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SSMA

INDUSTRY TECHNICAL NOTE
COLD FORMED STEEL CONSTRUCTION

2

MARCH
2000

UNSHEATHED FLANGE BRACING

INTRODUCTION

Non-structural interior walls framed with cold-formed steel studs are often framed with cladding (gypsum wall board, etc.) on one side only. With cladding on one side only, the unsheathed flange needs to be braced to resist torsional rotation of the framing member when the wall is subjected to a lateral load. The model codes require, as a minimum, a 5 psf interior lateral load.

In most cases this will be the controlling design load, except when higher loads are required by contract specifications. In high seismic areas the 5 psf load may be exceeded where heavy cladding materials are attached to the wall. An engineered solution is required for these applications. Examples of such applications are:

- Support of wall hung cabinets or plumbing fixtures.
- Floor mounted tall cabinets connected to the wall for lateral support.
- Heavy cladding materials (i.e. marble, stone, ceramic tile, etc.)

Traditionally, it has been common practice to require cold rolled channel to be installed at 4 foot on center through the web punch-outs to stiffen and stabilize the wall. The cold rolled channel installed through the punch-outs is effective in providing unsheathed flange bracing if there is a positive attachment of the cold rolled channel to the web of 6” and smaller studs (see Detail A).

The installation of the cold rolled channel, at 4 ft. o.c. will, in most cases, allow the wall to be considered fully braced similar to the wall having cladding installed on each flange, full height. However, the practice of bracing at 4 ft. on center may be uneconomical and unnecessary in some instances.

OBSERVATIONS

The ability to select an economical wall assembly for interior non-structural (non-axial loaded) walls sheathed on one flange is possible for a given depth of member, flange width and member thickness and the unsheathed flange bracing interval.

Historically, the bracing interval for walls sheathed on one flange, (chase walls, furred walls, etc.) if other than 4 ft. o.c. has been left to the design professional to determine or the manufacturer’s recommendation.

The 1996 American Iron and Steel Institute’s (AISI) “Specification for the Design of Cold-Formed Steel Structural Members” has design provisions for determining the bracing interval. The procedure contained in the Specification for determining the spacing of mechanical bracing for a given lateral load is easily applied using specialized cold formed steel software.

MECHANICAL BRACING INTERVAL DETERMINATION

The spacing of mechanical bracing to provide adequate stability for the unsheathed flange of a non-load bearing wall assembly can be determined in accordance with Section C3.1.2 of the AISI Specification. A series of curves (Figures 1 through 8), for a given stud depth, thickness, and stud spacing (16" or 24" o.c.), a specified deflection limit, wall height and a lateral load of 5 psf have been developed for determining the required bracing interval based on these provisions.

Satisfactory performance of the mechanical bracing is based on the following:

1. Each flange of the wall stud is engaged and secured to the flange of a track at the top and bottom of the wall.

2. Mechanical bracing is to be positively attached to each wall stud and spaced vertically at the maximum interval selected from the design curves.

3. When Detail A is used, punch-outs are to be installed in accordance with the provisions contained in Section D4 of the AISI Specification.

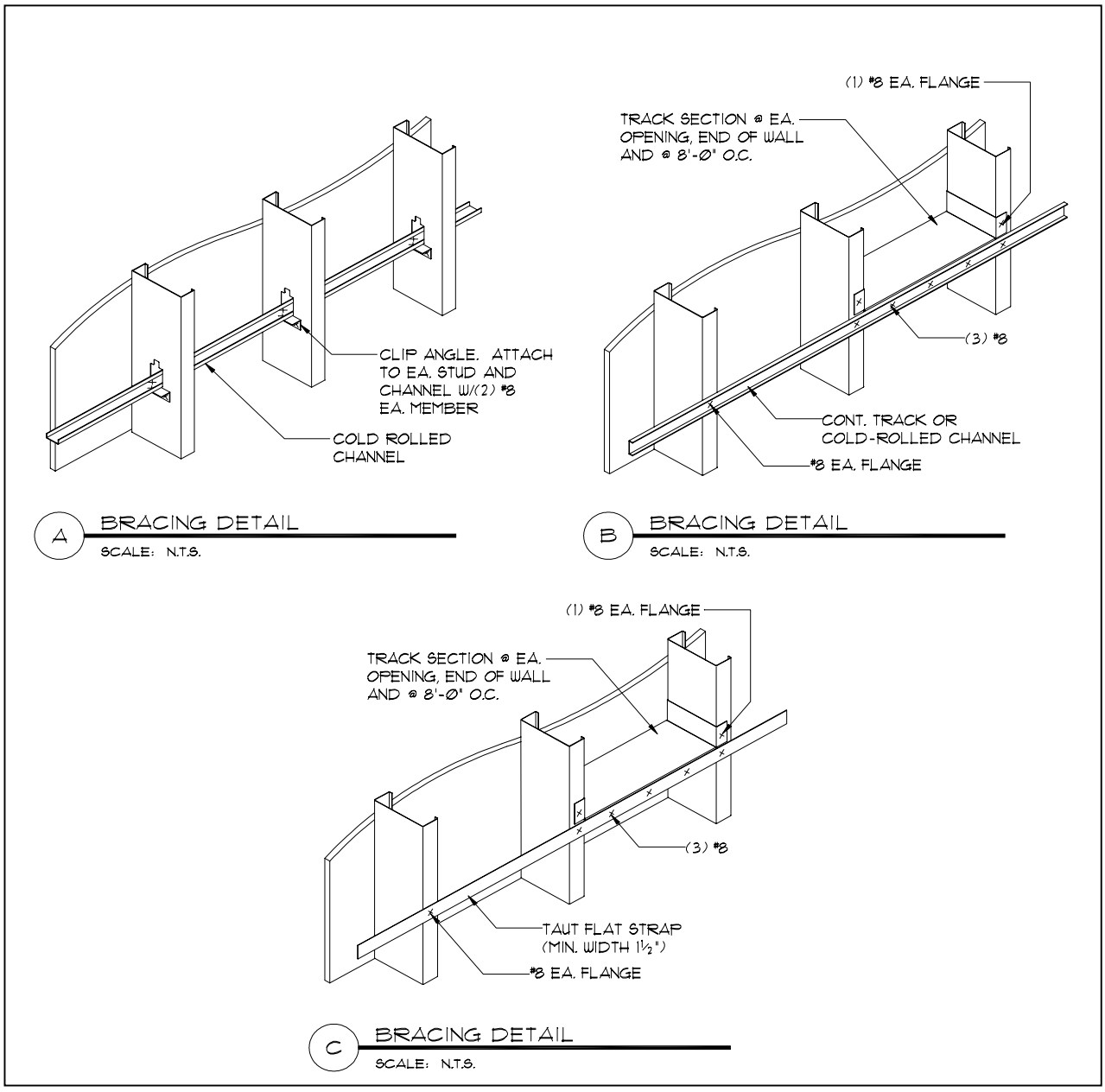
Once the required bracing interval has been determined, the method of stabilizing the unsheathed flange of the stud can be chosen from one of three methods shown in details A, B and C.

The stud depths used in Figures 1 through 8 are based on members commonly used for interior non-load bearing applications with a minimum yield stress of 33 ksi. If a 3 5/8" stud depth is specified, Figures 3A & B and 4A & B for the 3 1/2" stud depth can be used for selecting the bracing interval. The flange widths and steel thickness used are based on the designator system adopted as a national standard for specifying cold formed steel members which is as follows:

Stud Members Flange		Stiffener Lip
Width	Designator	Inches
1 1/4"	S125	3/16"
1 3/8"	S137	3/8"
1 5/8"	S163	1/2"

Min. Steel Thickness (Min. Yield Stress 33 ksi)	
Inches	Mils (.001 in.)
.0179 (25 ga.)	18
.0329 (20 ga.)	33
.0429 (18 ga.)	43

For a 5 psf lateral load, knowing the stud depth, wall height, and deflection limit required, a selection of possible stud members can be made with different bracing intervals. A final selection as to which stud and mechanical bracing interval to use can be made based on material cost, availability of materials and labor cost for installation.



The following examples are provided to assist in using the attached figures.

Example No. 1:

Stud size:	4”
Stud spacing:	24” o.c.
Deflection limit:	L/240
Lateral load:	5 psf
Wall height:	13 feet

From Figure 6B the following options are possible:

Stud Size and Thickness	Brace Interval, ft.
S125 - 33 (1 1/4” flg., 20 ga.)	6.8 ft. (1 row)
S137 - 43 (1 3/8” flg., 18 ga.)	10.4 ft. (1 row)
S162 - 33 (1 5/8” flg., 20ga.)	11.6 ft. (1 row)
S162 - 43 (1 5/8” flg., 18ga.)	None required

From these four possibilities, the most economical section can be selected.

Example No. 2:

Stud size:	3 1/2”
Stud spacing:	16” o.c.
Deflection limit:	L/240
Lateral load:	5 psf
Wall height:	13 feet

From Figure 3B the following options are possible:

Stud Size and Thickness	Brace Interval, ft.
S125 - 33 (1 1/4” flg., 20 ga.)	7.8 ft. (1 row)
S137 - 43 (1 3/8” flg., 18 ga.)	12.6 ft. (1 row)
S162 - 33 (1 5/8” flg., 20 ga.)	None required
S162 - 43 (1 5/8” flg., 18 ga.)	None required

From these four possibilities, the most economical section can be selected.

Example No. 3

Stud size:	2 1/2”
Stud spacing:	16” o.c.
Deflection limit:	L/120
Lateral load:	5 psf
Wall height:	14 feet

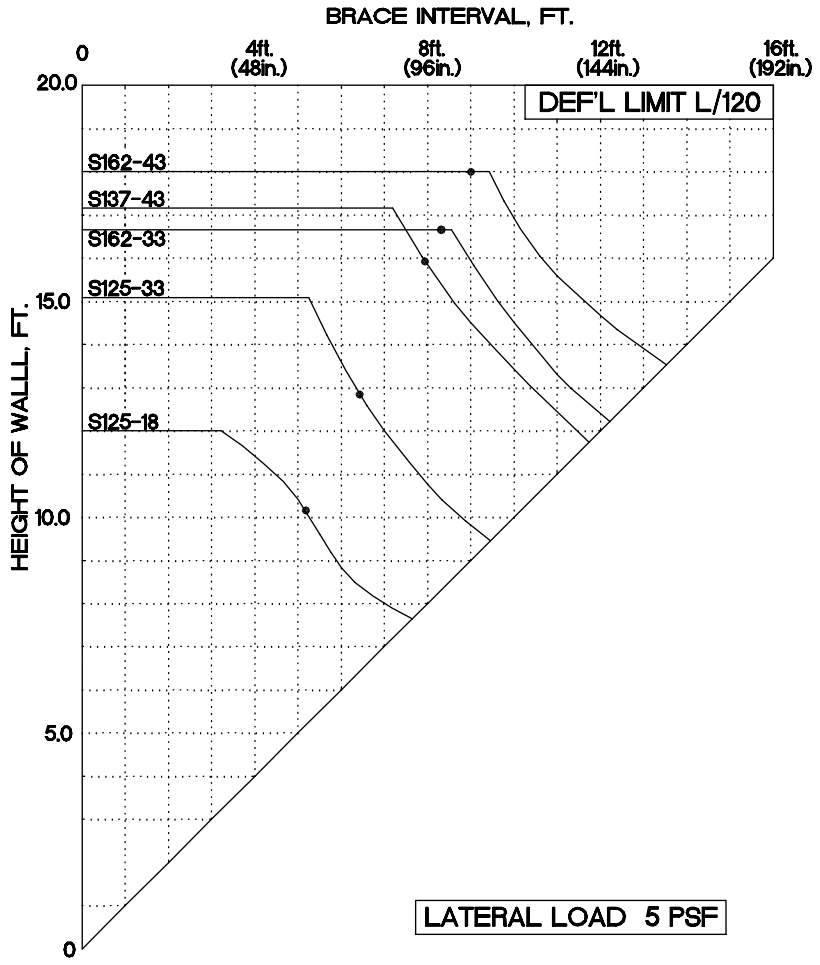
From Figure 1A the following options are possible:

Stud Size and Thickness	Brace Interval, ft.
S125 - 33 (1 1/4” flg., 20 ga.)	5.8 ft. (2 rows)
S137 - 43 (1 3/8” flg., 18 ga.)	9.5 ft. (1 row)
S162 - 33 (1 5/8” flg., 20 ga.)	10.4 ft. (1 row)
S162 - 43 (1 5/8” flg., 18 ga.)	12.8 ft. (1 row)

From these four possibilities, the most economical section can be selected.

FIGURE 1A

250 (2 1/2") STUD • 16" O.C.



• = Mid-Wall Brace Height

FIGURE 1B

250 (2 1/2") STUD • 16" O.C.

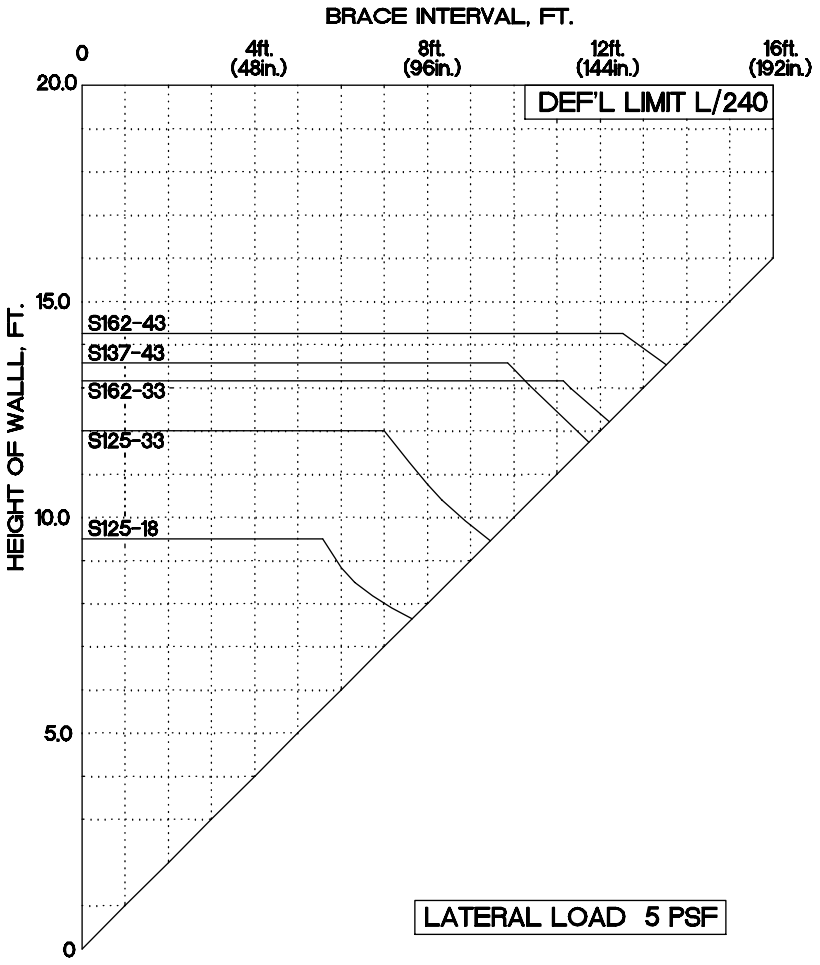


FIGURE 2A

250 (2 1/2") STUD • 24" O.C.

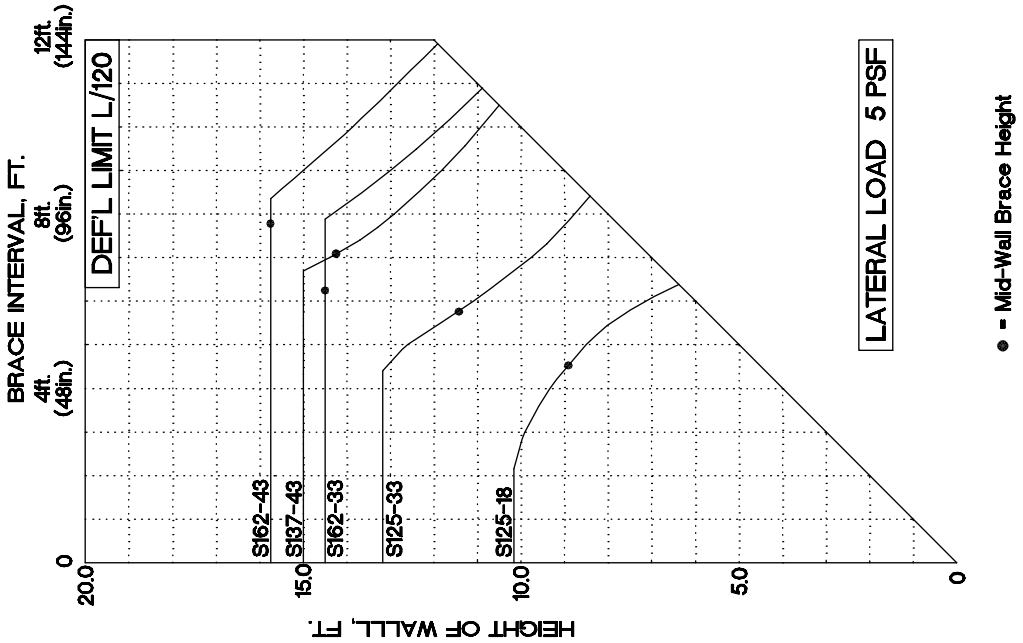


FIGURE 2B

250 (2 1/2") STUD • 24" O.C.

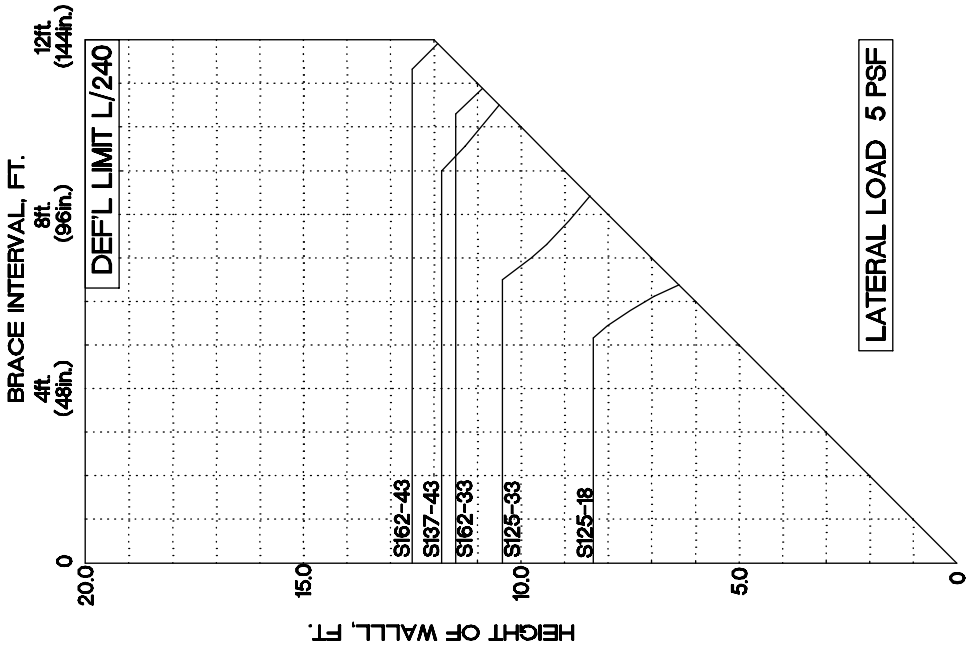


FIGURE 3A

350 (3 1/2") STUD • 16" O.C.

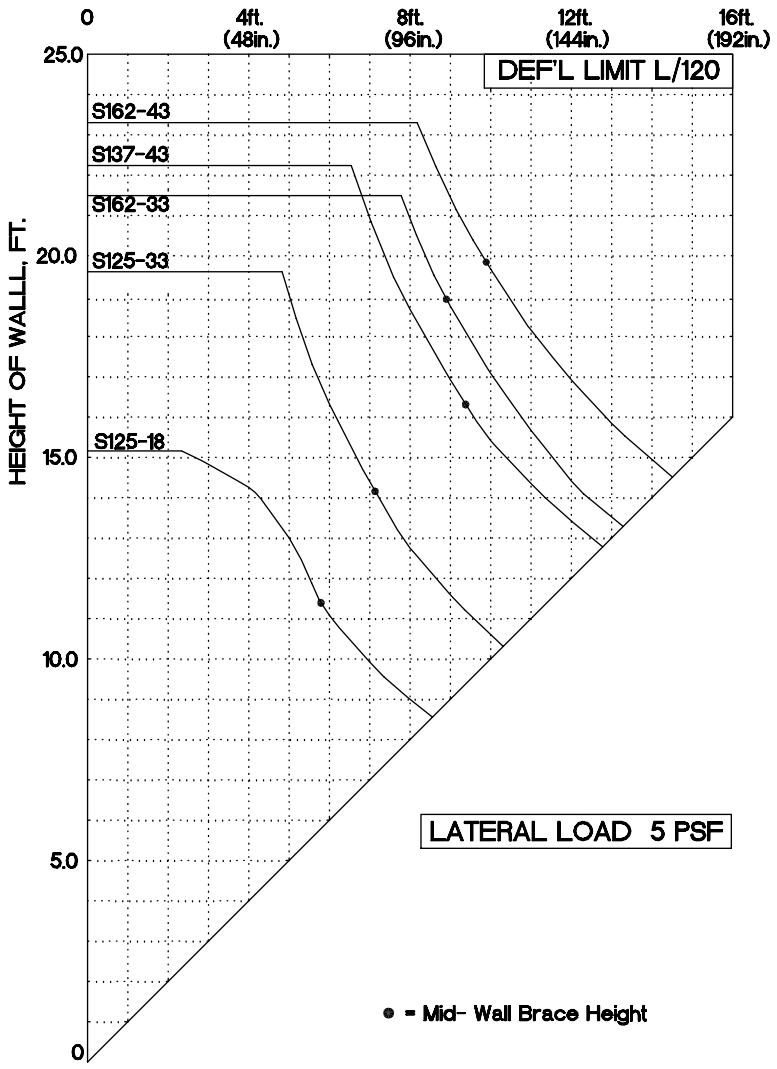


FIGURE 3B

350 (3 1/2") STUD • 16" O.C.

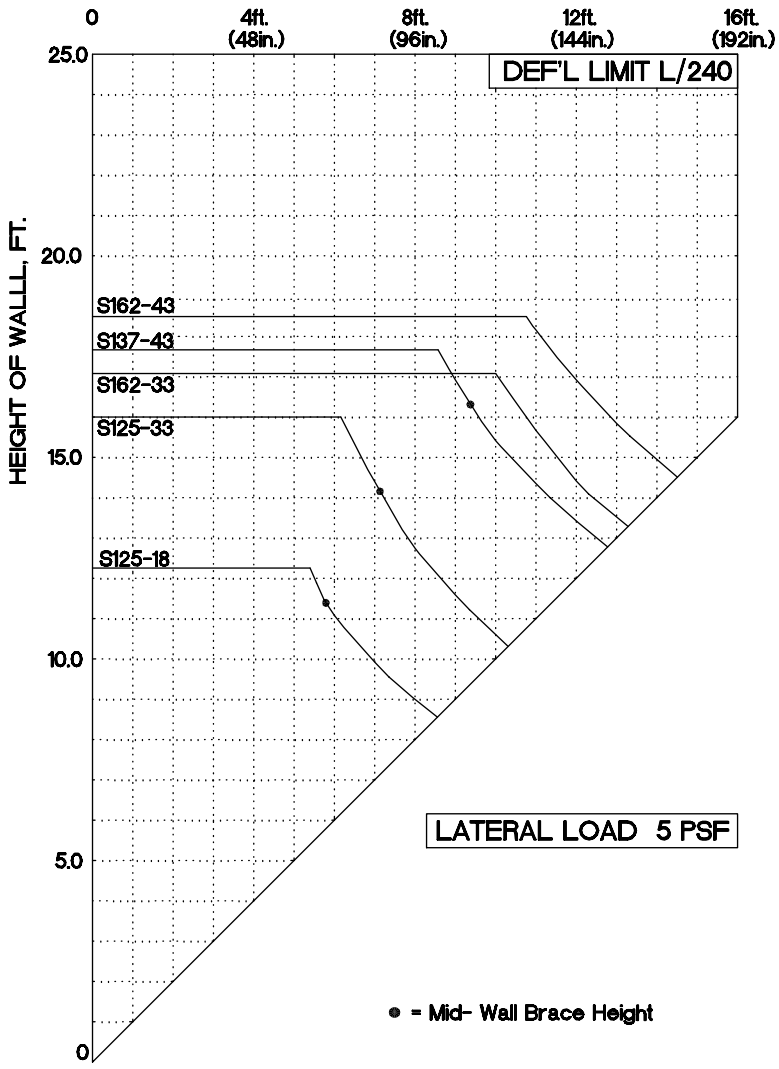


FIGURE 4A

350 (3 1/2") STUD • 24" O.C.

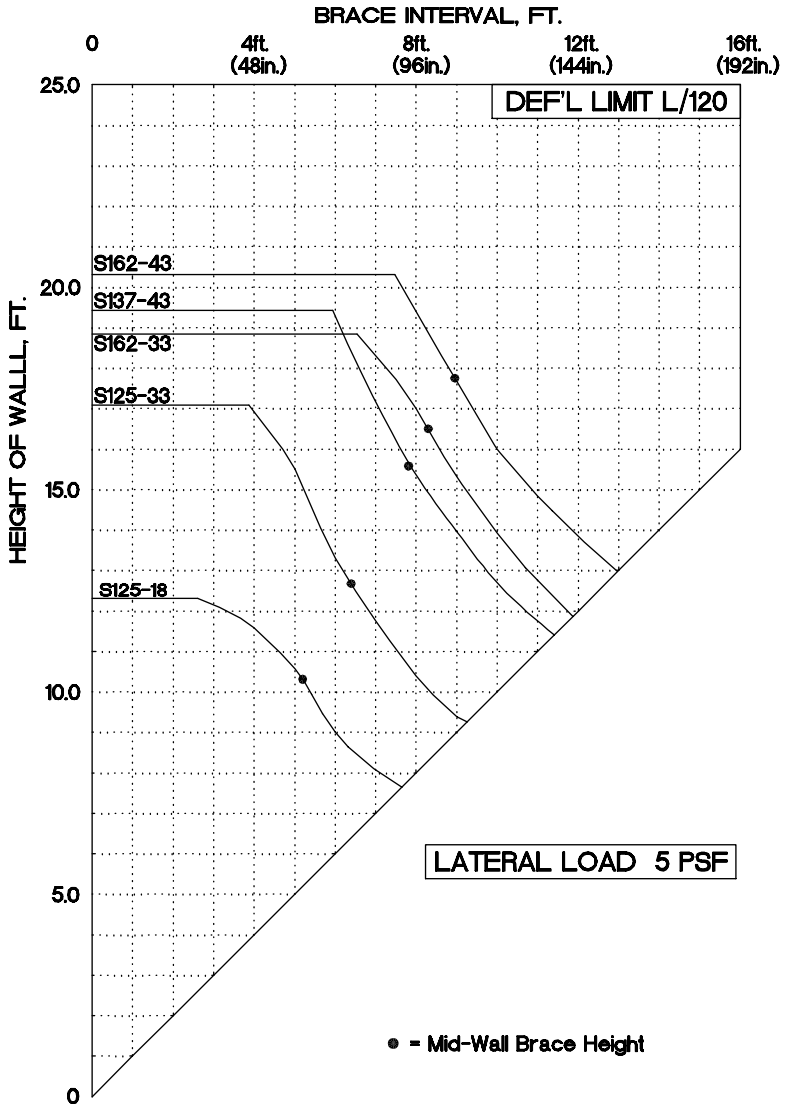


FIGURE 4B

350 (3 1/2") STUD • 24" O.C.

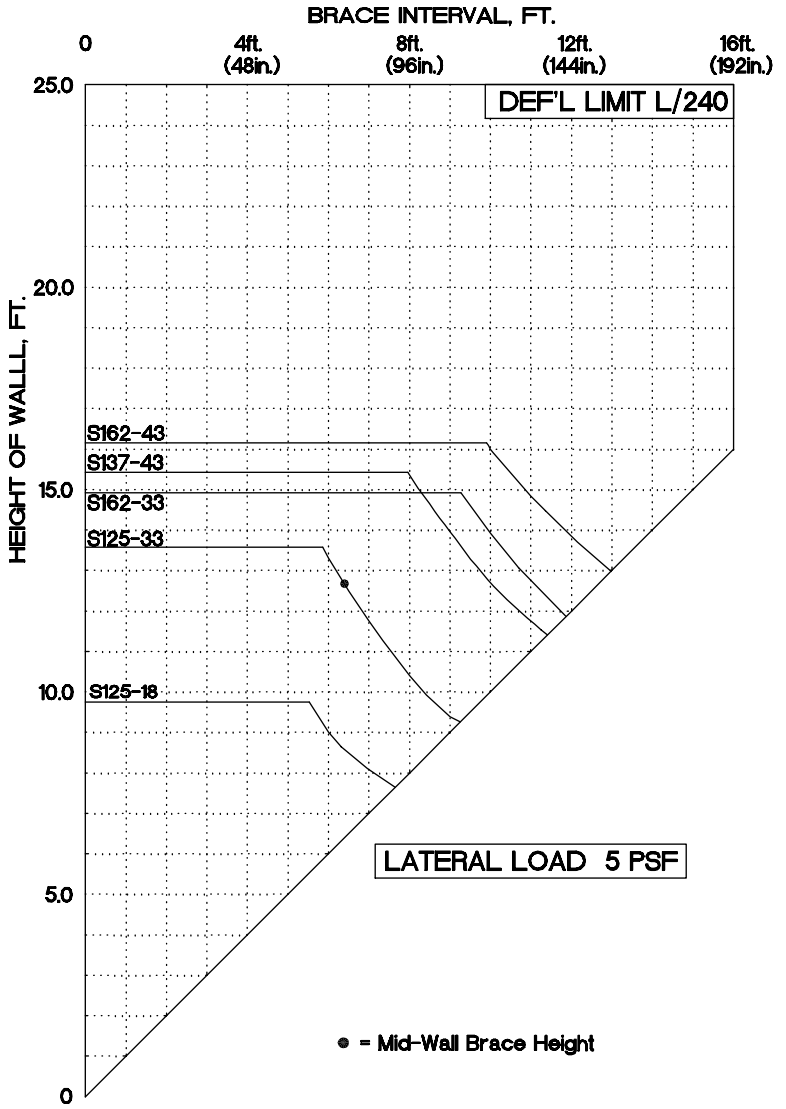


FIGURE 5A

400 (4") STUD • 16" O.C.

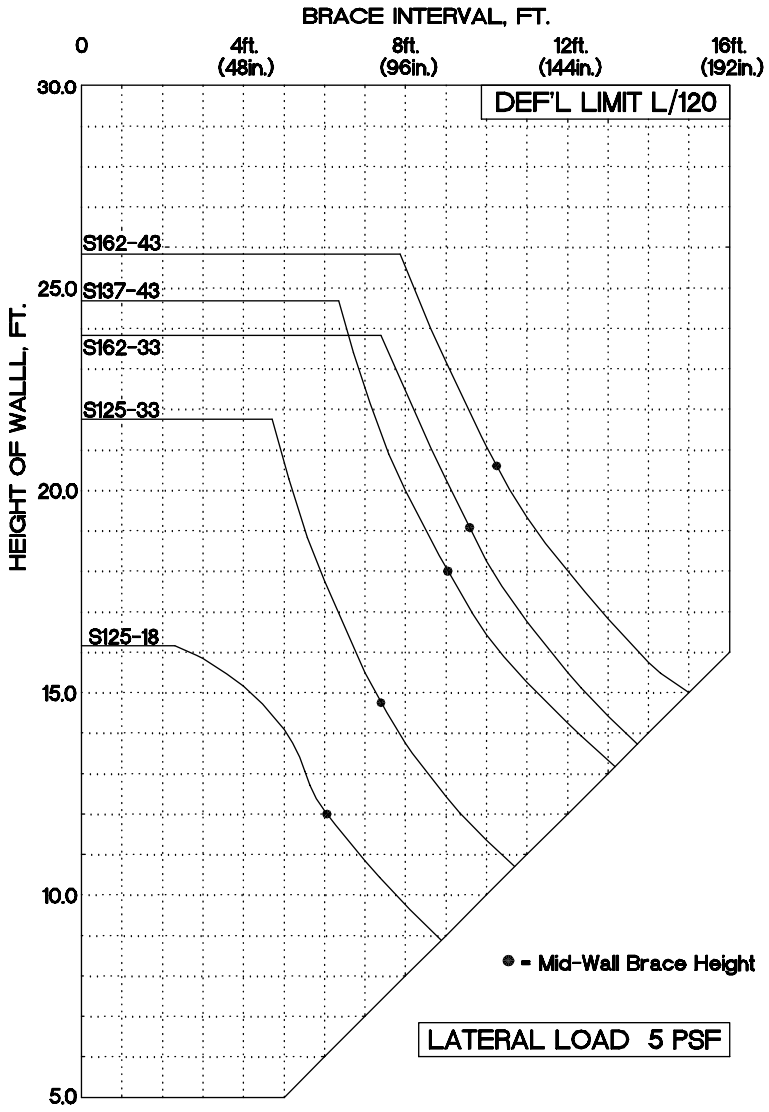


FIGURE 5B

400 (4") STUD • 16" O.C.

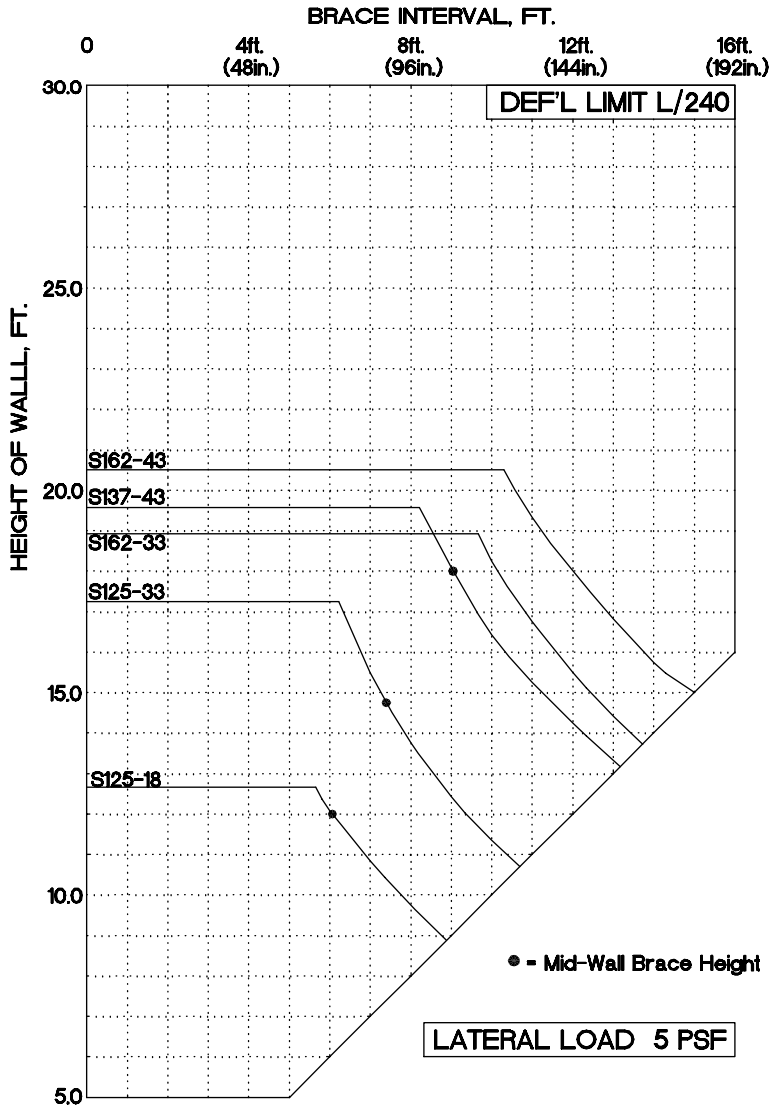


FIGURE 6A

400 (4") STUD • 24" O.C.

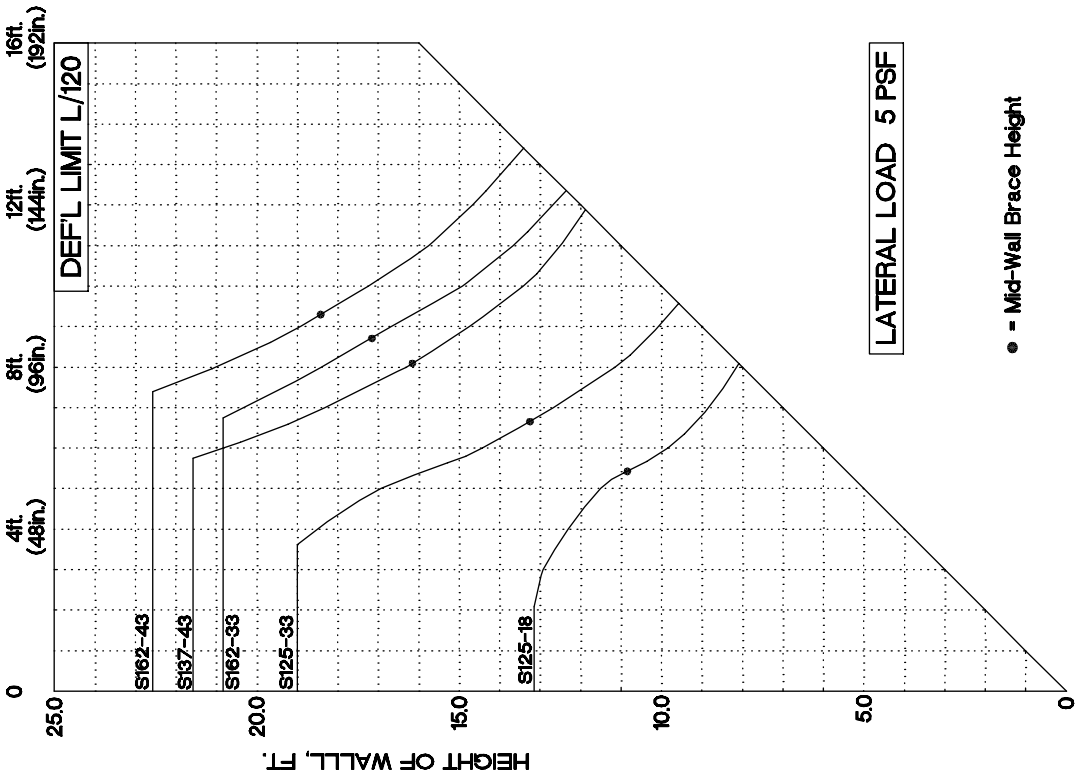


FIGURE 6B

400 (4") STUD • 24" O.C.

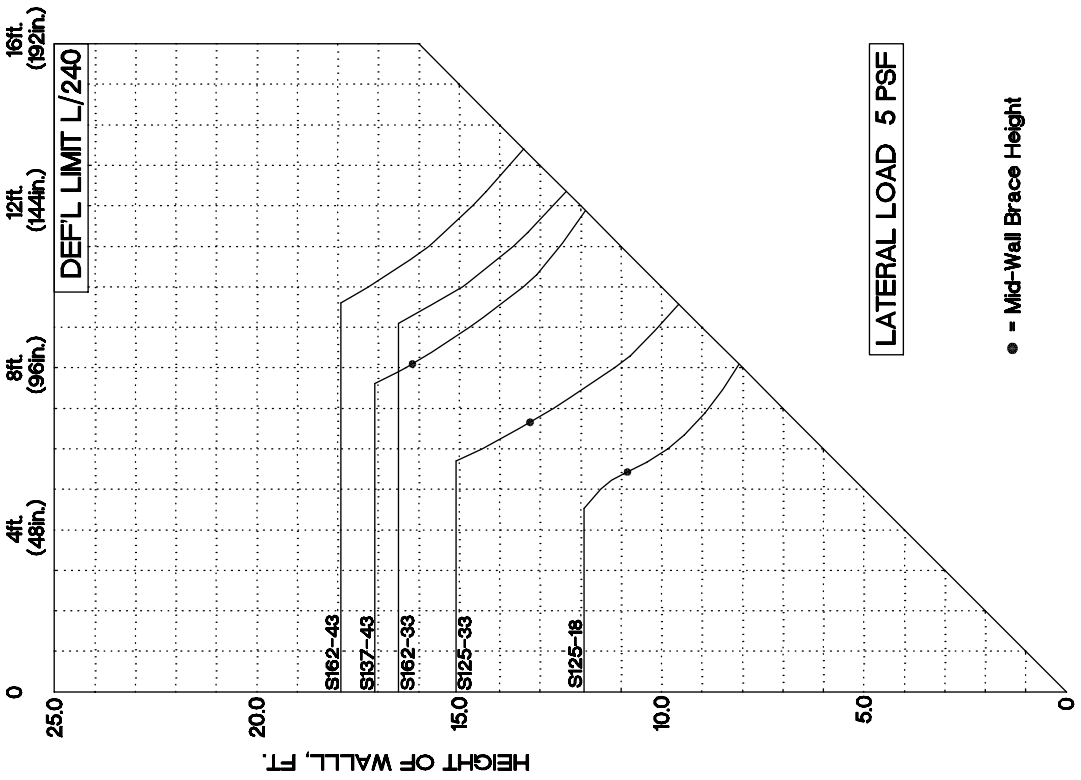


FIGURE 7A

600 (6") STUD • 16" O.C.

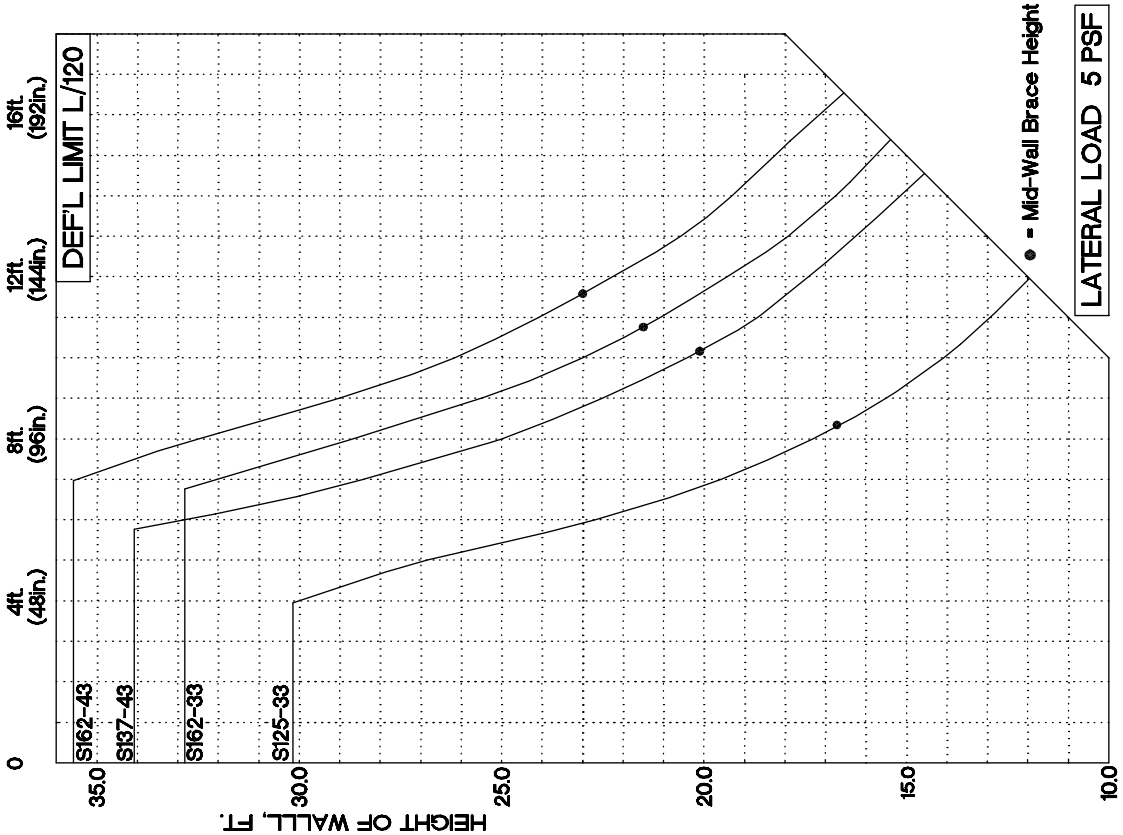


FIGURE 7B

600 (6") STUD • 16" O.C.

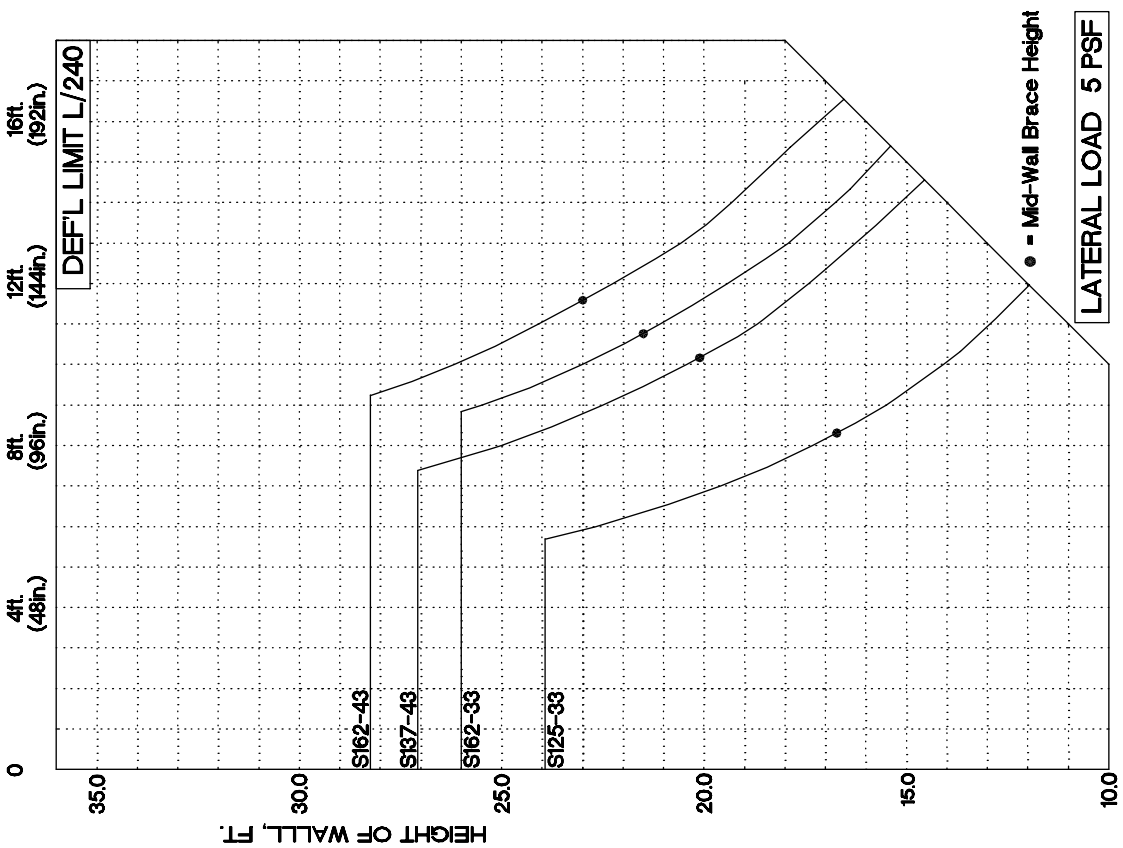


FIGURE 8A

600 (6') STUD • 24' O.C.

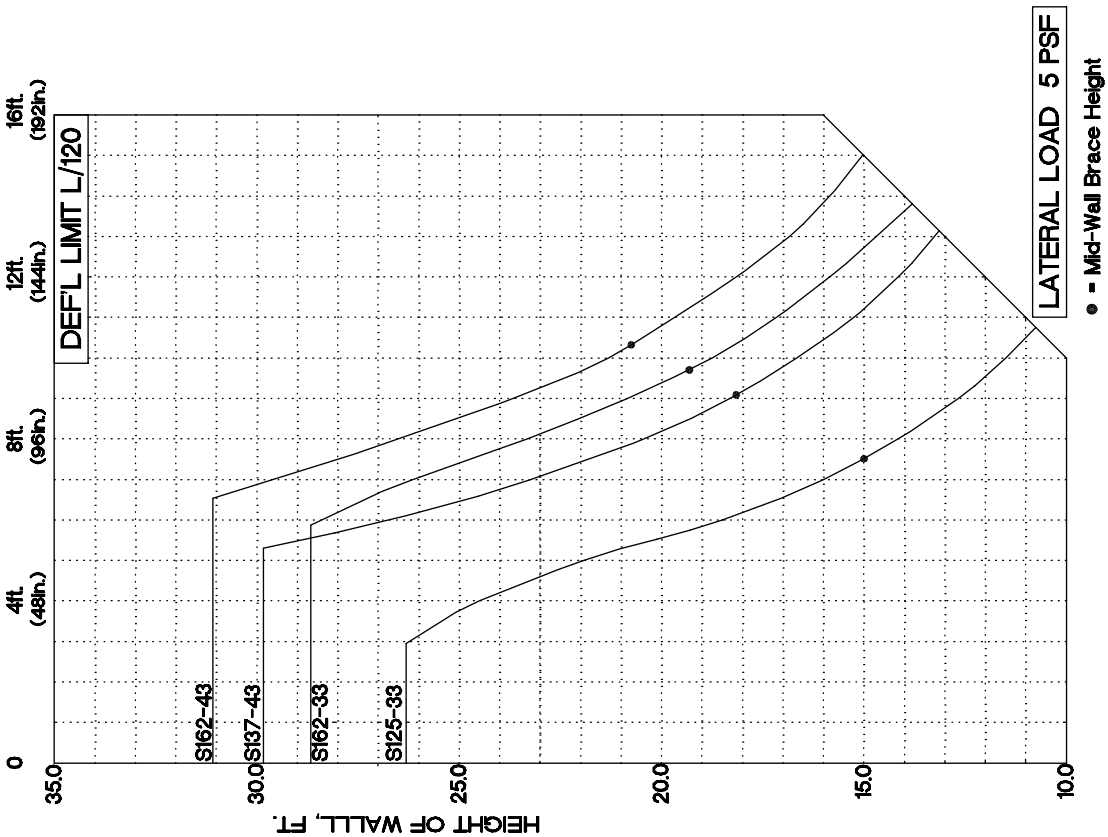


FIGURE 8B

600 (6') STUD • 24' O.C.