

PRESCRIPTIVE DESIGN GUIDE

2015 IRC CODE



**HF HARDY
FRAME**

BY

MiTek

08-01-17

The Hardy Frame Prescriptive Design Guide Offers Alternative Braced Wall Solutions That Comply With The 2015 IRC

This Hardy Frame Prescriptive Design Guide provides an overview of braced wall design, a flow chart of the design and specification process with specific instructions to properly apply the Hardy Frame Alternative Braced Wall Solution.

This Guide describes the need to locate Braced Wall Lines, determine the required Braced Wall Length, and identify the available Braced Wall Segments within each line. When the total length of the Segments is insufficient to meet the Braced Wall Length requirement, the Hardy Frame Alternative Braced Wall is the solution to meet the International Residential Code (IRC).

Garage fronts commonly have limited space that is problematic when specifiers need to meet Braced Wall Lengths and Braced Wall Panel requirements. The Hardy Frame HFX Prefabricated Narrow Shear Wall Panel – profiled in this Guide – is a proven solution for these conditions.

THIS HARDY FRAME PRESCRIPTIVE DESIGN GUIDE PROVIDES SOLUTIONS FOR MEETING THE LATEST IRC BRACED WALL PANEL REQUIREMENTS IN NARROW SHEAR WALLS, LIKE THOSE SO COMMON AT GARAGE FONTS.

The Guide's prescriptive design flow chart, its tables for equivalent braced wall panel lengths, and the Guide's details for anchorage into concrete combine to provide a complete design tool for building officials, contractors, designers, and suppliers. Using the Guide, building designers can gain insight into how Hardy Frame Panels can fit their needs by dovetailing with their specification process. Building officials will obtain comprehensive information of products and their installation for use in both the plan-check and field-inspection processes. Contractors and suppliers will have a product listing that includes panels, corresponding accessory products, and easy-to-follow installation details.

For more information, please call us at 800-754-3030 or visit our website at www.hardyframe.com

TABLE OF CONTENTS

Product ProfileInside Front Cover
The Need for Braced Walls..... 1
Prescriptive Design of Braced Wall Panels2
Flow Chart & Specification.....3

Braced Wall Panel Solutions

Wind & SDC A, B, C.....4
Seismic SDC D₀, D₁ D₂ & Townhouses in SDC C5

Installation Details

Wind.....6-7
Seismic.....8-9
Photos.....10-11
Hardy Frame Product Listing.....12
Hardy Frame Accessories.....13

USP Structural Connectors

MiTek USP CIA-GEL 7000-C14
MiTek USP Pro-Series Screws, Plate Connectors, Straps..15

Installation Instructions

Epoxy, Thru-Bolt, Underpin.....16
Top and Bottom Connections.....16
Panel Installation at Existing Framing.....16
Hole Chart and AttachmentsInside Back Cover

What are braced walls and why do you need them?

The International Residential code (IRC) requires all wood frame structures to be braced for lateral loads and provides a prescriptive approach that does not require an engineered design.

All structures are required to have a continuous lateral load path from the roof to the foundation. The load path consists of structural members combined with lateral load resisting elements. Under the IRC Code, Braced Wall Lines (BWLs) are the path and the lateral force resisting elements within the Braced Wall Lines are referred to as Braced Wall Panels (BWPs).

There are eight fundamental Braced Wall Panel construction methods that were qualified in the IRC Code. The amount of wall bracing required is determined by wind speed, the Seismic Design Categories and the construction method of Braced Wall Panels. The required minimum BWP length is typically between 4 to 6 feet with no openings. A properly braced wall will usually have a minimum of two Braced Wall Panels, one at each end. In some cases the total braced wall length available within a Braced Wall Line is less than the required minimum. The most common example is at garage fronts that are often limited to two feet or less on each side of a large door opening. For conditions unable to be met with one of the eight IRC methods an alternative bracing method is needed and can be found in the MiTek – Hardy Frame Panel.

The Hardy Frame® Panel

The Hardy Frame® Panel by MiTek combines the most desirable properties for a shear wall: strength, stiffness and ductility. This revolutionary system has been tested and evaluated under the ICC-Evaluation Service AC322 Acceptance Criteria and has been approved to provide the highest allowable shear loads in the industry combined with abundant ductility for a seismic R value of 6.5. The Hardy Frame® Panel system is easy to install with practical anchorage solutions.



MiTek-Hardy Frames manufacture and market the revolutionary Hardy Frame® Shear Wall System, and has been the leader in the pre-fabricated shear wall industry for over 18 years. The Hardy Frame® system allows Building Design Professionals to economically and safely minimize wall space and maximize wall openings while resisting high wind and earthquake loads.

From its inception the Hardy Frame® Shear Wall System has proven to be the leading innovator in the pre-fabricated shear wall category.

- The first to be recognized by ICBO-ES and LA City
- The first to be recognized for multi-story applications
- The first 9 inch wide Panel
- The first to be recognized to comply with the 2003 and 2006 IBC and IRC Building Codes
- The first to provide Reinforced Anchorage solutions to reduce foundation dimensions
- The first pre-fabricated Special Moment Frame in the industry
- The first to be recognized for Back-to-Back installations
- The first pre-fabricated SMF connection in the AISC 358 Pre qualified Moment Connection Standard

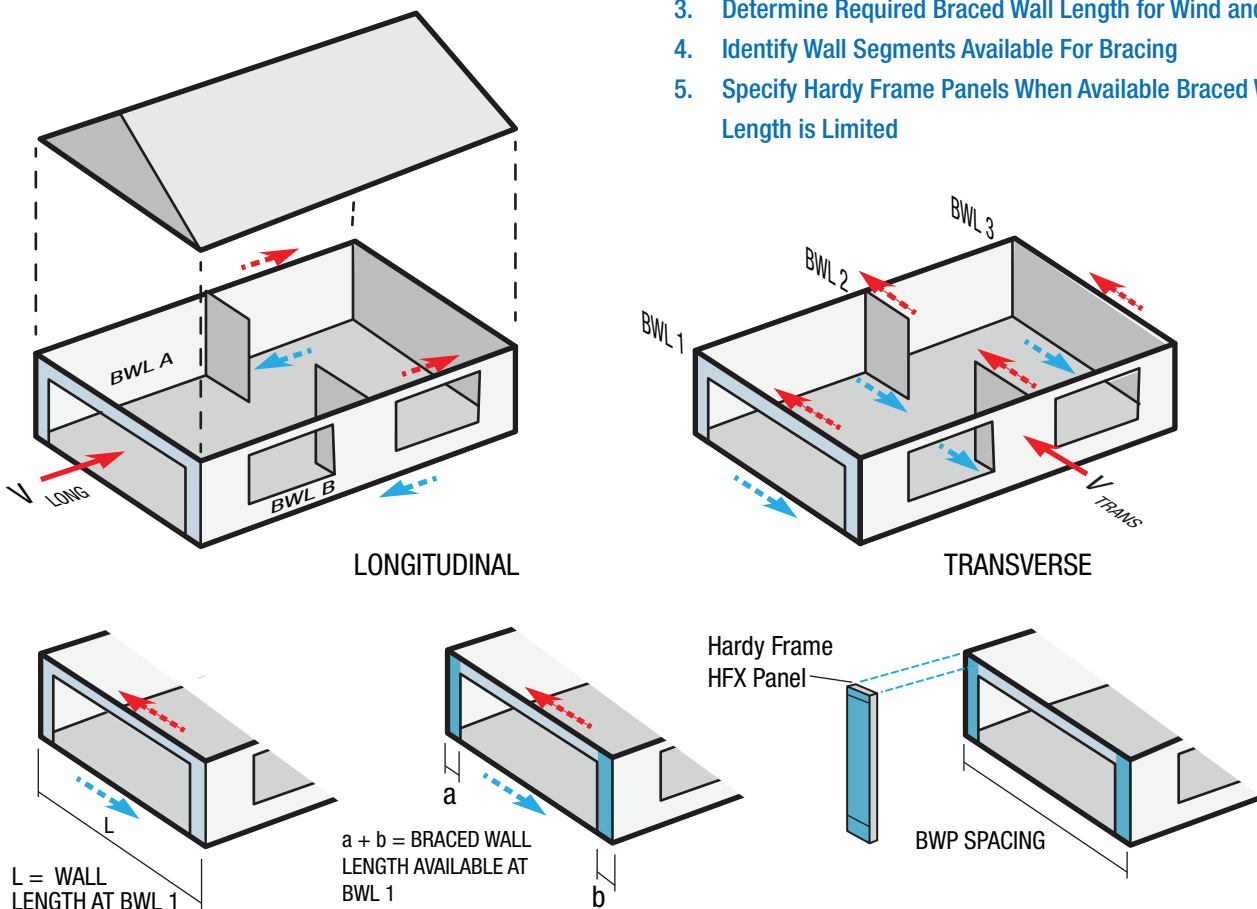
To structurally resist lateral wind and seismic loads in wood or steel framed buildings strategic Braced Wall Lines must be properly established. The Prescriptive Design approach helps identify lateral load resisting Braced Wall Lines (BWLs), establish required minimum Braced Wall Panel (BWP) lengths along each Braced Wall Line, define the proper location of Braced Wall Panels within those lines, and provides detailed construction methods for constructing the BWPs.

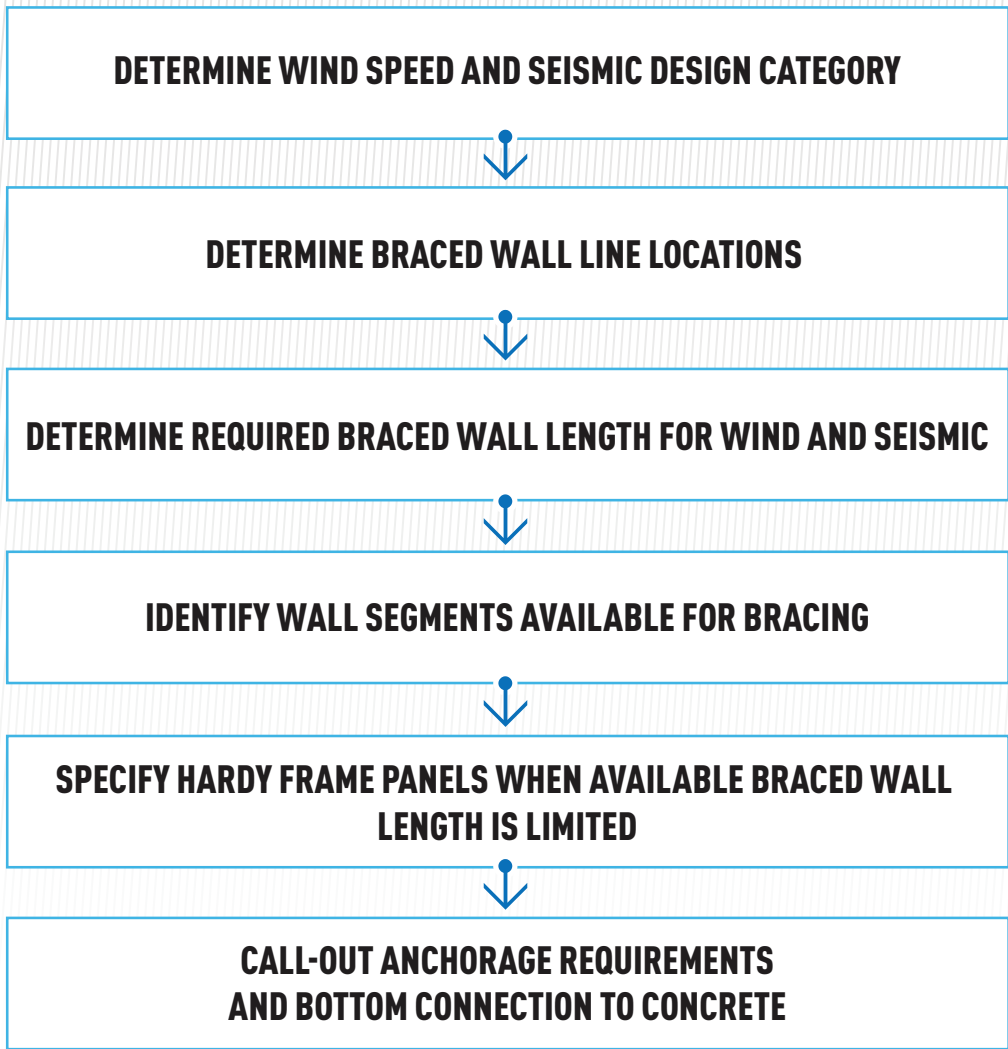
The general rule for prescriptive bracing design is that all exterior walls, as well as interior walls spaced no greater than the maximum distance set forth in Section R602.10, must be identified as Braced Wall Lines for resisting lateral load. When BWLs offset no more than 4 feet apart in either direction, the wall lines can be considered as one continuous Braced Wall Line. To be considered an effective Braced Wall Line, the IRC Code requires a minimum percentage of the wall length to be adequately constructed with a prequalified material and fastening schedule. The percentage required depends on the applied seismic or wind load, building stories and other adjusting factors.

As with engineered designs in the IBC Code, IRC Prescriptive Wall Bracing Design often results in sections of walls that are too narrow for conventional Braced Wall Panel requirements to be met. The most common example is at the garage front with narrow Braced Wall Panel lengths next to the door. MiTek Hardy Frame® Panels are the best solution for these conditions.

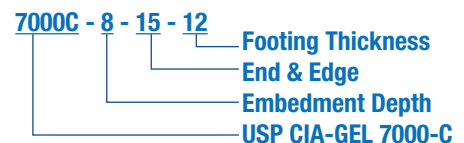
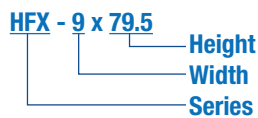
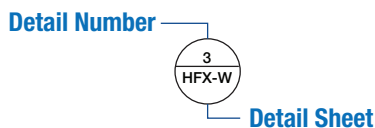
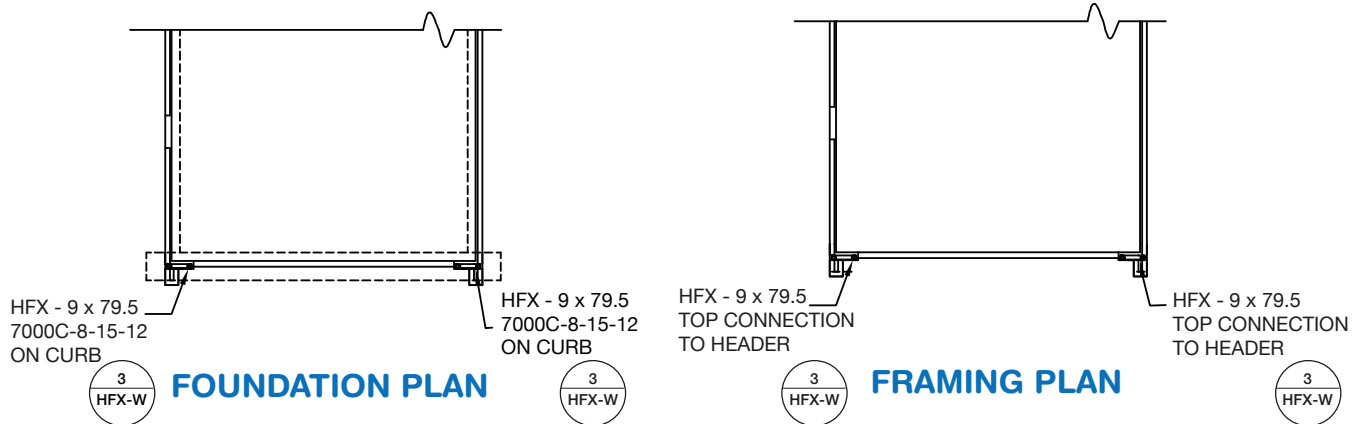
The Hardy Frame® 9" wide Panel is the narrowest prefabricated shear wall in the industry and is a very cost effective solution. Anchors for the Hardy Frame® Panel in a Prescriptive Wall Bracing Design can be cast in during the concrete pour or post installed with MiTek USP CIA-Gel 7000-C epoxy. MiTek Hardy Frame® HFX Panels provide the structural requirements in narrow wall lengths and their "C-Shape" is the most trade-friendly in the industry. The MiTek Hardy Frame® Prescriptive Braced Wall Solution is the ideal option for you and your contractors. For more information contact us at 800-754-3030 or visit us at hardyframe.com.

1. Determine Wind Speed and Seismic Design Category
2. Determine Braced Wall Line Locations
3. Determine Required Braced Wall Length for Wind and Seismic
4. Identify Wall Segments Available For Bracing
5. Specify Hardy Frame Panels When Available Braced Wall Length is Limited





EXAMPLES OF PANEL, ANCHORAGE AND CONNECTION CALL-OUTS



**MiTek® HARDY FRAME® PANEL SELECTION AND ANCHORAGE REQUIREMENTS ^{1,2}
WIND SPEEDS < 140 (2015 IRC) mph and SEISMIC DESIGN CATEGORIES (SDC) A, B and C**

Model Number	Net Height H (in)	Braced Wall ³ Length (ft)	Minimum Anchorage Requirements ⁶			
			Cast-In ⁴		USP CIA-GEL 7000-C Epoxy ⁵	
			Embedment Depth (in)	End and Edge Distance Ca ₁ & Ca ₂ (in)	Embedment Depth (in)	End and Edge Distance Ca ₁ & Ca ₂ (in)
HFX-9x79-1/2	79-1/2	6	6	9	8	13
		4	4-1/2	7-3/4	6	10
		2	4	6	4-1/2	7
HFX-12x78	78	6	5-1/2	8-1/4	6	9
		4	4-1/2	6-3/4	4-1/2	8
		2	4	6	4-1/2	5
HFX-15x78	78	6	5	7-1/2	5	9
		4	4	6	4-1/2	7
		2	4	6	4-1/2	5
HFX-18x78	78	6	4-1/2	6-3/4	4-1/2	8
		4	4	6	4-1/2	6
		2	4	6	4-1/2	4
HFX-9x8	93-3/4	6	6-1/2	9-3/4	8	15
		4	5	7-1/2	7	11
		2	4	6	4-1/2	8
HFX-12x8	92-1/4	6	5-1/2	8-1/4	6	10
		4	4-1/2	6-3/4	5	8
		2	4	6	4-1/2	6
HFX-15x8	92-1/4	6	5-1/2	8-1/4	6	9
		4	4-1/2	6-3/4	4-1/2	8
		2	4	6	4-1/2	5
HFX-18x8	92-1/4	6	5	7-1/2	4-1/2	9
		4	4	6	4-1/2	7
		2	4	6	4-1/2	4
HFX-12x9	104-1/4	6	6-1/2	9-3/4	7	13
		4	5	7-1/2	6	9
		2	4	6	4-1/2	7
HFX-15x9	104-1/4	6	6	9	7	11
		4	5	7-1/2	5	9
		2	4	6	4-1/2	6
HFX-18x9	104-1/4	6	5-1/2	8-1/4	6	9
		4	4-1/2	6-3/4	4-1/2	8
		2	4	6	4-1/2	5
HFX-12x10	116-1/4	6	7	10-1/2	8	14
		4	5-1/2	8-1/4	6	10
		2	4	6	4-1/2	7
HFX-15x10	116-1/4	6	6-1/2	9-3/4	7	12
		4	5	7-1/2	6	9
		2	4	6	4-1/2	7
HFX-18x10	116-1/4	6	6	9	6	10
		4	4-1/2	6-3/4	4-1/2	9
		2	4	6	4-1/2	6
HFX-15x11	128-1/4	6	7	10-1/2	8	14
		4	5-1/2	8-1/4	6	10
		2	4	6	4-1/2	7
HFX-18x11	128-1/4	6	6	9	6	11
		4	5	7-1/2	5	9
		2	4	6	4-1/2	6
HFX-15x12	140-1/4	6	7	10-1/2	8	15
		4	5-1/2	8-1/4	6	11
		2	4	6	4-1/2	8
HFX-18x12	140-1/4	6	6-1/2	9-3/4	7	12
		4	5	7-1/2	5	9
		2	4	6	4-1/2	6

GENERAL NOTE

- Table provides MiTek® Hardy Frame® Panel solutions/substitutions for braced wall panel lengths that comply with the wood structural panel (WSP) bracing method in the International Residential Code (IRC) 2015, Section R602.10.
- Table values apply to single-story detached one and two-family dwellings located in areas with wind speed less than 140 mph. Additionally, values apply to detached dwellings in Seismic Design Categories (SDC) A, B and C and townhouses in SDC A-B.
- MiTek® Hardy Frame Panels may be used in a designated braced wall line to replace braced wall lengths as listed in the table. Equivalent braced wall length applies to Panels installed on and connected to 2500psi concrete (min)
- Cast-in foundation anchorage solutions are based on the requirements of the American Concrete Institute (ACI) 318-14, Chapter 17. A concrete compressive strength of 2,500 psi is assumed. Tabulated minimum anchorage requirements are in accordance with the following assumptions:
 - No supplemental reinforcement for splitting due to concrete breakout.
 - No shear edge reinforcement greater than No. 4 bars.
- Epoxy anchorage solutions require the use of MiTek® USP CIA-Gel 7000-C epoxy adhesive per IAPMO Report ER-473, and the following field conditions:
 - Temperature range is 110° F long term and 130° F short term.
 - Periodic inspection in accordance with the local jurisdiction.
 - Dry concrete.
 - 1-1/8 in. ASTM F1554 Grade A36 anchor rod.
- Foundation design shall otherwise be addressed by the Qualified Building Designer.

**MiTek® HARDY FRAME® PANEL SELECTION AND ANCHORAGE REQUIREMENTS ^{1,2}
SEISMIC DESIGN CATEGORIES (SDC) D₀, D₁, D₂ AND TOWNHOUSES IN SDC C**

Model Number	Net Height H (in)	Braced Wall Length(ft) ³	Minimum Anchorage Requirements ⁶			
			Cast-In ⁴		USP CIA-GEL 7000-C Epoxy ⁵	
			Embedment Depth le (in)	End and Edge Distance Ca ₁ & Ca ₂ (in)	Embedment Depth le (in)	End and Edge Distance Ca ₁ & Ca ₂ (in)
HFX-9x79-1/2	79-1/2	6	8	12	12	17
		4	6-1/2	9-3/4	9	13
		2	4	6	6	10
HFX-12x78	78	6	7	10-1/2	8	12
		4	5-1/2	8-1/4	8	10
		2	4	6	6	8
HFX-15x78	78	6	6-1/2	9-3/4	8	11
		4	5	7-1/2	8	9
		2	4	6	4-1/2	8
HFX-18x78	78	6	6	9	8	10
		4	5	7-1/2	7	8
		2	4	6	4-1/2	7
HFX-9x8	93-3/4	6	9	13-1/2	15	19
		4	7	10-1/2	10	14
		2	4-1/2	6-3/4	7	10
HFX-12x8	92-1/4	6	7-1/2	11-1/4	9	14
		4	6	9	7	12
		2	4	6	7	8
HFX-15x8	92-1/4	6	7	10-1/2	8	12
		4	5-1/2	8-1/4	6	12
		2	4	6	4-1/2	9
HFX-18x8	92-1/4	6	6-1/2	9-3/4	7	11
		4	5	7-1/2	5	11
		2	4	6	4-1/2	8
HFX-12x9	104-1/4	6	8	12	11	20
		4	6-1/2	9-3/4	8	12
		2	4-1/2	6-3/4	5	10
HFX-15x9	104-1/4	6	7-1/2	11-1/4	9	15
		4	6	9	7	11
		2	4	6	5	9
HFX-18x9	104-1/4	6	6-1/2	10	8	11
		4	5	7-1/2	6	11
		2	4	6	4-1/2	8
HFX-12x10	116-1/4	6	8-1/2	12-3/4	12	16
		4	6-1/2	9-3/4	8	14
		2	4-1/2	6-3/4	5	11
HFX-15x10	116-1/4	6	7-1/2	11-1/4	10	14
		4	6	9	8	12
		2	4	6	6	9
HFX-18x10	116-1/4	6	7	10-1/4	8	12
		4	5.5	8-1/4	6	11
		2	4	6	4-1/2	10
HFX-15x11	128-1/4	6	10	15	16	19
		4	8	12	11	15
		2	5-1/2	8-1/4	7	11
HFX-18x11	128-1/4	6	9	13-1/2	12	16
		4	7	10-1/2	8	16
		2	5	7-1/2	5	11
HFX-15x12	140-1/4	6	10-1/2	15-3/4	17	21
		4	8	12	12	16
		2	5-1/2	8-1/4	7	11
HFX-18x12	140-1/4	6	9	13-1/2	13	17
		4	7-1/2	11-1/4	9	13
		2	5	7-1/4	6	11

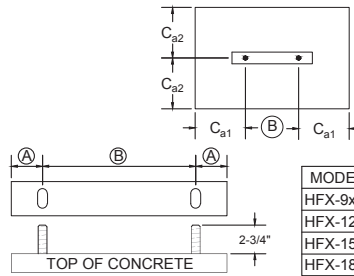
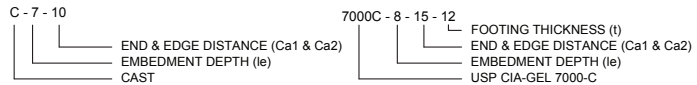
GENERAL NOTES

- Table provides MiTek® Hardy Frame® Panel solutions/substitutions for braced wall panel lengths that comply with the wood structural panel (WSP) bracing method in the 2015 International Residential Code (IRC), Section R602.10.
- Table values apply to single-story detached one and two-family dwellings located in Seismic Design Categories (SDC) D₀, D₁, and D₂, and townhouses located in SDC C, D₀, D₁, and D₂.
- MiTek® Hardy Frame Panels may be used in a designated braced wall line to replace braced wall lengths as listed in the table. Equivalent braced wall length applies to Panels installed on and connected to 2500psi concrete (min)
- Cast-in foundation anchorage solutions are based on the requirements of the American Concrete Institute (ACI) 318-14, Chapter 17, including the specific seismic provisions of Section 17.2.3 and the 0.75 reduction factor for cracked concrete. A concrete compressive strength of 2,500 psi is assumed. Tabulated foundation design recommendations represent minimum anchorage requirements in accordance with the following assumptions:
 - No supplemental reinforcement for splitting due to concrete breakout.
 - No shear edge reinforcement greater than No. 4 bars.
 - No shear reinforcement with stirrups less than 4 in. on center.
- Epoxy anchorage solutions require the use of MiTek® USP CIA-Gel 7000-C epoxy adhesive per IAPMO Report ER-473, and the following field conditions:
 - Temperature range is 110° F long term and 130° F short term.
 - Periodic inspection in accordance with the local jurisdiction.
 - Dry concrete.
 - 1-1/8 in. ASTM F1554 Grade A36 anchor rod.
- Foundation design shall otherwise be addressed by the Qualified Building Designer.

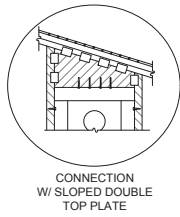
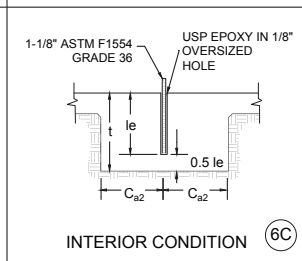
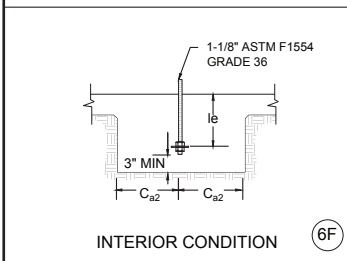
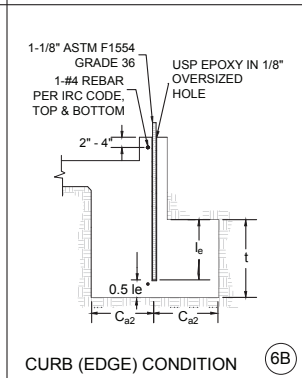
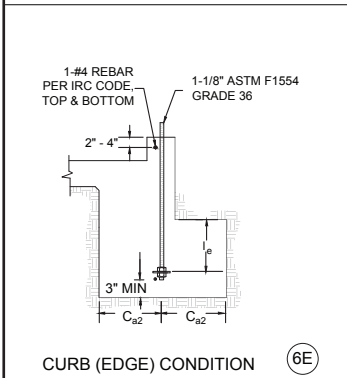
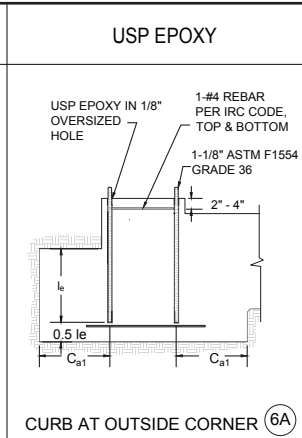
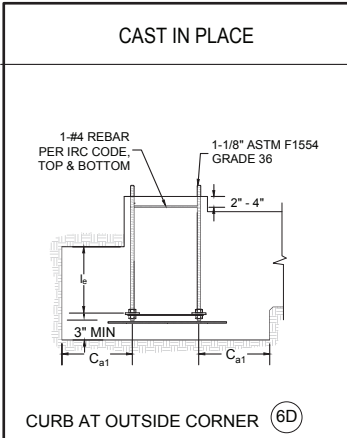
Wind Foundation Anchorage Requirements & SDC A.B.C.

MODEL NUMBER	CAST IN PLACE ¹			USP EPOXY ²				
	BRACE WALL LENGTH (ft)	EMBEDMENT ³ (in)	END & EDGE ^{4 5} (in)	MODEL NUMBER	BRACE WALL LENGTH (ft)	EMBEDMENT ³ (in)	END & EDGE ^{4 5} (in)	FOOTING THICKNESS (in)
HFX-9 x 79.5	6	7	10	HFX-9 x 79.5	6	8	15	12
HFX-9 x 8	≤ 4	5	8	HFX-9 x 8	≤ 4	7	11	11
HFX-12 x 78	6	7	11	HFX-12 x 78	6	6	10	9
HFX-12 x 8	≤ 4	5	8	HFX-12 x 8	≤ 4	5	8	8
HFX-12 x 9	≤ 4	6	9	HFX-12 x 9	6	8	14	12
HFX-12 x 10	≤ 4	6	9	HFX-12 x 10	≤ 4	6	10	9
HFX-15 x 78	6	7	10	HFX-15 x 78	6	6	9	9
HFX-15 x 8	≤ 4	5	8	HFX-15 x 8	≤ 4	5	8	8
HFX-15 x 9	≤ 4	5	8	HFX-15 x 9	6	7	12	11
HFX-15 x 10	≤ 4	5	8	HFX-15 x 10	≤ 4	6	9	9
HFX-15 x 11	6	7	11	HFX-15 x 11	6	8	15	12
HFX-15 x 12	≤ 4	6	9	HFX-15 x 12	≤ 4	6	11	9
HFX-18 x 78	6	6	9	HFX-18 x 78	6	6	10	9
HFX-18 x 8	≤ 4	5	7	HFX-18 x 8	≤ 4	5	9	8
HFX-18 x 9	6	7	10	HFX-18 x 9	6	7	12	11
HFX-18 x 10	≤ 4	5	8	HFX-18 x 10	≤ 4	5	9	8
HFX-18 x 11	6	7	10	HFX-18 x 11	6	7	12	11
HFX-18 x 12	≤ 4	5	8	HFX-18 x 12	≤ 4	5	9	8

ANCHORAGE NOMENCLATURE

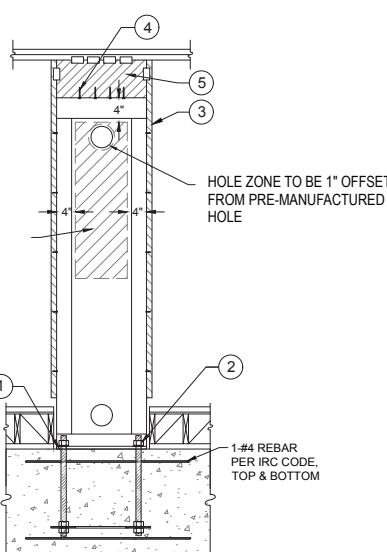


CAST IN & EPOXY ANCHORAGE



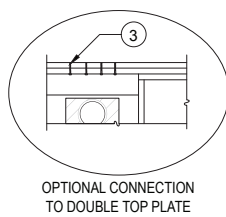
ADDITIONAL HOLE ZONE
DESIGNATES AREA THAT ALLOWS ONE ADDITIONAL HOLE, UP TO 1\"/>

FOR THE 9\"/>



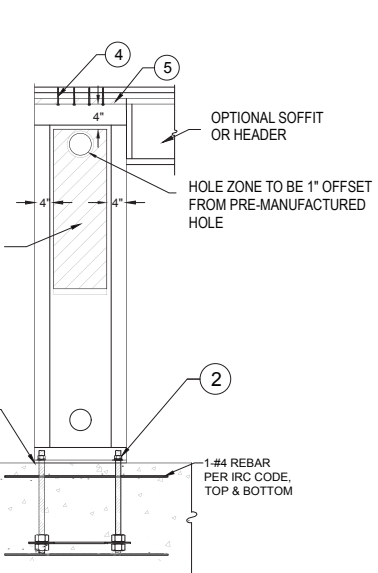
- 15# FELT OR EQUIVALENT MOISTURE BARRIER CAN BE PLACED BETWEEN PANEL BASE AND CONCRETE.
- 1 EA. HARDENED ROUND WASHER AND GRADE 8 HEX NUT
- ADJACENT FRAMING WITH 1/4\"/>

RAISED FLOOR WITH WOOD FILLER



ADDITIONAL HOLE ZONE
DESIGNATES AREA THAT ALLOWS ONE ADDITIONAL HOLE, UP TO 1\"/>

FOR THE 9\"/>



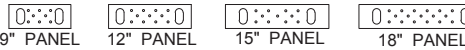
- 15# FELT OR EQUIVALENT MOISTURE BARRIER CAN BE PLACED BETWEEN PANEL BASE AND CONCRETE.
- 1EA. HARDENED ROUND WASHER AND GRADE 8 HEX NUT.
- 1/4\"/>

INSTALLATION ON SLAB FOUNDATION

ANCHORAGE NOTES

- CAST-IN FOUNDATION ANCHORAGE SOLUTIONS ARE BASED ON THE REQUIREMENTS OF THE AMERICAN CONCRETE INSTITUTE (ACI) 318-14, CHAPTER 17, INCLUDING THE SPECIFIC SEISMIC PROVISIONS OF SECTION 17.2.3 AND THE 0.75 REDUCTION FACTOR FOR CRACKED CONCRETE. A CONCRETE COMPRESSIVE STRENGTH OF 2,500 PSI IS ASSUMED. TABULATED FOUNDATION DESIGN RECOMMENDATIONS REPRESENT MINIMUM ANCHORAGE REQUIREMENTS IN ACCORDANCE WITH THE FOLLOWING ASSUMPTIONS:
 - NO SUPPLEMENTAL REINFORCEMENT FOR SPLITTING DUE TO CONCRETE BREAKOUT.
 - NO SHEAR EDGE REINFORCEMENT GREATER THAN NO. 4 BARS.
 - NO SHEAR REINFORCEMENT WITH STIRRUPS LESS THAN 4" ON CENTER.
- POST-INSTALLED FOUNDATION ANCHORAGE SOLUTIONS REQUIRE THE USE OF MITEK® USP CIA-GEL 7000-C EPOXY ADHESIVE PER IAPMO ER473, AND THE FOLLOWING FIELD CONDITIONS:
 - TEMPERATURE REANCE IS 110°F LONG TERM AND 130°F SHORT TERM.
 - PERIODIC INSPECTION IN ACCORDANCE WITH THE LOCAL JURISDICTION.
 - DRY CONCRETE.
 - 1 1/8" ASTM GRADE A36 ANCHORAGE ROD.
- l_e = LENGTH OF EMBEDMENT FROM THE TOP OF FOOTING OR GRADE BEAM TO THE TOP OF THE HFXBB BOLT BRACE.
- C_{ei} = DISTANCE FROM HD CENTERLINE TO THE END OF THE FOOTING OR GRADE BEAM.
- C_{eb} = DISTANCE FROM HD CENTERLINE TO BOTH THE FRONT AND THE BACK FACE OF THE FOOTING OR GRADE BEAM.
- CONCRETE EDGE DISTANCES MUST COMPLY WITH ACI 318-14, SECTION 17.7.1.
- ANCHORS ARE ASTM F1554 GRADE 36 WITH A HARDY FRAME BOLT BRACE (HFXBB) INSTALLED WITH DOUBLE NUTS ON THE EMBED END.
- REINFORCEMENT SHOWN IS THE MINIMUM REQUIREMENT AND IS NOT INTENDED TO REPLACE REINFORCEMENT DESIGNED BY THE EOR.
- ANCHORAGE IS DESIGNED FOR TENSION AND SHEAR TRANSFER ONLY, FOUNDATION DESIGN PER DESIGN PROFESSIONAL.

MODEL NUMBER	NET HEIGHT (in)	DEPTH (in)	HOLD DOWN DIAMETER (in)	SCREW QUANTITY		SCREW HOLE QTY AVAILABLE AT EDGES
				PANEL	TOP (ea)	
HFX-12 x 78 HFX-15 x 78 HFX-18 x 78	78	3-1/2	1-1/8	9" WIDTH 12" WIDTH 15" WIDTH 18" WIDTH	5 6 8 10	4
HFX-9 x 79-1/2 HFX-9 x 8	79-1/2 93-3/4					
HFX-12 x 8 HFX-15 x 8 HFX-18 x 8	92-1/4					
HFX-12 x 9 HFX-15 x 9 HFX-18 x 9	104-1/4					
HFX-15 x 10 HFX-18 x 10	116-1/4					
HFX-15 x 11 HFX-18 x 11	128-1/4					
HFX-15 x 12 HFX-18 x 12	140 1/4					6



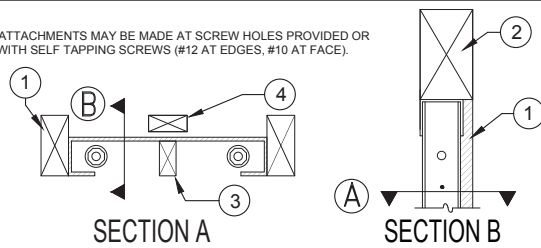
INSTALLATION INSTRUCTIONS

- WHEN INSTALLING DIRECTLY ON CONCRETE, PLACE PANEL OVER BOLTS AND CONNECT WITH (1EA) HARDENED ROUND WASHER AND A GRADE 8 OR 2H HEAVY HEX NUT. SECURE WITH A DEEP SOCKET (RECOMMENDED) UNTIL "SNUG TIGHT".
- USE 1/4" x 4-1/2" USP-WS SERIES SCREWS AT TOP CONNECTORS WITH A 2x FILLER. IF THE TOP OF PANEL IS IN DIRECT CONTACT WITH THE COLLECTOR ABOVE (TOP PLATES, HEADER, BEAM, ETC) USE 1/4 X 3" (MINIMUM).
- FOR INSTALLATIONS WITH A 4x FILLER ABOVE 1/4" DIAMETER SCREWS INTO KING STUDS ARE REQUIRED AT THE PANEL EDGES TO BRACE FOR THE OUT-OF-PLANE HINGE OR WHEN THEY ARE SPECIFIED BY THE DESIGN PROFESSIONAL.
- 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.

GENERAL NOTES

1

ATTACHMENTS MAY BE MADE AT SCREW HOLES PROVIDED OR WITH SELF TAPPING SCREWS (#12 AT EDGES, #10 AT FACE).



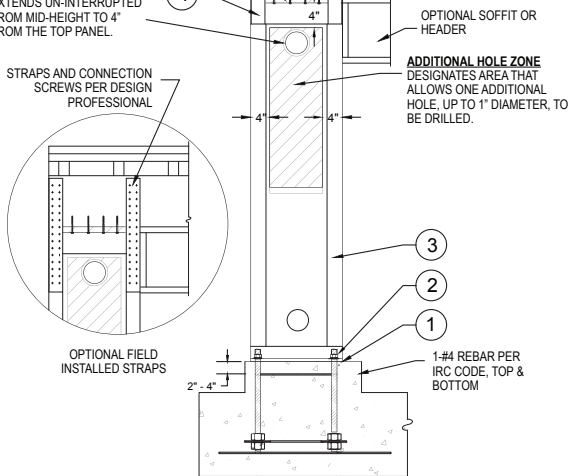
- TRIMMERS PROVIDE FULL BEARING FOR HEADER ABOVE. DESIGN AND CONNECTIONS BY OTHERS.
- 6x HEADER.
- WOOD MEMBERS MAY BE INSERTED VERTICALLY OR HORIZONTALLY IN CAVITY FOR BACKING AS NEEDED.

6x HEADER ABOVE (SECTION)

4

HOLE ZONE TO BE 1" OFFSET FROM PRE-MANUFACTURED HOLE

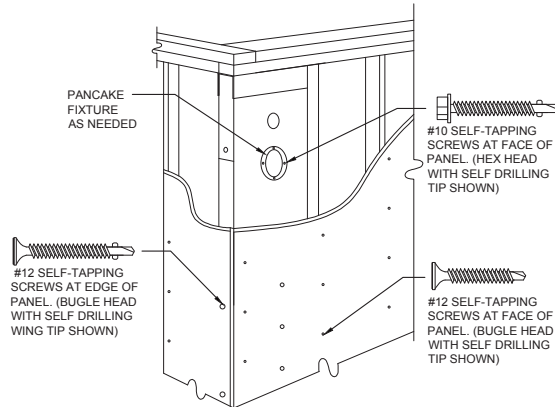
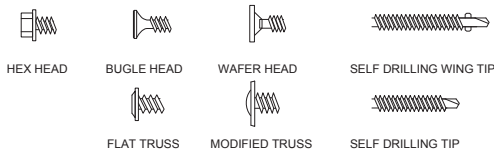
FOR THE 9" & 12" PANEL ONLY, THE DESIGNATED AREA FOR AN ADDITIONAL HOLE EXTENDS UN-INTERRUPTED FROM MID-HEIGHT TO 4" FROM THE TOP PANEL.



- 15# FELT OR EQUIVALENT MOISTURE BARRIER CAN BE PLACED BETWEEN PANEL BASE AND CONCRETE.
- 1 EA. HARDENED ROUND WASHER AND GRADE 8 HEX NUT.
- ADJACENT FRAMING OPTIONAL U.N.O. BY BUILDING DESIGN PROFESSIONAL.
- WELDED STRAPS ARE AVAILABLE FROM MANUFACTURER WHEN REQUIRED BY THE DESIGN PROFESSIONAL.
- A 2x WOOD FILLER WITH 1/4" x 4-1/2" (MIN) USP "WS SERIES SCREWS IS PERMITTED.
- WHEN CRIPPLE STUDS OCCUR, SHEAR TRANSFER DESIGN TO BE PER THE DESIGN PROFESSIONAL.

INSTALLATION ON CURB

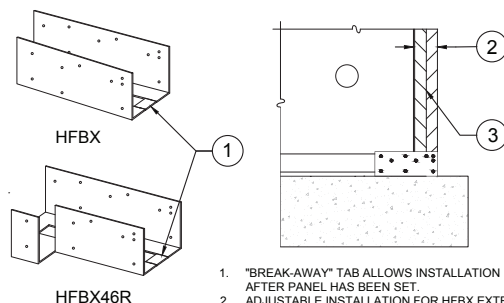
5



- SURFACE FINISHES, CONNECTORS AND FIXTURES ARE ATTACHED TO THE PANEL FACE WITH # 10 SELF-TAPPING SCREWS SPACED NO LESS THAN 2-1/4" OC.
- ATTACHMENTS TO THE PANEL EDGES ARE MADE WITH # 12 SELF-TAPPING SCREWS.
- STRUCTURAL CONNECTIONS ARE TO BE DESIGNED BY THE DESIGN PROFESSIONAL.
- STRUCTURAL HARDWARE USED TO TRANSFER LOADS SHOULD NOT EXCEED 12 GAGE.

CONNECTION SCREWS

2



BASE EXTENSION

3

- "BREAK-AWAY" TAB ALLOWS INSTALLATION AFTER PANEL HAS BEEN SET.
- ADJUSTABLE INSTALLATION FOR HFBX EXTENDS UP TO 6-1/2" BEYOND FACE OF PANEL.
- WOOD MEMBERS PER DESIGN PROFESSIONAL.

TYPICAL INSTALLATION DETAILS

THIS DETAIL SHEET IS NOT PROPRIETARY AND IS NOT REQUIRED FOR PLAN SUBMITTAL WITH HARDY FRAME PRODUCTS

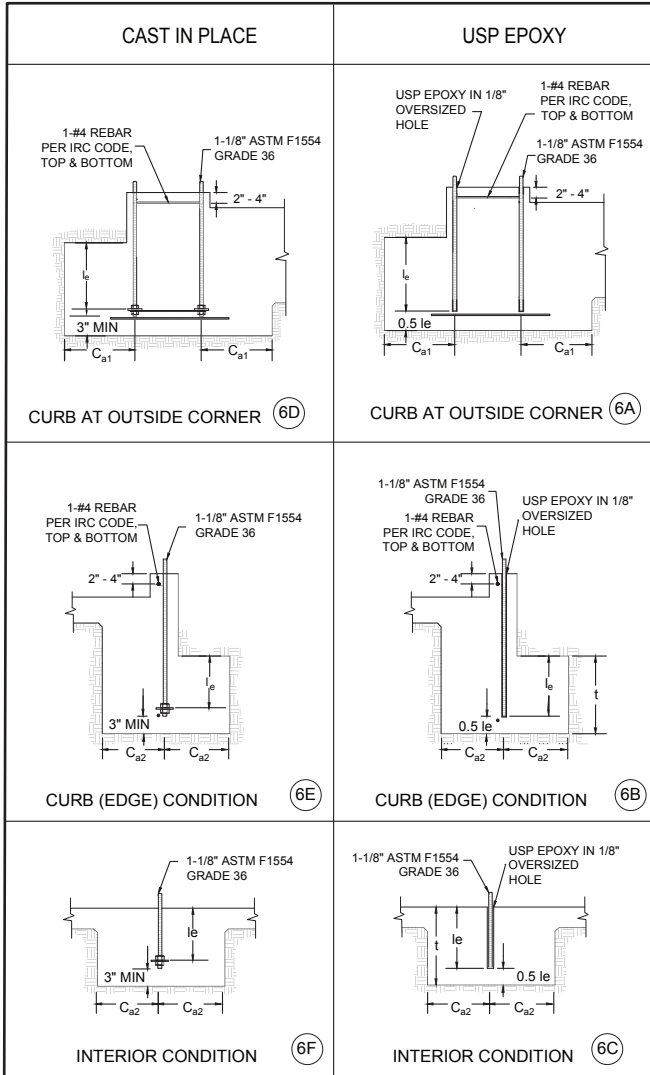
HARDY FRAME
SHEAR WALL SYSTEM
1732 PALMA DRIVE, SUITE 200, VENTURA, CA 93003
TELEPHONE: 800 754-3030 / www.hardyframe.com



DATE:

08/01/2017

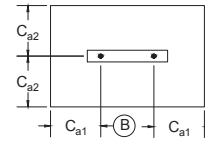
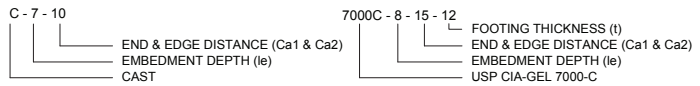
HFX-W WIND



Seismic Foundation Anchorage Requirements & SDC

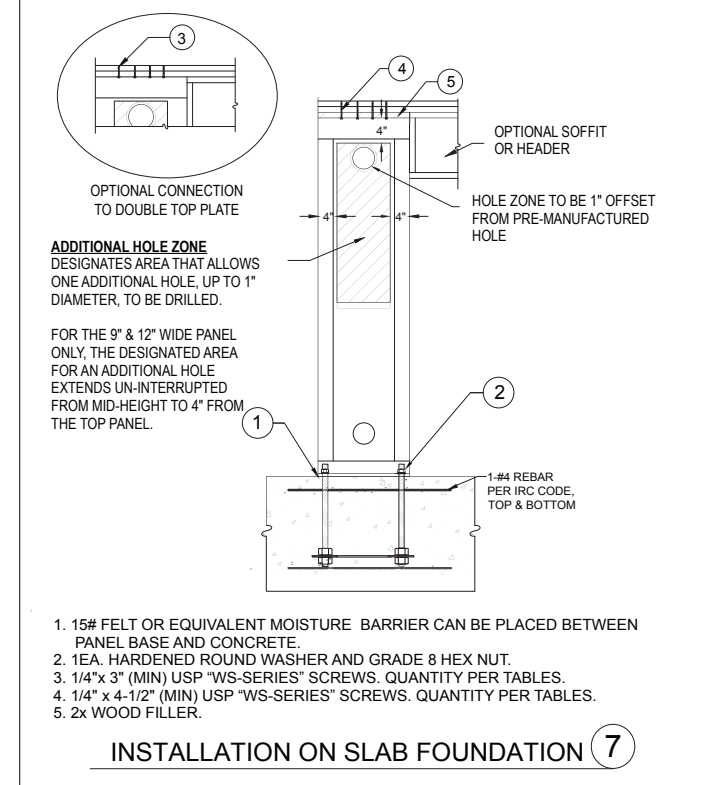
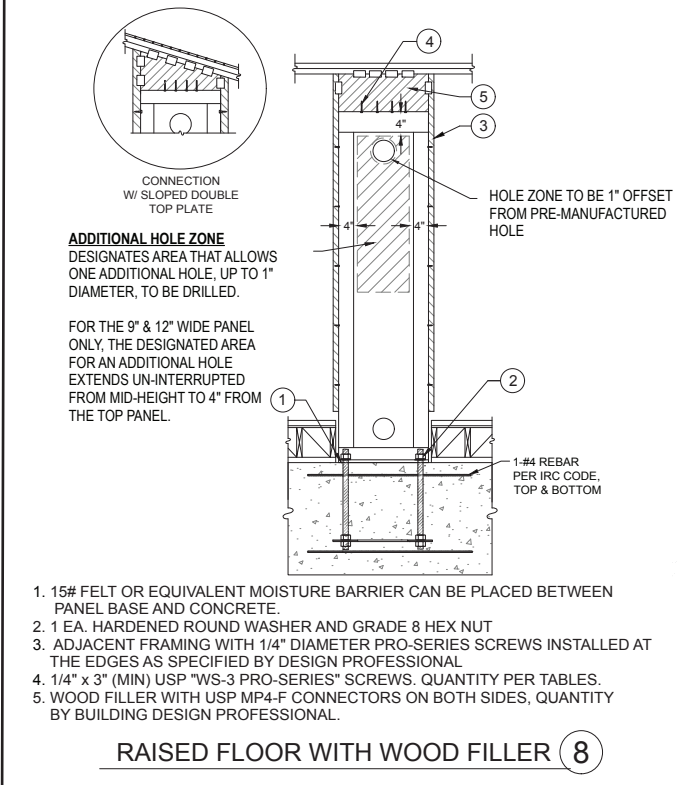
MODEL NUMBER	CAST IN PLACE ¹			USP EPOXY ²				
	BRACE WALL LENGTH (ft)	EMBEDMENT ³ l _e (in)	END & EDGE ^{4,5} C _{a1} & C _{a2}	MODEL NUMBER	BRACE WALL LENGTH (ft)	EMBEDMENT ³ l _e (in)	END & EDGE ^{4,5} C _{a1} & C _{a2}	FOOTING THICKNESS t (in)
HFX-9 x 79.5	6	9	14	HFX-9 x 79.5	6	15	19	23
HFX-9 x 8	≤ 4	7	11	HFX-9 x 8	≤ 4	10	14	15
HFX-12 x 78	6	9	13	HFX-12 x 78	6	9	14	14
HFX-12 x 8	≤ 4	7	11	HFX-12 x 8	≤ 4	8	12	12
HFX-12 x 9	≤ 4	7	10	HFX-12 x 9	6	12	20	18
HFX-12 x 10	≤ 4	7	10	HFX-12 x 10	≤ 4	8	14	12
HFX-15 x 78	6	8	12	HFX-15 x 78	6	8	12	12
HFX-15 x 8	≤ 4	7	11	HFX-15 x 8	≤ 4	8	12	12
HFX-15 x 9	≤ 4	6	9	HFX-15 x 9	6	10	15	15
HFX-15 x 10	≤ 4	6	9	HFX-15 x 10	≤ 4	8	12	12
HFX-15 x 11	6	11	16	HFX-15 x 11	6	17	21	26
HFX-15 x 12	≤ 4	8	12	HFX-15 x 12	≤ 4	12	16	18
HFX-18 x 78	6	7	11	HFX-18 x 78	6	8	12	12
HFX-18 x 8	≤ 4	6	9	HFX-18 x 8	≤ 4	7	11	11
HFX-18 x 9	≤ 4	6	9	HFX-18 x 9	≤ 4	7	11	11
HFX-18 x 10	6	9	14	HFX-18 x 10	6	13	17	20
HFX-18 x 11	≤ 4	8	12	HFX-18 x 11	≤ 4	9	16	14
HFX-18 x 12	≤ 4	8	12	HFX-18 x 12	≤ 4	9	16	14

ANCHORAGE NOMENCLATURE



MODEL	WIDTH	A	B
HFX-9x	9"	1-3/4"	5-1/2"
HFX-12x	12"	8-1/2"	8-1/2"
HFX-15x	15"	2-5/8"	9-3/4"
HFX-18x	18"	2-3/4"	12-3/4"

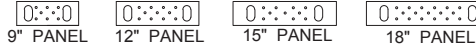
CAST IN & EPOXY ANCHORAGE



ANCHORAGE NOTES

- CAST-IN FOUNDATION ANCHORAGE SOLUTIONS ARE BASED ON THE REQUIREMENTS OF THE AMERICAN CONCRETE INSTITUTE (ACI) 318-14, CHAPTER 17, INCLUDING THE SPECIFIC SEISMIC PROVISIONS OF SECTION 17.2.3 AND THE 0.75 REDUCTION FACTOR FOR CRACKED CONCRETE. A CONCRETE COMPRESSIVE STRENGTH OF 2,500 PSI IS ASSUMED. TABULATED FOUNDATION DESIGN RECOMMENDATIONS REPRESENT MINIMUM ANCHORAGE REQUIREMENTS IN ACCORDANCE WITH THE FOLLOWING ASSUMPTIONS:
 - NO SUPPLEMENTAL REINFORCEMENT FOR SPLITTING DUE TO CONCRETE BREAKOUT.
 - NO SHEAR EDGE REINFORCEMENT GREATER THAN NO. 4 BARS.
 - NO SHEAR REINFORCEMENT WITH STIRRUPS LESS THAN 4" ON CENTER.
- POST-INSTALLED FOUNDATION ANCHORAGE SOLUTIONS REQUIRE THE USE OF MITEK® USP CIA-GEL 7000-C EPOXY ADHESIVE PER IAPMO ER473, AND THE FOLLOWING FIELD CONDITIONS:
 - TEMPERATURE REANCE IS 110°F LONG TERM AND 130°F SHORT TERM.
 - PERIODIC INSPECTION IN ACCORDANCE WITH THE LOCAL JURISDICTION.
 - DRY CONCRETE.
 - 1 1/8" ASTM GRADE A36 ANCHORAGE ROD.
- L_e = LENGTH OF EMBEDMENT FROM THE TOP OF FOOTING OR GRADE BEAM TO THE TOP OF THE HFXBB BOLT BRACE.
- C_{m1} = DISTANCE FROM HD CENTERLINE TO THE END OF THE FOOTING OR GRADE BEAM.
- C_{m2} = DISTANCE FROM HD CENTERLINE TO BOTH THE FRONT AND THE BACK FACE OF THE FOOTING OR GRADE BEAM.
- CONCRETE EDGE DISTANCES MUST COMPLY WITH ACI 318-14, SECTION 17.7.1.
- ANCHORS ARE ASTM F1554 GRADE 36 WITH A HARDY FRAME BOLT BRACE (HFXBB) INSTALLED WITH DOUBLE NUTS ON THE EMBED END.
- REINFORCEMENT SHOWN IS THE MINIMUM REQUIREMENT AND IS NOT INTENDED TO REPLACE REINFORCEMENT DESIGNED BY THE EOR.
- ANCHORAGE IS DESIGNED FOR TENSION AND SHEAR TRANSFER ONLY, FOUNDATION DESIGN PER DESIGN PROFESSIONAL.

MODEL NUMBER	NET HEIGHT (in)	DEPTH (in)	HOLD DOWN DIAMETER (in)	SCREW QUANTITY		SCREW HOLE QTY AVAILABLE AT EDGES
				PANEL	TOP (ea)	
HFX-12 x 78 HFX-15 x 78 HFX-18 x 78	78	3-1/2	1-1/8	9" WIDTH 12" WIDTH 15" WIDTH 18" WIDTH	5 6 8 10	4
HFX-9 x 79-1/2 HFX-9 x 8	79-1/2 93-3/4					
HFX-12 x 8 HFX-15 x 8 HFX-18 x 8	92-1/4					
HFX-12 x 9 HFX-15 x 9 HFX-18 x 9	104-1/4					
HFX-15 x 10 HFX-18 x 10	116-1/4					5
HFX-15 x 11 HFX-18 x 11	128-1/4					
HFX-15 x 12 HFX-18 x 12	140 1/4					



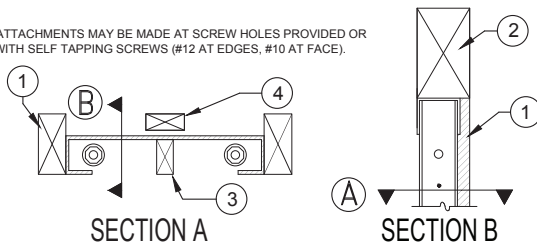
INSTALLATION INSTRUCTIONS

- WHEN INSTALLING DIRECTLY ON CONCRETE, PLACE PANEL OVER BOLTS AND CONNECT WITH (1EA) HARDENED ROUND WASHER AND A GRADE 8 OR 2H HEAVY HEX NUT. SECURE WITH A DEEP SOCKET (RECOMMENDED) UNTIL "SNUG TIGHT".
- USE 1/4" x 4-1/2" USP-WS SERIES SCREWS AT TOP CONNECTORS WITH A 2x FILLER. IF THE TOP OF PANEL IS IN DIRECT CONTACT WITH THE COLLECTOR ABOVE (TOP PLATES, HEADER, BEAM, ETC.) USE 1/4 X 3" (MINIMUM).
- FOR INSTALLATIONS WITH A 4x FILLER ABOVE 1/4" DIAMETER SCREWS INTO KING STUDS ARE REQUIRED AT THE PANEL EDGES TO BRACE FOR THE OUT-OF-PLANE HINGE OR WHEN THEY ARE SPECIFIED BY THE DESIGN PROFESSIONAL.
- 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.

GENERAL NOTES

1

ATTACHMENTS MAY BE MADE AT SCREW HOLES PROVIDED OR WITH SELF TAPPING SCREWS (#12 AT EDGES, #10 AT FACE).

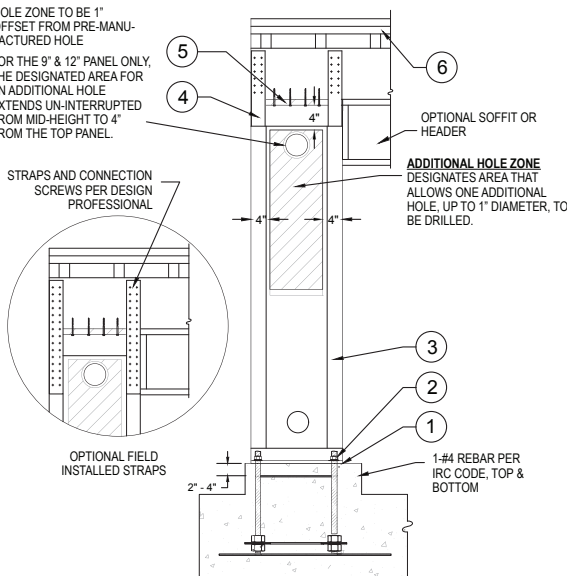


- TRIMMERS PROVIDE FULL BEARING FOR HEADER ABOVE, DESIGN AND CONNECTIONS BY OTHERS.
- 6x HEADER
- WOOD MEMBERS MAY BE INSERTED VERTICALLY OR HORIZONTALLY IN CAVITY FOR BACKING AS NEEDED.

6x HEADER ABOVE (SECTION)

4

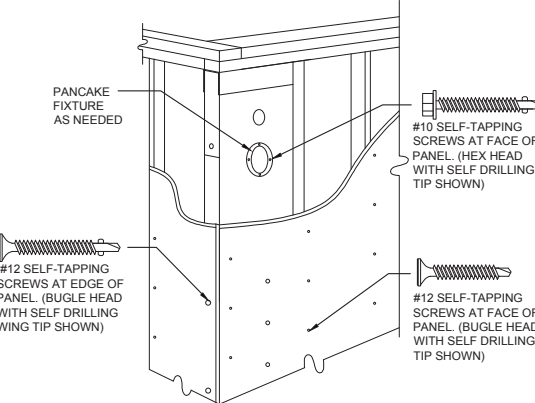
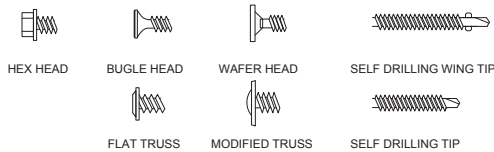
HOLE ZONE TO BE 1" OFFSET FROM PRE-MANUFACTURED HOLE
FOR THE 9" & 12" PANEL ONLY, THE DESIGNATED AREA FOR AN ADDITIONAL HOLE EXTENDS UN-INTERRUPTED FROM MID-HEIGHT TO 4" FROM THE TOP PANEL.



- 15# FELT OR EQUIVALENT MOISTURE BARRIER CAN BE PLACED BETWEEN PANEL BASE AND CONCRETE.
- 1 EA. HARDENED ROUND WASHER AND GRADE 8 HEX NUT.
- ADJACENT FRAMING OPTIONAL U.N.O. BY BUILDING DESIGN PROFESSIONAL.
- WELDED STRAPS ARE AVAILABLE FROM MANUFACTURER WHEN REQUIRED BY THE DESIGN PROFESSIONAL.
- A 2x WOOD FILLER WITH 1/4" x 4-1/2" (MIN) USP "WS SERIES SCREWS IS PERMITTED.
- WHEN CRIPPLE STUDS OCCUR, SHEAR TRANSFER DESIGN TO BE PER THE DESIGN PROFESSIONAL.

INSTALLATION ON CURB

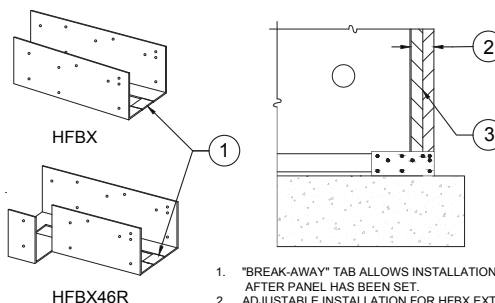
5



- SURFACE FINISHES, CONNECTORS AND FIXTURES ARE ATTACHED TO THE PANEL FACE WITH # 10 SELF-TAPPING SCREWS SPACED NO LESS THAN 2-1/4" OC.
- ATTACHMENTS TO THE PANEL EDGES ARE MADE WITH # 12 SELF-TAPPING SCREWS.
- STRUCTURAL CONNECTIONS ARE TO BE DESIGNED BY THE DESIGN PROFESSIONAL.
- STRUCTURAL HARDWARE USED TO TRANSFER LOADS SHOULD NOT EXCEED 12 GAGE.

CONNECTION SCREWS

2



BASE EXTENSION

3

- "BREAK-AWAY" TAB ALLOWS INSTALLATION AFTER PANEL HAS BEEN SET.
- ADJUSTABLE INSTALLATION FOR HFBX EXTENDS UP TO 6-1/2" BEYOND FACE OF PANEL.
- WOOD MEMBERS PER DESIGN PROFESSIONAL.

TYPICAL INSTALLATION DETAILS

THIS DETAIL SHEET IS NOT PROPRIETARY AND IS NOT REQUIRED FOR PLAN SUBMITTAL WITH HARDY FRAME PRODUCTS

HARDY FRAME
SHEAR WALL SYSTEM
1732 PALMA DRIVE, SUITE 200, VENTURA, CA 93003
TELEPHONE: 800 754-3030 / www.hardyframe.com



DATE:

08/01/2017

HFX-S SEISMIC



GARAGE FRONT TOP PLATE CONNECTION



RETROFIT APPLICATION



BASE EXTENSION (HFBX)



GARAGE FRONT WITH STRAPS



GARAGE FRONT HANGING SOFFIT



GARAGE FRONT WITH STRAPS



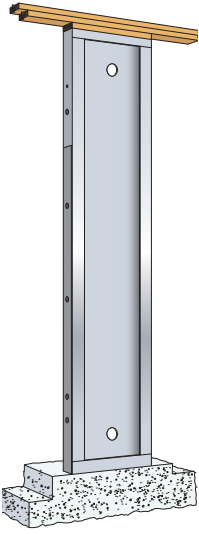
PORTAL INSTALLATION WITH SOFFIT & FIXTURES



BOTTOM CONNECTION WITH DEEP SOCKET & SWIVEL



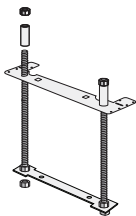
OUTSIDE CORNER APPLICATION

 Panel	HFX Model Number	W (in)	H (in)	Depth (in)	Wt (lbs)	Minimum Screw Qty @ Top (ea)	Minimum Screw Qty @ Bottom (ea)	Screw Holes Available @ Edges (ea)	
	HFX-9x79.5	9	79-1/2	78	3-1/2	77	5	NA	4
HFX-12x78	12	93-3/4	90			6	6	4	
HFX-15x78	15		101			8	8		
HFX-18x78	18		113			10	10		
HFX-21x78	21		133			12	12		
HFX-24x78	24		148			14	14		
HFX-9x8	9		92-1/4	90		5	NA		4
HFX-12x8	12	106		6		6			
HFX-15x8	15	118		8		8			
HFX-18x8	18	131		10		10			
HFX-21x8	21	157		12		12			
HFX-24x8	24	172		14		14			
HFX-12x9	12	104-1/4	116	6		6	4		
HFX-15x9	15		130	8		8			
HFX-18x9	18		144	10		10			
HFX-21x9	21		175	12		12			
HFX-24x9	24		190	14		14			
HFX-12x10	12		116-1/4	128		6		6	5
HFX-15x10	15	143		8	8				
HFX-18x10	18	158		10	10				
HFX-15x11	15	128-1/4		161	8	8	5		
HFX-18x11	18			177	10	10			
HFX-15x12	15	140-1/4		174	8	8	6		
HFX-18x12	18		190	10	10				

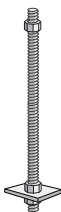
Anchorage Accessories

Bottom and Top Connectors

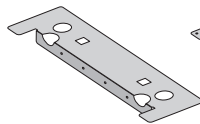
Template Kits		Anchor Bolt Assemblies		Templates				Bolt Braces		Base Extensions		Shear Transfer		
MODEL	Wt (lbs)	MODEL	Wt (lbs)	MODEL 4" framing	Wt (lbs)	MODEL 6" framing	Wt (lbs)	MODEL	Wt (lbs)	MODEL	Wt (lbs)	MiTek Pro-Series Screws	Size	Box Qty
HFXTK9	20	HFAB1-1/8x36STD	10.5	HFXT9	0.7	HFXT9-6	1.0	HFxBB9	0.3	HFBX	2	WS3-HF	1/4 x 3	30
HFXTK12	20	HFAB1-1/8x48STD	13.5	HFXT12	0.9	HFXT12-6	1.2	HFxBB12	0.4	HFBX46-L	2.5	WS45-HF	1/4 x 4 1/2	30
HFXTK15	21	HFAB1-1/8x60STD	16.3	HFXT15	1.2	HFXT15-6	1.5	HFxBB15	0.5	HFBX46-R	2.5			
HFXTK18	21	HFAB1-1/8x72STD	18.9	HFXT18	1.4	HFXT18-6	1.7	HFxBB18	0.6	HFBX66-L	3			
										HFBX66-R	3			



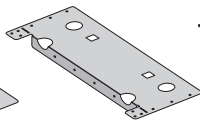
HFXTK



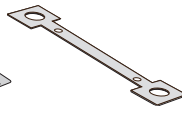
HFAB



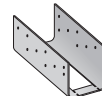
HFXT



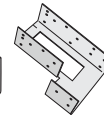
HFXT-6



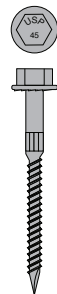
HFxBB



HFBX



HFBX46L



Notes

- STD Anchor Bolts are ASTM F1554 Grade 36.

Ordering Information

- Custom heights are available for Panels not to exceed the maximum height listed for that model.
- Model numbers HFX-9x79.5, HFX-12x78, HFX-15x78, HFX-18x78 Panels come with two straps welded to the solid face of panel. All models can be ordered custom with welded straps on either face.

Connector Information

- Screws are 1/4-inch diameter USP-WS (ESR-2761)
- Screws at top are 3-inches (WS3) when attaching directly to the collector. When installing a 2x wood filler at the top connection the minimum screw length is 4-1/2 (WS45) inches.
- 1/4" diameter edge screws to adjacent framing are required when installing fillers above greater than 1-1/2" or when specified by the Building Design Professional.

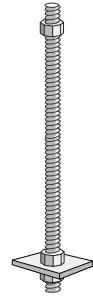
Anchor Bolt Assemblies

Hardy Frame Anchor Bolt Assemblies (HFAB) are sold individually in lengths of 36, 48, 60 and 72 inches to provide rod lengths that accommodate various embed depths. HFABs are available in 1-1/8" diameter, Standard Grade (STD) for anchoring Panels.

For complete structural components provided in Hardy Frame Template Kits order the following:

- 2 each HFAB1-1/8 (Specify length and STD)
- 1 each HFXT Template
- 1 each HFXBB Bolt Brace

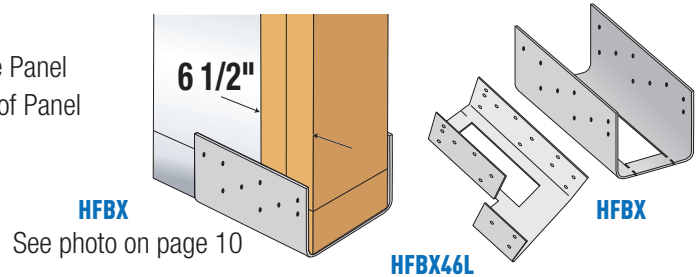
Models
HFAB1-1/8x36STD
HFAB1-1/8x48STD
HFAB1-1/8x60STD
HFAB1-1/8x72STD



ANCHOR BOLT ASSEMBLY

Hardy Frame® Base Extension (HFBX)

- Connects adjacent wood mudsill and stud (or Post) to Hardy Frame Panel
- Adjustable installation for HFBX extends up to 6 1/2" beyond face of Panel
- "Break-away" tab allows installation after Panel has been set
- Pre-punched holes for wood nailing
- Can be screwed to Panel for additional stability



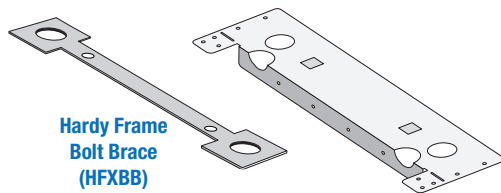
HFBX

See photo on page 10

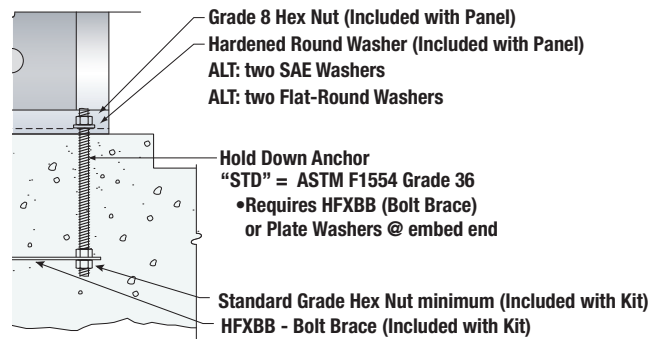
HFBX46L

Hardy Frame® HFX Template (HFXT)

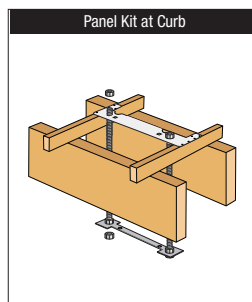
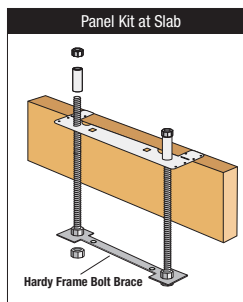
- Assures proper bolt spacing and alignment
- 16 gage material supports weight of embed bolts
- Variety of applications
- Also available for 2x6 wall framing (HFXT-6)



Hardy Frame Bolt Brace (HFXBB)



Hardy Frame® HFX Template Kit (HFXTK)



Hardy Frame® HFX Template Kit Components			
Kit Model Number	Template (1 ea)	Bolt Brace (1 ea)	Anchor Bolt Assembly 1-1/8 STD
HFXTK9	HFXT9	HFXBB9	2
HFXTK12	HFXT12	HFXBB12	2
HFXTK15	HFXT15	HFXBB15	2
HFXTK18	HFXT18	HFXBB18	2

Anchor Bolt Assemblies:

- 1-1/8 STD = 1-1/8 x 32" ASTM F1554 Grade-36 all thread with (3) Standard Hex Nuts.

For other rod lengths contact Hardy Frames

- All Thread length = length of embed (le) + 12" (formboard) + 6" (Kit assembly + height above concrete)
- The Hardened Round Washers for connecting the Panel base may be substituted with two SAE or two Round-Flat Washers
- STD assemblies require a Hardy Frame® Bolt Brace (Minimum) double nitted at the embed end

CIA-GEL 7000-C Code Compliant Epoxy
IAPMO ER 473 Complies with 2015 IBC and 2015 IRC

CIA-GEL 7000-C Epoxy is an adhesive designed to attach threaded rods into concrete that may become cracked during service due to cyclic loading from wind or earthquakes. It may also be used with fully grouted CMU construction. It is a low odor, solvent free, non-shrink, non-sag adhesive. The two-component (resin and hardener) epoxy is supplied in equal volume cartridges, which are combined in a 1:1 ratio when dispensed through the attached mixing nozzle. Either a hand powered or air-powered dispenser may be used. The cartridges are sealed with a D-plug which opens easily on the jobsite and allows partially used cartridges to be saved for later use. The epoxy has a two year shelf life when stored in unopened containers at temperatures between 50° F and 77° F.

Features:

- Designed for tension and shear loads due to wind or earthquake (Seismic Design Category C-F)
- 15 minute gel time and 8 hour cure time (between 60° F to 70° F provides convenient installation)
- Use with threaded steel rod
- Can be installed in dry, saturated or water filled holes
- No shrinkage
- Easy to dispense
- MXCA free (Meta-xylenediamine) and VOC free (volatile organic compounds)

Applications:

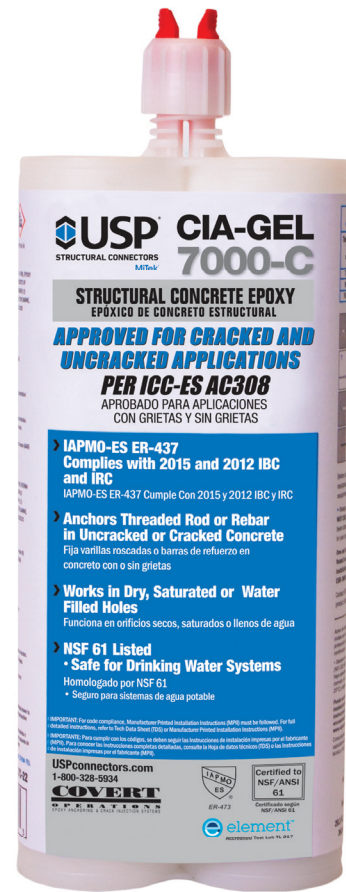
- Anchors continuously threaded steel rod into concrete for high seismic zones (SDC C-F)
- Horizontal and overhead anchoring applications (requires special inspection)

Code Evaluations:

IAPMO ES ER-473 FL 17248 LA City RR 25991

CIA-GEL 7000-C		
USP #	GEL7C-10	GEL7C-22
Size	9.4 oz	20.3 oz
Dispensers	USP HDT-10 Cox 300 ml Manual	USP HDT-22 USP PDT-22 Newborn 600ml Manual Newborn 600ml Pneumatic
Nozzle(s)	7C-SMN	7C-SMN 7C-XLMN

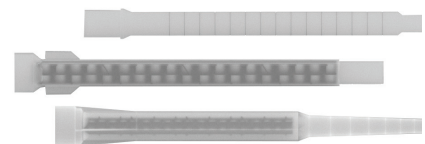
Threaded Rod		
Rod Dia.	Hole Dia. (in.)	Hole Depth
1-1/8	1-1/4	see design table



Available in:

8.5 oz. - GEL7C-10
20.3 oz. - GEL7C-22

Mixing Nozzles



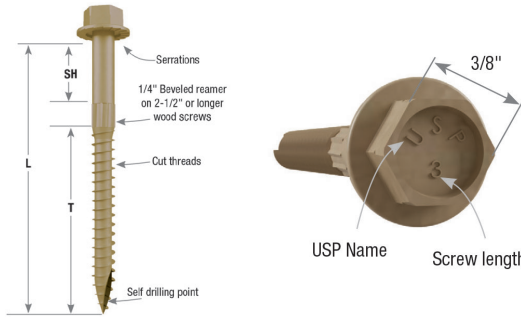
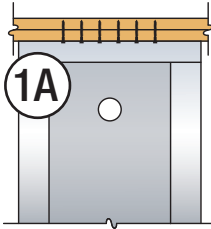
Hand Dispensing Tool



MiTek Pro-Series Screw for use with Hardy Frame Panels

WS-1/4" x 3" Screws

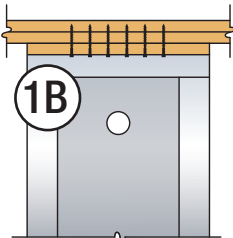
For connection directly to top plates



MiTek PRO SERIES

WS-1/4" x 4-1/2" Screws

For 2x filler above

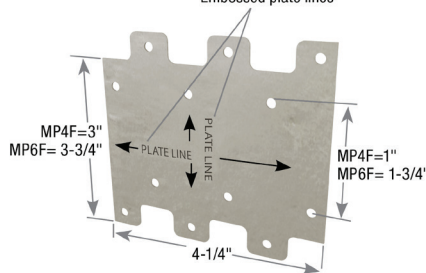
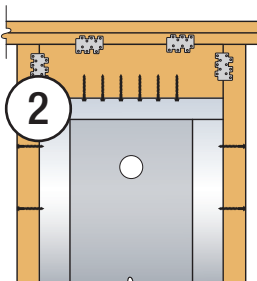


USP Stock No.	Description	Dimensions (in)				Finish	Allowable Shear (160%)	
		L	SH	T	Thread		12 GA Steel to DF-L/SP	12 GA Steel to S-P-F
WS3	1/4" x 3"	3	3/4	2-1/4	2	Zinc	668 lbs	475 lbs
WS45	1/4" x 4-1/2"	4-1/2	1-1/4	3-1/4	3	Zinc	825 lbs	673 lbs

1. Allowable loads have been increased 60% for short term loading; no further increase shall be permitted.
2. Zinc finish = Yellow Zinc Dichromate.
3. Code Approved by ICC Evaluation Service (ESR-2761), LA City (RR-25850), and State of Florida (FL-16091).

"MP4F" Plate Connector

For 4x filler above

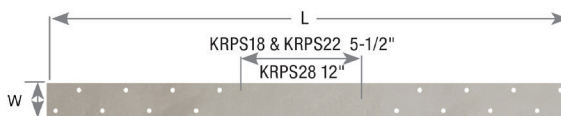
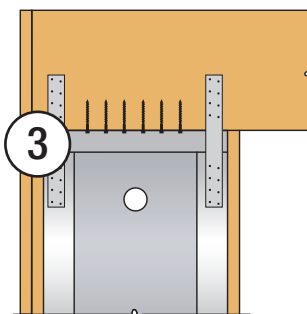


USP Stock No.	Steel Gage	Orientation	Fastener Schedule		Direction of Load	Allowable Shear (160%)	
			Each Member			DF-L/SP	S-P-F
			Qty	Type			
MP4F	20	H	6	8d x 1-1/2"	H	845 lbs	710 lbs

1. Allowable loads have been increased 60% for short term loading; no further increase shall be permitted.
2. 8d nails are .131" dia. x 1-1/2" long, minimum embedment shall be 1-5/16".
3. Code Approved by ICC Evaluation Service (ESR-3455), LA City (RR-25779), and State of Florida (FL-821).

"KRPS" Straps

For Portal condition with #10 self-tapping screws to Panel and 16d nails to header

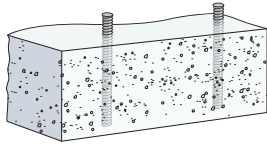


USP Stock No.	Steel Gage	Dimensions (in)		Fastener Schedule		Allowable Tension (160%)
		W	L	#10 Screws	16d Nails	DF-L/SP
KRPS18	16	1-1/2	18-5/16	6	6	1325 lbs
KRPS22			22-5/16	8	8	1720 lbs
KRPS28			28-5/16			

1. Allowable loads have been increased 60% for short term loading; no further increase shall be permitted.
2. 16d nails are .162" dia. x 3-1/2" long, minimum embedment shall be 1-5/8".
3. #10 Hex Head self-tapping screws with a Self Drilling (SD) point are recommended into face of Panel.

Epoxy

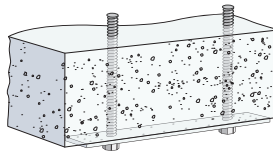
CIA GEL7000-C epoxy has an ICC-ES evaluation report (ESR-3609) for design in seismic categories A-F for use in cracked and un-cracked concrete. The engineer of records design will take into account concrete edge distances, end distances and the amount of combined tension and shear needed to resist the forces transferring from the Hardy Frame Shear Panel to the existing foundation.



Epoxy

Thru-Bolt

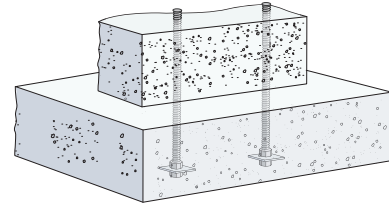
The design, including capacity of existing concrete and size of Bearing Plates below is determined by the engineer of record. The adjacent illustration shows installation with a Hardy Frame Bearing Plate (HFXBP) at the underside of concrete.



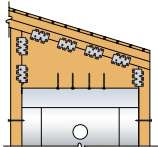
Thru-Bolt

New Footing Below

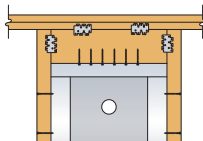
Hardy Frame unreinforced or reinforced anchorage solutions may be used below existing concrete or to replace existing concrete.



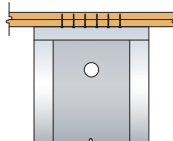
New Footing Below Existing



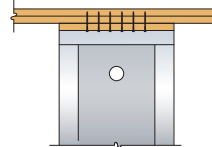
Rake Filler



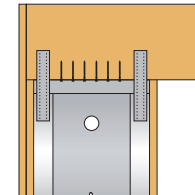
4x Filler



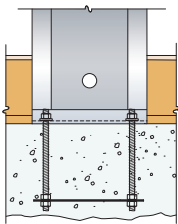
Connection to top plates
1/4 x 3" WS-Series screws



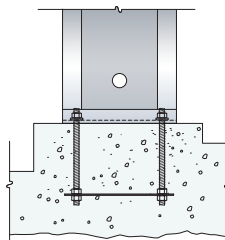
With 2x filler
1/4 x 4 1/2" WS-Series screws



Portal condition
1/4 x 3" WS-Series screws and USP KRPS straps (when required by design professional). Use #10 self tapping screws to Panel and 16d nails to header. Note: 78" and 79-1/2" heights include welded straps by manufacturer



At raised floor head out

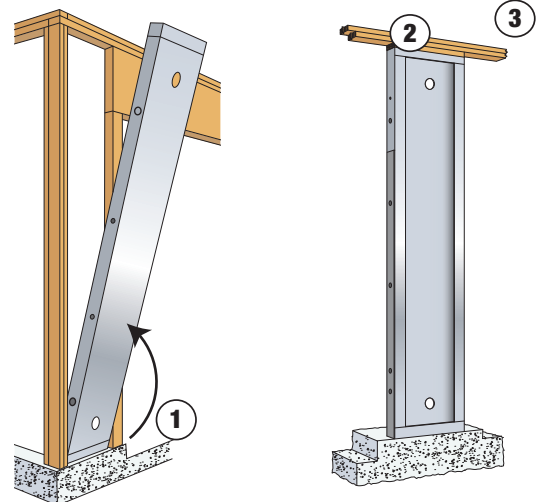


On concrete

Hardy Frame® Panel at Existing Framing

Panel Installation

1. Tilt Panel, lift over bolts and swing into the existing space
2. Install 2x filler at 1-1/2" gap
3. Connect with 1/4 x 4-1/2 USP WS-Series Screws

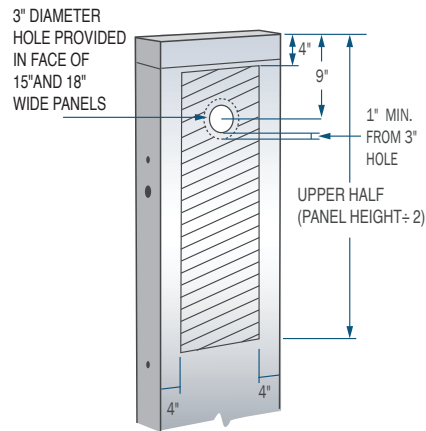


Refer to the Hardy Frame® Product Catalog and Installation Details for more specific information

Hole Chart

An additional 1" diameter hole may be drilled in the upper half of the Panel when it is located in the hatched area.

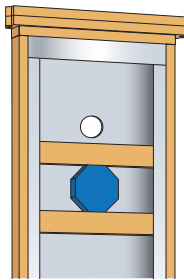
To drill more than one hole, a larger diameter hole or a hole in a location outside of the hatched area, contact Hardy Frames.



Fixture Installation

2x4 Wall Framing

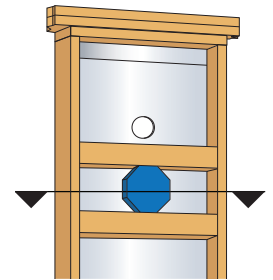
- There is no "inside or outside face" of Hardy Frame Panels.
- Install with the cavity face of Panel oriented in the direction of the fixture to be attached
- Install 2x backing in the cavity and secure with #10 (minimum) self-tapping screws through the wood into the steel or with 1/4" Pro-Series Screws through pre-drilled holes in the face of Panel. Pre-drilled holes must be evenly spaced no less than 3" OC



Cavity Face
Panel in 2x4 framing with cavity towards outside face of wall

2x6 Wall Framing

- Installation of Panels are recommended to be at the inside face of a 2x6 wall to increase the concrete edge distance at the hold down anchors and to provide a 2" recess that can be used to:
- Provide flat stud backing for surface finishes
- Provide a thermal break in cold weather climates
- Install a fixture at one or both faces of the wall



Solid Face
Panel set flush to inside face of 2x6 wall



Wood

For attaching wood, siding, drywall and other surface finishes to the Panel or Brace Frame face #10 Flat or Wafer Head, self-tapping screws with a "Winged" self drilling (SD) point are recommended. When connecting to the edge of Panels, use a #12 diameter screw.



FLAT TRUSS



WAFER HEAD



WING TIP "SD" SELF TAPPING

Steel

When attaching steel connectors (12-gage maximum) fixtures, electrical boxes, wire mesh, etc. to the Panel #10 Hex, Flat Truss or Modified Truss Head with a Self Drilling (SD) point are recommended. When connecting to the edge of Panels, use a #12 diameter.



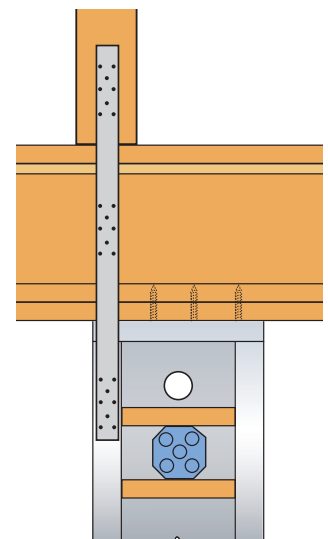
HEX HEAD



FLAT TRUSS



SELF DRILLING "SD" POINT SELF TAPPING



ADDITIONAL PUBLICATIONS FROM MiTek, USA

Hardy Frames is a wholly owned subsidiary of MiTek, USA. Along with USP Structural Connectors and the Z4 Tie-Down System our combined team serves the construction industry with a full range of structural and design solutions.



Hardy Frame® Product Catalog

The Hardy Frame® Product Catalog provides complete information for Engineers, Architects and Designers to specify our shear wall system. There is a complete listing of all Panels, Brace Frames and Accessories, allowable shear loads, corresponding uplift and drift, pre-engineered anchorage information, specification tips, photos and Typical Installation Details. The Installation Details in the Product Catalog conveniently match our ACad version that can be included as supplemental sheets to plan submittals.



Hardy Frame® Installation Guide

The Hardy Frame® Installation Guide was written specifically for Suppliers and Installers. This publication provides all HFX model numbers, dimensions, bolt and screw patterns, connectors, installation illustrations, attachments with self-tapping screws and information regarding Template Kit (HFXTK) and Floor to Floor Connector Kit (HFTC) components.



USP Structural Connectors Product Catalog

The 2015-2016 USP Catalog is a comprehensive 236 page guide to the United States product line. It features all new product and application illustrations, detailed installation instructions, fastening schedules and load ratings. EWP and Plated Truss connectors are included.



USP Structural Connectors Anchoring Solutions Guide

Detailed descriptions and specifications for the complete line of epoxy products; CIA-GEL 7000-C for Cracked Concrete, CIA GEL 7000 Masonry epoxy, CIA GEL 6000-GP General Purpose & Department of Transportation (DOT) epoxy, CIA-EA Un-cracked Concrete epoxy and Acrylate, Incredi-Bond® multi-purpose epoxy. 16 pages. #2278 April 2017

HF HARDY
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hardyframe.com

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