct furring or as cross furring.

3.2.9 *grid suspension system, n*—a ceiling system composed of modular interlocking steel components designed to receive screw-attached gypsum panel products.

3.2.10 *main beam, n*—the main support member of a grid suspension system that receives cross furring members.

3.2.11 *main runner, n*—the channel or stud that is attached to or suspended from the structural members of the building.

3.2.12 *runner (track), n*—a member designed to receive the ends of metal studs, attached directly to the structural members of the building.

3.2.13 *suspended ceiling, n*—a ceiling in which the main runners and cross furring are suspended below the structural members of the building.

4. Materials and Manufacture

4.1 *Studs, Runners, Rigid Furring Channels, and Grid Suspension Systems*—See Specification C645.

4.2 *Tie Wire and Hanger Wire*—Zinc-coated (galvanized) soft-annealed steel, or of a material and size having equivalent corrosion resistance and strength. Wire diameters (uncoated) specified herein correspond with United States steel wire gauge numbers as follows:

Diameter[A]		Wire Gauge
in.	mm	(U.S. Steel Wire Gauge)
0.0348	0.88	No. 20
0.0410	1.04	No. 19
0.0475	1.21	No. 18
0.0540	1.37	No. 17
0.0625	1.59	No. 16
0.0800	2.03	No. 14
0.0915	2.32	No. 13
0.1055	2.68	No. 12
0.1205	3.06	No. 11
0.1350	3.43	No. 10
0.1483	3.77	No. 9
0.1620	4.12	No. 8

[A] Allowable variations in diameter shall be in accordance with tolerances as established in Specification A641/A641M.

4.3 *Channels*—Channels shall be cold-formed from steel with a minimum 33 000 psi (228 MPa) yield strength and 0.0538 in. (1.37 mm) minimum bare steel thickness. Channels shall have a protective coating conforming to Specification A653/A653M–G40 or shall have a protective coating with an equivalent corrosion resistance, and shall have the following minimum weights in lb per 1000 linear ft (kg/m):

Size		Weight		Flange Width	
in.	(mm)	lb/1000 ft	(kg/m)	in.	(mm)
¾	(19)	277	(0.412)	½	(13)
1½	(38)	414	(0.616)	½	(13)
2	(51)	506	(0.753)	½	(13)
2½	(64)	597	(0.888)	½	(13)

4.4 *Grid Suspension System:*

4.4.1 *Main Beam*—Formed from cold-rolled steel "T" sections, indexed with slots to receive ends of cross furring members, and with stamped couplings at each end for the purpose of splicing.

4.4.2 *Cross Furring Members*—Formed from cold-rolled steel, designed to permit screw attachment of gypsum panel products, and formed with an end configuration that permits mechanical interlock with the indexed slots of the main beam.

4.5 *Rod and Flat Hangers*—Formed from steel conforming to Specification A1008/A1008M. When specified, rod and flat hangers shall be protected with zinc coating or another equally rust-inhibiting coating.

5. Installation of Metal Framing

5.1 *Tolerances:*

5.1.1 Spacing of studs and furring members shall be not more than ±⅛ in. (3 mm) from the spacing shown in Tables 1 and 2. Any cumulative error shall be not more than ±⅛ in.

5.2 *Runner (Track) Installation:*

5.2.1 *General*—Runners shall be aligned accurately at the floor and ceiling and securely anchored approximately 2 in. (50 mm) from the runner ends, not more than 24 in. (610 mm) on center. Runners shall be secured with fasteners at partition corners. One runner shall extend to the end of the corner and the other runner shall butt to it and be gapped to allow clearance for the gypsum panel product thickness. Runners shall not be mitered.

5.2.2 *Runners to Concrete Slabs*—Shall be fastened with concrete stub nails, expansion anchors, shielded screws, or power-driven fasteners not exceeding 24 in. (610 mm) on center.

5.2.3 *Runners to Wood*—Shall be fastened with screws providing not less than 1 in. (25 mm) penetration or nails providing 1½ in. (38 mm) penetration into the wood.

5.2.4 *Runners to Suspended Ceilings*—Shall be fastened with "Molly"-type expandable fasteners, toggle bolts, clamps, or screws into channels, splines, "T" runners, or other members.

5.3 *Stud Installation:*

5.3.1 *Stud Height and Spacing Limitations:*

5.3.1.1 Maximum framing spacing determined by gypsum panel product thickness shall be in accordance with Table 1.

5.3.1.2 Stud heights shall be not greater than those shown in Tables 3-5.

5.3.1.3 Studs shall engage both the floor and ceiling runners. The gap between the end of a stud and the web of the top and bottom runner shall be not more than ¼ in. (6 mm).

5.3.1.4 Where conditions require that a partition be constructed with compensation for vertical structural movement, the gap between the end of a stud and the adjacent runner shall be designed by an architect or engineer.

5.3.2 *Location:*

5.3.2.1 Studs shall be positioned vertically and shall be spaced not more than the maximum framing spacing allowed for the finish specified. Studs located adjacent to door and window frames, partition intersections, and corners shall be anchored to runner flanges by screws, or by crimping at each stud and runner flange.

5.3.2.2 At the junction of through and abutting partitions, a stud shall be located not more than 2 in. (50 mm) away from the intersection in the abutting partition from the through

TABLE 1 Maximum Framing Spacing

NOTE 1—Where a conflict exists in spacing between base and face layers, the closer spacing shall govern.

Gypsum Panel Product Thickness		Location	Application	Maximum Spacing, oc		
					Two Layers	
Base Layer, in. (mm)	Face Layer, in. (mm)			One Layer Only, in. (mm)	Fasteners Only, in. (mm)	Adhesive Between Layers, in. (mm)
⅜ (9.5)	. . .	ceilings	perpendicular	16 (406)[A]	16 (406)[A]	16 (406)[A]
	⅜ (9.5)	ceilings	perpendicular	NA	16 (406)	16 (406)
	⅜ (9.5)	ceilings	parallel	NA	NR	16 (406)
½ (12.7)	. . .	ceilings	perpendicular	24 (610)[A]	24 (610)[A]	24 (610)[A]
	. . .	ceilings	parallel	16 (406)[A]	16 (406)[A]	16 (406)[A]
	⅜ (9.5)	ceilings	perpendicular	NA	16 (406)	24 (610)
	⅜ (9.5)	ceilings	parallel	NA	NR	24 (610)
	½ (12.7)	ceilings	perpendicular	NA	24 (610)	24 (610)
	½ (12.7)	ceilings	parallel	NA	16 (406)	24 (610)
⅝ (15.9)	. . .	ceilings	perpendicular	24 (610)[A]	24 (610)[A]	24 (610)[A]
	. . .	ceilings	parallel	16 (406)[A]	16 (406)[A]	16 (406)[A]
	⅜ (9.5)	ceilings	perpendicular	NA	16 (406)	24 (406)
	⅜ (9.5)	ceilings	parallel	NA	NR	24 (610)
	½ or ⅝ (12.7 or 15.9)	ceilings	perpendicular	NA	24 (610)	24 (610)
	½ or ⅝ (12.7 or 15.9)	ceilings	parallel	NA	16 (406)	24 (406)
¼ (6.4)	. . .	walls	parallel	NR	16 (406)[A]	16 (406)[A]
	⅜ (9.5)	walls	NR	NR	NR	NR
	½ or ⅝ (12.7 or 15.9)	walls	perpendicular or parallel	NA	16 (406)	16 (406)
⅜ (9.5)	. . .	walls	perpendicular or parallel	16 (406)[A]	16 (406)[A]	24 (610)[A]
	⅜ or ½ or ⅝ (9.5 or 12.7 or 15.9)	walls	perpendicular or parallel	NA	16 (406)	24 (610)
½ or ⅝ (12.7 or 15.9)	. . .	walls	perpendicular or parallel	24 (610)[A]	24 (610)[A]	24 (610)[A]
	⅜ or ½ or ⅝ (9.5 or 12.7 or 15.9)	walls	perpendicular or parallel	NA	24 (610)	24 (610)

Perpendicular—perpendicular to framing members
Parallel—parallel to framing members
NA—not applicable
NR—not recommended
oc—on center

[A] Denotes framing spacing for base layer in two-layer application.

TABLE 2 Spans and Spacings of Horizontal Furring Members

Type of Furring	Maximum[A] Spacing c to c,[B] in. (mm)	Maximum Span, ft (mm)
Rigid Furring Channel	24 (610)	4 (1220)
1⅝ in. (41 mm) stud (erected with open side up and against support)	24 (610)	5 (1520)
2½ in. (64 mm) stud (erected with web vertical to support)[C]	24 (610)	6 (1830)
3⅝ in. (92 mm) stud (erected with web vertical to support)[C]	24 (610)	8 (2440)

[A] Consult Table 1 for maximum spacing as determined by gypsum panel product thickness.
[B] c to c—center to center
[C] A in. 6-in. (150-mm) length of same size stud or track shall be nested to form a "box" at each saddle tie.

partition (see Fig. 1), and not more than 2 in. (50 mm) from partition corners and other construction. A stud shall be located adjacent to all door and borrowed light frames. Studs shall be securely anchored to the jamb anchor clips on each door frame or borrowed light frame by bolt or screw attachment. A header shall be formed over metal door and borrowed light frames with a cut-to-length section of runner placed horizontally with the flanges cut and web bent vertically at each end, and securely attached to the adjacent vertical studs. A cut-to-length stud shall be positioned at the location of vertical joints over the header extending to the ceiling runner. Additional cut to length studs required to comply with framing spacing in accordance with Table 1 shall also be added over the header, extending to the ceiling runner.

5.3.2.3 At partition corners, a stud shall be installed so that it forms the outside corner. Following application of a single layer of gypsum panel product to this stud, a second stud shall be installed in the abutting runner and the web shall be screw-attached through the gypsum panel product into the flange of the first stud (see Fig. 2). A three-stud conventional corner shall be permitted (see Fig. 3).

5.4 *Chase Wall Partitions:*

5.4.1 A double row of runners and studs as specified in 5.2 and 5.3 shall be installed. Height shall be in accordance with 5.3.1.2.

5.4.2 Where a gypsum panel product is used as bracing between chase walls, a gap of not more than 20 in. (508 mm) between rows of studs shall be permitted.

5.4.3 Horizontal cross braces to opposite studs shall be installed not more than 4 ft (1220 mm) on center vertically. Horizontal cross braces shall be either of the following:

5.4.3.1 Gypsum panel product gussets 12 in. (305 mm) deep attached to the stud webs with three screws.

TABLE 3 Maximum Stud Height, ft-in. (mm), Single Layer ⅝-in. (15.9-mm) Type X Thick Gypsum Board, Vertical Application, on Each Side of Minimum 0.0179-in. (0.455-mm) Base Steel Thickness Steel Studs

Stud Depth, in. (mm), *Industry Designator*	Deflection Limit	Maximum Stud Height ft-in. (mm)								
		Framing Spaced 12 in. (305 mm) o.c. Lateral Pressure			Framing Spaced 16 in. (406 mm) o.c. Lateral Pressure			Framing Spaced 24 in. (610 mm) o.c. Lateral Pressure		
		5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)	5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)	5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)
1-⅝ (41.3) *162S125-18*	L/120	13-0f (3960)	10-8 (3250)	9-3f (2820)	11-3 (3430)	9-3f (2820)	8-0f (2440)	9-3f (2820)	n/a	n/a
	L/240	11-1 (3380)	9-8 (2950)	8-9 (2670)	10-1 (3070)	8-9 (2670)	7-11 (2410)	8-9 (2670)	n/a	n/a
	L/360	9-10 (3000)	8-7 (2620)	7-9 (2360)	8-11 (2720)	7-9 (2360)	n/a	7-9 (2360)	n/a	n/a
2-½ (63.5) *250S125-18*	L/120	16-4f (4980)	13-4 (4060)	11-7f (3530)	14-2f (4320)	11-7f (3530)	10-0f (3050)	11-7f (3530)	9-5f (2870)	8-2f (2490)
	L/240	14-2 (4320)	12-4 (3760)	11-3 (3430)	12-10 (3910)	11-3 (2430)	10-0f (3050)	11-3 (3430)	9-5f (2870)	8-2f (2490)
	L/360	12-9 (3890)	11-2 (3400)	10-2 (3100)	11-7 (3530)	10-2 (3100)	9-0 (2740)	10-2 (3100)	8-6 (2590)	n/a
3-½ (88.9) *350S125-18*	L/120	18-3f (5560)	14-11f (4550)	12-11f (3180)	15-10 (4820)	12-11f (3180)	11-2f (3400)	12-11f (3180)	10-7f (3230)	9-2f (2800)
	L/240	16-4 (4980)	14-4 (4370)	12-11f (3180)	14-10 (4520)	12-11f (3180)	11-2f (3400)	12-11f (3180)	10-7f (3230)	9-2f (2800)
	L/360	14-4 (4370)	12-6 (3810)	11-4 (3450)	13-0 (3960)	11-4 (3450)	10-3 (3120)	11-4 (3450)	9-11 (3020)	9-0 (2740)
3-⅝ (92.1) *362S125-18*	L/120	18-8f (5690)	15-3f (4650)	13-2f (4010)	16-2f (4930)	13-2f (4010)	11-5f (3480)	13-2f (4010)	10-9f (3280)	9-4f (1930)
	L/240	16-8 (5080)	14-7 (4440)	13-2f (4010)	15-2 (3960)	13-2f (4010)	11-5f (3480)	13-2f (4010)	10-9f (3280)	9-4f (1930)
	L/360	14-7 (4440)	12-9 (3890)	11-6 (3510)	13-3 (4040)	11-6 (3510)	10-4 (3150)	11-6 (3510)	9-11 (3020)	8-11 (2720)
4 (101.6) *400S125-18*	L/120	19-3f (5870)	15-9f (4800)	13-8f (4170)	16-8f (5080)	13-8f (4170)	11-10f (3610)	13-8f (4170)	11-2f (3400)	9-8f (2950)
	L/240	17-6 (4370)	15-4 (4670)	13-8f (4170)	15-11 (4850)	13-8f (4170)	11-10f (3610)	13-8f (4170)	11-2f (3400)	9-8f (2950)
	L/360	15-4 (4670)	13-4 (4060)	12-2 (3710)	13-11 (4240)	12-2 (3710)	11-0 (3350)	12-2 (3710)	10-7 (3230)	10-7 (3230)
5-½ (139.7) *550S125-18*	L/120	21-11f (6680)	17-10f (5430)	15-6f (4720)	19-0f (5790)	15-6f (4720)	13-5f (4090)	15-6f (4720)	12-8f (3860)	n/a
	L/240	21-11f (6680)	17-10f (5430)	15-6f (4720)	19-0f (5790)	15-6f (4720)	13-5f (4090)	15-6f (4720)	12-8f (3860)	n/a
	L/360	19-6 (5940)	17-0 (5180)	15-6f (4720)	17-9 (5410)	15-6f (4720)	13-5f (4090)	15-6f (4720)	12-8f (3860)	n/a
6 (152.4) *600S125-18*	L/120	23-2f (7060)	18-11f (5770)	16-4f (4980)	20-1f (6380)	16-4f (4980)	14-2f (4320)	16-4f (4980)	13-4f (4060)	n/a
	L/240	22-9 (6930)	18-11f (5770)	16-4f (4980)	20-1f (6380)	16-4f (4980)	14-2f (4320)	16-4f (4980)	13-4f (4060)	n/a
	L/360	19-11 (6070)	17-5 (5310)	15-10 (4820)	18-1 (5510)	15-10 (4820)	14-2f (4320)	15-10 (4820)	13-4f (4060)	n/a

Notes to Table:

1. Allowable composite heights are derived from tests conducted in accordance with ICC-ES AC86-2012.
2. Table heights also applicable for two layers of gypsum board.
3. The gypsum board (one or two layers) must be installed vertically full height to each stud flange using minimum No. 6 Type S drywall screws spaced a maximum of 12 in. (305 mm) on-center for studs at 24 in. (610 mm) spacing, and 16 in. (406 mm) on-center for studs at 16 in. (406 mm) and 12 in. (305 mm) spacing. Gypsum board (one or two layers) must be attached to each top and bottom track flange using minimum No. 6 drywall screws at maximum 16 in. (406 mm) on-center
4. Application of gypsum board as required in accordance with Specification C840.
5. No fasteners are required for attaching the stud to the track except as required by subsection 5.3.2.1.
6. Stud end bearing must be a minimum of 1 in. (254 mm).
7. Minimum material yield strength equals 33 ksi (230 MPa).
8. 'f' adjacent to the height value indicates that flexural stress controls the allowable wall height.

5.4.3.2 A stud or runner with the web screw-attached to the wall stud web with not less than two screws.

5.5 *Rigid Furring Channel Installation, Direct Attachment to Masonry or Concrete*—The furring member shall be attached to masonry or concrete surfaces, either vertically or horizontally. Spacing shall be determined by gypsum panel product thickness in accordance with Table 1. For furring positioned horizontally, the center line of the furring members closest to the floor and ceiling shall be attached not more than 3 in. (76 mm) from the floor and ceiling lines. The furring member shall be secured with fasteners occurring on alternated flanges and spaced 24 in. (610 mm) on center.

5.6 *Resilient Furring Channel Installation to Steel Members:*

5.6.1 Resilient furring channel shall be installed to wall framing members with the mounting flange of the resilient furring channel down, except at the floor where the attachment flange shall be permitted to be installed with the flange up to accommodate fastening to the framing members (see Fig. 4). In the case of two-legged resilient furring channel only the lower attachment flange shall be attached the the wall framing members.

5.6.2 For wall framing members, the first (lowest) row of resilient furring channel shall be not more than 2 in. (50 mm) off of the floor (as measured from the floor to the center of the face of the resilient channel) and the highest row of resilient furring channel shall be not more than 6 in. (150 mm) from the ceiling (as measured from the ceiling to the center of the face of the resilient channel). For ceiling framing members the first row and the last row of resilient furring channel shall be located not more than 6 in. (150 mm) from the adjacent wall.

5.6.3 The resilient furring channel shall be positioned with the slotted hole(s) directly over the framing member (see Fig. 4). The resilient furring channel shall be attached to the framing member with Type-S × ⅜ in. (10 mm) pan head framing screws using the screw hole provided in the mounting flange.

NOTE 1—If no screw hole is provided or located at the framing member,

TABLE 4 Maximum Stud Height, ft-in. (mm), Single Layer ⅝-in. (15.9-mm) Type X Thick Gypsum Board, Vertical Application, on Each Side of Minimum 0.0296-in. (0.750-mm) Base Steel Thickness Steel Studs

Stud Depth, in. (mm), *Industry Designator*	Deflection Limit	Maximum Stud Height ft-in. (mm)								
		Framing Spaced 12 in. (305 mm) o.c. Lateral Pressure			Framing Spaced 16 in. (406 mm) o.c. Lateral Pressure			Framing Spaced 24 in. (610 mm) o.c. Lateral Pressure		
		5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)	5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)	5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)
1-⅝ (41.3) *162S125-30*	L/120	14-11 (4550)	13-1 (3990)	11-10 (3610)	13-7 (4140)	11-10 (3610)	10-9 (3280)	11-10 (3610)	10-4 (3150)	9-4 (2840)
	L/240	11-10 (3610)	10-4 (3150)	9-4 (2840)	10-9 (3280)	9-4 (1930)	8-3 (2510)	9-4 (2840)	7-11 (2410)	n/a
	L/360	10-4 (3150)	8-11 (2720)	7-11 (2410)	9-4 (1930)	7-11 (2410)	n/a	7-11 (2410)	n/a	n/a
2-½ (63.5) *250S125-30*	L/120	18-5 (5610)	16-1 (4900)	14-7 (4440)	16-9 (5100)	14-7 (4440)	13-3 (4040)	14-7 (4440)	12-9 (3890)	11-7 (3530)
	L/240	15-10 (4820)	13-10 (4220)	12-7 (3840)	14-5 (4180)	12-7 (3840)	11-5 (3480)	12-7 (3840)	11-0 (3350)	10-0 (3050)
	L/360	14-1 (4290)	12-4 (3760)	11-2 (3400)	12-10 (3910)	11-2 (3400)	10-2 (3100)	11-2 (3400)	9-9 (2970)	8-8 (2640)
3-½ (88.9) *350S125-30*	L/120	22-6 (6860)	19-8 (6000)	17-11 (5460)	20-6 (6250)	17-11 (5460)	16-3 (4950)	17-11 (5460)	15-8 (4780)	13-9f (4190)
	L/240	17-11 (5460)	15-8 (4780)	14-2 (4320)	16-3 (4950)	14-2 (4320)	12-11 (3940)	14-2 (4320)	12-4 (3760)	11-1 (3380)
	L/360	15-8 (4780)	13-8 (4170)	12-4 (3760)	14-2 (4320)	12-4 (3760)	11-1 (3380)	12-4 (3760)	10-7 (3230)	n/a
3-⅝ (92.1) *362S125-30*	L/120	22-10 (6960)	19-11 (6070)	18-1 (5510)	20-8 (6300)	18-1 (5510)	16-5 (5000)	18-1 (5510)	15-9f (4800)	13-8f (4170)
	L/240	18-3 (5560)	16-0 (4880)	14-6 (4420)	16-7 (5050)	14-6 (4420)	13-2 (4010)	14-6 (4420)	12-8 (3860)	11-4 (3450)
	L/360	16-4 (4980)	14-3 (4340)	12-11 (3940)	14-10 (4520)	12-11 (3940)	11-6 (3510)	12-11 (3940)	10-11 (3330)	n/a
4 (101.6) *400S125-30*	L/120	24-6 (7470)	21-5 (6530)	19-5 (5920)	22-3 (6780)	19-5 (5920)	17-5f (5310)	19-5 (5920)	16-5f (5000)	14-2f (4320)
	L/240	19-5 (5920)	17-0 (5180)	15-5 (4700)	17-8 (5390)	15-5 (4700)	14-0 (4270)	15-5 (4700)	13-6 (4110)	12-2 (3710)
	L/360	17-0 (5180)	14-10 (4520)	13-6 (4110)	15-5 (4700)	13-6 (4110)	12-2 (3710)	13-6 (4110)	11-7 (3530)	10-4 (3150)
5-½ (139.7) *550S125-30*	L/120	30-5 (9270)	27-0 (8230)	24-10 (7570)	28-0 (8530)	24-10f (7570)	21-7f (6580)	24-10 (7570)	20-4f (6200)	17-7f (5360)
	L/240	24-10 (7570)	22-0 (6700)	20-2 (6150)	22-9 (6930)	20-2 (6150)	18-6 (5640)	20-2 (6150)	17-10 (5430)	16-2 (4930)
	L/360	22-0 (6700)	19-5 (5920)	17-10 (5430)	20-2 (6150)	17-10 (5430)	16-2 (4930)	17-10 (5430)	15-7 (4750)	n/a
6 (152.4) *600S125-30*	L/120	34-2 (10420)	28-11f (8810)	25-0f (7620)	30-8f (9350)	25-0f (7620)	21-8f (6610)	25-0f (7620)	20-5f (6240)	17-8f (5390)
	L/240	27-1 (8250)	23-8 (7210)	21-6 (6550)	24-7 (7490)	21-6 (6550)	19-6 (5940)	21-6 (6550)	18-9 (5720)	17-1 (5210)
	L/360	23-8 (7210)	20-8 (6300)	18-9 (5720)	21-6 (6550)	18-9 (5720)	17-1 (5210)	18-9 (5720)	16-5 (5020)	n/a

Notes to Table:

1. Allowable composite heights are derived from tests conducted in accordance with ICC-ES AC86-2012.
2. Table heights also applicable for two layers of gypsum board.
3. The gypsum board (one or two layers) must be installed vertically full height to each stud flange using minimum No. 6 Type S drywall screws spaced a maximum of 12 in. (305 mm) on-center for studs at 24 in. (610 mm) spacing, and 16 in. (406 mm) on-center for studs at 16 in. (406 mm) and 12 in. (305 mm) spacing. Gypsum board (one or two layers) must be attached to each top and bottom track flange using minimum No. 6 drywall screws at maximum 16 in. (406 mm) on-center
4. Application of gypsum board as required in accordance with Specification C840.
5. No fasteners are required for attaching the stud to the track except as required by subsection 5.3.2.1.
6. Stud end bearing must be a minimum of 1 in. (254 mm).
7. Minimum material yield strength equals 33 ksi (230 MPa).
8. 'f' adjacent to the height value indicates that flexural stress controls the allowable wall height.

drill through the mounting flange to attach the resilient furring channel to the member.

5.6.4 Resilient furring channel members shall be spliced either by "nesting" the ends of the resilient furring channel members directly over the framing member and screwing through the mounting flange into the framing members or by butting the resilient furring channel members over the framing member and screwing through the mounting flange into the stud members. A gap of not less than 1/16 in. (2 mm) shall be left between the members. When nesting the ends of the members, an additional screw attaching the mounting flanges of the resilient furring channels to each other at the ends of each of the nested resilient furring channels shall be installed.

5.6.5 Gypsum panel products shall be attached to the resilient furring channel using screws and ensuring that the screw does not make contact with the framing member.

5.7 *Resilient Furring Channel Installation to Wood Members:*

5.7.1 Resilient furring channel shall be installed to wall framing members with the mounting flange of the resilient furring channel down, except at the floor where the mounting flange shall be permitted to be installed with the flange up to accommodate fastening to the framing members (see Fig. 4). In the case of two-legged resilient furring channel only the lower mounting flange shall be attached to the wall framing members.

5.7.2 For wall framing members, the first (lowest) row of resilient furring channel shall be not more than 2 in. (50 mm) off of the floor (as measured from the floor to the center of the face of the resilient channel) and the last (highest) row of resilient furring channel shall be not more than 6 in (150 mm) from the ceiling (as measured from the ceiling to the center of the face of the resilient channel). For ceiling framing members the first row and the last row of resilient furring channel shall be located not more than 6 in. (150 mm) from the adjacent wall.

5.7.3 The resilient furring channel shall be positioned with the slotted hole(s) directly over the framing member (see Fig. 4). The resilient furring channel shall be attached to the framing member with Type-W or Type-S screws (minimum 1¼ (32 mm) long) using the screw hole provided in the mounting flange.

TABLE 5 Maximum Stud Height, ft-in. (mm), Single Layer ⅝-in. (15.9-mm) Type X Thick Gypsum Board, Vertical Application, on Each Side of Minimum 0.0329-in. (0.836-mm) Base Steel Thickness Steel Studs

Stud Depth, in. (mm), *Industry Designator*	Deflection Limit	Maximum Stud Height ft-in. (mm)								
		Framing Spaced 12 in. (305 mm) o.c. Lateral Pressure			Framing Spaced 16 in. (406 mm) o.c. Lateral Pressure			Framing Spaced 24 in. (610 mm) o.c. Lateral Pressure		
		5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)	5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)	5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)
2-½ (63.5) *250S125-33*	L/120	19-8 (6000)	17-3 (5260)	15-8 (4780)	17-11 (5460)	15-8 (4780)	14-3 (4340)	15-8 (4780)	13-8 (4170)	12-4F (3760)
	L/240	15-8 (4780)	13-8 (4170)	12-5 (3800)	14-3 (4340)	12-5 (3800)	11-3 (3430)	12-5 (3800)	10-10 (3300)	9-10 (3000)
	L/360	13-8 (4170)	11-11 (3630)	10-10 (3300)	12-5 (3790)	10-10 (3300)	9-10 (3000)	10-10 (3300)	9-5 (2870)	8-4 (2540)
3-½ (88.9) *350S125-33*	L/120	23-0 (7010)	20-1 (6120)	18-3 (5560)	20-11 (6380)	18-3 (5560)	16-7 (5050)	18-3 (5560)	15-11 (4850)	14-4f (4370)
	L/240	18-3 (5560)	15-11 (4850)	14-6 (4420)	16-7 (5050)	14-6 (4420)	13-2 (4010)	14-6 (4420)	12-8 (3860)	11-4 (3450)
	L/360	15-11 (4850)	13-11 (4240)	12-8 (3860)	14-6 (4420)	12-8 (3860)	11-4 (3450)	12-8 (3860)	10-10 (3300)	9-8 (2950)
3-⅝ (92.1) *362S125-33*	L/120	24-2 (7370)	21-1 (6430)	19-2 (5840)	21-1 (6430)	19-2 (5840)	17-5 (5310)	19-2 (5840)	16-8f (5080)	14-5f (4180)
	L/240	19-2 (5840)	16-9 (5100)	15-3 (4650)	17-5 (5310)	15-3 (4650)	13-10 (4220)	15-3 (4650)	13-4 (4060)	11-11 (3630)
	L/360	16-9 (5100)	14-8 (4470)	13-4 (4060)	15-3 (4650)	13-4 (4060)	11-11 (3630)	13-4 (4060)	11-4 (3450)	10-1 (3070)
4 (101.6) *400S125-33*	L/120	25-3 (7700)	22-1 (6730)	20-1 (6120)	22-11 (6990)	20-1 (6120)	18-3 (5560)	20-1 (6120)	17-3f (5260)	15-0f (4570)
	L/240	20-1 (6120)	17-6 (5330)	15-11 (4850)	18-3 (5560)	15-11 (4850)	14-5 (4400)	15-11 (4850)	13-11 (4240)	12-7 (3840)
	L/360	17-6 (5330)	15-4 (4670)	13-11 (4240)	15-11 (4850)	13-11 (4240)	12-7 (3840)	13-11 (4240)	12-0 (3660)	10-9 (3280)
6 (152.4) *600S125-33*	L/120	35-4 (10770)	30-10 (9400)	27-10f (8480)	32-1f (9780)	27-10f (8480)	24-1f (7340)	27-10f (8480)	22-9f (6930)	19-8f (6000)
	L/240	28-1 (8560)	24-6 (7470)	22-3 (6780)	25-6 (7770)	22-3 (6780)	20-3 (6170)	22-3 (6780)	19-5 (5920)	17-8 (5390)
	L/360	24-6 (7470)	21-5 (6530)	19-5 (5920)	22-3 (6780)	19-5 (5920)	17-8 (5390)	19-5 (5920)	16-11 (5160)	n/a

Notes to Table:

1. Allowable composite heights are derived from tests conducted in accordance with ICC-ES AC86-2012.
2. Table heights also applicable for two layers of gypsum board.
3. The gypsum board (one or two layers) must be installed vertically full height to each stud flange using minimum No. 6 Type S drywall screws spaced a maximum of 12 in. (305 mm) on-center for studs at 24 in. (610 mm) spacing, and 16 in. (406 mm) on-center for studs at 16 in. (406 mm) and 12 in. (305 mm) spacing. Gypsum board (one or two layers) must be attached to each top and bottom track flange using minimum No. 6 drywall screws at maximum 16 in. (406 mm) on-center
4. Application of gypsum board as required in accordance with Specification C840.
5. No fasteners are required for attaching the stud to the track except as required by subsection 5.3.2.1.
6. Stud end bearing must be a minimum of 1 in. (254 mm).
7. Minimum material yield strength equals 33 ksi (230 MPa).
8. 'f' adjacent to the height value indicates that flexural stress controls the allowable wall height.

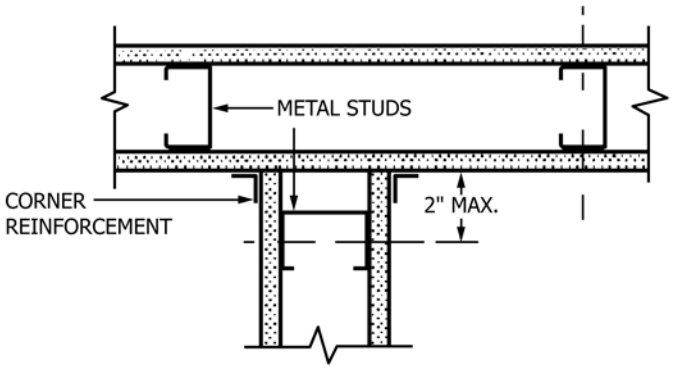

FIG. 1 Abutting Partition Detail

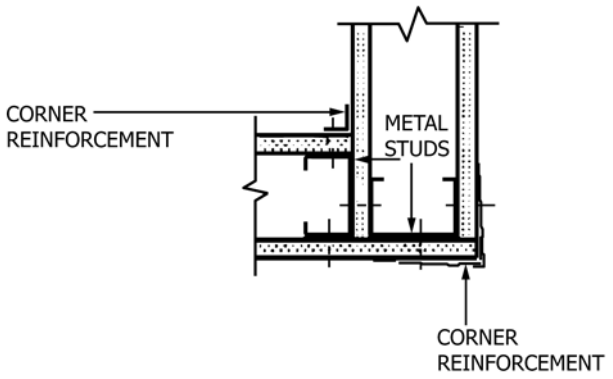

FIG. 2 Partition Corner Detail

NOTE 2—If no screw hole is provided or located at the framing member, drill through the mounting flange to attach the resilient furring channel to the member.

5.7.4 Resilient furring channel members shall be spliced either by "nesting" the ends of the resilient furring channel members directly over the framing member and screwing through the mounting flange into the framing members or by butting the resilient furring channel members over the framing member and screwing through the mounting flange into the stud members. A gap of not less than 1/16 in. (2 mm) shall be left between the members. When nesting the ends of the members, an additional screw attaching the mounting flanges of the resilient furring channels to each other at the ends of the nested resilient furring channels shall be installed.

5.7.5 Gypsum panel products shall be attached to the resilient furring channel using screws and ensuring that the screw does not make contact with the framing member.

5.8 *Wall Furring-Bracket System:*

5.8.1 Adjustable wall furring brackets with serrated edges facing upward shall be attached to masonry or concrete walls in the following spacing pattern: 48 in. (1220 mm) on center vertically, 6 in. (152 mm) maximum from floor and ceiling, 36 in. (910 mm) on center horizontally, 4 in. (100 mm) maximum from columns or other abutting construction, and as required

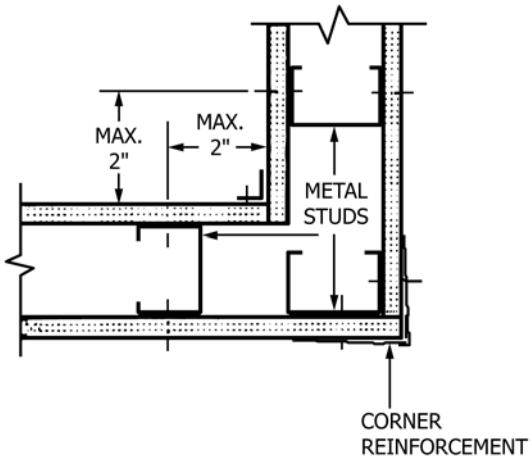

FIG. 3 Partition Corner Detail

above and below windows. Each bracket shall be fastened through the hole nearest to the serrated edges.

5.8.2 Channels ¾ in. (19 mm) shall be laid horizontally on the furring brackets so that the channel flanges engage the serrated edges of the bracket. Each channel shall be plumbed to align with ceiling and base channels. Channels shall be wire-tied to each bracket with a double strand of 16-gauge or a triple strand of 18-gauge tie wire. Each excess bracket length shall be bent down and inward toward the wall.

5.8.3 Rigid furring channels shall be positioned vertically with wing flanges against the channels with spacing determined by gypsum panel product thickness in accordance with Table 1. Each furring channel intersection shall be wire-tied with a double strand of 16-gauge or a triple strand of 18-gauge tie wire.

5.9 *Soffits*—Soffits shall be framed by attaching runners to ceilings and walls as specified in 5.2.1. Runners shall be used for backing of all outside corners. Hangers or spacers (cut-to-length pieces of stud), shall be provided from ceiling runner to outside corner and from outside corner to vertical surface. Where the hanger or spacer length is not more than the maximum framing spacing allowed in Table 1 for the gypsum panel product thickness specified, hangers or spacers shall be located not more than 4 ft (1220 mm) on centers. Where the hanger or spacer length is more than the maximum framing spacing allowed, they become the attachment means and shall be spaced in accordance with Table 1.

6. Suspended and Furred Ceilings

6.1 *Hangers and Inserts for Suspended Ceilings:*

6.1.1 Minimum No. 12-gauge (2.9 mm) galvanized, soft annealed, mild steel wire per Specification A641/A641M shall be used for ceiling areas not more than 16 ft^2 (1.5 m^2) and not more than 6 lb/ft^2 (2.7 kg/m^2).

6.1.2 For ceiling weights greater than 6 lb/ft^2 (2.7 kg/m^2) but not more than 10 lb/ft^2 (4.6 kg/m^2), use Table 6.

6.1.3 Wire hangers shall be saddle-tied around main runners and furring members so as to prevent turning or twisting of the member and to develop the full strength of the hanger with a minimum of three complete wraps around itself within 3 in. (75 mm) (see Figs. 5 and 6).

6.1.4 Wire for attaching main runners and rigid furring channels directly to concrete beams and joists, to steel beams and joists, and to wood beams and joists shall be per 6.1.1 or 6.1.2.

6.1.5 *Flat Channel Beam Hanger*—For attaching indirect hung grid suspension ceiling systems to 1.5 in. (38 mm) or 2.0 in. (51 mm) cold rolled channel. Flat channel beam hanger shall be formed from steel conforming to Specification A653/A653M and having a minimum width of 1.5 in. (38 mm) and a minimum thickness of 0.048 in. (1.21 mm) (see Fig. 7).

6.2 *Wood Construction*—Hangers for suspended ceilings under wood construction shall be per 6.1.1 or 6.1.2, and shall be attached to supports by any of the following methods.

6.2.1 A hole shall be drilled through the wood member not less than 3 in. (76 mm) above the bottom with the upper end of the wire hanger passed through the hole and twisted three times around itself (see Fig. 8).

6.2.2 Three 12-penny nails shall be driven, on a downward slant, into the sides of the wood member with not less than 1¼ in. (32 mm) penetration and not less than 5 in. (130 mm) from the bottom edges, and not more than 36 in. (910 mm) on center with the upper end of the wire hanger wrapped around the nails and twisted three times around itself (see Fig. 9).

6.2.3 A loop shall be formed on the upper end of the wire hanger and secured to the wood member by not less than four 1½ in. (38 mm), 9-gauge diameter wire staples driven horizontally or on a downward slant into the sides of the wood members, three near the upper end of the loop, and the fourth to fasten the loose end (see Fig. 10).

6.2.4 Where supports for flooring are thicker than 1½ in. (38 mm) and are spaced more than 4 ft (1220 mm) on center, 1½ in. (38 mm) No. 1/0 (0.3065 in.) (7.78 mm) eye screws, or equivalent, spaced not greater than 3 ft (910 mm) on centers shall be screwed into the flooring with the upper end of the hanger inserted through the eye screws and twisted three times around itself.

6.2.5 *Flat Hangers*—Two holes shall be drilled in the upper end of the flat hangers and nailed to the sides of the wood members with 12d penny nails driven through holes and clinched. Nails shall be not less than 3 in. (76 mm) above the bottom edge of the framing member (see Fig. 11).

6.3 *Rigid Furring Channels*—Rigid furring channels applied directly to wood framing shall be applied with screws providing 1-in. (25.4 mm) penetration or as otherwise specified by the manufacturer of the furring channels.

6.4 *Flat Hangers and Inserts:*

6.4.1 *Inserts*—Where 1 by 3⁄16-in. (25 by 4.7-mm) inserts are used, 7⁄16-in. (11-mm) diameter holes shall be punched on the center line at the lower ends of the insert to permit flat hangers to be bolted tightly to the inserts with 3⁄8-in. (10-mm) diameter bolts.

6.4.2 *Hangers*—Lower ends of the flat hangers shall be bolted to the main runners or shall be bent tightly around the members and bolted tightly to the main part of the hanger with 3⁄8-in. (9.5-mm) diameter bolts in a 7⁄16-in. (11-mm) diameter hole (see Fig. 12), or machine screws.

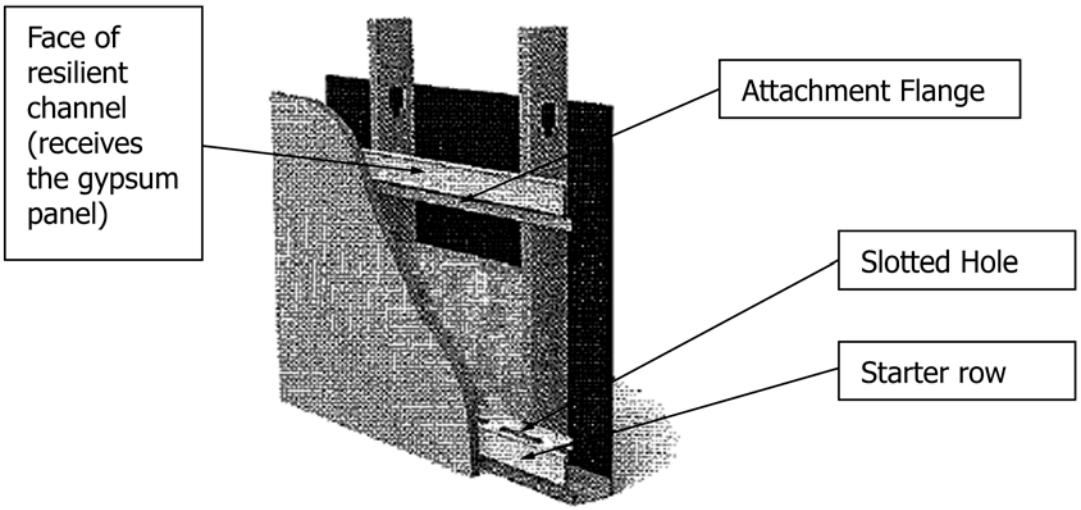

FIG. 4 Resilient Furring Channel

TABLE 6 Suspended and Furred Ceilings, Minimum Sizes for Hangers for Ceilings Greater Than 6 lb/ft² (2.7 kg/m²) But Not More Than 10 lb/ft² (4.6 kg/m²)

Type of Hanger			Maximum Ceiling Area Supported, ft² (m²)	Minimum Size, in. (mm) [gauge]
Hangers for Suspended Ceilings			14 (1.3)	0.1350 (3.43) [10] hanger wire
			16 (1.5)	0.1483 (3.77) [9] hanger wire
			18 (1.7)	0.1620 (4.12) [8] hanger wire
			20 (1.9)	3/16 (4.76) diameter mild steel rod
			22.5 (2.1)	7/32 (5.56) diameter mild steel rod
			25 (2.3)	1/4 (6.35) diameter mild steel rod
			28 (2.6)	1 by 3/16 (25.4 by 4.76) mild steel flat
Hangers for attaching main runners and furring directly to structural members	For supporting main runners	Hangers between structural members[A]	9 (0.8)	0.1055 (2.68) [12] hanger wire
			14 (1.3)	0.1350 (3.43) [10] hanger wire
			18 (1.7)	0.1620 (4.12) [8] hanger wire
		Double-wire loops at structural member[A]	9 (0.8)	0.0800 (2.03) [14] hanger wire
			14 (1.3)	0.1055 (2.68) [12] hanger wire
			18 (1.7)	0.1350 (3.43) [10] hanger wire
	For supporting furring without a runner (wire loops at supports)	Types of support:		
		Concrete	9 (0.8)	0.0800 (2.03) [14] hanger wire
		Steel or Wood	9 (0.8)	0.0625 (1.59) [16] hanger wire (two loops)[B]

[A] Inserts, special clips or screws, or other devices of equal strength shall be permitted.
[B] Two loops of 0.0475 in. (1.21 mm), No. 18-gauge galvanized wire shall be permitted to be substituted for each loop of 0.0625 in. (1.59 mm), No. 16-gauge wire for attaching steel furring to steel or wood joists.

6.4.3 *General*—Holes in both inserts and hangers shall not be nearer to the ends than 3/8 in. (10 mm).

6.5 *Main Runners for Suspended Ceilings*—Channels for the various spacings of hangers shall be as specified in Table 7.

6.5.1 Ends and sides of main runners and cross furring shall not come in contact with abutting masonry or reinforced concrete walls or partitions. Clearance of not less than 1 in. (25 mm) from ends and 1/8 in. (3 mm) from sides shall be provided. A channel shall be located within 6 in. (150 mm) of the paralleling walls to support the ends of the cross furring. The ends at walls shall be supported by hangers located not more than 6 in. (150 mm) from such ends.

6.5.2 When main runners and cross furring are spliced, the ends shall be overlapped not less than 12 in. (305 mm) with flanges interlocked and securely fastened near each end of the splice with double loops of No. 16-gauge tie wire, minimum, or with screws.

6.6 *Furring Members for Suspended or Furred Ceilings:*

6.6.1 Furring members shall be spaced in accordance with Tables 2 and 7.

6.6.2 Furring members shall be securely fastened to main runners and structural supports with special clips, screws, or equivalent attachments. Where required, rigid furring channels shall be saddle-tied to main runners with No. 16-gauge tie wire, a double strand of 18-gauge tie wire, or with screws (see Fig. 13).

6.6.3 When furring members are spliced, the ends shall be overlapped not less than 8 in. (203 mm) and securely fastened near each end of the splice with double loops of No. 16-gauge tie wire or with screws.

6.6.4 Flanges of rigid furring channels shall be interlocked. Ends and sides of furring members shall not come in contact with abutting masonry or reinforced concrete walls or partitions.

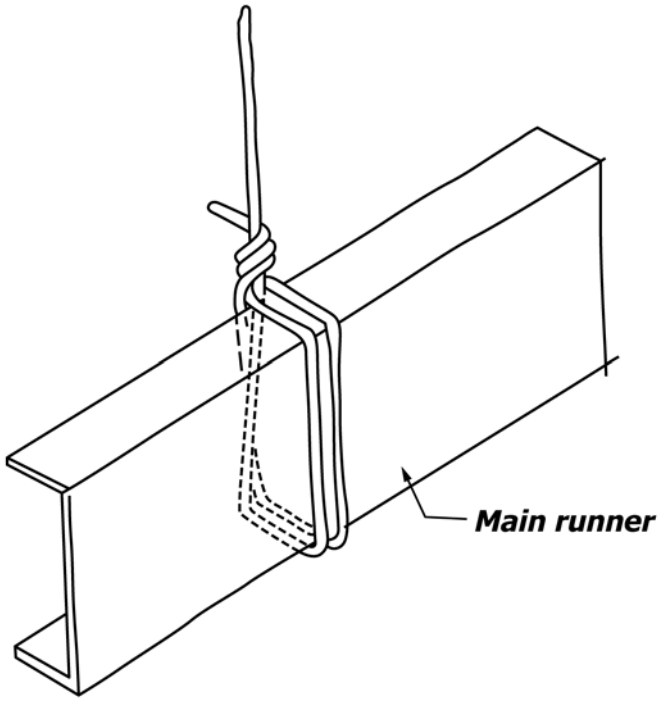

FIG. 5 Saddle Tie

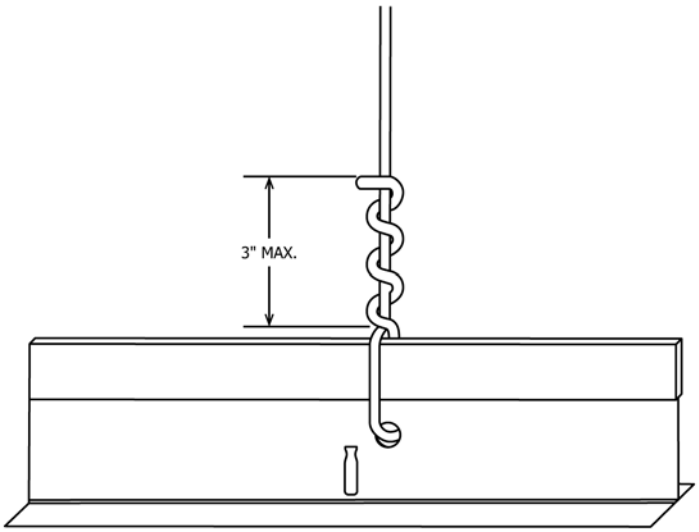

FIG. 6 Hanger Wire Tie Detail

6.7 *Grid Suspension System*—Main beams shall be suspended in parallel rows spliced together at their ends.

6.7.1 Hangers for supporting the main beams shall be per 6.1.1 or 6.1.2.

6.7.2 Cross furring members of grid suspension systems shall interlock to the main beams in rows running perpendicular and spaced not to exceed maximums specified in Table 1. Cross furring members along the ceiling perimeter shall be supported by angle or channels attached to the wall.

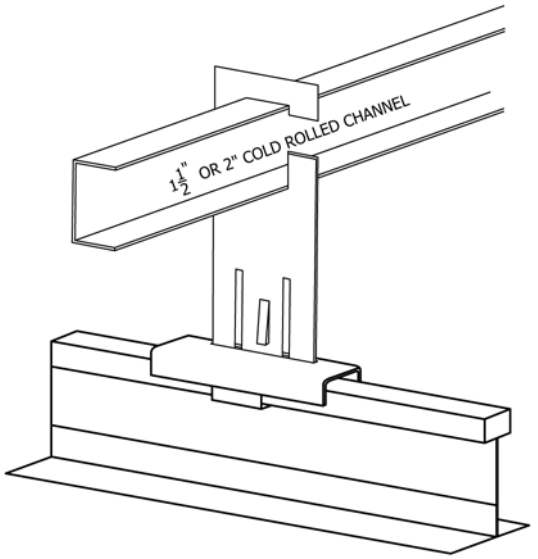

FIG. 7 Flat Channel Beam Hanger Supporting Suspended Ceiling Main Runner

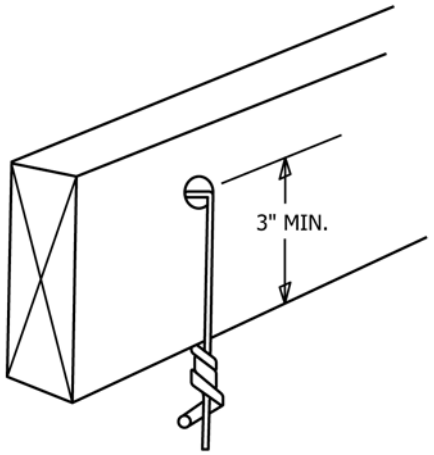

FIG. 8 Wire Hanger Attached to Wood Member Through a Drilled Hole

7. Product Delivery, Identification, and Marking

7.1 All materials shall be delivered in original packages, containers, or bundles bearing the brand name and the name of the manufacturer or the supplier for whom the product is manufactured.

8. Product Storage

8.1 Material shall be received and stored in accordance with AISI COSP, F3—Delivery, Handling and Storage of Materials.

9. Keywords

9.1 channel; framing; framing member; furring; grid suspension system; gypsum panel product; hangers; hanger wire; main runners; rigid furring channel; runner; stud; suspended ceiling; tie wire

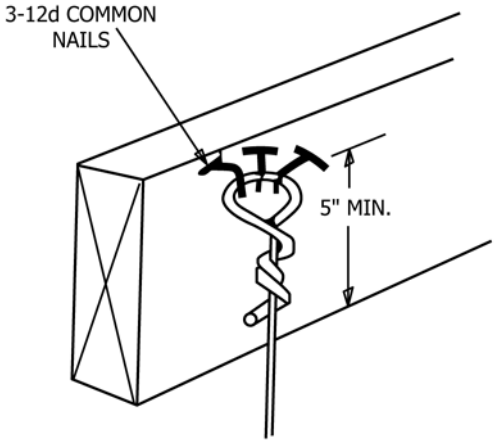

FIG. 9 Wire Hanger Attached to Wood Member Using Nails

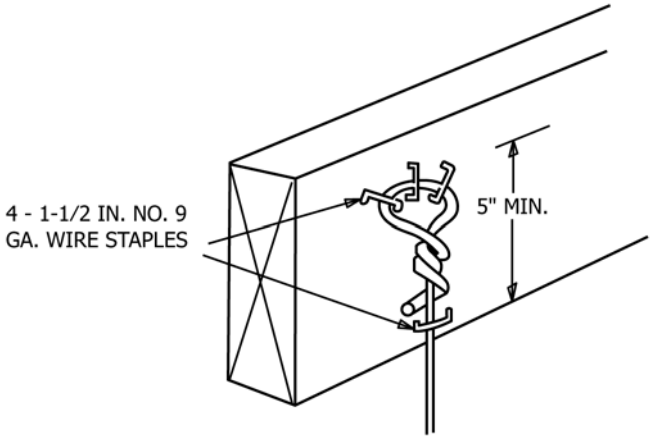

FIG. 10 Wire Hanger Attached to Wood Member Using Staples

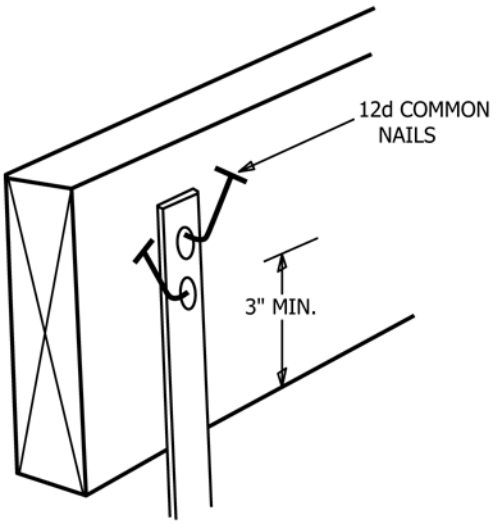

FIG. 11 Flat Hanger Attached to Wood Member Using Nails

TABLE 7 Allowable Spans, ft-in. (mm)
Cold-Rolled Channel Main Runners[A,B,C,D,E,F]

Member Size, In (mm)	Member Weight lb/1000 ft (kg/m)	Span Condition[G,H]	Total Uniform Load = 4 psf (0.19 kPa) Member Spacing, in. (mm)				
			24 (610)	36 (914)	48 (1220)	60 (1520)	72 (1830)
¾ (19)	277 (0.412)	Simple	3–3 (990)	2–10 (860)	2–7 (790)	2–5 (740)	2–3 (690)
		2 or More	4–1 (1240)	3–6 (1070)	3–3 (990)	3–0 (910)	2–10 (860)
1½ (38)	414 (0.616)	Simple	5–1 (1550)	4–5 (1350)	4–0 (1220)	3–9 (1140)	3–6 (1070)
		2 or More	7–1 (2160)	6–2 (1880)	5–8 (173)	5–2 (1570)	4–10 (1470)
2 (51)	506 (0.753)	Simple	5–4 (1630)	4–8 (1420)	4–3 (1300)	4–0 (1220)	3–9 (1140)
		2 or More	7–5 (2260)	6–6 (1980)	5–11 (1800)	5–6 (1680)	5–2 (1570)
2½ (64)	597 (0.888)	Simple	5–7 (1700)	4–11 (1500)	4–5 (1350)	4–2 (1270)	3–11 (1190)
		2 or More	7–9 (2360)	6–9 (2060)	6–2 (1880)	5–9 (1750)	5–5 (1650)
Total Uniform Load = 6 psf (0.29 kPa)							
Member Size, In (mm)	Member Weight lb/1000 ft (kg/m)	Span Condition[G,H]	Member Spacing, in. (mm)				
			24 (610)	36 (914)	48 (1220)	60 (1520)	72 (1830)
¾ (19)	277 (0.412)	Simple	2–10 (860)	2–6 (780)	2–3 (690)	2–1 (630)	2–0 (610)
		2 or More	3–6 (1070)	3–1 (490)	2–10 (860)	2–7 (790)	2–5 (740)
1½ (38)	414 (0.616)	Simple	4–5 (1350)	3–11 (1190)	3–6 (1070)	3–3 (990)	3–1 (940)
		2 or More	6–2 (1880)	5–5 (1650)	4–10 (1470)	4–6 (1370)	4–2 (1270)
2 (51)	506 (0.753)	Simple	4–8 (1420)	4–1 (1240)	3–9 (1140)	3–6 (1070)	3–3 (990)
		2 or More	6–6 (1980)	5–8 (1730)	5–2 (1570)	4–10 (1470)	4–7 (1400)
2½ (64)	597 (0.888)	Simple	4–11 (1500)	4–3 (1300)	3–11 (1190)	3–8 (1120)	3–5 (1040)
		2 or More	6–9 (2060)	5–11 (1800)	5–5 (1650)	5–0 (1520)	4–9 (1450)

[A] Bare metal thickness of cold-rolled main runners shall be not less than 0.0538 in. (1.367 mm).
[B] Inside corner radii shall not be greater than ⅛ in. (3.19 mm).
[C] Spans based on upper flange of main runners laterally unbraced.
[D] Maximum deflection limited to 1/360 th of the span length.
[E] Steel yield stress, *Fy*, shall be not less than 33 000 psi (228 MPa).
[F] Tabulated spans apply only to main runners with webs oriented vertically.
[G] "2 or More" spans refers to two or more continuous, equal spans.
[H] For the "2 or More" span condition, listed spans represent the center-to-center distance between adjacent supports.

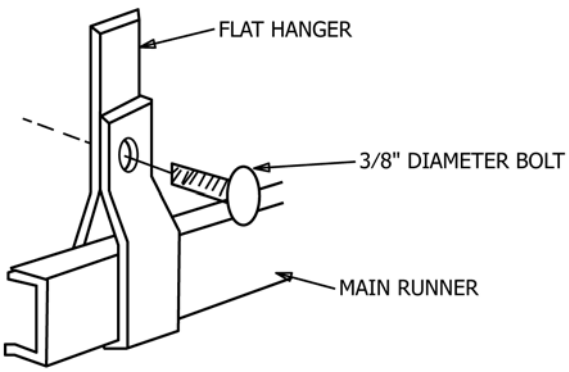

FIG. 12 Flat Hanger Attached to Main Runner Using Bolt

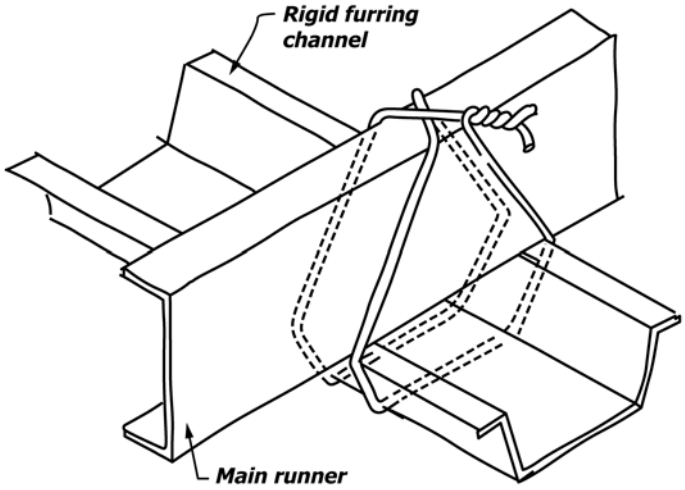

FIG. 13 Saddle Tie

APPENDIX

(Nonmandatory Information)

X1. MAXIMUM HEIGHTS COMMENTARY

INTRODUCTION

This Appendix gives general information and also suggestions for inclusions to be made elsewhere by the specifier. It is not a part of this specification.

X1.1 Tables X1.1-X1.3 are suitable for confirming compliance in existing construction designed in accordance with the UBC 1994 but should not be used for design purposes in new construction requiring use of subsequent building codes.

X1.2 The limiting heights tables included in this Appendix as Tables X1.1-X1.3 are based on tests conducted using ½ in. thick gypsum panel product and the July 1995 edition of the ICC-ES-AC86 test procedure, also known as Acceptance Criteria AC86. They are provided in this Appendix and for historical reference and are not a mandatory part of this Specification.

X1.3 Maximum heights of steel stud partitions are determined using the test method described in Acceptance Criteria AC86, based on the 1994 edition of the Uniform Building Code (UBC 1994).

X1.3.1 Acceptance Criteria AC86 was originally approved in July 1995 and subsequently revised in June 2007, February 2008, and February 2010. The current edition was approved in May 2012 and was editorially revised in August 2013

X1.3.2 The technical revisions resulting in the June 2007 edition of AC86 result in different maximum heights when compared to the same assemblies when evaluated under the July 1995 version of AC86, thereby rendering the 1995 edition, upon which the values in Tables X1.1-X1.3 are based, obsolete.

X1.4 In order to preserve the historical data developed under the July 1995 and originally included in the body of Specification C754 as Tables 3, 4, and 5, where they were used for design purposes, the tables were relocated to this Appendix as Tables X1.1-X1.3, respectively.

X1.4.1 Tables X1.1-X1.3 also provide useful information on steel stud partitions sheathed with ½ in. thick gypsum board, for the UBC 1994, whereas the current Tables 3, 4, and 5 in the body of this Specification are for steel stud partitions sheathed with ⅝ in. Type X gypsum board and conform to IBC 2012.

TABLE X1.1 Maximum Stud Height,[A] ft-in. (mm), Single Layer ½-in. (12.7-mm) Thick Gypsum Board,[B] Vertical Application,[C] on Each Side of Minimum 0.0179-in. (0.455-mm) Base Metal Thickness Steel Studs Spaced 12-in. (305-mm), 16-in. (406-mm), and 24-in. (610-mm) o.c.[D,E,F]

Stud Depth, in. (mm), *Industry Designator*[G]	Deflection Limit	Maximum Stud Height ft-in. (mm)								
		Framing Spaced 12 in. (305 mm) o.c. Lateral Pressure			Framing Spaced 16 in. (406 mm) o.c. Lateral Pressure			Framing Spaced 24 in. (610 mm) o.c. Lateral Pressure		
		5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)	5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)	5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)
1-⅝ (41.3) *162S125-18*	L/120	11-2 (3400)	9-9 (2970)	8-10 (2690)	10-7 (3230)	8-10 (2690)	8-4 (2540)	9-9 (2970)	8-0 (2440)	H
	L/240	8-10 (2690)	H	H	8-4 (2540)	H	H	7-11 (2410)	H	H
	L/360	H	H	H	H	H	H	H	H	H
2-½ (63.5) *250S125-18*	L/120	15-1 (4600)	12-4 (3760)	10-9 (3280)	13-3 (4040)	10-10 (3300)	9-5 (2870)	11-10 (3610)	9-8 (2950)	8-5 (2570)
	L/240	11-11 (3630)	10-5 (3180)	9-6 (2900)	11-3 (3430)	9-10 (3000)	8-11 (2720)	10-7 (3230)	9-3 (2820)	8-5 (2570)
	L/360	10-5 (3180)	9-1 (2770)	H	9-10 (3000)	8-7 (2620)	H	9-3 (2820)	8-1 (2460)	H
3-½ (88.9)[I] *350S125-18*	L/120	17-8 (5380)	14-3 (4340)	12-5 (3780)	15-4 (4670)	12-5 (3780)	10-9 (3280)	13-9 (4190)	11-0 (3350)	9-5 (2870)
	L/240	15-4 (4670)	13-3 (4040)	12-0 (3660)	14-4 (4370)	12-5 (3780)	10-9 (3280)	13-5 (4090)	11-0 (3350)	9-5 (2870)
	L/360	13-3 (4040)	11-7 (3530)	10-5 (3180)	12-4 (3760)	10-10 (3300)	9-9 (2970)	11-7 (3530)	10-1 (3070)	9-1 (2770)
4 (101.6) *400S125-18*	L/120	19-6 (5940)	15-9 (4800)	13-8 (4170)	17-2 (5230)	13-10 (4220)	11-11 (3630)	15-1 (4600)	12-1 (3680)	10-5 (3180)
	L/240	16-5 (5000)	14-4 (4370)	13-0 (3960)	15-4 (4670)	13-4 (4060)	11-11 (3630)	14-2 (4320)	12-1 (3680)	10-5 (3180)
	L/360	14-4 (4370)	12-6 (3810)	11-4 (3450)	13-4 (4060)	11-8 (3560)	10-6 (3200)	12-4 (3760)	10-9 (3280)	9-9 (2970)
6 (152.4) *600S125-18*	L/120	22-10 (6960)	18-7 (5660)	16-2 (4930)	19-9 (6020)	16-2 (4930)	14-0 (4270)	16-9 (5110)	13-5 (4090)	11-5 (3480)
	L/240	22-1 (6730)	18-7 (5660)	16-2 (4930)	19-9 (6020)	16-2 (4930)	14-0 (4270)	16-9 (5110)	13-5 (4090)	11-5 (3480)
	L/360	19-4 (5890)	16-9 (5110)	15-0 (4570)	17-11 (5460)	15-7 (4750)	13-10 (4220)	16-9 (5110)	13-5 (4090)	11-5 (3480)

[A] Based on tests conducted with gypsum board attached with screws spaced 12 in. (305 mm) o.c. to framing members.
[B] Maximum stud heights are also applicable to walls sheathed with gypsum board greater than ½ in. (12.7 mm) thick and multiple layers of gypsum board.
[C] Application per Specification C840.
[D] Limiting heights based on ICC-ES "Acceptance Criteria for Steel Studs and Gypsum-Board Interior Nonload-Bearing Walls—Complete Construction—AC86—Approved July 1995 (Editorially revised September 2005)."
[E] Runner flanges need not be fastened to studs except as required by 5.3.2.1.
[F] ICC-ES-AC86 utilized a 0.75 load reduction factor (for strength determination only) to determine the heights as shown in the table.
[G] The *Industry Designator* defines the cold formed steel framing member.
Example: *350S125-18:*
350 designates the member web depth in 100ths of an in., 350 = 3.50 in. (88.9 mm).
S designates the type of member, *S* = stud.
125 designates the member flange width in 100ths of an in., 125 = 1.25 in. (32 mm).
18 designates the member base metal thickness in mils, 18 = .0179 in. (0.455 mm).
[H] Data not available.
[I] Also applicable to 3-⅝ in. (92.1 mm) stud depth, *362S125-18*.

TABLE X1.2 Maximum Stud Height,[A] ft-in. (mm), Single Layer ½-in. (12.7-mm) Thick Gypsum Board,[B] Vertical Application,[C] on Each Side of Minimum 0.0296-in. (0.752-mm) Base Metal Thickness Steel Studs Spaced 12-in. (305-mm), 16-in. (406-mm), and 24-in. (610-mm) o.c.[D,E,F]

Stud Depth, in. (mm), *Industry Designator*[G]	Deflection Limit	Maximum Stud Height ft-in. (mm)								
		Framing Spaced 12 in. (305 mm) o.c. Lateral Pressure			Framing Spaced 16 in. (406 mm) o.c. Lateral Pressure			Framing Spaced 24 in. (610 mm) o.c. Lateral Pressure		
		5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)	5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)	5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)
1-⅝ (41.3) *162S125-30*	L/120	12-5 (3780)	10-10 (3300)	9-11 (3020))	11-6 (3510)	10-1 (3070)	9-2 (2790)	10-5 (3180)	9-2 (2790)	8-3 (2520)
	L/240	9-11 (3020)	H	H	9-2 (2790)	H	H	8-3 (2520)	H	H
	L/360	H	H	H	H	H	H	H	H	H
2-½ (63.5) *250S125-30*	L/120	16-8 (5080)	14-7 (4450)	13-2 (4010)	15-4 (4670)	13-4 (4060)	12-1 (3680)	13-9 (4190)	11-11 (3630)	10-9 (3280)
	L/240	13-2 (4010)	11-6 (3510)	10-5 (3180)	12-1 (3680)	10-6 (3000)	9-6 (2900)	10-9 (3280)	9-4 (1930)	8-6 (2590)
	L/360	11-6 (3510)	10-0 (3050)	9-1 (2770)	10-6 (3000)	9-2 (2790)	8-4 (2540)	9-4 (1930)	8-1 (260)	7-4 (2240)
3-½ (88.9)[I] *350S125-30*	L/120	21-8 (6610)	18-1 (5770)	17-1 (5210)	19-11 (6070)	17-5 (5310)	15-8 (4780)	17-9 (5410)	15-6 (4720)	14-0 (4270)
	L/240	17-1 (5210)	14-10 (4520)	13-5 (4090)	15-8 (4780)	13-7 (4140)	12-3 (3730)	14-0 (4270)	12-0 (3660)	10-10 (3300)
	L/360	14-10 (4520)	12-20 (3910)	1-8 (3560)	13-7 (4140)	11-9 (3580)	10-7 (3230)	12-0 (3660)	10-5 (3180)	9-4 (1930)
4 (101.6) *400S125-30*	L/120	24-0 (7320)	20-11 (6380)	19-0 (5790)	22-0 (6710)	19-3 (5870)	17-6 (5330)	19-8 (6000)	17-1 (5250)	14-9 (4500)
	L/240	19-0 (5790)	16-6 (5030)	14-11 (4550)	17-6 (5330)	15-2 (4620)	13-8 (4170)	15-7 (4750)	13-5 (4090)	12-1 (3680)
	L/360	16-6 (5030)	14-4 (4370)	12-11 (2940)	15-2 (4620)	13-1 (3990)	11-10 (3610)	13-5 (4090)	11-7 (3530)	10-5 (3180)
6 (152.4) *600S125-30*	L/120	32-1 (9780)	28-0 (8530)	24-7 (7490)	29-2 (8890)	24-9 (7540)	21-5 (6530)	25-1 (7650)	20-6 (6250)	17-9 (5410)
	L/240	25-6 (7770)	22-3 (6780)	20-3 (6170)	23-2 (7060)	20-3 (6170)	18-4 (5590)	20-3 (6170)	17-8 (5380)	16-0 (4880)
	L/360	22-3 (6780)	19-5 (5910)	17-6 (5330)	20-3 (6170)	17-8 (5380)	15-10 (4830)	17-8 (5380)	15-5 (4700)	13-8 (4170)

[A] Based on tests conducted with gypsum board attached with screws spaced 12 in. (305 mm) o.c. to framing members.
[B] Maximum stud heights are also applicable to walls sheathed with gypsum board greater than ½ in. (12.7 mm) thick and multiple layers of gypsum board.
[C] Application per Specification C840.
[D] Limiting heights based on ICC-ES "Acceptance Criteria for Steel Studs and Gypsum-Board Interior Nonload-Bearing Walls—Complete Construction—AC86—Approved July 1995 (Editorially revised September 2005)."
[E] Runner flanges need not be fastened to studs except as required by 5.3.2.1.
[F] ICC-ES-AC86 utilized a 0.75 load reduction factor (for strength determination only) to determine the heights as shown in the table.
[G] The *Industry Designator* defines the cold formed steel framing member.
Example: *350S125-30:*
350 designates the member web depth in 100ths of an in., 350 = 3.50 in. (88.9 mm).
S designates the type of member, *S* = stud.
125 designates the member flange width in 100ths of an in., 125 = 1.25 in. (32 mm).
30 designates the member base metal thickness in mils, 30 = .0296 in. (0.752 mm).
[H] Data not available.
[I] Also applicable to 3-⅝ in. (92.1 mm) stud depth, *362S125-30*.

TABLE X1.3 Maximum Stud Height[A] , ft-in. (mm), Single Layer ½-in. (12.7-mm) Thick Gypsum Board,[B] Vertical Application,[C] on Each Side of Minimum 0.0329-in. (0.836-mm) Base Metal Thickness Steel Studs Spaced 12-in. (305-mm), 16-in. (406-mm), and 24-in. (610-mm) o.c.[D,E,F]

Stud Depth, in. (mm), *Industry Designator*[G]	Deflection Limit	Maximum Stud Height ft-in. (mm)								
		Framing Spaced 12 in. (305 mm) o.c. Lateral Pressure			Framing Spaced 16 in. (406 mm) o.c. Lateral Pressure			Framing Spaced 24 in. (610 mm) o.c. Lateral Pressure		
		5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)	5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)	5 psf (240 Pa)	7.5 psf (360 Pa)	10 psf (480 Pa)
1-⅝ (41.3) *162S125-33*	L/120	13-0 (3960)	11-4 (3450)	10-4 (3150)	12-1 (3680)	10-7 (3230)	9-8 (2950)	11-0 (3350)	9-7 (2920)	8-9 (2670)
	L/240	10-4 (3150)	9-0 (2740)	[H]	9-8 (2950)	8-5 (2570)	[H]	8-9 (2670)	7-8 (2340)	[H]
	L/360	9-0 (2740)	[H]	[H]	8-5 (2570)	[H]	[H]	7-8 (2340)	[H]	[H]
2-½ (63.5) *250S125-33*	L/120	17-9 (5410)	15-6 (4720)	13-11 (4240)	16-5 (5000)	14-4 (4370)	12-10 (3910)	14-10 (4520)	13-0 (3960)	11-7 (3530)
	L/240	13-11 (4240)	12-1 (3680)	10-11 (3330)	12-10 (3910)	11-2 (3400)	10-0 (3050)	11-7 (3530)	10-0 (3050)	8-11 (2720)
	L/360	12-1 (3680)	10-6 (3200)	9-5 (2870)	11-2 (3400)	9-8 (2950)	8-8 (2640)	10-0 (3050)	8-7 (2620)	7-8 (2340)
3-½ (88.9)[I] *350S125-33*	L/120	22-6 (6860)	19-8 (5990)	17-10 (5440)	20-8 (6300)	18-1 (5510)	16-5 (5000)	18-6 (5640)	16-2 (5840)	14-9 (4500)
	L/240	17-10 (5440)	15-6 (4720)	14-1 (4290)	16-5 (5000)	14-3 (4340)	12-11 (3940)	14-9 (4500)	12-9 (3890)	11-7 (3530)
	L/360	15-6 (4720)	13-7 (4140)	12-4 (3760)	14-3 (4340)	12-6 (3810)	11-4 (3450)	12-9 (3890)	11-2 (3400)	10-1 (3070)
4 (101.6) *400S125-33*	L/120	25-1 (7650)	21-11 (6680)	19-11 (6070)	23-1 (7040)	20-2 (6150)	18-4 (5590)	20-9 (6320)	18-1 (5510)	16-5 (5000)
	L/240	19-11 (6070)	17-4 (5280)	15-8 (4780)	18-4 (5590)	15-11 (4850)	14-5 (4390)	16-5 (5000)	14-3 (4340)	12-10 (3910)
	L/360	17-4 (5280)	15-0 (4570)	13-7 (4140)	15-11 (4850)	13-9 (4190)	12-6 (3810)	14-3 (4340)	12-4 (3760)	11-2 (3400)
6 (152.4) *600S125-33*	L/120	33-9 (10290)	29-6 (8990)	26-9 (8150)	30-10 (9400)	27-0 (8230)	24-6 (7470)	27-2 (8280)	23-10 (7260)	19-1 (5820)
	L/240	26-9 (8150)	23-5 (7140)	21-3 (6480)	24-6 (7470)	21-4 (6500)	19-5 (5920)	21-7 (6580)	18-10 (5740)	17-3 (5260)
	L/360	23-5 (7140)	20-6 (6250)	18-7 (5660)	21-4 (6500)	18-9 (5720)	17-0 (5180)	18-10 (5740)	16-7 (5050)	15-0 (4570)

[A] Based on tests conducted with gypsum board attached with screws spaced 12 in. (305 mm) o.c. to framing members.
[B] Maximum stud heights are also applicable to walls sheathed with gypsum board greater than ½ in. (12.7 mm) thick and multiple layers of gypsum board.
[C] Application per Specification C840.
[D] Limiting heights based on ICC-ES "Acceptance Criteria for Steel Studs and Gypsum-Board Interior Nonload-Bearing Walls—Complete Construction—AC86—Approved July 1995 (Editorially revised September 2005)."
[E] Runner flanges need not be fastened to studs except as required by 5.3.2.1.
[F] ICC-ES-AC86 utilized a 0.75 load reduction factor (for strength determination only) to determine the heights as shown in the table.
[G] The *Industry Designator* defines the cold formed steel framing member.
Example: *350S125-33:*
350 designates the member web depth in 100ths of an in., 350 = 3.50 in. (88.9 mm).
S designates the type of member, *S* = stud.
125 designates the member flange width in 100ths of an in., 125 = 1.25 in. (32 mm).
33 designates the member base metal thickness in mils, 33 = .0329 in. (0.836 mm).
[H] Data not available.
[I] Also applicable to 3-⅝ in. (92.1 mm) stud depth, *362S125-33*.

SUMMARY OF CHANGES

Committee C11 has identified the location of selected changes to this standard since the last issue (C754 – 15) that may impact the use of this standard. (Approved Jan. 1, 2017.)

(1) Revised 5.6.

Committee C11 has identified the location of selected changes to this standard since the last issue (C754 – 11) that may impact the use of this standard. (Approved Feb. 1, 2015.)

(1) Added Appendix X1.
(2) Moved Tables 3-5 from previous edition to Appendix X1, Tables X1.1-X1.3.
(3) Revised subsection 2.3 to update version of AC86.
(4) Added new Tables 3-5.