Strong-Wall® Site-Built Portal Frame System
for Prescriptive Design

TO BE USED WITH DESIGNS CONFORMING TO THE INTERNATIONAL RESIDENTIAL CODE® (IRC)
The Strong-Wall site-built portal frame system (PFS) provides Designers, builders and contractors in prescriptive markets with an easy way to meet code-required wall-bracing requirements with narrow wall widths. Simple and quick to install, the PFS is a cost-effective alternative to IRC braced-wall solutions.

- **Narrow wall width** — 10" or 12" nominal column sizes allow builders to maintain narrow return walls at garage openings and allow Designers to maximize portal openings in standard wall framing, such as for large picture windows or sliding glass doors.

- **Easy to assemble** — saves time for the installer and increases the confidence of the specifier that it will be installed properly.

- **Cost effective** — site-built portal frames are less expensive than prefabricated shearwalls or moment frames.

- **Equivalent wall length** — Designers need as much equivalent wall length as possible to economically design structures.

### Single-Wall Portal (PFS-HKS)

- (2) Holdown assemblies
- (2) Composite standoff bases*
- (5) Moment connection straps
- (1) Adjustable post base (ABW44Z)
- (33) SDW22300 truss-ply screws
- (8) SD9112 Connector screws
- (1) 6-lobe T40 driver bit
- (1) Installation instructions (T-L-PFUSHWIN19)

### Double-Wall Portal (PFS-HKD)

- (4) Holdown assemblies
- (4) Composite standoff bases*
- (8) Moment connection straps
- (66) SDW22300 truss-ply screws
- (1) 6-lobe T40 driver bit
- (1) Installation instructions (T-L-PFUSHWIN19)

*Extra composite standoff bases included. Use only the base that corresponds to the column width and discard extra base(s).
Portal Frame System Dimensions

<table>
<thead>
<tr>
<th>Acceptable Framing Materials</th>
<th>Minimum Column Sizes (in.)</th>
<th>Minimum Beam Depths (in.)</th>
<th>Rough Opening Dimensions</th>
<th>Max. Total Height (in.)</th>
<th>Anchor Dia.² (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 in. Nominal</td>
<td>(2) 1¼ x 9½</td>
<td>11½</td>
<td>108½</td>
<td>2 min. 18 max.</td>
<td>120</td>
</tr>
<tr>
<td>12 in. Nominal</td>
<td>(2) 1¼ x 11¾</td>
<td>11½</td>
<td>108½</td>
<td>2 min. 18 max.</td>
<td>(2) ¾</td>
</tr>
<tr>
<td>Solid Sawn DF/SP/SPF/HF</td>
<td>(2) 1½ x 9¾</td>
<td>11½</td>
<td>108½</td>
<td>2 min. 18 max.</td>
<td>(1) ½</td>
</tr>
</tbody>
</table>

1. LVL is 2.0E (min.); solid sawn lumber is #2 or better.
2. Anchor bolts are not included in the portal frame system kit. Refer to pages 5–7 for additional information on anchorage.
3. Refer to foundation details for minimum concrete dimensions.
4. Solid sawn columns require a wood shim at the holdown assemblies.

To specify a portal frame system, include the following:

- Single or double hardware kit
- Column size and material
- Beam size and material
- Anchor diameter, adhesive type and embedment depths
- Specific reference to any shim blocking or pony wall assembly details, if applicable
- Include the Simpson Strong-Tie installation detail sheet with your plans and reference the sheet number

Example:

- Simpson Strong-Tie PFS-HKS single wall portal with (2) 2x10 SPF columns with ½" OSB shim, (2) 1¾" x 11¾" LVL beams with ¼" shim
- Simpson Strong-Tie SET-3G™ epoxy, ¼"-diameter all-thread rod, 12" embedment

See Simpson Strong-Tie® PFS installation details on sheet SX.XX
### Portal Frame System Bracing Equivalents for Wind

<table>
<thead>
<tr>
<th>Framing Material</th>
<th>Concurrent Vertical Load on Column (lb.)</th>
<th>Equivalent Wall-Bracing Length (ft.)</th>
<th>Maximum Allowable Beam End Reaction (lb.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10&quot; Nominal Column Size</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single-Wall Portal</td>
<td>Double-Wall Portal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12&quot; Nominal Column Size</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single-Wall Portal</td>
<td>Double-Wall Portal</td>
<td></td>
</tr>
<tr>
<td>LVL</td>
<td>1,000</td>
<td>4.00</td>
<td>8.00</td>
</tr>
<tr>
<td></td>
<td>4,000</td>
<td>4.00</td>
<td>8.00</td>
</tr>
<tr>
<td></td>
<td>7,500</td>
<td>3.75</td>
<td>7.50</td>
</tr>
<tr>
<td>DF/SP</td>
<td>1,000</td>
<td>3.00</td>
<td>6.00</td>
</tr>
<tr>
<td>SPF/HF</td>
<td>1,000</td>
<td>2.75</td>
<td>5.50</td>
</tr>
</tbody>
</table>

1. The Strong-Wall site-built portal frame system (PFS) is applicable for use up to a height of 10' max. The height is permitted to be increased to 12' with a 2" max. pony wall. Allowable wall-bracing length must be multiplied by a 0.80 factor.
3. Use limited to single-story and the first of two-story applications.
4. Concurrent vertical load denotes the total maximum concentric vertical load permitted on the panel acting in combination with the lateral wind loading.
5. The Designer is responsible for the beam design. The reaction at beam/column interface shall not exceed the tabulated maximum allowable beam end reaction for each material type.
6. Minimum header depths for LVL and solid sawn are 11 7/8" and 11 1/4" respectively.
7. Solid sawn columns may be used in combination with LVL header material. Wall-bracing length is limited to that of the solid sawn material. Shims illustrated in LVL — Solid Sawn detail below must be used for proper framing alignment.
8. For 10" nominal DF/SP and SPF/HF systems constructed with shim at holdown only, vertical load is limited to 2,500 lb.

### Wood Framing Details

- **LVL Assembly (no shim block required)**
  - 12" tall, full-width wood structural panel shim block, ¾" min.
  - 2x Solid Sawn Assembly with Shim Block at Holdown Only (2,500 lb. max. vertical load for 10" nominal column)

- **Full-height/length wood structural panel shim blocks, ¾" min.**

- **2x Solid Sawn Assembly with Full Height and Full-Length Shim Blocks**
  - Wood structural panel shim block, ¾" min.

- **2x Solid Sawn Column with LVL Beam Assembly**
  - Wood structural panel shim block, ¾" min.

- **Sheath all framing with min ¾" wood structural panel sheathing. Fasten with 0.131" x 2½" @ 6:12 per IRC table R602.3(3).**
  - For shear transfer and for out-of-plane resistance of pony wall framing.

### Pony Wall Assembly Requirements

- **Pony wall height**
- **Full-height stud on both sides required per Designer**
- **10' max.**
- **Strap per IRC table R602.10.6.4 (opposite side)**
- **Fasten with 0.162" x 3½" @ spacing per Designer. Fastener quantity must meet or exceed strap capacity.**
- **All framing attached to and around PFS must meet fastening requirements of IRC table R602.3**
Slab on Grade Anchorage

Portal Frame System Anchorage for Wind, Slab on Grade

<table>
<thead>
<tr>
<th>Material</th>
<th>Application</th>
<th>Embedment Depth, (d) (in.)</th>
<th>Minimum Footing Dimensions (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2,500 psi Concrete</td>
<td>3,000 psi Concrete</td>
</tr>
<tr>
<td>LVL</td>
<td>Garage Curb</td>
<td>SET-3G™</td>
<td>AT-XP®</td>
</tr>
<tr>
<td></td>
<td>Midwall</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>DF/SP</td>
<td>Garage Curb</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Midwall</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>SPF/HF</td>
<td>Garage Curb</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Midwall</td>
<td>12</td>
<td>12</td>
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</tbody>
</table>

1. Post-installed anchor rods shall be 5/8"-diameter ASTM F1554 Grade 36 or ASTM A 36 minimum threaded rods.
2. Post-installed solutions must be installed with Simpson Strong-Tie SET-3G or AT-XP anchoring adhesives.
3. Tabulated embedment depths are based on 10'-tall portal frame. Visit the Strong-Wall® Bracing Selector software at strongtie.com for anchorage solutions specific to frame, material and use.
Brick Ledge Anchorage

Portal Frame System Anchorage for Wind, Brick Ledge

<table>
<thead>
<tr>
<th>Material</th>
<th>Application</th>
<th>Embedment Depth, d_e (in.)</th>
<th>Minimum Footing Dimensions (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2,500 psi Concrete</td>
<td>3,000 psi Concrete</td>
</tr>
<tr>
<td>LVL</td>
<td>Garage Curb</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Midwall</td>
<td></td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>DF/SP</td>
<td>Garage Curb</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Midwall</td>
<td></td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>SPF/HF</td>
<td>Garage Curb</td>
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<tr>
<td>Midwall</td>
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<td>12</td>
<td>12</td>
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</tbody>
</table>

1. Post-installed anchor rods shall be \( \frac{1}{4} \)-diameter ASTM F1554 Grade 36 or ASTM A 36 minimum threaded rods.
2. Post-installed solutions must be installed with Simpson Strong-Tie SET-3G or AT-XP anchoring adhesives.
3. Tabulated embedment depths are based on 10'-tall portal frame. Visit the Strong-Wall® Bracing Selector software at strongtie.com for anchorage solutions specific to frame, material and use.
**Stemwall Anchorage**

Portal Frame System Anchorage for Wind, Stemwall

<table>
<thead>
<tr>
<th>Material</th>
<th>Application</th>
<th>Embedment Depth, $d_e$ (in.)</th>
<th>Minimum Stemwall Dimensions (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2,500 psi Concrete</td>
<td>3,000 psi Concrete</td>
</tr>
<tr>
<td>LVL</td>
<td>Garage Curb</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Midwall</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>DF/SP</td>
<td>Garage Curb</td>
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<td>17</td>
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<tr>
<td>SPF/HF</td>
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<tr>
<td></td>
<td>Midwall</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

1. Post-installed anchor rods shall be $5/8”$-diameter ASTM F1554 Grade 36 or ASTM A 36 minimum threaded rods.
2. Post-installed solutions must be installed with Simpson Strong-Tie SET-3G or AT-XP anchoring adhesives.
3. Tabulated embedment depths are based on 10’-tall portal frame. Visit the Strong-Wall® Bracing Selector software at strongtie.com for anchorage solutions specific to frame, material and use.

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**Plan View**

- Garage Curb
- Midwall

**Section View**

- Anchor rod
- 1¼”
- #4 rebar (min.)

**Elevation View**

- Garbage Curb
- Garage Curb
- Footing depth required by code
- 12” max.
- 10¾” min. for 10” nominal column
- 12¼” min. for 12” nominal column
- 2”–4”

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**Diagram:**

- Anchor bolts
- Plan View
- Perspective View
- Garage Curb
- Midwall
Software


Wall-Bracing Length Calculator

The Wall-Bracing Length Calculator helps the user navigate the complex wall-bracing requirements in the IRC.

- Easy-to-use interface
- Determines total length of bracing required along a braced wall line
- Includes all adjustment factors for both wind and seismic loading
- Print consolidated output for multiple braced wall lines

Strong-Wall Bracing Selector

In areas where the code-defined bracing methods are not adequate, use the Strong-Wall Bracing Selector to help choose a Wood or Steel Strong-Wall wall-bracing replacement.

- Step-by-step tutorials guide you through the design process
- Print designs for project submittal
- Save and upload designs

Visit strongtie.com/pfs for information and to try these design tools.

Structural Details

Simple-to-download detail sheets are available in .dwg, .dxf and .pdf formats at strongtie.com/pfs.