

Tables with Allowable ASD Seismic Values  
For Design at  $R = 6.5$

**HARDY<sup>TM</sup> & FRAMES<sup>Inc.</sup>**  
A MiTek Company

# Special Moment Frame



MF1-12



**H**ardy Frames, Inc manufactures and markets pre-fabricated shear wall systems. We have been the innovative leader in the industry for over 15 years. Our company first introduced the Original Hardy Frame<sup>®</sup> Panels and Brace Frames in 1996. In 2006, we joined forces with SidePlate Systems, Inc. to launch the Hardy Frame<sup>®</sup> Special Moment Frame, the first pre-engineered, pre-fabricated Moment Frame in the industry.

The Hardy Frame<sup>®</sup> Moment Frame may be used in single and multistory structures, and uses the new-generation SidePlate<sup>®</sup> moment connection to resist lateral forces from earthquakes and wind. This connection was conceived and developed by David Houghton, a licensed structural engineer, to eliminate all problems that were exposed in traditional moment connections as a result of the 1994 Northridge earthquake. The outstanding performance of the SidePlate<sup>®</sup> system is nationally recognized and is the same technology we use in the Hardy Frame<sup>®</sup> Moment Frame to provide high allowable loads in narrow wall sections. Adding to the structural benefits, our Moment Frame is designed to arrive at the jobsite completely pre-assembled with no field welding and no special inspection required.

The mission of Hardy Frames is to provide cost effective, state-of-the-art, lateral force resisting systems that are easily installed to meet architectural, engineering and code requirements.

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## General Information

### Code Evaluations:

SidePlate® has been evaluated by the following code authorities:  
 ICC Evaluation Service, Inc.: ICC-ES ESR-1275  
 The City of Los Angeles, California: Research Report - RR 25393

### Testing:

The SidePlate® connections have been extensively tested and qualified in accordance with AISC and ICC criteria. Products in this catalog are designed in accordance with the provisions of ICC-ES ESR-1275. A calculation package, stamped and signed by a registered design professional of SidePlate Systems, Inc., is provided for building department submittal which includes the complete design of the moment frame conforming to SMF standards.

### Product Use:

The Hardy Frame® products are designed and manufactured for the specific purposes described in this catalog. Any changes to the products or in the installation procedures must be approved by the designer of record and are the sole responsibility of the designer.

### Quality Statement:

Hardy Frames, Inc. warrants to its customers that its products are free from material defects of manufacture or design, and will perform in substantial accordance with published specifications, if properly used.

Hardy Frame® Moment Frames are manufactured from prime quality steel:

### Plate Material:

- ASTM A572 Grade 50: SidePlate and built up columns
- ASTM A36: Base Plates

### Rolled Shapes:

- ASTM A992 ( $F_y=50$ ksi): Columns (W-sections)
- ASTM A500 Grade B ( $F_y=46$ ksi): Beams (Hollow Structural Sections - HSS)

### Misc. Materials

- ASTM A36/F1554-36: Anchor bolts at column base plates
- ASTM A36: All other fasteners and components
- Nelson Studs:  $F_y=70$  ksi
- No. 2 Douglas Fir Larch or better: Beam and column nailers

Hardy Frames, Inc. reserves the right to change specifications, designs, and models without notice and liability of such changes.  
 The information presented in this catalog supersedes all information published in previous documents and publications.  
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## Moment Frame Design and Construction Standards

### Referenced Documents:

- American Institute of Steel Construction Specification for Structural Steel Buildings (AISC 360)
- American Institute of Steel Construction Seismic Provisions for Structural Steel Buildings Part I and Part III, Supplement No. 1 dated Nov. 16, 2005 (AISC 341s1-05)
- American Welding Society D1.1 2006 Structural Welding Code-Steel (AWS D1.1)
- International Code Council-Evaluation Service Engineering Report ESR-1275
- City of Los Angeles Research Report 25393
- Los Angeles Building Code-2008 & 2010
- International Building Code-2006 & 2009
- LADBS Information Bulletin/Public-Building Code P/BC 2002-098 rev 3-09-2010

### Frame Design Input:

Frame Modeling Software: ETABS

Model represents P-Delta effects, fully rigid panel zone & SidePlate® connection stiffness and pinned column bases

Allowable Story Drift,  $\Delta_a$ : All moment frames were designed using  $\Delta_a = 0.025h_{sx}$ . **Load Cases:** Dead (DL, includes self-weight), Live (LL), Roof Live (LL<sub>r</sub>), Snow (S), Earthquake (EQ) and Wind (W)

### Load Combinations:

- 1.4DL<sup>a</sup>
- 1.2DL<sup>a</sup>+1.6LL+0.5(LL<sub>r</sub> or S)
- 1.2DL+1.6(LL<sub>r</sub> or S)+(0.5LL or 0.8W)
- 1.2DL+1.6W+0.5LL+(0.5LL<sub>r</sub> or 0.5S)
- 1.2DL+1.0EQ<sup>b</sup>+0.5LL+0.7S
- 0.9DL+1.6W
- 0.9DL+1.0EQ<sup>b</sup>
- 0.9DL-1.0EQ<sup>b</sup>

a. Notational load equal to 0.2% of the dead load included.

b. Includes assumed values of  $\rho=1.0$  and  $S_{ds}=2.0$ .

### Design Factors of Safety:

Stress and vertical beam deflections are limited to 90% of code allowable for all designs. Under 90% limit for stress, stress governs over L/240 and L/360 beam deflection criteria; for actual reported deflections see "Hardy Frame® Moment Frame Calculations" design package.

### SidePlate® Connection Design:

The SidePlate® connection design used to complete the Hardy Frame® Moment Frame design is prepared by a registered design professional of SidePlate Systems, Inc. using the SidePlate® Connection Design Software (compliant with the requirements of ICC-ES ESR - 1275 & LA RR#25393). A strong column-weak beam relationship at the SidePlate® connection is achieved for all moment frame designs.

## Designing with Hardy Frame<sup>®</sup> Moment Frame Overview

### When to use a Hardy Frame Moment Frame:

- At large openings where the narrowest wall space is available and high shear loads are required
- When foundations are limited or existing and a pinned base connection facilitates foundation design
- When designing three story or greater structures, all parallel walls must be designed at the lowest R-Value. Specify a Hardy Frame Moment Frame and design at the same  $R=6.5$  as design of plywood shear walls.
- NOTE: Standard Hardy Frame Moment Frames are listed for opening widths up to 23 feet and wall heights up to 20 feet. When both the width and the height exceed 13 feet, the Frame is over-sized for trucking and must ship as a “Knock-Down” unit, which requires field welding and special inspection to be supplied by others.

### Design:

- Calculate the design shear load based on an R-Value of 6.5
- Select a Hardy Frame Moment Frame based on the required geometry
- Check that the tabulated Allowable Shear meets the design shear load
- If the design shear load exceeds the allowable table value, contact Hardy Frames to determine if an alternate solution, such as a “fixed base” connection will meet the design loads.
- Calculate the additional vertical loads using the IBC strength design load combinations
- Check that additional vertical loads do not exceed the tabulated Allowable Vertical Loads
- Calculate the tabulated Column Base Reactions for use in the foundation design. For more information see the “Shear Multiplier” column in the Allowable Load tables and the corresponding table notes.

### Specification:

#### On the Foundation Plan

- Specify the Hardy Frame Moment Frame model number at the location to be installed
- Specify anchorage for tension and shear from Hardy Frame Moment Frame Anchorage Solutions
- Specify connection of column base to the foundation (on Nuts & Washers, on Concrete, with Pinned or Fixed Base) refer to Typical Installation Details for standard connections

#### On the Framing Plan

- Specify a connection from the collector (or “drag”) to the top of the Hardy Frame Moment Frame. Refer to Typical Installation Details for standard connections
- Consider out of plane bracing for the Frame either through a diaphragm to the beam or with framing members to the columns

### Submittal:

- Include a calculation package for the model number specified (provided by Hardy Frames)
- Include Typical Installation Detail Sheets HFMF1 and HFMF2 as “supplemental pages”

### Additional Items:

- The table values in this catalog for Allowable Shear Loads assume Pinned Base anchorage.
- When additional shear load or a drift limit less than the code maximum is needed a Fixed Base design is available. Consult with Hardy Frames to determine fixed base values and options.
- All allowable shear loads have been adjusted to an R-Value of 6.5. To convert design loads from  $R=3.5$  to  $R=6.5$ , multiply the design load by  $3.5/6.5$ .
- The allowable shear loads are based on a story drift of  $0.025h$ . To convert shear loads to a story drift of  $0.020h$  multiply the table value by a factor of 0.8.
- When designing lateral resistance for a wall line with varying shear resisting elements the stiffness (drift/allowable shear load) must be proportioned.
- Two story Moment Frames are available. Fill out the Non-Standard Worksheet at the back of this catalog and submit to Hardy Frame to check the required configuration and loading.

## Design Example

**Given:** 9' 1" Nominal Wall Height  
16' x 7' Garage Door Opening  
6 inch concrete curb at garage wall framing  
21 foot wall length  
ASD Seismic Design Shear ( $V_{DSN}$ ) at R of 6.5 = 16,000 lbs  
No overturning loads applied from above  
Uniform Loading on Header: DL = 256 lbs/LF  
LL = 480 lbs/LF

### Look Up Model Numbers by Width

From Table 1.0 – Standard Widths:

- HF-D9 16x: Win = 16' 7" Wout = 18' 4"
- HF-D18 16x: Win = 16' 7" Wout = 19' 9-1/2" All Dimensions are compatible with Design Requirements
- HF-D18H 16x: Win = 16' 7" Wout = 19' 10"

### Check Allowable Shear (V) and Opening Height (h1)

From Table 1.9 – Nominal 9' 1" Wall Heights – Pinned Base:

HF-D18H 16x9: Allowable ASD Seismic Shear = 18,442 lbs > 16,000 lbs **OK**  
7' 9-1/4" Opening height (h1) + 6" concrete curb height = 8' 3-1/4" > 7' **OK**

### Calculate and check the aggregate additional vertical load $P_{DSN}$ for HF-D18H 16x9

From Table 1.9 – Nominal 9' 1" Wall Heights – Pinned Base:

- Maximum Additional Vertical Load  $P_U$  = 35,280 lbs
- Design DL = 256 lbs/LF x 19' 10" = 5,077 lbs
- Design LL = 480 lbs/LF x 19' 10" = 9,520 lbs
- E = Overturning Forces on Moment Frame header from Earthquake = 0
- W = Overturning Forces on Moment Frame header from Wind = 0
- $\Omega_0$  = IBC Over-strength Factor

$$1.4DL = 1.4 \times 5,077 \text{ lbs} = 7,108 \text{ lbs}$$

$$1.2DL + 1.6LL = (1.2 \times 5,077 \text{ lbs}) + (1.6 \times 9,520 \text{ lbs}) = 21,324 \text{ lbs} - \text{Controls}$$

$$1.2DL + 0.5LL + \Omega_0 E = (1.2 \times 5,077 \text{ lbs}) + (0.5 \times 9,520 \text{ lbs} + 0) = 10,850 \text{ lbs}$$

$$1.2DL + 0.5LL + 1.6W = (1.2 \times 5,077 \text{ lbs}) + (0.5 \times 9,520 \text{ lbs} + 0) = 10,850 \text{ lbs}$$

$$0.9DL + 1.6W = (0.9 \times 5,077 \text{ lbs}) + 0 = 4,569 \text{ lbs}$$

$$0.9DL + 1.0E = (0.9 \times 5,077 \text{ lbs}) + 0 = 4,569 \text{ lbs}$$

Maximum  $P_{DSN}$  = 21,324 lbs < 35,280 lbs **OK**

Minimum  $P_{DSN}$  = 4,569 lbs

### USE – HF-D18H 16x9 with Pinned Base Connection

#### SPECIFY ON FOUNDATION PLAN

- Hardy Frame Moment Frame Model Number HF-D18H 16x9
- Anchorage = D18H–Pinned (See Anchorage Table in this Catalog)
- Bottom Connection = Installation at Concrete Curb on Nuts & Washers

#### SPECIFY ON FRAMING PLAN

- Hardy Frame Moment Frame Model Number HF-D18H 16x9
- Top connection including quantity and spacing of USP MP4F connectors for shear transfer (see detail 5 of this catalog)

#### FOR FOUNDATION DESIGN

##### Calculate and check the column base resultant shear for HF-D18H 16x9

- From Table 1.9 Shear Multiplier at compression column  $V_{Mult}$  = 0.342
- From Table 1.9 Maximum Resultant Shear at Column Base  $V_R$  = 16,548 lbs

$$V_R = (V_{DSN} / 2) + (V_{Mult} \times \text{Maximum } P_{DSN}) = (16,000 \text{ lbs} / 2) + (0.342 \times 21,324 \text{ lbs}) = 15,293 \text{ lbs}$$

##### Calculate the column uplift for HF-D18H 16x9

- From Table 1.9 Wall Height = 9' 0-3/4"
- From Table 1.0  $W_{CL}$  = 18' 1"

$$\text{Uplift} = [(V_{DSN} \times \text{MF Height}) / W_{CL}] - (\text{Minimum } P_{DSN} / 2) = [(16,000 \text{ lbs} \times 9.06 \text{ ft}) / 18.08 \text{ ft}] - (4,569 \text{ lbs} / 2) = 5,733 \text{ lbs}$$



Pre-assembled 2-story Hardy Frame Moment Frames



Standard SidePlate® connection



Soft Story Seismic Retro-Fit



Pre-assembled Moment Frame at a foyer



Pre-assembled Hardy Frame Moment Frame in production

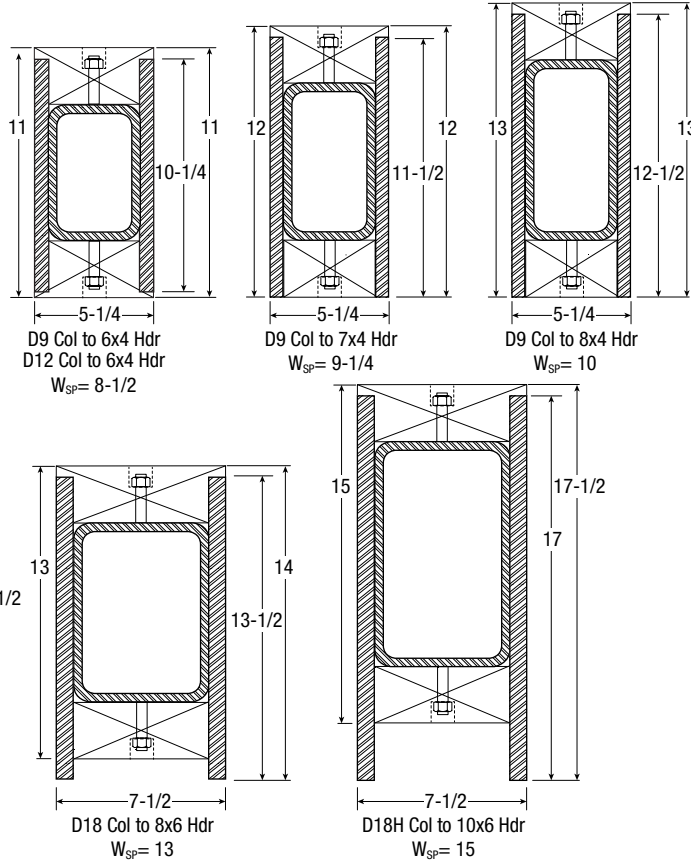
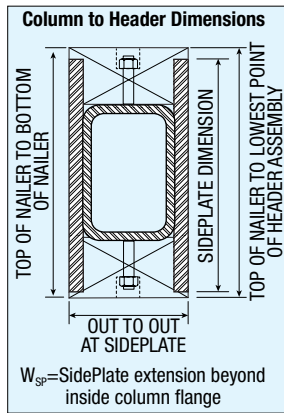


Column installed on nuts and washers prior to application on non-shrink grout



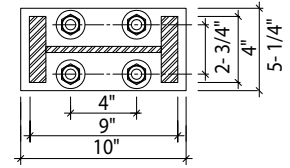
Hardy Frame Moment Frames from factory arrive at job site

## Column to Header Assembly

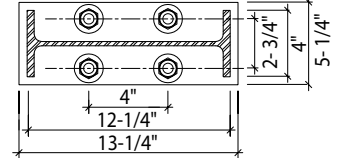


## Column Footprint Dimensions

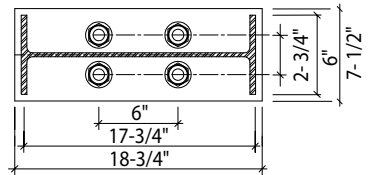
### D9 & D9H = BUILT UP COLUMN



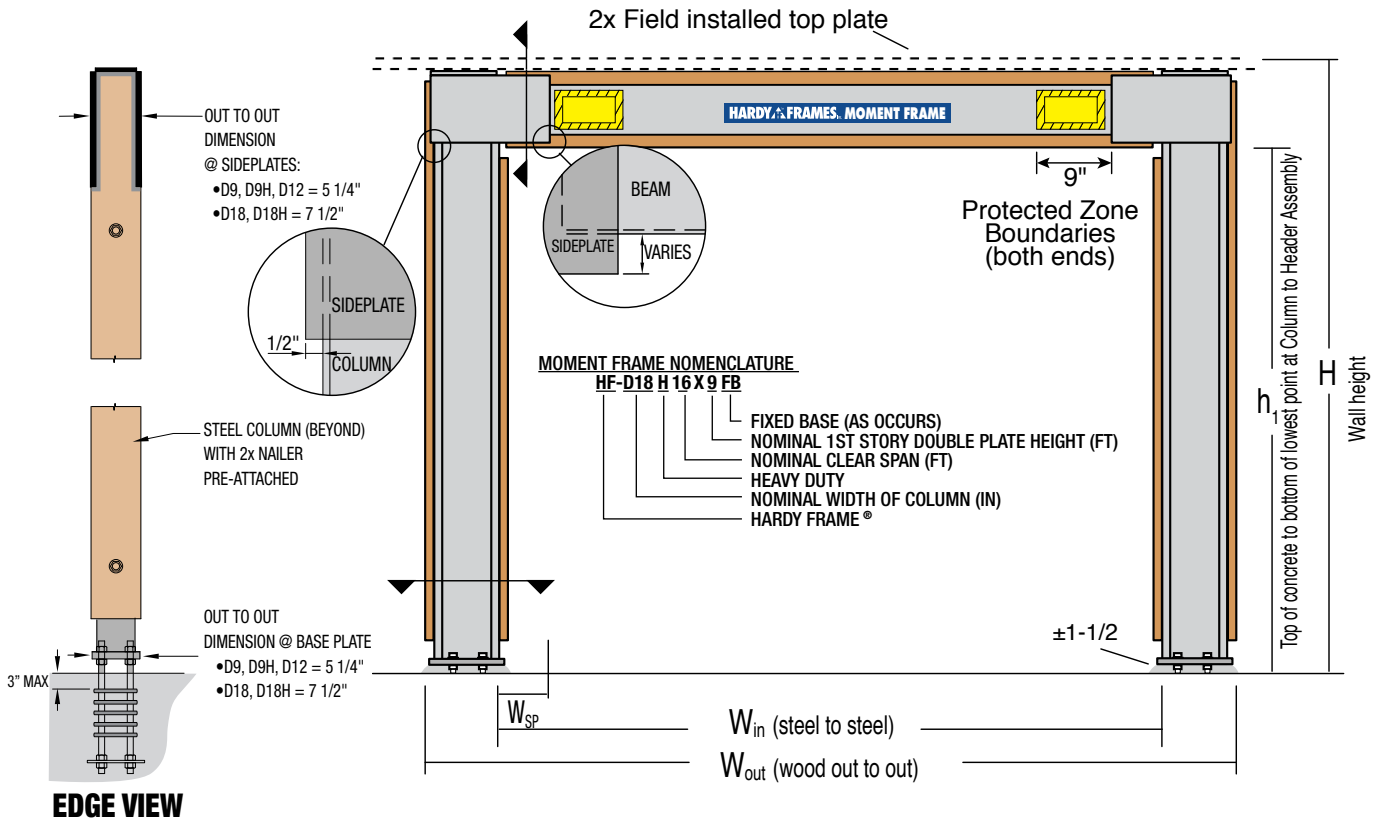
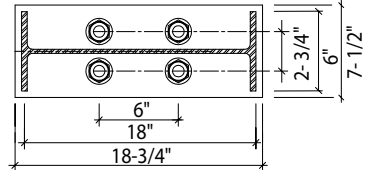
### D12=W12 x 22



### D18 = W18 x 35



### D18H = W18x46



**Table 1.0 Hardy Frame Moment Frame Width Dimensioning**

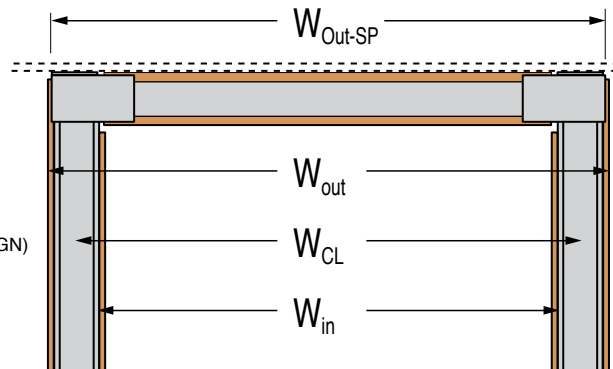
| Nominal Opening Width (ft) | Model Number | W <sub>in</sub> Steel to Steel @ Column Flanges (ft-in) | W <sub>CL</sub> Centerline to Centerline @ Columns (ft-in) | W <sub>out-SP</sub> Out to Out @ SidePlate Connection (ft-in) | W <sub>out</sub> at Wood Nailers on Outside Column Flanges (ft-in) | Col-Beam Designation |
|----------------------------|--------------|---------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------|----------------------|
| <b>6</b>                   | HF-D9 6x     | 6' 7"                                                   | 7' 4"                                                      | 8' 2"                                                         | 8' 4"                                                              | D9-6x4               |
| <b>7</b>                   | HF-D9 7x     | 7' 7"                                                   | 8' 4"                                                      | 9' 2"                                                         | 9' 4"                                                              | D9-6x4               |
| <b>8</b>                   | HF-D9 8x     | 8' 7"                                                   | 9' 4"                                                      | 10' 2"                                                        | 10' 4"                                                             | D9-6x4               |
|                            | HF-D9H 8x    |                                                         | 9' 4"                                                      | 10' 2"                                                        | 10' 4"                                                             | D9-7x4               |
|                            | HF-D12 8x    |                                                         | 9' 7-1/4"                                                  | 10' 8-1/2"                                                    | 10' 10-1/2"                                                        | D12-6x4              |
|                            | HF-D18 8x    |                                                         | 10' 0-3/4"                                                 | 11' 7-1/2"                                                    | 11' 9-1/2"                                                         | D18-6x6              |
| <b>9</b>                   | HF-D9 9x     | 9' 7"                                                   | 10' 4"                                                     | 11' 2"                                                        | 11' 4"                                                             | D9-7x4               |
|                            | HF-D12 9x    |                                                         | 10' 7-1/4"                                                 | 11' 8-1/2"                                                    | 11' 10-1/2"                                                        | D12-6x4              |
|                            | HF-D18 9x    |                                                         | 11' 0-3/4"                                                 | 12' 7-1/2"                                                    | 12' 9-1/2"                                                         | D18-8x6              |
| <b>10</b>                  | HF-D9 10x    | 10' 7"                                                  | 11' 4"                                                     | 12' 2"                                                        | 12' 4"                                                             | D9-7x4               |
|                            | HF-D12 10x   |                                                         | 11' 7-1/4"                                                 | 12' 8-1/2"                                                    | 12' 10-1/2"                                                        | D12-6x4              |
|                            | HF-D18 10x   |                                                         | 12' 0-3/4"                                                 | 13' 7-1/2"                                                    | 13' 9-1/2"                                                         | D18-8x6              |
| <b>11</b>                  | HF-D9 11x    | 11' 7"                                                  | 12' 4"                                                     | 13' 2"                                                        | 13' 4"                                                             | D9-7x4               |
|                            | HF-D12 11x   |                                                         | 12' 7-1/4"                                                 | 13' 8-1/2"                                                    | 13' 10-1/2"                                                        | D12-6x4              |
|                            | HF-D18 11x   |                                                         | 13' 0-3/4"                                                 | 14' 7-1/2"                                                    | 14' 9-1/2"                                                         | D18-8x6              |
| <b>12</b>                  | HF-D9 12x    | 12' 7"                                                  | 13' 4"                                                     | 14' 2"                                                        | 14' 4"                                                             | D9-7x4               |
|                            | HF-D12 12x   |                                                         | 13' 7-1/4"                                                 | 14' 8-1/2"                                                    | 14' 10-1/2"                                                        | D12-6x4              |
|                            | HF-D18 12x   |                                                         | 14' 0-3/4"                                                 | 15' 7-1/2"                                                    | 15' 9-1/2"                                                         | D18-8x6              |
| <b>13</b>                  | HF-D9 13x    | 13' 7"                                                  | 14' 4"                                                     | 15' 2"                                                        | 15' 4"                                                             | D9-7x4               |
|                            | HF-D12 13x   |                                                         | 14' 7-1/4"                                                 | 15' 8-1/2"                                                    | 15' 10-1/2"                                                        | D12-6x4              |
|                            | HF-D18 13x   |                                                         | 15' 0-3/4"                                                 | 16' 7-1/2"                                                    | 16' 9-1/2"                                                         | D18-8x6              |
| <b>14</b>                  | HF-D9 14x    | 14' 7"                                                  | 15' 4"                                                     | 16' 2"                                                        | 16' 4"                                                             | D9-7x4               |
|                            | HF-D12 14x   |                                                         | 15' 7-1/4"                                                 | 16' 8-1/2"                                                    | 16' 10-1/2"                                                        | D12-6x4              |
|                            | HF-D18 14x   |                                                         | 16' 0-3/4"                                                 | 17' 7-1/2"                                                    | 17' 9-1/2"                                                         | D18-8x6              |
|                            | HF-D18H 14x  |                                                         | 16' 1"                                                     | 17' 8"                                                        | 17' 10"                                                            | D18-10x6             |
| <b>15</b>                  | HF-D9 15x    | 15' 7"                                                  | 16' 4"                                                     | 17' 2"                                                        | 17' 4"                                                             | D9-8x4               |
|                            | HF-D18 15x   |                                                         | 17' 0-3/4"                                                 | 18' 7-1/2"                                                    | 18' 9-1/2"                                                         | D18-8x6              |
|                            | HF-D18H 15x  |                                                         | 17' 1"                                                     | 18' 8"                                                        | 18' 10"                                                            | D18-10x6             |
| <b>16</b>                  | HF-D9 16x    | 16' 7"                                                  | 17' 4"                                                     | 18' 2"                                                        | 18' 4"                                                             | D9-8x4               |
|                            | HF-D18 16x   |                                                         | 18' 0-3/4"                                                 | 19' 7-1/2"                                                    | 19' 9-1/2"                                                         | D18-8x6              |
|                            | HF-D18H 16x  |                                                         | 18' 1"                                                     | 19' 8"                                                        | 19' 10"                                                            | D18-10x6             |
| <b>17</b>                  | HF-D18H 17x  | 17' 7"                                                  | 19' 1"                                                     | 20' 8"                                                        | 20' 10"                                                            | D18-10x6             |
| <b>18</b>                  | HF-D18H 18x  | 18' 7"                                                  | 20' 1"                                                     | 21' 8"                                                        | 21' 10"                                                            | D18-10x6             |
| <b>19</b>                  | HF-D18H 19x  | 19' 7"                                                  | 21' 1"                                                     | 22' 8"                                                        | 22' 10"                                                            | D18-10x6             |
| <b>20</b>                  | HF-D18H 20x  | 20' 7"                                                  | 22' 1"                                                     | 23' 8"                                                        | 23' 10"                                                            | D18-10x6             |
| <b>21</b>                  | HF-D18H 21x  | 21' 7"                                                  | 23' 1"                                                     | 24' 8"                                                        | 24' 10"                                                            | D18-10x6             |
| <b>22</b>                  | HF-D18H 22x  | 22' 7"                                                  | 24' 1"                                                     | 25' 8"                                                        | 25' 10"                                                            | D18-10x6             |
| <b>23</b>                  | HF-D18H 23x  | 23' 7"                                                  | 25' 1"                                                     | 26' 8"                                                        | 26' 10"                                                            | D18-10x6             |

For two story moment frames see the non-standard worksheet at the back of this catalog

## MODEL NUMBERING

**HF-D18H 16 X 9 FB**

"FB" = FIXED BASE (THIS OPTION REQUIRES A CUSTOM DESIGN)  
 NOMINAL DOUBLE PLATE HEIGHT (FT)  
 NOMINAL CLEAR SPAN (FT)  
 H = HEAVY DUTY  
 NOMINAL COLUMN WIDTH (IN)  
**HARDY FRAME<sup>®</sup>**



## Table 1.8 - 8' 1" Nominal Wall Heights

Net Wall Ht = 8' 0-3/4"

| Model       | Seismic                                             |                                      | Wind                       |                                      | Maximum Add'l<br>Vertical <sup>3</sup><br>Load Pu (lbs) | Shear Multiplier <sup>4</sup><br>@ Compression<br>Column V <sub>Mult</sub> | Column Base Reactions                                                   |                                                    | h1 <sup>7</sup><br>Opening<br>Height<br>(ft-in) | Approx<br>Weight<br>(lbs) |
|-------------|-----------------------------------------------------|--------------------------------------|----------------------------|--------------------------------------|---------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|---------------------------|
|             | Allowable <sup>1</sup><br>Shear V @<br>R= 6.5 (lbs) | Drift <sup>2</sup> @ Allow<br>V (in) | Allowable<br>Shear V (lbs) | Drift <sup>2</sup> @ Allow<br>V (in) |                                                         |                                                                            | Resultant Shear <sup>5</sup> V <sub>R</sub> @<br>Allow V & Max Pu (lbs) | Uplift <sup>6</sup> @ Allow V<br>when Pu = 0 (lbs) |                                                 |                           |
| HF-D9 6x8   | 7,569                                               | 0.410                                | 10,597                     | 0.574                                | 51,800                                                  | 0.149                                                                      | 8,470                                                                   | 7,982                                              | 7' 0-1/4"                                       | 987                       |
| HF-D9 7x8   | 6,684                                               | 0.410                                | 9,358                      | 0.574                                | 45,360                                                  | 0.169                                                                      | 8,008                                                                   | 6,201                                              | 7' 0-1/4"                                       | 1,019                     |
| HF-D9 8x8   | 5,956                                               | 0.410                                | 8,338                      | 0.574                                | 40,320                                                  | 0.189                                                                      | 7,610                                                                   | 4,935                                              | 7' 0-1/4"                                       | 1,051                     |
| HF-D9 9x8   | 7,789                                               | 0.410                                | 10,905                     | 0.574                                | 49,840                                                  | 0.182                                                                      | 9,387                                                                   | 6,455                                              | 6' 11-1/4"                                      | 1,102                     |
| HF-D12 8x8  | 6,392                                               | 0.410                                | 8,949                      | 0.574                                | 40,600                                                  | 0.201                                                                      | 8,151                                                                   | 5,143                                              | 7' 0-1/4"                                       | 890                       |
| HF-D18 8x8  | 13,130                                              | 0.410                                | 14,706                     | 0.459                                | 18,144                                                  | 0.236                                                                      | 9,167                                                                   | 10,085                                             | 6' 11-3/4"                                      | 1,412                     |
| HF-D9 9x8   | 7,102                                               | 0.410                                | 9,943                      | 0.574                                | 44,800                                                  | 0.202                                                                      | 9,046                                                                   | 5,317                                              | 6' 11-1/4"                                      | 1,137                     |
| HF-D12 9x8  | 5,722                                               | 0.410                                | 8,011                      | 0.574                                | 36,400                                                  | 0.222                                                                      | 7,756                                                                   | 4,172                                              | 7' 0-1/4"                                       | 922                       |
| HF-D18 9x8  | 20,386                                              | 0.410                                | 22,832                     | 0.459                                | 23,520                                                  | 0.250                                                                      | 13,763                                                                  | 14,243                                             | 6' 9-1/4"                                       | 1,602                     |
| HF-D9 10x8  | 6,512                                               | 0.410                                | 9,117                      | 0.574                                | 40,880                                                  | 0.222                                                                      | 8,771                                                                   | 4,446                                              | 6' 11-1/4"                                      | 1,173                     |
| HF-D12 10x8 | 5,166                                               | 0.410                                | 7,232                      | 0.574                                | 33,040                                                  | 0.241                                                                      | 7,425                                                                   | 3,442                                              | 7' 0-1/4"                                       | 954                       |
| HF-D18 10x8 | 18,218                                              | 0.410                                | 20,404                     | 0.459                                | 35,280                                                  | 0.269                                                                      | 14,869                                                                  | 11,679                                             | 6' 9-1/4"                                       | 1,650                     |
| HF-D9 11x8  | 6,004                                               | 0.410                                | 8,406                      | 0.574                                | 37,520                                                  | 0.242                                                                      | 8,517                                                                   | 3,763                                              | 6' 11-1/4"                                      | 1,208                     |
| HF-D12 11x8 | 4,699                                               | 0.410                                | 6,579                      | 0.574                                | 29,960                                                  | 0.262                                                                      | 7,110                                                                   | 2,886                                              | 7' 0-1/4"                                       | 986                       |
| HF-D18 11x8 | 16,418                                              | 0.410                                | 18,388                     | 0.459                                | 39,480                                                  | 0.289                                                                      | 15,129                                                                  | 9,717                                              | 6' 9-1/4"                                       | 1,698                     |
| HF-D9 12x8  | 5,564                                               | 0.410                                | 7,790                      | 0.574                                | 34,440                                                  | 0.262                                                                      | 8,266                                                                   | 3,228                                              | 6' 11-1/4"                                      | 1,244                     |
| HF-D12 12x8 | 4,304                                               | 0.410                                | 6,026                      | 0.574                                | 27,440                                                  | 0.282                                                                      | 6,856                                                                   | 2,444                                              | 7' 0-1/4"                                       | 1,018                     |
| HF-D18 12x8 | 14,901                                              | 0.410                                | 16,689                     | 0.459                                | 25,200                                                  | 0.311                                                                      | 12,206                                                                  | 8,190                                              | 6' 9-1/4"                                       | 1,746                     |
| HF-D9 13x8  | 5,180                                               | 0.410                                | 7,252                      | 0.574                                | 31,920                                                  | 0.282                                                                      | 8,062                                                                   | 2,792                                              | 6' 11-1/4"                                      | 1,280                     |
| HF-D12 13x8 | 3,967                                               | 0.410                                | 5,554                      | 0.574                                | 25,480                                                  | 0.302                                                                      | 6,659                                                                   | 2,103                                              | 7' 0-1/4"                                       | 1,050                     |
| HF-D18 13x8 | 13,616                                              | 0.410                                | 15,250                     | 0.459                                | 29,400                                                  | 0.330                                                                      | 12,697                                                                  | 6,991                                              | 6' 9-1/4"                                       | 1,794                     |
| HF-D9 14x8  | 4,842                                               | 0.410                                | 6,779                      | 0.574                                | 29,680                                                  | 0.303                                                                      | 7,884                                                                   | 2,444                                              | 6' 11-1/4"                                      | 1,315                     |
| HF-D12 14x8 | 3,676                                               | 0.410                                | 5,146                      | 0.574                                | 23,520                                                  | 0.322                                                                      | 6,442                                                                   | 1,821                                              | 7' 0-1/4"                                       | 1,083                     |
| HF-D18 14x8 | 12,513                                              | 0.410                                | 14,015                     | 0.459                                | 31,080                                                  | 0.350                                                                      | 12,856                                                                  | 6,020                                              | 6' 9-1/4"                                       | 1,842                     |
| HF-D18 14x8 | 25,027                                              | 0.410                                | 28,030                     | 0.459                                | 34,272                                                  | 0.351                                                                      | 19,808                                                                  | 12,027                                             | 6' 5-3/4"                                       | 2,372                     |
| HF-D9 15x8  | 5,914                                               | 0.410                                | 8,280                      | 0.574                                | 33,600                                                  | 0.314                                                                      | 9,360                                                                   | 2,799                                              | 6' 10-1/4"                                      | 1,423                     |
| HF-D18 15x8 | 11,563                                              | 0.410                                | 12,951                     | 0.459                                | 28,896                                                  | 0.370                                                                      | 12,278                                                                  | 5,243                                              | 6' 9-1/4"                                       | 1,890                     |
| HF-D18 15x8 | 23,208                                              | 0.410                                | 25,993                     | 0.459                                | 38,640                                                  | 0.370                                                                      | 20,283                                                                  | 10,500                                             | 6' 5-3/4"                                       | 2,437                     |
| HF-D9 16x8  | 5,596                                               | 0.410                                | 7,834                      | 0.574                                | 31,640                                                  | 0.334                                                                      | 9,209                                                                   | 2,498                                              | 6' 10-1/4"                                      | 1,462                     |
| HF-D18 16x8 | 10,732                                              | 0.410                                | 12,020                     | 0.459                                | 27,048                                                  | 0.390                                                                      | 11,773                                                                  | 4,594                                              | 6' 9-1/4"                                       | 1,938                     |
| HF-D18 16x8 | 21,612                                              | 0.410                                | 24,205                     | 0.459                                | 31,416                                                  | 0.392                                                                      | 18,273                                                                  | 9,241                                              | 6' 5-3/4"                                       | 2,502                     |
| HF-D18 17x8 | 20,200                                              | 0.410                                | 22,624                     | 0.459                                | 33,768                                                  | 0.411                                                                      | 18,530                                                                  | 8,183                                              | 6' 5-3/4"                                       | 2,567                     |
| HF-D18 18x8 | 18,952                                              | 0.410                                | 21,226                     | 0.459                                | 35,280                                                  | 0.431                                                                      | 18,706                                                                  | 7,299                                              | 6' 5-3/4"                                       | 2,633                     |
| HF-D18 19x8 | 17,835                                              | 0.410                                | 19,975                     | 0.459                                | 36,960                                                  | 0.451                                                                      | 19,025                                                                  | 6,542                                              | 6' 5-3/4"                                       | 2,698                     |
| HF-D18 20x8 | 16,840                                              | 0.410                                | 18,861                     | 0.459                                | 31,920                                                  | 0.472                                                                      | 17,570                                                                  | 5,900                                              | 6' 5-3/4"                                       | 2,763                     |
| HF-D18 21x8 | 15,938                                              | 0.410                                | 17,851                     | 0.459                                | 31,920                                                  | 0.492                                                                      | 17,504                                                                  | 5,337                                              | 6' 5-3/4"                                       | 2,828                     |
| HF-D18 22x8 | 15,125                                              | 0.410                                | 16,940                     | 0.459                                | 31,248                                                  | 0.513                                                                      | 17,288                                                                  | 4,855                                              | 6' 5-3/4"                                       | 2,893                     |
| HF-D18 23x8 | 14,389                                              | 0.410                                | 16,116                     | 0.459                                | 30,408                                                  | 0.534                                                                      | 17,046                                                                  | 4,440                                              | 6' 5-3/4"                                       | 2,958                     |

- The values in this table are Allowable Stress Design (ASD) excluding a 1.33 stress increase and pertain to pinned base installation on 2500 psi concrete or nut & washers with high strength non-shrink grout
- Drift at the allowable shear load is within the code allowed limits for R=6.5, C<sub>d</sub>=4.0, Δ<sub>a</sub> = 0.025h
- Pu is the allowable aggregate point load applied at the beam mid-span in combination with the vertical load produced by overturning at the allowable shear load.
- The table value for Resultant Shear (V<sub>R</sub>) assumes the Allowable Shear (V) in combination with the Maximum Additional Vertical Load (Pu).
- The design Resultant Shear (V<sub>R</sub>) from combined horizontal and compression forces on a column are solved with the following equation:  

$$V_R = (V_{Dsn}/2) + (V_{Mult} \times \text{Max } P_{Dsn})$$

**Where:** V<sub>Dsn</sub> = Design Shear Load (lbs)  
P<sub>Dsn</sub> = Design Aggregate Point Load at the beam mid-span (lbs)
- The Uplift on a column is calculated with the following equation:  

$$\text{Uplift} = [(V_{Dsn} \times \text{MF Height}) / W_{CL}] - (\text{Min } P_{Dsn} / 2)$$

**Where:** V<sub>Dsn</sub> = Design Shear Load (lbs)  
MF Height = Dimension from top of concrete to top of the wall framing (ft)  
W<sub>CL</sub> = Inside steel to steel dimension (Win) + the column depth (ft)  
P<sub>Dsn</sub> = Design Aggregate Point Load at the beam mid-span (lbs)
- h1 is the dimension from top of concrete to bottom of the lowest point in the header assembly assuming installation on nuts and washers with the Base Plate plate elevated 1-1/2" above finish concrete

**Table 1.9 - 9' 1" Nominal Wall Heights**

**Net Wall Ht = 9' 0-3/4"**

| Model        | Seismic                                       |                                   | Wind                    |                                   | Maximum Add'l Vertical <sup>3</sup> Load Pu (lbs) | Shear Multiplier <sup>4</sup> @ Compression Column V <sub>Mult</sub> | Column Base Reactions                                    |                                                 | h1 <sup>7</sup> Opening Height (ft-in) | Approx Weight (lbs) |
|--------------|-----------------------------------------------|-----------------------------------|-------------------------|-----------------------------------|---------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|----------------------------------------|---------------------|
|              | Allowable <sup>1</sup> Shear V @ R= 6.5 (lbs) | Drift <sup>2</sup> @ Allow V (in) | Allowable Shear V (lbs) | Drift <sup>2</sup> @ Allow V (in) |                                                   |                                                                      | Resultant Shear <sup>5</sup> VR @ Allow V & Max Pu (lbs) | Uplift <sup>6</sup> @ Allow V when Pu = 0 (lbs) |                                        |                     |
| HF-D9 6x9    | 6,232                                         | 0.463                             | 8,725                   | 0.648                             | 50,680                                            | 0.129                                                                | 7,081                                                    | 7,420                                           | 8' 0-1/4"                              | 1,064               |
| HF-D9 7x9    | 5,549                                         | 0.463                             | 7,769                   | 0.648                             | 44,520                                            | 0.147                                                                | 6,739                                                    | 5,813                                           | 8' 0-1/4"                              | 1,096               |
| HF-D9 8x9    | 4,980                                         | 0.463                             | 6,972                   | 0.648                             | 39,760                                            | 0.165                                                                | 6,471                                                    | 4,661                                           | 8' 0-1/4"                              | 1,128               |
| HF-D9H 8x9   | 6,405                                         | 0.463                             | 8,967                   | 0.648                             | 48,720                                            | 0.157                                                                | 7,848                                                    | 5,993                                           | 7' 11-1/4"                             | 1,179               |
| HF-D12 8x9   | 5,357                                         | 0.463                             | 7,500                   | 0.648                             | 40,040                                            | 0.175                                                                | 6,929                                                    | 4,868                                           | 8' 0-1/4"                              | 938                 |
| HF-D18 8x9   | 11,235                                        | 0.463                             | 12,583                  | 0.519                             | 23,520                                            | 0.207                                                                | 8,570                                                    | 9,750                                           | 7' 11-3/4"                             | 1,490               |
| HF-D9 9x9    | 5,878                                         | 0.463                             | 8,229                   | 0.648                             | 44,240                                            | 0.175                                                                | 7,630                                                    | 4,969                                           | 7' 11-1/4"                             | 1,214               |
| HF-D12 9x9   | 4,823                                         | 0.463                             | 6,752                   | 0.648                             | 35,840                                            | 0.193                                                                | 6,611                                                    | 3,971                                           | 8' 0-1/4"                              | 970                 |
| HF-D18 9x9   | 17,144                                        | 0.463                             | 19,201                  | 0.519                             | 33,600                                            | 0.217                                                                | 13,006                                                   | 13,533                                          | 7' 9-1/4"                              | 1,680               |
| HF-D9 10x9   | 5,421                                         | 0.463                             | 7,589                   | 0.648                             | 40,320                                            | 0.193                                                                | 7,432                                                    | 4,179                                           | 7' 11-1/4"                             | 1,250               |
| HF-D12 10x9  | 4,375                                         | 0.463                             | 6,125                   | 0.648                             | 32,480                                            | 0.211                                                                | 6,350                                                    | 3,295                                           | 8' 0-1/4"                              | 1,002               |
| HF-D18 10x9  | 15,410                                        | 0.463                             | 17,259                  | 0.519                             | 42,840                                            | 0.235                                                                | 13,816                                                   | 11,156                                          | 7' 9-1/4"                              | 1,728               |
| HF-D9 11x9   | 5,022                                         | 0.463                             | 7,031                   | 0.648                             | 36,960                                            | 0.210                                                                | 7,231                                                    | 3,556                                           | 7' 11-1/4"                             | 1,285               |
| HF-D12 11x9  | 3,996                                         | 0.463                             | 5,594                   | 0.648                             | 29,680                                            | 0.229                                                                | 6,132                                                    | 2,772                                           | 8' 0-1/4"                              | 1,035               |
| HF-D18 11x9  | 13,951                                        | 0.463                             | 15,625                  | 0.519                             | 39,144                                            | 0.253                                                                | 12,990                                                   | 9,328                                           | 7' 9-1/4"                              | 1,776               |
| HF-D9 12x9   | 4,673                                         | 0.463                             | 6,542                   | 0.648                             | 34,160                                            | 0.228                                                                | 7,067                                                    | 3,060                                           | 7' 11-1/4"                             | 1,321               |
| HF-D12 12x9  | 3,672                                         | 0.463                             | 5,141                   | 0.648                             | 27,440                                            | 0.247                                                                | 5,945                                                    | 2,357                                           | 8' 0-1/4"                              | 1,067               |
| HF-D18 12x9  | 12,715                                        | 0.463                             | 14,241                  | 0.519                             | 29,400                                            | 0.272                                                                | 11,204                                                   | 7,895                                           | 7' 9-1/4"                              | 1,824               |
| HF-D9 13x9   | 4,365                                         | 0.463                             | 6,111                   | 0.648                             | 31,640                                            | 0.246                                                                | 6,903                                                    | 2,658                                           | 7' 11-1/4"                             | 1,357               |
| HF-D12 13x9  | 3,394                                         | 0.463                             | 4,752                   | 0.648                             | 25,480                                            | 0.265                                                                | 5,801                                                    | 2,029                                           | 8' 0-1/4"                              | 1,099               |
| HF-D18 13x9  | 11,655                                        | 0.463                             | 13,054                  | 0.519                             | 32,760                                            | 0.289                                                                | 11,575                                                   | 6,757                                           | 7' 9-1/4"                              | 1,871               |
| HF-D9 14x9   | 4,094                                         | 0.463                             | 5,732                   | 0.648                             | 29,400                                            | 0.264                                                                | 6,759                                                    | 2,330                                           | 7' 11-1/4"                             | 1,392               |
| HF-D12 14x9  | 3,153                                         | 0.463                             | 4,414                   | 0.648                             | 23,520                                            | 0.283                                                                | 5,610                                                    | 1,768                                           | 8' 0-1/4"                              | 1,131               |
| HF-D18 14x9  | 10,738                                        | 0.463                             | 12,027                  | 0.519                             | 30,912                                            | 0.307                                                                | 11,137                                                   | 5,839                                           | 7' 9-1/4"                              | 1,919               |
| HF-D18H 14x9 | 21,233                                        | 0.463                             | 23,781                  | 0.519                             | 42,504                                            | 0.306                                                                | 18,500                                                   | 11,525                                          | 7' 5-3/4"                              | 2,471               |
| HF-D9 15x9   | 4,953                                         | 0.463                             | 6,934                   | 0.648                             | 33,320                                            | 0.273                                                                | 7,988                                                    | 2,652                                           | 7' 10-1/4"                             | 1,500               |
| HF-D18 15x9  | 9,950                                         | 0.463                             | 11,144                  | 0.519                             | 28,728                                            | 0.325                                                                | 10,646                                                   | 5,089                                           | 7' 9-1/4"                              | 1,967               |
| HF-D18H 15x9 | 19,752                                        | 0.463                             | 22,122                  | 0.519                             | 45,864                                            | 0.323                                                                | 18,873                                                   | 10,098                                          | 7' 5-3/4"                              | 2,536               |
| HF-D9 16x9   | 4,701                                         | 0.463                             | 6,581                   | 0.648                             | 31,080                                            | 0.291                                                                | 7,837                                                    | 2,371                                           | 7' 10-1/4"                             | 1,539               |
| HF-D18 16x9  | 9,258                                         | 0.463                             | 10,369                  | 0.519                             | 26,880                                            | 0.343                                                                | 10,232                                                   | 4,473                                           | 7' 9-1/4"                              | 2,015               |
| HF-D18H 16x9 | 18,442                                        | 0.463                             | 20,655                  | 0.519                             | 35,280                                            | 0.342                                                                | 16,548                                                   | 8,906                                           | 7' 5-3/4"                              | 2,601               |
| HF-D18H 17x9 | 17,284                                        | 0.463                             | 19,358                  | 0.519                             | 37,464                                            | 0.360                                                                | 16,824                                                   | 7,908                                           | 7' 5-3/4"                              | 2,667               |
| HF-D18H 18x9 | 16,249                                        | 0.463                             | 18,199                  | 0.519                             | 38,136                                            | 0.378                                                                | 16,866                                                   | 7,065                                           | 7' 5-3/4"                              | 2,732               |
| HF-D18H 19x9 | 15,325                                        | 0.463                             | 17,164                  | 0.519                             | 37,464                                            | 0.395                                                                | 16,656                                                   | 6,348                                           | 7' 5-3/4"                              | 2,797               |
| HF-D18H 20x9 | 14,490                                        | 0.463                             | 16,229                  | 0.519                             | 33,768                                            | 0.414                                                                | 15,731                                                   | 5,732                                           | 7' 5-3/4"                              | 2,862               |
| HF-D18H 21x9 | 13,738                                        | 0.463                             | 15,387                  | 0.519                             | 33,600                                            | 0.432                                                                | 15,680                                                   | 5,196                                           | 7' 5-3/4"                              | 2,927               |
| HF-D18H 22x9 | 13,058                                        | 0.463                             | 14,625                  | 0.519                             | 32,088                                            | 0.451                                                                | 15,308                                                   | 4,734                                           | 7' 5-3/4"                              | 2,993               |
| HF-D18H 23x9 | 12,436                                        | 0.463                             | 13,928                  | 0.519                             | 30,408                                            | 0.469                                                                | 14,874                                                   | 4,333                                           | 7' 5-3/4"                              | 3,058               |

1. The values in this table are Allowable Stress Design (ASD) excluding a 1.33 stress increase and pertain to pinned base installation on 2500 psi concrete or nut & washers with high strength non-shrink grout

2. Drift at the allowable shear load is within the code allowed limits for R=6.5, C<sub>u</sub>=4.0, Δ<sub>a</sub> = 0.025h

3. Pu is the allowable aggregate point load applied at the beam mid-span in combination with the vertical load produced by overturning at the allowable shear load.

4. The table value for Resultant Shear (V<sub>R</sub>) assumes the Allowable Shear (V) in combination with the Maximum Additional Vertical Load (Pu).

5. The design Resultant Shear (V<sub>R</sub>) from combined horizontal and compression forces on a column are solved with the following equation:

$$V_R = (V_{Dsn}/2) + (V_{Mult} \times \text{Max } P_{Dsn}) \quad \text{Where: } V_{Dsn} = \text{Design Shear Load (lbs)} \\ P_{Dsn} = \text{Design Aggregate Point Load at the beam mid-span (lbs)}$$

6. The Uplift on a column is calculated with the following equation:

$$\text{Uplift} = [(V_{Dsn} \times \text{MF Height}) / W_{CL}] - (\text{Min } P_{Dsn} / 2) \quad \text{Where: } V_{Dsn} = \text{Design Shear Load (lbs)} \\ \text{MF Height} = \text{Dimension from top of concrete to top of the wall framing (ft)} \\ W_{CL} = \text{Inside steel to steel dimension (Win) + the column depth (ft)} \\ P_{Dsn} = \text{Design Aggregate Point Load at the beam mid-span (lbs)}$$

7. h1 is the dimension from top of concrete to bottom of the lowest point in the header assembly assuming installation on nuts and washers with the Base Plate plate elevated 1-1/2" above finish concrete

## Table 1.10 - 10' 1" Nominal Wall Heights

Net Wall Ht = 10' 0-3/4"

| Model         | Seismic                                       |                                   | Wind                    |                                   | Maximum Add'l Vertical <sup>3</sup> Load Pu (lbs) | Shear Multiplier <sup>4</sup> @ Compression Column V <sub>Mult</sub> | Column Base Reactions                                    |                                                 | h1 <sup>7</sup> Opening Height (ft-in) | Approx Weight (lbs) |
|---------------|-----------------------------------------------|-----------------------------------|-------------------------|-----------------------------------|---------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|----------------------------------------|---------------------|
|               | Allowable <sup>1</sup> Shear V @ R= 6.5 (lbs) | Drift <sup>2</sup> @ Allow V (in) | Allowable Shear V (lbs) | Drift <sup>2</sup> @ Allow V (in) |                                                   |                                                                      | Resultant Shear <sup>5</sup> VR @ Allow V & Max Pu (lbs) | Uplift <sup>6</sup> @ Allow V when Pu = 0 (lbs) |                                        |                     |
| HF-D9 6x10    | 5,220                                         | 0.516                             | 7,308                   | 0.722                             | 49,560                                            | 0.113                                                                | 6,002                                                    | 6,931                                           | 9' 0-1/4"                              | 1,141               |
| HF-D9 7x10    | 4,683                                         | 0.516                             | 6,556                   | 0.722                             | 43,680                                            | 0.129                                                                | 5,764                                                    | 5,471                                           | 9' 0-1/4"                              | 1,173               |
| HF-D9 8x10    | 4,230                                         | 0.516                             | 5,922                   | 0.722                             | 39,200                                            | 0.145                                                                | 5,576                                                    | 4,413                                           | 9' 0-1/4"                              | 1,205               |
| HF-D9H 8x10   | 5,360                                         | 0.516                             | 7,504                   | 0.722                             | 47,600                                            | 0.137                                                                | 6,645                                                    | 5,592                                           | 8' 11-1/4"                             | 1,256               |
| HF-D12 8x10   | 4,558                                         | 0.516                             | 6,381                   | 0.722                             | 39,200                                            | 0.155                                                                | 5,963                                                    | 4,621                                           | 9' 0-1/4"                              | 987                 |
| HF-D18 8x10   | 9,743                                         | 0.516                             | 10,912                  | 0.578                             | 27,720                                            | 0.184                                                                | 7,971                                                    | 9,422                                           | 8' 11-3/4"                             | 1,567               |
| HF-D9 9x10    | 4,948                                         | 0.516                             | 6,927                   | 0.722                             | 43,400                                            | 0.153                                                                | 6,508                                                    | 4,661                                           | 8' 11-1/4"                             | 1,291               |
| HF-D12 9x10   | 4,126                                         | 0.516                             | 5,776                   | 0.722                             | 35,560                                            | 0.171                                                                | 5,753                                                    | 3,790                                           | 9' 0-1/4"                              | 1,019               |
| HF-D18 9x10   | 14,625                                        | 0.516                             | 16,380                  | 0.578                             | 45,360                                            | 0.192                                                                | 12,599                                                   | 12,864                                          | 8' 9-1/4"                              | 1,757               |
| HF-D9 10x10   | 4,584                                         | 0.516                             | 6,418                   | 0.722                             | 39,480                                            | 0.170                                                                | 6,357                                                    | 3,938                                           | 8' 11-1/4"                             | 1,327               |
| HF-D12 10x10  | 3,759                                         | 0.516                             | 5,263                   | 0.722                             | 32,200                                            | 0.187                                                                | 5,532                                                    | 3,154                                           | 9' 0-1/4"                              | 1,051               |
| HF-D18 10x10  | 13,225                                        | 0.516                             | 14,812                  | 0.578                             | 42,168                                            | 0.208                                                                | 11,944                                                   | 10,667                                          | 8' 9-1/4"                              | 1,805               |
| HF-D9 11x10   | 4,266                                         | 0.516                             | 5,972                   | 0.722                             | 36,120                                            | 0.185                                                                | 6,196                                                    | 3,368                                           | 8' 11-1/4"                             | 1,362               |
| HF-D12 11x10  | 3,447                                         | 0.516                             | 4,826                   | 0.722                             | 29,400                                            | 0.203                                                                | 5,348                                                    | 2,665                                           | 9' 0-1/4"                              | 1,115               |
| HF-D18 11x10  | 12,023                                        | 0.516                             | 13,466                  | 0.578                             | 38,640                                            | 0.225                                                                | 11,282                                                   | 8,960                                           | 8' 9-1/4"                              | 1,853               |
| HF-D9 12x10   | 3,984                                         | 0.516                             | 5,578                   | 0.722                             | 33,600                                            | 0.202                                                                | 6,106                                                    | 2,913                                           | 8' 11-1/4"                             | 1,398               |
| HF-D12 12x10  | 3,178                                         | 0.516                             | 4,449                   | 0.722                             | 27,160                                            | 0.219                                                                | 5,204                                                    | 2,277                                           | 9' 0-1/4"                              | 1,115               |
| HF-D18 12x10  | 10,994                                        | 0.516                             | 12,313                  | 0.578                             | 33,600                                            | 0.241                                                                | 10,412                                                   | 7,607                                           | 8' 9-1/4"                              | 1,901               |
| HF-D9 13x10   | 3,735                                         | 0.516                             | 5,229                   | 0.722                             | 31,080                                            | 0.217                                                                | 5,968                                                    | 2,538                                           | 8' 11-1/4"                             | 1,434               |
| HF-D12 13x10  | 2,945                                         | 0.516                             | 4,123                   | 0.722                             | 25,200                                            | 0.235                                                                | 5,073                                                    | 1,962                                           | 9' 0-1/4"                              | 1,148               |
| HF-D18 13x10  | 10,109                                        | 0.516                             | 11,322                  | 0.578                             | 33,096                                            | 0.257                                                                | 10,223                                                   | 6,536                                           | 8' 9-1/4"                              | 1,949               |
| HF-D9 14x10   | 3,512                                         | 0.516                             | 4,917                   | 0.722                             | 29,120                                            | 0.233                                                                | 5,881                                                    | 2,230                                           | 8' 11-1/4"                             | 1,469               |
| HF-D12 14x10  | 2,742                                         | 0.516                             | 3,839                   | 0.722                             | 23,240                                            | 0.251                                                                | 4,913                                                    | 1,714                                           | 9' 0-1/4"                              | 1,180               |
| HF-D18 14x10  | 9,344                                         | 0.516                             | 10,465                  | 0.578                             | 30,744                                            | 0.273                                                                | 9,768                                                    | 5,665                                           | 8' 9-1/4"                              | 1,997               |
| HF-D18H 14x10 | 18,255                                        | 0.516                             | 20,446                  | 0.578                             | 48,720                                            | 0.270                                                                | 17,127                                                   | 11,049                                          | 8' 5-3/4"                              | 2,570               |
| HF-D9 15x10   | 4,212                                         | 0.516                             | 5,897                   | 0.722                             | 32,760                                            | 0.240                                                                | 6,879                                                    | 2,511                                           | 8' 10-1/4"                             | 1,577               |
| HF-D18 15x10  | 8,673                                         | 0.516                             | 9,714                   | 0.578                             | 28,560                                            | 0.289                                                                | 9,355                                                    | 4,949                                           | 8' 9-1/4"                              | 2,045               |
| HF-D18H 15x10 | 17,034                                        | 0.516                             | 19,078                  | 0.578                             | 47,376                                            | 0.287                                                                | 16,757                                                   | 9,703                                           | 8' 5-3/4"                              | 2,636               |
| HF-D9 16x10   | 4,008                                         | 0.516                             | 5,611                   | 0.722                             | 30,800                                            | 0.256                                                                | 6,789                                                    | 2,250                                           | 8' 10-1/4"                             | 1,616               |
| HF-D18 16x10  | 8,086                                         | 0.516                             | 9,056                   | 0.578                             | 26,880                                            | 0.306                                                                | 9,031                                                    | 4,359                                           | 8' 9-1/4"                              | 2,093               |
| HF-D18H 16x10 | 15,950                                        | 0.516                             | 17,864                  | 0.578                             | 39,816                                            | 0.303                                                                | 15,302                                                   | 8,585                                           | 8' 5-3/4"                              | 2,701               |
| HF-D18H 17x10 | 14,982                                        | 0.516                             | 16,780                  | 0.578                             | 41,160                                            | 0.319                                                                | 15,462                                                   | 7,641                                           | 8' 5-3/4"                              | 2,766               |
| HF-D18H 18x10 | 14,116                                        | 0.516                             | 15,810                  | 0.578                             | 39,480                                            | 0.335                                                                | 15,093                                                   | 6,844                                           | 8' 5-3/4"                              | 2,831               |
| HF-D18H 19x10 | 13,337                                        | 0.516                             | 14,937                  | 0.578                             | 37,296                                            | 0.352                                                                | 14,626                                                   | 6,161                                           | 8' 5-3/4"                              | 2,896               |
| HF-D18H 20x10 | 12,632                                        | 0.516                             | 14,148                  | 0.578                             | 35,448                                            | 0.368                                                                | 14,236                                                   | 5,571                                           | 8' 5-3/4"                              | 2,962               |
| HF-D18H 21x10 | 11,995                                        | 0.516                             | 13,434                  | 0.578                             | 33,600                                            | 0.384                                                                | 13,837                                                   | 5,056                                           | 8' 5-3/4"                              | 3,027               |
| HF-D18H 22x10 | 11,414                                        | 0.516                             | 12,784                  | 0.578                             | 31,920                                            | 0.401                                                                | 13,477                                                   | 4,614                                           | 8' 5-3/4"                              | 3,092               |
| HF-D18H 23x10 | 10,886                                        | 0.516                             | 12,192                  | 0.578                             | 30,408                                            | 0.418                                                                | 13,155                                                   | 4,225                                           | 8' 5-3/4"                              | 3,157               |

1. The values in this table are Allowable Stress Design (ASD) excluding a 1.33 stress increase and pertain to pinned base installation on 2500 psi concrete or nut & washers with high strength non-shrink grout

2. Drift at the allowable shear load is within the code allowed limits for R=6.5, C<sub>d</sub>=4.0, Δ<sub>a</sub> = 0.025h

3. Pu is the allowable aggregate point load applied at the beam mid-span in combination with the vertical load produced by overturning at the allowable shear load.

4. The table value for Resultant Shear (V<sub>R</sub>) assumes the Allowable Shear (V) in combination with the Maximum Additional Vertical Load (Pu).

5. The design Resultant Shear (V<sub>R</sub>) from combined horizontal and compression forces on a column are solved with the following equation:

$$V_R = (V_{Dsn}/2) + (V_{Mult} \times \text{Max } P_{Dsn})$$

Where:

V<sub>Dsn</sub> = Design Shear Load (lbs)

P<sub>Dsn</sub> = Design Aggregate Point Load at the beam mid-span (lbs)

6. The Uplift on a column is calculated with the following equation:

$$\text{Uplift} = [(V_{Dsn} \times \text{MF Height}) / W_{CL}] - (\text{Min } P_{Dsn} / 2)$$

Where: V<sub>Dsn</sub> = Design Shear Load (lbs)

MF Height = Dimension from top of concrete to top of the wall framing (ft)

W<sub>CL</sub> = Inside steel to steel dimension (Win) + the column depth (ft)

P<sub>Dsn</sub> = Design Aggregate Point Load at the beam mid-span (lbs)

7. h1 is the dimension from top of concrete to bottom of the lowest point in the header assembly assuming installation on nuts and washers with the Base Plate plate elevated 1-1/2" above finish concrete

**Table 1.11 - 11' 1" Nominal Wall Heights**

**Net Wall Ht = 11' 0-3/4"**

| Model         | Seismic                                       |                                   | Wind                    |                                   | Maximum Add'l Vertical <sup>3</sup> Load Pu (lbs) | Shear Multiplier <sup>4</sup> @ Compression Column V <sub>Mult</sub> | Column Base Reactions                                    |                                                 | h1 <sup>7</sup> Opening Height (ft-in) | Approx Weight (lbs) |
|---------------|-----------------------------------------------|-----------------------------------|-------------------------|-----------------------------------|---------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|----------------------------------------|---------------------|
|               | Allowable <sup>1</sup> Shear V @ R= 6.5 (lbs) | Drift <sup>2</sup> @ Allow V (in) | Allowable Shear V (lbs) | Drift <sup>2</sup> @ Allow V (in) |                                                   |                                                                      | Resultant Shear <sup>5</sup> VR @ Allow V & Max Pu (lbs) | Uplift <sup>6</sup> @ Allow V when Pu = 0 (lbs) |                                        |                     |
| HF-D9 6x11    | 4,436                                         | 0.569                             | 6,210                   | 0.797                             | 48,440                                            | 0.100                                                                | 5,157                                                    | 6,496                                           | 10' 0-1/4"                             | 1,218               |
| HF-D9 7x11    | 4,007                                         | 0.569                             | 5,610                   | 0.797                             | 42,840                                            | 0.115                                                                | 4,982                                                    | 5,163                                           | 10' 0-1/4"                             | 1,250               |
| HF-D9 8x11    | 3,640                                         | 0.569                             | 5,096                   | 0.797                             | 38,360                                            | 0.130                                                                | 4,841                                                    | 4,185                                           | 10' 0-1/4"                             | 1,282               |
| HF-D9H 8x11   | 4,552                                         | 0.569                             | 6,373                   | 0.797                             | 46,480                                            | 0.121                                                                | 5,697                                                    | 5,237                                           | 9' 11-1/4"                             | 1,333               |
| HF-D12 8x11   | 3,929                                         | 0.569                             | 5,501                   | 0.797                             | 38,640                                            | 0.138                                                                | 5,209                                                    | 4,393                                           | 10' 0-1/4"                             | 1,035               |
| HF-D18 8x11   | 8,549                                         | 0.569                             | 9,575                   | 0.637                             | 32,424                                            | 0.165                                                                | 7,531                                                    | 9,121                                           | 9' 11-3/4"                             | 1,644               |
| HF-D9 9x11    | 4,222                                         | 0.569                             | 5,911                   | 0.797                             | 42,280                                            | 0.136                                                                | 5,606                                                    | 4,386                                           | 9' 11-1/4"                             | 1,368               |
| HF-D12 9x11   | 3,573                                         | 0.569                             | 5,002                   | 0.797                             | 35,000                                            | 0.153                                                                | 5,038                                                    | 3,616                                           | 10' 0-1/4"                             | 1,068               |
| HF-D18 9x11   | 12,635                                        | 0.569                             | 14,151                  | 0.637                             | 45,864                                            | 0.172                                                                | 11,103                                                   | 12,261                                          | 9' 9-1/4"                              | 1,834               |
| HF-D9 10x11   | 3,930                                         | 0.569                             | 5,502                   | 0.797                             | 38,640                                            | 0.151                                                                | 5,499                                                    | 3,723                                           | 9' 11-1/4"                             | 1,404               |
| HF-D12 10x11  | 3,269                                         | 0.569                             | 4,577                   | 0.797                             | 31,920                                            | 0.168                                                                | 4,884                                                    | 3,027                                           | 10' 0-1/4"                             | 1,100               |
| HF-D18 10x11  | 11,474                                        | 0.569                             | 12,851                  | 0.637                             | 41,832                                            | 0.187                                                                | 10,479                                                   | 10,212                                          | 9' 9-1/4"                              | 1,882               |
| HF-D9 11x11   | 3,671                                         | 0.569                             | 5,139                   | 0.797                             | 35,560                                            | 0.165                                                                | 5,395                                                    | 3,194                                           | 9' 11-1/4"                             | 1,439               |
| HF-D12 11x11  | 3,008                                         | 0.569                             | 4,211                   | 0.797                             | 29,120                                            | 0.182                                                                | 4,727                                                    | 2,565                                           | 10' 0-1/4"                             | 1,132               |
| HF-D18 11x11  | 10,478                                        | 0.569                             | 11,735                  | 0.637                             | 38,304                                            | 0.201                                                                | 9,923                                                    | 8,612                                           | 9' 9-1/4"                              | 1,930               |
| HF-D9 12x11   | 3,440                                         | 0.569                             | 4,816                   | 0.797                             | 33,040                                            | 0.180                                                                | 5,321                                                    | 2,772                                           | 9' 11-1/4"                             | 1,475               |
| HF-D12 12x11  | 2,782                                         | 0.569                             | 3,895                   | 0.797                             | 26,880                                            | 0.196                                                                | 4,593                                                    | 2,196                                           | 10' 0-1/4"                             | 1,164               |
| HF-D18 12x11  | 9,616                                         | 0.569                             | 10,770                  | 0.637                             | 35,280                                            | 0.216                                                                | 9,441                                                    | 7,339                                           | 9' 9-1/4"                              | 1,978               |
| HF-D9 13x11   | 3,234                                         | 0.569                             | 4,528                   | 0.797                             | 30,800                                            | 0.194                                                                | 5,251                                                    | 2,424                                           | 9' 11-1/4"                             | 1,510               |
| HF-D12 13x11  | 2,585                                         | 0.569                             | 3,619                   | 0.797                             | 24,920                                            | 0.211                                                                | 4,482                                                    | 1,902                                           | 10' 0-1/4"                             | 1,196               |
| HF-D18 13x11  | 8,867                                         | 0.569                             | 9,931                   | 0.637                             | 32,760                                            | 0.231                                                                | 9,030                                                    | 6,321                                           | 9' 9-1/4"                              | 2,026               |
| HF-D9 14x11   | 3,050                                         | 0.569                             | 4,270                   | 0.797                             | 28,840                                            | 0.209                                                                | 5,177                                                    | 2,136                                           | 9' 11-1/4"                             | 1,546               |
| HF-D12 14x11  | 2,412                                         | 0.569                             | 3,377                   | 0.797                             | 23,240                                            | 0.226                                                                | 4,395                                                    | 1,661                                           | 10' 0-1/4"                             | 1,228               |
| HF-D18 14x11  | 8,215                                         | 0.569                             | 9,201                   | 0.637                             | 30,408                                            | 0.246                                                                | 8,642                                                    | 5,491                                           | 9' 9-1/4"                              | 2,074               |
| HF-D18H 14x11 | 15,878                                        | 0.569                             | 17,783                  | 0.637                             | 50,232                                            | 0.242                                                                | 15,323                                                   | 10,594                                          | 9' 5-3/4"                              | 2,670               |
| HF-D9 15x11   | 3,629                                         | 0.569                             | 5,081                   | 0.797                             | 32,480                                            | 0.214                                                                | 6,025                                                    | 2,384                                           | 9' 10-1/4"                             | 1,654               |
| HF-D18 15x11  | 7,644                                         | 0.569                             | 8,561                   | 0.637                             | 28,392                                            | 0.260                                                                | 8,306                                                    | 4,808                                           | 9' 9-1/4"                              | 2,122               |
| HF-D18H 15x11 | 14,856                                        | 0.569                             | 16,639                  | 0.637                             | 47,040                                            | 0.257                                                                | 14,766                                                   | 9,335                                           | 9' 5-3/4"                              | 2,735               |
| HF-D9 16x11   | 3,461                                         | 0.569                             | 4,845                   | 0.797                             | 30,520                                            | 0.228                                                                | 5,954                                                    | 2,143                                           | 9' 10-1/4"                             | 1,693               |
| HF-D18 16x11  | 7,140                                         | 0.569                             | 7,997                   | 0.637                             | 26,712                                            | 0.275                                                                | 8,034                                                    | 4,246                                           | 9' 9-1/4"                              | 2,170               |
| HF-D18H 16x11 | 13,947                                        | 0.569                             | 15,621                  | 0.637                             | 44,184                                            | 0.272                                                                | 14,262                                                   | 8,277                                           | 9' 5-3/4"                              | 2,800               |
| HF-D18H 17x11 | 13,128                                        | 0.569                             | 14,703                  | 0.637                             | 41,664                                            | 0.287                                                                | 13,812                                                   | 7,386                                           | 9' 5-3/4"                              | 2,865               |
| HF-D18H 18x11 | 12,394                                        | 0.569                             | 13,881                  | 0.637                             | 39,312                                            | 0.301                                                                | 13,384                                                   | 6,623                                           | 9' 5-3/4"                              | 2,930               |
| HF-D18H 19x11 | 11,731                                        | 0.569                             | 13,139                  | 0.637                             | 37,128                                            | 0.316                                                                | 12,989                                                   | 5,973                                           | 9' 5-3/4"                              | 2,996               |
| HF-D18H 20x11 | 11,131                                        | 0.569                             | 12,467                  | 0.637                             | 35,280                                            | 0.331                                                                | 12,651                                                   | 5,411                                           | 9' 5-3/4"                              | 3,061               |
| HF-D18H 21x11 | 10,584                                        | 0.569                             | 11,854                  | 0.637                             | 33,600                                            | 0.346                                                                | 12,341                                                   | 4,922                                           | 9' 5-3/4"                              | 3,126               |
| HF-D18H 22x11 | 10,086                                        | 0.569                             | 11,296                  | 0.637                             | 31,920                                            | 0.361                                                                | 12,033                                                   | 4,500                                           | 9' 5-3/4"                              | 3,191               |
| HF-D18H 23x11 | 9,630                                         | 0.569                             | 10,786                  | 0.637                             | 30,408                                            | 0.376                                                                | 11,757                                                   | 4,125                                           | 9' 5-3/4"                              | 3,256               |

1. The values in this table are Allowable Stress Design (ASD) excluding a 1.33 stress increase and pertain to pinned base installation on 2500 psi concrete or nut & washers with high strength non-shrink grout

2. Drift at the allowable shear load is within the code allowed limits for R=6.5, C<sub>d</sub>=4.0, Δ<sub>a</sub> = 0.025h

3. Pu is the allowable aggregate point load applied at the beam mid-span in combination with the vertical load produced by overturning at the allowable shear load.

4. The table value for Resultant Shear (V<sub>R</sub>) assumes the Allowable Shear (V) in combination with the Maximum Additional Vertical Load (Pu).

5. The design Resultant Shear (V<sub>R</sub>) from combined horizontal and compression forces on a column are solved with the following equation:

$$V_R = (V_{Dsn}/2) + (V_{Mult} \times \text{Max } P_{Dsn})$$

Where: V<sub>Dsn</sub> = Design Shear Load (lbs)

P<sub>Dsn</sub> = Design Aggregate Point Load at the beam mid-span (lbs)

6. The Uplift on a column is calculated with the following equation:

$$\text{Uplift} = [(V_{Dsn} \times \text{MF Height}) / W_{CL}] - (\text{Min } P_{Dsn} / 2)$$

Where: V<sub>Dsn</sub> = Design Shear Load (lbs)

MF Height = Dimension from top of concrete to top of the wall framing (ft)

W<sub>CL</sub> = Inside steel to steel dimension (Win) + the column depth (ft)

P<sub>Dsn</sub> = Design Aggregate Point Load at the beam mid-span (lbs)

7. h1 is the dimension from top of concrete to bottom of the lowest point in the header assembly assuming installation on nuts and washers with the Base Plate plate elevated 1-1/2" above finish concrete

**Table 1.12 - 12' 1" Nominal Wall Heights**

**Net Wall Ht = 12' 0-3/4"**

| Model         | Seismic                                       |                                   | Wind                    |                                   | Maximum Add'l Vertical <sup>3</sup> Load Pu (lbs) | Shear Multiplier <sup>4</sup> @ Compression Column V <sub>Mult</sub> | Column Base Reactions                                    |                                                 | h1 <sup>7</sup> Opening Height (ft-in) | Approx Weight (lbs) |
|---------------|-----------------------------------------------|-----------------------------------|-------------------------|-----------------------------------|---------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|----------------------------------------|---------------------|
|               | Allowable <sup>1</sup> Shear V @ R= 6.5 (lbs) | Drift <sup>2</sup> @ Allow V (in) | Allowable Shear V (lbs) | Drift <sup>2</sup> @ Allow V (in) |                                                   |                                                                      | Resultant Shear <sup>5</sup> VR @ Allow V & Max Pu (lbs) | Uplift <sup>6</sup> @ Allow V when Pu = 0 (lbs) |                                        |                     |
| HF-D9 6x12    | 3,816                                         | 0.622                             | 5,342                   | 0.871                             | 47,320                                            | 0.089                                                                | 4,478                                                    | 6,107                                           | 11' 0-1/4"                             | 1,295               |
| HF-D9 7x12    | 3,468                                         | 0.622                             | 4,855                   | 0.871                             | 42,000                                            | 0.103                                                                | 4,364                                                    | 4,888                                           | 11' 0-1/4"                             | 1,327               |
| HF-D9 8x12    | 3,165                                         | 0.622                             | 4,431                   | 0.871                             | 37,800                                            | 0.117                                                                | 4,257                                                    | 3,984                                           | 11' 0-1/4"                             | 1,359               |
| HF-D9H 8x12   | 3,912                                         | 0.622                             | 5,477                   | 0.871                             | 45,640                                            | 0.108                                                                | 4,955                                                    | 4,922                                           | 10' 11-1/4"                            | 1,410               |
| HF-D12 8x12   | 3,423                                         | 0.622                             | 3,834                   | 0.697                             | 22,848                                            | 0.125                                                                | 3,442                                                    | 4,185                                           | 11' 0-1/4"                             | 1,084               |
| HF-D18 8x12   | 7,568                                         | 0.622                             | 8,476                   | 0.697                             | 35,112                                            | 0.150                                                                | 6,975                                                    | 8,826                                           | 10' 11-3/4"                            | 1,722               |
| HF-D9 9x12    | 3,646                                         | 0.622                             | 5,104                   | 0.871                             | 41,720                                            | 0.122                                                                | 4,908                                                    | 4,145                                           | 10' 11-1/4"                            | 1,445               |
| HF-D12 9x12   | 3,127                                         | 0.622                             | 3,502                   | 0.697                             | 20,664                                            | 0.138                                                                | 3,295                                                    | 3,462                                           | 11' 0-1/4"                             | 1,116               |
| HF-D18 9x12   | 11,022                                        | 0.622                             | 12,345                  | 0.697                             | 45,192                                            | 0.155                                                                | 9,766                                                    | 11,692                                          | 10' 9-1/4"                             | 1,911               |
| HF-D9 10x12   | 3,406                                         | 0.622                             | 4,768                   | 0.871                             | 38,080                                            | 0.135                                                                | 4,828                                                    | 3,529                                           | 10' 11-1/4"                            | 1,481               |
| HF-D12 10x12  | 2,871                                         | 0.622                             | 3,216                   | 0.697                             | 18,816                                            | 0.151                                                                | 3,162                                                    | 2,906                                           | 11' 0-1/4"                             | 1,148               |
| HF-D18 10x12  | 10,058                                        | 0.622                             | 11,265                  | 0.697                             | 41,160                                            | 0.169                                                                | 9,248                                                    | 9,783                                           | 10' 9-1/4"                             | 1,959               |
| HF-D9 11x12   | 3,194                                         | 0.622                             | 4,472                   | 0.871                             | 35,280                                            | 0.148                                                                | 4,770                                                    | 3,040                                           | 10' 11-1/4"                            | 1,516               |
| HF-D12 11x12  | 2,650                                         | 0.622                             | 2,968                   | 0.697                             | 17,304                                            | 0.165                                                                | 3,054                                                    | 2,471                                           | 11' 0-1/4"                             | 1,181               |
| HF-D18 11x12  | 9,219                                         | 0.622                             | 10,325                  | 0.697                             | 37,800                                            | 0.182                                                                | 8,790                                                    | 8,283                                           | 10' 9-1/4"                             | 2,007               |
| HF-D9 12x12   | 3,002                                         | 0.622                             | 4,203                   | 0.871                             | 32,480                                            | 0.161                                                                | 4,680                                                    | 2,645                                           | 10' 11-1/4"                            | 1,552               |
| HF-D12 12x12  | 2,458                                         | 0.622                             | 2,753                   | 0.697                             | 15,960                                            | 0.178                                                                | 2,954                                                    | 2,123                                           | 11' 0-1/4"                             | 1,213               |
| HF-D18 12x12  | 8,490                                         | 0.622                             | 9,509                   | 0.697                             | 34,944                                            | 0.196                                                                | 8,404                                                    | 7,085                                           | 10' 9-1/4"                             | 2,055               |
| HF-D9 13x12   | 2,830                                         | 0.622                             | 3,962                   | 0.871                             | 30,240                                            | 0.175                                                                | 4,620                                                    | 2,317                                           | 10' 11-1/4"                            | 1,587               |
| HF-D12 13x12  | 2,290                                         | 0.622                             | 2,565                   | 0.697                             | 14,784                                            | 0.191                                                                | 2,861                                                    | 1,842                                           | 11' 0-1/4"                             | 1,245               |
| HF-D18 13x12  | 7,850                                         | 0.622                             | 8,792                   | 0.697                             | 32,424                                            | 0.209                                                                | 8,047                                                    | 6,114                                           | 10' 9-1/4"                             | 2,103               |
| HF-D9 14x12   | 2,676                                         | 0.622                             | 3,746                   | 0.871                             | 28,280                                            | 0.188                                                                | 4,569                                                    | 2,049                                           | 10' 11-1/4"                            | 1,623               |
| HF-D12 14x12  | 2,142                                         | 0.622                             | 2,399                   | 0.697                             | 13,776                                            | 0.204                                                                | 2,781                                                    | 1,614                                           | 11' 0-1/4"                             | 1,277               |
| HF-D18 14x12  | 7,290                                         | 0.622                             | 8,165                   | 0.697                             | 30,240                                            | 0.223                                                                | 7,736                                                    | 5,330                                           | 10' 9-1/4"                             | 2,151               |
| HF-D18H 14x12 | 13,942                                        | 0.622                             | 15,615                  | 0.697                             | 49,728                                            | 0.219                                                                | 13,578                                                   | 10,172                                          | 10' 5-3/4"                             | 2,769               |
| HF-D9 15x12   | 3,159                                         | 0.622                             | 4,423                   | 0.871                             | 31,920                                            | 0.191                                                                | 5,280                                                    | 2,270                                           | 10' 10-1/4"                            | 1,731               |
| HF-D18 15x12  | 6,798                                         | 0.622                             | 7,614                   | 0.697                             | 28,224                                            | 0.236                                                                | 7,446                                                    | 4,674                                           | 10' 9-1/4"                             | 2,199               |
| HF-D18H 15x12 | 13,081                                        | 0.622                             | 14,651                  | 0.697                             | 46,536                                            | 0.232                                                                | 13,107                                                   | 8,987                                           | 10' 5-3/4"                             | 2,834               |
| HF-D9 16x12   | 3,021                                         | 0.622                             | 4,229                   | 0.871                             | 29,960                                            | 0.205                                                                | 5,243                                                    | 2,049                                           | 10' 10-1/4"                            | 1,770               |
| HF-D18 16x12  | 6,363                                         | 0.622                             | 7,127                   | 0.697                             | 26,544                                            | 0.250                                                                | 7,214                                                    | 4,138                                           | 10' 9-1/4"                             | 2,247               |
| HF-D18H 16x12 | 12,307                                        | 0.622                             | 13,784                  | 0.697                             | 43,680                                            | 0.246                                                                | 12,671                                                   | 7,989                                           | 10' 5-3/4"                             | 2,899               |
| HF-D18H 17x12 | 11,610                                        | 0.622                             | 13,003                  | 0.697                             | 41,328                                            | 0.259                                                                | 12,311                                                   | 7,138                                           | 10' 5-3/4"                             | 2,965               |
| HF-D18H 18x12 | 10,983                                        | 0.622                             | 12,301                  | 0.697                             | 38,976                                            | 0.273                                                                | 11,954                                                   | 6,422                                           | 10' 5-3/4"                             | 3,030               |
| HF-D18H 19x12 | 10,412                                        | 0.622                             | 11,661                  | 0.697                             | 36,960                                            | 0.287                                                                | 11,637                                                   | 5,799                                           | 10' 5-3/4"                             | 3,095               |
| HF-D18H 20x12 | 9,895                                         | 0.622                             | 11,082                  | 0.697                             | 35,112                                            | 0.300                                                                | 11,345                                                   | 5,257                                           | 10' 5-3/4"                             | 3,160               |
| HF-D18H 21x12 | 9,423                                         | 0.622                             | 10,554                  | 0.697                             | 33,432                                            | 0.314                                                                | 11,087                                                   | 4,795                                           | 10' 5-3/4"                             | 3,225               |
| HF-D18H 22x12 | 8,991                                         | 0.622                             | 10,070                  | 0.697                             | 31,752                                            | 0.327                                                                | 10,806                                                   | 4,386                                           | 10' 5-3/4"                             | 3,290               |
| HF-D18H 23x12 | 8,594                                         | 0.622                             | 9,625                   | 0.697                             | 30,240                                            | 0.342                                                                | 10,570                                                   | 4,025                                           | 10' 5-3/4"                             | 3,356               |

- The values in this table are Allowable Stress Design (ASD) excluding a 1.33 stress increase and pertain to pinned base installation on 2500 psi concrete or nut & washers with high strength non-shrink grout
- Drift at the allowable shear load is within the code allowed limits for R=6.5, C<sub>d</sub>=4.0, Δ<sub>a</sub> = 0.025h
- Pu is the allowable aggregate point load applied at the beam mid-span in combination with the vertical load produced by overturning at the allowable shear load.
- The table value for Resultant Shear (V<sub>R</sub>) assumes the Allowable Shear (V) in combination with the Maximum Additional Vertical Load (Pu).
- The design Resultant Shear (V<sub>R</sub>) from combined horizontal and compression forces on a column are solved with the following equation:  

$$V_R = (V_{Dsn}/2) + (V_{Mult} \times \text{Max } P_{Dsn})$$

**Where:** V<sub>Dsn</sub> = Design Shear Load (lbs)  
P<sub>Dsn</sub> = Design Aggregate Point Load at the beam mid-span (lbs)
- The Uplift on a column is calculated with the following equation:  

$$\text{Uplift} = [(V_{Dsn} \times \text{MF Height}) / W_{CL}] - (\text{Min } P_{Dsn} / 2)$$

**Where:** V<sub>Dsn</sub> = Design Shear Load (lbs)  
MF Height = Dimension from top of concrete to top of the wall framing (ft)  
W<sub>CL</sub> = Inside steel to steel dimension (Win) + the column depth (ft)  
P<sub>Dsn</sub> = Design Aggregate Point Load at the beam mid-span (lbs)
- h1 is the dimension from top of concrete to bottom of the lowest point in the header assembly assuming installation on nuts and washers with the Base Plate plate elevated 1-1/2" above finish concrete

**Table 1.13 - 13' 1" Nominal Wall Heights**

**Net Wall Ht = 13' 0-3/4"**

| Model         | Seismic                                       |                                   | Wind                    |                                   | Maximum Add'l Vertical <sup>3</sup> Load Pu (lbs) | Shear Multiplier <sup>4</sup> @ Compression Column V <sub>Mult</sub> | Column Base Reactions                                    |                                                 | h1 <sup>7</sup> Opening Height (ft-in) | Approx Weight (lbs) |
|---------------|-----------------------------------------------|-----------------------------------|-------------------------|-----------------------------------|---------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|----------------------------------------|---------------------|
|               | Allowable <sup>1</sup> Shear V @ R= 6.5 (lbs) | Drift <sup>2</sup> @ Allow V (in) | Allowable Shear V (lbs) | Drift <sup>2</sup> @ Allow V (in) |                                                   |                                                                      | Resultant Shear <sup>5</sup> VR @ Allow V & Max Pu (lbs) | Uplift <sup>6</sup> @ Allow V when Pu = 0 (lbs) |                                        |                     |
| HF-D9 6x13    | 3,317                                         | 0.540                             | 4,644                   | 0.756                             | 46,480                                            | 0.081                                                                | 3,931                                                    | 5,766                                           | 12' 0-1/4"                             | 1,372               |
| HF-D9 7x13    | 3,031                                         | 0.540                             | 4,243                   | 0.756                             | 41,440                                            | 0.093                                                                | 3,860                                                    | 4,634                                           | 12' 0-1/4"                             | 1,404               |
| HF-D9 8x13    | 2,780                                         | 0.540                             | 3,892                   | 0.756                             | 37,240                                            | 0.105                                                                | 3,773                                                    | 3,797                                           | 12' 0-1/4"                             | 1,436               |
| HF-D9H 8x13   | 3,399                                         | 0.540                             | 4,759                   | 0.756                             | 44,800                                            | 0.098                                                                | 4,351                                                    | 4,641                                           | 11' 11-1/4"                            | 1,487               |
| HF-D12 8x13   | 3,009                                         | 0.540                             | 3,370                   | 0.605                             | 18,816                                            | 0.113                                                                | 2,797                                                    | 3,991                                           | 12' 0-1/4"                             | 1,133               |
| HF-D18 8x13   | 6,754                                         | 0.540                             | 7,564                   | 0.605                             | 34,776                                            | 0.137                                                                | 6,274                                                    | 8,551                                           | 11' 11-3/4"                            | 1,799               |
| HF-D9 9x13    | 3,179                                         | 0.540                             | 4,451                   | 0.756                             | 40,880                                            | 0.110                                                                | 4,314                                                    | 3,924                                           | 11' 11-1/4"                            | 1,522               |
| HF-D12 9x13   | 2,760                                         | 0.540                             | 3,091                   | 0.605                             | 18,984                                            | 0.125                                                                | 2,819                                                    | 3,315                                           | 12' 0-1/4"                             | 1,165               |
| HF-D18 9x13   | 9,705                                         | 0.540                             | 10,870                  | 0.605                             | 44,520                                            | 0.141                                                                | 8,659                                                    | 11,170                                          | 11' 9-1/4"                             | 1,989               |
| HF-D9 10x13   | 2,982                                         | 0.540                             | 4,175                   | 0.756                             | 37,520                                            | 0.122                                                                | 4,273                                                    | 3,355                                           | 11' 11-1/4"                            | 1,558               |
| HF-D12 10x13  | 2,545                                         | 0.540                             | 2,850                   | 0.605                             | 18,648                                            | 0.137                                                                | 2,826                                                    | 2,792                                           | 12' 0-1/4"                             | 1,197               |
| HF-D18 10x13  | 8,893                                         | 0.540                             | 9,960                   | 0.605                             | 40,656                                            | 0.154                                                                | 8,239                                                    | 9,388                                           | 11' 9-1/4"                             | 2,037               |
| HF-D9 11x13   | 2,804                                         | 0.540                             | 3,926                   | 0.756                             | 34,720                                            | 0.134                                                                | 4,236                                                    | 2,900                                           | 11' 11-1/4"                            | 1,593               |
| HF-D12 11x13  | 2,355                                         | 0.540                             | 2,638                   | 0.605                             | 17,136                                            | 0.150                                                                | 2,733                                                    | 2,384                                           | 12' 0-1/4"                             | 1,229               |
| HF-D18 11x13  | 8,182                                         | 0.540                             | 9,164                   | 0.605                             | 37,464                                            | 0.166                                                                | 7,872                                                    | 7,975                                           | 11' 9-1/4"                             | 2,085               |
| HF-D9 12x13   | 2,643                                         | 0.540                             | 3,700                   | 0.756                             | 32,200                                            | 0.147                                                                | 4,186                                                    | 2,525                                           | 11' 11-1/4"                            | 1,629               |
| HF-D12 12x13  | 2,190                                         | 0.540                             | 2,453                   | 0.605                             | 15,792                                            | 0.162                                                                | 2,652                                                    | 2,049                                           | 12' 0-1/4"                             | 1,261               |
| HF-D18 12x13  | 7,555                                         | 0.540                             | 8,462                   | 0.605                             | 34,608                                            | 0.179                                                                | 7,539                                                    | 6,844                                           | 11' 9-1/4"                             | 2,133               |
| HF-D9 13x13   | 2,498                                         | 0.540                             | 3,497                   | 0.756                             | 29,960                                            | 0.159                                                                | 4,132                                                    | 2,223                                           | 11' 11-1/4"                            | 1,664               |
| HF-D12 13x13  | 2,045                                         | 0.540                             | 2,290                   | 0.605                             | 14,784                                            | 0.174                                                                | 2,585                                                    | 1,788                                           | 12' 0-1/4"                             | 1,294               |
| HF-D18 13x13  | 7,004                                         | 0.540                             | 7,844                   | 0.605                             | 32,088                                            | 0.192                                                                | 7,235                                                    | 5,926                                           | 11' 9-1/4"                             | 2,181               |
| HF-D9 14x13   | 2,368                                         | 0.540                             | 3,315                   | 0.756                             | 28,000                                            | 0.171                                                                | 4,085                                                    | 1,969                                           | 11' 11-1/4"                            | 1,700               |
| HF-D12 14x13  | 1,916                                         | 0.540                             | 2,146                   | 0.605                             | 13,776                                            | 0.187                                                                | 2,518                                                    | 1,567                                           | 12' 0-1/4"                             | 1,326               |
| HF-D18 14x13  | 6,520                                         | 0.540                             | 7,302                   | 0.605                             | 29,904                                            | 0.204                                                                | 6,957                                                    | 5,170                                           | 11' 9-1/4"                             | 2,229               |
| HF-D18H 14x13 | 12,346                                        | 0.540                             | 13,828                  | 0.605                             | 49,056                                            | 0.199                                                                | 12,103                                                   | 9,777                                           | 11' 5-3/4"                             | 2,868               |
| HF-D9 15x13   | 2,776                                         | 0.540                             | 3,886                   | 0.756                             | 31,640                                            | 0.174                                                                | 4,723                                                    | 2,170                                           | 11' 10-1/4"                            | 1,808               |
| HF-D18 15x13  | 6,092                                         | 0.540                             | 6,823                   | 0.605                             | 28,056                                            | 0.216                                                                | 6,725                                                    | 4,547                                           | 11' 9-1/4"                             | 2,277               |
| HF-D18H 15x13 | 11,612                                        | 0.540                             | 13,005                  | 0.605                             | 46,032                                            | 0.212                                                                | 11,723                                                   | 8,658                                           | 11' 5-3/4"                             | 2,933               |
| HF-D9 16x13   | 2,659                                         | 0.540                             | 3,723                   | 0.756                             | 29,680                                            | 0.186                                                                | 4,673                                                    | 1,955                                           | 11' 10-1/4"                            | 1,847               |
| HF-D18 16x13  | 5,713                                         | 0.540                             | 6,399                   | 0.605                             | 26,376                                            | 0.229                                                                | 6,519                                                    | 4,031                                           | 11' 9-1/4"                             | 2,325               |
| HF-D18H 16x13 | 10,949                                        | 0.540                             | 12,263                  | 0.605                             | 43,344                                            | 0.224                                                                | 11,370                                                   | 7,714                                           | 11' 5-3/4"                             | 2,999               |
| HF-D18H 17x13 | 10,351                                        | 0.540                             | 11,593                  | 0.605                             | 40,992                                            | 0.237                                                                | 11,069                                                   | 6,911                                           | 11' 5-3/4"                             | 3,064               |
| HF-D18H 18x13 | 9,808                                         | 0.540                             | 10,985                  | 0.605                             | 38,640                                            | 0.249                                                                | 10,746                                                   | 6,221                                           | 11' 5-3/4"                             | 3,129               |
| HF-D18H 19x13 | 9,314                                         | 0.540                             | 10,432                  | 0.605                             | 36,624                                            | 0.261                                                                | 10,469                                                   | 5,632                                           | 11' 5-3/4"                             | 3,194               |
| HF-D18H 20x13 | 8,864                                         | 0.540                             | 9,928                   | 0.605                             | 34,944                                            | 0.274                                                                | 10,248                                                   | 5,116                                           | 11' 5-3/4"                             | 3,259               |
| HF-D18H 21x13 | 8,452                                         | 0.540                             | 9,466                   | 0.605                             | 33,264                                            | 0.287                                                                | 10,022                                                   | 4,667                                           | 11' 5-3/4"                             | 3,325               |
| HF-D18H 22x13 | 8,075                                         | 0.540                             | 9,044                   | 0.605                             | 31,584                                            | 0.300                                                                | 9,787                                                    | 4,272                                           | 11' 5-3/4"                             | 3,390               |
| HF-D18H 23x13 | 7,728                                         | 0.540                             | 8,655                   | 0.605                             | 30,240                                            | 0.313                                                                | 9,601                                                    | 3,924                                           | 11' 5-3/4"                             | 3,455               |

1. The values in this table are Allowable Stress Design (ASD) excluding a 1.33 stress increase and pertain to pinned base installation on 2500 psi concrete or nut & washers with high strength non-shrink grout

2. Drift at the allowable shear load is within the code allowed limits for R=6.5, C<sub>d</sub>=4.0, Δ<sub>a</sub> = 0.025h

3. Pu is the allowable aggregate point load applied at the beam mid-span in combination with the vertical load produced by overturning at the allowable shear load.

4. The table value for Resultant Shear (V<sub>R</sub>) assumes the Allowable Shear (V) in combination with the Maximum Additional Vertical Load (Pu).

5. The Design Resultant Shear (V<sub>R</sub>) from combined horizontal and compression forces on a column are solved with the following equation:

$$V_R = (V_{Dsn}/2) + (V_{Mult} \times \text{Max } P_{Dsn})$$

**Where:** V<sub>Dsn</sub> = Design Shear Load (lbs)

P<sub>Dsn</sub> = Design Aggregate Point Load at the beam mid-span (lbs)

6. The Uplift on a column is calculated with the following equation:

$$\text{Uplift} = [(V_{Dsn} \times \text{MF Height}) / W_{CL}] - (\text{Min } P_{Dsn} / 2)$$

**Where:** V<sub>Dsn</sub> = Design Shear Load (lbs)

MF Height = Dimension from top of concrete to top of the wall framing (ft)

W<sub>CL</sub> = Inside steel to steel dimension (Win) + the column depth (ft)

P<sub>Dsn</sub> = Design Aggregate Point Load at the beam mid-span (lbs)

7. h1 is the dimension from top of concrete to bottom of the lowest point in the header assembly assuming installation on nuts and washers with the Base Plate plate elevated 1-1/2" above finish concrete

**Table 1.14 - 14' 1" Nominal Wall Heights**

**Net Wall Ht = 14' 0-3/4"**

| Model         | Seismic                                       |                                   | Wind                    |                                   | Maximum Add'l Vertical <sup>3</sup> Load Pu (lbs) | Shear Multiplier <sup>4</sup> @ Compression Column V <sub>Mult</sub> | Column Base Reactions                                    |                                                 | h1 <sup>7</sup> Opening Height (ft-in) | Approx Weight (lbs) |
|---------------|-----------------------------------------------|-----------------------------------|-------------------------|-----------------------------------|---------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|----------------------------------------|---------------------|
|               | Allowable <sup>1</sup> Shear V @ R= 6.5 (lbs) | Drift <sup>2</sup> @ Allow V (in) | Allowable Shear V (lbs) | Drift <sup>2</sup> @ Allow V (in) |                                                   |                                                                      | Resultant Shear <sup>5</sup> VR @ Allow V & Max Pu (lbs) | Uplift <sup>6</sup> @ Allow V when Pu = 0 (lbs) |                                        |                     |
| HF-D9 6x14    | 2,911                                         | 0.728                             | 4,075                   | 1.019                             | 45,640                                            | 0.073                                                                | 3,490                                                    | 5,458                                           | 13' 0-1/4"                             | 1,449               |
| HF-D9 7x14    | 2,673                                         | 0.728                             | 3,742                   | 0.722                             | 40,600                                            | 0.085                                                                | 3,429                                                    | 4,406                                           | 13' 0-1/4"                             | 1,481               |
| HF-D9 8x14    | 2,461                                         | 0.728                             | 3,445                   | 0.722                             | 36,680                                            | 0.096                                                                | 3,372                                                    | 3,623                                           | 13' 0-1/4"                             | 1,513               |
| HF-D9H 8x14   | 2,979                                         | 0.728                             | 4,171                   | 0.722                             | 43,960                                            | 0.089                                                                | 3,853                                                    | 4,386                                           | 12' 11-1/4"                            | 1,563               |
| HF-D12 8x14   | 2,667                                         | 0.728                             | 2,987                   | 0.578                             | 15,624                                            | 0.103                                                                | 2,311                                                    | 3,817                                           | 13' 0-1/4"                             | 1,181               |
| HF-D18 8x14   | 6,071                                         | 0.728                             | 6,800                   | 0.578                             | 34,440                                            | 0.126                                                                | 5,674                                                    | 8,290                                           | 12' 11-3/4"                            | 1,876               |
| HF-D9 9x14    | 2,798                                         | 0.728                             | 3,917                   | 0.722                             | 40,320                                            | 0.100                                                                | 3,840                                                    | 3,723                                           | 12' 11-1/4"                            | 1,599               |
| HF-D12 9x14   | 2,457                                         | 0.728                             | 2,752                   | 0.578                             | 15,792                                            | 0.116                                                                | 2,336                                                    | 3,188                                           | 13' 0-1/4"                             | 1,214               |
| HF-D18 9x14   | 8,615                                         | 0.728                             | 9,649                   | 0.578                             | 43,848                                            | 0.129                                                                | 7,745                                                    | 10,694                                          | 12' 9-1/4"                             | 2,066               |
| HF-D9 10x14   | 2,632                                         | 0.728                             | 3,685                   | 0.722                             | 36,960                                            | 0.111                                                                | 3,799                                                    | 3,194                                           | 12' 11-1/4"                            | 1,635               |
| HF-D12 10x14  | 2,271                                         | 0.728                             | 2,544                   | 0.578                             | 15,792                                            | 0.127                                                                | 2,350                                                    | 2,692                                           | 13' 0-1/4"                             | 1,246               |
| HF-D18 10x14  | 7,923                                         | 0.728                             | 8,874                   | 0.578                             | 40,152                                            | 0.141                                                                | 7,396                                                    | 9,020                                           | 12' 9-1/4"                             | 2,114               |
| HF-D9 11x14   | 2,482                                         | 0.728                             | 3,475                   | 0.722                             | 34,160                                            | 0.122                                                                | 3,776                                                    | 2,766                                           | 12' 11-1/4"                            | 1,670               |
| HF-D12 11x14  | 2,109                                         | 0.728                             | 2,362                   | 0.578                             | 15,624                                            | 0.138                                                                | 2,360                                                    | 2,297                                           | 13' 0-1/4"                             | 1,278               |
| HF-D18 11x14  | 7,313                                         | 0.728                             | 8,191                   | 0.578                             | 36,960                                            | 0.152                                                                | 7,077                                                    | 7,688                                           | 12' 9-1/4"                             | 2,162               |
| HF-D9 12x14   | 2,346                                         | 0.728                             | 3,284                   | 0.722                             | 31,640                                            | 0.134                                                                | 3,739                                                    | 2,417                                           | 12' 11-1/4"                            | 1,706               |
| HF-D12 12x14  | 1,965                                         | 0.728                             | 2,201                   | 0.578                             | 15,288                                            | 0.149                                                                | 2,364                                                    | 1,989                                           | 13' 0-1/4"                             | 1,310               |
| HF-D18 12x14  | 6,772                                         | 0.728                             | 7,585                   | 0.578                             | 34,272                                            | 0.164                                                                | 6,796                                                    | 6,616                                           | 12' 9-1/4"                             | 2,210               |
| HF-D9 13x14   | 2,223                                         | 0.728                             | 3,112                   | 0.722                             | 29,680                                            | 0.144                                                                | 3,712                                                    | 2,136                                           | 12' 11-1/4"                            | 1,741               |
| HF-D12 13x14  | 1,840                                         | 0.728                             | 2,061                   | 0.578                             | 14,616                                            | 0.161                                                                | 2,346                                                    | 1,734                                           | 13' 0-1/4"                             | 1,342               |
| HF-D18 13x14  | 6,294                                         | 0.728                             | 7,049                   | 0.578                             | 31,752                                            | 0.176                                                                | 6,531                                                    | 5,739                                           | 12' 9-1/4"                             | 2,258               |
| HF-D9 14x14   | 2,111                                         | 0.728                             | 2,955                   | 0.722                             | 27,720                                            | 0.156                                                                | 3,678                                                    | 1,895                                           | 12' 11-1/4"                            | 1,777               |
| HF-D12 14x14  | 1,726                                         | 0.728                             | 1,933                   | 0.578                             | 13,608                                            | 0.172                                                                | 2,280                                                    | 1,520                                           | 13' 0-1/4"                             | 1,374               |
| HF-D18 14x14  | 5,873                                         | 0.728                             | 6,578                   | 0.578                             | 29,736                                            | 0.187                                                                | 6,318                                                    | 5,022                                           | 12' 9-1/4"                             | 2,306               |
| HF-D18H 14x14 | 11,010                                        | 0.728                             | 12,331                  | 0.578                             | 48,384                                            | 0.182                                                                | 10,863                                                   | 9,402                                           | 12' 5-3/4"                             | 2,968               |
| HF-D9 15x14   | 2,460                                         | 0.728                             | 3,444                   | 0.722                             | 31,080                                            | 0.158                                                                | 4,202                                                    | 2,069                                           | 12' 10-1/4"                            | 1,885               |
| HF-D18 15x14  | 5,497                                         | 0.728                             | 6,157                   | 0.578                             | 27,888                                            | 0.199                                                                | 6,112                                                    | 4,426                                           | 12' 9-1/4"                             | 2,354               |
| HF-D18H 15x14 | 10,379                                        | 0.728                             | 11,624                  | 0.578                             | 45,528                                            | 0.194                                                                | 10,554                                                   | 8,350                                           | 12' 5-3/4"                             | 3,033               |
| HF-D9 16x14   | 2,360                                         | 0.728                             | 3,304                   | 0.722                             | 29,400                                            | 0.170                                                                | 4,205                                                    | 1,875                                           | 12' 10-1/4"                            | 1,924               |
| HF-D18 16x14  | 5,163                                         | 0.728                             | 5,783                   | 0.578                             | 26,208                                            | 0.210                                                                | 5,927                                                    | 3,931                                           | 12' 9-1/4"                             | 2,402               |
| HF-D18H 16x14 | 9,810                                         | 0.728                             | 10,987                  | 0.578                             | 43,008                                            | 0.206                                                                | 10,272                                                   | 7,453                                           | 12' 5-3/4"                             | 3,098               |
| HF-D18H 17x14 | 9,291                                         | 0.728                             | 10,406                  | 0.578                             | 40,656                                            | 0.217                                                                | 10,006                                                   | 6,690                                           | 12' 5-3/4"                             | 3,163               |
| HF-D18H 18x14 | 8,818                                         | 0.728                             | 9,876                   | 0.578                             | 38,304                                            | 0.229                                                                | 9,729                                                    | 6,033                                           | 12' 5-3/4"                             | 3,228               |
| HF-D18H 19x14 | 8,388                                         | 0.728                             | 9,395                   | 0.578                             | 36,456                                            | 0.240                                                                | 9,515                                                    | 5,471                                           | 12' 5-3/4"                             | 3,293               |
| HF-D18H 20x14 | 7,994                                         | 0.728                             | 8,953                   | 0.578                             | 34,608                                            | 0.252                                                                | 9,296                                                    | 4,975                                           | 12' 5-3/4"                             | 3,359               |
| HF-D18H 21x14 | 7,632                                         | 0.728                             | 8,548                   | 0.578                             | 33,096                                            | 0.264                                                                | 9,116                                                    | 4,547                                           | 12' 5-3/4"                             | 3,424               |
| HF-D18H 22x14 | 7,300                                         | 0.728                             | 8,176                   | 0.578                             | 31,584                                            | 0.276                                                                | 8,936                                                    | 4,165                                           | 12' 5-3/4"                             | 3,489               |
| HF-D18H 23x14 | 6,993                                         | 0.728                             | 7,832                   | 0.578                             | 30,072                                            | 0.287                                                                | 8,740                                                    | 3,830                                           | 12' 5-3/4"                             | 3,554               |

- The values in this table are Allowable Stress Design (ASD) excluding a 1.33 stress increase and pertain to pinned base installation on 2500 psi concrete or nut & washers with high strength non-shrink grout
- Drift at the allowable shear load is within the code allowed limits for R=6.5, C<sub>d</sub>=4.0, Δ<sub>a</sub> = 0.025h
- Pu is the allowable aggregate point load applied at the beam mid-span in combination with the vertical load produced by overturning at the allowable shear load.
- The table value for Resultant Shear (V<sub>R</sub>) assumes the Allowable Shear (V) in combination with the Maximum Additional Vertical Load (Pu).
- The design Resultant Shear (V<sub>R</sub>) from combined horizontal and compression forces on a column are solved with the following equation:  

$$V_R = (V_{Dsn} / 2) + (V_{Mult} \times \text{Max } P_{Dsn})$$

**Where:** V<sub>Dsn</sub> = Design Shear Load (lbs)  
P<sub>Dsn</sub> = Design Aggregate Point Load at the beam mid-span (lbs)
- The Uplift on a column is calculated with the following equation:  

$$\text{Uplift} = [(V_{Dsn} \times \text{MF Height}) / W_{CL}] - (\text{Min } P_{Dsn} / 2)$$

**Where:** V<sub>Dsn</sub> = Design Shear Load (lbs)  
MF Height = Dimension from top of concrete to top of the wall framing (ft)  
W<sub>CL</sub> = Inside steel to steel dimension (Win) + the column depth (ft)  
P<sub>Dsn</sub> = Design Aggregate Point Load at the beam mid-span (lbs)
- h1 is the dimension from top of concrete to bottom of the lowest point in the header assembly assuming installation on nuts and washers with the Base Plate plate elevated 1-1/2" above finish concrete

**Table 1.15 - 15' 1" Nominal Wall Heights**

**Net Wall Ht = 15' 0-3/4"**

| Model         | Seismic                                       |                                   | Wind                    |                                   | Maximum Add'l Vertical <sup>3</sup> Load Pu (lbs) | Shear Multiplier <sup>4</sup> @ Compression Column V <sub>Mult</sub> | Column Base Reactions                                    |                                                 | h1 <sup>7</sup> Opening Height (ft-in) | Approx Weight (lbs) |
|---------------|-----------------------------------------------|-----------------------------------|-------------------------|-----------------------------------|---------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|----------------------------------------|---------------------|
|               | Allowable <sup>1</sup> Shear V @ R= 6.5 (lbs) | Drift <sup>2</sup> @ Allow V (in) | Allowable Shear V (lbs) | Drift <sup>2</sup> @ Allow V (in) |                                                   |                                                                      | Resultant Shear <sup>5</sup> VR @ Allow V & Max Pu (lbs) | Uplift <sup>6</sup> @ Allow V when Pu = 0 (lbs) |                                        |                     |
| HF-D18 8x15   | 5,489                                         | 0.781                             | 6,148                   | 0.875                             | 34,104                                            | 0.117                                                                | 5,158                                                    | 8,042                                           | 13' 11-3/4"                            | 1,953               |
| HF-D18 10x15  | 7,106                                         | 0.781                             | 7,959                   | 0.875                             | 39,648                                            | 0.130                                                                | 6,676                                                    | 8,685                                           | 13' 9-1/4"                             | 2,191               |
| HF-D18 12x15  | 6,108                                         | 0.781                             | 6,841                   | 0.875                             | 33,936                                            | 0.151                                                                | 6,174                                                    | 6,402                                           | 13' 9-1/4"                             | 2,287               |
| HF-D18H 14x15 | 9,884                                         | 0.781                             | 11,070                  | 0.875                             | 47,880                                            | 0.168                                                                | 9,827                                                    | 9,060                                           | 13' 5-3/4"                             | 3,067               |
| HF-D18H 16x15 | 8,842                                         | 0.781                             | 9,903                   | 0.875                             | 42,504                                            | 0.190                                                                | 9,316                                                    | 7,205                                           | 13' 5-3/4"                             | 3,197               |
| HF-D18H 18x15 | 7,975                                         | 0.781                             | 8,932                   | 0.875                             | 38,136                                            | 0.211                                                                | 8,875                                                    | 5,853                                           | 13' 5-3/4"                             | 3,328               |
| HF-D18H 20x15 | 7,250                                         | 0.781                             | 8,120                   | 0.875                             | 34,440                                            | 0.233                                                                | 8,495                                                    | 4,842                                           | 13' 5-3/4"                             | 3,458               |
| HF-D18H 22x15 | 6,636                                         | 0.781                             | 7,432                   | 0.875                             | 31,248                                            | 0.255                                                                | 8,157                                                    | 4,065                                           | 13' 5-3/4"                             | 3,588               |

**Table 1.16 - 16' 1" Nominal Wall Heights**

**Net Wall Ht = 16' 0-3/4"**

|               |       |       |       |       |        |       |       |       |             |       |
|---------------|-------|-------|-------|-------|--------|-------|-------|-------|-------------|-------|
| HF-D18 8x16   | 4,991 | 0.834 | 5,590 | 0.934 | 33,768 | 0.108 | 4,718 | 7,808 | 14' 11-3/4" | 2,031 |
| HF-D18 10x16  | 6,407 | 0.834 | 7,176 | 0.934 | 36,624 | 0.120 | 5,878 | 8,364 | 14' 9-1/4"  | 2,269 |
| HF-D18 12x16  | 5,539 | 0.834 | 6,204 | 0.934 | 33,600 | 0.140 | 5,634 | 6,201 | 14' 9-1/4"  | 2,365 |
| HF-D18H 14x16 | 8,924 | 0.834 | 9,995 | 0.934 | 47,376 | 0.156 | 8,937 | 8,732 | 14' 5-3/4"  | 3,166 |
| HF-D18H 16x16 | 8,015 | 0.834 | 8,977 | 0.934 | 42,000 | 0.176 | 8,487 | 6,978 | 14' 5-3/4"  | 3,296 |
| HF-D18H 18x16 | 7,252 | 0.834 | 8,122 | 0.934 | 37,800 | 0.196 | 8,123 | 5,685 | 14' 5-3/4"  | 3,427 |
| HF-D18H 20x16 | 6,611 | 0.834 | 7,404 | 0.934 | 34,104 | 0.216 | 7,784 | 4,714 | 14' 5-3/4"  | 3,557 |
| HF-D18H 22x16 | 6,065 | 0.834 | 6,793 | 0.934 | 31,080 | 0.237 | 7,504 | 3,964 | 14' 5-3/4"  | 3,688 |

**Table 1.17 - 17' 1" Nominal Wall Heights**

**Net Wall Ht = 17' 0-3/4"**

|               |       |       |       |       |        |       |       |       |             |       |
|---------------|-------|-------|-------|-------|--------|-------|-------|-------|-------------|-------|
| HF-D18 8x17   | 4,558 | 0.887 | 5,105 | 0.993 | 33,432 | 0.101 | 4,335 | 7,587 | 15' 11-3/4" | 2,108 |
| HF-D18 10x17  | 5,810 | 0.887 | 6,507 | 0.993 | 29,736 | 0.112 | 4,922 | 8,063 | 15' 9-1/4"  | 2,346 |
| HF-D18 12x17  | 5,046 | 0.887 | 5,652 | 0.993 | 31,080 | 0.131 | 4,991 | 6,007 | 15' 9-1/4"  | 2,442 |
| HF-D18H 14x17 | 8,097 | 0.887 | 9,069 | 0.993 | 46,872 | 0.144 | 8,155 | 8,431 | 15' 5-3/4"  | 3,265 |
| HF-D18H 16x17 | 7,300 | 0.887 | 8,176 | 0.993 | 41,664 | 0.163 | 7,784 | 6,763 | 15' 5-3/4"  | 3,396 |
| HF-D18H 18x17 | 6,626 | 0.887 | 7,421 | 0.993 | 37,464 | 0.183 | 7,473 | 5,525 | 15' 5-3/4"  | 3,526 |
| HF-D18H 20x17 | 6,054 | 0.887 | 6,780 | 0.993 | 33,936 | 0.202 | 7,185 | 4,594 | 15' 5-3/4"  | 3,657 |
| HF-D18H 22x17 | 5,566 | 0.887 | 6,234 | 0.993 | 30,912 | 0.221 | 6,932 | 3,871 | 15' 5-3/4"  | 3,787 |

- The values in this table are Allowable Stress Design (ASD) excluding a 1.33 stress increase and pertain to pinned base installation on 2500 psi concrete or nut & washers with high strength non-shrink grout
- Drift at the allowable shear load is within the code allowed limits for R=6.5, C<sub>a</sub>=4.0, Δ<sub>a</sub> = 0.025h
- Pu is the allowable aggregate point load applied at the beam mid-span in combination with the vertical load produced by overturning at the allowable shear load.
- The table value for Resultant Shear (V<sub>R</sub>) assumes the Allowable Shear (V) in combination with the Maximum Additional Vertical Load (Pu).
- The design Resultant Shear (V<sub>R</sub>) from combined horizontal and compression forces on a column are solved with the following equation:  

$$V_R = (V_{Dsn}/2) + (V_{Mult} \times \text{Max } P_{Dsn})$$

**Where:** V<sub>Dsn</sub> = Design Shear Load (lbs)  
P<sub>Dsn</sub> = Design Aggregate Point Load at the beam mid-span (lbs)
- The Uplift on a column is calculated with the following equation:  

$$\text{Uplift} = [(V_{Dsn} \times \text{MF Height}) / W_{CL}] - (\text{Min } P_{Dsn} / 2)$$

**Where:** V<sub>Dsn</sub> = Design Shear Load (lbs)  
MF Height = Dimension from top of concrete to top of the wall framing (ft)  
W<sub>CL</sub> = Inside steel to steel dimension (Win) + the column depth (ft)  
P<sub>Dsn</sub> = Design Aggregate Point Load at the beam mid-span (lbs)
- h1 is the dimension from top of concrete to bottom of the lowest point in the header assembly assuming installation on nuts and washers with the Base Plate plate elevated 1-1/2" above finish concrete

**Table 1.18 - 18 1" Nominal Wall Heights**

**Net Wall Ht = 18' 0-3/4"**

| Model         | Seismic                                       |                                   | Wind                    |                                   | Maximum Add'l Vertical <sup>3</sup> Load Pu (lbs) | Shear Multiplier <sup>4</sup> @ Compression Column V <sub>Mult</sub> | Column Base Reactions                                    |                                                 | h1 <sup>7</sup> Opening Height (ft-in) | Approx Weight (lbs) |
|---------------|-----------------------------------------------|-----------------------------------|-------------------------|-----------------------------------|---------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|----------------------------------------|---------------------|
|               | Allowable <sup>1</sup> Shear V @ R= 6.5 (lbs) | Drift <sup>2</sup> @ Allow V (in) | Allowable Shear V (lbs) | Drift <sup>2</sup> @ Allow V (in) |                                                   |                                                                      | Resultant Shear <sup>5</sup> VR @ Allow V & Max Pu (lbs) | Uplift <sup>6</sup> @ Allow V when Pu = 0 (lbs) |                                        |                     |
| HF-D18 8x18   | 4,182                                         | 0.940                             | 4,684                   | 1.053                             | 31,920                                            | 0.095                                                                | 3,932                                                    | 7,373                                           | 16' 11-3/4"                            | 2,185               |
| HF-D18 10x18  | 5,293                                         | 0.940                             | 5,928                   | 1.053                             | 23,688                                            | 0.105                                                                | 4,158                                                    | 7,788                                           | 16' 9-1/4"                             | 2,423               |
| HF-D18 12x18  | 4,619                                         | 0.940                             | 5,173                   | 1.053                             | 26,544                                            | 0.123                                                                | 4,284                                                    | 5,833                                           | 16' 9-1/4"                             | 2,519               |
| HF-D18H 14x18 | 7,383                                         | 0.940                             | 8,269                   | 1.053                             | 43,680                                            | 0.135                                                                | 7,266                                                    | 8,150                                           | 16' 5-3/4"                             | 3,365               |
| HF-D18H 16x18 | 6,678                                         | 0.940                             | 7,479                   | 1.053                             | 41,328                                            | 0.153                                                                | 7,170                                                    | 6,556                                           | 16' 5-3/4"                             | 3,495               |
| HF-D18H 18x18 | 6,078                                         | 0.940                             | 6,807                   | 1.053                             | 37,128                                            | 0.171                                                                | 6,893                                                    | 5,371                                           | 16' 5-3/4"                             | 3,626               |
| HF-D18H 20x18 | 5,567                                         | 0.940                             | 6,235                   | 1.053                             | 33,768                                            | 0.189                                                                | 6,656                                                    | 4,480                                           | 16' 5-3/4"                             | 3,756               |
| HF-D18H 22x18 | 5,129                                         | 0.940                             | 5,744                   | 1.053                             | 30,744                                            | 0.207                                                                | 6,435                                                    | 3,783                                           | 16' 5-3/4"                             | 3,886               |

**Table 1.19 - 19 1" Nominal Wall Heights**

**Net Wall Ht = 19' 0-3/4"**

|               |       |       |       |       |        |       |       |       |             |       |
|---------------|-------|-------|-------|-------|--------|-------|-------|-------|-------------|-------|
| HF-D18 8x19   | 3,851 | 0.993 | 4,313 | 1.112 | 27,048 | 0.089 | 3,393 | 7,179 | 17' 11-3/4" | 2,263 |
| HF-D18 10x19  | 4,842 | 0.993 | 5,423 | 1.112 | 18,816 | 0.099 | 3,546 | 7,527 | 17' 9-1/4"  | 2,500 |
| HF-D18 12x19  | 4,245 | 0.993 | 4,754 | 1.112 | 22,512 | 0.115 | 3,695 | 5,658 | 17' 9-1/4"  | 2,596 |
| HF-D18H 14x19 | 6,758 | 0.993 | 7,569 | 1.112 | 37,968 | 0.126 | 6,292 | 7,882 | 17' 5-3/4"  | 3,464 |
| HF-D18H 16x19 | 6,133 | 0.993 | 6,869 | 1.112 | 37,464 | 0.144 | 6,332 | 6,362 | 17' 5-3/4"  | 3,594 |
| HF-D18H 18x19 | 5,598 | 0.993 | 6,270 | 1.112 | 36,624 | 0.160 | 6,364 | 5,230 | 17' 5-3/4"  | 3,725 |
| HF-D18H 20x19 | 5,139 | 0.993 | 5,756 | 1.112 | 33,432 | 0.178 | 6,172 | 4,366 | 17' 5-3/4"  | 3,855 |
| HF-D18H 22x19 | 4,744 | 0.993 | 5,313 | 1.112 | 30,576 | 0.195 | 5,983 | 3,696 | 17' 5-3/4"  | 3,985 |

**Table 1.20 - 20 1" Nominal Wall Heights**

**Net Wall Ht = 20' 0-3/4"**

|               |       |       |       |       |        |       |       |       |             |       |
|---------------|-------|-------|-------|-------|--------|-------|-------|-------|-------------|-------|
| HF-D18 8x20   | 3,559 | 1.046 | 3,986 | 1.172 | 22,680 | 0.084 | 2,939 | 6,984 | 18' 11-3/4" | 2,340 |
| HF-D18 10x20  | 4,447 | 1.046 | 4,981 | 1.172 | 14,784 | 0.094 | 3,064 | 7,286 | 18' 9-1/4"  | 2,578 |
| HF-D18 12x20  | 3,915 | 1.046 | 4,385 | 1.172 | 18,480 | 0.109 | 3,180 | 5,504 | 18' 9-1/4"  | 2,674 |
| HF-D18H 14x20 | 6,211 | 1.046 | 6,956 | 1.172 | 33,096 | 0.119 | 5,495 | 7,627 | 18' 5-3/4"  | 3,563 |
| HF-D18H 16x20 | 5,653 | 1.046 | 6,331 | 1.172 | 33,096 | 0.135 | 5,545 | 6,181 | 18' 5-3/4"  | 3,694 |
| HF-D18H 18x20 | 5,173 | 1.046 | 5,794 | 1.172 | 32,424 | 0.151 | 5,556 | 5,089 | 18' 5-3/4"  | 3,824 |
| HF-D18 H20x20 | 4,759 | 1.046 | 5,330 | 1.172 | 31,752 | 0.167 | 5,600 | 4,259 | 18' 5-3/4"  | 3,954 |
| HF-D18H 22x20 | 4,402 | 1.046 | 4,930 | 1.172 | 30,408 | 0.184 | 5,588 | 3,616 | 18' 5-3/4"  | 4,085 |

- The values in this table are Allowable Stress Design (ASD) excluding a 1.33 stress increase and pertain to pinned base installation on 2500 psi concrete or nut & washers with high strength non-shrink grout
- Drift at the allowable shear load is within the code allowed limits for R=6.5, C<sub>d</sub>=4.0, Δ<sub>s</sub> = 0.025h
- Pu is the allowable aggregate point load applied at the beam mid-span in combination with the vertical load produced by overturning at the allowable shear load.
- The table value for Resultant Shear (V<sub>R</sub>) assumes the Allowable Shear (V) in combination with the Maximum Additional Vertical Load (Pu).
- The design Resultant Shear (V<sub>R</sub>) from combined horizontal and compression forces on a column are solved with the following equation:  

$$V_R = (V_{Dsn}/2) + (V_{Mult} \times \text{Max } P_{Dsn})$$

**Where:** V<sub>Dsn</sub> = Design Shear Load (lbs)  
P<sub>Dsn</sub> = Design Aggregate Point Load at the beam mid-span (lbs)
- The Uplift on a column is calculated with the following equation:  

$$\text{Uplift} = [(V_{Dsn} \times \text{MF Height}) / W_{CL}] - (\text{Min } P_{Dsn} / 2)$$

**Where:** V<sub>Dsn</sub> = Design Shear Load (lbs)  
MF Height = Dimension from top of concrete to top of the wall framing (ft)  
W<sub>CL</sub> = Inside steel to steel dimension (Win) + the column depth (ft)  
P<sub>Dsn</sub> = Design Aggregate Point Load at the beam mid-span (lbs)
- h1 is the dimension from top of concrete to bottom of the lowest point in the header assembly assuming installation on nuts and washers with the Base Plate plate elevated 1-1/2" above finish concrete

## Installer

### How to Quote a Hardy Frame® Moment Frame:

- Locate the model number call-out on Foundation and Framing plans.

**Note:** One Moment Frame consists of two columns and a header. Be careful not to double the count by confusing Moment Frame columns with individual Hardy Frame® Panels.

- Call your material supplier or Hardy Frames with the following information for a job quote:
  - Job name and location
  - Quantity and model number
  - Project accessibility for trucks to deliver
  - Jobsite access for installing the Frame
- Check anchorage edge dimensions to determine wood framing requirements
- Check job conditions for accessibility and placement of pre-assembled Frames with a forklift or crane.

### Ordering a Hardy Frame® Moment Frame:

- Prior to fabrication a Moment Frame “Dimension Sheet” will be provided indicating standard inside and outside widths and heights. This is a working document that allows the contractor to adjust dimensions, request changes to wood nailer sizes or customize nailer applications.
- Template Kits are provided when purchasing Moment Frames. They are in stock and can ship within one to two business days to expedite pouring concrete.
- Allow 15 to 20 working days for delivery of Moment Frame

### Installing Template Kits and Hold Down Anchors:

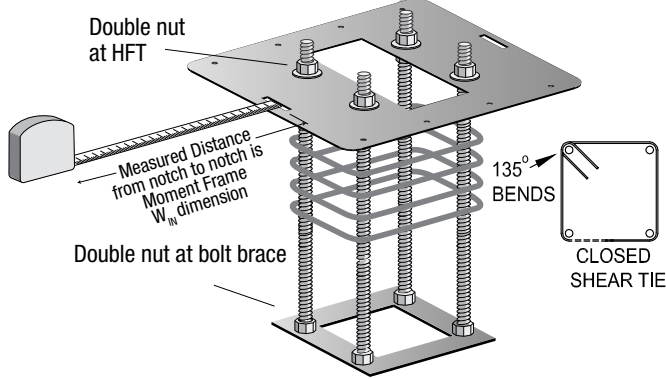
- Assemble the Kit as shown in Hardy Frame Typical Installation Details and the illustrations provided on the Template and Template Kit box labels
- Locate one Template Kit assembly at each of the column locations
- Be sure to place the Templates so that the edges with the slotted holes are oriented in the same direction as the Moment Frame wall line
- Measure the interior slot to slot distance to be the same as the “W<sub>in</sub>” (inside steel to steel) dimension for the Frame being ordered.
- Set the top of all hold down bolts at 4-1/4 inches (minimum) to 6 inches (maximum) above top of concrete. Be sure that the embed end is extending the required distance into the footing below.
- Pour concrete and check that the assembly did not move out of alignment prior to the concrete hardening.

### Installing the Hardy Frame® Moment Frame:

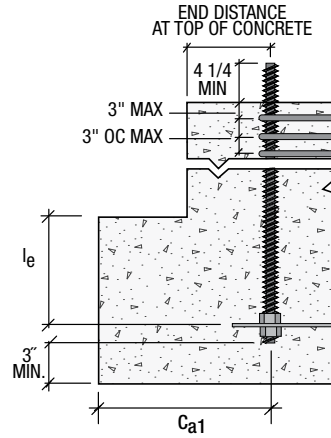
- Install one nut with one washer above on all hold down anchors. Set the top of washer at approximately 1-1/2 inches above top of concrete.
- Unload the Moment Frame by lifting with forks or a crane at the header.
- Install the Moment Frame on the hold downs so that the base plates seat firmly on the washers and nuts below.
- Install one washer in contact with the base plate and one nut above it on all hold down bolts.
- Level the Frame and make minor height adjustments by raising or lowering the double nut connection at the base plates, then secure the connection until all nuts are “snug-tight”. For installations on nuts and washers with high strength non-shrink grout, third party inspection may be required.
- Install wood framing above per the specified installation details and make connections to transfer shear loads. If the specified connection will be concealed when framing is installed above, be sure to get inspections while still visible.

## Template Kit Assembly

D9 Shown



## Anchorage Dimensions



$l_e$  = embed depth  
 $Ca1$  = end distance  
 $Ca2$  = edge distance

### Moment Frame Template Kits

| Column Type | HFT Model | Hold Down Rods |              |             |
|-------------|-----------|----------------|--------------|-------------|
|             |           | Grade          | Diameter(in) | Length (in) |
| D9 & D9H    | HFTK-D9   | STD            | 3/4          | 32          |
| D12         | HFTK-D12  |                |              | 36          |
| D18 & D18H  | HFTK-D18  | HS             |              |             |

1. STD (Standard) rods are ASTM F1554 Grade 36
2. HS (High Strength) rods are ASTM A 193 Grade B7
3. All Template Kits include:
  - 2-Templates (HFT)
  - 2-Bolt Braces (HFB)
  - 8-Threaded Rods with 2 washers & 4 nuts for each rod

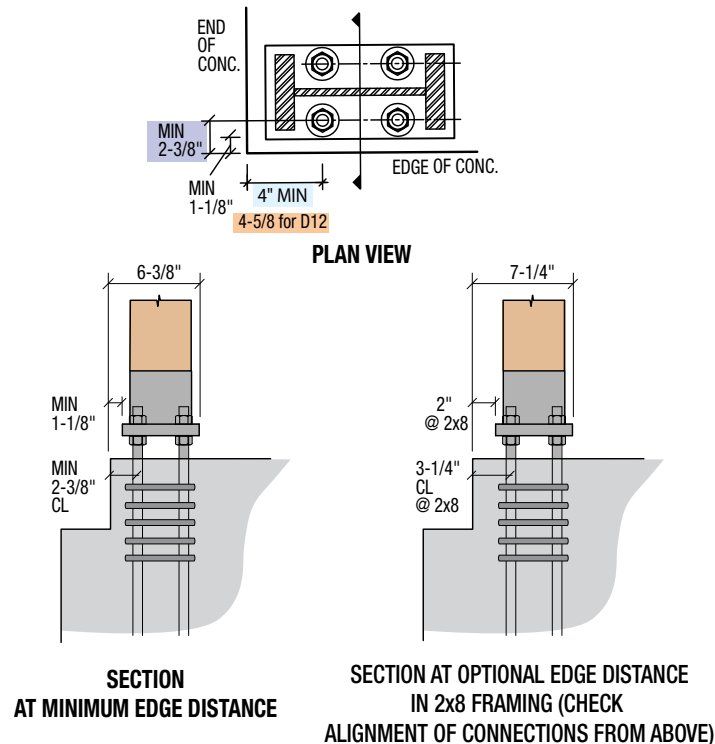
### Hardy Frame Moment Frame: Embed Schedule<sup>1,2</sup>

| Column Type | Anchorage <sup>2</sup> Designation | Embed From Top of Footing $l_e$ (in) | Min Edge & End Dist at Footing (in) | Min Edge Dist at T.O. Conc (IN) | Min End Dist at T.O. Conc (IN) | Anchor QTY DIA & Grade Per Column (IN) | Closed Shear Tie Min QTY, Size & Spacing |
|-------------|------------------------------------|--------------------------------------|-------------------------------------|---------------------------------|--------------------------------|----------------------------------------|------------------------------------------|
| D9          | D9-Pinned                          | 12                                   | 19                                  | 2 3/8                           | 4                              | 4 EA 3/4-STD                           | 4 EA #3 @ 3" OC                          |
| D9H         | D9H-Pinned                         |                                      |                                     |                                 | 4-5/8                          |                                        |                                          |
| D12         | D12-Pinned                         |                                      |                                     |                                 | 7 3/8                          |                                        |                                          |
| D18         | D18-Pinned                         | 18                                   | 27                                  | 2 3/8                           | 7 3/8                          | 4 EA 3/4 - HS                          | 5 EA #3 @ 3" OC                          |
| D18H        | D18H-Pinned                        |                                      |                                     |                                 |                                |                                        |                                          |

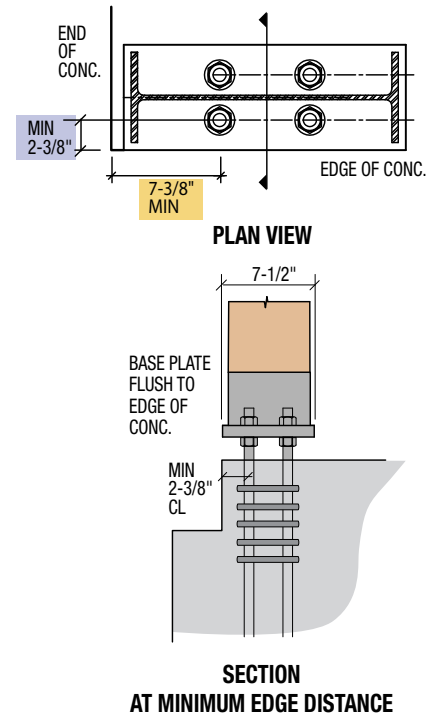
FOUNDATION DESIGN, FOOTINGS AND STEM WALLS SHALL BE DESIGNED BY THE ENGINEER OF RECORD

- Notes: 1. Anchors are designed per AISC 341-10 and ACI 318 Appendix D based on  $f'_c=2500$  psi,  $f_u=60,000$  psi and  $f_y=40,000$  psi (min)  
 2. For alternate shear transfers or pull-out resistance, calculations shall be supplied by the Engineer of Record

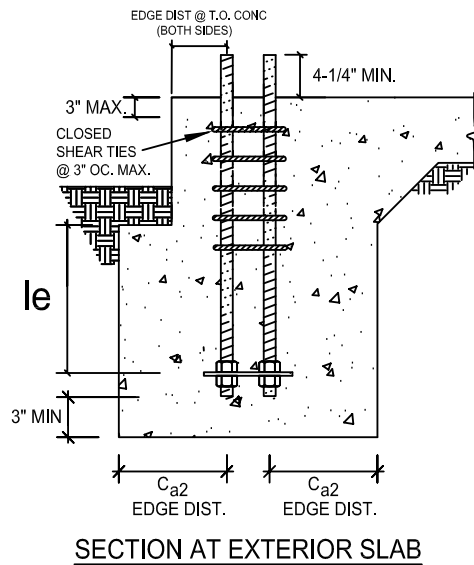
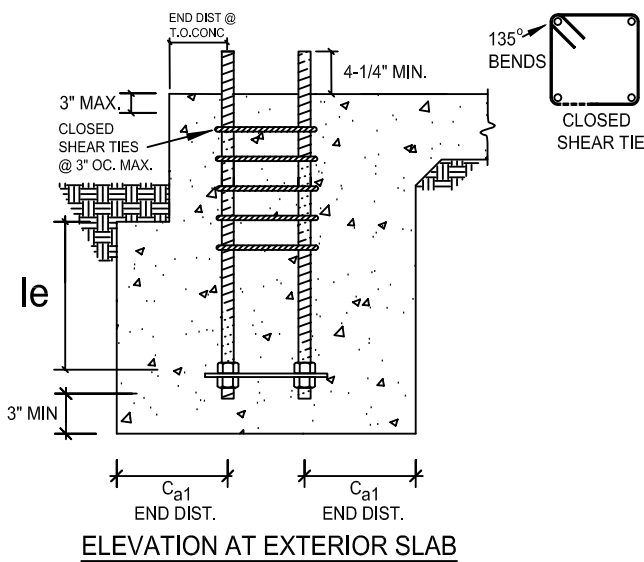
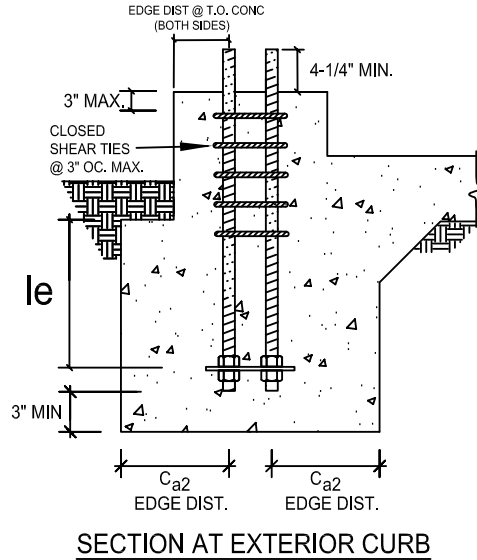
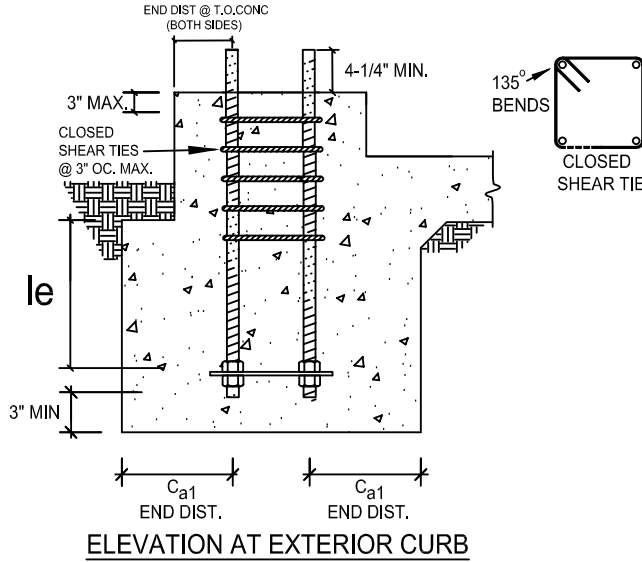
### D9, D9H & D12 MINIMUM EDGE & END DISTANCES



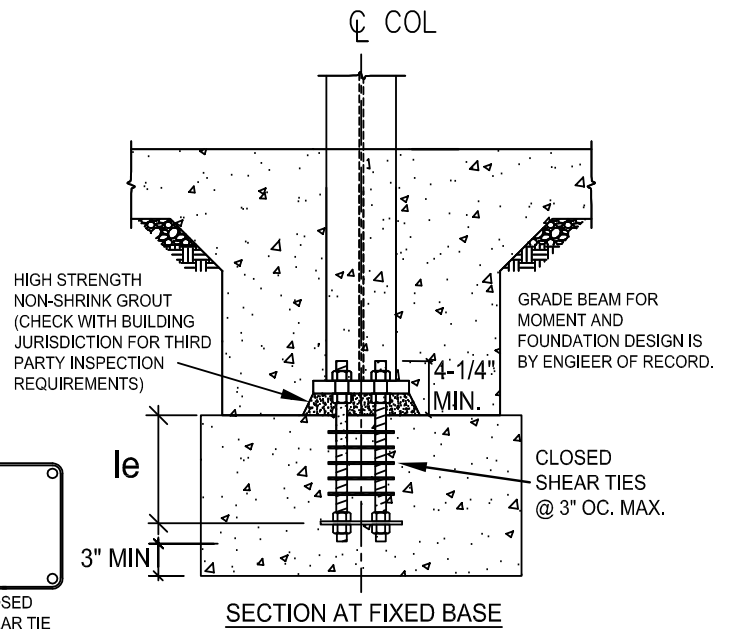
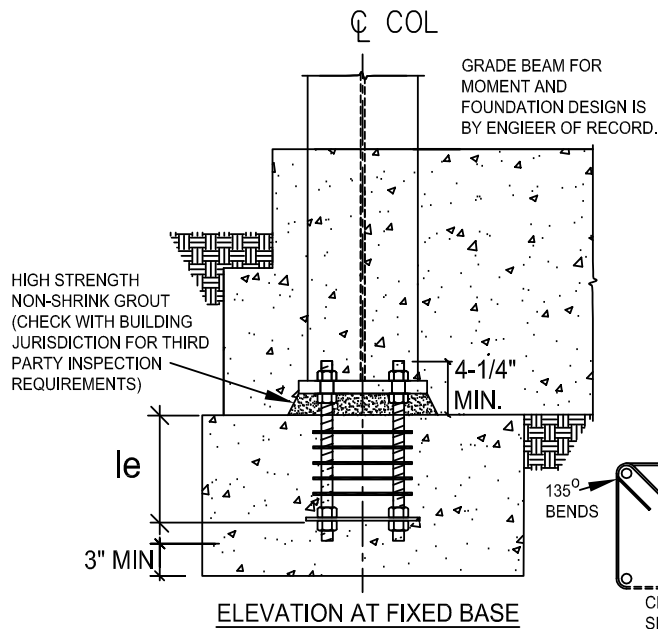
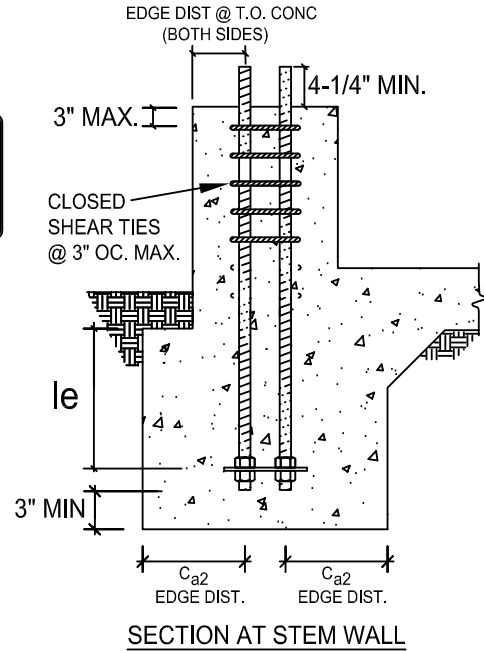
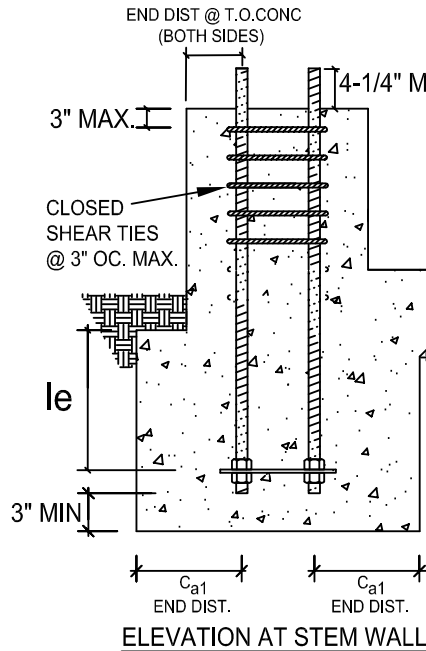
### D18, D18H MINIMUM EDGE & END DISTANCES



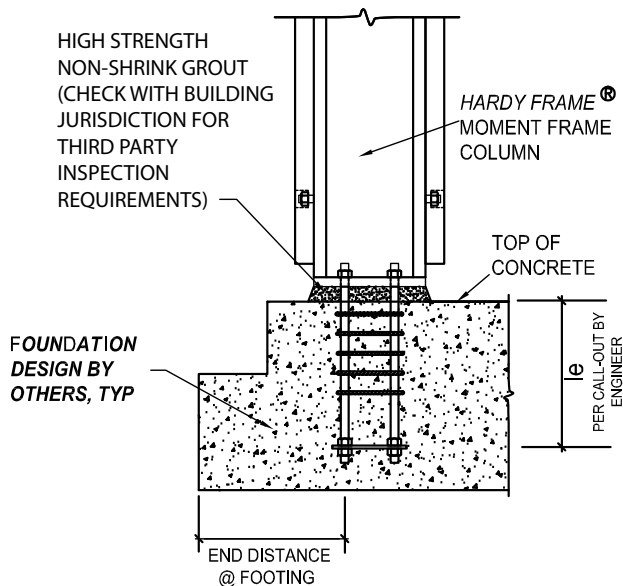
## Anchorage



## Anchorage

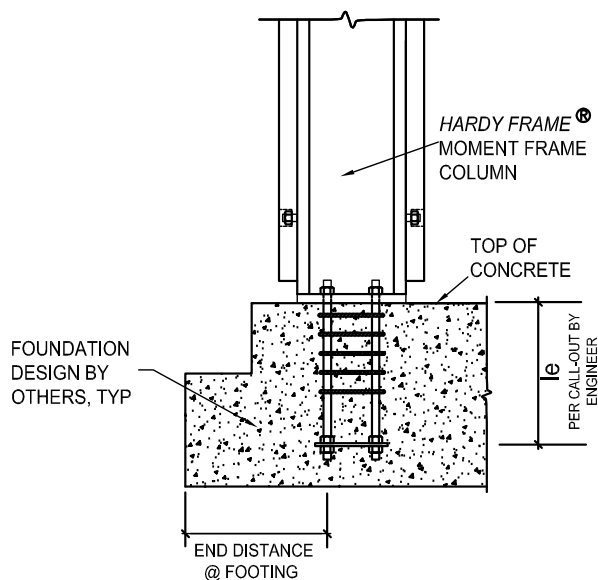


THE ENGINEER OF RECORD IS PERMITTED TO MODIFY THIS DETAIL TO ACCOMMODATE A SPECIFIC CONDITION



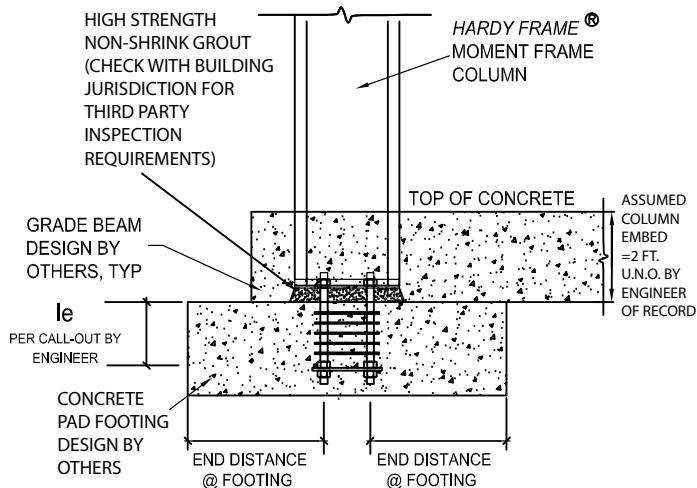
**ON NUTS AND WASHERS-PINNED BASE** 1

THE ENGINEER OF RECORD IS PERMITTED TO MODIFY THIS DETAIL TO ACCOMMODATE A SPECIFIC CONDITION



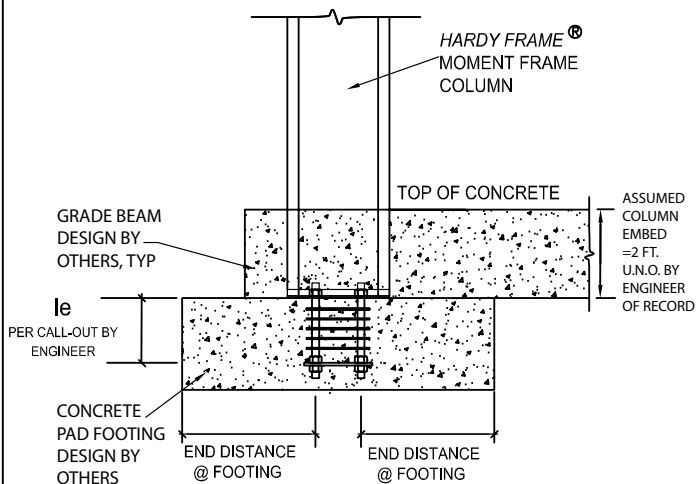
**ON CONCRETE-PINNED BASE** 2

THIS DETAIL IS FOR EXAMPLE ONLY. REFER TO ENGINEER'S CALCS FOR FIXED COLUMN BASE DETAIL.

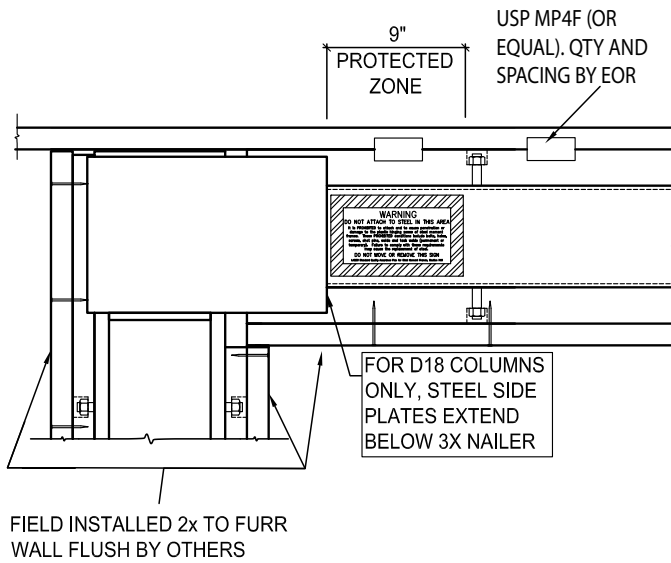


**ON NUTS AND WASHERS-FIXED BASE** 3

THIS DETAIL IS FOR EXAMPLE ONLY. REFER TO ENGINEER'S CALCS FOR FIXED COLUMN BASE DETAIL.

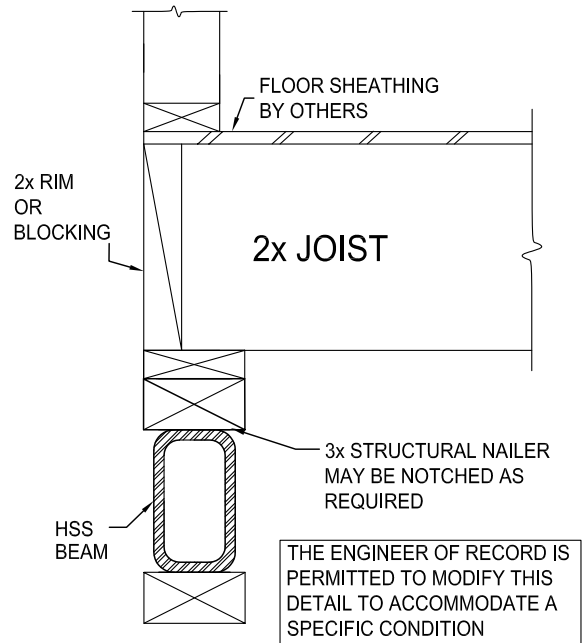


**ON CONCRETE-FIXED BASE** 4



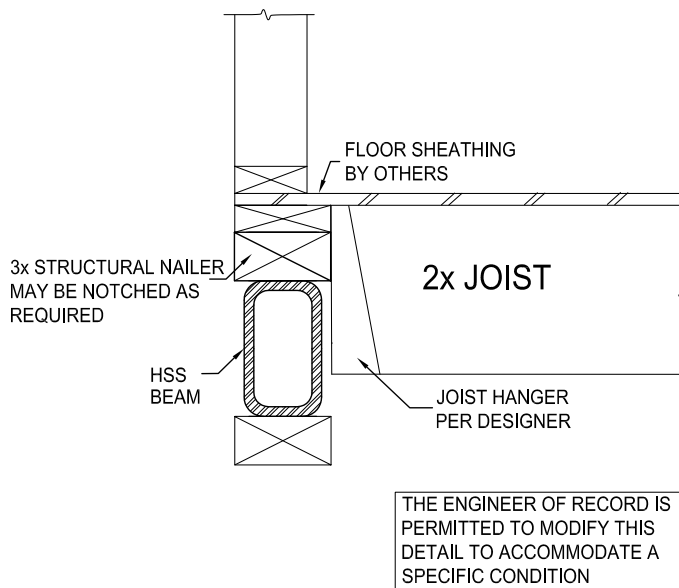
**ELEVATION WITH 2X TOP PLATE**

5



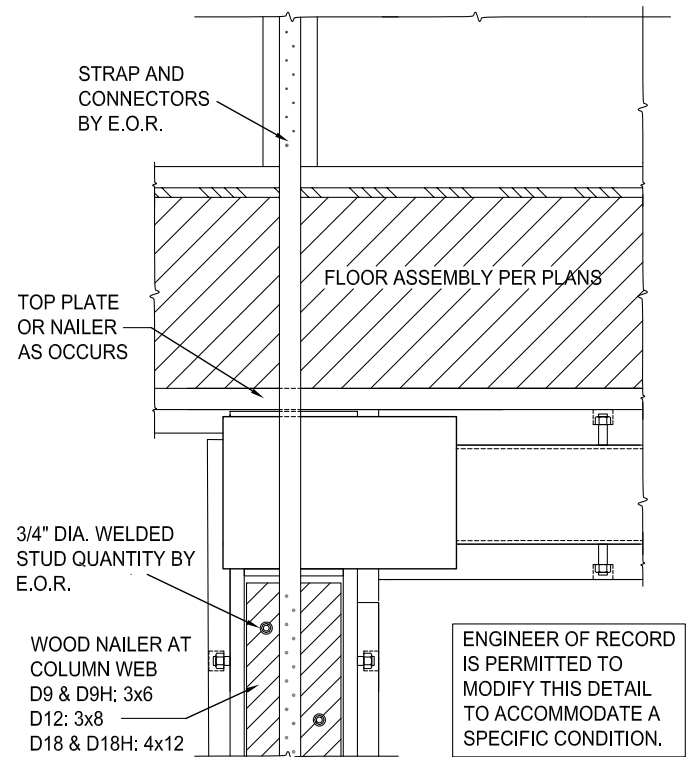
**SECTION @ HEADER - BOTTOM CORD BEARING JOIST**

6



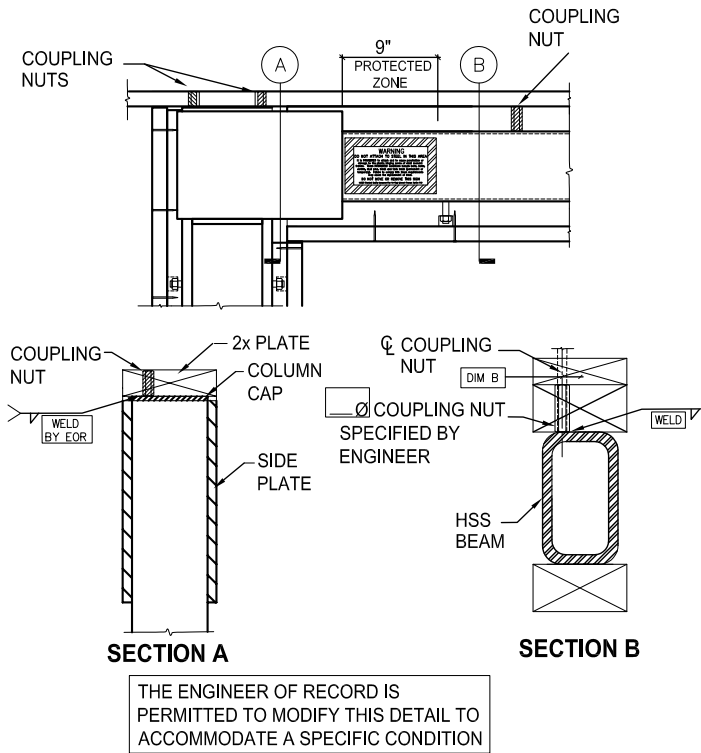
**SECTION @ HEADER WITH JOIST HANGING**

7

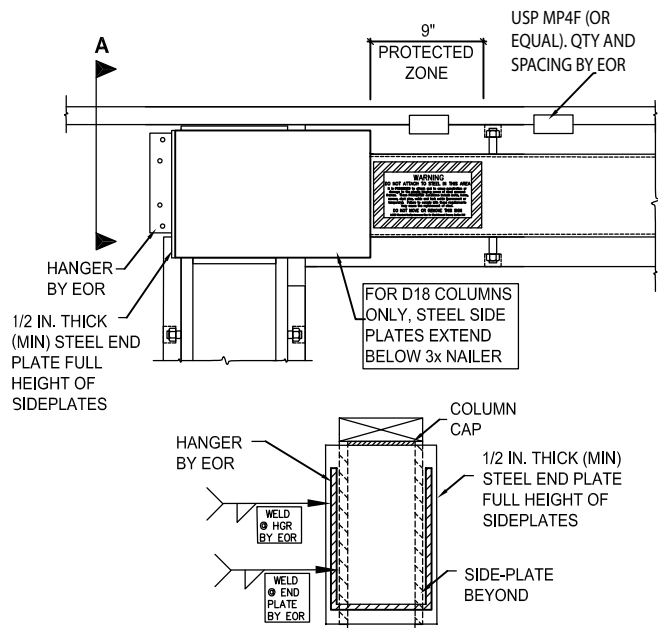


**HOLD DOWN STRAP TO COLUMN WEB**

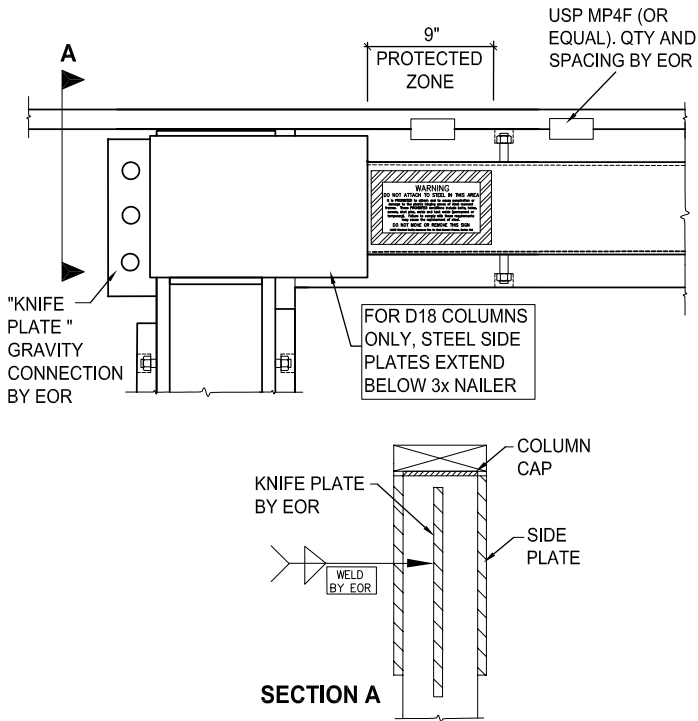
8



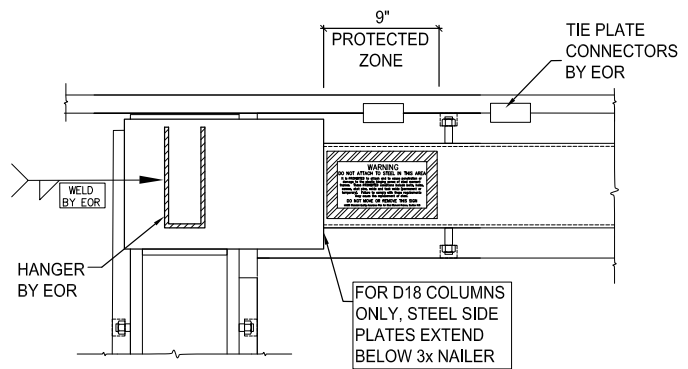
**WELDED COUPLING NUTS** 9



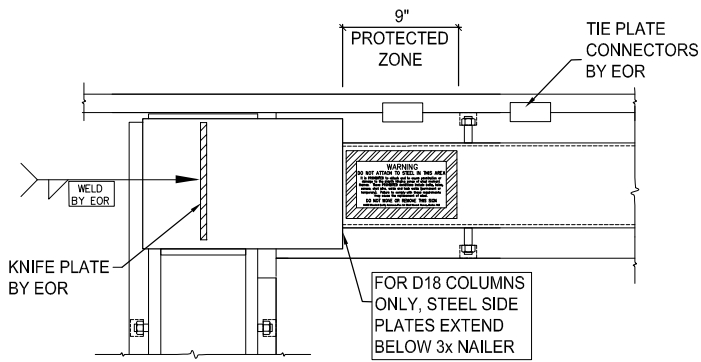
**HANGER @ COLUMN FLANGE** 10



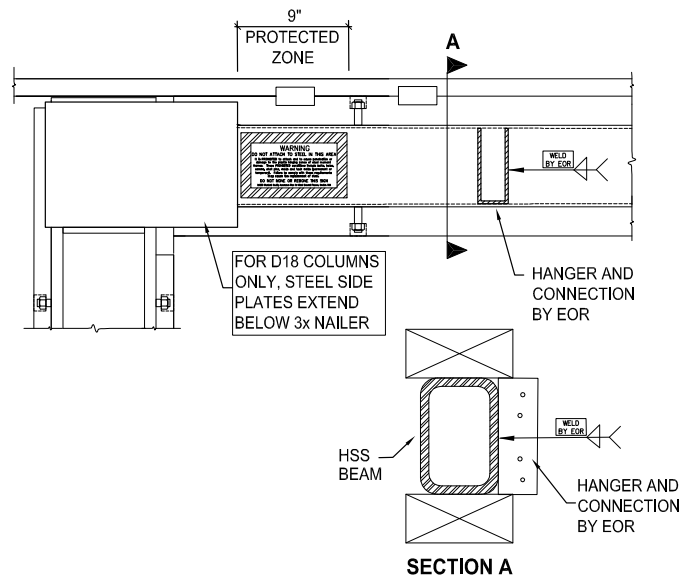
**STEEL BEAM TO COLUMN FLANGE** 11



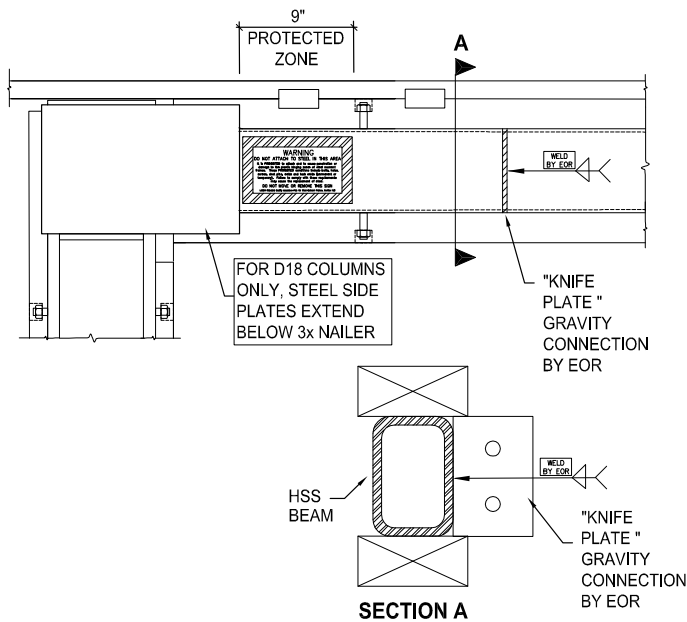
**HANGER @ SIDEPLATE FACE** 12



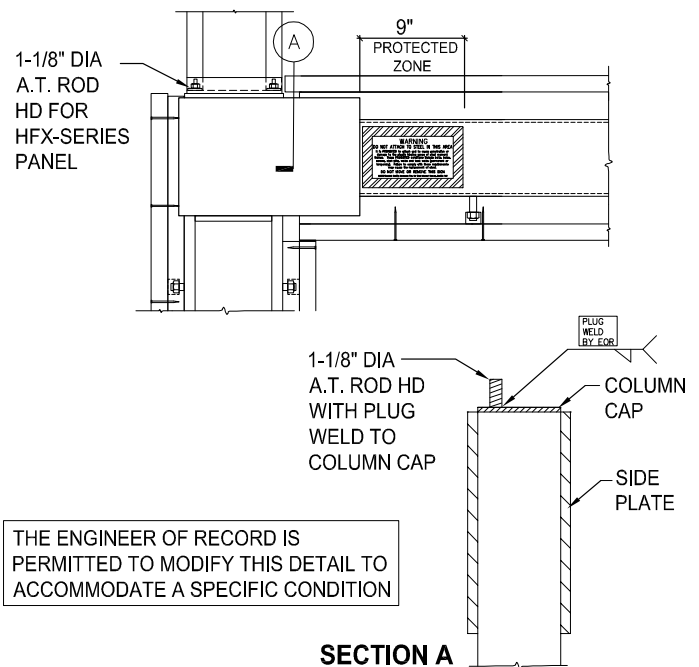
**KNIFE PLATE TO SIDEPLATE FACE** 13



**HANGER TO HEADER** 14



**KNIFE PLATE TO HEADER** 15



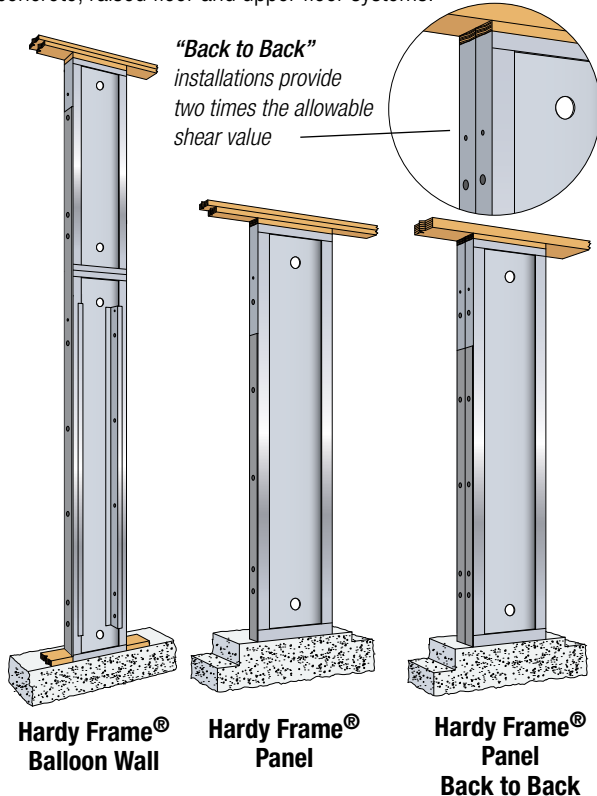
**PANEL WITH ANCHORS ATTACHED TO MOMET FRAME BELOW** 16

## Hardy Frame<sup>®</sup> Panels, Brace Frames and Accessories

### General Information

Hardy Frames has been leading the pre-manufactured shear wall industry from its beginning. We were the first to be recognized by ICBO-ES and LA City, first to gain approval for multi-story applications, first Balloon Wall application and first to be recognized to comply with the 2003 and 2006 IBC and IRC Building Codes. Today we are the first, and only, to offer a 9 inch Panel width and a Balloon Wall application that is fully assembled in the manufacturing plant and ships as a one piece unit.

All Hardy Frame<sup>®</sup> Panels and Brace Frames are code listed in ICC-ES ESR-2089 under the 2006 and 2009 IBC Codes and include installations on concrete, raised floor and upper floor systems.

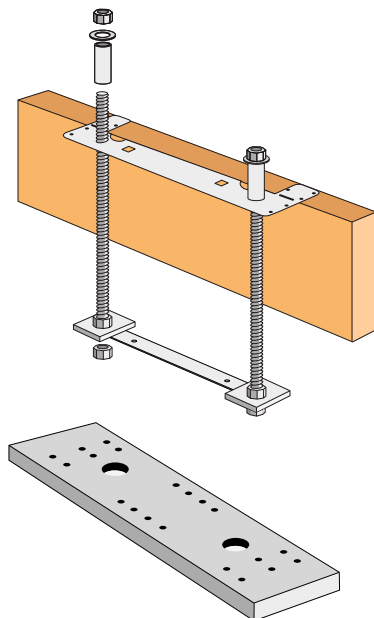
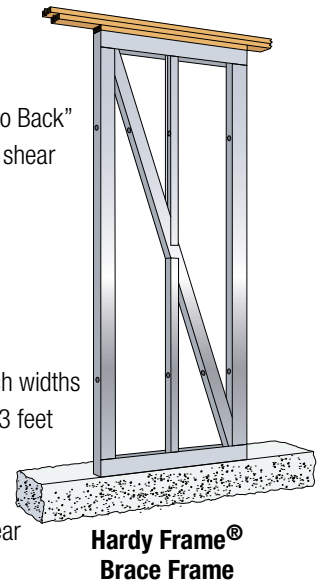


### Hardy Frame<sup>®</sup> HFX-Series Panels

- Panels are available in 9, 12, 18 and 24 inch widths
- Standard Heights range from 78 inches for portal applications to 20 feet for Balloon Walls
- Custom heights are manufactured routinely
- R Value for design = 6.5, Cd = 4.0
- With proper detailing and anchorage "Back to Back" installations provide two times the allowable shear value without increasing the wall width

### Hardy Frame<sup>®</sup> HFX-Series Brace Frames

- Brace Frames are available in 32 and 44 inch widths
- Standard Heights range from nominal 8 to 13 feet
- Custom heights are manufactured routinely
- R Value for design = 6.5, Cd = 4.0
- For a given shear load, installing a wider shear wall results in reduced overturning



### Template Kit (HFXTK)

Includes:

- One Template for accurate anchor spacing and alignment
- One Bolt Brace for installation at embed end of anchors to prevent independent sway while pouring concrete
- Two 1-1/8 inch diameter hold down anchors
- Six Grade 8 hex nuts
- Two hardened round washers
- Two 1/2 x 3 x 3 plate washers are included when high strength (HS) anchors are specified

### Hardy Frame Bearing Plate (HFXBP)

- 3/4" thick x 3 1/2" wide ASTM A36 steel
- Length extends 3" beyond Panel edges. Check for outside corner conditions!
- Reduces wood deformation from overturning forces
- Reduces effects of shrinkage by eliminating bottom plate

*Note: The allowable values in raised floor and upper floor tables assume installation of HFXBP. Installation without a HFXBP may result in a reduction of allowable loads.*

# Hardy Frame® Moment Frame Non-Standard Worksheet

(Please complete one form for each application and fax to Hardy Frame, Inc. 805.477.0993)

Date: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Company: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

Email: \_\_\_\_\_

Address: \_\_\_\_\_

Project: \_\_\_\_\_

City: \_\_\_\_\_

Building Code: \_\_\_\_\_

R: \_\_\_\_\_ Cd : \_\_\_\_\_

Quantity: \_\_\_\_\_

Single Story In Plane Design Shear Required:

$V_1$  (ASD) \_\_\_\_\_ lbs.

$P_1$  DL \_\_\_\_\_ lbs.  $P_1$  LL \_\_\_\_\_ lbs.

$P_1$  snow \_\_\_\_\_ lbs.  $P_1$  seismic \_\_\_\_\_ lbs.

Two Story In Plane Design Shear Required (as applicable):

$V_2$  (ASD) \_\_\_\_\_ lbs.

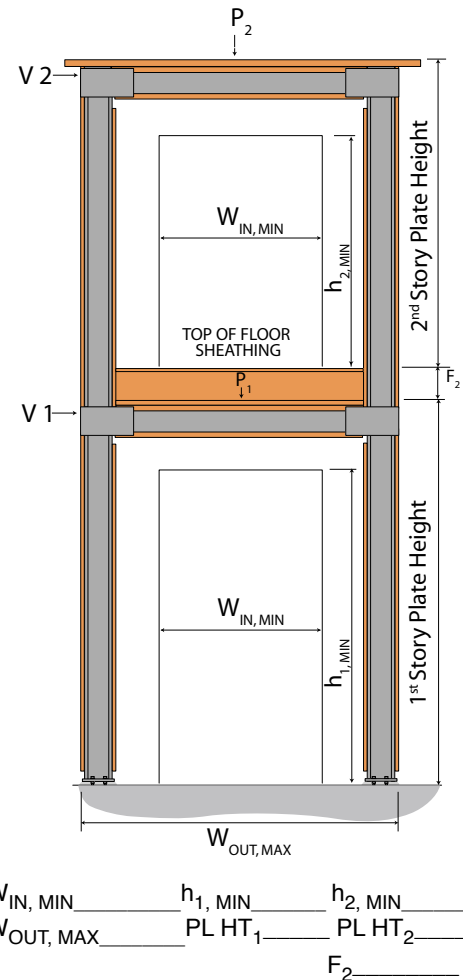
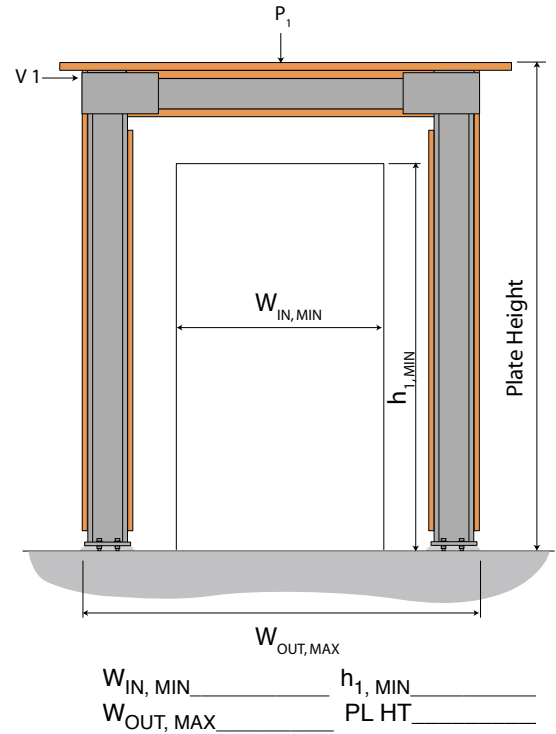
$P_2$  DL \_\_\_\_\_ lbs.  $P_2$  LL \_\_\_\_\_ lbs.

$P_2$  snow \_\_\_\_\_ lbs.  $P_2$  seismic \_\_\_\_\_ lbs.

Unless otherwise noted, drift is assumed to be limited to 0.025 hsx nailers will be included per standard provisions and floor joist will be considered as bearing vs. hanging.

Notes and additional information

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## Available Tools From Hardy Frames, Inc.

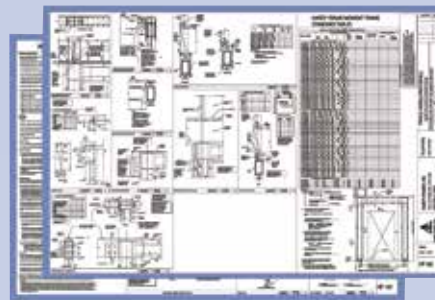
### CD-ROM

CD-ROM information includes Code Reports, Typical Installation Details, Tables and Catalogs for all Hardy Frame Products.



### Typical Installation Detail Pages

Hardy Frames, Inc. provides Typical Installation Sheets in plan format. These sheets are available in AutoCAD and pdf files, or you may request a hard copy. The information provided may be submitted with building plans as supplemental pages or specific details can be incorporated into the plan set as needed.



### Hardy Frame® Moment Frame Calculation Package

For all designs Hardy Frames, Inc. provides a complete Hardy Frame Moment Frame Calculation Package that is stamped and signed by a registered Professional Engineer in the State of California. The package covers the Frame, moment connections, structural wood nailer, anchor rods and base plates.



**HARDY<sup>TM</sup> FRAMES<sup>Inc.</sup>**  
A MiTek Company

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Ventura, California 93003 800 754-3030  
[www.hardyframe.com](http://www.hardyframe.com)