**BACK TO BACK REINFORCED ANCHORAGE (BB-RA)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Panel Width (in)</th>
<th>Anchorage Code</th>
<th>Rod Dia (in)</th>
<th>Rod Grade</th>
<th>BB-RA</th>
<th>Shear Ties</th>
<th>(8 x #4)</th>
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<tbody>
<tr>
<td>HFX-9x</td>
<td>9</td>
<td>1-1/8-STD-BB-RA</td>
<td>STD</td>
<td>13</td>
<td>10-3/4</td>
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<tr>
<td>HFX-12x</td>
<td>12</td>
<td>1-1/8-STD-BB-RA</td>
<td>HS</td>
<td>18</td>
<td>10-3/4</td>
<td>8 - #4</td>
<td></td>
</tr>
<tr>
<td>HFX-15x</td>
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<td>1-1/8-STD-BB-RA</td>
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<td>HFX-24x</td>
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**REINFORCED ANCHORAGE (RA)**

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<th>RA</th>
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<th>(8 x #4)</th>
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<td>HFX-12x</td>
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<td>1-1/8-STD-RA</td>
<td>HS</td>
<td>15</td>
<td>6</td>
<td>6 - #4</td>
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<tr>
<td>HFX-15x</td>
<td>15</td>
<td>1-1/8-STD-RA</td>
<td>STD</td>
<td>15</td>
<td>6</td>
<td>6 - #4</td>
<td></td>
</tr>
<tr>
<td>HFX-18x</td>
<td>18</td>
<td>1-1/8-STD-RA</td>
<td>HS</td>
<td>15</td>
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<td>6 - #4</td>
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<tr>
<td>HFX-21x</td>
<td>21</td>
<td>1-1/8-STD-RA</td>
<td>STD</td>
<td>15</td>
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<td>6 - #4</td>
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</tr>
<tr>
<td>HFX-24x</td>
<td>24</td>
<td>1-1/8-STD-RA</td>
<td>HS</td>
<td>15</td>
<td>6</td>
<td>6 - #4</td>
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</tr>
</tbody>
</table>

**BB-RA SECTIONS & ELEVATIONS**

**RA SECTIONS & ELEVATIONS**

**IMPORTANT NOTES**
- BB-RA SHEAR TIES & STIRRUPS
- RA SHEAR TIES & STIRRUPS
- CURB (12" MIN WIDTH)
- EXTERIOR SLAB
- INTERIOR SLAB
- CURB @ OUTSIDE CORNER
- CONTINUOUS FOOTING

**KEY**
- A = 2-1/2" o.c.
- B = 1-1/4" ea
- Side of HD

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**DATE:** 1-1-2016

**REVISIONS DATE**

**REMARKS**
- This detail sheet is not proprietary and is not required for plan submittal with Hardy Frame products.
- Anchorage Details — HFX Panels
- Shear Wall System
Anchorage Details — HFX Panels

**UNREINFORCED ANCHORAGE (UA)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Panel Height</th>
<th>Anchorage</th>
<th>Rod Dia</th>
<th>Rod Grade</th>
<th>UA Grade</th>
<th>Shear 7.8</th>
<th>Details</th>
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<tr>
<td>HFX-9x</td>
<td>79.5” - 8”</td>
<td>1-1/8-STD-13-19</td>
<td>STD 13</td>
<td>STD 19</td>
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<tr>
<td>HFX-12x</td>
<td>79” - 10”</td>
<td>1-1/8-STD-20-30</td>
<td>HS 20</td>
<td>HS 30</td>
<td>2 - #3</td>
<td></td>
<td></td>
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<tr>
<td>HFX-15x, 18”</td>
<td>79” - 13”</td>
<td>1-1/8-STD-14-20</td>
<td>STD 14</td>
<td>STD 20</td>
<td>2 - #3</td>
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<tr>
<td>HFX-15x, 15”</td>
<td>14” - 20”</td>
<td>1-1/8-STD-20-30</td>
<td>HS 20</td>
<td>HS 30</td>
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<tr>
<td>HFX-21x, 24”</td>
<td>79” - 13”</td>
<td>1-1/8-STD-14-20</td>
<td>STD 14</td>
<td>STD 20</td>
<td>2 - #3</td>
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<tr>
<td>HFX-21x, 24”</td>
<td>14” - 30”</td>
<td>1-1/8-STD-20-30</td>
<td>HS 20</td>
<td>HS 30</td>
<td>2 - #3</td>
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**SHEAR TIES NOT REQUIRED WHEN**

- BB-RA SHEAR TIES & STIRRUPS
- BB-RA SECTIONS & ELEVATIONS
- RA SECTIONS & ELEVATIONS
- UA SECTIONS & ELEVATIONS
- HFX ANCHOR CENTERLINES

**TOP OF CONCRETE**

<table>
<thead>
<tr>
<th>Model</th>
<th>Width</th>
<th>A</th>
<th>B</th>
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</thead>
<tbody>
<tr>
<td>HFX-9x</td>
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</tr>
<tr>
<td>HFX-15x</td>
<td>12”</td>
<td>6-1/2”</td>
<td></td>
</tr>
<tr>
<td>HFX-16x</td>
<td>15”</td>
<td>9-3/4”</td>
<td></td>
</tr>
<tr>
<td>HFX-21x</td>
<td>18”</td>
<td>12-3/4”</td>
<td></td>
</tr>
<tr>
<td>HFX-24x</td>
<td>21”</td>
<td>15-3/4”</td>
<td></td>
</tr>
<tr>
<td>HFX-24x</td>
<td>24”</td>
<td>18-3/4”</td>
<td></td>
</tr>
</tbody>
</table>

**IMPORTANT NOTES**

1. Anchorages are designed for tensile and shear transfer only, foundation design per EOR.
2. Reinforcement shown is the minimum requirement and is not intended to replace reinforcement designed by the EOR.
3. For RA and BB-RA installations, the HFXB bolt brace may be placed on top of the stirrups provided double-nuts are installed at the embed end of the anchor rods. (Note: 3/8” x 3” x 3” plate washers are required to be double-nutted at embed end of high strength anchor rods.)
4. High strength all-thread rods provided by Hardy frames are stamped on both ends.

**HFX DETAILS**

1. Shear Ties per UA Table
2. 10” Max or per Plans
3. Be per Table
4. C1 per Table
5. Z from Top of Concrete to GL of Shear Tie
6. 1” CL @ Upper Two Ties
7. Shear Ties per RA Table when Top of Concrete is 8” above Top of Slab
8. 12” Min
9. C1 per Table

** table notes**

1. Designs are to resist loading per ACI 318-11 D.3.3.4.3.
2. STD indicates Anchors complying with ASTM F1554 Grade 36 with a Hardy Frame Bolt Brace (HFXB) installed with double nuts on the embed end.
3. HS indicates Anchors complying with ASTM A193 Grade B7 with a 1 1/2” x 3” x 3” plate washer installed with double nuts on the embed end (HFXB not required).
4. Be = length of embedment from the top of footing or grade beam to the top of the HFXB bolt brace (top of the embedded plate washer @ HS anchors)
5. Ca = distance from HD Centerline to the edge of the footing or grade beam.
6. Ca = distance from HD Centerline to both the front and the back face of the footing or grade beam.
7. Shear Ties are Grade 60 (Min) rebar that are required for near edge distance conditions per ACI-316-11, fs = 2,500 psi. Curves and stem walls must be 6 inch (min) width for UA and RA, 12 inch (min) width for BB-RA.
8. For UA applications shear ties are not required when the installation is away from the edge (see detail 1A), installation on wood framing, or for IRC Braced Wall Panel applications.
9. Stirrups are Grade 60 (Min) rebar. See table for size and spacing. See “Stirrup Layout” diagrams and “Key” for layout patterns.
10. Concrete Edge Distances must comply with ACI 318-11 D8.2.
BACK TO BACK INSTALLATION

1. CAVITY ORIENTED FOR CONNECTION ACCESS.
2. 1 EA. HARDENED ROUND, 2 E.A. SAE OR 2 EA. ROUND-FLAT WASHERS AND 1 EA. GRADE 8 HEX NUT AT BOTH ENDS. SEE HFX1 FOR ANCHORAGE.
3. 6 INCH FRAMING ABOVE (MIN). 5/8 INCH FRAMING ABOVE (MIN).
4. A 2x FILLER WITH 1/4" x 4 1/2" MIN USP-WS SCREWS (OR EQUAL) IS PERMITTED.
5. WOOD BACKING FIELD INSTALLED AS NEEDED.

BALLOON WALL INSTALLATION

1. 1 1/4" FEET OR EQUIVALENT MOISTURE BARRIER RECOMMENDED BETWEEN PANEL BASE AND CONCRETE.
2. 1 EA. HARDENED ROUND, 2 EA. SAE OR 2 EA. ROUND FLAT WASHERS AND 1 EA. GRADE 8 HEX NUT. SEE HFX1 FOR ANCHORAGE.
3. WELDED CONNECTION BY HARDY FRAMES, INC. (NO FIELD CONNECTION REQUIRED).
4. A 2x FILLER WITH 1/4" x 4 1/2" MIN USP-WS SCREWS (OR EQUAL) IS PERMITTED.
5. WHEN REQUIRED BY THE BUILDING DESIGN PROFESSIONAL, ATTACH ADJACENT WOOD MEMBERS TO PANEL WITH 1 1/4"x 4 1/2" MIN USP-WS SCREWS (OR EQUAL) THROUGH THE PANEL EDGE INTO THE WOOD MEMBER.

TOP CONNECTION W/4x FILLER

1. 4x WOOD FILLER WITH USP MIN-4 CONNECTORS (OR EQUAL) BY BUILDING DESIGN PROFESSIONAL.
2. 1" x 3" MIN USP WS-SERIES SCREWS (OR EQUAL). QUANTITY PER TABLES
3. ADJACENT FRAMING WITH 1/4" DIAMETER SCREWS IS INSTALLED AT THE EDGES WHEN INSTALLING A 4x FILLER ABOVE OR WHEN SPECIFIED BY DESIGN PROFESSIONAL.
4. OPTIONAL LEDGER PRE-DRILL 3/16" DIAM HOLES, EVENLY SPACED IN FACE OF PANEL AND INSTALL 1/4" DIAM WOOD SCREWS INTO 2x MIN WOOD LEDGER INSTALLED IN PANEL CAVITY.
5. CONNECTOR AND ATTACHMENT BY BUILDING DESIGN PROFESSIONAL.

TOP PLATE CONNECTIONS

1. 15F FELT OR EQUIVALENT MOISTURE BARRIER RECOMMENDED BETWEEN PANEL BASE AND CONCRETE.
2. 1 EA. HARDENED ROUND, 2 EA. SAE OR 2 EA. ROUND-FLAT WASHERS AND 1 EA. GRADE 8 HEX NUT AT BOTH ENDS. SEE HFX1 FOR ANCHORAGE.
3. ADJACENT FRAMING WITH 1/4" DIAMETER SCREWS IS INSTALLED AT THE EDGES WHEN INSTALLING A 4x FILLER ABOVE OR WHEN SPECIFIED BY DESIGN PROFESSIONAL.

RAISED FLOOR HEAD-OUT

1. 15F FELT OR EQUIVALENT MOISTURE BARRIER RECOMMENDED BETWEEN PANEL BASE AND CONCRETE.
2. 1 EA. HARDENED ROUND, 2 EA. SAE OR 2 EA. ROUND-FLAT WASHERS AND 1 EA. GRADE 8 HEX NUT, SEE HFX1 FOR ANCHORAGE.

INSTALLATION ON 2x PLATE

1. PLUS OR MINUS 1-1/2" GAP TO BE FILLED WITH MIN. 5,000 PSI STRENGTH NON-SHRINK GROUT.
2. 1 EA. HARDENED ROUND, 2 EA. SAE OR 2 EA. ROUND-FLAT WASHERS AND 1 EA. GRADE 8 HEX NUT, SEE HFX1 FOR ANCHORAGE.

INSTALLATION ON FOUNDATION

1. PLUS OR MINUS 1-1/2" GAP TO BE FILLED WITH MIN. 5,000 PSI STRENGTH NON-SHRINK GROUT.
2. 1 EA. HARDENED ROUND, 2 EA. SAE OR 2 EA. ROUND-FLAT WASHERS AND 1 EA. GRADE 8 HEX NUT, SEE HFX1 FOR ANCHORAGE.

INSTALLATION ON NUTS & WASHERS

1. PLUS OR MINUS 1-1/2" GAP TO BE FILLED WITH MIN. 5,000 PSI STRENGTH NON-SHRINK GROUT.
2. 1 EA. HARDENED ROUND, 2 EA. SAE OR 2 EA. ROUND-FLAT WASHERS AND 1 EA. GRADE 8 HEX NUT, SEE HFX1 FOR ANCHORAGE.
NOTES:
1. ATTACHMENTS MAY BE MADE AT SCREW HOLES PROVIDED OR WITH SELF TAPPING SCREWS.
2. 6x HEADER.
3. WOOD MEMBERS MAY BE INSERTED VERTICALLY OR HORIZONTALLY IN CAVITY FOR BACKING AS NEEDED.

6X HEADER ABOVE-SECTION

1A. WELDED STRAPS ARE AVAILABLE FROM MANUFACTURER WHEN REQUIRED BY THE DESIGN PROFESSIONAL.
1B. WHEN STRAPS ARE FIELD INSTALLED THE DESIGN AND CONNECTION IS BY THE DESIGN PROFESSIONAL. CONNECTION TO PANEL WITH SELF TAPPING SCREWS IS PERMITTED.
2. A 2x WOOD FILLER WITH 1/4"x4-1/2" (MIN.) USP "WS" SERIES SCREWS OR EQUAL IS PERMITTED.
3. WHEN CRIPPLE STUDS OCCUR, SHEAR TRANSFER DESIGN TO BE PER THE DESIGN PROFESSIONAL.
4A. THERE IS NO "INSIDE" OR "OUTSIDE" FACE OF PANEL. TO PREVENT THE NEED FOR ADDITIONAL HOLES ORIENT THE PANEL CAVITY TOWARD THE FIXTURE BEING INSTALLED.
4B. A 1/2 IN. HOLE MAY BE ADDED IN THE PANEL. FACE WHEN IT IS LOCATED IN THE UPPER HALF OF THE PANEL, HEIGHT AND IS 4" MIN. FROM ANY EDGE, FOR PANELS MORE THAN 1/2" WIDE, ADDITIONAL HOLES MUST ALSO BE 1" MINIMUM ABOVE AND BELOW THE 3/4 IN. HOLE PROVIDED.
4C. FOR HOLES LARGER THAN 1/2 IN. OR TO ADD MORE THAN ONE HOLE CONTACT HARDY FRAMES INC.

TOP CONNECTION TO HEADER

1. 15A FELT OR EQUIVALENT MOISTURE BARRIER RECOMMENDED BETWEEN PANEL BASE AND CONCRETE.
2. 1 EA. HARDENED ROUND 2 EA. SAE OR 2 EA. ROUND FLAT WASHERS AND 1 EA. GRADE 8 HEX NUT.
3. ADJACENT FRAMING OPTIONAL U.N.O. BY BUILDING DESIGN PROFESSIONAL.

HFX-SERIES 78 IN. THRU 13 FEET

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Net Height (in)</th>
<th>Hold Down Diameter 1 (in)</th>
<th>Top Screw Qty 2 (ea)</th>
<th>Screw Qty Available at Edges (ea)</th>
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<tbody>
<tr>
<td>HFX-12.15, 18.21 &amp; 24x29</td>
<td>78-1/2</td>
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BALLOON PANELS 14 FEET THRU 20 FEET

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<th>Model Number</th>
<th>Net Height (in)</th>
<th>Hold Down Diameter 1 (in)</th>
<th>Top Screw Qty 2 (ea)</th>
<th>Screw Qty Available at Edges (ea)</th>
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</table>

INSTRUCTION INSTRUCTIONS

A) WHEN INSTALLING DIRECTLY ON CONCRETE, PLACE PANELS AND CONNECT WITH 1 EA. HARDENED ROUND, 2 EA. ROUND FLAT OR 2 EA. SAE WASHERS BELOW (1 EA) GRADE 8 OR 2H HEAVY HEX NUT. SECURE WITH A DEEP SOCKET (RECOMMENDED) UNTIL "SNUG TIGHT".
B) IF BOTTOM CONNECTION IS NOT DETAINED ON PLANS, CONFIRM WITH DESIGN PROFESSIONAL BEFORE INSTALLING ON NUTS & WASHERS OR ON A MUDSLIP.
C) USE 1/4"x4-1/2" USP-WS SERIES SCREWS (OR EQUAL) AT TOP CONNECTIONS WITH A 2x KIT. IF THE TOP PANEL IS IN DIRECT CONTACT WITH THE COLLECTOR ABOVE (TOP PLATES, HEADER, BEAM, ETC.) USE 1/4"x3" "MINIMUM"
D) FOR INSTALLATIONS WITH A 4" KIT ABOVE 1/4" DIAMETER SCREWS ARE REQUIRED AT THE PANEL EDGES TO BRACE FOR THE OUT-OF-PLANE HINGE OR WHEN THEY ARE SPECIFIED BY THE DESIGN PROFESSIONAL.

NOTES:
1) SURFACE FINISHES, CONNECTORS AND FIXTURES ARE ATTACHED TO THE PANEL FACE WITH 15% SELF TAPPING SCREWS SPACED NO LESS THAN 120 DEG.
2) ATTACHMENTS TO THE PANEL SIDES ARE MADE WITH 15% SELF TAPPING SCREWS.
3) STRUCTURAL CONNECTIONS ARE TO BE DESIGNED BY THE DESIGN PROFESSIONAL.
4) STRUCTURAL HARDWARE USED TO TRANSFER LOADS SHOULD NOT EXCEED 12 GAUGE.
Floor System Details — HFX Panels

**SHEAR WALL SYSTEM**

1. **RAISED-OS CORNER**
   - 1/4" x 3/8" DRILL DEEP HOLE (1/2" Chief Hole, 1/4" Chief Hole)
   - Floor beams and hangers for bearing plate (beams)
   - CRIPPLE WALL above BEARING PLATE
   - 4 THRU BOLT STAGGERED TO POST
   - 3 POST ON DBL. NUT
   - 1 1/4" STEEL BM-WELDED HD WOOD BM WELDED TO PANEL
   - 1 1/4" STEEL BM-WELDED HD WOOD BM THRU BOLT

2. **RAISED BEARING PL**
   - 1/4" x 3/8" DRILL DEEP HOLE (1/2" Chief Hole, 1/4" Chief Hole)
   - Floor beams and hangers for bearing plate (beams)
   - CRIPPLE WALL above BEARING PLATE
   - 4 THRU BOLT STAGGERED TO POST
   - 3 POST ON DBL. NUT
   - 1 1/4" STEEL BM-WELDED HD WOOD BM WELDED TO PANEL
   - 1 1/4" STEEL BM-WELDED HD WOOD BM THRU BOLT

3. **RAISED STEM WALL**
   - 1/4" x 3/8" DRILL DEEP HOLE (1/2" Chief Hole, 1/4" Chief Hole)
   - Floor beams and hangers for bearing plate (beams)
   - CRIPPLE WALL above BEARING PLATE
   - 4 THRU BOLT STAGGERED TO POST
   - 3 POST ON DBL. NUT
   - 1 1/4" STEEL BM-WELDED HD WOOD BM WELDED TO PANEL
   - 1 1/4" STEEL BM-WELDED HD WOOD BM THRU BOLT

4. **PYRAMID STACK**
   - 1/4" x 3/8" DRILL DEEP HOLE (1/2" Chief Hole, 1/4" Chief Hole)
   - Floor beams and hangers for bearing plate (beams)
   - CRIPPLE WALL above BEARING PLATE
   - 4 THRU BOLT STAGGERED TO POST
   - 3 POST ON DBL. NUT
   - 1 1/4" STEEL BM-WELDED HD WOOD BM WELDED TO PANEL
   - 1 1/4" STEEL BM-WELDED HD WOOD BM THRU BOLT

5. **STACK @ OS CORNER**
   - 1/4" x 3/8" DRILL DEEP HOLE (1/2" Chief Hole, 1/4" Chief Hole)
   - Floor beams and hangers for bearing plate (beams)
   - CRIPPLE WALL above BEARING PLATE
   - 4 THRU BOLT STAGGERED TO POST
   - 3 POST ON DBL. NUT
   - 1 1/4" STEEL BM-WELDED HD WOOD BM WELDED TO PANEL
   - 1 1/4" STEEL BM-WELDED HD WOOD BM THRU BOLT

6. **STRAIGHT STACK**
   - 1/4" x 3/8" DRILL DEEP HOLE (1/2" Chief Hole, 1/4" Chief Hole)
   - Floor beams and hangers for bearing plate (beams)
   - CRIPPLE WALL above BEARING PLATE
   - 4 THRU BOLT STAGGERED TO POST
   - 3 POST ON DBL. NUT
   - 1 1/4" STEEL BM-WELDED HD WOOD BM WELDED TO PANEL
   - 1 1/4" STEEL BM-WELDED HD WOOD BM THRU BOLT

7. **OPEN WEB TRUSS**
   - 1/4" x 3/8" DRILL DEEP HOLE (1/2" Chief Hole, 1/4" Chief Hole)
   - Floor beams and hangers for bearing plate (beams)
   - CRIPPLE WALL above BEARING PLATE
   - 4 THRU BOLT STAGGERED TO POST
   - 3 POST ON DBL. NUT
   - 1 1/4" STEEL BM-WELDED HD WOOD BM WELDED TO PANEL
   - 1 1/4" STEEL BM-WELDED HD WOOD BM THRU BOLT

8. **STEEL BM-WELDED HD**
   - 1/4" x 3/8" DRILL DEEP HOLE (1/2" Chief Hole, 1/4" Chief Hole)
   - Floor beams and hangers for bearing plate (beams)
   - CRIPPLE WALL above BEARING PLATE
   - 4 THRU BOLT STAGGERED TO POST
   - 3 POST ON DBL. NUT
   - 1 1/4" STEEL BM-WELDED HD WOOD BM WELDED TO PANEL
   - 1 1/4" STEEL BM-WELDED HD WOOD BM THRU BOLT

9. **WOOD BM THRU BOLT**
   - 1/4" x 3/8" DRILL DEEP HOLE (1/2" Chief Hole, 1/4" Chief Hole)
   - Floor beams and hangers for bearing plate (beams)
   - CRIPPLE WALL above BEARING PLATE
   - 4 THRU BOLT STAGGERED TO POST
   - 3 POST ON DBL. NUT
   - 1 1/4" STEEL BM-WELDED HD WOOD BM WELDED TO PANEL
   - 1 1/4" STEEL BM-WELDED HD WOOD BM THRU BOLT
Installation on floor systems with Hardy Frame® Bearing Plate (HFBXP):

A. Install a solid 4x (min) rim in floor system below Panel. Table values assume Engineered Wood Product (EWP).

B. Notch floor sheathing and screw ends of HFBXP to rim with 1/4"x3.5" (min) USP "WS" Series Screws (or equal).

C. Install Panel on HFBXP, connect with threaded rod grade specified in plans and secure base of Panel with Hardened Round Washer and Grade 8 Nut (or equal). Nuts to be snug tight.

D. When stacking to a Panel below, "STK" Panels include "STK" Washers pre-welded in the top channel, or field install "STK" Washer, Hardened Round Washer and a Grade 8 Nut in the top channel of the Panel below.

E. When more than 12 screws are required for minimum bottom screw quantity, install 1/4"x4.5" Screws through Panel base and HFBXP into rim.

F. For standard wall heights, install a 2x filler above Panel (Dil 6/HFBX2). For larger fillers see Dil 10/HFBX2.

Note: Installations may vary with specific job conditions and/or specifications by the Design Professional.
**Hardy Frame® Installation**

**Step 1: Concrete Preparation**

A) Concrete contractor shall use Hardy Frame HFX-Series Templates to accurately place embed bolts for spacing and alignment in the wall.

B) Attach the HFX-Series Template to a formboard at the location specified on plans and install bolts. Install 1/2"x3"x3" plate washers with nuts above and below at hold downs.

C) At interior footings, templates may be secured in place using stakes.

D) Footing design, embed depths, and anchor edge/end distances are per the building design professional.

E) Determine if the Hardy Frame will be installed on concrete or a mudsill. For installation directly on concrete, the recommended bolt height above finished concrete is 2-3/4" and for installation on a 2x mudsill, it is 4-1/4".

**Step 2: First Floor Installation on concrete**

A) Installation of a moisture barrier such as Moistop or 15# felt is recommended under the Frame.

B) Set the Hardy Frame over the embed bolts and install (1) Hardened Round, (2) Round-Flat, or (2) SAE washers and a Grade 8 hex nut.

C) Tighten nuts until snug tight.

D) After framing and plumb & line are complete, place a 2x filler above the Frame to make up the height difference created by eliminating the sill plate, and connect with 1/4" x 4-1/2" screws through the top of the Frame, through the filler and into the double top plates or header above. For fillers larger than 1-1/2" net, refer to detail 3/HFX5.

**Step 2: First Floor Installation on a Sill Plate**

A) If the Hardy Frame is to be installed on a mudsill, plot the bottom plate and cut the length to match the width of the Frame. If located next to a door opening, allow the plate to run into the opening.

B) Set the Hardy Frame over the embed bolts and install (1) Hardened Round, (2) Round-Flat, or (2) SAE washers and a Grade 8 hex nut.

C) Tighten nuts until snug tight.

D) After framing and plumb & line are complete, install 1/4"x3" screws through the top of the Frame into the double top plates or header above. Top plates must be continuous or have a minimum 8' lap at splices.

---

**Shear Ties**

1) Applies to 2500 psi compressive strength concrete, both seismic and wind loading.

2) STD indicates rods complying with ASTM F1554 Grade 36 with a 1/2x3x3 plate washer double nutted on the embed end.

3) HS indicates rods complying with ASTM A 193 Grade B7 (or equal) with a 1/2x3x3 plate washer double nutted on the embed end.

4) Concrete edge distance must comply with ACI-318-08 D8.2.

5) Installation on curbs or stemwalls must be 6 inch width minimum, and require supplemental shear reinforcement per ACI-318-08, fc = 2500 psi.

6) Shear Ties #3 rebar, grade 60 (min).

7) Shear Ties are not required for installations away from Foundation Edge, for installation on wood framing or for Braced Wall Panel applications.

8) Foundation Design is by others.

9) The building design professional is permitted to modify these details to accommodate a specific condition.
**Hardy Frame Installation**

**Step 1: Concrete Preparation**

A) Concrete contractor shall use *Hardy Frame* HFX-Series Templates to accurately place embed bolts for spacing and alignment in the wall.

B) Attach the HFX-Series Template to a formboard at the location specified on plans and install bolts. Install 1/2"x3"x3" plate washers with nuts above and below at hold downs.

C) At interior footings Templates may be secured in place using stakes.

D) Footing design, embed depths, and anchor edge/end distances are per the Building Design Professional.

E) Determine if the Hardy Frame will be installed on concrete or a mudsill. For installation directly on concrete the recommended bolt height above finished concrete is 2-3/4" and for installation on a 2x mudsill it is 4-1/4".

**Step 2: First Floor Installation on concrete**

A) Installation of a moisture barrier such as Moisstop or 15# felt is recommended under the Frame.

B) Set the *Hardy Frame* over the embed bolts and install (1) Hardened Round, (2) Round-Flat, or (2) SAE washers and a Grade 8 hex nut.

C) Tighten nuts until snug tight.

D) After framing and plumb & line are complete, place a 2x filler above the Frame to make up the height difference created by eliminating the sill plate, and connect with 1/4" x 4-1/2" screws through the top of the Frame, through the filler and into the double top plates or header above.

For fillers larger than 1-1/2" net, refer to detail 3/HFX5.

**Step 2: First Floor Installation on a Sill Plate**

A) If the *Hardy Frame* is to be installed on a mudsill, plot the bottom plate and cut the length to match the width of the Frame. If located next to a door opening, allow the plate to run into the opening.

B) Set the *Hardy Frame* over the embed bolts and install (1) Hardened Round, (2) Round-Flat, or (2) SAE washers and a Grade 8 hex nut.

C) Tighten nuts until snug tight.

D) After framing and plumb & line are complete, install 1/4"x3" screws through the top of the Frame into the double top plates or header above. Top plates must be continuous or have a minimum 8" lap at splices.

**Foundation Details — HFX Brace Frames**

**HOLE PATTERN TOP & BOTTOM**

1) Applies to 2500 psi compressive strength concrete, both seismic and wind loading.

2) STD indicates rods complying with ASTM F1554 Grade 36 with a 1/2x3x3 plate washer double nutted on the embed end.

3) HS indicates rods complying with ASTM A 193 Grade B7 (or equal) with a 1/2x3x3 plate washer double nutted on the embed end.

4) Concrete edge distance must comply with ACI-318-08 D8.2.

5) Installation on curbs or stemwalls must be 6 inch width minimum, and require supplemental shear reinforcement per ACI-318-08, fc = 2500 psi.

6) Shear Ties #3 rebar grade 60 (min).

7) Shear Ties are not required for installations away from Foundation Edge, for installation on wood framing or for Braced Wall Panel applications.

8) Foundation Design is by others.

9) The Building Design Professional is permitted to modify these details to accommodate a specific condition.

**2012 IBC HOLD DOWN ANCHORAGE TABLE**
1. **Rake Filler**
   - 4x Filler
   - 2x Filler

2. **Post to Top Plates**
   - 8

3. **Header - 4x Filler**
   - 7

4. **Header - 2x Filler**
   - 6

5. **Hardy Frame Saddle**
   - 12

6. **Back to Back 2x Filler**
   - 11

7. **Back to Back Top Plates**
   - 10

---

**Framing Details — HFX Brace Frames**

**Shear Wall System**

**Table 6.1: Hardy Frame® Saddle**

<table>
<thead>
<tr>
<th>Material/Type</th>
<th>Fastener Size</th>
<th>ASD Tension (lbs)</th>
<th>ASD Compression (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 9521</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 9522</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 9524</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 9530</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 9535</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. Maximum Osha ge 4.10.1
2. Fasteners shall be installed with the nut to the side of the plate to allow the bolt to be accessible to the field.
3.** A** - Alternate 1
4. For the Type 9524 that is installed with 22 - 1/8 inch washers and 22 - 1/2 inch washers, the bolt shall be accessible to the field.
5. For the Type 9530 that is installed with 21 - 1/8 inch washers and 21 - 1/2 inch washers, the bolt shall be accessible to the field.
6. Allowable tension capacity is based on attachment to lumber with at least 5000 psi grade of G4S, 7. Epicyclic and adhesive stress (G4S) are excluded from the tests.
HEADING - CRIPPLES (5)

1. Continue header over last long upvs screws.
2. Attach header to header by long upvs screws.
3. Obtain header framing details from Hardy Frame.
4. See design details on page 5.

TOP PLATE (1)

1. Diameter (minimum) US/VS screws or nails for wood transfer from wood to header.
2. Connect header to header by long upvs screws.
3. Obtain header framing details from Hardy Frame.
4. See design details on page 5.

NOTES:
1. All hardware used to transfer loads should not exceed 10 gauge.
2. Structural connections to the brace frame are to be designed by the building design professional.
3. Structural details to the brace frame are to be designed by the building design professional.
4. The brace frame is a shear wall system.

FRAME SHEET IS NOT PROPRIETARY AND IS NOT REQUIRED FOR SUBMITTAL WITH HARDY FRAME PRODUCTS.

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Height (in)</th>
<th>Net Depth (in)</th>
<th>Screw Qty</th>
<th>Bottom</th>
<th>Top</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFX-X2</td>
<td>17-5/16</td>
<td>7/16</td>
<td>9</td>
<td>NA</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>HFX-X3</td>
<td>17-13/32</td>
<td>7/16</td>
<td>9</td>
<td>NA</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>HFX-X3-1/16</td>
<td>17-13/32</td>
<td>7/16</td>
<td>9</td>
<td>NA</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>HFX-X4</td>
<td>17-13/32</td>
<td>7/16</td>
<td>9</td>
<td>NA</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>HFX-X4-1/8</td>
<td>17-13/32</td>
<td>7/16</td>
<td>9</td>
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<td>3</td>
<td>3</td>
</tr>
<tr>
<td>HFX-X4-1/4</td>
<td>17-13/32</td>
<td>7/16</td>
<td>9</td>
<td>NA</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

For detailed design and installation instructions, please refer to the manufacturer's manual or contact Hardy Frame directly.

Hardy Frame® SHEAR WALL SYSTEM
1732 PALMA DRIVE, SUITE 200, VENTURA, CA 93003
TELEPHONE: 800 754-3030 / www.hardyframe.com
### Table 1.0 Hardy Frame® HFX-Series Product Data and Connectors

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>NET HEIGHT (in)</th>
<th>DEPTH (in)</th>
<th>Hold Down Diameter 1(^2) (in)</th>
<th>Top Screw 2 Qty (ea)</th>
<th>Bottom Screw Qty (ea)</th>
<th>Screw Qty Available at Edges (ea)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFX-33x8</td>
<td>92-1/4</td>
<td>3-1/2</td>
<td>7/8</td>
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<td>44&quot; Width = 14</td>
<td>NA</td>
</tr>
<tr>
<td>HFX-44x8</td>
<td>104-1/4</td>
<td>4-1/2</td>
<td>8/8</td>
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<td>44&quot; Width = 14</td>
<td>NA</td>
</tr>
<tr>
<td>HFX-33x10</td>
<td>116-1/4</td>
<td>5-1/2</td>
<td>9/8</td>
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<td>44&quot; Width = 14</td>
<td>NA</td>
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<tr>
<td>HFX-44x11</td>
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<td>6-1/2</td>
<td>10/8</td>
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<td>44&quot; Width = 14</td>
<td>NA</td>
</tr>
<tr>
<td>HFX-33x12</td>
<td>140-1/4</td>
<td>7-1/2</td>
<td>11/8</td>
<td>32&quot; Width = 10</td>
<td>44&quot; Width = 14</td>
<td>NA</td>
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<tr>
<td>HFX-44x13</td>
<td>152-1/4</td>
<td>8-1/2</td>
<td>12/8</td>
<td>32&quot; Width = 10</td>
<td>44&quot; Width = 14</td>
<td>NA</td>
</tr>
</tbody>
</table>

1. Standard Hold down bolts must have a 1/2"x3"x3" ASTM A36 plate washer double nutted on the embed end that connects to the panel or Brace Frame base with one Hardened Round, two Round-Flat or two SAE Washers and a Grade 8 Hex Nut on each end as specified by the Building Design Professional.
2. High Strength Hold down bolts can be ASTM A193 Grade B7 (or specified by the Building Design Professional) with 1/4"x3/8"x3" ASTM A36 Plate Washers double nutted on the embed end that connects to the panel or Brace Frame base with one Hardened Round, two Round-Flat or two SAE Washers and a Grade 8 Hex Nut on each end.
3. 1/4" diameter USP-WS Series screws (or equal), Length is 3" (minimum) when attaching directly to the collector and 4-1/2" (minimum) when installing a 2x filer above the Brace Frame.
4. 1/4" diameter USP-WS Series screws (or equal), Length is 4-1/2" (minimum) through base of Brace Frame.

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**Installation on Floor Systems**

1. Install a solid 4x (min) rpm in floor system for bearing. Table values assume Engineered Wood Product (EWP).
2. After the floor is sheathed, cut and plot the bottom plate as in the first floor installation or plate can be continuous.
3. Use all threads to connect the corners of the second floor frame to a Brace Frame, Panel or Post below.
4. Secure the base of the Frame with 1/4x4 1/2" (Minimum) Screws. See Tables for minimum quantities.
5. When Framing, Plumb & Line are complete, install 1/4x5 (minimum) screws through the top channel into the collector.

**Notes:** Installations may vary with specific job conditions and/or specifications by the Building Design Professional.

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**Standard Connectors:**

1. 7/8" Diameter Rod with Hardened Round, (2) SAE or (2) Round-Flat Washers and Grade 8 Hex Nuts at Both Ends.
2. USP Min-Max Connections or equal by Building Design Professional.
3. 1/4" Diameter (Minimum) x 4-1/2" Long USP-WS Screws (or equal) per tables.
4. USP Min-Max Connections or equal by Building Design Professional.
5. 1/4" Diameter (Minimum) x 4-1/2" Long USP-WS Screws (or equal) per tables.
6. USP Min-Max Connections or equal by Building Design Professional.
7. 1/4" Diameter (Minimum) x 4-1/2" Long USP-WS Screws (or equal) per tables.
8. USP Min-Max Connections or equal by Building Design Professional.
9. 1/4" Diameter (Minimum) x 4-1/2" Long USP-WS Screws (or equal) per tables.
10. USP Min-Max Connections or equal by Building Design Professional.
11. USP Min-Max Connections or equal by Building Design Professional.

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**Notes:**

1. The diameter of the rod will be determined by the Building Design Professional.
2. The diameter of the rod will be determined by the Building Design Professional.
3. The diameter of the rod will be determined by the Building Design Professional.
4. The diameter of the rod will be determined by the Building Design Professional.
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