Designation: ~~C754 – 18~~ C754 – 20

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.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

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

C955 Specification for Cold-Formed Steel Structural Framing Members

2.2 *AISI ~~Standard:~~Standards:*[3]

~~AISI COSP~~S202 Code of Standard Practice for Cold-Formed Steel Structural Framing~~ – 2006 Edition~~

S220 North American Standard for Cold-Formed Steel Framing – Nonstructural Members

S240 North American Standard for Cold-Formed Steel Structural Framing

2.3 *ICC-ES ~~Document~~Document:*[4]

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

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[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~~25 Massachusetts Ave., NW, Suite ~~705~~,800, Washington, DC ~~20036~~,20001, http://www.steel.org.

[4] Available from ~~ICC Evaluation Services, Inc., 5360 Workman Mill Road, Whittier, CA 90601, www.icc-es.org~~.International Code Council (ICC), 500 New Jersey Ave., NW, 6th Floor, Washington, DC 20001, http://www.iccsafe.org.

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

3. Terminology

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

3.1 *Definitions:*

3.1.1 For definitions of terms used in this specification, refer to 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.

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~~.~~ or AISI S220.

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.

4.3.1 *Protective Coating:*

4.3.1.1 Channels for use in interior applications shall have a protective coating conforming to the requirements of Specification C645~~.~~ or AISI S220.

4.3.1.2 Channels for use in exterior applications shall have a protective coating conforming to the requirements of Specification C955~~.~~ or AISI S240.

4.3.2 Channels shall have the following minimum weights in lb per 1000 linear ft (kg/m):

Section	Web Depth		Flange Width		Weight	
Designation	in.	(mm)	in.	(mm)	lb/1000 ft	(kg/m)
075U050 -54	¾	(19)	½	(13)	277	(0.412)

150U050 -54	1½	(38)	½	(13)	414	(0.616)
200U050 -54	2	(51)	½	(13)	506	(0.753)
250U050 -54	2½	(64)	½	(13)	597	(0.888)

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 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).

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~~

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[A]	Maximum Spacing, o.c.[B]		
					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)[C]	16 (406)[C]	16 (406)[C]
	⅜ (9.5)	ceilings	perpendicular	[D]	16 (406)	16 (406)
	⅜ (9.5)	ceilings	parallel	[D]	[E]	16 (406)
½ (12.7)	. . .	ceilings	perpendicular	24 (610)[C]	24 (610)[C]	24 (610)[C]
	. . .	ceilings	parallel	16 (406)[C]	16 (406)[C]	16 (406)[C]
	⅜ (9.5)	ceilings	perpendicular	[D]	16 (406)	24 (610)
	⅜ (9.5)	ceilings	parallel	[D]	[E]	24 (610)
	½ (12.7)	ceilings	perpendicular	[D]	24 (610)	24 (610)
	½ (12.7)	ceilings	parallel	[D]	16 (406)	24 (610)
⅝ (15.9)	. . .	ceilings	perpendicular	24 (610)[C]	24 (610)[C]	24 (610)[C]
	. . .	ceilings	parallel	16 (406)[C]	16 (406)[C]	16 (406)[C]
	⅜ (9.5)	ceilings	perpendicular	[D]	16 (406)	24 (406)
	⅜ (9.5)	ceilings	parallel	[D]	[E]	24 (610)
	½ or ⅝ (12.7 or 15.9)	ceilings	perpendicular	[D]	24 (610)	24 (610)
	½ or ⅝ (12.7 or 15.9)	ceilings	parallel	[D]	16 (406)	24 (406)
¼ (6.4)	. . .	walls	parallel	[E]	16 (406)[C]	16 (406)[C]
	⅜ (9.5)	walls	[E]	[E]	[E]	[E]
	½ or ⅝ (12.7 or 15.9)	walls	perpendicular or parallel	[D]	16 (406)	16 (406)
⅜ (9.5)	. . .	walls	perpendicular or parallel	16 (406)[C]	16 (406)[C]	24 (610)[C]
	⅜ or ½ or ⅝ (9.5 or 12.7 or 15.9)	walls	perpendicular or parallel	[D]	16 (406)	24 (610)
½ or ⅝ (12.7 or 15.9)	. . .	walls	perpendicular or parallel	24 (610)[C]	24 (610)[C]	24 (610)[C]
	⅜ or ½ or ⅝ (9.5 or 12.7 or 15.9)	walls	perpendicular or parallel	[D]	24 (610)	24 (610)

[A] In relation to framing members.
[B] On center.
[C] Denotes framing spacing for base layer in two-layer application.
[D] Not applicable.

[E] Not recommended.

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)~~(150 mm) length of same size stud or track shall be nested to form a "box" at each saddle tie.

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.

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, 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

TABLE 3 Maximum Stud Height, ft-in. (mm), Single Layer ⅝-in. ~~(15.9-mm) Type X~~ (15.9 mm) Type-X Thick Gypsum Board, Vertical Application, on Each Side of Minimum 0.0179-in. ~~(0.455-mm)~~(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.			Framing Spaced 16 in. (406 mm) o.c.			Framing Spaced 24 in. (610 mm) o.c.		
		Lateral Pressure			Lateral Pressure			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~~
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.

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.

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.

TABLE 4 Maximum Stud Height, ft-in. (mm), Single Layer ⅝-in. ~~(15.9-mm) Type X~~ (15.9 mm) Type-X Thick Gypsum Board, Vertical Application, on Each Side of Minimum 0.0296-in. ~~(0.750-mm)~~(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.			Framing Spaced 16 in. (406 mm) o.c.			Framing Spaced 24 in. (610 mm) o.c.		
		Lateral Pressure			Lateral Pressure			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~~
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.

5.7.5 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~~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 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