GROWspan™
greenhouse structures

GrowSpan™ Gothic Premium High Tunnels (All H Models With Polycarbonate End Walls)

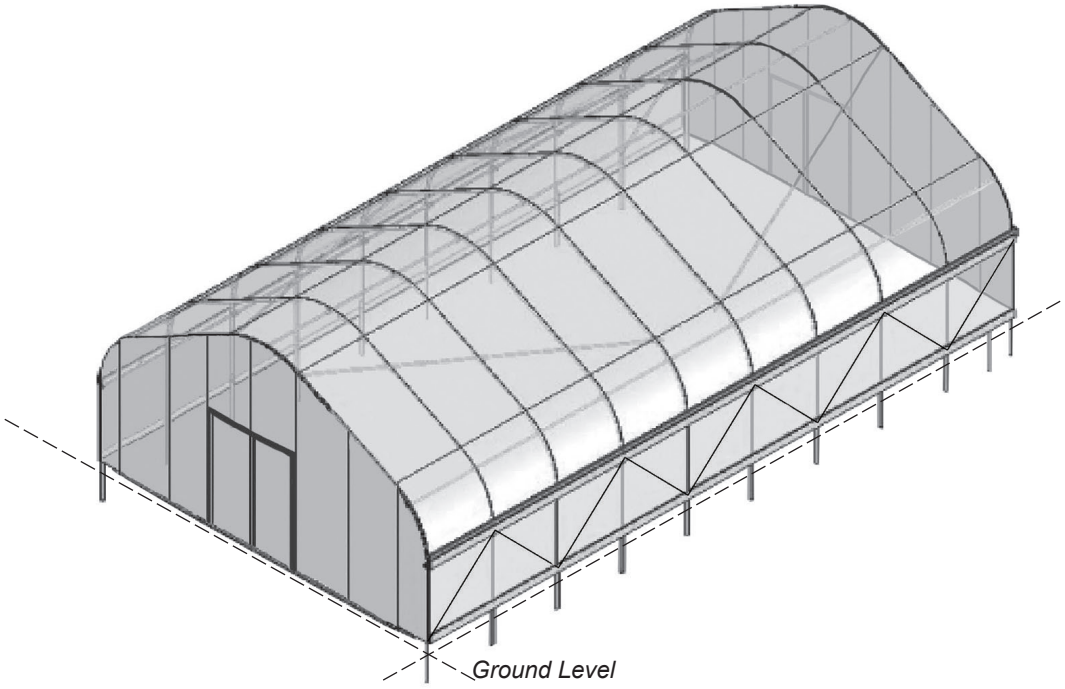


Photo may show a different but similar model. These instructions include information for buildings equipped with either drop-down side panels or roll-up side panels. Verify that you are completing the correct steps for your building. The cover installation steps for buildings with a film cover or a 5.2 oz fabric cover are the same.

STK#	DIMENSIONS
108179H_PC	20' W x 14' H x 24 L
108180H_PC	20' W x 14' H x 36' L
108181H_PC	20' W x 14' H x 48' L
108182H_PC	20' W x 14' H x 60' L
108183H_PC	20' W x 14' H x 72' L
108184H_PC	20' W x 14' H x 96' L

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WARNING: Cancer and Reproductive Toxicity - P65Warnings.ca.gov

Revision date: 10.22.26

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READ THIS DOCUMENT BEFORE YOU BEGIN.

Thank you for purchasing this GrowSpan™ high tunnel. When properly assembled and maintained, this product will provide years of reliable service. These instructions include helpful hints and important information needed to safely assemble and properly maintain the high tunnel. Please read these instructions ***before*** you begin.

If you have any questions during the assembly, contact Customer Service at 1-800-245-9881 for assistance.

SAFETY PRECAUTIONS

- Wear eye protection.
- Wear head protection.
- Wear gloves when handling metal tubes.
- Use a portable GFCI (Ground Fault Circuit Interrupter) when working with power tools and cords.
- Do not climb on the high tunnel or framing during or after construction.
- Do not occupy the high tunnel or attempt to install the panel during high winds, tornadoes, or hurricanes.
- *Never* attempt to install the panel during windy or stormy conditions.
- Assemble and anchor the high tunnel frame.
- Provide adequate ventilation if the structure is enclosed.
- Do not store hazardous materials in the high tunnel.
- Provide proper ingress and egress to prevent entrapment.

ANCHORING INSTRUCTIONS

Prior to assembling this high tunnel, please read the *MUST READ* document included with the shipment.

⚠ **WARNING:** The anchor assembly is an integral part of the high tunnel construction. Improper anchoring may cause high tunnel instability and failure of the structure. Failing to anchor the high tunnel properly *will void the manufacturer's warranty* and may cause serious injury and damage.

LOCATION

Choosing the proper location is an important step before you begin to assemble the structure. Follow these requirements:

- Never erect the structure under power lines.
- Identify whether underground cables and pipes are present *before* preparing the site or anchoring the structure.
- Location should be away from structures that could cause snow to drift on or around the building.
- Do not position the high tunnel where large loads such as snow and ice, large tree branches, or other overhead obstacles could fall.
- *Always check local building codes before you begin.*

SITE

After choosing a location, proper preparation of the site is essential. The following site characteristics will help ensure the integrity of the structure.

- *A level site is required*. The site must be level to properly and safely erect and anchor the structure.
- If the site is not level, use footings to provide a secure base to assemble the structure. Pre-cast concrete blocks, pressure-treated wood posts, or poured footings are all acceptable when properly used. (Some high tunnels use ground posts or base plates.)
- Drainage: Water draining off the structure and from areas surrounding the site should drain away from the site to prevent damage to the site, the structure, and contents of the structure.

⚠ **WARNING:** The individuals assembling this structure are responsible for designing and furnishing all temporary bracing, shoring and support needed during the assembly process. For safety reasons, those who are not familiar with recognized construction methods and techniques *must seek the help of a qualified contractor.*

CUSTOMER-SUPPLIED MATERIALS

Dimension lumber for the ribbon board, retaining board, and baseboard may be required depending on the high tunnel sidewall panel option.

Consult the "DROP DOWN SIDES: Ribbon Boards and Baseboards" & "ROLL-UP SIDES: Ribbon Boards and Baseboards" pages for additional details and diagrams.

ASSEMBLY PROCEDURE

Following the instructions as presented will help ensure the proper assembly of your high tunnel. Failing to follow these steps may result in an improperly assembled and anchored high tunnel and will void all warranty and protection the owner is entitled.

The steps outlining the assembly process are as follows:

1. Verify that all parts are included in the shipment. Notify Customer Service for questions or concerns.
2. Read these instructions, the Must Read document, and all additional documentation included with the shipment ***before*** you begin.
3. Gather the tools, bracing, ladders (and lifts), and assistance needed to assemble the high tunnel.
4. Check the weather ***before*** you install the roof cover and any panels (if equipped). ***Do not install covers or panels on a windy or stormy day.***
5. Re-evaluate the location and site based on information and precautions presented in the documentation included with the shipment.
6. Prepare the site (if applicable).
7. Assemble the frame components in the order they are presented in these instructions.
8. Assemble the frame including the struts (if equipped).
9. Consult the MUST READ document and properly anchor the assembled frame.
10. Install the end wall framing. (These are optional items for some high tunnels.)
11. Install, tighten, and secure the end wall end panels and doors. (These are optional items for some buildings.)
12. Install, tighten, and secure the main cover. This applies to fabric and film covers that stretch over the frame assembly.
13. Attach the panel components to the main frame, install the panel, and attach the anti-billow ropes.
14. Read the care and maintenance information at the end of these instructions.
15. Complete and return all warranty information as instructed.

BUILDING IDENTIFICATION

All buildings are identified by a building sku number (e.g., 108179**HCD**). Use the following information to determine the cover and side panel specifics of your building.

- **HCD: Film cover with Drop-Down Sides**
- **HFD: 5.2 oz cover with Drop-Down Sides**
- **HCRU: Film cover with Roll-Up Sides**
- **HFRU: 5.2 oz cover with Roll-Up Sides**

REQUIRED TOOLS

The following list identifies the main tools needed to assemble the high tunnel. Additional tools and supports may be needed depending on the structure, location, and application.

- Tape measure or measuring device
- Marker to mark locations on the pipes
- Variable speed drill/driver (cordless with extra batteries works best)
- Metal-cutting saw
- Wrenches and socket set, or an adjustable wrench
- Scissors, utility knife, or tin snips
- Hammers, gloves and eye protection
- Adjustable pliers and self-locking pliers
- Ladders, work platforms, and other machinery for lifting designed to work safely at the height of the building

UNPACK AND IDENTIFY PARTS

The following steps will ensure that you have all the necessary parts *before* you begin to assemble the high tunnel frame.

1. Unpack the contents of the shipment and place where you can easily inventory the parts. Refer to the Bill of Materials/Spec Sheets.
2. Verify that all parts listed on the Bill of Materials/Spec Sheets are present. If anything is missing or you have questions, consult the Pictorial Parts Guide and all diagrams for clarification, or contact Customer Service.

   NOTE: At this time, you do not need to open the plastic bags containing smaller parts such as fasteners or washers (if equipped).

DROP-DOWN SIDES: Ribbon Boards & Baseboards (Required)

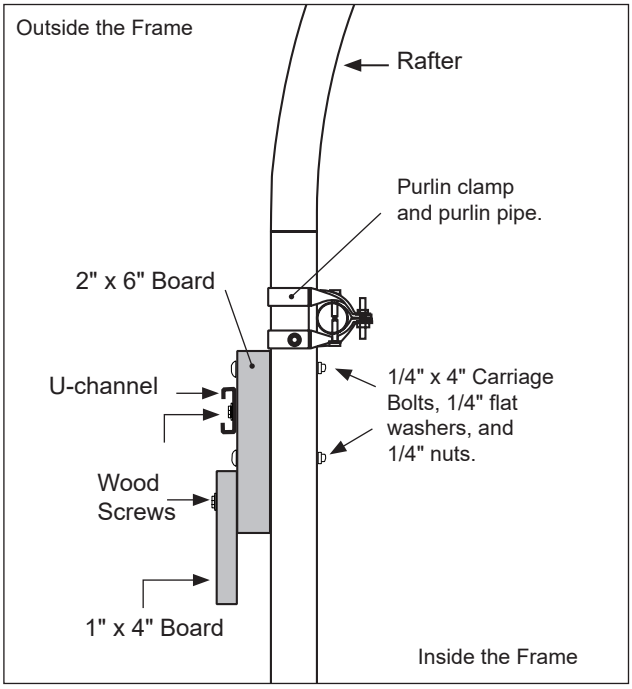
NOTE: If your high tunnel is equipped with roll-up side panels, skip this page and continue with the next.

A c***ustomer-supplied two-piece ribbon board*** is required for the drop-down panel. Fasteners are included. *Customer supplies the materials for the ribbon board.* ***Minimum board requirements are shown in the diagrams below.***

RIBBON BOARD

The ribbon board runs the length of the frame along each side. Height is determined by frame design and is typically set a few inches below the rafter curve to maximize the opening for ventilation. ***Maximum sidewall opening for this frame design is 6' 6". See grid diagram in the Quick Start section near the back of this guide.***

The diagram shows a customer-supplied ribbon board as attached to the frame. Diagram applies to buildings equipped with drop-down side panels.



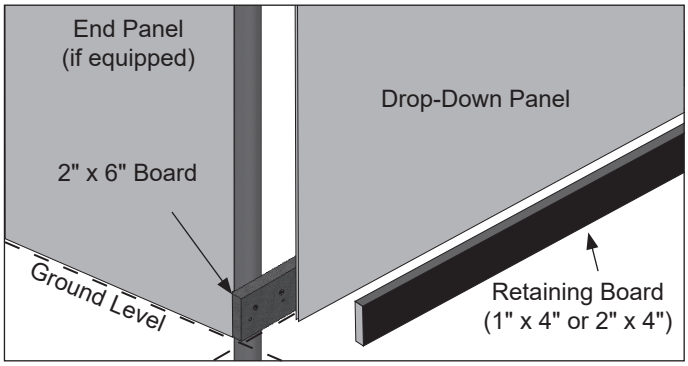
ATTENTION: DEPENDING ON PURLIN LOCATION, RIBBON BOARD CAN BE INSTALLED EITHER ABOVE (NOT SHOWN) OR BELOW THE PURLIN (AS SHOWN ABOVE.) ***DO NOT INSTALL THE RIBBON BOARD ON THE RAFTER CURVE.***

Use two (2) carriage bolts per rafter connection for the ribbon board. When attaching the second board to the ribbon board, space the wood screws at 24" on-center.

DIAGRAMS ARE NOT TO SCALE.

BASEBOARD

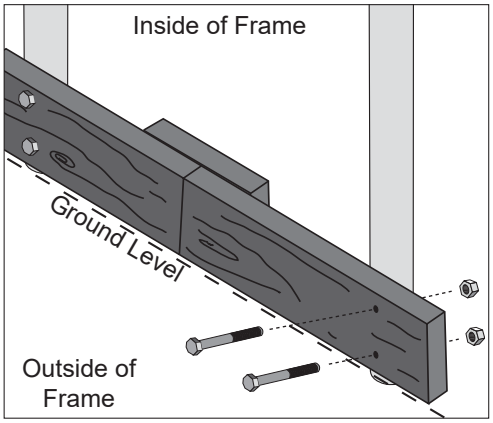
A customer-supplied baseboard and retaining board *are required* to attach the drop-down side panels. See the exploded view below. *Minimum lumber dimensions are also shown.*



View shown from outside the high tunnel.

The baseboard runs the length of the frame at ground level. The retaining board secures the drop-down panel to the baseboard. *The baseboard and retaining boards are supplied by the customer.*

Retaining boards are attached during the drop-down panel installation. The retaining board is not needed when the building is equipped with a roll-up panel.



Fasteners (1/4" x 4" carriage bolts and wood screws) are included. Depending on board width, use two (2) carriage bolts per rafter connection for the baseboard. Evenly space the wood screws at 24" on-center when attaching the retaining board to the baseboard during the side panel installation. Countersink carriage bolt heads if needed to install the retaining board.

Secure baseboard and ribbon board joints between rafters on the inside of the frame as shown to prevent conflicts with other components.

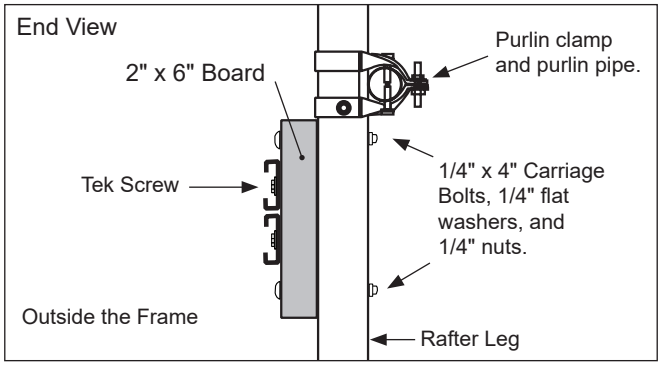
ROLL-UP SIDES: Ribbon Boards & Baseboards (See Below)

NOTE: If your high tunnel is equipped with drop-down side panels, skip this page and continue on the next page.

A ribbon board is optional for high tunnels with roll-up sides. The double u-channel provides sufficient support when attached directly to the rafters. A baseboard is strongly recommended, but not required. When installed, a baseboard helps prevent ground posts from working loose in sandy soil when concrete is not used. ***Minimum board requirements are shown in the diagrams below.***

RIBBON BOARD — OPTIONAL

A customer-supplied ribbon board is optional for the installation of the roll-up panel. Fasteners are included. *Customer supplies the materials for the ribbon board.*

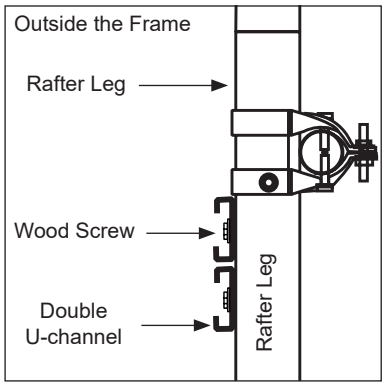


ATTENTION: The ribbon board and the double u-channel run the length of the frame along each side. Height is typically set a few inches below the rafter curve to maximize the opening for ventilation. ***Maximum sidewall opening for this frame design is 6' 6". See grid diagram in the Quick Start section near the back of this guide.***

DEPENDING ON PURLIN LOCATION, THE DOUBLE U-CHANNEL CAN BE INSTALLED EITHER ABOVE (NOT SHOWN) OR BELOW THE PURLIN (AS SHOWN.) ***DO NOT INSTALL THE RIBBON BOARD ON THE RAFTER CURVE.***

If a ribbon board is not used, attach the double u-channel directly to the rafters along the outside of the frame using Tek screws as shown.

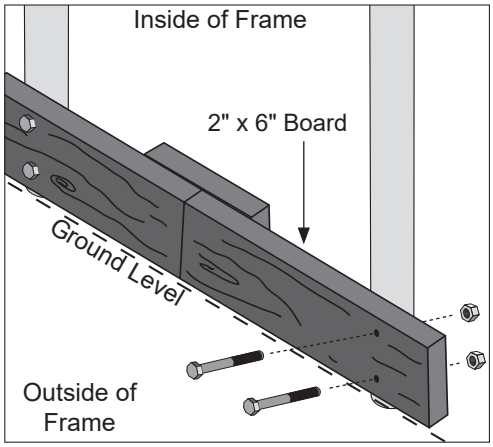
Diagram shows the double u-channel attached directly to the rafter without a ribbon board.



DIAGRAMS ARE NOT TO SCALE.

BASEBOARD — STRONGLY RECOMMENDED

A baseboard is not required for buildings with roll-up sides panel, but installing one is strongly recommended. Fasteners are included to attach the boards to the frame. Customer supplies baseboard material. *Minimum lumber dimensions are also shown.*



Fasteners (1/4" x 4" carriage bolts and wood screws) are included. Depending on board width, use two (2) carriage bolts per rafter connection for the baseboard.

Secure baseboard and ribbon board joints between rafters on the inside of the frame as shown to prevent conflicts with other components.

STEEL GIRT BASEBOARDS — ADDITIONAL PURCHASE REQUIRED

If you purchased the steel girt baseboards for the high tunnel, see "INSTALL BASEBOARD" section in this manual for further baseboard information.



The following will help identify parts used to construct greenhouse. Part numbers are identified in the Bill of Materials provided with purchased greenhouse. Reference images are present in instruction diagrams and photos.

The table below provides the description of parts shown in the connection details diagrams for this greenhouse. Use this table to determine where parts are needed. Quantities are often noted in diagrams and in the Bill of Materials.

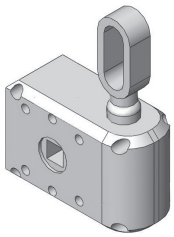
Part ID for Instructions	Part Description	Where Used and Guide Section
Peak Rafter	30'WIDE GOTHIC GRO-MAX RAFTER POS 3	Peak of the building. Assembling The Frame Components and Quick Start Guide.
64" Swaged Rafter	PIPE 1.660" X 64" SWAGED 14GA/EA.	64" Straight pipe attaches to peak rafter.and drilled rafter leg Assembling The Frame Components and Quick Start Guide.
Drilled Rafter Leg	PIPE(1.90)30'GOTHIC 4'SS POS#1 DRILLED	Curved drilled pipe attaches to 51" straight pipe. Assembling The Frame Components and Quick Start Guide.
Drilled Rafter Leg 27"	PIPE 1.90" X 27" SWAGED 14GA DRILLED	27" Straight drilled pipe attaches to curved drilled pipe. Assembling The Frame Components and Quick Start Guide.
Ground Post	GROUND POST 3'X1.900"	Use to secure building into the ground. Layout The Building Site.
Post Driver	POST DRIVER 1.900"PIPE	Use to pound ground post to ground. Layout The Building Site.
5/16" x 2-1/2" Carriage Bolt	BOLT CARR 5/16-18 X 2.50 GALV	Use to secure drilled rafter leg 27" to ground post and square/ round bracket. Assembling The Frame Components and Assemble End Wall Frame.
5/16" Hex Nut	NUT HEX 5/16-18 GR 2 ZP	Use with 5/16" x 2-1/2" carriage bolt. Assembling The Frame Components.
Band Clamp	1.660" OD BAND CLAMP ASSY	Use with sidewall struts and square to round brackets on polycarbonate end walls. Assembling The Frame, Side Strut Installation. Install End Wall Frame, and Quick Start Guide.
End Clamp	HALF CLAMP 1.660" X 1.315" HOT DIP GALV	Use on the end rafter for peak purlin and side purlins. Frame Assembly and Quick Start Guide.
1" Pipe Strap	1" PIPE STRAP/1.315" PURLIN	Use to attach angle purlin to rafter. Install Angled Purlins.
Cross Connector	UNIVERSAL CROSS CONNECTOR FOR 1.66" PIPE	Use to secure purlins to mid-rafters. Frame Assembly and Quick Start Guide.
Purlin / Roll Up or Drop Down / Angle Purlin	TUBE RD GALV 1.315 X 17GA X 75 SWAGED A513 TYPE 1	75" Swaged straight pipe used for purlins, roll up or drop down conduit, crank up (if applicable), and angle purlin assemblies. Frame Assembly, Install Angled Purlin, Install The Drop-Down Sides, Install Panel Conduit and Attach Rope, and Quick Start Guide.
Purlin End Pipe	TUBE RD GALV 1.315 X 17GA X XXXX A513 TYPE 1	Purlin end pipe. Frame Assembly and Quick Start Guide.
Angle Purlin End Pipe	TUBE RD GALV 1.315 X 17GA X XXXX A513 TYPE 1	Angle purlin end pipe. Install angled purlins and Quick Start Guide.
#14 x 1" Tek Screw	SCREW TEK #14-14 X 1 HWH ZINC (EA)	Use to secure rafters, purlins, angle purlins, roll up/drop down conduit, and swaged square tubes together. Also end clamps, pipe straps, cross connectors, variable angle brackets, square tube fittings, u-channels, tension band clamps (if applicable), mounting plate, and drop down (if applicable) where indicated.
Fabric Clip	FABRIC CLIP 1.315" OD PIPE	Use to secure side and door material to pipe. Roll-Up Sides - Assembly & Installation.

Part ID for Instructions	Part Description	Where Used and Guide Section
Wood Screw	WOODGRIP # 10-15 1-1/2" 100BG	Use to secure u-channel to wood baseboard, retaining, 1" x 4", and ribbon boards, attach steel pulley to ribbon board, and fabric door material (if applicable).. Drop-Down Sides, Roll-Up Sides and Customer-Supplied End Frame Assembly.
1/4" x 4" Carriage Bolt	BOLT CARR 1/4-20 X 4.00 ZP	Used to attach wood baseboard and ribbon board to rafters. Drop-Down Sides and Roll-Up Sides.
1/4" x 2" Carriage Bolt	BOLT CARR 1/4-20 X 2.00 ZP	Use with Double Drive. Install the Drop-Down Sides and Roll-Up Sides - Assembly & Installation.
1/4" Flat Washer	WASHER FLAT 1/4" GALV	Use will all 1/4" carriage bolts.
1/4" Hex Lock Nut	NUT HEX LOCK 1/4-20 STS EACH	Use to install door latch to door frame. Door Assembly.
1/4" Hex Nut	NUT HEX 1/4-20 GR C ZP	Used with 1/4" x 4" and 1/4" x 2" carriage bolts.
U-Channel	U-CHNNL ALUM 1.25"W X 78" LONG	Used to install corner baffles and drop down ribbon board. Install Corner Baffles and Install The Drop-Down Panel.
Roof Double U-channel	POLYETHYLENE ROOF VENT SLAM RAIL 144"	Use to connect two lengths of film on buildings 120'L. Install U-Channel and Install Main Cover.
Double U-Channel	DOUBLE POLY LATCH 78" LONG	*Roll up sidewalls only.* Installed on the ribbon board. Roll-Up Sides Assembly & Installation.
U-Channel Spring	WIGGLE WIRE BLUE 78.74" X .09"	Use to secure cover, baffle, and roll up material (if applicable) to u-channel and double u-channel. Install Cover Film and Roll-Up Assembly & Installation.
Sidewall Strut	GALVANIZED STRUT 1.315"OD - 60"L	Attach to each band clamp. Side Strut Installation and Quick Start Guide.
Guide Channel	8'ALUMINUM CHANNEL	*Roll up sidewalls only.* Use for gear box on roll up side material. Roll-Up Sides - Assembly & Installation.
3/8" Threaded Rod-Roll Up	THRD ROD 3/8-16 ZINC 1'	*Roll up sidewalls only.* Use with guide channel. Roll-Up Sides - Assembly & Installation.
3/8" Flat Washer	WASHER FLAT 3/8" GALV	Use on the threaded rod. Roll-Up Sides - Assembly & Installation.
3/8" Hex Nut	NUT HEX 3/8-16 GR C ZP	Use on threaded rod to attach guide channel to end rafter. Roll-Up Sides - Assembly & Installation.
Mounting Plate	MOUNTING PLATE FOR 15:1 GEARBOX W/SCREWS	Use to attach gear box to. Install The Drop-Down Sides and Roll-Up Sides - Assembly & Installation.
Gear Box	15:1 HEAVY DUTY GEAR BOX	Use to roll up side material. Install The Drop-Down Sides and Roll-Up Sides - Assembly & Installation
Roller Bearing	ROLLER BEARING ASSY FOR GEARBOX	Attaches to the mounting plate to move gear box on guide channel. Install The Drop-Down Sides and Roll-Up Sides - Assembly & Installation.
Double Drive	DOUBLE DRIVE SET FOR GEARBOX	Attaches to the gear box and roll up conduit. Install The Drop-Down Sides and Roll-Up Sides - Assembly & Installation.
Hand Crank	6-1/2' HAND CRANK DRIVE	Use on gear box to roll up side material. The Drop-Down Sides and Roll-Up Sides - Assembly & Installation.
Tension Band Clamp	1.66" HEAVY DUTY TENSION BAND	*Drop down sidewalls only.* Use to hold drop down conduit to buildng. Install The Drop-Down Sides.
Steel Pulley	PULLEY 7/8" NYLON	*Drop down sidewalls only.* Attaches to the inside of the ribbon board. Attach Drop-Down Panel Pulleys.

Part ID for Instructions	Part Description	Where Used and Guide Section
EZ-Snap Rope Hook	EZSNAP ROPE HOOK ALUMINUM	Used for anti-billow rope. Install Anti-Billow Ropes (Roll-Up and Drop-Down Sides) and Quick Start Guide.
Rope	POLYESTER CORD #8 1/4"	Used for anti-billow and drop down. Install The Drop-Down Panel and Install Anti-Billow Ropes (Roll-Up and Drop-Down Sides) and Quick Start Guide.
POLYCARBONATE END WALLS		
Door Frame	48X92 DOOR FRAME	Door Frame only. Door Assembly.
#14 x 1-1/2" Tek Screw	SCREW TEK #14-14 X 1-1/2 HWH ZINC (EA)	Use to attach u-profile, h-channel, and polycarbonate to door frame. Door Assembly and Install End Wall H-Channel.
Neobonded washer	WASHER 1" NEOBONDED EDPM GALVANIZED (EA)	Use with Tek screws. Install the Drop-Down Panel, and Door Assembly.
Butt Hinge	BUTT HINGE SS 3"LX3"W.060"	Use on doors. Door Assembly.
6"Chain Bolt	CHAIN BOLT 6" ZINC	Includes chain bolt, bolt receiver, latching plate, chain retainer, and hardware. Used to lock door. Door assembly.
Door Latch	DOOR LATCH SS HEAVY DUTY	Includes handle, latch and hardware. Use on doors. Door assembly
End Cap	END CAP FOR PCARB DOORS/ FANS/VENTS - 8' LONG	Installed on the door frame. Install Double Door.
1-1/2" x 99" Swaged Square Tube	TUBE SQ GALV 1.50 X 16GA X 99 A500 GR C SWAGED	Attaches to the base of end rafter spanning the width of the end wall. Cut to fit. Assemble End Wall Frame and Quick Start Guide.
Variable Angle Bracket	VARIABLE ANGLE GABLE FRAME BRACKET	Secures the base square tube to rafter leg and vertical square tube around the door frame. Assemble End Wall Frame.
1-1/2" x 12' Plain Square Tube	SQUARE TUBE 1.50" X 144"16GA PLAIN 16GA	Mid-end wall verticals. Cut to fit. Assemble End Wall Frame and Quick Start Guide.
Square Tube Fitting	HD GLV SQUARE TUBE FITTING 1-WAY W/PLATE	Used to attach middle end wall verticals. Assemble End Wall Frame and Quick Start Guide.
Square/Round Bracket	BRACKET FOR SQUARE/ROUND TUBE-CONNECT	Used to attach the end wall vertical to end wall band clamp. Assemble End Wall Frame.
5/16" Hex Nut	BOLT CARR 5/16-18 X 2.50 GALV	Used on square/round bracket. Assemble End Wall Frame.
End Roof U-Channel	GABLE END 8FT. FOR POLY CARB	Use on the end rafter of buildings s. Install U-Channel and Install Main Cover.
U-Profile	ALUM U-PROFILE FOR 8MM 8FT LONG	Attached to the bottom of the end wall on either side of the door and along the sides of the door frame. Door Assembly and End Wall Installation.
H-Channel	ALUM H-CHANNEL FOR 8MM PC 144"L	Attach to the middle end wall verticals. Install End Wall H-Channel.
47.25" x 8' Polycarb	8MM POLY-CARB 47.25"X96" TWINWALL SHEET	Used to on door frame and cover end wall. Door Quick Start Guide.
47.25" x 12' Polycarb	8MM POLY-CARB 47.25"X144" TWINWALL SHEET	Used to cover end wall. Quick Start Guide.
Foil Tape	FOIL TAPE 1"X 150'	Used on the top of polycarb sheets. Typical Panel Preparation.
Vent Tape	3M VENT TAPE FOR POLY-CARB 1"X108’	Used on the bottom of polycarb sheets. Typical Panel Preparation.

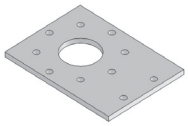
Part ID for Instructions	Part Description	Where Used and Guide Section
FABRIC END WALLS		
3/8" Threaded Rod-Door	THRD ROD 3'SS 3/8-16	Use to attach customer supplied end posts to end rafters. Cusotomer-Supplied End Frame Assembly and Quick Start Guide.
Neobonded washer	WASHER 1" NEOBONDED EDPM GALVANIZED (EA)	Use with wood screws on end door material. Customer-Supplied End Frame Assembly
4X4 Inside Bracket	END WALL VERTICAL TIE BRACKET HOT DIP GALVANIZED	Use to connect the door header to the side door frame. Customer Supplied End Frame Assembly and Quick Start Guide.
Guide Post Bracket	2"X3" HD 1-WAY CONNECTOR (L-SHAPE)	Use to connect guide post assembly to side door frame. Customer Supplied End Frame Assembly and Quick Start Guide.
1/2" x 5-1/2" Hex Cap Screw	SCREW HEX CAP 1/2-13 X 5.50 ZP	Use to attach 4x4 inside bracket to door header. Roll-Up Panel Installation and Quick Start Guide.
1/2" Hex Nut	NUT HEX 1/2-13 J995 GR 2 ZP	Use on 1/2" hex cap screw. Roll-Up Panel Installation and Quick Start Guide.
Guide Post Assembly	TUBE RD GALV 1.66 X 14GA X 75 SWAGED A500 50KSI	Use to keep the door's crank up assembly contained. Roll-Up Panel Installation and Quick Start Guide.
Guide Post End Pipe	TUBE RD GALV 1.66 X 14GA X 48 A500 50KSI	Use at the end of the guide post assembly. Roll-Up Panel Installation and Quick Start Guide.
Roll Up End Pipe	PIPE 1.315" X 43" PLAIN 17 GA	Use at the end of the crank up assembly. Roll-Up Panel Installation and Quick Start Guide.
Spin Handle	SPIN HANDLE	Used to crank the door material. Quick Start Guide.
Drive Handle Pipe	TUBE RD GALV 1.315 X 17GA X 72 A513 TYPE 1	Used to attach the spin handle and universal joint. Quick Start Guide
Universal Joint	UNIVERSAL JOINT	Used to attach the drive handle pipe and the crank up pipe assembly. Quick Start Guide.
Screw Lags	SCREW HOOK 5/16X3-1/2 ZINC	Use to weave the rope in and out of the grommets on the side of the door ftrame. Install Roll-Up End Panel Ropes.
Zipper Extension Pole	ZIPPER DOOR EXTENSION POLE	Use to roll up the door material. Install Roll-Up End Panel Ropes.
End Panel Material	CURTAIN 72" 10OZ CLR PMAX FAB - 100'	Used to cover the spaces outside the end wall door. End Panel Installation and Quick Start Guide.
Door Material	END ROLL-UP DOOR 20X10 10OZ 22 TRANSLUCE	Roll up door material. Roll-Up Panel Installation.
BUILDING MATERIAL		
Cover Material	COVER 30X48 5.2OZ CLEAR	Used as cover (if applicable). Install Main Cover.
Cover Material	GREENHOUSE FILM CLEAR EVO AC 40'W	Used as cover (if applicable). Install Main Cover.
Roll Up/Drop Down Material	DRP DWN/RL UP SIDE PNL 84"X96' 5.2OZCLR	Used as drop down or roll up. Install the Drop-Down Sides, Roll-Up Sides - Assembly & Installation,
Baffle Material	6'W 6MIL CLEAR GREENHOUSE FILM	Used for baffles. Install Corner Baffles.

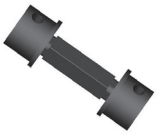
The following graphics and photos will help you identify the different parts. (Some parts are not shown.)


Gear box


Steel Pulley
(Drop-Down Sides Only)


Tek Screw


Mounting Plate

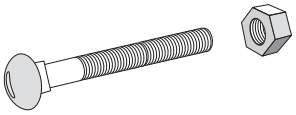

Double Drive


Neobonded Washers


End Wall
Clamp


1.66"
Band Clamp

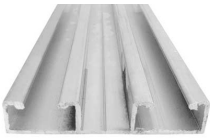

EZ-Snap Rope
Hooks

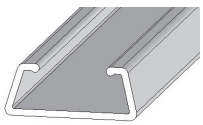

Carriage Bolt & Hex Nut

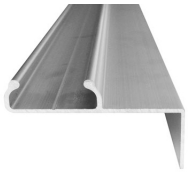

Cross Connector

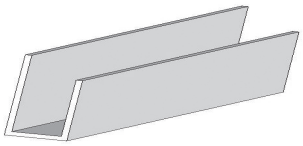

Tension Band Clamp
(Drop-Down Sides Only)

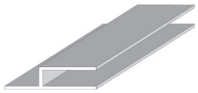

1.90"
Band Clamp

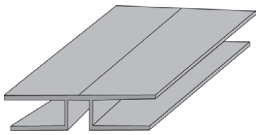

Double U-channel
(Roll-Up Sides Only)

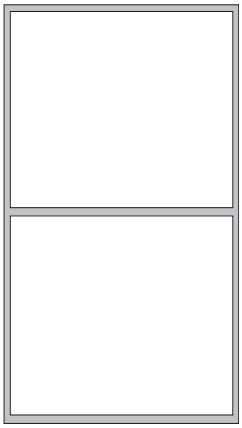

Single
U-channel
(length may vary)


End Wall Aluminum
U-Channel


Aluminum U-Profile


Aluminum
End Cap


Aluminum H-Channel

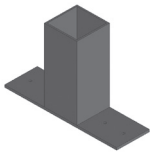

Door Frame


Door Latch


Butt Hinge


Foil Tape


Half Clamp


Square Tube
Fitting


Chain Bolt


Vent Tape


Square to Round
Bracket

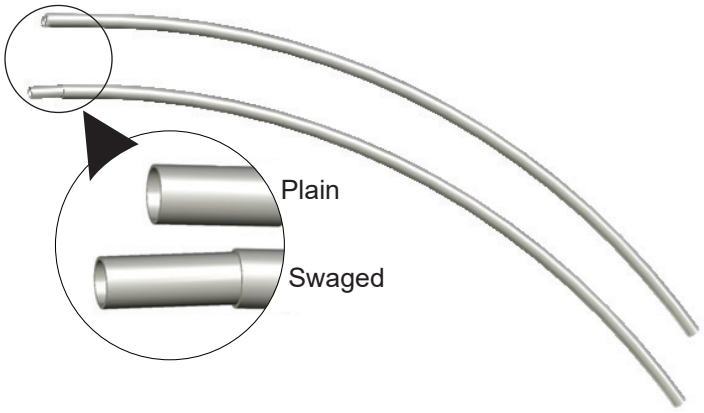

Variable Angle
Bracket


Post Driver

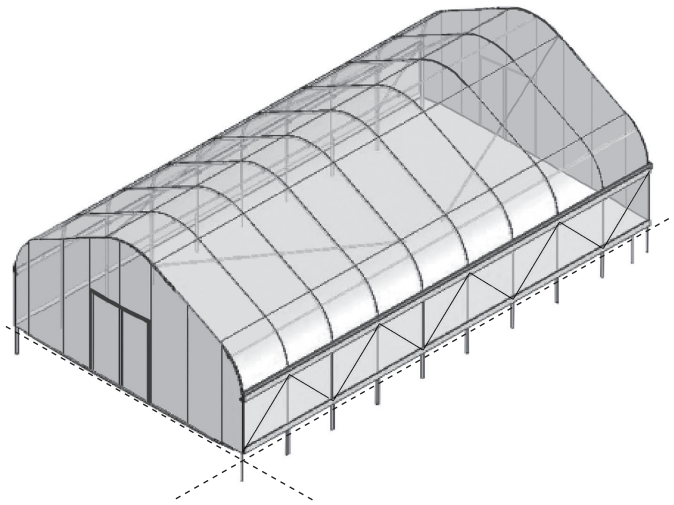
PART IDENTIFICATION (continued)



Poly-Coated
U-Channel Spring



Swaged and Plain Rafter Sections



Gothic Premium High Tunnel: H_PC Models

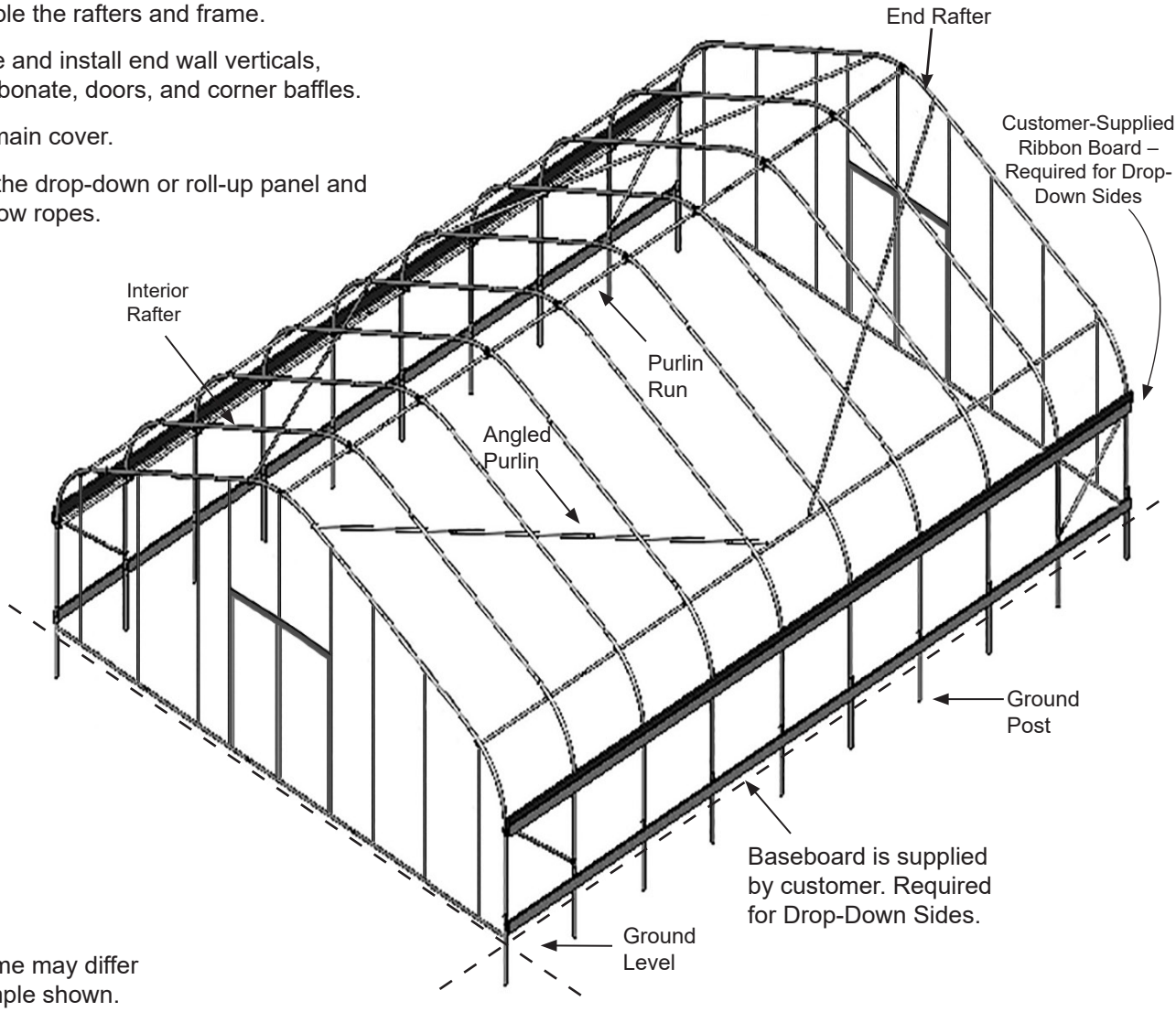
ATTENTION: These instructions describe the installation of the optional ridge vent kit. (Additional purchase required.) The ridge vent kit is designed for use with the **HF** model (5.2 oz. cover) only. If you have the C model or did not purchase the ridge vent kit, skip those installation procedures when presented and continue as instructed.

Do not cut the film of the **HC** *model to install ridge vent kit.*

OVERVIEW

See illustration below to identify main parts of your high tunnel. Basic assembly steps include:

1. Locate the required parts for each assembly procedure.
2. Assemble the rafters and frame.
3. Prepare and install end wall verticals, polycarbonate, doors, and corner baffles.
4. Install main cover.
5. Attach the drop-down or roll-up panel and anti-billow ropes.



Actual frame may differ from example shown.

LAY OUT THE BUILDING SITE

After the site is prepared, lay out the building site.

Drive ground posts to the proper depth. The top of the post will be one (1) foot above the finished grade when properly driven. Width of the frame is measured from the center of one ground post to the center of the remaining ground post.

SQUARE THE SITE

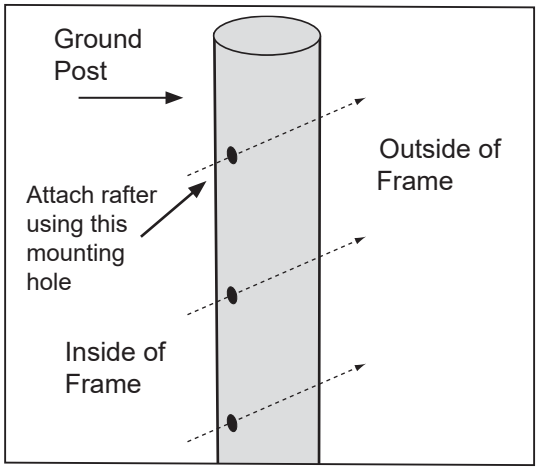
Gather the parts:

- Ground posts ***(Use top hole when attaching rafter.)***
- 5/16" x 2-1/2" Machine bolts
- 5/16" Nuts

1. Identify a corner where a ground post will be positioned and drive the first ground post into the ground.

   NOTE: Insert the ground post driver into the top of the ground post to protect the post and drive the post into the ground. *The top of the post will be one (1) foot above the finished grade when properly driven.*

   Position the pre-drilled holes facing to the inside/ outside of the high tunnel so they can be aligned with the bolt holes in the rafter legs.



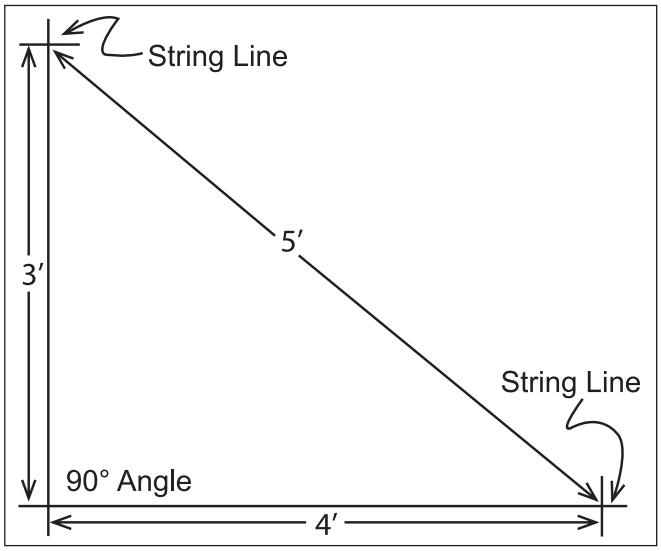
   To align the bolt holes in the ground posts with those in the rafter *after driving the ground posts,* insert a tapered rod or pry bar into a ground post bolt hole and turn the post using the rod or pry bar.

2. After the first corner ground post is in place, string a line the width of the building (center-to-center) and drive the second ground post into the ground just enough to hold it in place.

3. Use a transit or another method to position the second post, and to drive the post the same depth as the first ground post.

4. String a line at least as long as the building from the first stake at 90°.

   NOTE: A transit can be used to ensure an accurate 90° angle, or the 3-4-5 rule can be used. Refer to diagram. Using multiples of 3-4-5 such as 6-8-10 or 12-16-20 helps to maintain an accurate 90° angle.



5. After squaring the position of the building, measure the length (center-to-center) and drive the next corner ground post.

6. Repeat the same step for the last corner post.

   NOTE: The distance measured diagonally between corner posts must be equal for the building to be square.

7. Check all dimensions (and adjust if needed) before driving the remaining posts to the required height.

8. After all corner posts are accurately installed, tie a string line between the tops of the corner ground posts on the same side of the frame. The string is used to identify the tops of all remaining ground posts. The string must remain tight and level.

9. Use a tape measure to mark the on-center locations of the remaining ground posts. *See the Side Profile diagrams in the Quick Start section for your frame.*

10. Drive the remaining ground posts into the ground at the required on-center rafter spacing and frame width and the height identified by the string.

    NOTE: Verify that the holes in the ground posts are in the proper position and that each post is plumb and driven to the correct depth.

11. Continue with the **Rafter Assembly** steps that follow.

ASSEMBLE THE FRAME COMPONENTS

After the site is prepared and an inventory of parts is complete, continue with the rafter assembly.

NOTE: All rafter assemblies consist of rafter tubes and purlin clamps. Consult the rafter diagram in the Quick Start section of these instructions before and during the rafter assembly process.

Assistance is required to assemble the high tunnel frame.

RAFTER ASSEMBLY

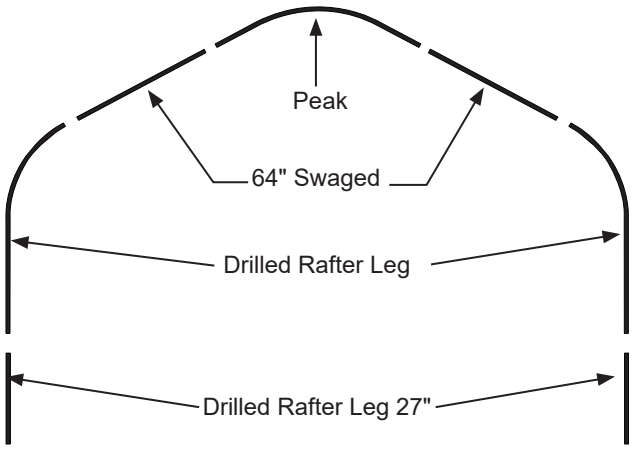
Gather the parts:

- Drilled rafter pipe 27"
- Peak rafter pipe
- Drilled rafter leg pipe
- 1.66" x 64"Rafter pipe
- End wall clamps
- #14 x 1" Tek screws
- Nut setter 3/8" x 2-9/16" magnetic

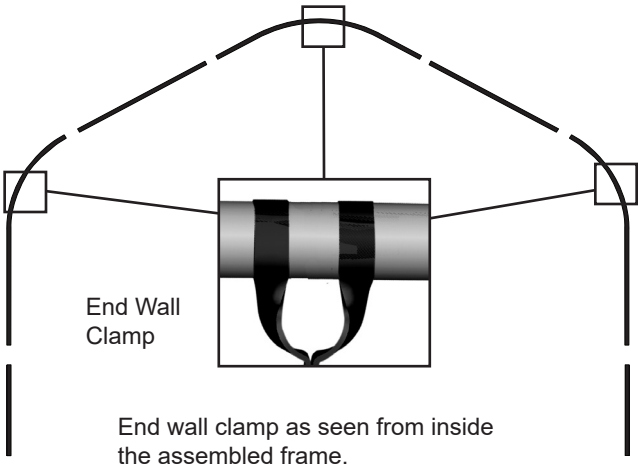
END RAFTER ASSEMBLY

The end rafters include purlin end clamps and band clamps. Install the purlin end clamps before the different pipes of the rafters are connected. The band clamps for the side struts are installed when the two (2) end rafters are set onto the ground posts.

1. Select the seven (7) pipes needed to assemble the first end rafter and arrange on a level surface.

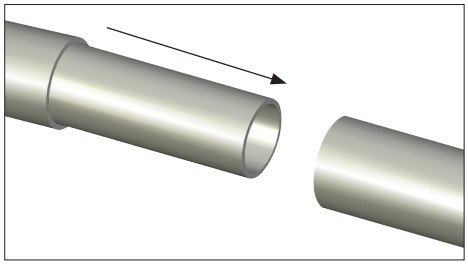


2. Slide one (1) end wall purlin clamp onto the peak rafter pipe and one clamp onto each leg pipe. Position end clamps on the rafter pipes as shown.

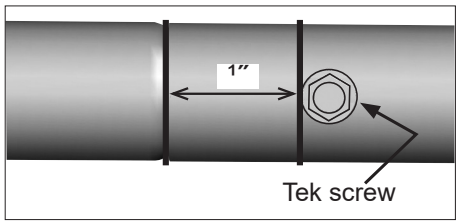


End wall clamp as seen from inside the assembled frame.

3. Insert the swaged end of the rafter pipes into the plain ends of the pipes to assemble the rafter.



4. Once the rafter is assembled, install a Tek screw through the rafter pipes to secure each joint.



IMPORTANT: To prevent damage to the cover, position the Tek screws so the heads do not contact the cover when it is installed.

5. Repeat steps to assemble the remaining end rafter and set both end rafters aside. ***Use a piece of duct tape to hold each clamp in place if needed.***

6. Continue by assembling the interior rafters. Interior rafters are assembled exactly the same, except the end clamps are not used. Consult the Front Profile diagram in the Quick Start Section for details.

   ATTENTION: Depending on building length and available space, you may want to begin frame assembly after constructing a few interior rafters as opposed to constructing all interior rafters.

7. Continue by assembling the frame.

ASSEMBLE THE FRAME

After all ground posts are driven in place and rafters are assembled, assemble the frame.

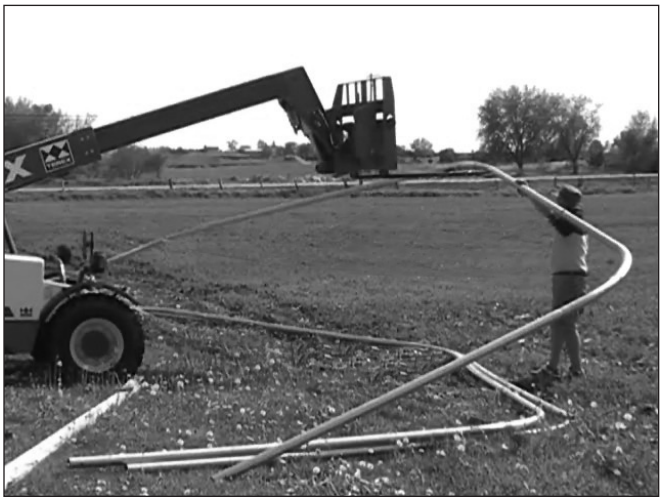
Gather the parts:

- All rafter assemblies and purlin pipe: See Side Profile diagram for your building in the Quick Start section for pipe identification and quantities.
- 1.66" Band clamps
- Cross connector
- 5/16" x 2-1/2" bolts and 5/16" nuts
- Lifts, ladders, and assistants
- Rope or cable (supplied by customer)

Complete these steps:

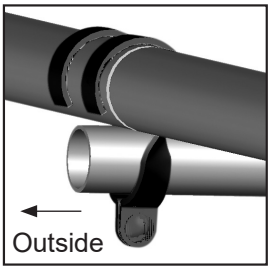
1. Carefully lift the *first end rafter*, slide a band clamp onto each rafter leg, and place the leg pipes into the first set of ground posts. ***Secure to top hole in ground post.***

   Brace the rafter in place to keep it straight. Depending on the frame size, a lift and additional assistants may be needed. Consult Quick Start section for details.



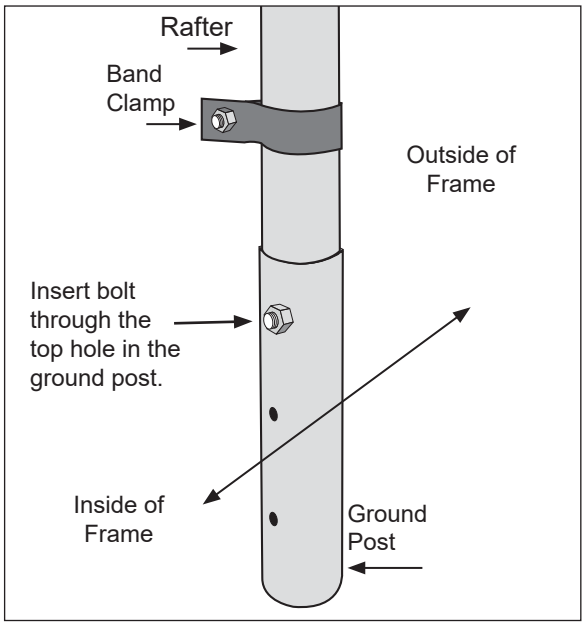
Rafter shown differs in design.

ATTENTION: Stand the rafter so the end clamp nuts and bolts are to the inside of the frame. Consult the diagrams on the following page and below.



Position end clamp as shown when setting the rafter into place.

2. Secure the leg pipes to the ground posts using the 5/16" x 2 1/2" bolts and 5/16" nuts. ***Secure using the top hole in the ground post.***

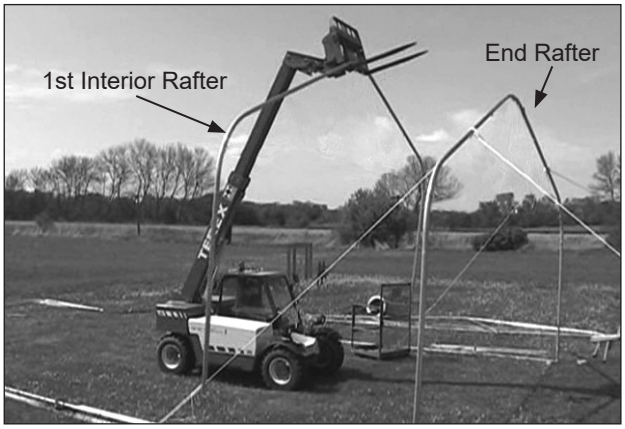


3. Use rope or cable to brace the rafter in position.



Rafter shown differs in design from actual rafter.

4. Carefully lift the first interior rafter, slide a band clamp onto each rafter leg, position in place, and secure the leg pipes to the ground posts.

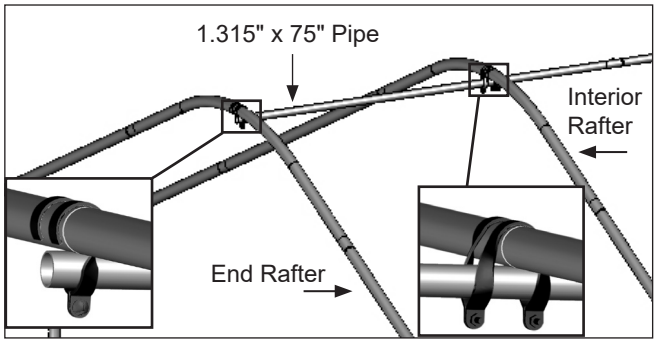


Rafter shown differs in design from actual rafter.

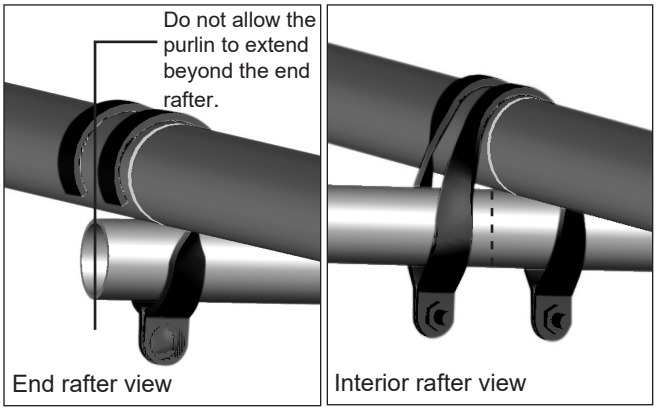
FRAME ASSEMBLY (continued)

5. As the second rafter is steadied, take one section of 1.315" x 75" swaged pipe and insert the plain end through the upper end clamp of the end rafter and through a cross connector placed in the same position on the *interior rafter.*

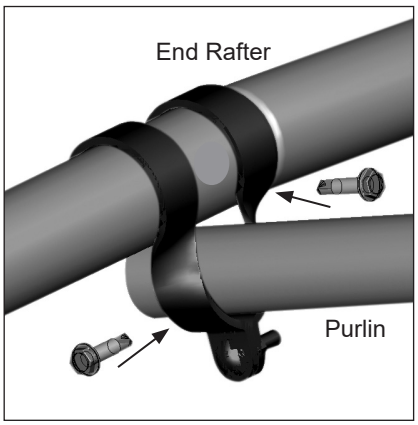
6. Align the plain end of the purlin with the center of the end rafter.



7. Tighten the end clamp and secure it to the rafter using a #14 x 1" Tek screw.

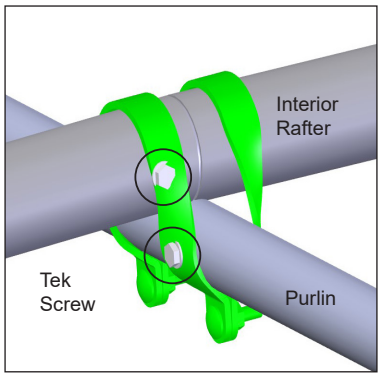


8. Install Tek screw through end clamp and into the purlin pipe.



NOTE: View of connection as seen from inside the building frame.

9. Move to the interior rafter, verify that the rafter spacing is forty-eight inches (48") on-center (adjust as needed), and tighten the cross connector.



10. Secure the cross connector to the rafter and to the purlin using #14 x 1" Tek screws. See Quick Start section if needed: Connection Details diagram.

11. Take another section of 1.315" x 75" swaged pipe and repeat steps 5 through 10 for the remaining purlin runs.

12. Choose another interior rafter assembly and set it in position. *DO NOT USE THE REMAINING END RAFTER.*

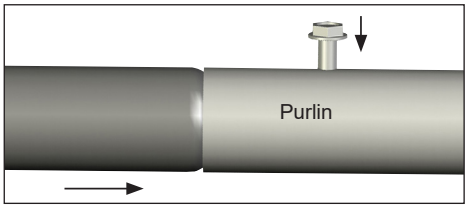
    ATTENTION: Do not add a band clamp. A band clamp is only added to the *end rafters* and the *first interior rafters* at either end of the frame.

13. Secure the rafter legs to the ground posts as previously described and steady the rafter.

14. Take additional sections of purlin pipe and attach these to the rafter/frame.

15. Verify that the rafter spacing is 48" on-center (adjust as needed) and tighten the cross connector.

16. Secure the purlin pipe joint with a Tek screw.



17. Repeat the above steps as needed to stand and secure the remaining interior rafters and purlins to complete the frame assembly. Remember: *Slide a band clamp onto each leg of the last interior rafter and end rafter.*

18. Stand the last end rafter and verify that the end clamps are positioned with the nut and bolt to the inside of the assembled frame. ***Refer to the Quick Start section and previous diagrams if needed.***

    NOTE: If the last end rafter is plumb and the purlin extends beyond the end of the rafter, cut the last section of purlin pipe to the required length. ***Verify you have used the correct pipe before cutting.***

FRAME ASSEMBLY (continued)

INSTALL ANGLED PURLINS

Gather the Parts:

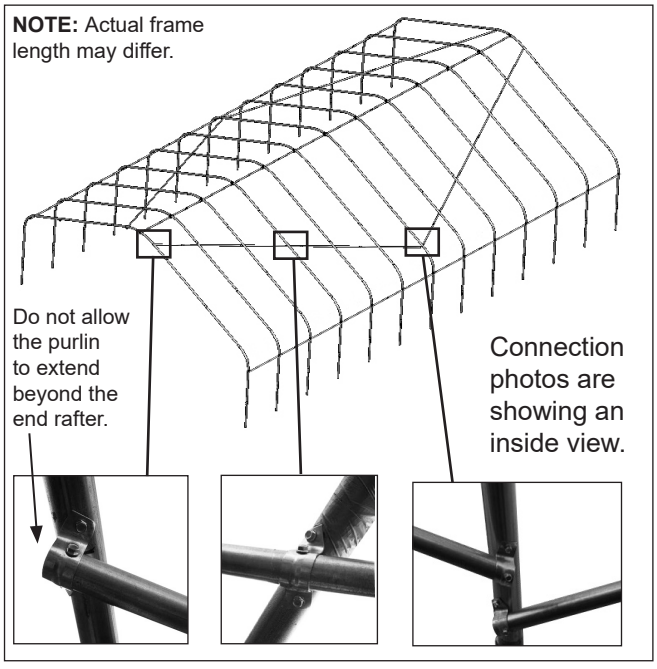
- Pipe 1.315" x 75" swaged
- Pipe 1.315" x XX" plain (131P0XX): See Side Profile Diagram in the Quick Start section for your frame.
- 1" Pipe straps, Tek screws, and duct tape (customer supplied)

NOTE: The angled purlins are part of the assembled frame and run diagonally on the underside of the rafter assemblies. Consult the Side Profile diagram in the Quick Start section for your high tunnel length to identify pipe.

Complete these steps:

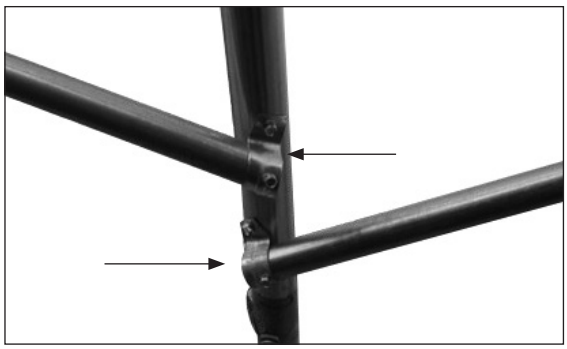
1. Select the required pipe sections for one purlin and connect these by inserting the swaged ends of the pipes into the plain ends until the entire purlin is assembled.
2. Verify that each pipe joint is properly seated and secure each joint by installing a Tek screw through the pipes.
3. Using the diagram below and the Side Profile diagram in the Quick Start section as guides, position a purlin diagonally ***and secure to each rafter it crosses using pipe straps and Tek screws.***

   NOTE: Bend the pipe strap and twist as needed to fit the purlin at a diagonal angle. If two angled purlins end on the same rafter, offset the purlins to fit on the rafter as shown in the diagram below.

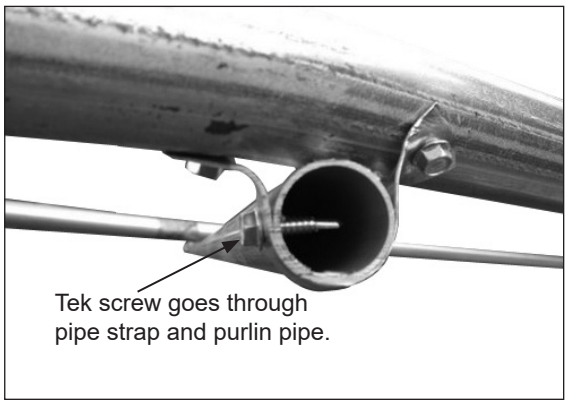


Reference enlarged views of these connections near the back of these instructions if needed.

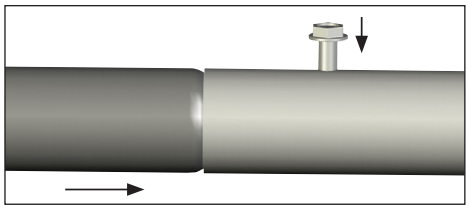
4. Verify that the purlin is in the correct position and secure the purlin to each pipe strap with a Tek screw.



5. Repeat steps 1 through 4 for the remaining three angled purlins.



6. Once all rafters are set and all purlins are in place and secure, ***return to each pipe splice of each purlin and verify that each is secured with a Tek screw.*** Install a screw if needed.



7. Continue by installing the diagonal struts.

SIDE STRUT INSTALLATION

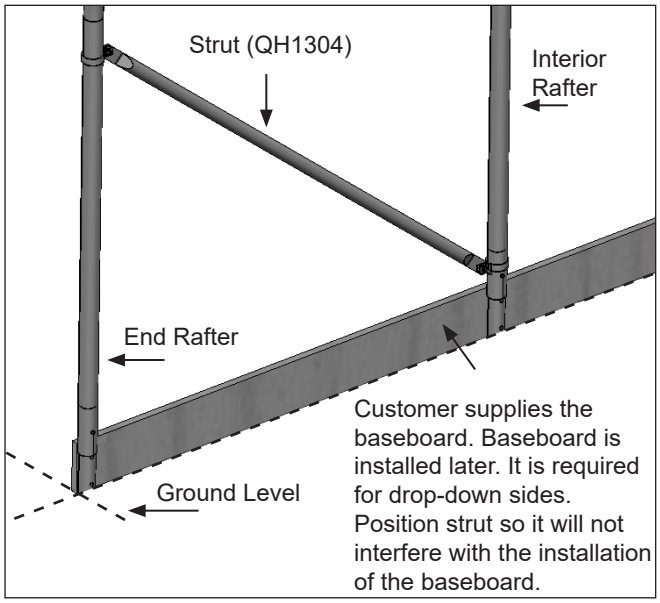
There are four (4) sidewall struts for the frame. These struts are positioned between the end rafters and the first interior rafter on each side of the frame at each corner.

Complete these steps to install the four (4) side struts:

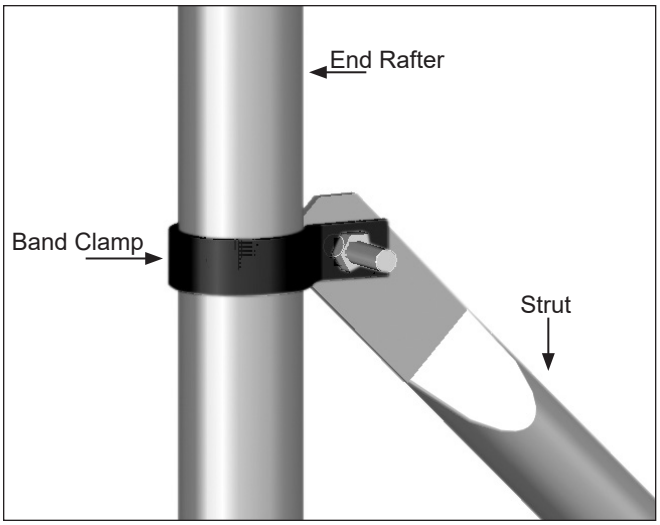
Gather the parts:

- Sidewall Struts
- 1.66" Band Clamps

1. Locate one strut and position it between one end rafter leg and the leg of the first interior rafter as shown below.

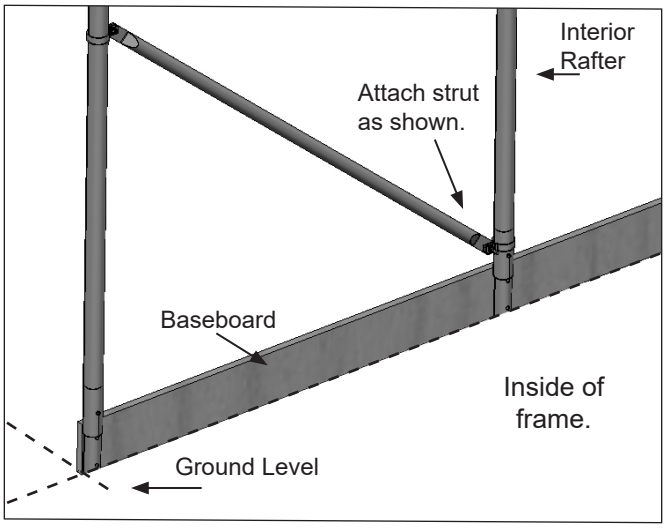


2. Attach one end of the strut to the band clamp as shown in the diagram below.



NOTE: To prevent contact with the sidewall panel, install bolt so nut is toward the inside of the frame.

3. Attach the remaining end of the strut to the added band clamp on the first interior rafter. See the diagram that follows for location.



4. Repeat the above steps to attach the remaining side struts to the frame.
5. After securing the struts, verify that all clamps are secured with a Tek screw to the rafters.
6. Verify that each pipe splice (purlin and rafter) is secured with a Tek screw.
7. Complete the next procedure.

INSTALL BASEBOARDS

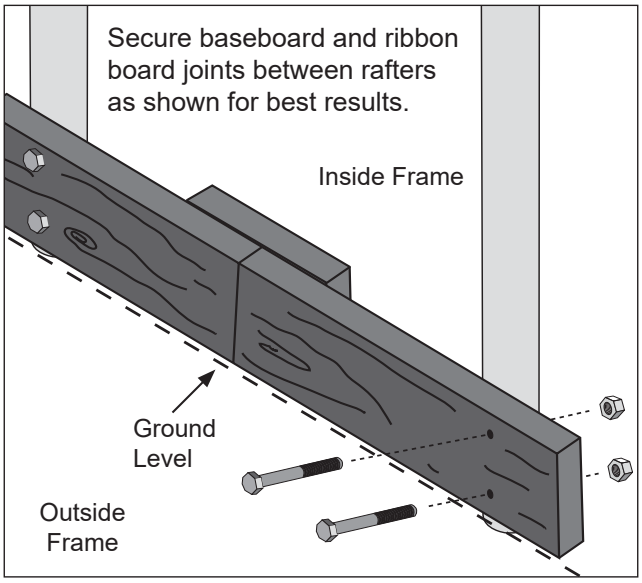
A customer-supplied baseboard *is required* to attach the drop-down side panels. The baseboard is strongly recommended for a building with roll-up sides. Review the information in the ribbonboard and baseboard information near the begining of these instructions for your sidewall panel option.

The baseboard runs the length of the frame at ground level. *The baseboard is supplied by the customer.*

Fasteners (1/4" x 4" carriage bolts and wood screws) are included. Use two (2) carriage bolts per rafter connection for the baseboard.

ATTENTION: A baseboard is not required for buildings with a roll-up side panel, ***but installing a baseboard is strongly recommended***. Fasteners are included to attach the boards. Customer supplies baseboard material. Minimum lumber dimension is 2" x 6". Use treated lumber if allowed by local codes for your application. Always check codes before purchasing treated lumber.

After installing the baseboards, continue by anchoring the frame.



STEEL GIRT BASEBOARDS — ADDITIONAL PURCHASE REQUIRED

If the steel girt baseboard kit was purchased at the time the high tunnel was purchased, install that baseboard according to the instructions *included with those baseboard components*. Then return to these instructions.

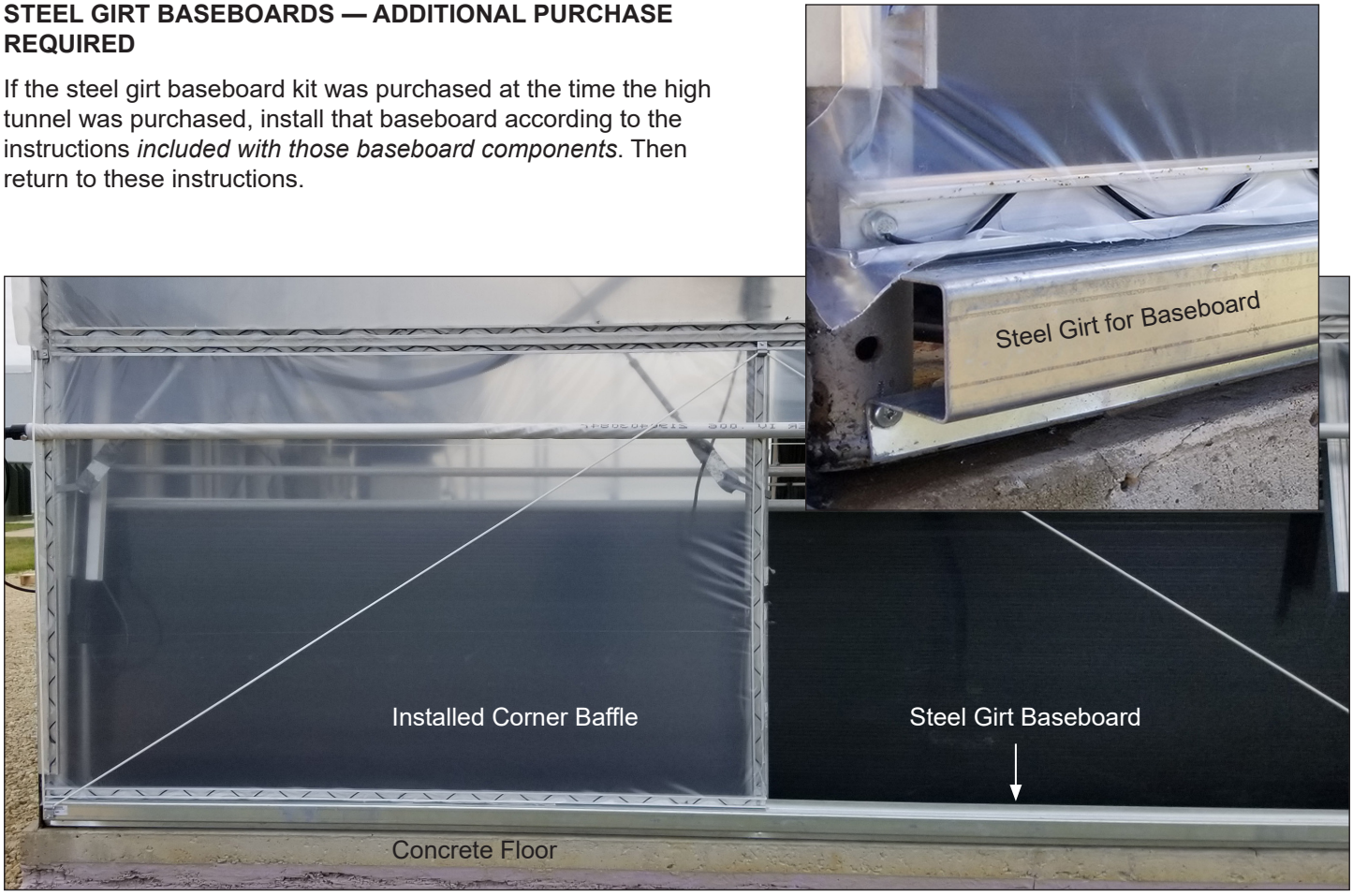


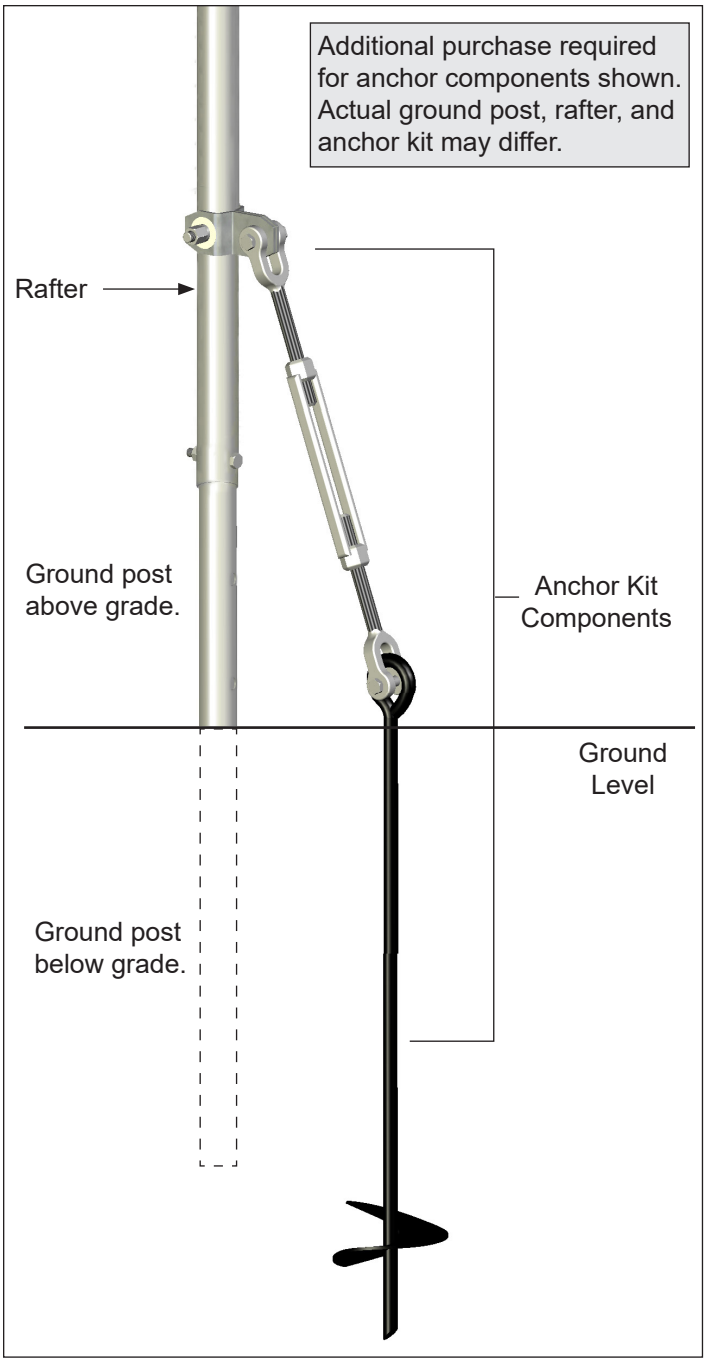
Photo above shows the steel girt baseboard running along the bottom of the rafters on the outside of the frame. Installed corner baffle components are also shown. ACTUAL FRAME DIFFERS FROM THE EXAMPLE SHOWN.

ANCHOR ASSEMBLED FRAME

At this point, anchor the frame. Consult the MUST READ document for anchoring information and suggestions. Call customer service at 1-800-245-9881 for additional anchoring information if needed.

⚠ **CAUTION**: The anchor assembly is an integral part of construction. Improper anchoring may cause instability and failure of structure to perform as designed. Failing to anchor the high tunnel properly will void the manufacturer's warranty and may cause serious injury and damage. ***Anchor the frame before you continue.***

ATTENTION: If ground posts were set in concrete, skip this section. If ground posts were driven into place *and not set in concrete*, read the information on this page and anchor the high tunnel ***before continuing***.



AFTER ANCHOR INSTALL: INSPECT FRAME BEFORE COVER INSTALLATION

1. Inspect frame for sharp edges or fasteners that could damage cover.
2. Verify frame members are properly secured and bolts and pipe straps tight.
3. Recheck frame assembly for sharp edges, clamps, and bolts that may interfere with cover installation. *File smooth or tape sharp edges as needed.*
4. Reposition clamps and bolts as needed and tape all rafter pipe joints with duct tape to protect cover material.



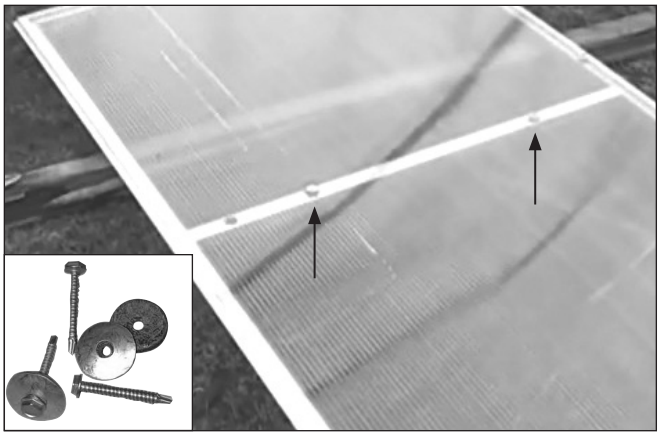
5. Verify main building frame is properly and adequately anchored.
6. Continue with the next procedure.

DOOR ASSEMBLY

ATTENTION: The assembly and installation of double doors can occur any time after assembling main frame and installing end wall cladding. For easier access without obstructions, assemble and install doors *after* installing sidewall and roof cladding.

ASSEMBLE AND ATTACH DOORS

1. Locate door frame, assemble (if needed), and place on a flat surface.
2. Select one 4' x 8' polycarbonate panel and trim it so length is one-quarter inch (1/4") shorter than length of door frame. Width of panel does not need trimmed.
3. Remove protective film. Mark UV-protected side if needed. *Always install panels with UV-protected side outside (toward sun).*
4. Center panel on door frame. Use #14 x 1-1/2" Tek screws and neobonded washers to attach panel to *horizontal cross tube* of door frame. *Space screws at 12" on center.*



NOTE: Attach panel in locations shown in photo to hold panel in place while installing U-profile to perimeter edge of panel. ***Do not install screws near latch mounting hole.***

5. Install u-profile along all edges of polycarbonate panel.

   Photo shows panel installed on door frame and finished with the aluminum u-profile. Corners are cut at 45° angles.

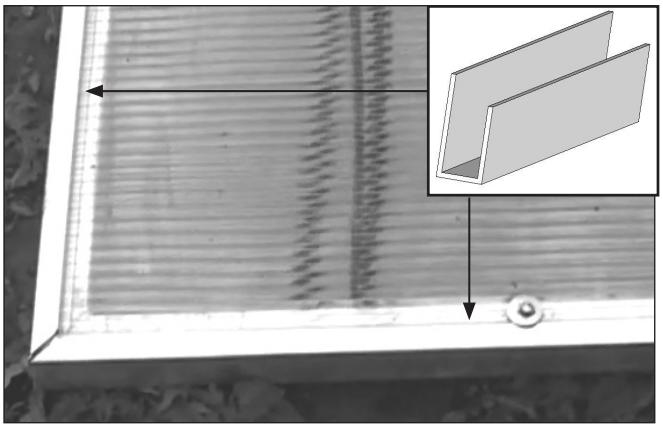
   To keep panel and profile secure, install #14 x 1-1/2" Tek screws and neobonded washers so screw goes through longer edge of U-profile (underside of panel) and washer overlaps shorter edge of U-profile (top) as shown (above right).
6. Repeat above steps to attach panel and to attach aluminum profile to remaining door frame.

Materials and parts needed to assemble doors include:

- Door frames and polycarbonate panels
- Door hinges and latch hardware
- Aluminum U-profile and End cap
- #14 x 1-1/2" Tek screws
- Neobonded washers

7. After assembling both doors, evenly space three (3) hinges along each door frame. *Typical distance from top and bottom of frame for hinge placement is approximately 12" to 16".*

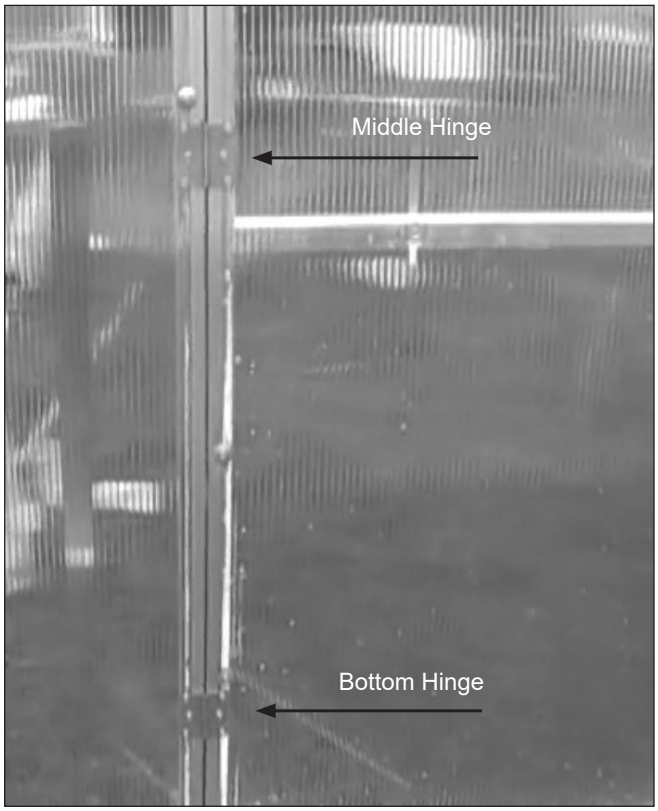
   NOTE: Ensure you are attaching to correct edge of door frame. Verify latch mounting hole location.
8. Attach hinges to assembly using #14 x 1-1/2" Tek screws.





DOOR ASSEMBLY (continued)

9. With assistance, lift door and attach hinges to end wall using #14 x 1-1/2" Tek screws.

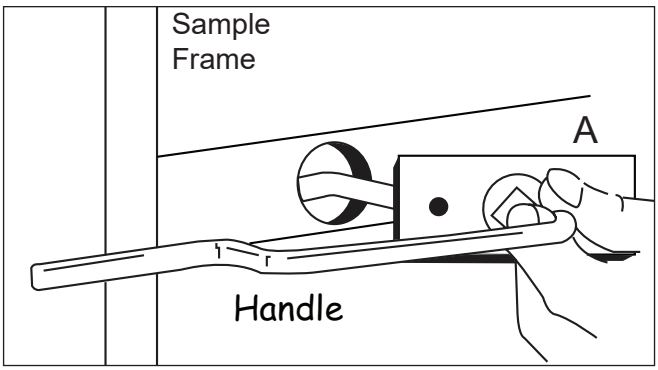


Locations of door hinges may vary.

10. Check door operation on hinges.

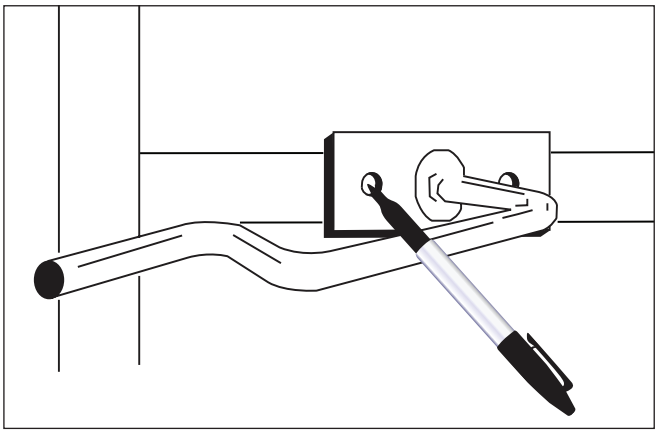
11. Determine on which door to install latch handle, locate door latch mounting hole (5" from edge of door in cross member), and drill a 1" hole through polycarbonate panel at hole location.

12. Place main latch handle assembly A through hole in door and twist handle and mounting plate into place as shown in drawing below.



NOTE: Polycarbonate panel is not shown.

13. Using mounting plate as a template, mark plate mounting hole locations on panel and drill 5/16" holes through panel and door frame.

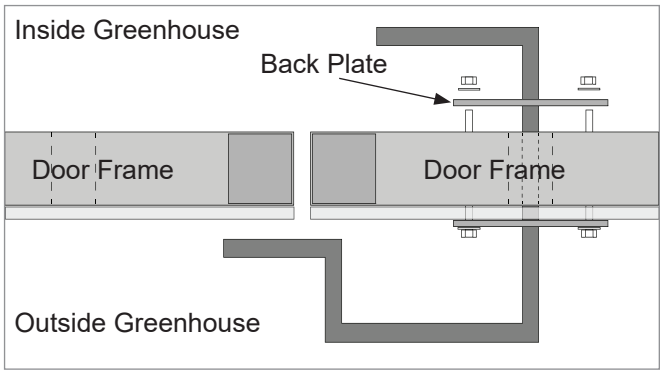


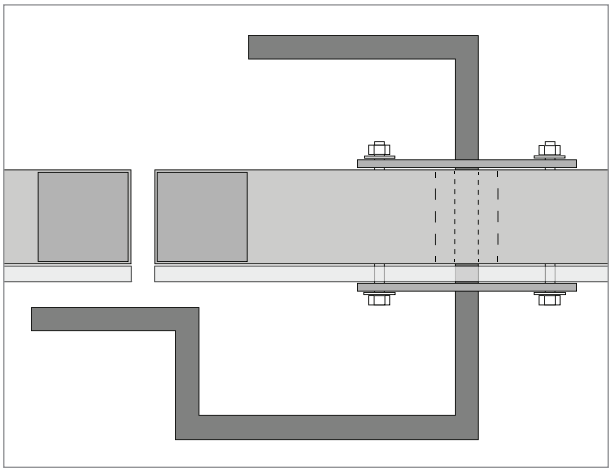
ATTENTION: Before marking mounting hole locations, slide door latch guide B — see diagram next page — onto outside latch handle to better judge where to place main latch assembly on door frame cross bar.

14. From outside, slide latch handle through hole and into position. On the inside, slide back plate onto latch handle. See top views below.

15. Align mounting plate and back plate with mounting holes and secure using two (2) 1/4" x 3" bolts and lock nuts (included with latch kit).

16. Tighten nuts until snug and verify latch operates freely.





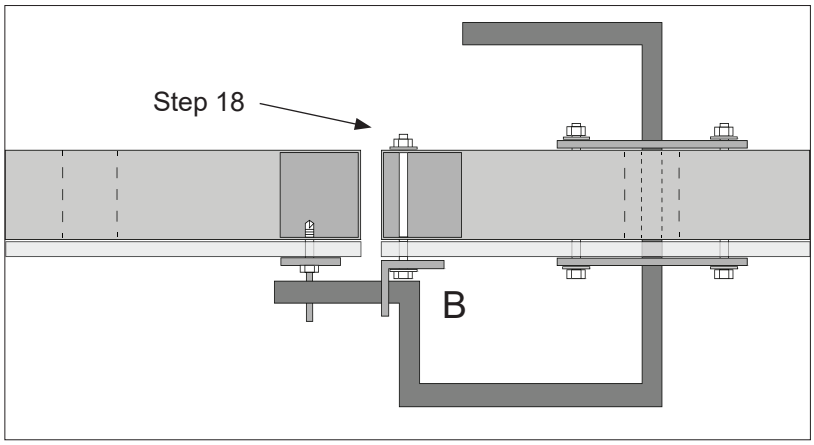
17. Using a hacksaw, cut mounting bolts flush to lock nut and file bolt ends smooth to prevent cuts when operating door latch.

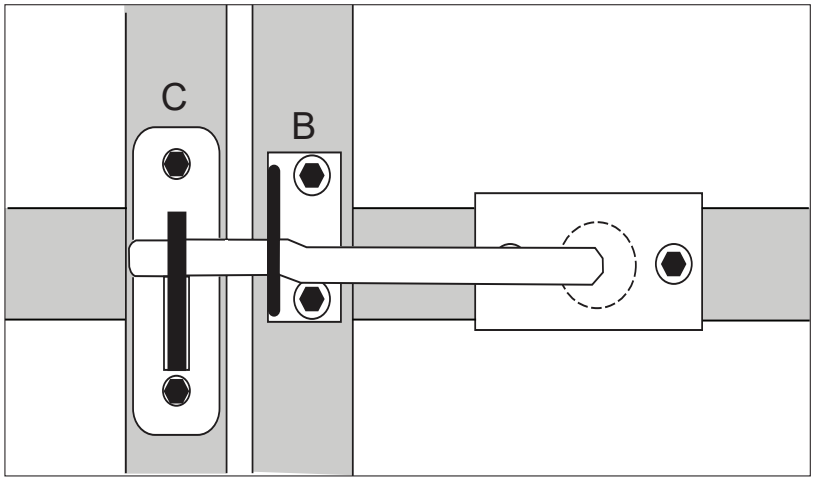
DOOR ASSEMBLY (continued)

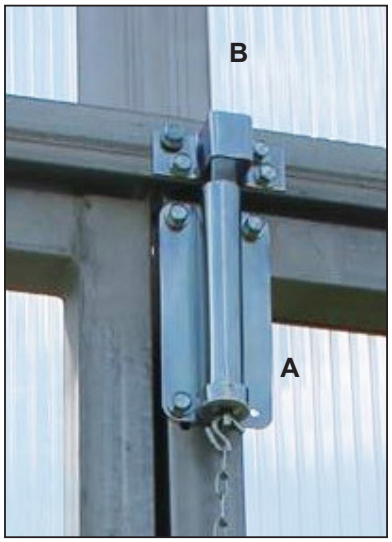
18. Mount *door latch guide* (slotted plate – B) using the remaining 1/4" x 3" bolts. Position so latch handle is level. See next diagram .
19. Repeat step to cut bolts to length after tightening.
20. Place latching plate C (diagram top-right) in position against ***panel of adjacent door.***
21. Using latching plate C as a template, mark mounting hole locations on panel. ***With doors closed, verify latch handle and latching plate alignment.***
22. Attach latching plate C to door frame using #14 x 1-1/2" Tek screws.
23. With the latch installed, move inside the building and close the doors. Attach 6" chain bolt assembly (Part A) to upper part of door that has latching plate C attached to it. (*This is door frame without main latch.)* Attach Part B to header above door.

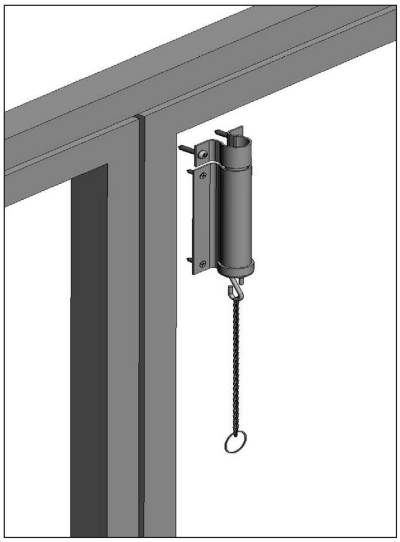
    NOTE: Use fasteners included with chain bolt assembly kit. Predrill all mounting holes as needed. If drill bit is not available, use #14 x 1-1/2" Tek screws to secure assembly to frame. ***Only three mounting holes are used.***

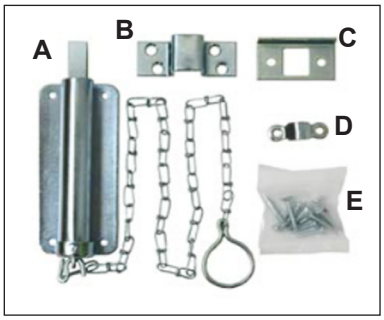
    Do not attach chain retainer D to door frame until next steps are completed.











CHAIN BOLT LATCH PARTS

A: Spring Chain Bolt
B: Bolt Receiver
C: Latching Plate (not used)
D: Chain Retainer
E: Hardware/Fasteners

END WALL FRAME - ACCESSORIES NOTE

A NOTE ABOUT INSTALLING END WALL FRAMING FOR OPTIONAL HEATERS, VENT FANS, AND MOTORIZED SHUTTERS (if equipped):

Optional accessories such as heaters, vent fans and motorized shutter units are available to be installed in end walls of this greenhouse. Additional horizontal framing (not included) is installed *between* vertical end wall frame tubes to mount these accessories. Spacing shown for end wall supports on end frame diagrams may be too narrow for installation of some larger accessories.

Diagrams do not show framing for accessories.

When framing end wall, consult installation instructions for accessories (if equipped), or measure width of accessory to accurately space and position end frame tubes. ***Consult panel installation diagrams in Quick Start section to identify verticals that can be moved.***

Before installing any greenhouse accessory, adhere to the following:

- Consult end frame diagrams ***before*** installing accessory horizontal framing.
- If labeled, move only those verticals labeled as "NON-CRITICAL" on end frame diagrams when deciding where to install additional horizontal framing for accessories.

  NOTE: Some vertical frame tubes must remain in locations shown on end frame diagrams. Polycarbonate panel installation requires specific on-center spacing. *Moving critical end frame tubes can compromise end panel installation.*
- Consult diagrams in Quick Start section showing polycarbonate panel locations and locations of aluminum trim and profile before repositioning any end wall vertical.
- DO NOT REPOSITION END WALL VERTICALS USED AT SEAM OF TWO (2) POLYCARBONATE PANELS.
- Always consult installation guides that shipped with the accessory for additional precautions, recommendations, and safety requirements.
- Before installing any electrical accessory, consult a professional electrician for precautions and additional assistance.
- For gas heaters, ***a professional, qualified service technician must install the unit.***

Complete these steps to install accessory framing:

1. Based on installation requirements and precautions of the accessory, choose a location to mount accessory, and cut a 1.5" x 1.5" frame tube to required length for framing.
2. Attach these horizontal frame tubes between vertical frame tubes (at required height determined by installation instructions included with that accessory) using QH1330 brackets.

ASSEMBLE END WALL FRAME

Refer to end frame diagrams in Quick Start section and those on the following pages for assembly details. ***Read notes below to assemble end wall frame.***

- Secure all tube splices and connections using #14 x 1" Tek screws. One for each splice and connection is sufficient.
- Install all Tek screws in locations that *will not contact* roof or end wall cladding when cladding is installed.
- Secure base tube between ground posts using #14 x 1" Tek screws and variable angle brackets.
- Vertical frame member dimensions are measured from center-to-center unless noted otherwise on diagrams.
- When measuring vertical tube lengths, remember to account for the square-to-round bracket that connects vertical tubes to band clamps on end rafter.
- Secure each band clamp to end rafter using an #14 x 1" Tek screw.
- Secure each square tube fitting to each vertical frame tube using a #14 x 1" Tek screw.
- During installation, ensure all vertical tubes are plumb.

Complete these step to install end wall frame

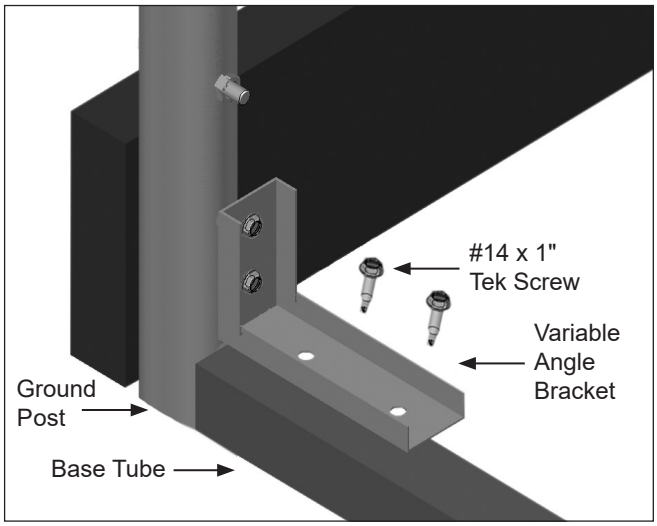
1. Frame and square rough opening for door. Use variable angle brackets installed outside to secure door jambs and header
2. If applicable, review dimensions for accessories such as fans and shutters and determine where to instll these in the end walls.

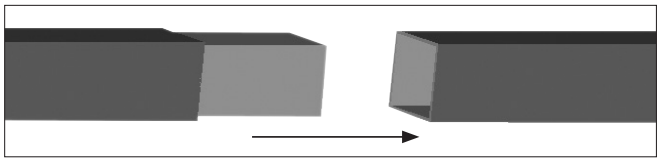
   ATTENTION: Consider door operation and required locations of end wall vertical tubes for end wall polycarbonate panel installation. Positions of some vertical tubes cannot be moved regardless of accessories.
3. Install all vertical frame tubes including those above door header.

   ATTENTION: Use variable angle brackets to install verticals above header.
4. Secure all band clamps on end rafter tube using an #14 x 1" Tek screw for each.
5. Check all tube splices to ensure each is secured with a Tek screw.

Gather parts:

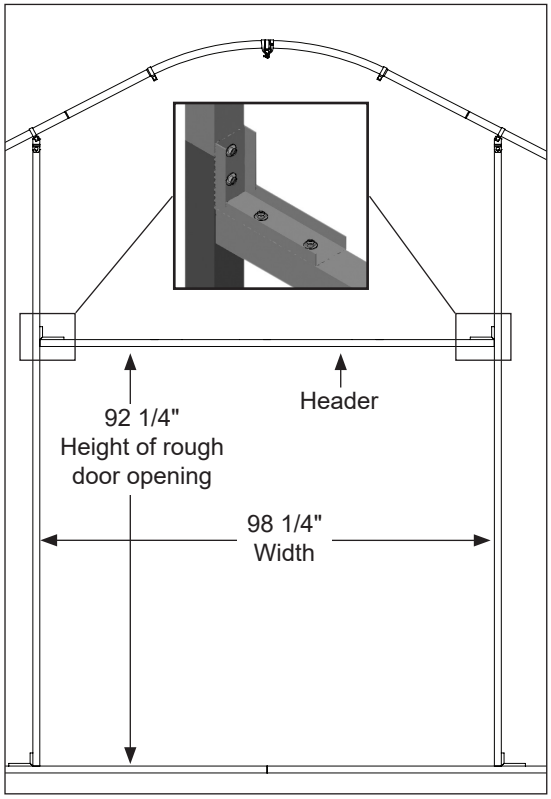
- Square Tube (
- Variable Angle Brackets and 1.66" Band Clamp
- Square Tube Fitting
- Square-to-Round Tube Connect Bracket
- 5/16" x 2-1/2" Carriage Bolt and 5/16" Nut
- #14 x 1" Tek Screw
- #14 x 1-1/2" Tek Screw

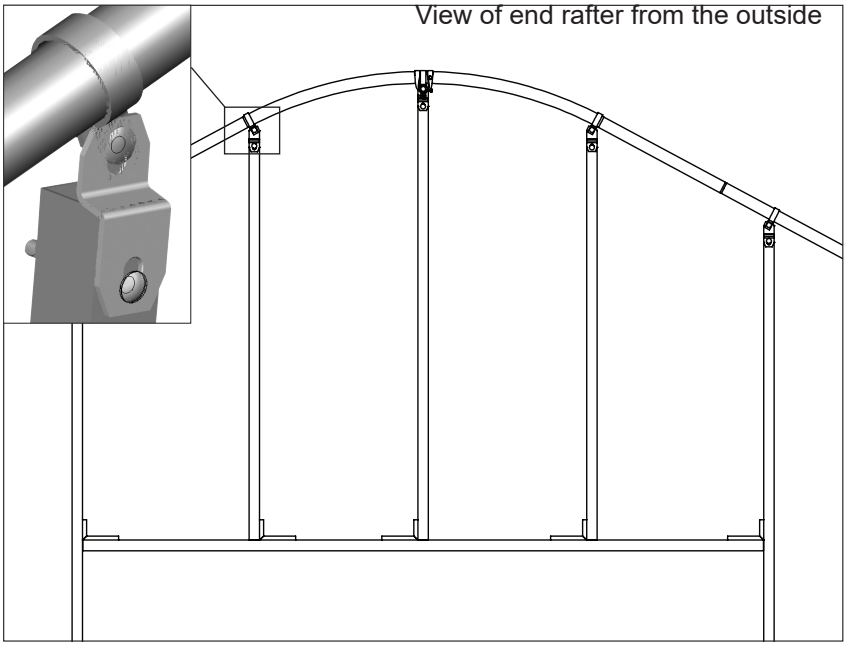


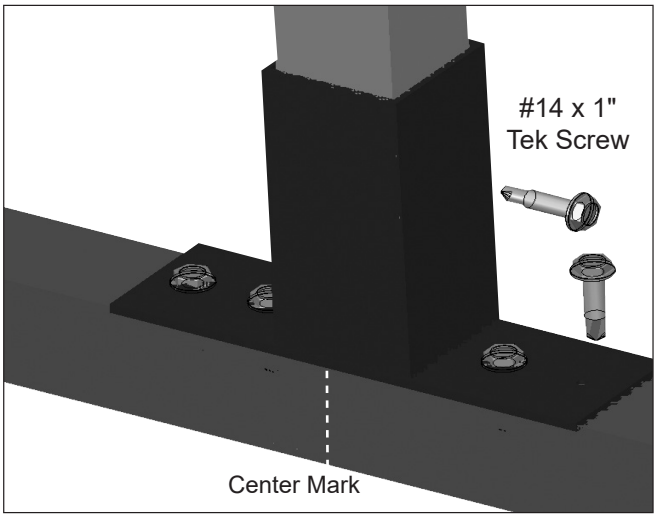


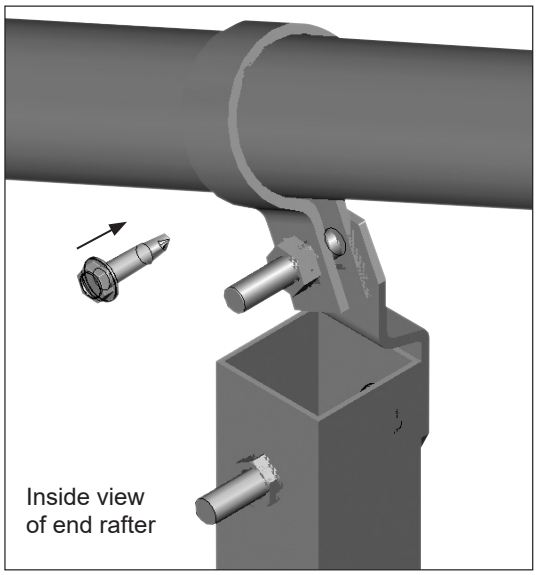
Secure all tube splices using an #14 x 1" Tek screw.

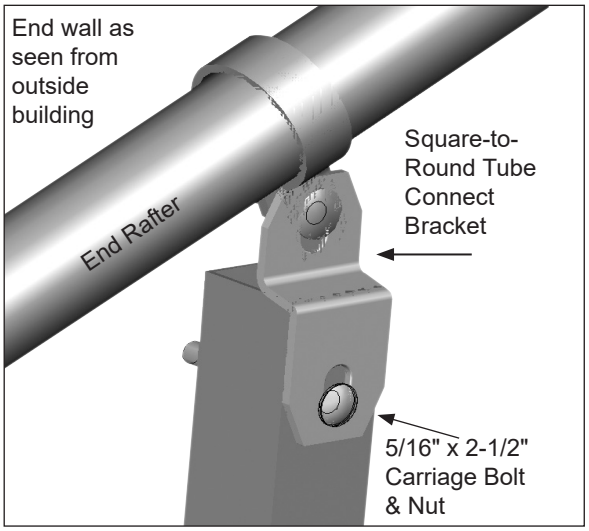
ASSEMBLE END WALL FRAME (continued)





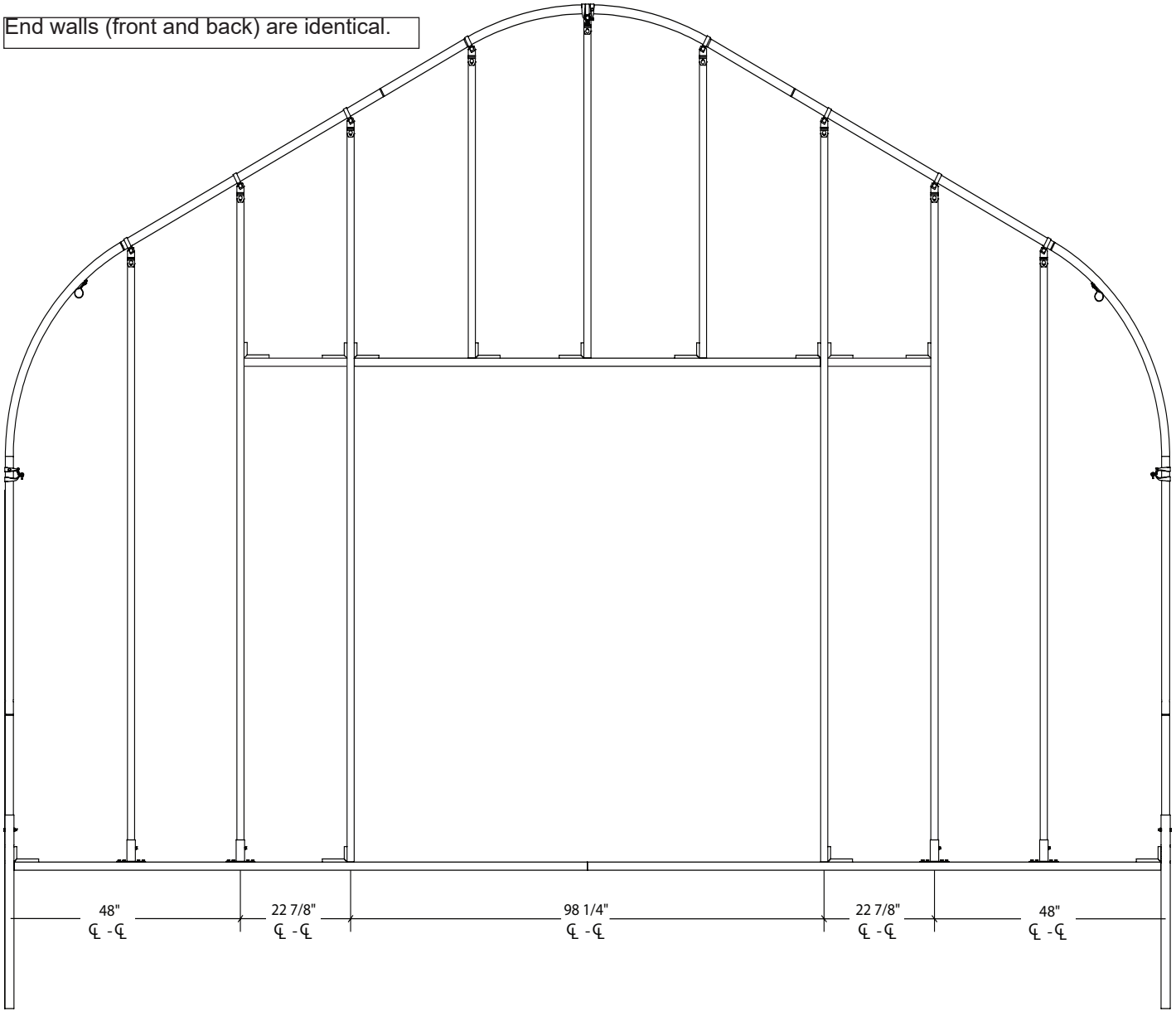






ASSEMBLE END WALL FRAME — CONTINUED

End walls (front and back) are identical.



END PANEL INSTALLATION

After end frames are assembled, install polycarbonate panels. Steps that follow describe one way to complete panel installation.

Materials and parts needed to install end panels include:

- Polycarbonate panels, foil tape and vent tape
- Aluminum U-profile
- Aluminum 12' H-Channel
- Aluminum End Cap
- #14 x 1-1/2" Tek screws & Neobonded washers

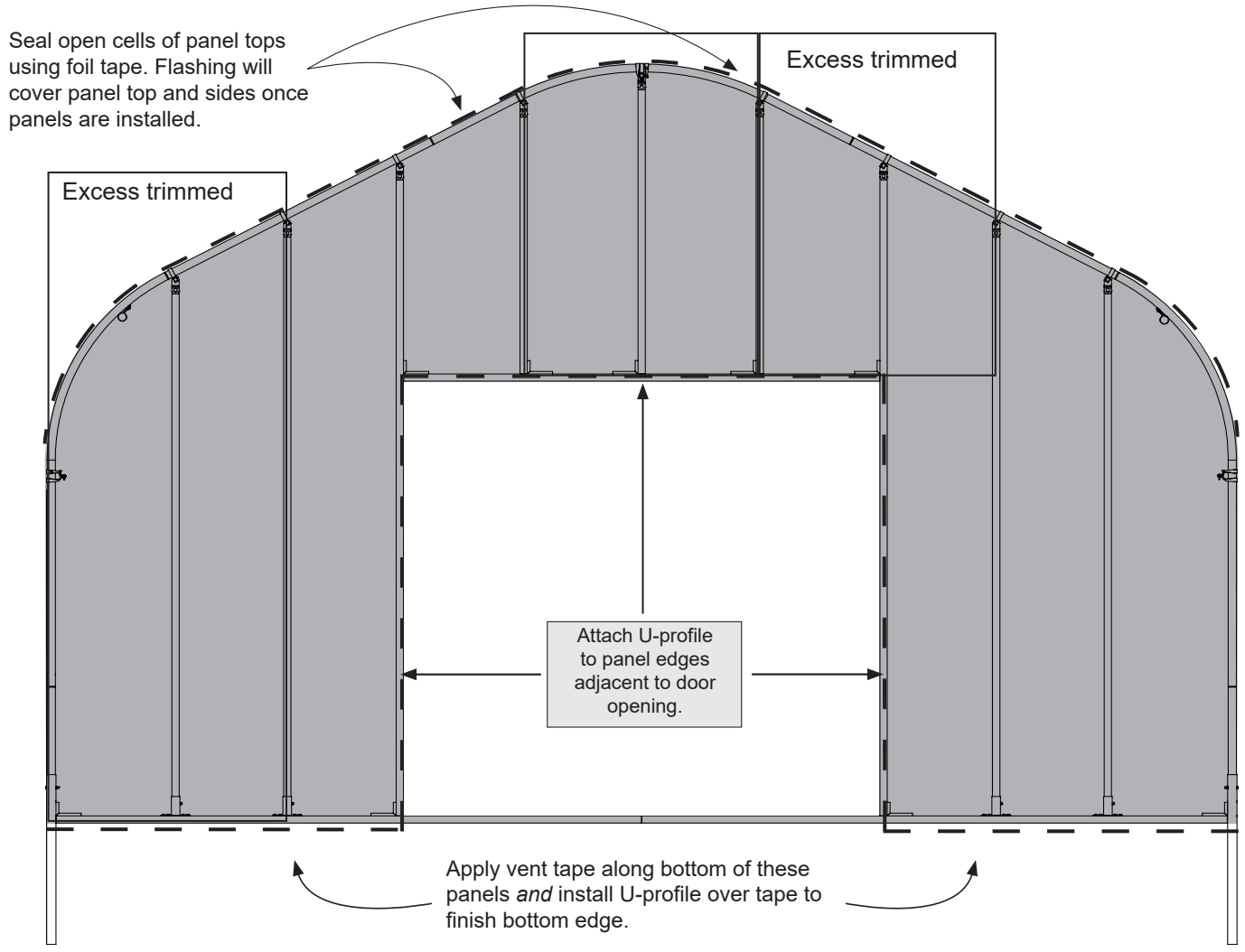
Read the following information before starting:

- U-profile used to finish bottom of some polycarbonate panels.
- Aluminum 8' H-Channel used to join two (2) separate polycarbonate panels at seam.
- #14 x 1-1/2" Tek screws and neobonded washers used to secure aluminum channel and panels to frame.
- Install polycarbonate panels with UV-protected side toward the sun. Mark side with a marker or piece of tape after removing protective film.

  ATTENTION: Remove protective film from panels. ***Allowing film to remain intact and in direct sunlight will make it difficult if not impossible to remove.***
- During preparation, rest panel edges on cardboard or other material to protect them from dirt and damage.
- Seal bottom edge of panels with vent tape.
- Consult polycarbonate panels (Quick Start section) for location and dimensions of each panel. Diagrams are located near back of these instructions.

ATTENTION: Position panels as shown on diagrams. Using a panel in the incorrect place can affect placement of subsequent panels.

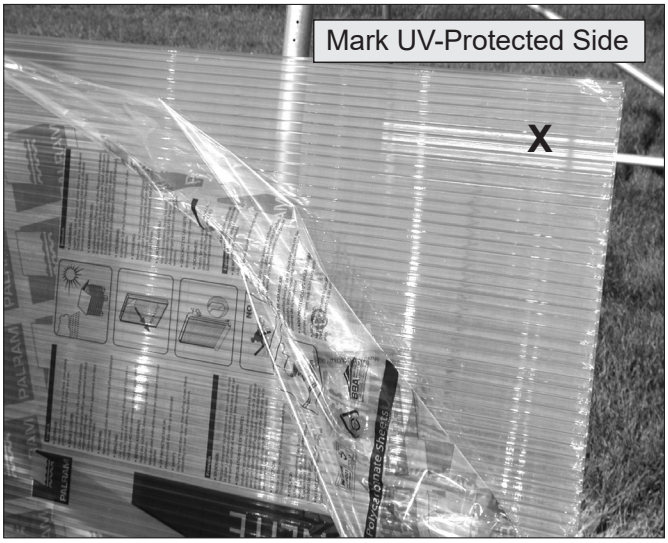
Install all accessories (fans, vents, heaters, etc.) after installing all polycarbonate sheets.



TYPICAL PANEL PREPARATION

ATTENTION: Complete the following steps as directed ***after cutting panels to size***. In some instances, this is before panel is attached to frame; in other instances, this is after panel is attached to frame. Procedure depends on panel location.

1. All End Panels: Remove protective film from each panel before installation. Identify and mark UV-protected side using a piece of tape or similar non-permanent means. ***Always install UV-protected side toward the sun.***





ATTENTION: Remove protective film from panels before installation. ***Allowing film to remain intact and in direct sunlight will make film difficult if not impossible to remove.***

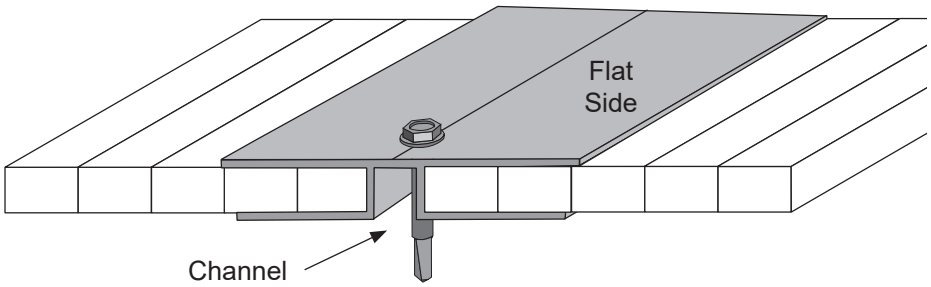
2. Seal bottom of lower panels using vent tape. (Applies to panel edges that attach to end frame base tube only.)
3. After installing panels in lower positions, cut and install a piece of U-profile over vent taped ends of panels.
4. Apply foil tape to seal top of all panels along end rafter. See dashed line in diagram on previous page. This panel edge is ultimately covered with flashing when it is installed.

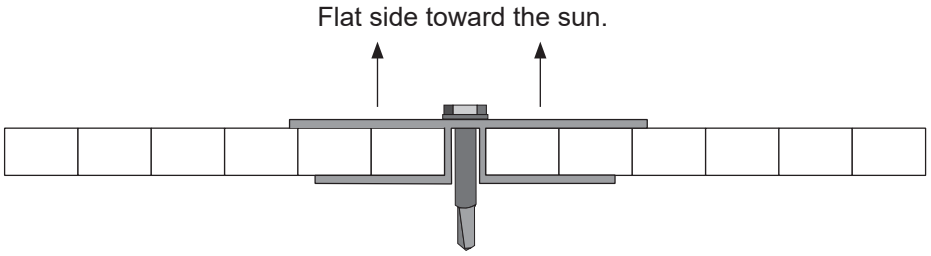
INSTALL END WALL H-CHANNEL

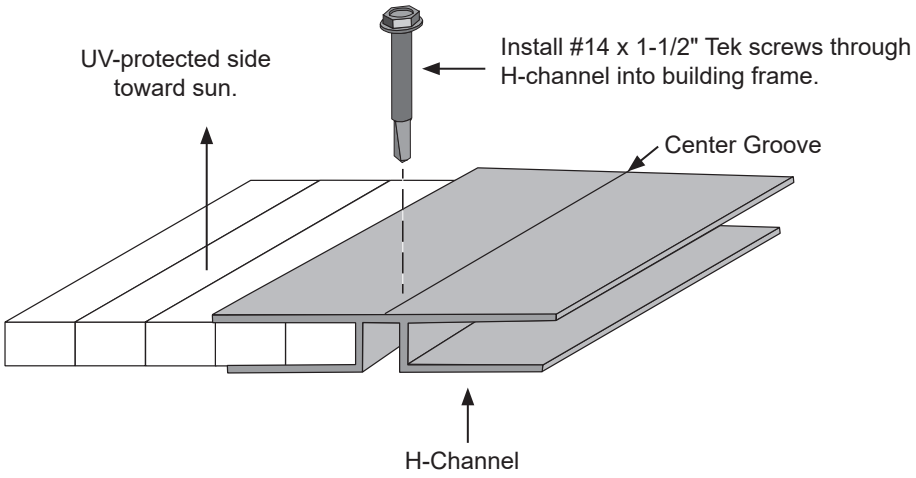
The H-channel design requires installation of the flat side facing out with channel side toward the frame. Some diagrams and photos in this document may show installation of H-channel with channel side facing out. Design of the new H-channel *does not allow* channel-side out installation.

Use the diagrams on this page to install H-channel with flat side facing out.

ATTENTION: Use only #14 x 1-1/2" Tek screws to attach H-channel to building frame. ***Do not use the shorter 1" Tek screws. They will not hold. Do not use washers on Tek screws when installing H-channel. See diagrams below.***



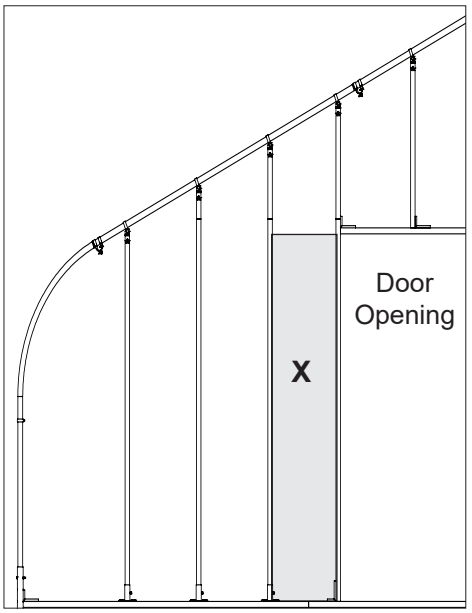




ATTENTION: Install all twin-wall poly carbonate panels with UV-protected side toward the sun.

END WALL PANEL INSTALLATION

Complete the following general steps to install end panels.



1. Consult panel location diagrams and select a panel. Begin at door opening edge and work toward outside edge of end wall. See X in diagram below for first panel.
2. Measure frame opening that panel will cover to determine panel size and cut panel as needed.

   ATTENTION: For panels adjacent to door opening, measure from *edge of door to center of end frame vertical support* that panel and H-channel will attach to. During installation, ***do not allow*** panel to extend into door opening.
3. Remove protective film, mark UV-protected side with a piece of tape, and apply vent tape to panel bottom.
4. Take a piece of aluminum H-channel and cut to needed length.

   NOTE: Review panel layout diagram in Quick Start section to best understand where to install the different aluminum profiles. When attaching any aluminum profile, remember to account for areas where different sections of profile (U-profile and H-channel) intersect so you cut profile to proper length.

   Determine how you want these profiles to intersect and install as needed to achieve the desired, uniform, and finished look.
5. Space #14 x 1-1/2" Tek screws with neobonded washers ***evenly at 16" on-center*** when securing panels. DO NOT USE WASHERS WHEN SECURING H-CHANNEL TO END FRAME.

   ATTENTION: *DO NOT install U-profile on bottom of end wall panels until all panels are installed.*

   Use diagram (lower right) when attaching panels and H-channel to frame. Install H-channel with flat side out as shown. No washer is needed for H-channel installation. Use washer for panel installation only as shown in photo.



Use an #14 x 1-1/2"Tek screw and washer to secure panel to end wall frame. Do not crush panel when installing screws.

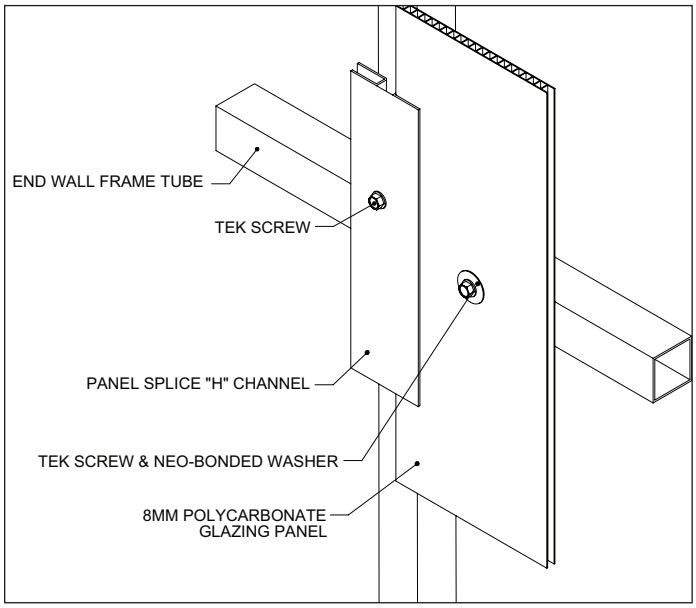
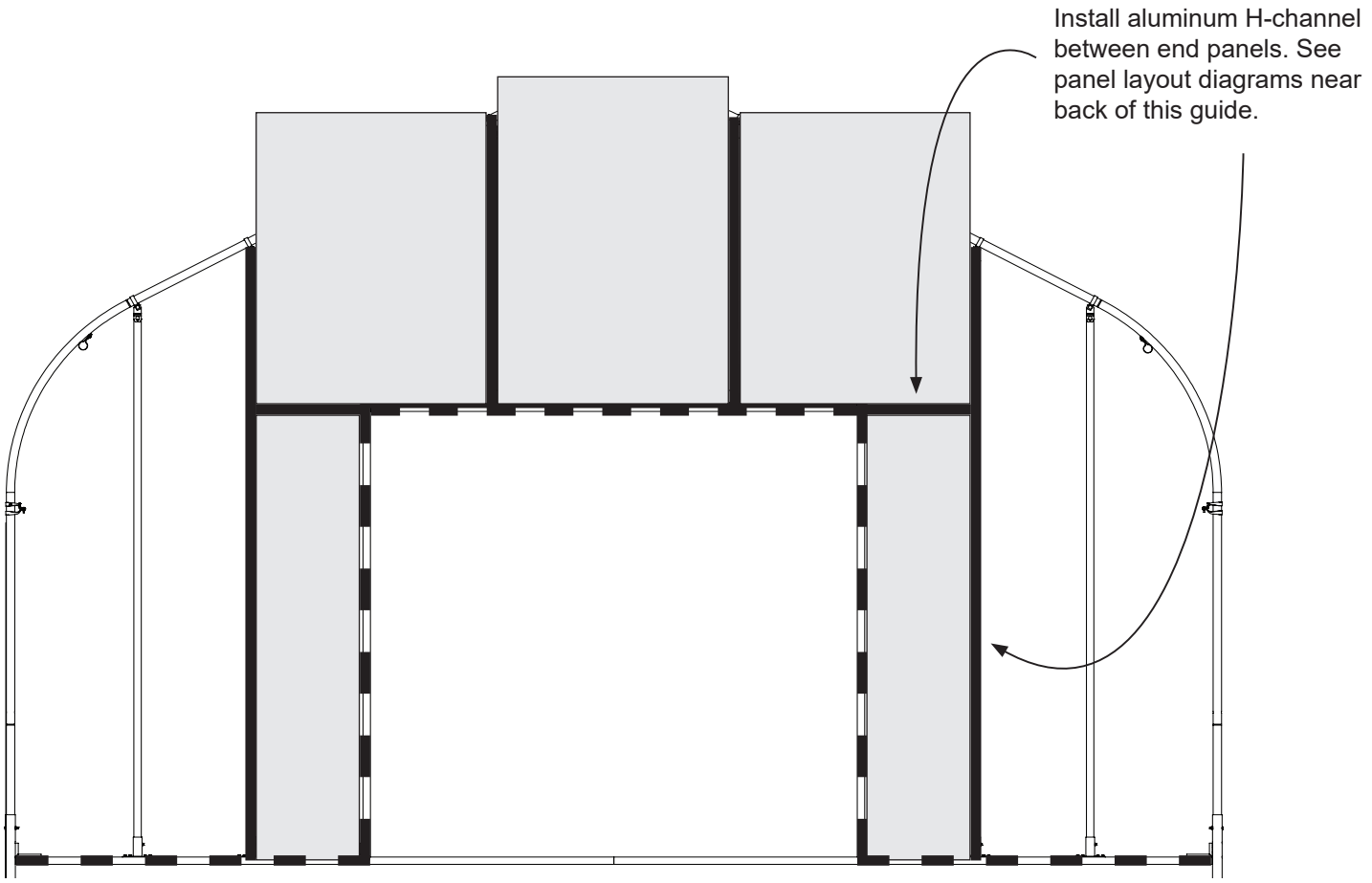


Diagram shows basic panel installation and fasteners used to secure polycarbonate panels.

END WALL PANEL INSTALLATION (continued)

6. Continue installing panels and aluminum profile in locations shown on end panel diagrams (Quick Start section) for front and back end walls. End wall with double door shown below. ***See next pages to install outer panels.***

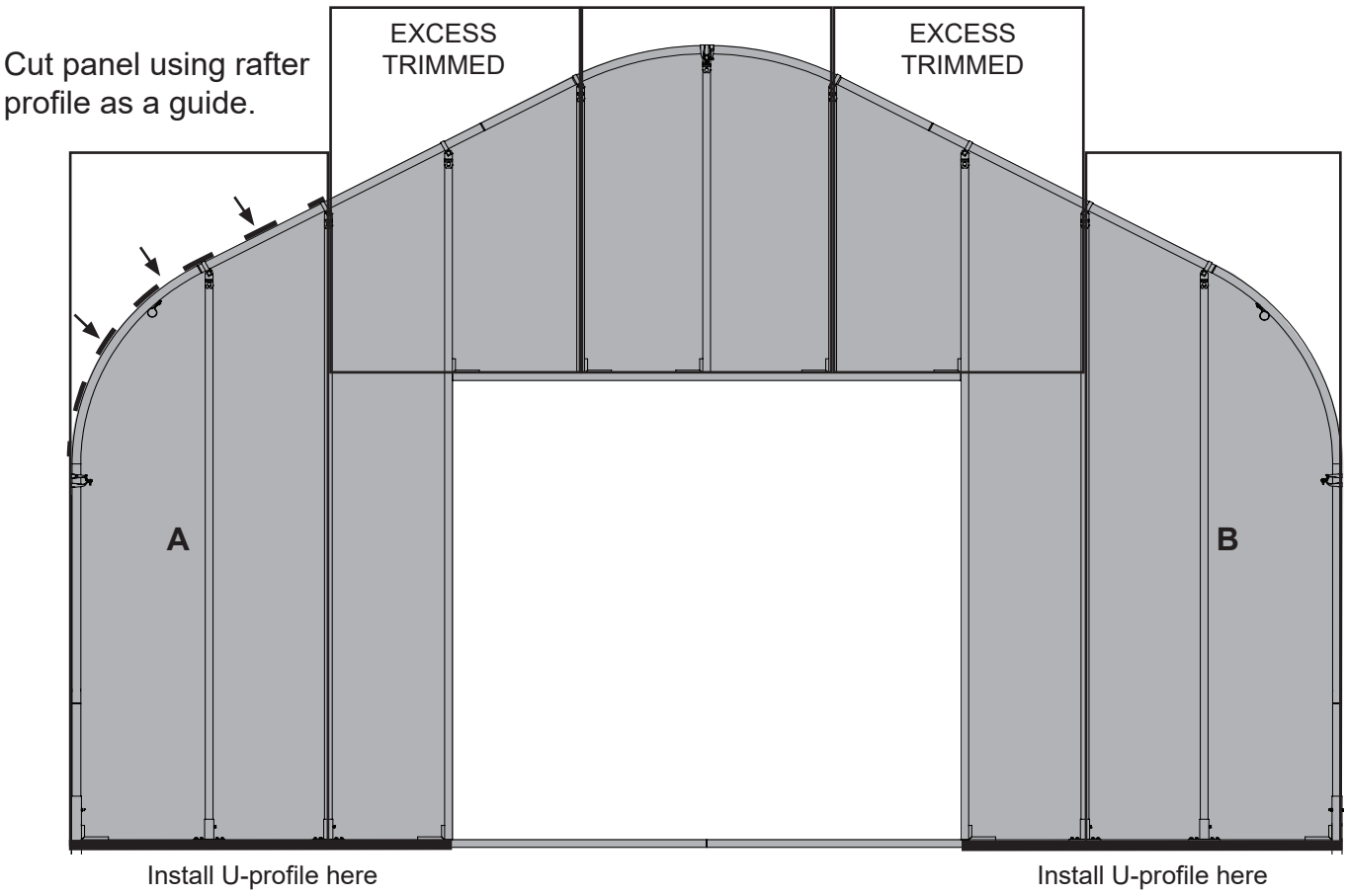


ATTENTION: Install U-profile along panel edges shown above (dashed line).

7. After panels are installed and cut to fit as shown on next pages, apply foil tape to seal open cells at top of all panels.
8. After applying foil tape to tops of end panels, continue with **Guide #2**.

END WALL PANEL INSTALLATION (continued)

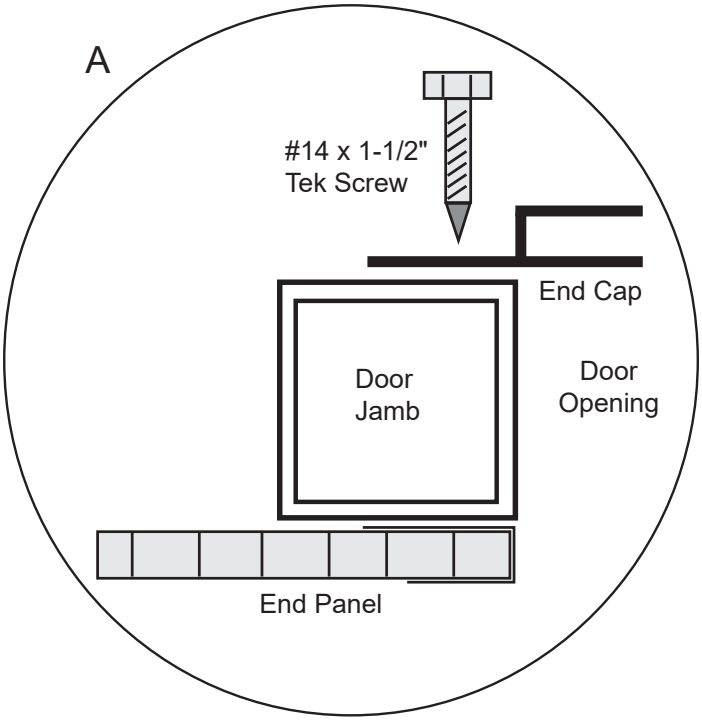
To cut end panels A & B at rafter radius, temporarily attach panel to end wall and trace rafter profile on panel using rafter as a guide. Remove panel and cut to shape. *Be sure to mark UV-protected side and install that side toward the sun.*

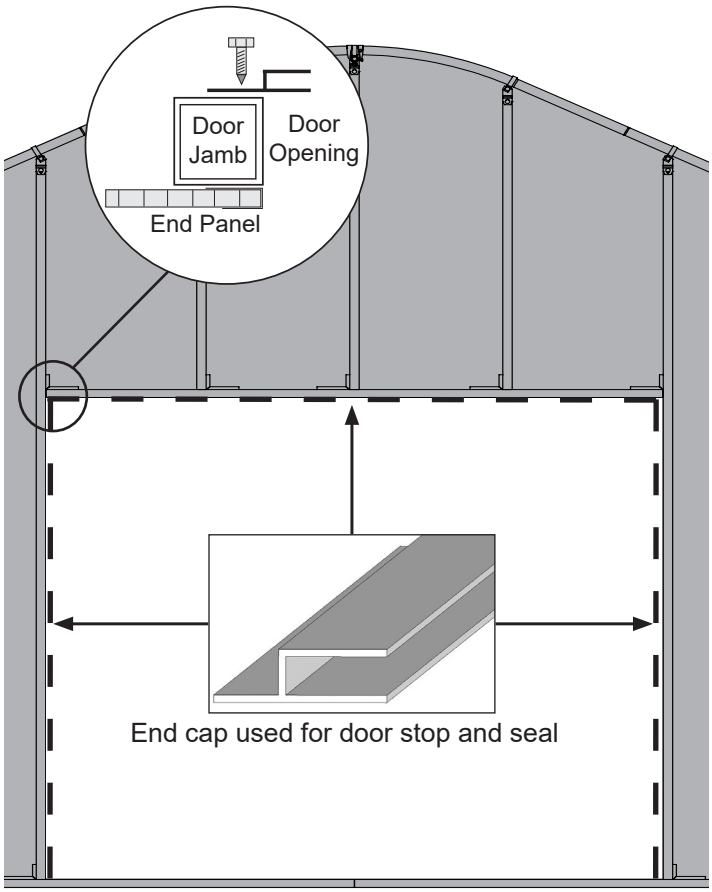


INSTALL DOUBLE DOOR

1. At top and sides of end frame door opening ***on the inside***, attach end cap using #14 x 1-1/2" Tek screws. Allow end cap to extend into door opening. ***Space screws every 16" on center.***

Diagram below shows top view of where to attach end cap to door frame. **Polycarbonate e*nd panel is outside frame; end cap is inside frame.***

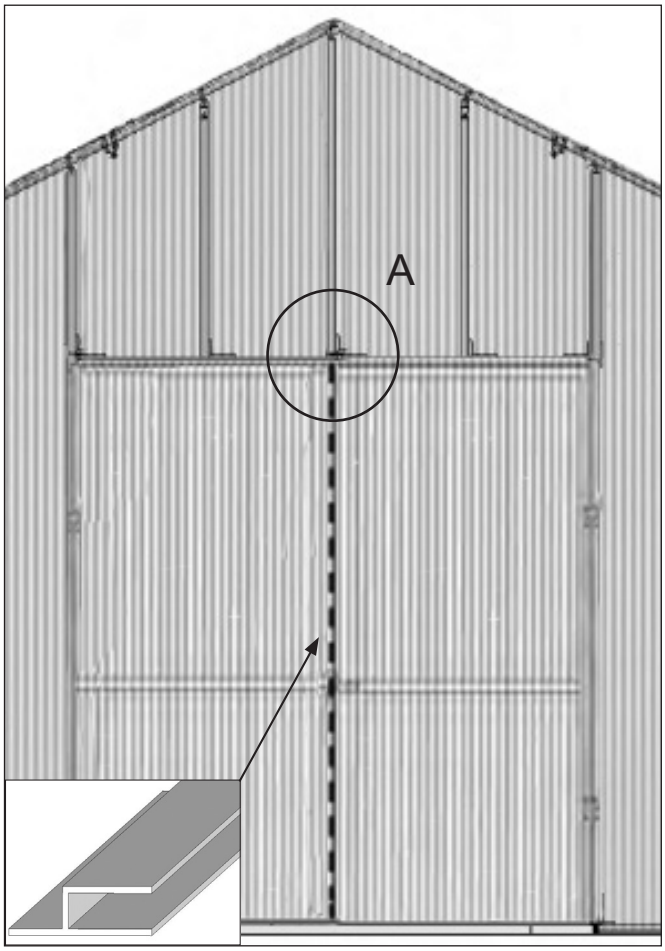




Dashed line identifies where to attach end cap. End cap extends into door opening to stop doors and to help seal gap between door and frame.

INSTALL DOUBLE DOOR (continued)

2. After installing the end cap, attach another section along the *inside frame of swinging door that includes the chain latch – Part A*.



Frame used for illustration purposes only. Outside view of doors.

NOTE: This section of end cap acts as a stop for other door of the double door assembly *when both doors are closed*.

3. Attach chain retainer D to end cap attached to door frame. See photo on next page.

4. Read care and maintenance information at the end of this guide.

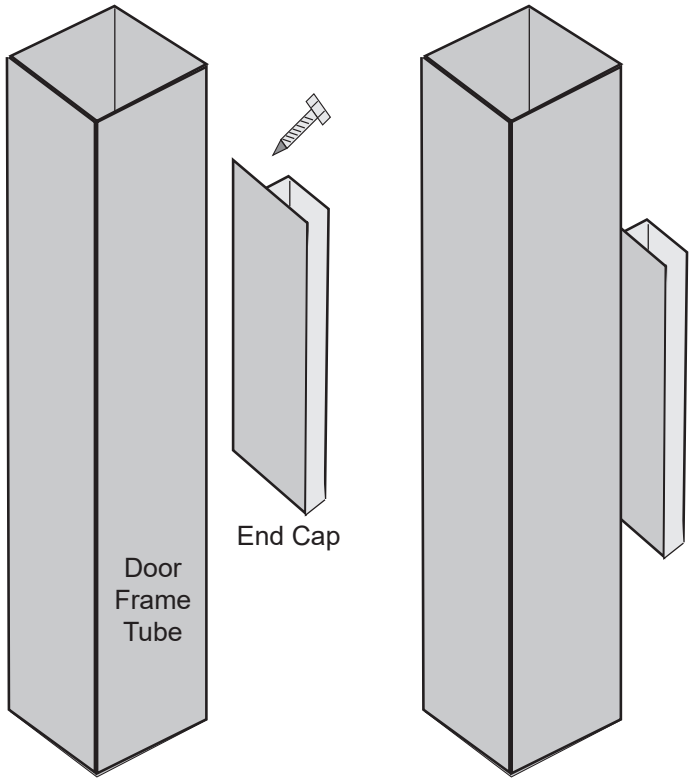
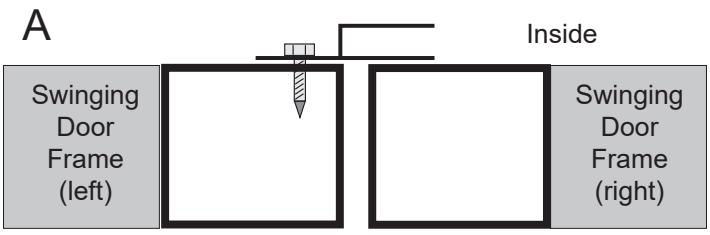


Diagram above shows view of end cap as attached to inside edge of door frame. Polycarbonate panel is not shown. View is from outside looking at section of door frame. Top view shown below.



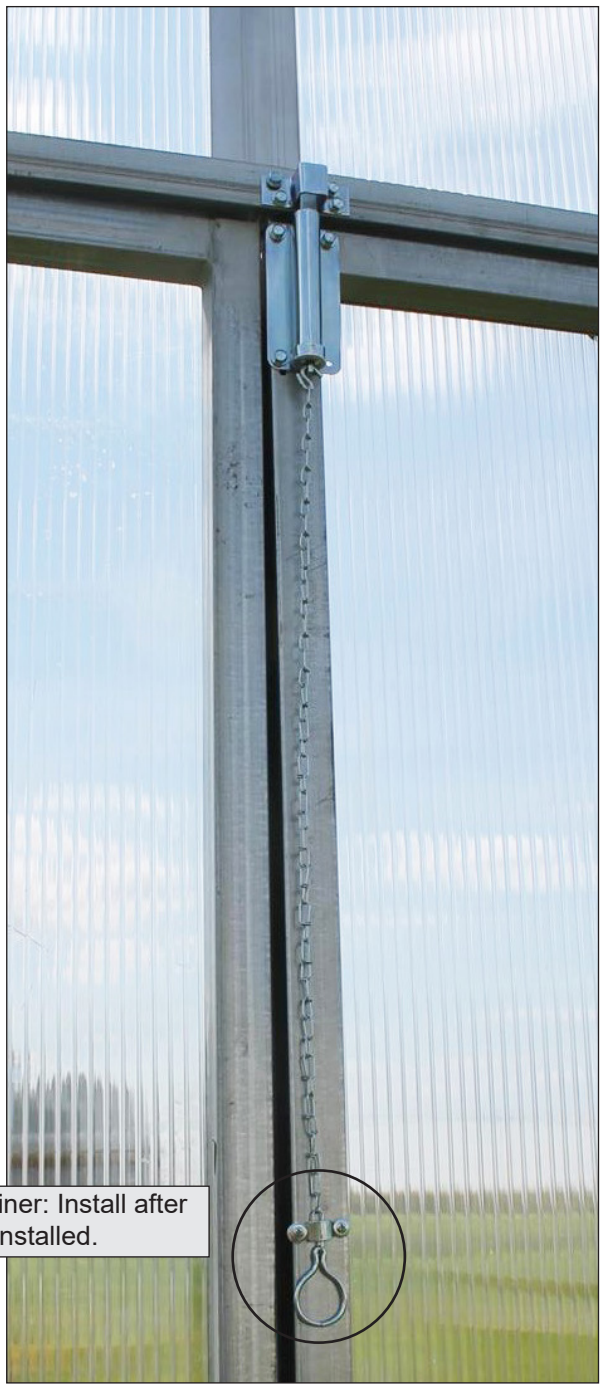
Additional Photos





Photo above shows latch assembly as seen from inside greenhouse. Fasteners may differ. Photo at right shows chain bolt assembly as seen standing inside greenhouse.

NOTE: End cap profile has not been installed. Dashed line shows where to install end cap.



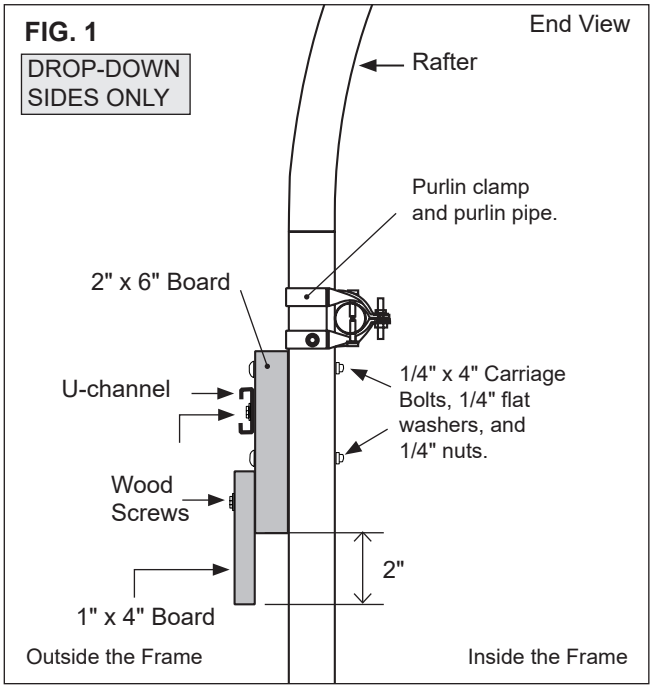
Chain Retainer: Install after end cap is installed.

ATTENTION: For those who purchased the endwall header kit, continue with these instructions at this point once those instructions are completed.

For those who just finished the end panel installation on the previous page, continue with the procedure that follows.

RIBBON BOARD REQUIRED: DROP-DOWN SIDES

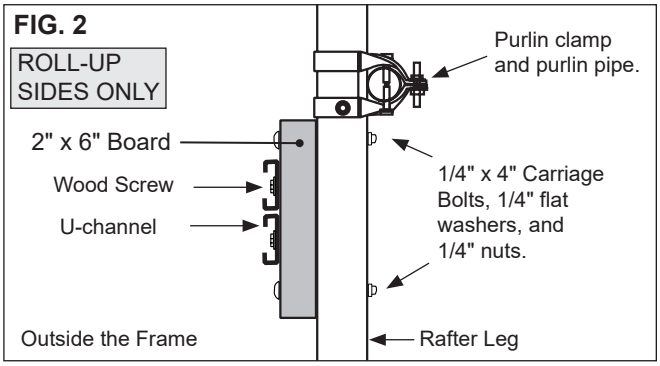
A customer-supplied two-piece ribbon board is required for the installation of the drop-down panel. Fasteners are included. *Customer supplies ribbon board materials.*



ATTENTION: The single u-channel is installed in the next procedure.

RIBBON BOARD OPTIONAL: ROLL-UP SIDES

A customer-supplied ribbon board is optional for the installation of the roll-up panel. Fasteners are included. *Customer supplies the materials for the ribbon board.*



ATTENTION: If a ribbon board is used for roll-up sides, install as shown above and described below. There is no second part (1" x 4" board) of a ribbon board for high tunnels with roll-up sides. *The double u-channel shown above is installed in the next procedure on the next page.*

If ***no ribbon board is wanted for the roll-up side option***, skip this page and continue by installing the double u-channel as shown on the next page.

RIBBON BOARD INSTALLATION

1. For drop-down and roll-up sides with a ribbon board, attach the first run of 2" x 6" lumber to the frame at the required height for the panel. See the Main Cover Details diagram in the Quick Start section for the sidewall height. ***From ground-to-bottom of ribbon board, maximum height not to exceed 6' 6". Side panel is 7' top to bottom.***
2. Repeat for the remaining side of the frame.
3. For high tunnels ***with roll-up sides***, continue with Step 4.

   For high tunnels ***with drop-down sides***, use the diagram above to attach the second board (1" x 4") to the ribbon board. Use wood screws (included) spaced at 24". Repeat for the remaining side.
4. Inspect the frame assembly for sharp edges or clamps and bolts that may interfere with the installation of the side panels. File or tape sharp edges as needed. Reposition clamps if needed.
5. Continue with the installation of the u-channel and main cover.

MAIN COVER INSTALLATION (Film or 5.2 oz Fabric)

The steps to install the main cover include:

1. Attach the u-channel along the high tunnel sides and tops of the high tunnel *end rafters*.
2. Pull the cover material (film or 5.2 oz.) over the frame and attach to the end rafters.
3. Stretch and attach the cover.

REQUIRED PARTS

- Single U-channel and Double U-channel for Roll-Up Side option.
- End Wall U-Channel
- Wood Screws
- #14 x 1" Tek screws.

INSTALL U-CHANNEL

ATTENTION: IF NEEDED, REVISIT THE DIAGRAMS ON THE PREVIOUS PAGE FOR U-CHANNEL LOCATIONS.

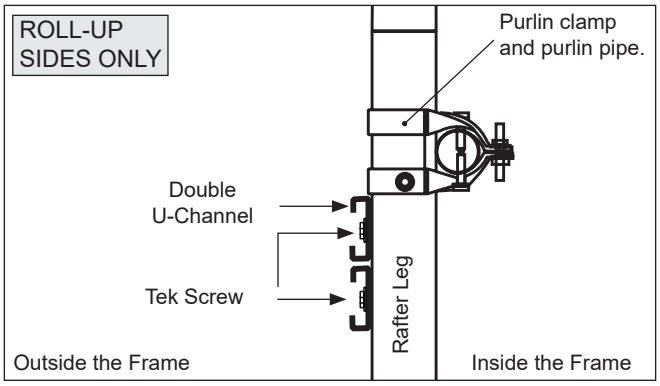
Complete these steps:

1. For high tunnels with drop-down sides, attach one section of single u-channel flush to the end of the ribbon board using wood screws ***spaced every 12"***. Position near the top of the board.

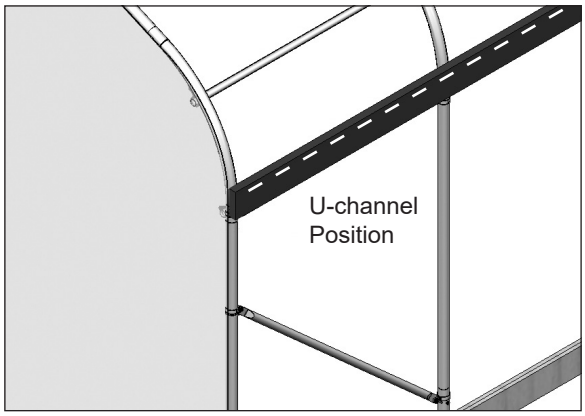
   For high tunnels with roll-up sides and an installed ribbon board (**FIG. 2,** previous page), attach the double u-channel to the ribbon board by installing a wood screw ***in each channel every 24".***

   ATTENTION: For best results, predrill the mounting holes in the u-channel using a 3/16" drill bit.

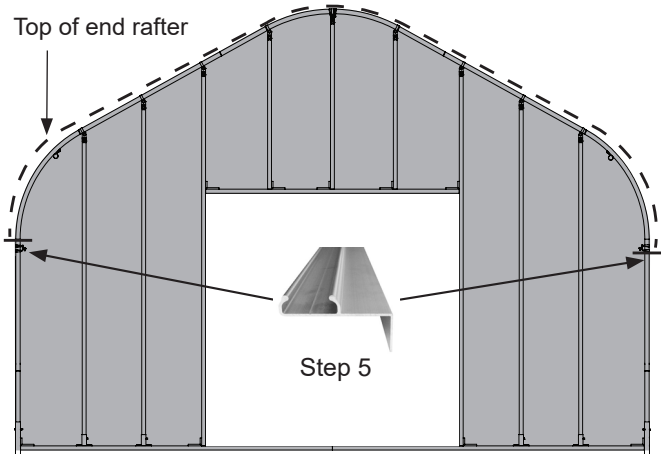
   For ***high tunnels without a ribbon board***, attach the double u-channel directly to the rafters. Install a Tek screw in each channel and into each rafter. See the diagram that follows.



2. Continue attaching the u-channel sections to the ribbon board (or rafters for no ribbon board) and work toward the other end of the frame.
3. Cut the last section of u-channel to the required length so that it is flush with the end of the ribbon board.
4. Repeat these steps to attach the u-channel to the ribbon board along the remaining side of the frame



5. After attaching the u-channel to the ribbon board (or rafters for the roll-up side option), use Tek screws to attach the end wall u-channel to the top edge of the end rafters. ***Space screws every 12"-16".***



Location of the side runs of end wall u-channel and ribbon board.

NOTE: The end roof u-channel will bend with the curve of the rafter as it is attached. ***FOR BEST RESULTS, DO NOT SPLICE U-CHANNEL SECTIONS ON ANY RAFTER CURVE.***

6. Continue to attach the end wall u-channel until it has been installed on the top of *both end rafters*.
7. Read the information on the following pages and continue as instructed.

RIDGE VENT (HFD AND HFRU MODELS): ADDITIONAL PURCHASE

If you purchased the optional ridge vent feature for your 5.2 oz. cover, continue with these steps. If you did not purchase the ridge vent feature, skip this procedure and continue with the installation of the main cover.

OPTIONAL RIDGE VENT INSTALLATION: HFD & HFRU Models Only (Additional purchase required.)

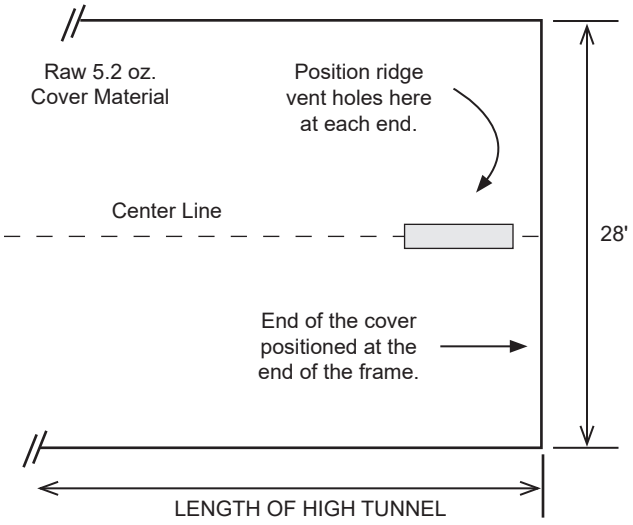
Before you install the 5.2 oz. main cover (HF models only), cut the vent holes in the cover as instructed in the Ridge Vent Kit Instructions that follow.

ATTENTION: If your building is the HC model that includes the 6 mil film cover, or you did not purchase the optional ridge vent kit, skip this section and continue with the installation of the main cover.

COVER DIMENSIONS

Before you cut the holes in the main cover material for the ridge vent, determine how the cover will sit on the frame. For some high tunnels the over-the-top measurement of the frame is greater than the length of the high tunnel. To avoid cutting the holes in the wrong ends of the cover material, consult the information below to cut the holes at the proper ends of the cover.

For all HF models (108179, 108180, 108181, 108182, 108183, and 108184), position the ridge vent holes at the center line along the 28' side of the raw cover material as shown. This is the over-the-top dimension.



ATTENTION: *Do not cut holes in your cover if you did not purchase the ridge vent kit for your building or if the cover is film.* Consult your sales representative for additional information and to purchase the kit for your building.

RIDGE VENT KIT INSTRUCTIONS

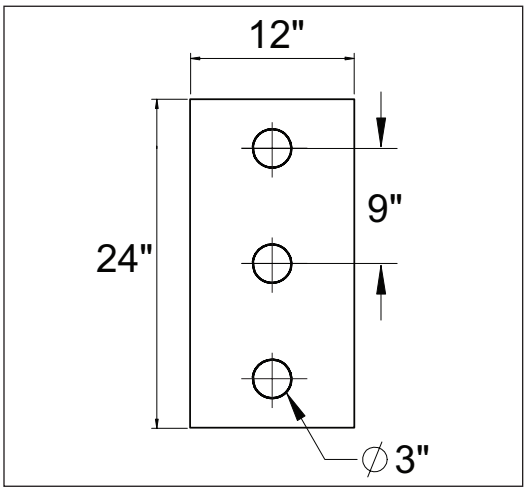
The optional Ridge Vent Kit is available *only on HF units with 5.2 oz. cover*. The kit allows control over ventilation, humidity buildup, and temperatures within the high tunnel.

Before installation, drill the ridge vent holes in the main cover. You will need a 3" hole saw and a customer-supplied vent hole template. Example shown on the next page.

1. Identify the ridge vent location and mark a line on the center of the cover using a non-permanent marker.
2. Measure and mark 3' in from the outside edge of the cover and every 9" consecutively until you have finished the pattern shown below.
3. Place the vent hole template on the lines of the pre-marked cover, stand on the edges of the template, and carefully drill vent holes in the cover using a 3" hole saw. *Adding a scrap piece of wood under the cover for support will help keep cover tight as holes are drilled.*
4. After drilling the first set of vent holes, repeat steps for the remaining end of the cover.
5. Once the ridge vents are complete, continue with the installation of the main cover.

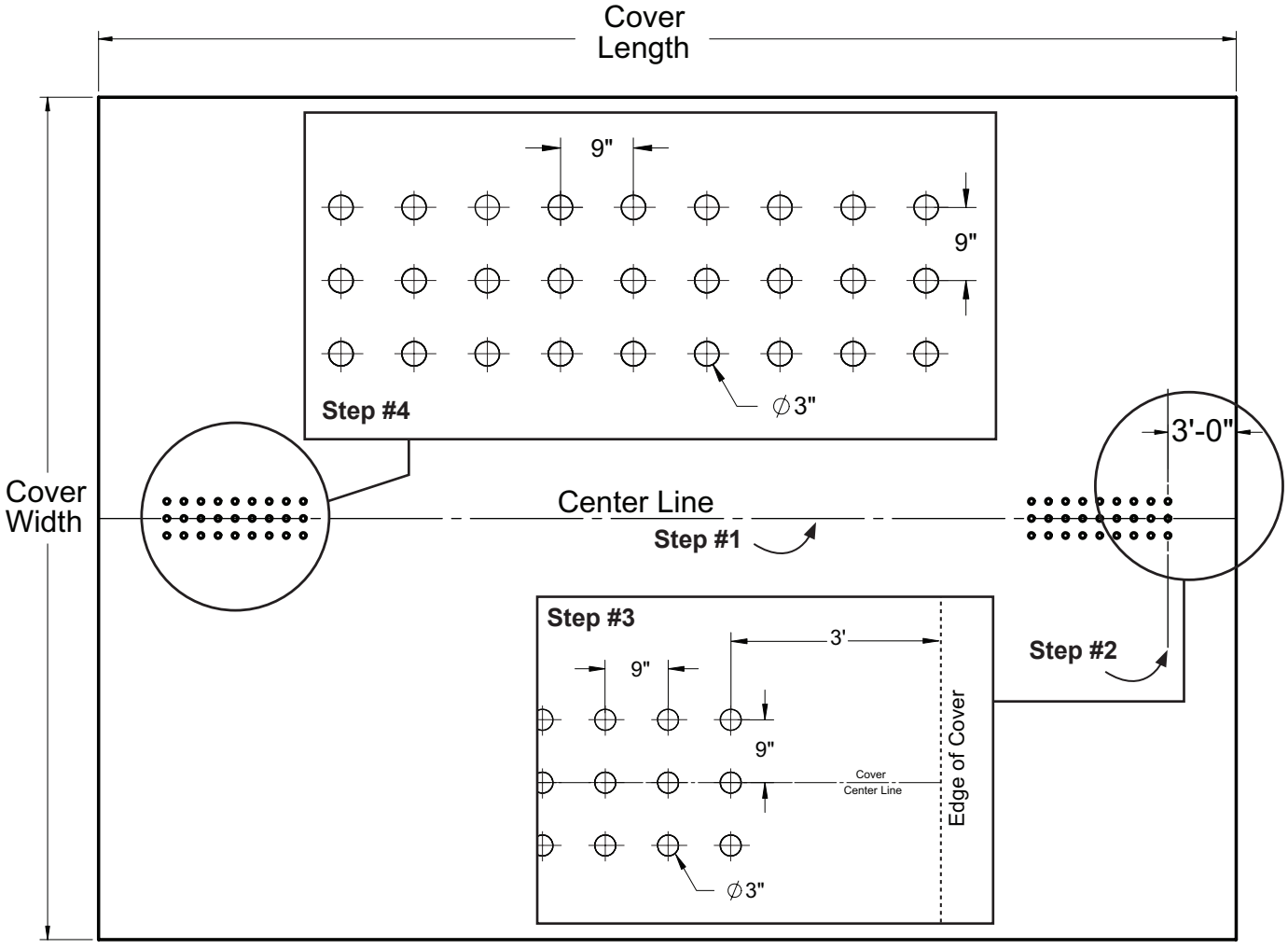
CONSULT THE DIAGRAMS ON THE FOLLOWING PAGE FOR ADDITION INFORMATION.

VENT HOLE TEMPLATE



Hint: Create a vent hole template using a 12" x 24" piece of plywood. Cut 3" holes into the template as shown above. Space the three (3) holes 9" on-center.

ATTENTION: Ridge vent kits are for the HF version (5.2 oz. cover material) of the high tunnel only. *Do not cut holes in the film cover of the HC building model.*



INSTALL MAIN COVER

Gather the parts:

- Main cover (Film or 5.2oz Clear)
- U-channel spring
- Ropes long enough to reach over the frame (provided by the customer, or use the anti-billow rope included.)
- Box cutter or utility knife

WARNING: To prevent damage to the cover and to prevent serious personal injury, ***DO NOT*** attempt to install the main cover on windy or stormy days.

WEAR EYE PROTECTION WHEN INSTALLING SPRING WIRE!

IMPORTANT: *Verify the writing is facing the ground so it can be easily read when inside the structure.*

After attaching u-channel along sides and to the end rafters, install the main cover. Ropes or straps are used to pull main cover onto and over the frame. The main cover material is typically cut two (2) feet longer than the frame length (e.g., length is 48'; film roll is 50'). For some frames, it is possible that the over-the-top dimension exceeds the length of the frame. Roll out the cover along the frame and take additional measurements to ensure you are pulling the cover onto the frame correctly.

Complete these steps:

1. Take the cover and position it at the frame base along one side.



NOTE: Unfold cover and locate edge. Cover ground if needed to protect film and to keep film clean and free of debris.

2. Along cover edge to pull over frame, tie rope (or strap) around a tennis ball, for example, and ***toss free end of each rope over the frame***. See photo.



This procedure may not be required for small high tunnels; simply pull the cover over by hand.

NOTE: Evenly space ropes along side. Number of ropes depends on building length; use additional ropes spaced evenly throughout length to prevent tearing cover when pulled onto frame.

INSTALL COVER FILM (continued)

3. After tying ropes to the cover, ***toss the free end of each rope over the frame*** and pull cover onto frame.

   IMPORTANT: To prevent damage to the cover during installation, ***use additional personnel and lifts as needed stationed inside frame*** to help guide the cover onto the frame and to protect cover from door frame posts.

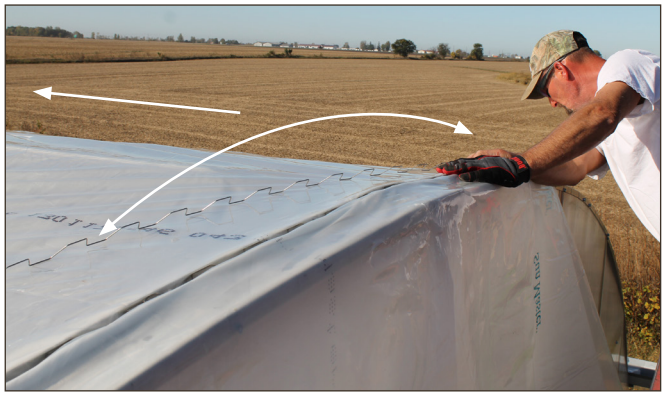


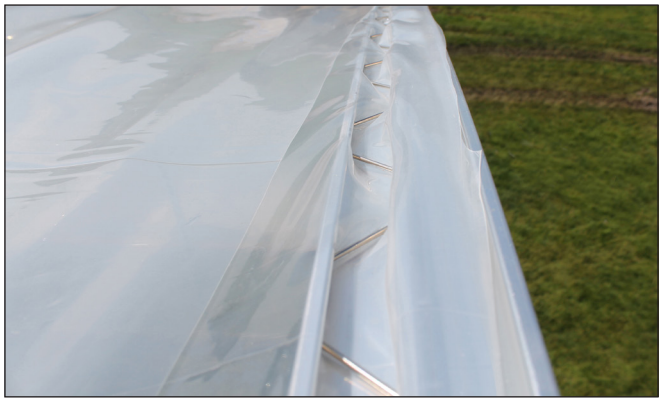
4. Center side-to-side and end-to-end.
5. Once main cover is in place and centered, begin at the peak at one end and install the wire spring into the single u-channel.

   ATTENTION: Ensure enough film is present to lock into u-channel flashing. Typically, cover film is cut longer than required to cover frame end-to-end. For easier anchoring, allow approximately 10" to extend past end rafter as film is anchored. Remove ropes (if used) after film is secure.
6. Continue down both edges of first end rafter until film is secured.



7. Pull film toward other end and stretch gently to remove wrinkles.

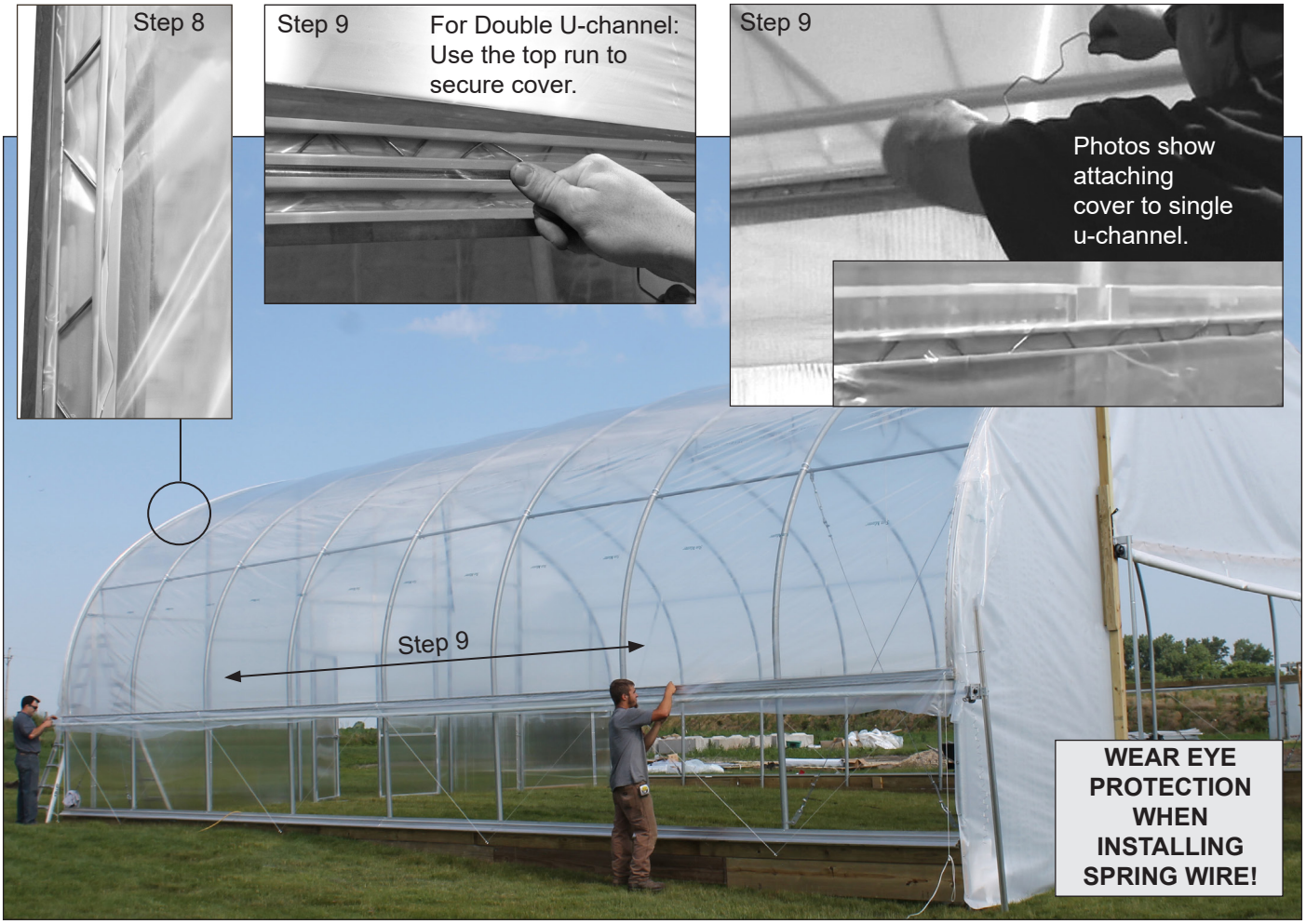




INSTALL COVER FILM (continued)

8. Move to the other end rafter, pull cover tight, and repeat steps to secure cover to the end rafter.
9. After securing cover end-to-end, move to one side, and install spring wire in the side u-channel.

   NOTE: Beginning at the middle, work toward each end to remove wrinkles during installation. ***Use the upper run of u-channel to secure the roof film for frames with the double u-channel***.



10. Next, move to remaining side, stretch cover, and secure in place. Pull snug during spring wire installation.
11. Trim away excess material if desired. Allow a few inches to remain in the event that the cover needs stretched in the future. ***Sample high tunnel is shown. Actual frame design may differ.***
12. Complete the final frame check (next page) and install the drop-down or roll-up sides, depending on your high tunnel model.

    ATTENTION: FOR DROP-DOWN SIDES (all CD & FD models), CONTINUE WITH THE "INSTALL THE DROP-DOWN SIDES" PROCEDURE.

    FOR ROLL-UP SIDES (all CRU & FRU models), CONTINUE WITH THE "INSTALL THE ROLL-UP SIDES" PROCEDURE.

FRAME CHECK

Before you attach the side panels, inspect the frame for sharp edges or fasteners that could damage the panel or kit components.

1. Verify that all frame members are properly secured.
2. Verify that all bolts and clamps are tight.
3. Recheck the frame assembly for sharp edges or clamps and bolts that may interfere with the installation of the panel. File or tape sharp edges as needed.
4. Reposition clamps and bolts as needed and tape all rafter pipe joints with duct tape to protect the panel.
5. Verify that the main building frame is properly and adequately anchored.

   Do not attach the side panels to an unanchored frame.
6. Continue by installing the side panels and components.

INSTALL THE DROP-DOWN SIDES

If your building includes roll-up sides, go to and complete the **"Install Roll-Up Sides"** procedure. ***Do not continue with these drop-down panel steps.***

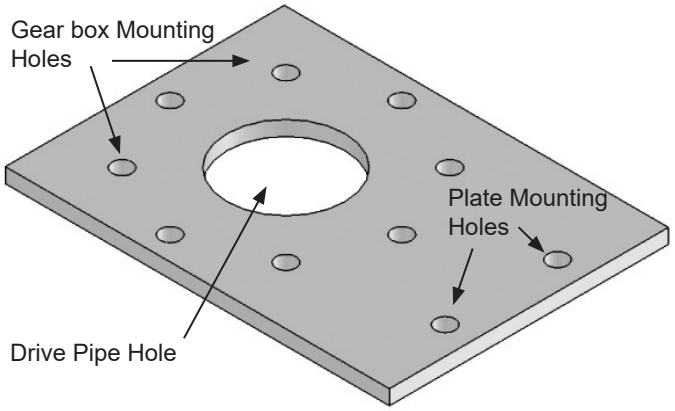
Locate these parts to attach the pulleys and drop-down panel drive pipe:

- 1.315" x 75" swaged pipe for drive pipe) and 1.315" x XX (where XX represents the length needed to complete the drive pipe assembly). See side profile for pipe identification if needed.
- Tension band clamp
- Gear box and mounting plate
- Gear box double drive
- #14 x 1" Tek screws (for drive pipe)
- 1/4" x 4" carriage bolts and 1/4" nuts—use with flat washers on the nut side.
- 1/4" x 2" hex head bolts
- 1/4" lock nut and 1/4" flat washer—used to secure the mounting plate.

Continue with the steps that follow to install the drop-down panel components.

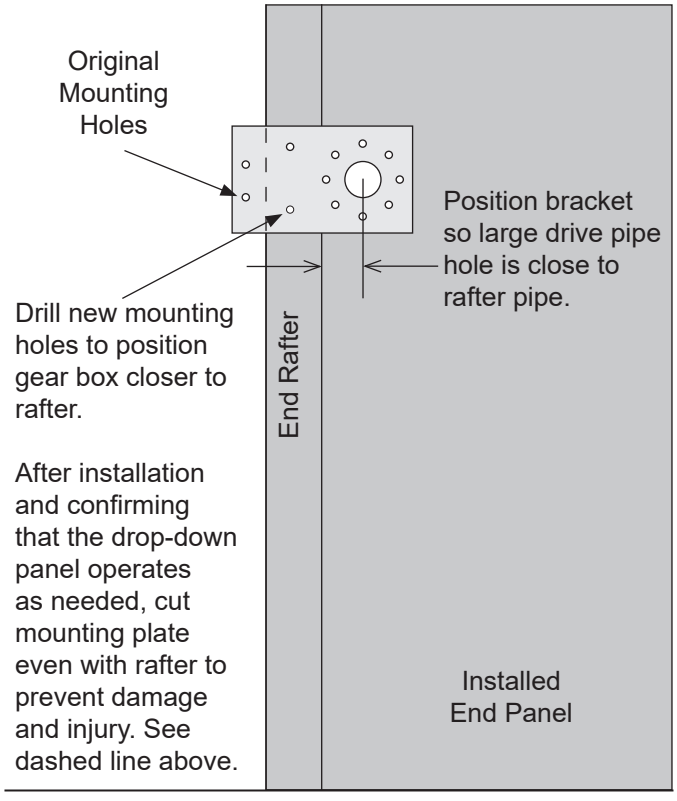
1. Take the mounting plate (shown below) and move outside the end wall where you want to position the gear box.

Mounting Plate (Figure 1)
Actual mounting plate may differ from what is shown.



ATTENTION: Depending on the mounting plate design, it may be necessary to redrill and reposition the plate mounting holes to keep the drive pipe closer to the rafters.See the diagram below for an example.

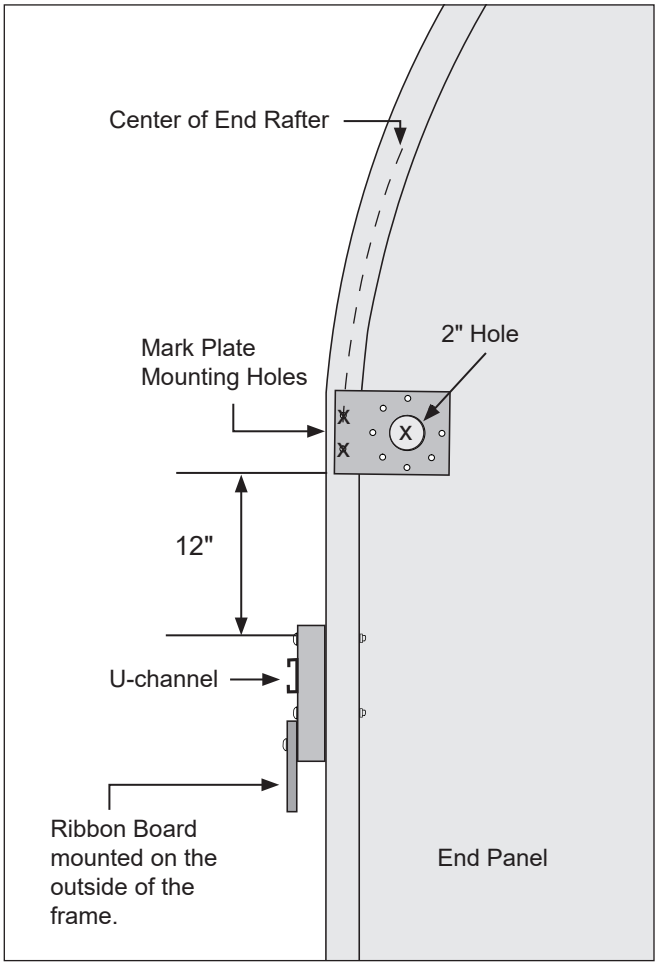
May not apply to all drop-down sides and mounting plates.



INSTALL THE DROP-DOWN SIDES (continued)

1. Measure approximately 12" *above the ribbon board* along the end rafter, place the mounting plate against the end wall, and align the plate mounting holes with the center of the end rafter.

2. Mark plate mounting hole locations and drill the holes. Use a 1/4" drill bit for the mounting holes.



NOTE: Do not position the mounting plate in a location where purlins, clamps, or other frame components will interfere with the installation of the drop-down panel components. *The drive pipe mounting clamps are installed on the underside of the rafters inside the frame*.

3. Using the 1/4" x 4" carriage bolts and 1/4" nuts, temporarily secure the plate to the outside of the end wall.

4. With the plate in place, mark the location of the 2" drive pipe hole on the end panel, remove the mounting plate, and cut the hole for the drive pipe.

   NOTE: If the end wall is covered with a fabric panel, use a utility knife to cut a small X through the panel within the 2" hole position and continue.

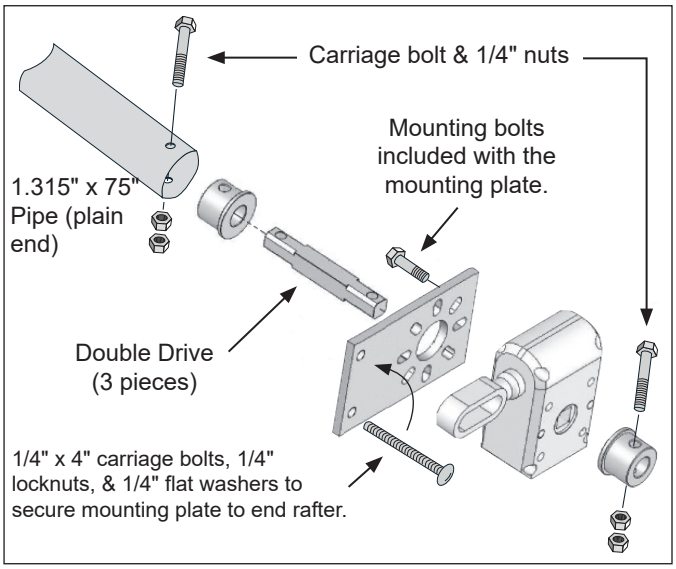
5. With the mounting plate attached to the end rafter, take the gear box and place it against the mounting plate at the desired angle.

6. Using a marker, trace the edges of the gear box to mark the desired angle on the mounting plate.

   NOTE: The gear box can be tilted when mounted to the plate to allow easier access when using the crank handle.

7. Set the gear box aside and remove the mounting plate from the end rafter

8. Using the diagram below and the marks made in Step 7, align and attach the gear box and assemble the remaining components as shown.



NOTE: Attach the plain end of the 1.315" x 75" swaged pipe to the double drive hub. Actual components may differ slightly from those shown in the diagrams.

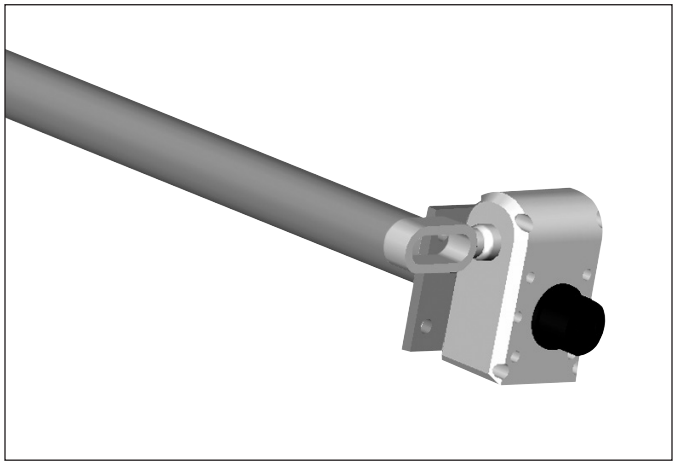
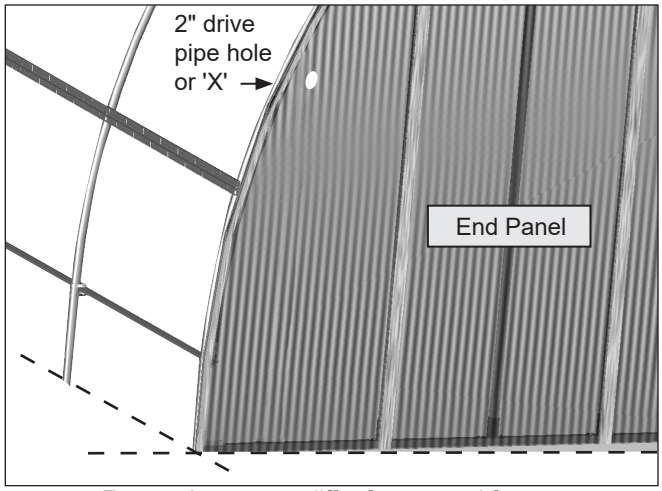


Diagram shows the assembled components. Insert the 1/4" x 4" mounting bolts into the mounting plate before mounting the gear box if box will block the holes.

Actual position of gear box on plate may differ.

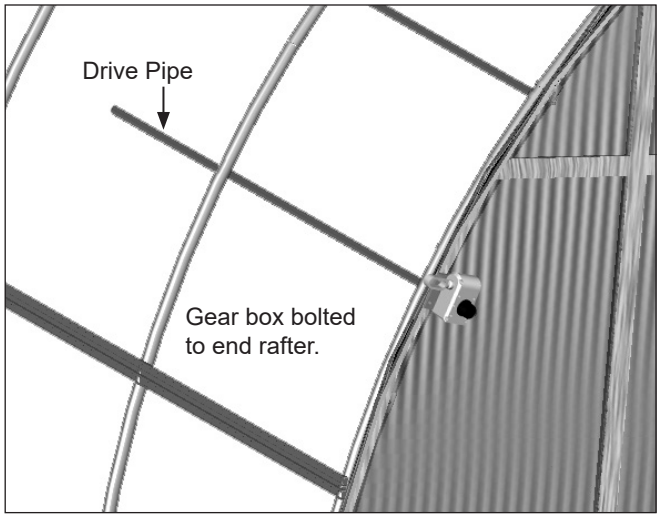
INSTALL THE DROP-DOWN SIDES (continued)

9. Carefully lift the assembly and insert the tapered/free end of the 1.315" x 75" swaged pipe through the 2" drive pipe hole, or 'X', in the end panel.



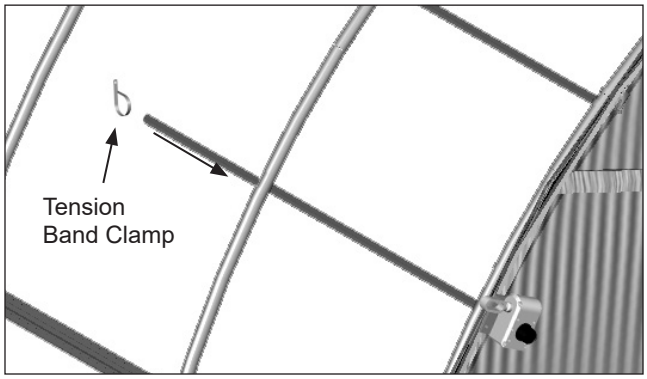
Frame shown may differ from actual frame.

10. Align the plate mounting holes with the mounting holes drilled in the end rafter (Step 3) and reattach the mounting plate using two 1/4" x 4" carriage bolts, 1/4" lock nuts, and 1/4" flat washers.

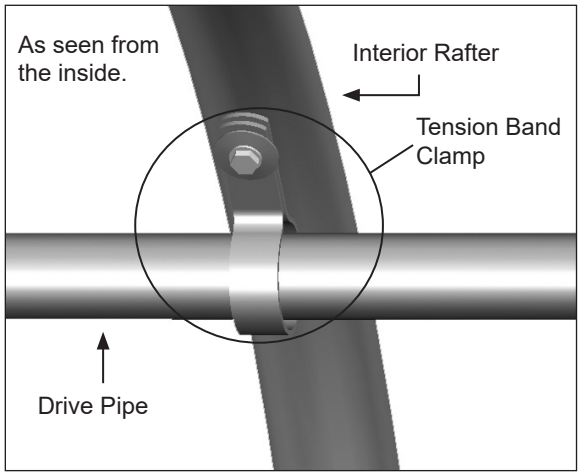


NOTE: Cover is not shown in the above diagram. Diagram shows gear box mounted to the end rafter on the outside of the end wall cover.

11. Move inside the frame and slide a tension band clamp over the tapered end of the 1.315" x 75" swaged pipe.

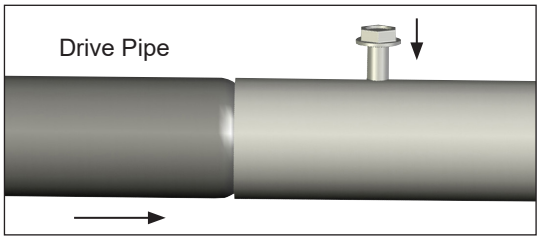


12. Verify that the pipe is level and secure the band clamp to the underside of the second rafter using a #14 x 1" Tek screw. Pipe should remain loose in the band clamp.



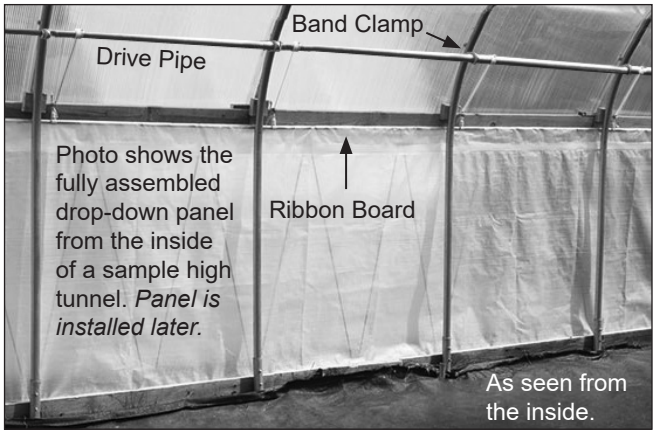
Band clamps support the drive pipe at each rafter except the end rafter where the gear box is mounted.

13. Take a section of 1.315" x 75" pipe, attach it to the first, and secure the connection using one Tek screw.



14. Slide another band clamp onto the tapered/swaged end of the conduit, level the conduit, and secure the band clamp to the underside of the next rafter.

15. Continue adding conduit and band clamps and work toward the other end of the frame. Verify that the drive pipe remains level throughout the length. *Attach one band clamp to the inside of each rafter.*



16. Select the final section of plain pipe (1.315" x XX where XX represents the length needed to reach the end of your building. Consult side profile diagram for pipe identification.) **Reference enlarged photo at the back of these instructions for clarity.**

INSTALL THE DROP-DOWN SIDES (continued)

NOTE: To prevent damage to the end panels, *do not allow the free end of the drive pipe to touch the inside surface of the end wall. Trim pipe if needed. Drive pipe must turn freely in the band clamps.*

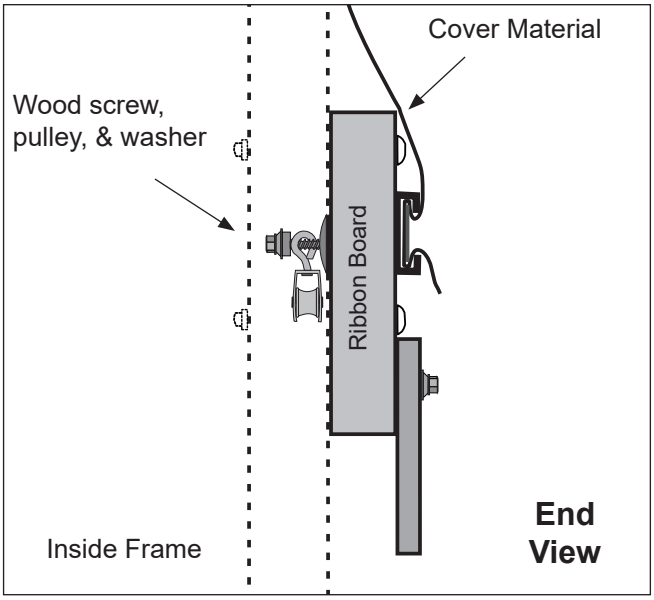
17. After installing all sections of drive pipe for the first drop-down panel assembly, verify that the drive pipe is level and that each conduit splice is secured with a Tek screw (Step 14).
18. Move to the gear box and test the assembly using the crank handle.

    NOTE: The assembled drive pipe should turn freely throughout the length of the frame. Adjust the band clamps as needed. Reposition clamps and screws if these prevent smooth operation of the drive pipe.
19. Repeat the procedure to assemble and attach the gear box and drive pipe *to the other side of the frame.*
20. Continue by preparing and attaching the drop-down panels to the frame and drive pipe of both drop-down assemblies.

ATTACH DROP-DOWN PANEL PULLEYS

Locate these parts:

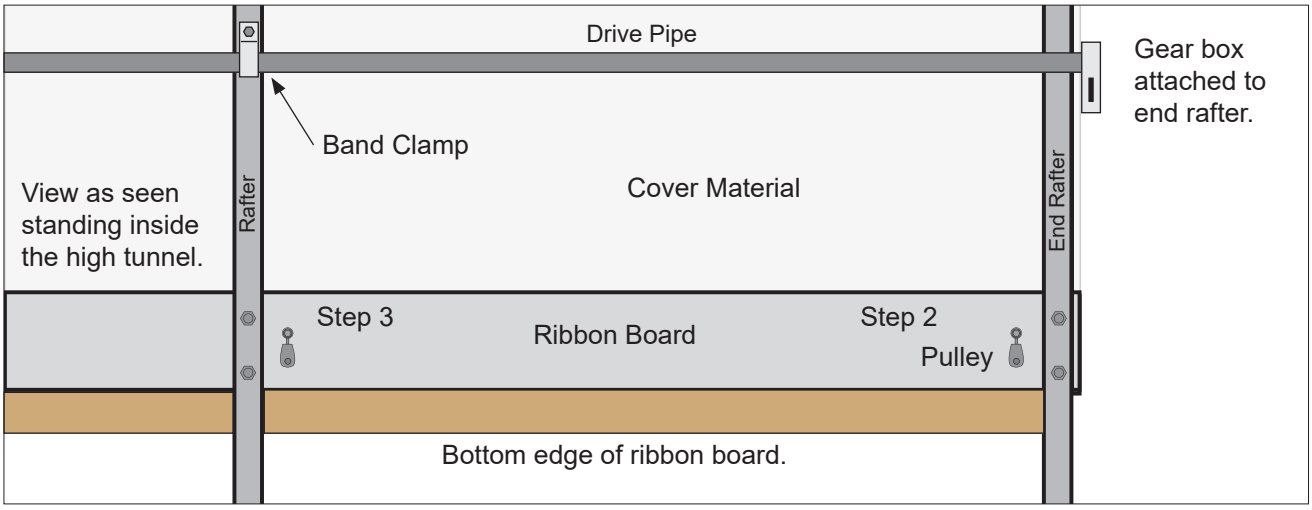
- 1.315" x 75" swaged pipe conduit and 1/4" panel rope
- Wood Screws and steel pulleys
- Duct tape
- Drop-down panel



Continue with the steps that follow:

1. Gather the pulleys and the same quantity of wood screws and move inside of the high tunnel.
2. Position the first pulley against the ribbon board approximately 2"-4" from the end rafter where the gear box is attached.

   NOTE: Pulley should hang freely from the wood screw. *Do not overtighten the screw. See diagram above.*
3. Move to the next rafter and repeat the steps to install another pulley. *Install one pulley for each rafter along each side.*



4. Continue attaching pulleys to the ribbon board *next to each rafter* until all pulleys are installed *along both sides of the high tunnel*.
5. Install the panel conduit and attach ropes as described in the next procedure.

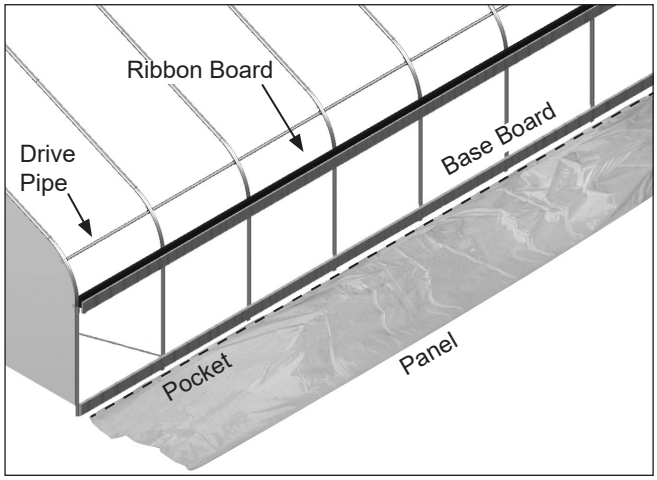
INSTALL PANEL CONDUIT AND ATTACH ROPE

After installing all pulleys, locate the drop-down panels, 1.315" x 75" swaged conduit, 1/4" rope, wood screws, and duct tape.

Complete these steps:

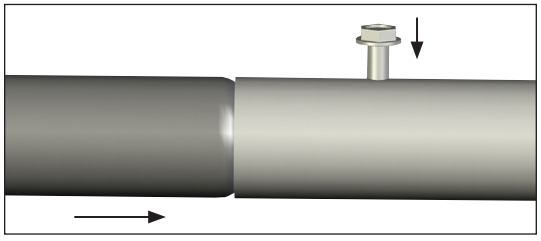
1. Unfold the panel along one side of the frame and position the conduit pocket along the baseboard.

   Panel is longer than the length of the assembled frame. Panel can be trimmed to the desired length before or after installation depending on preference.



   NOTE: Dashed line shows where to position the pocket of the panel.

2. Take one 1.315" x 75" swaged conduit and insert the plain end (not the tapered end) into the panel pocket.
3. With the first conduit section in the pocket, add another conduit to the first (plain end over tapered/swaged end), secure joint using an #14 x 1" Tek screw, and tape the conduit joint using duct tape.



4. Continue adding conduit sections and taping each joint until the conduit is as long as the panel.
5. Complete the panel conduit installation by cutting the conduit so that it extends from the panel pocket as desired.
6. Align the panel and the installed panel conduit with the end rafters of the frame.



7. Position the panel conduit at the base of the baseboard along the outside of the frame.
8. Measure the distance *from the panel conduit up to the drive pipe* mounted to the frame and add 12" to ensure that the rope length is sufficient.

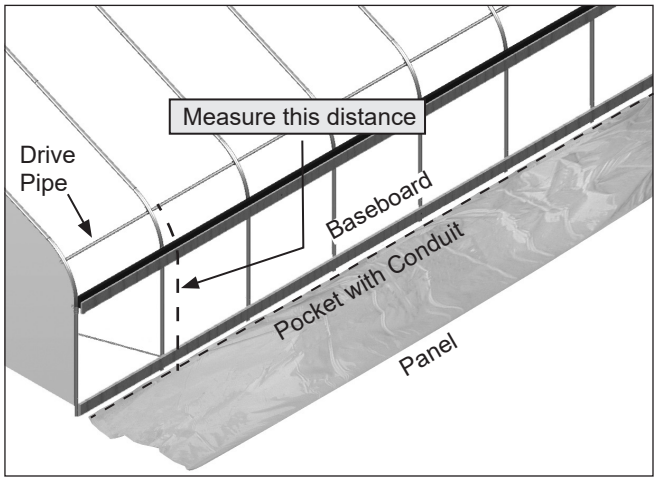
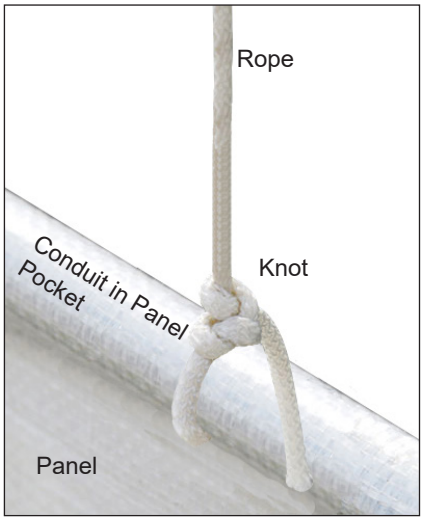


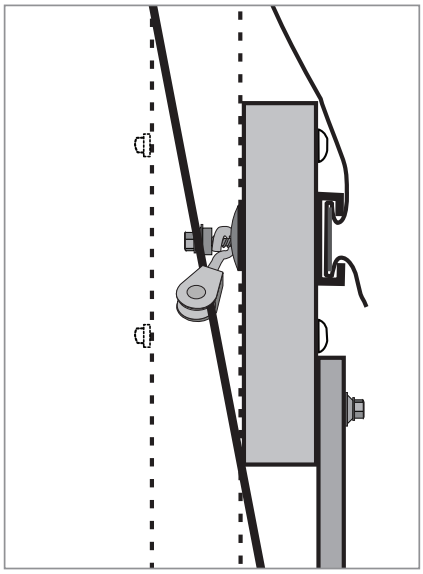
Diagram above shows where to measure to determine rope length.

INSTALL THE DROP-DOWN PANEL (continued)

9. Locate the 1/4" panel rope and cut a section of rope to the length determined in the previous step.
10. Beginning at one end of the frame, move to the panel conduit in the panel pocket, and make a small cut in the material *below* the conduit and in line with a pulley.
11. Insert the end of the rope through the opening in the panel and tie the rope to the conduit.



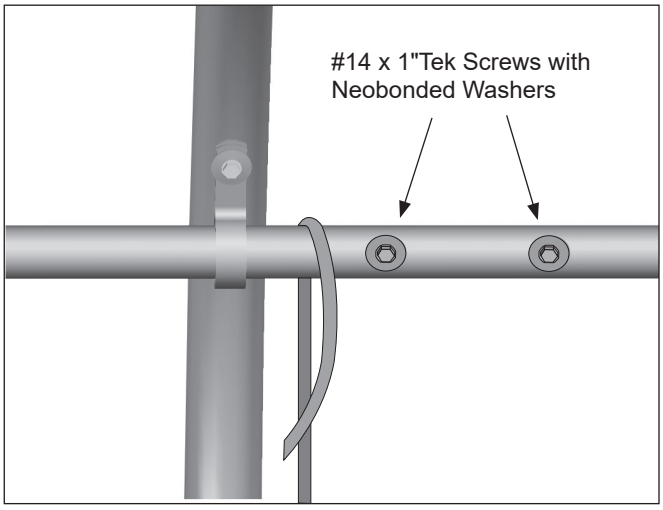
12. Take the free end of the rope, thread it through the pulley, *wrap it over and around the drive pipe,* and temporarily tie it to the drive pipe.



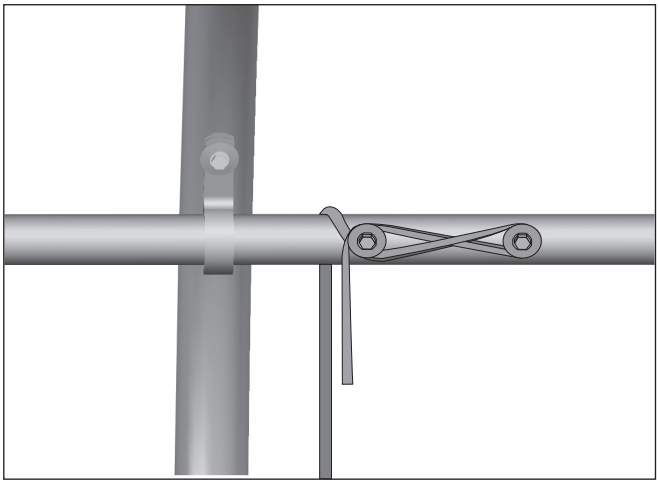
NOTE: Verify that the rope is properly aligned with the pulley and with the other end of the rope tied to the panel conduit.

The rope must remain aligned for proper panel operation.

13. Drive two (2) #14 x 1" Tek screws with neobonded washers into the drive pipe where the rope is located. *Do not fully seat the Tek screws to the conduit.* Allow space to remain between the washer and conduit.



14. Verify that the panel conduit remains against the baseboard and pull the slack from the rope.
15. Weave the roped around the Tek screws as shown and tighten the screws to secure the rope to the drive pipe.

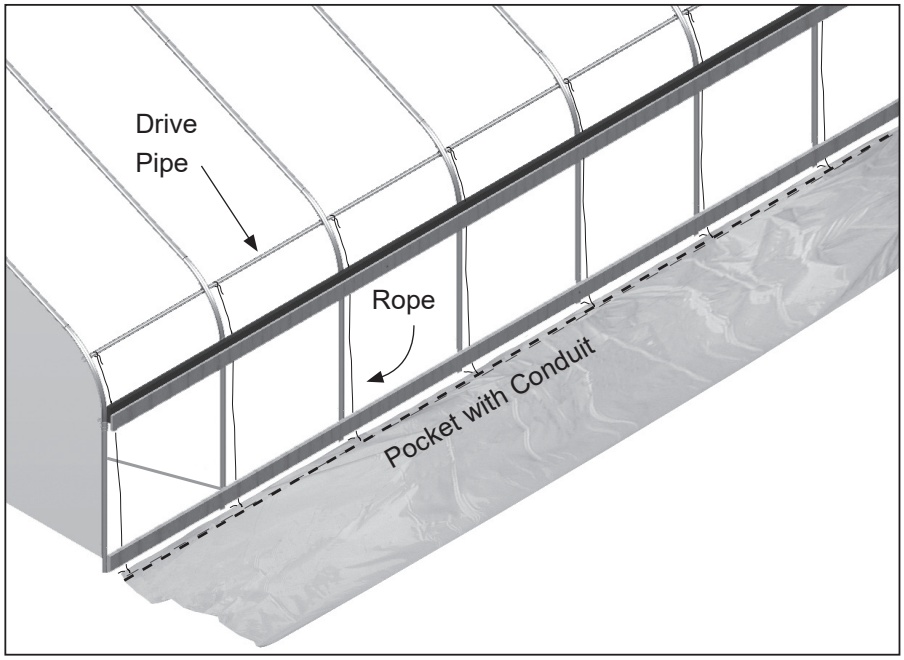


16. Move to the next pulley position and repeat the steps to measure, cut, and attach another rope to the panel and drive pipe.

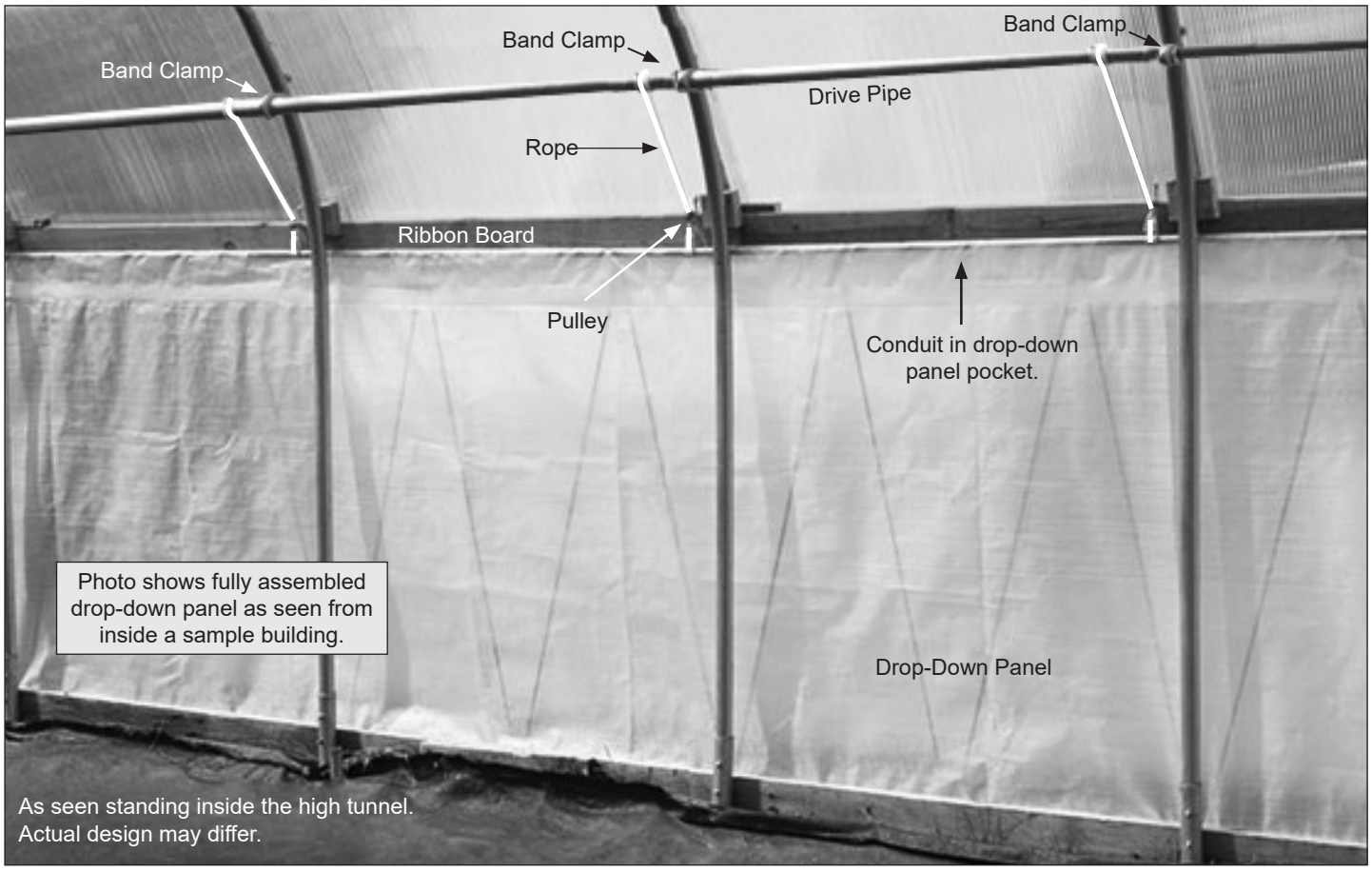
    ATTENTION: If the rope length was correct for the first, cut additional ropes to the same length. To ensure that the panel remains level during operation, verify that additional ropes are wrapped around the drive pipe in the same direction as the first rope. Continue this pattern for all remaining rope-to-drive pipe connections.

INSTALL THE DROP-DOWN PANEL (continued)

17. Repeat the above steps until all ropes are attached to the first panel along one side of the high tunnel.



ATTENTION: Diagram shows ropes attached to the panel conduit and to the drive pipe. Dashed line shows the position of the panel conduit. Photo below shows the inside view of an installed drop-down panel with all ropes attached and the panel closed. Actual high tunnel differs from the example shown.



18. Continue by attaching the lower panel edge to the baseboard for the first panel installation.

ATTACH LOWER EDGE OF PANEL TO BASEBOARD

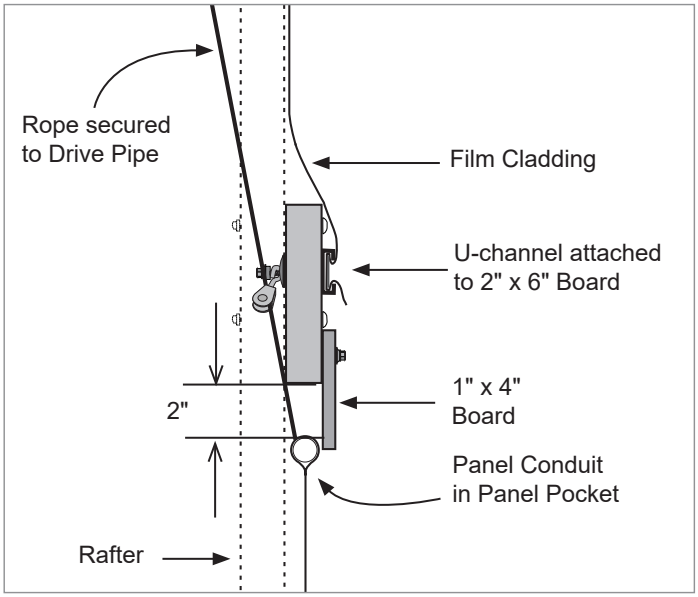
Use customer-supplied dimension lumber as a retaining board for the lower edge of the panel.

The retaining board must be ***at least 1" x 2"*** to adequately secure the panel to the baseboard. See the diagram below for an example.

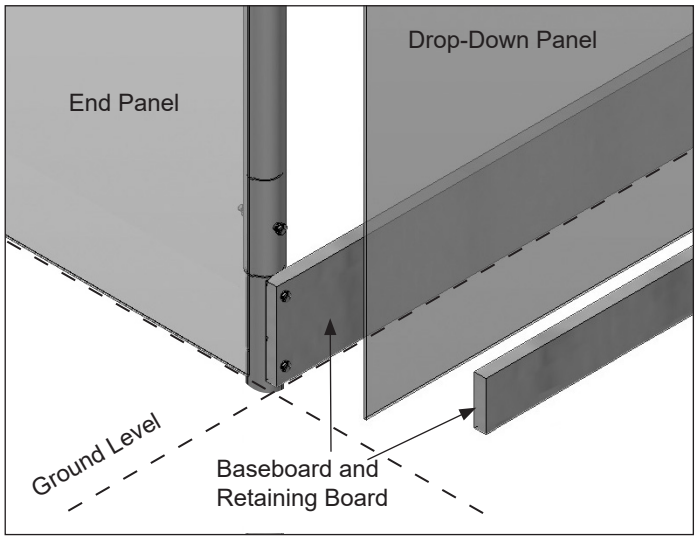
⚠ **CAUTION:** Do not attempt to attach the panel to the baseboard during stormy or windy conditions or when such conditions are expected.

Complete these steps to attach the lower edge of the panel to the customer-supplied baseboard.

1. Using the supplied-crank handle, roll the panel up to within 2" of where it will seat into the channel created by the ribbon boards.

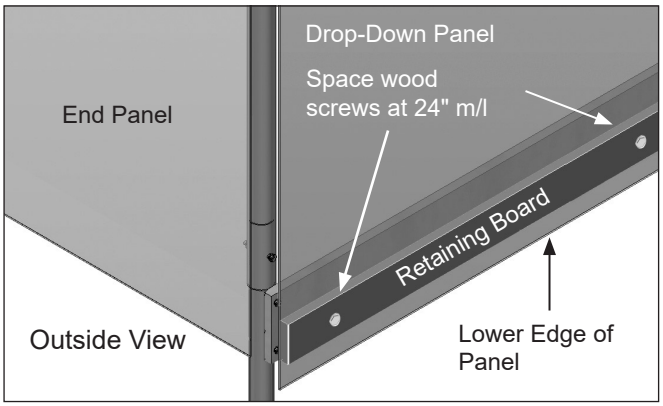


2. Move to the bottom of the panel and with assistance, evenly stretch the panel end-to-end along the baseboard.



3. Take the first section of customer-supplied retaining board and place it against the panel and the baseboard to hold the panel in position.

   NOTE: Evenly and gently pull the panel edge down to remove wrinkles. *Applying too much force may bend the panel conduit.*



4. Using the supplied wood screws, secure the retaining board to the baseboard as shown.
5. Repeat the steps to secure the remaining lower edge of the panel to the baseboard along the side.
6. Return to the gear box and check the operation of the drop-down panel using the crank handle. Adjust ropes as needed for a level panel.
7. Skip to and continue with the install of the anti-billow ropes--"INSTALL ANTI-BILLOW ROPES (ROLL-UP & DROP-DOWN SIDES" section--then return to this section and repeat the steps to attach the remaining drop-down panel.
8. Finally, install the anti-billow ropes for the remaining side.

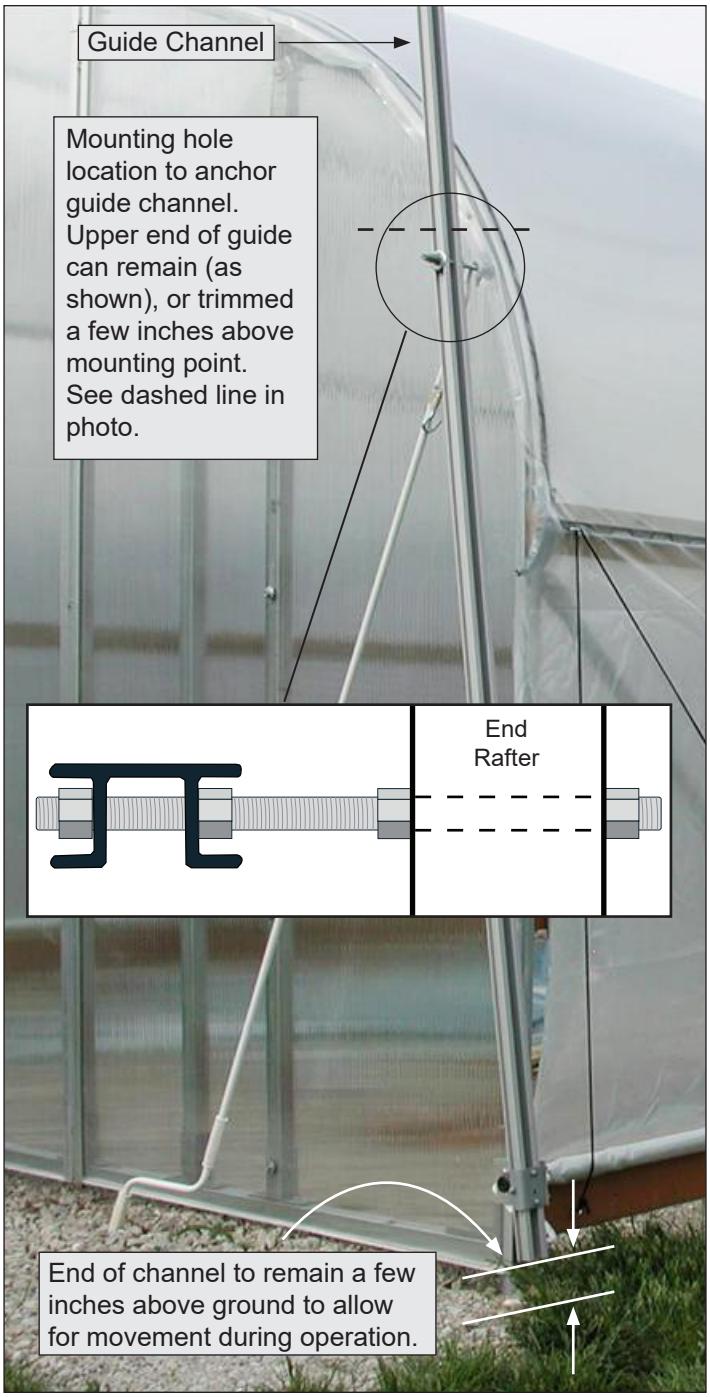
Diagrams may show a different frame and panel assembly.

ROLL-UP SIDES — ASSEMBLY & INSTALLATION

TWIST-OF-THE-WRIST ASSEMBLY

Complete these steps:

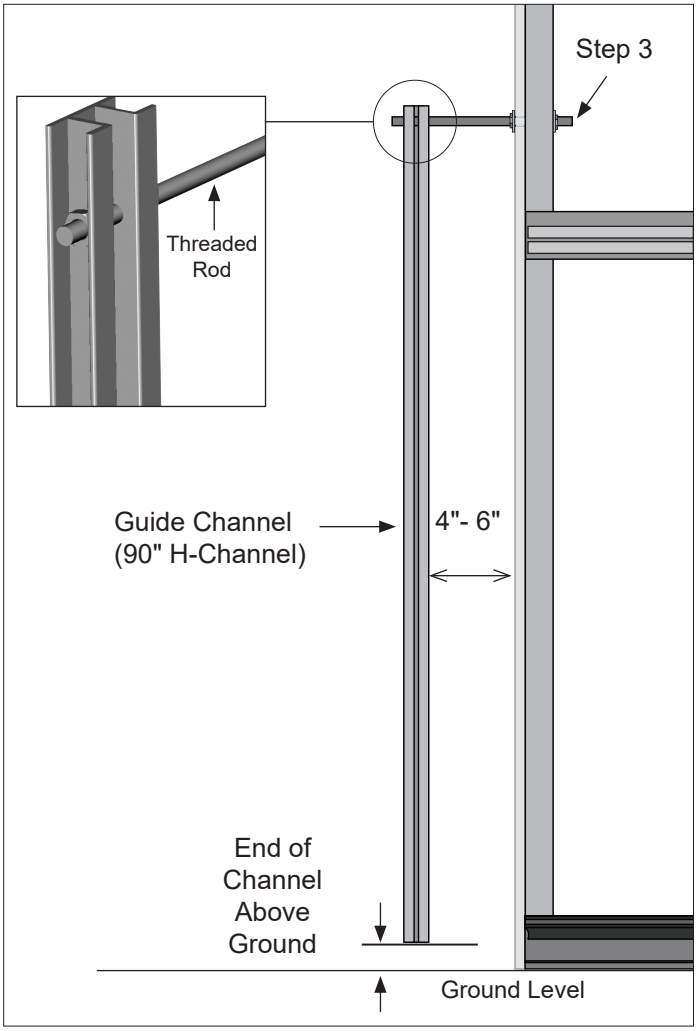
1. At building end where roll-up gear box will be located, take one guide channel (90" H-Channel) and use it to mark mounting hole location. See photo below. Excess channel length above threaded rod is removed later.
2. After marking hole position, drill a 3/8" hole through *end panel and end rafter*. See diagram (lower left).



Gather the parts:

- Aluminum channel (90" H-Channel) and drive handle
- Gear box and double drive
- Mounting plate, bearing, and 3/8" threaded rod
- 3/8" nuts and 3/8" washers

3. Next, insert 3/8" threaded rod through mounting hole and attach using a 3/8" nut and washer on each side. Tighten. *Install so most of the rod extends outside high tunnel.*
4. Place guide channel in position and mark where threaded rod end meets channel.



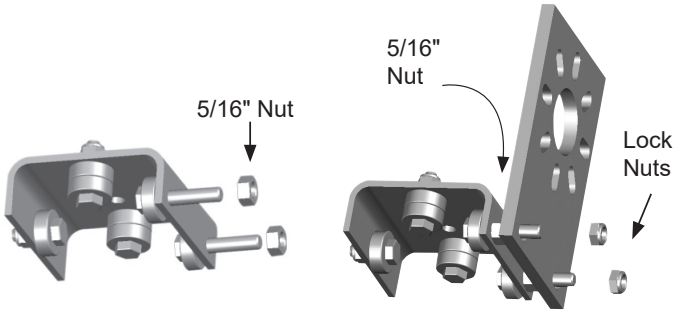
ATTENTION: Lower end of channel will "float" slightly above ground when installed at correct height. Lower end is not anchored. *Do not allow channel end to contact ground.*

5. Drill 3/8" hole through guide channel and secure using 3/8" nut on each side. ***Do not tighten at this time.***
6. Continue with next procedure.

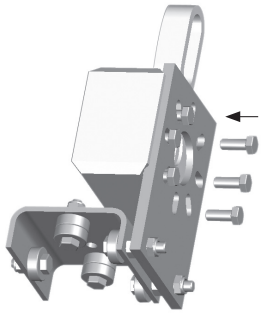
ROLL-UP SIDES — ASSEMBLY & INSTALLATION

ASSEMBLE BEARINGS AND GEAR BOX

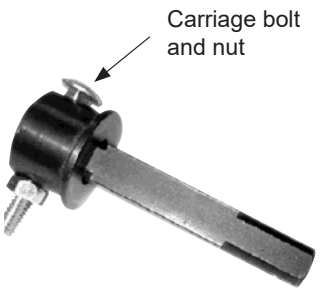
1. Select bearing assembly and slide mounting plate over the long bolts and secure plate using lock nuts (included with bearings).



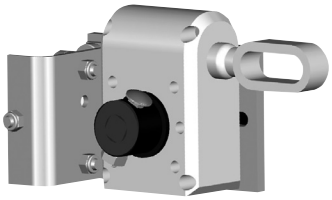
2. Attach gear box to mounting plate using hex head bolts. *Gear box can attach to either side of flat mounting bracket.*



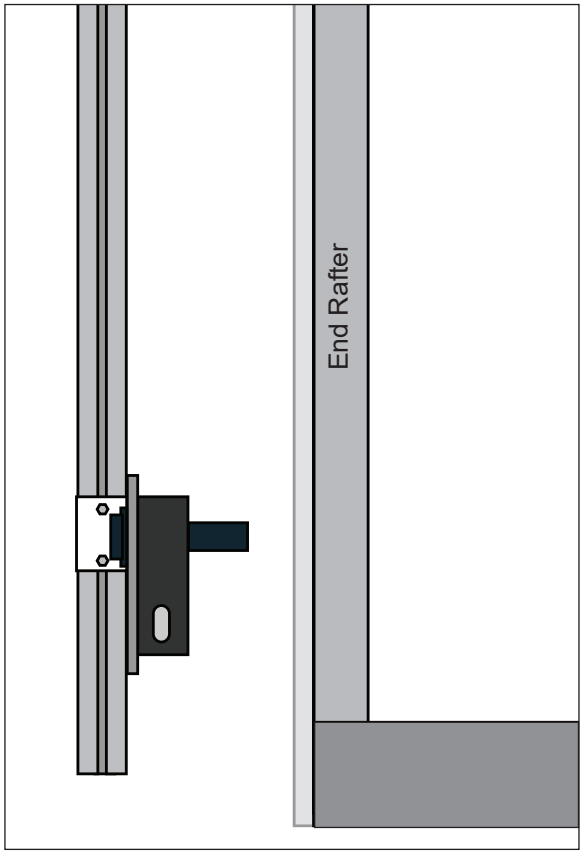
3. Using a 1/4" x 2" carriage bolt and 1/4" nut, attach square shaft to a tubing adapter.



4. Slide square shaft through the Twist-of-the-Wrist gear box.



5. Slide the gear box assembly onto the aluminum channel — ground end. (This is the free end of channel opposite the threaded mounting rod.)

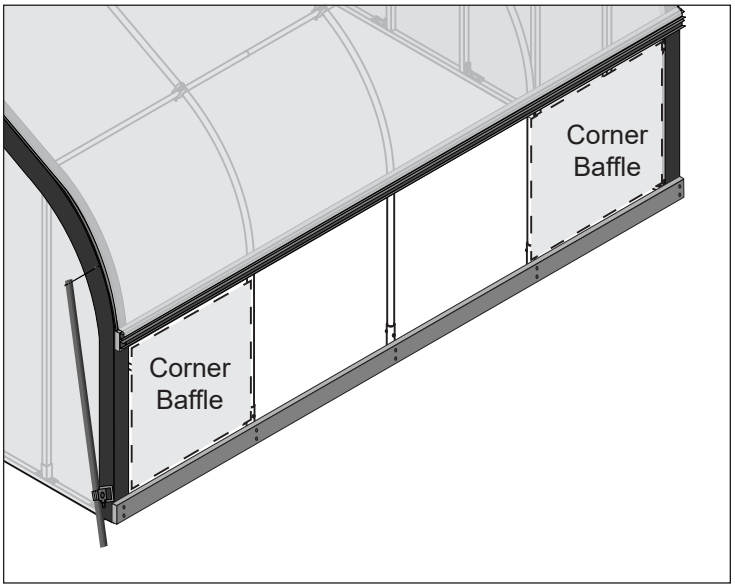


6. Repeat for the remaining side.
7. Continue with next procedure.

INSTALL CORNER BAFFLES FOR ROLL-UP SIDES ONLY

ATTENTION: SKIP THIS SECTION IF YOUR HIGH TUNNEL INCLUDES DROP-DOWN SIDES.

If you do not want corner baffles installed, skip this section and continue with the next page. Corner baffles for roll-up sides can be installed later; however, it is easier to install before installing roll-up panels and the anti-billow ropes.

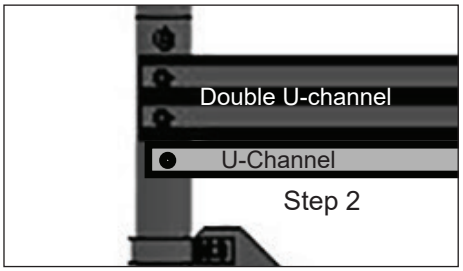


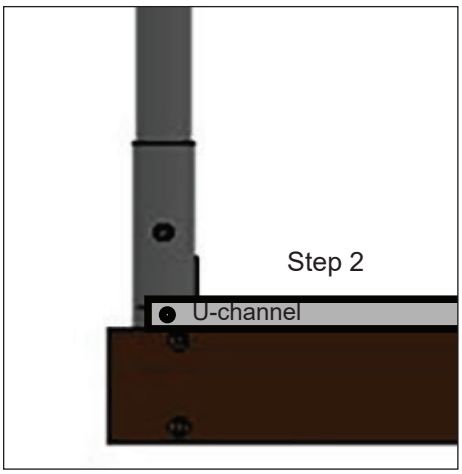
REQUIRED PARTS:

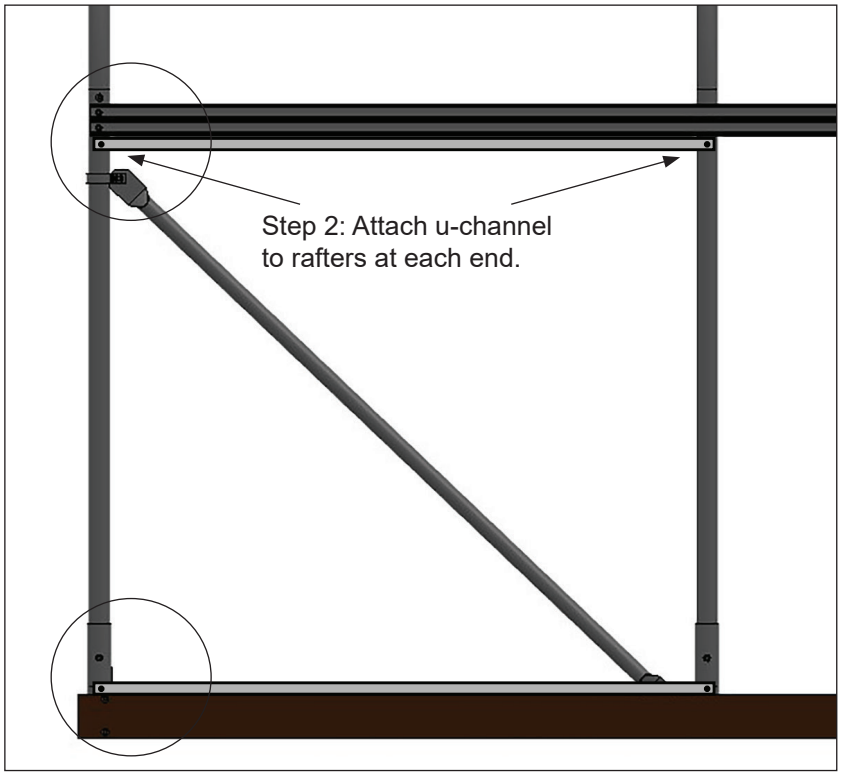
- Single U-channel
- Poly-Coated Spring Wire
- 6' Wide 6 MIL Film
- #14 x 1" Tek Screws

Complete these steps to install a baffle at each corner of the assembled frame.

1. Locate three (3) pieces of single u-channel, additional spring wire, and the roll of 6 mil film.
2. At one corner, cut and attach the single u-channel to the end rafter and first interior rafter as shown. Install these horizontal runs of single u-channel above the baseboard and below the double u-channel.

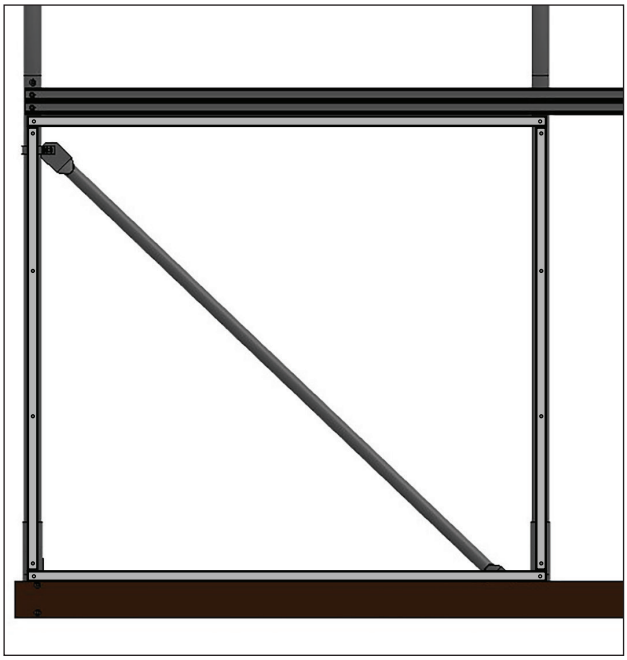






INSTALL CORNER BAFFLES (continued)

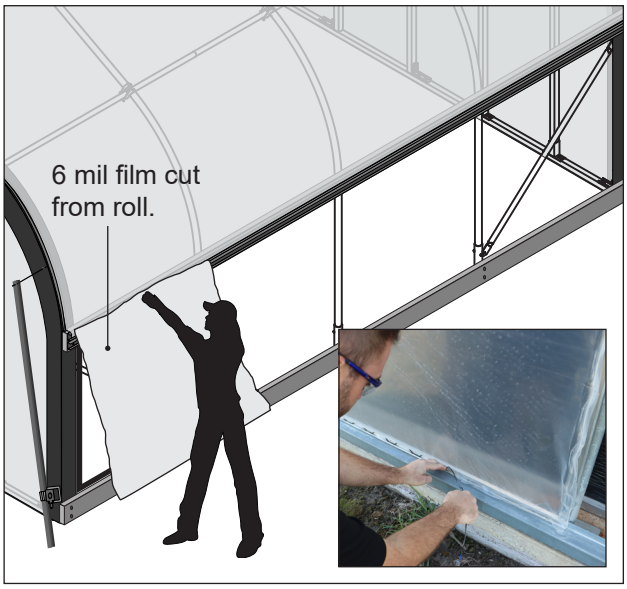
3. Measure the distance between the upper and lower single u-channel installed in Step 2. Cut two additional u-channel sections to this length and attach these vertical runs to the end rafter and interior rafter. *Space #14 x 1" Tek screws approximately 12" on-center.* ***Vertical channel runs may consist of multiple small lengths of available u-channel.***





4. Take the roll of 6 mil film and cut a piece to cover the end bay opening framed by the single u-channel. Roll out the film and measure length to determine the best way to cut the film. You need four (4) identical panels from the film roll.

5. With assistance, secure the film panel in the u-channel using the wire spring.





6. Trim the film as needed and repeat the steps to install all remaining corner baffles.

7. After installing all baffles, continue with the next procedure.

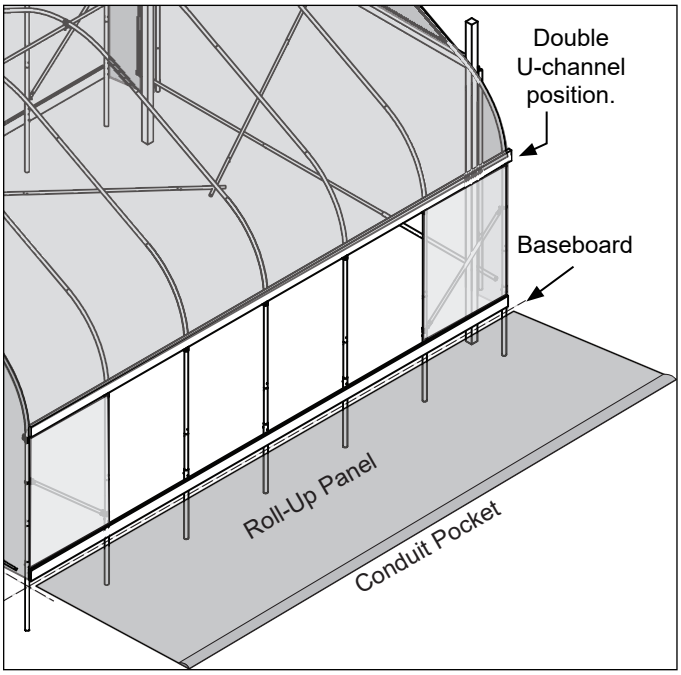
ROLL-UP SIDES — ASSEMBLY & INSTALLATION

CAUTION: **Risk of Injury**
Always wear eye protection when installing the spring!

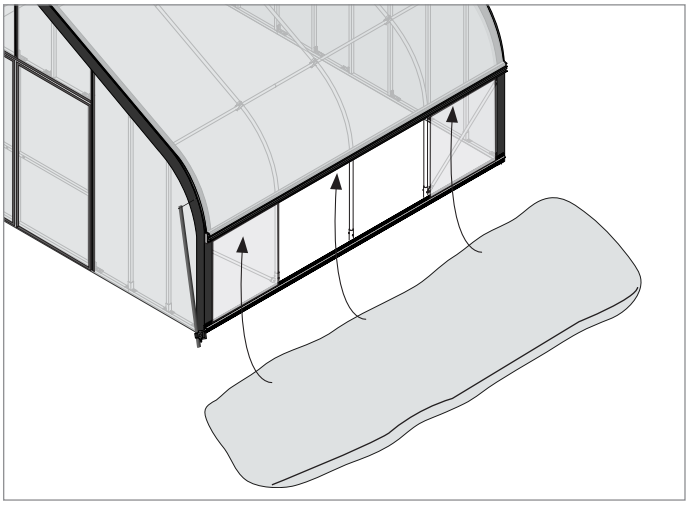
INSTALL ROLL-UP SIDE PANELS

Complete the following steps:

1. Locate a roll-up side panel and roll it out along the side of the frame. Position the pocket of the panel away from the frame. See diagram below.
2. Stretch the panel and center it from end-to-end.

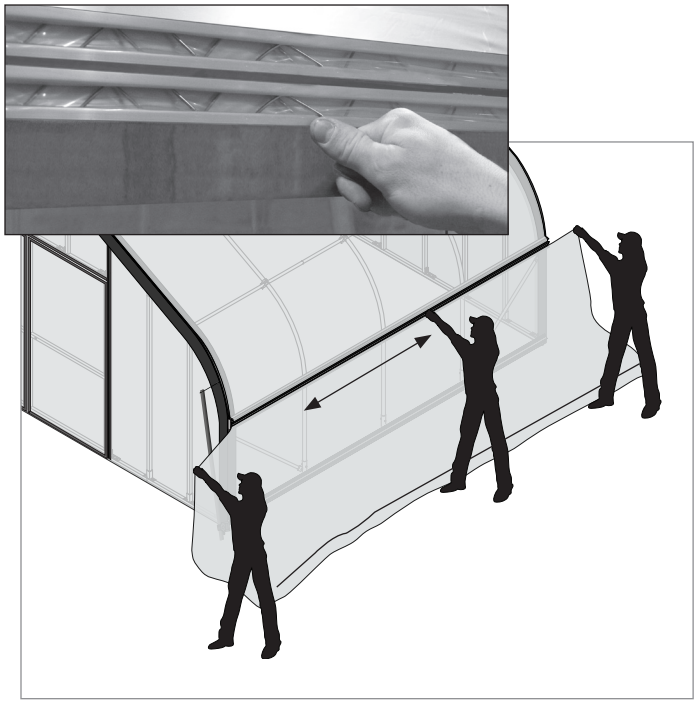


3. With assistance, lift the panel (no pocket) edge up to the lower channel of the double u-channel.

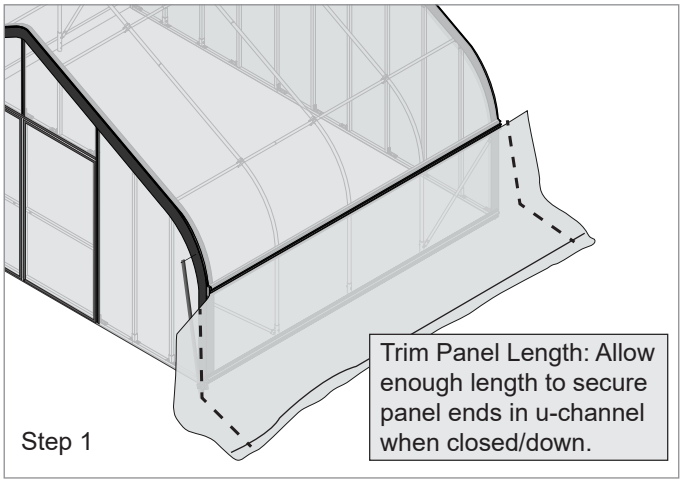


NOTE: Keep panel centered and stretched during this step.

4. Secure panel in the lower channel using the u-channel spring.



NOTE: Begin at one end of the u-channel and work toward the other. Verify that the panel is centered on the frame. Roll-up panels are longer than the frame.



5. Trim panel so it is a few inches longer than the frame.
6. With the top edge secured, spread the free/loose edge of the panel (with pocket) out so that it hangs down evenly from the u-channel.
7. Continue with the following roll-up procedures to finish the installation.

ROLL-UP SIDES — ASSEMBLY & INSTALLATION

ASSEMBLE THE ROLL-UP SIDE CONDUIT

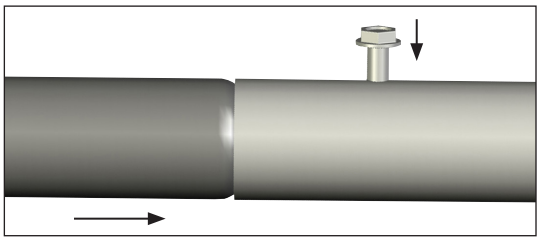
Gather the parts:

- Pipe 1.315" x 75" swaged
- #14 x 1" Tek screws

The roll-up side conduit assembly slides into the panel pocket. This assembly runs the length of the frame and serves as the center pipe that the panel wraps around when is open to ventilate the high tunnel.

Complete these steps to assemble the roll-up side conduit.

1. Locate all sections of 1.315" x 75" swaged pipe needed to assemble the conduit. Consult the Side Profile diagram in the Quick Start section for details.
2. Insert the swaged end of a pipe into the plain end of another pipe.
3. Secure the pipe joint using a #14 x 1" Tek screw and tape over the screw using duct tape.



4. Slide the conduit into the panel pocket and repeat steps 2-3 until the conduit is assembled.
5. Allow approximately 12" to extend from the pocket at the end of the panel where the gear box will be located. Pipe is trimmed to length once the twist-of-the-wrist assembly is installed and used as a guide.

   ATTENTION: *Consult the Twist-of-the-Wrist Assembly procedure on the next page for diagrams that show an assembled roll-up side.*

6. Continue with the procedure that follows to attach the conduit to the roll-up side panels using fabric clips.



Fabric Clip

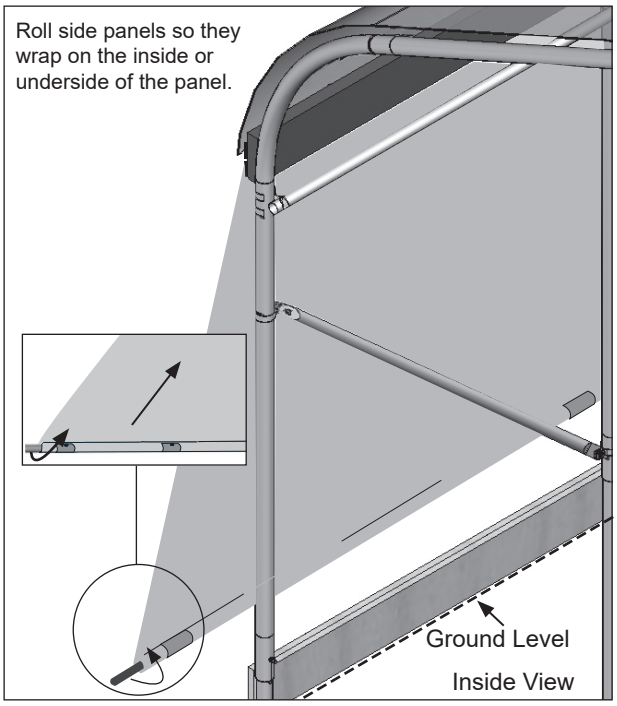
ATTACH CONDUIT TO ROLL-UP SIDE PANEL

Gather the parts:

- Fabric clips (One for each rafter position.)
- #14 x 1" Tek screws

To this point, the roll-up side panel is secured to and hanging down from the aluminum u-channel. The assembled roll-up conduit is in the panel pocket.

1. Using one fabric clip at each rafter and #14 x 1" screws, secure the panel to the conduit.



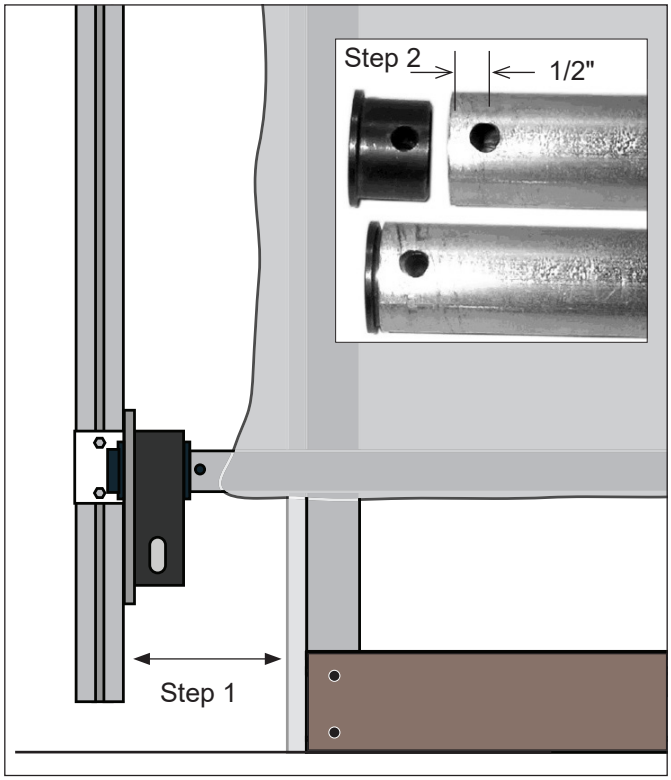
   NOTE: Twist the conduit in a direction that wraps the panel toward the inside of the frame. This allows water to drain off the roll-up panel.

2. Continue to roll the conduit until the excess panel is wound around the conduit and the lower edge is positioned at the base of the frame.
3. Temporarily anchor the conduit and panel to the frame or ground *and repeat the steps to complete the installation of the roll-up side panel for the remaining side of the building up to this point*.

   A**TTENTION: IF THERE IS A CHANCE THAT WIND WILL LIFT THE PANEL DURING THE NEXT PROCEDURE, SKIP TO AND COMPLETE THE "INSTALL THE ANTI-BILLOW ROPE" STEPS THEN RETURN TO AND COMPLETE THE TWIST-OF-THE-WRIST STEPS THAT FOLLOW.**

4. Continue with the installation of the Twist-of-the-Wrist components for the roll-up sides.

ROLL-UP SIDES — ASSEMBLY & INSTALLATION



ATTACH ROLL-UP CONDUIT TO GEAR BOX

Complete these steps:

1. Using threaded rod and adjusting nuts, adjust position of channel so roll-up conduit can attach to gear box. Cut the conduit to length if needed.
2. Drill a 5/16" hole through roll-up conduit 1/2" from end that attaches to gear box. Insert tubing adapter into conduit and align holes.
3. Attach roll-up conduit to square shaft by inserting a 1/4" x 2" carriage bolt through hole. Add 1/4" nuts and tighten.
4. Test roll-up curtain assembly and ***roll panel to fully opened (upper) position***. ***Do not allow to remain in lower position at this time.***

   NOTE: ***DO NOT ROLL PANEL TO ITS CLOSED/ DOWN POSITION WITHOUT FIRST INSTALLING ANTI-BILLOW ROPES AS SHOWN IN THE NEXT PROCEDURE.***



5. Repeat steps to install remaining roll-up panel and Twist-of-the-Wrist assembly.
6. Once both assemblies are installed, install anti-billow rope as described in next procedure.

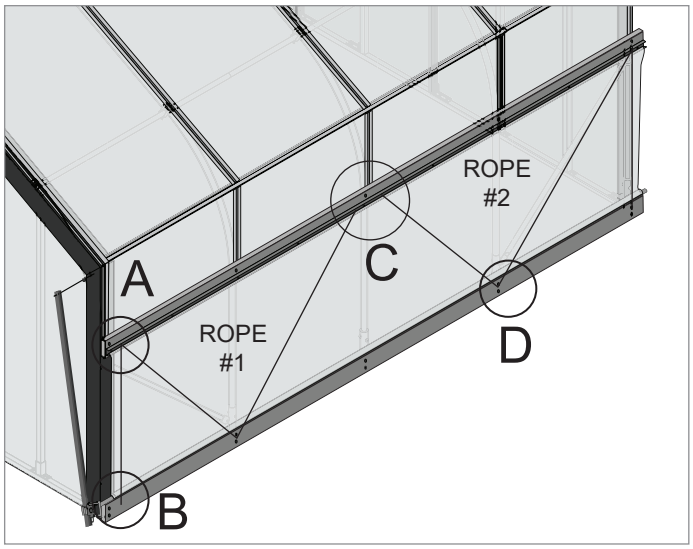
INSTALL ANTI-BILLOW ROPES (ROLL-UP & DROP-DOWN SIDES)

ANTI-BILLOW ROPE INSTALLATION

TO PREVENT DAMAGE AND POSSIBLE INJURY, INSTALL ANTI-BILLOW ROPES ***IN SHORT LENGTHS*** ALONG EACH SIDE. DO NOT INSTALL AS A SINGLE LENGTH TIED AT EACH END. DOING SO WILL RESULT IN A LOOSE SIDE PANEL IF SINGLE ROPE BREAKS. ***CONSULT THE SIDE PROFILE DIAGRAM FOR YOUR FRAME LENGTH IN THE QUICK START SECTION FOR ROPE PATTERN AND ROPE HOOK LOCATIONS.***

Follow these general steps to attach the rope hooks and install the anti-billow ropes:

1. Determine the location of rope hooks and the number of anti-billow ropes for each side using the Side Profile diagram in the Quick Start section for your frame length.
2. Attach the rope hooks using wood screws for wood and Tek screws for metal. Be sure to note where one rope stops and the next rope begins.
3. Take the 1/4" rope and install it in short lengths along each side. Pull tight to keep panels in place.
4. Test the operation of the roll-up or drop-down side.
5. Repeat to install the anti-billow rope for the remaining side once the panel is installed.
6. With all anti-billow ropes installed, continue with the next page.

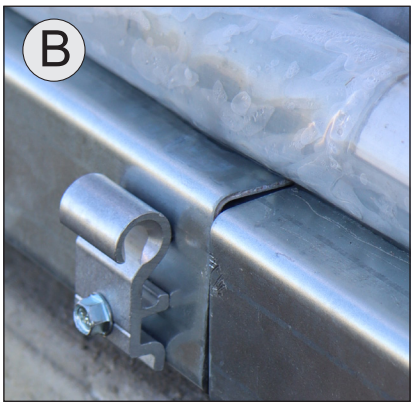












NOTE: In those instances when two ropes terminate at the baseboard or lower position (D), install the rope snaps and rope as shown in these photos.





INSTALL THE RIDGE VENT COVER (ADDITIONAL PURCHASE REQUIRED)

If you purchased the ridge vent kit for your HF model, continue with the steps below to compete the cover installation for the kit. ***Skip this section if you did not purchase the additional ridge vent kit.***

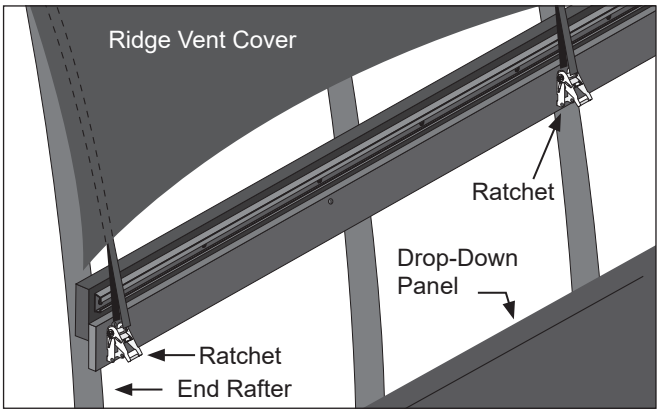
Gather the parts included with ridge vent kit:

- Cover with straps and 1" ratchets
- Customer-supplied fasteners: *Due to the different materials used for the ribbon board, the customer is responsible for supplying the required fasteners. Consult the advice of a qualified professional contractor if needed.*

  WARNING: *To prevent damage and injury, do not leave the cover unattended if it has not been properly secured.*

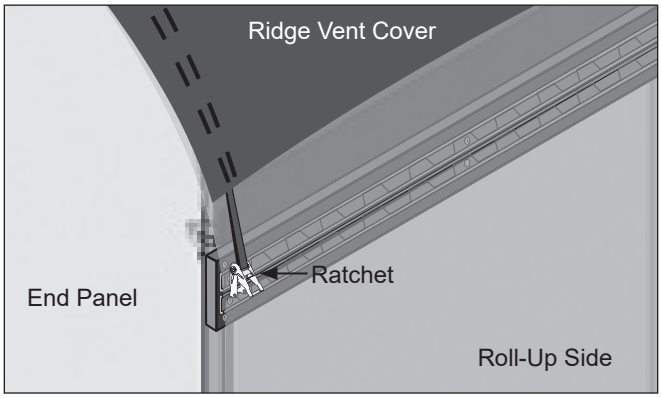
Complete the following steps to install the ridge vent cover.

1. Set ridge vent cover on top of the high tunnel, center the cover, and unfold in both directions toward the ribbon board attached along the sides of the frame.
2. Using the cover straps as a guide, attach two (2) 1" ratchets to the board as shown in the following diagrams.



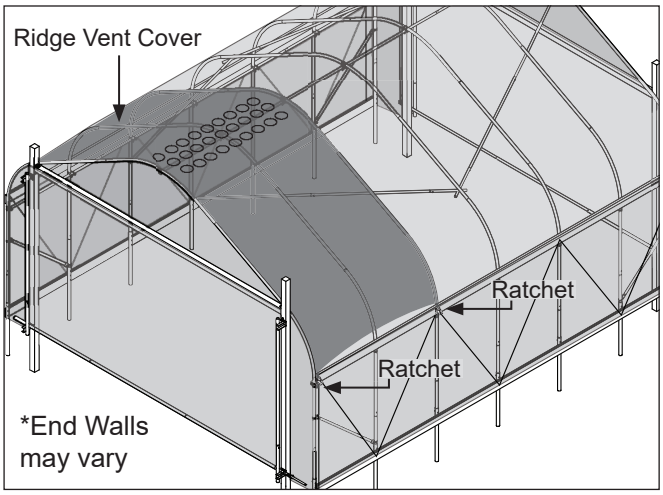
NOTE: Drop-Down Panel: Attach the ratchets to the ribbon board below the u-channel using customer-supplied fasteners.

Roll-Up Side Panel: Predrill through upper u-channel and ribbon board before attaching ratchets using customer-supplied fasteners.

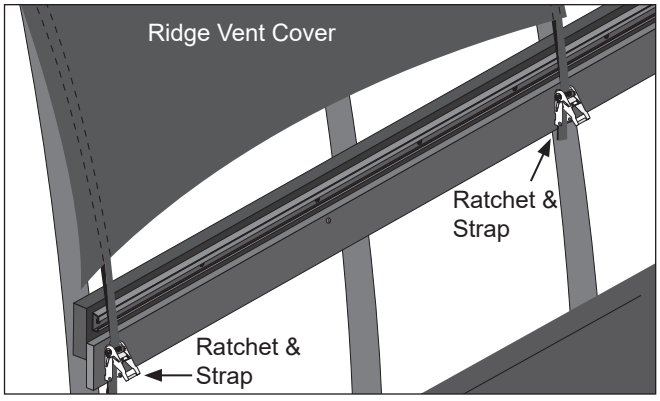


3. Install the remaining two (2) ratchets on the other side of the frame immediately across from the first ratchets installed in Step 2.

   Two (2) 1" ratchets are used on each side of the high tunnel to secure one ridge vent cover.



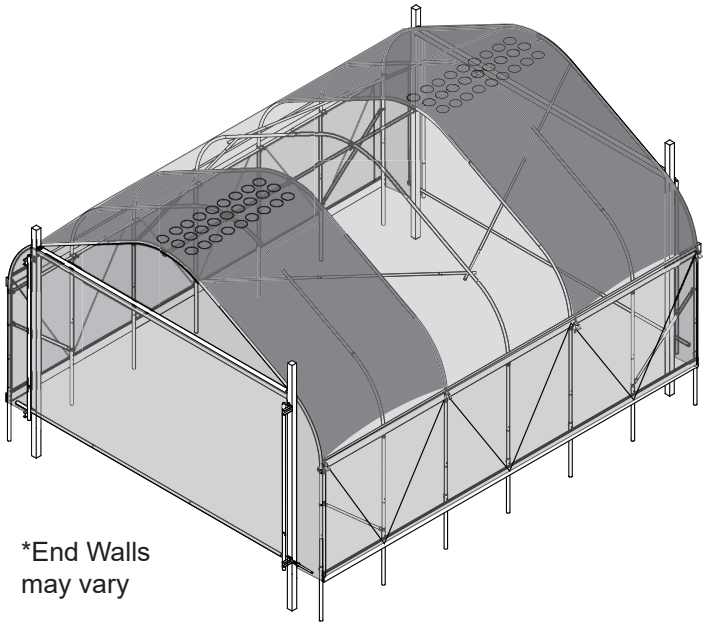
4. With assistants holding the strap ends along one side of the frame, feed the strap ends on the opposite side through the center slot in each ratchet. Operate the ratchet to wrap the strap onto the center hub just enough to keep the strap secure.



NOTE: Do not tighten completely at this time.

INSTALL THE RIDGE VENT COVER (continued)

5. Repeat the previous steps to secure the opposite side.



*End Walls may vary

Photo above shows an example of a high tunnel with the ratchets attached and the ridge vent cover secured.

6. After all side straps are in place and slightly tightened and the ridge vent cover is centered on the frame, tighten all ratchets evenly.

   NOTE: Edge of the vent cover will overlap the second rafter and will be snug against the main cover to keep in place.

7. Repeat steps to install additional ridge vent cover for the remaining end of the high tunnel. (Additional purchase required.)

8. Read the care and maintenance information that follows.

HIGH TUNNEL CARE AND MAINTENANCE

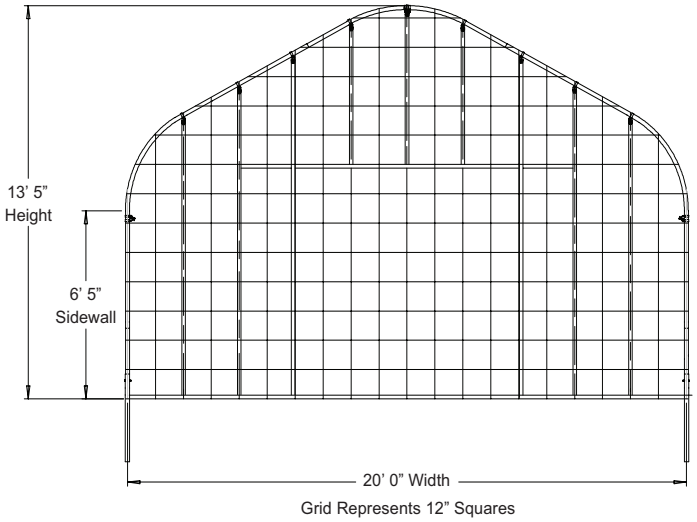
Proper care and maintenance of the high tunnel is important. Check the following items periodically to properly maintain the high tunnel:

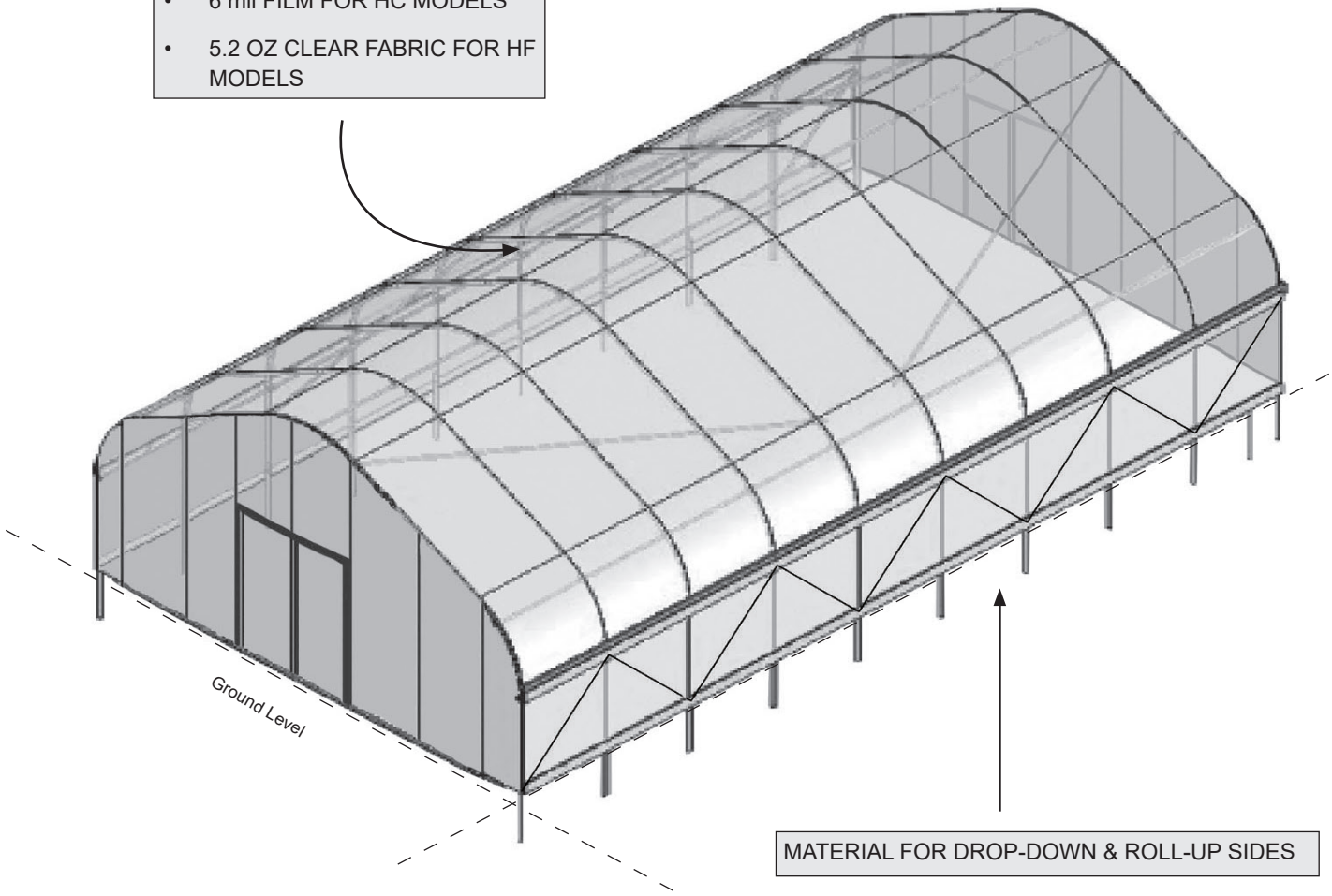
- Regularly check the cover or covers to see that these are tight and in proper repair. Tighten and adjust the tension as needed to prevent damage and wear.
- Check connections and all fasteners to verify that they remain tight and in good condition.
- Do not climb or stand on the high tunnel at anytime.
- Inspect the anchoring system to verify that all components remain tight and in good condition.
- Verify that the roll-up end panel components are in good working condition.
- Do not allow drop-down panel to remain in the down position for extended periods. Raise the panel to allow it to dry and for cleaning.
- Replace anti-billow rope immediately if worn or broken.
- Remove debris and objects that can accumulate on the high tunnel. Use tools that will not damage the cover when removing debris.
- Check the corner baffles periodically to ensure the film is tight and intact. Replace film when needed.
- Remove snow to prevent excess accumulation. Use tools that will not damage the cover when removing snow.
- Check the contents of the high tunnel to verify that nothing is touching the cover that could cause damage.
- If the high tunnel is dismantled and moved, inspect all parts and connections before using.
- Depending on the contents, construction of the high tunnel, high tunnel materials, and location, the potential for condensation exists. GrowSpan™ offers several items that can be used to alleviate a condensation condition. Please contact a GrowSpan™ representative for additional information.
- For replacement or missing parts, call 1-800-245-9881 for assistance.

GROWspan™
greenhouse structures

QUICK START GUIDE

20' Gothic Premium High Tunnels

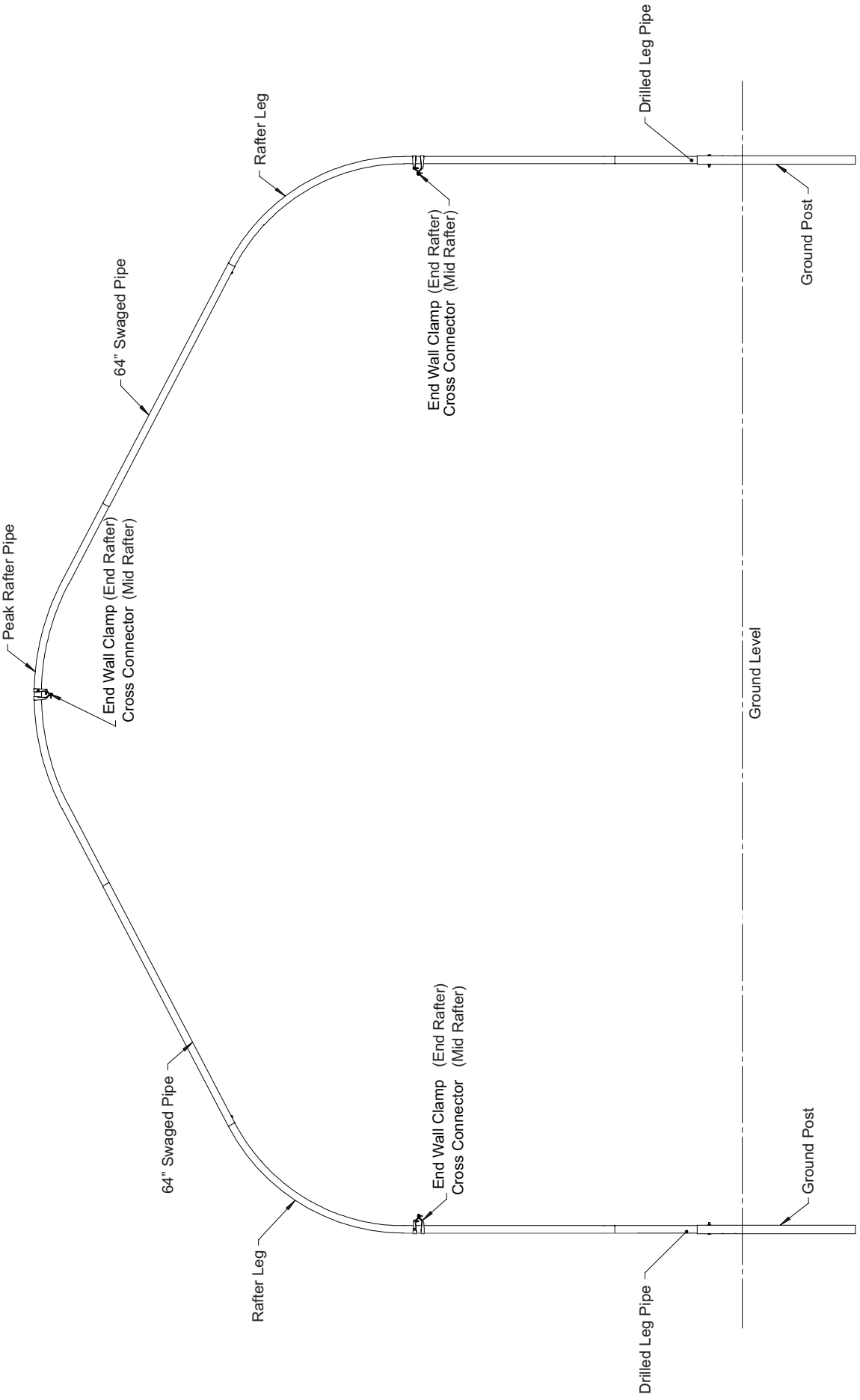




MATERIAL IDENTIFICATION DIAGRAM

Frame shown may differ in length from actual frame.

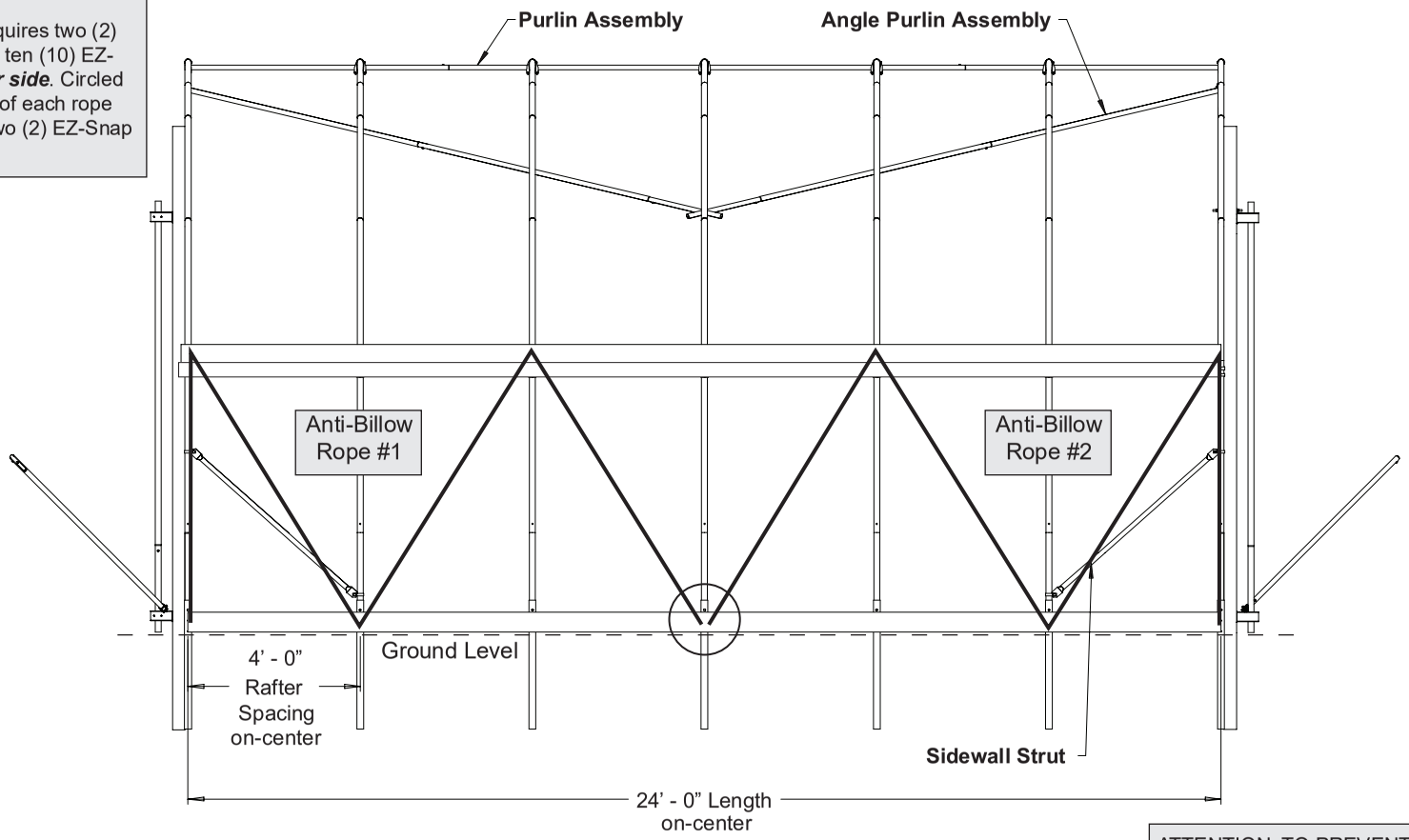
FRONT PROFILE



SIDE PROFILE - 108179H

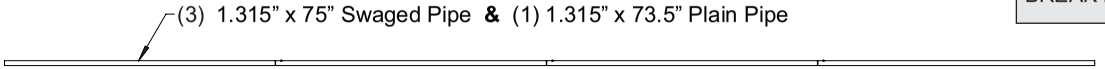
ANTI-BILLOW ROPES PER SIDE

This frame length requires two (2) anti-billow ropes and ten (10) EZ-Snap Rope Clips ***per side***. Circled point shows the end of each rope and the location of two (2) EZ-Snap Rope Clips.

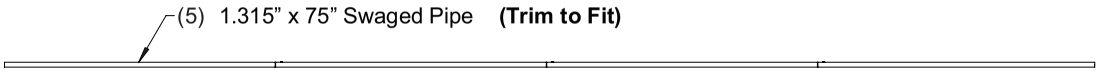




Angle Purlin Assembly



Purlin Assembly



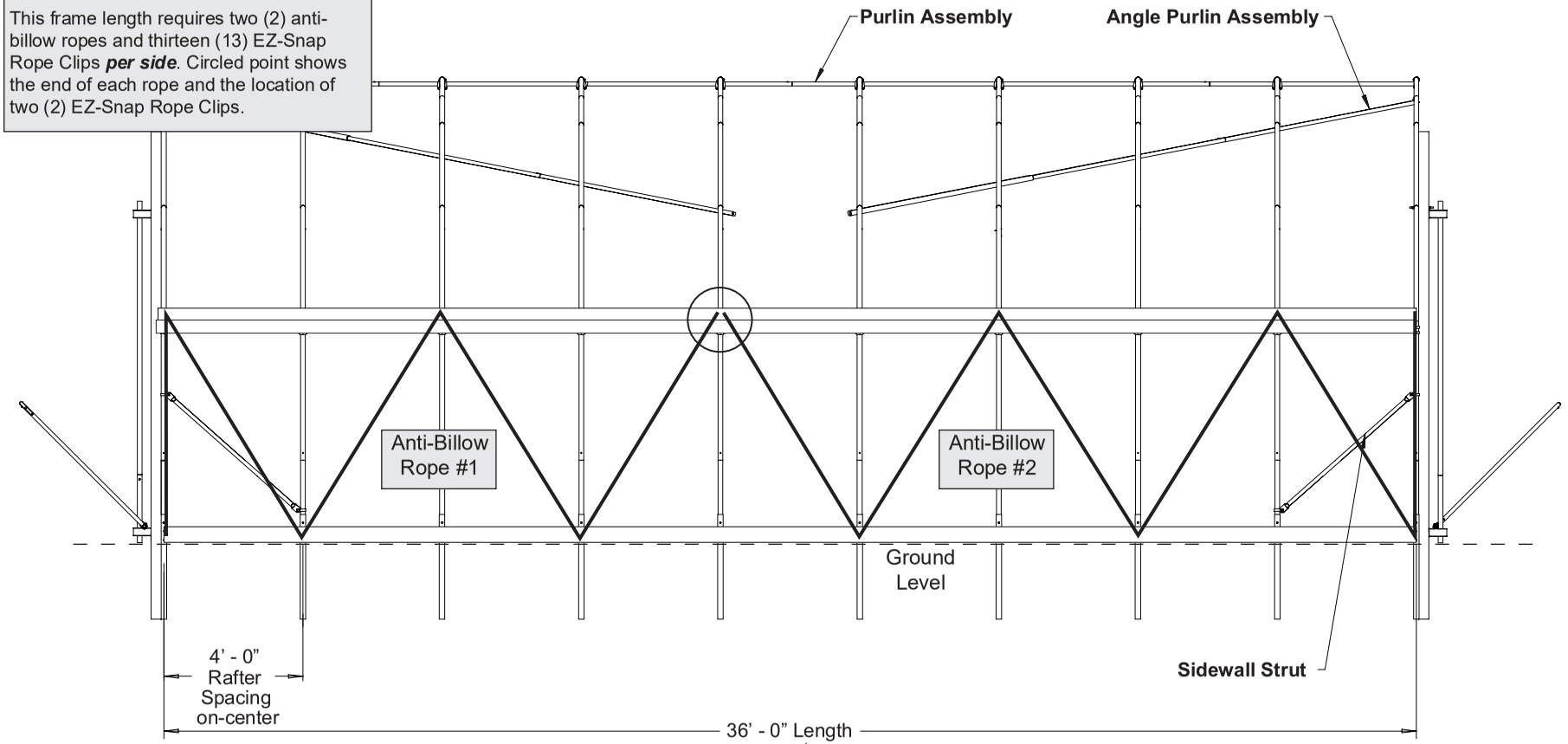
Drop-Down/Roll-up Conduit Assembly

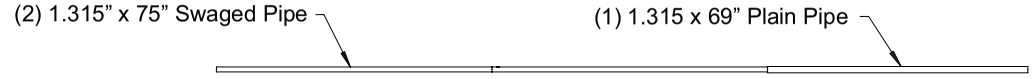
ATTENTION: TO PREVENT DAMAGE AND POSSIBLE INJURY, INSTALL THE ANTI-BILLOW ROPE IN SHORT LENGTHS ALONG EACH SIDE OF THE FRAME. DO NOT INSTALL AS A SINGLE LENGTH TIED AT EACH END. DOING SO WILL RESULT IN A LOOSE SIDE PANEL SHOULD THE ROPE BREAK DURING STRONG WINDS.

SIDE PROFILE - 108180H

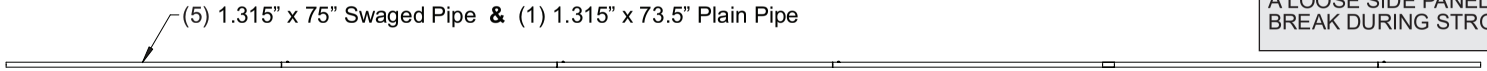
ANTI-BILLOW ROPES PER SIDE

This frame length requires two (2) anti-billow ropes and thirteen (13) EZ-Snap Rope Clips ***per side***. Circled point shows the end of each rope and the location of two (2) EZ-Snap Rope Clips.





Angle Purlin Assembly



Purlin Assembly



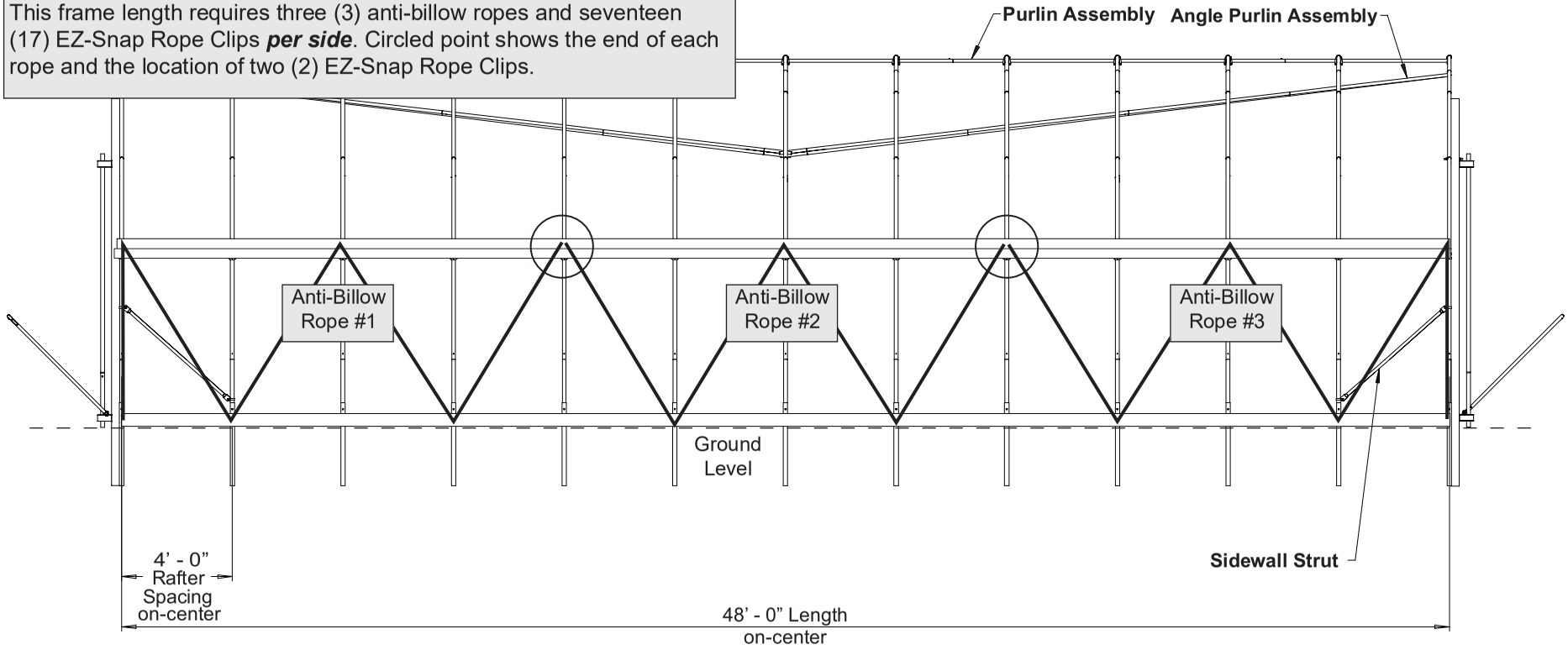
Drop-Down/Roll-up Conduit Assembly

ATTENTION: TO PREVENT DAMAGE AND POSSIBLE INJURY, INSTALL THE ANTI-BILLOW ROPE IN SHORT LENGTHS ALONG EACH SIDE OF THE FRAME. DO NOT INSTALL AS A SINGLE LENGTH TIED AT EACH END. DOING SO WILL RESULT IN A LOOSE SIDE PANEL SHOULD THE ROPE BREAK DURING STRONG WINDS.

SIDE PROFILE - 108181H

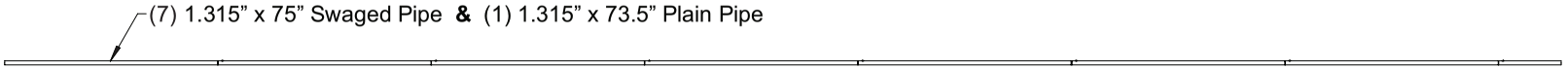
ANTI-BILLOW ROPES PER SIDE

This frame length requires three (3) anti-billow ropes and seventeen (17) EZ-Snap Rope Clips ***per side***. Circled point shows the end of each rope and the location of two (2) EZ-Snap Rope Clips.





Angle Purlin Assembly



Purlin Assembly



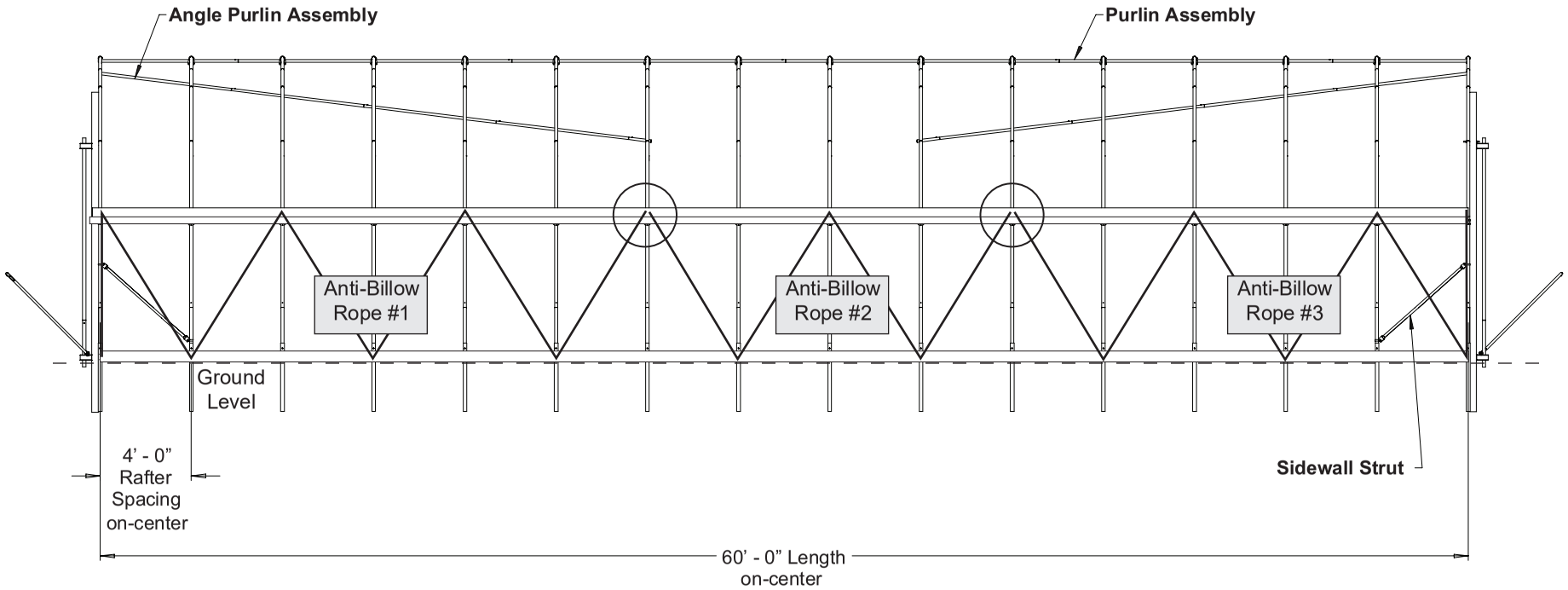
Drop-Down/Roll-up Conduit Assembly

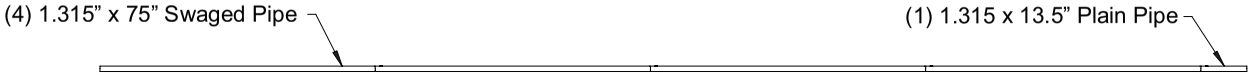
ATTENTION: TO PREVENT DAMAGE AND POSSIBLE INJURY, INSTALL THE ANTI-BILLOW ROPE IN SHORT LENGTHS ALONG EACH SIDE OF THE FRAME. DO NOT INSTALL AS A SINGLE LENGTH TIED AT EACH END. DOING SO WILL RESULT IN A LOOSE SIDE PANEL SHOULD THE ROPE BREAK DURING STRONG WINDS.

SIDE PROFILE - 108182H

ANTI-BILLOW ROPES PER SIDE

This frame length requires three (3) anti-billow ropes and twenty (20) EZ-Snap Rope Clips ***per side***. Circled point shows the end of each rope where two (2) EZ-Snap Rope Clips are installed.





Angle Purlin Assembly



Purlin Assembly



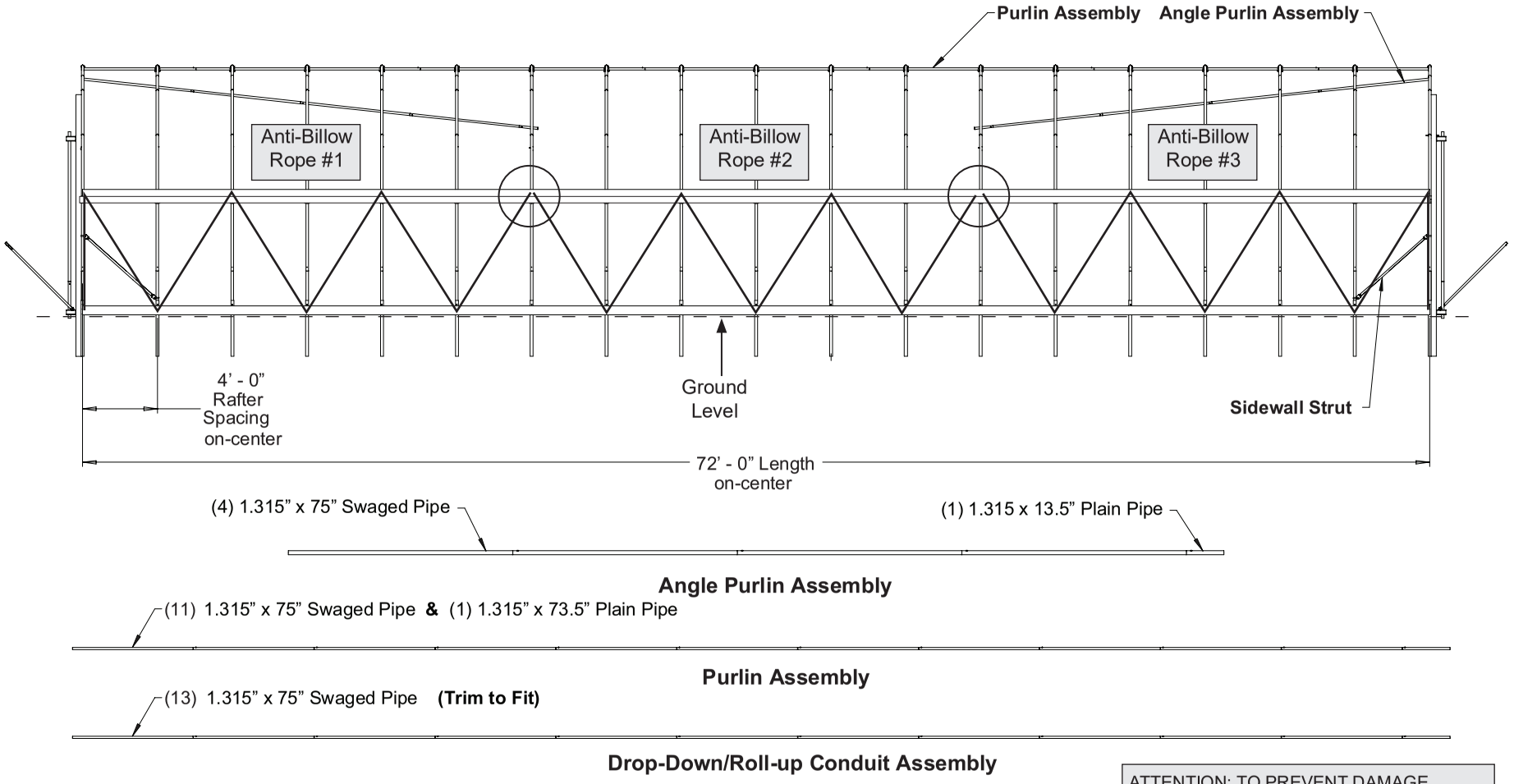
Drop-Down/Roll-up Conduit Assembly

ATTENTION: TO PREVENT DAMAGE AND POSSIBLE INJURY, INSTALL THE ANTI-BILLOW ROPE IN SHORT LENGTHS ALONG EACH SIDE OF THE FRAME. DO NOT INSTALL AS A SINGLE LENGTH TIED AT EACH END. DOING SO WILL RESULT IN A LOOSE SIDE PANEL SHOULD THE ROPE BREAK DURING STRONG WINDS.

SIDE PROFILE - 108183H

ANTI-BILLOW ROPES PER SIDE

This frame length requires three (3) anti-billow ropes and twenty-three (23) EZ-Snap Rope Clips ***per side***. Circled point shows the end of each rope where two (2) EZ-Snap Rope Clips are installed.

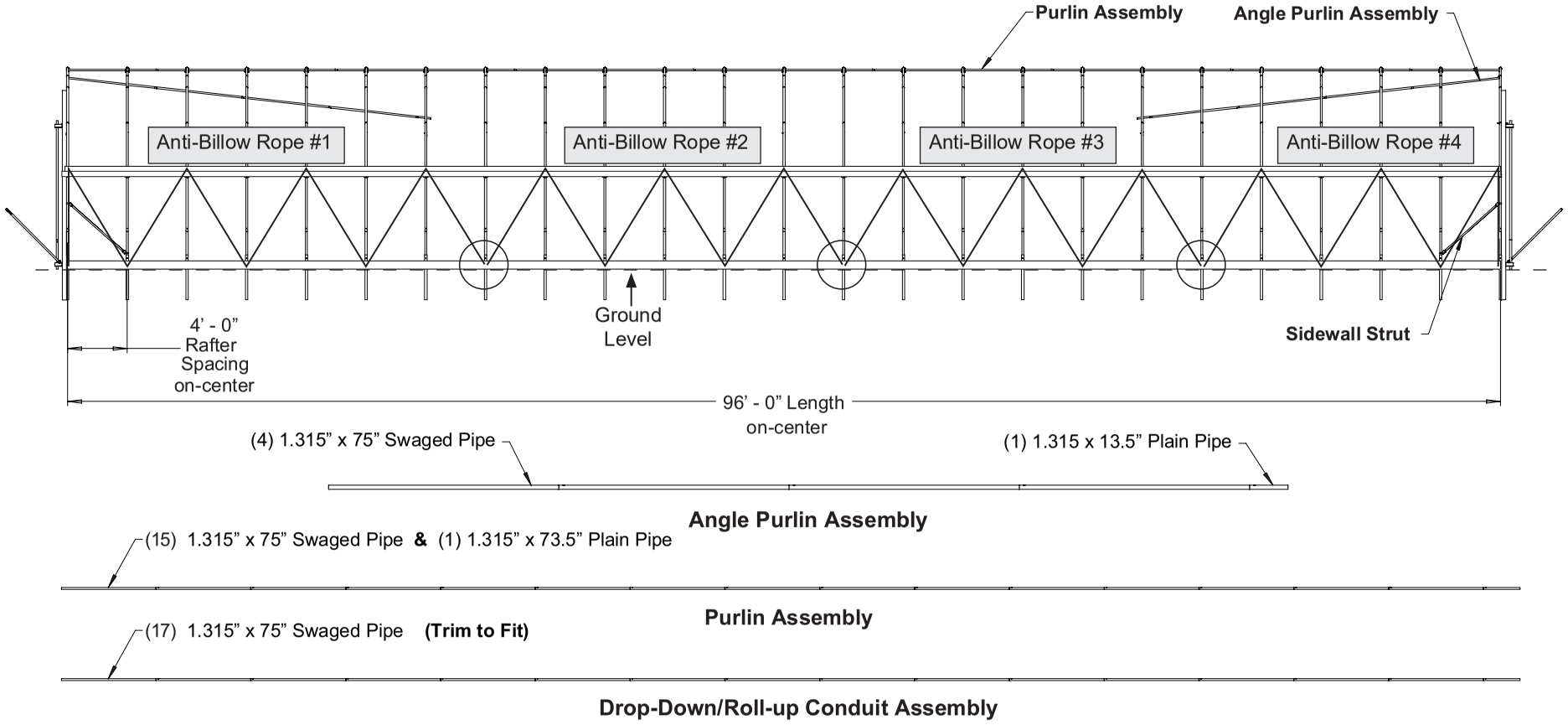


ATTENTION: TO PREVENT DAMAGE AND POSSIBLE INJURY, INSTALL THE ANTI-BILLOW ROPE IN SHORT LENGTHS ALONG EACH SIDE OF THE FRAME. DO NOT INSTALL AS A SINGLE LENGTH TIED AT EACH END. DOING SO WILL RESULT IN A LOOSE SIDE PANEL SHOULD THE ROPE BREAK DURING STRONG WINDS.

SIDE PROFILE - 108184H

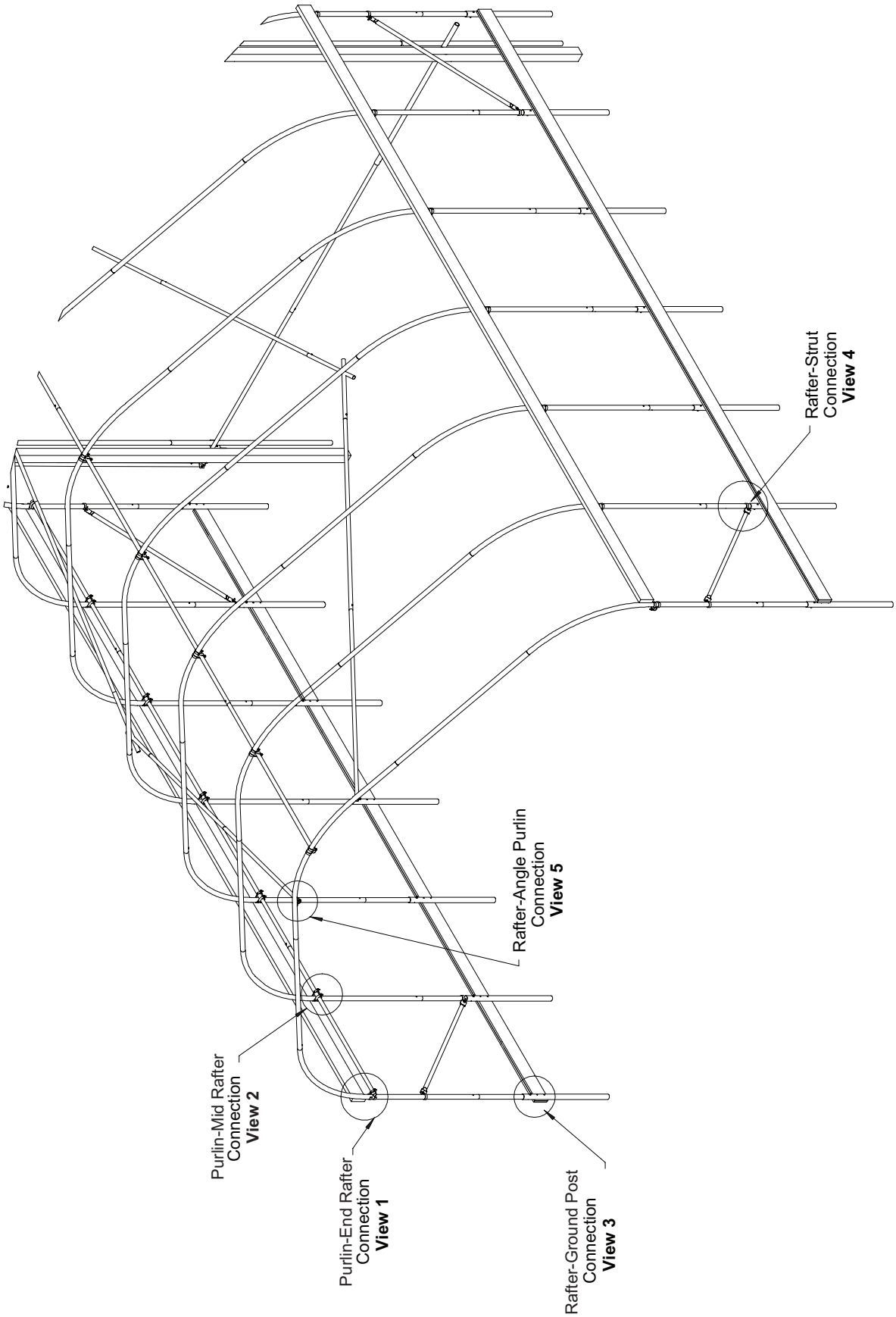
ANTI-BILLOW ROPES PER SIDE

This frame length requires four (4) anti-billow ropes and thirty (30) EZ-Snap Rope Clips ***per side***. Circled point shows the end of each rope where two (2) EZ-Snap Rope Clips are installed.

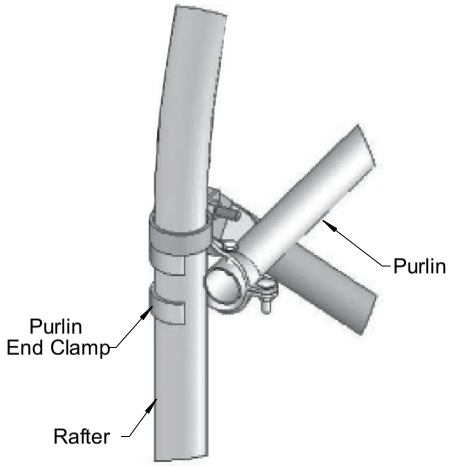


ATTENTION: TO PREVENT DAMAGE AND POSSIBLE INJURY, INSTALL THE ANTI-BILLOW ROPE IN SHORT LENGTHS ALONG EACH SIDE OF THE FRAME. DO NOT INSTALL AS A SINGLE LENGTH TIED AT EACH END. DOING SO WILL RESULT IN A LOOSE SIDE PANEL SHOULD THE ROPE BREAK DURING STRONG WINDS.

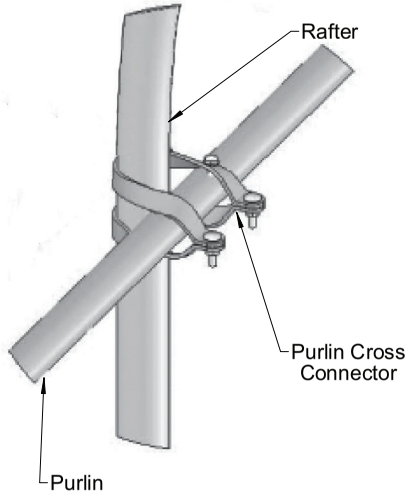
CONNECTIONS



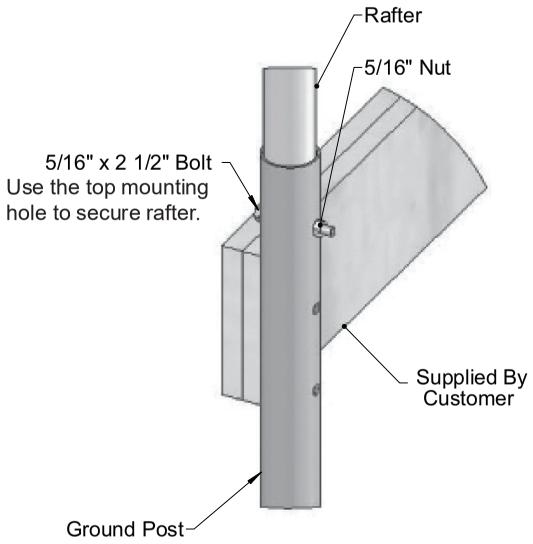
CONNECTION - DETAILS



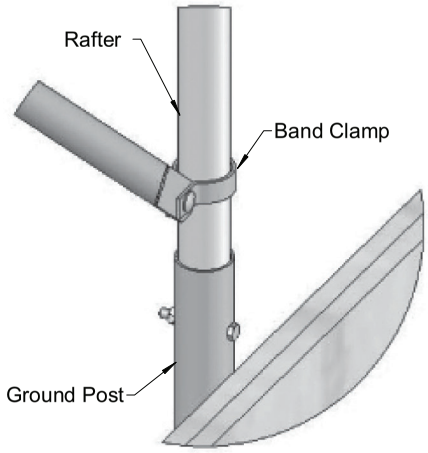
View 1
Purlin-End Rafter
Connection



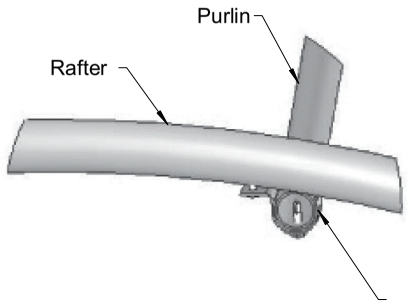
View 2
Purlin-Mid Rafter
Connection



View 3
Rafter-Ground Post
Connection

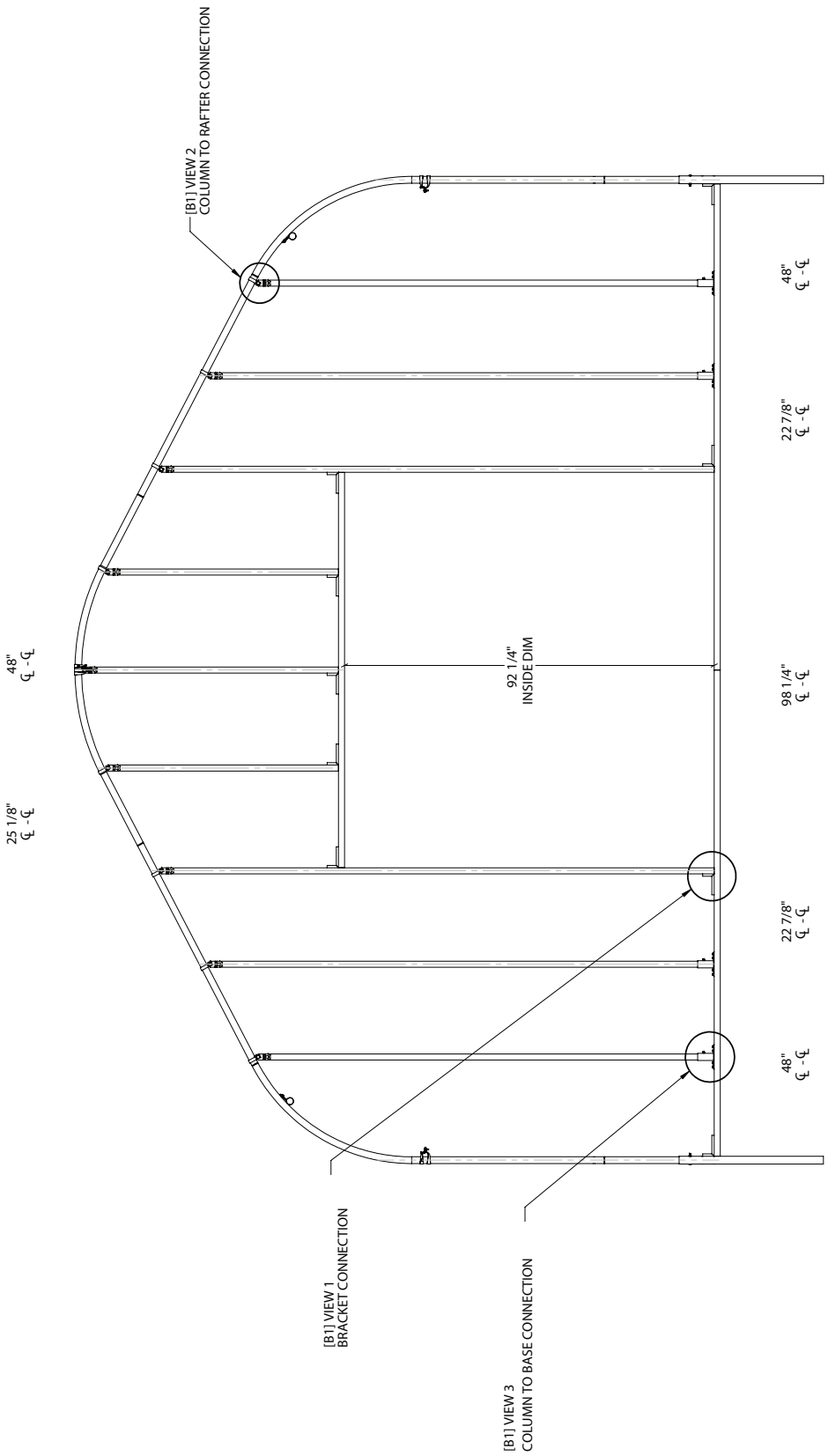


View 4
Rafter-Strut
Connection



View 5
Rafter-Angle Purlin
Connection

END FRAMING



[A 1] VIEW 1: ENDWALL LAYOUT

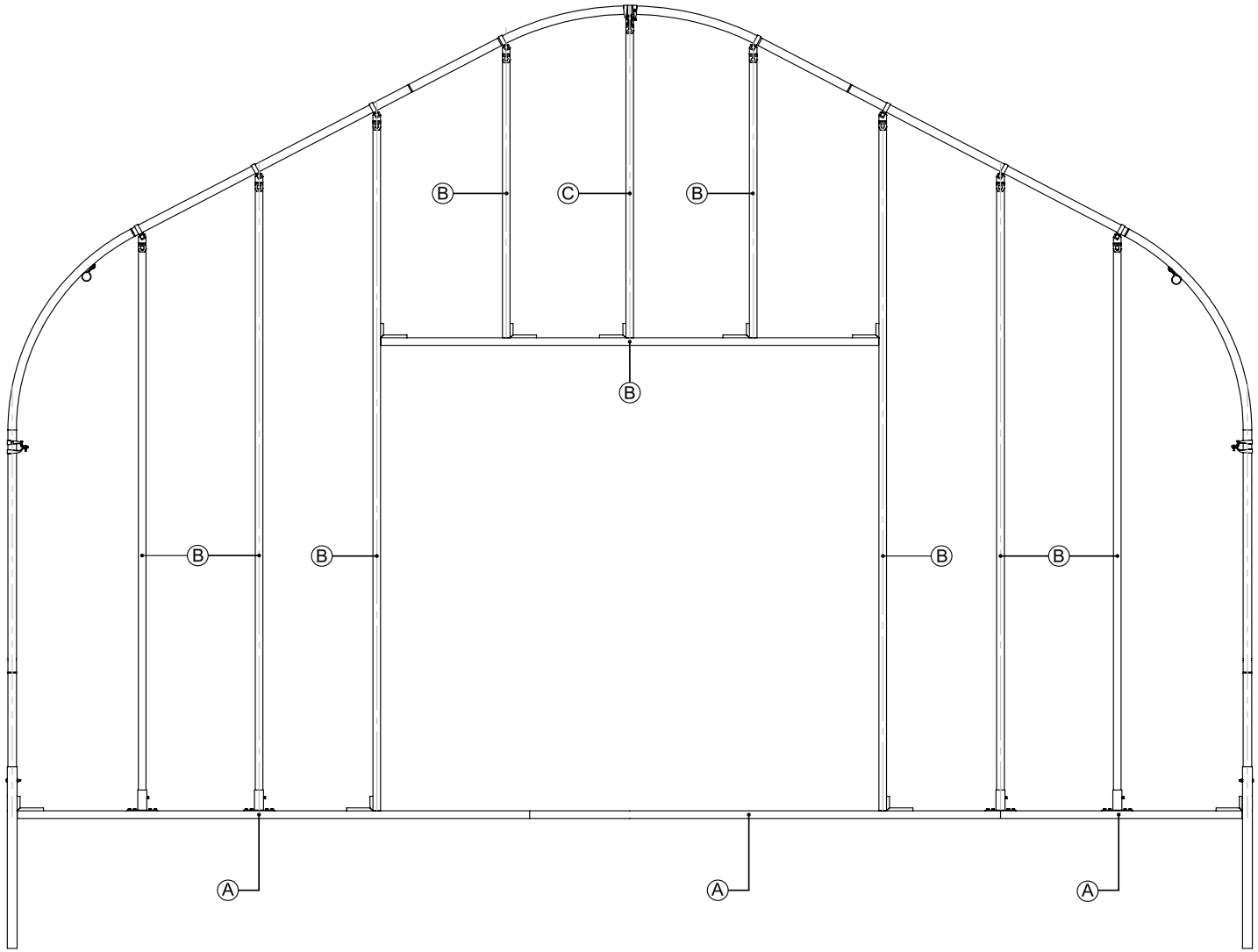
NOTE: COLUMNS NOT DIMENIONED HAVE A NON-CRITICAL PLACEMENT AND ARE USED FOR POLYCARBONATE SUPPORT.

ALL END FRAMING TUBES ARE FULL LENGTH OR CUT FROM 1 1/2" X 1 1/2" SQUARE TUBING.

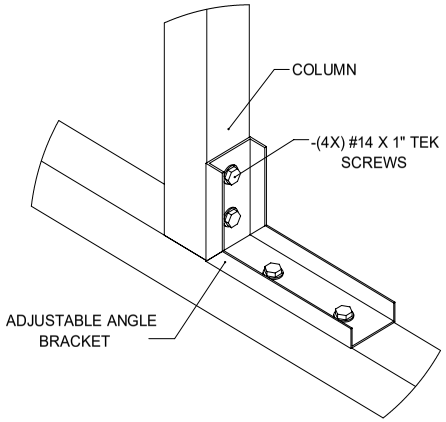
END FRAMING

ALL END FRAMING TUBES ARE FULL LENGTH OR CUT
FROM 1 1/2" X 1 1/2" SQUARE TUBING.

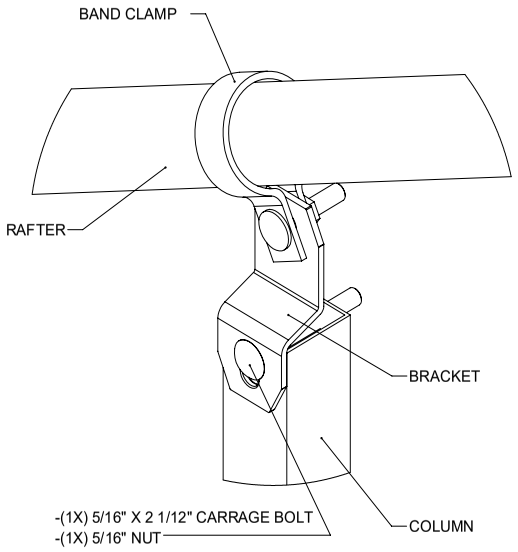
Ⓐ 1-1/2" x 99" SWAGED SQUARE TUBE
Ⓑ 1-1/2" x 144" PLAIN SQUARE TUBE
Ⓒ LEFTOVER CUT FROM SHORT CUT ABOVE THE DOOR
***NOTE:** THE LEFTOVER CUT FROM THE SECOND SHORT CUT SHOULD BE USED ON THE OPPOSITE END WALL



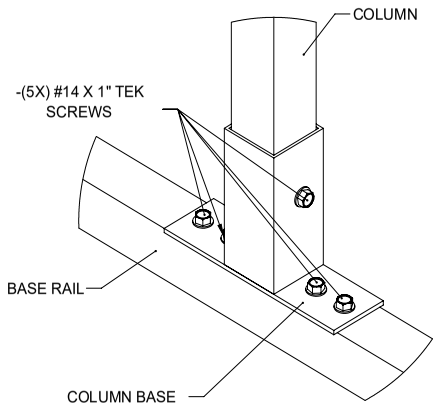
END FRAMING - CONNECTION DETAILS



[B1] VIEW 1:
BRACKET CONNECTION



[B1] VIEW 2:
COLUMN TO RAFTER CONNECTION



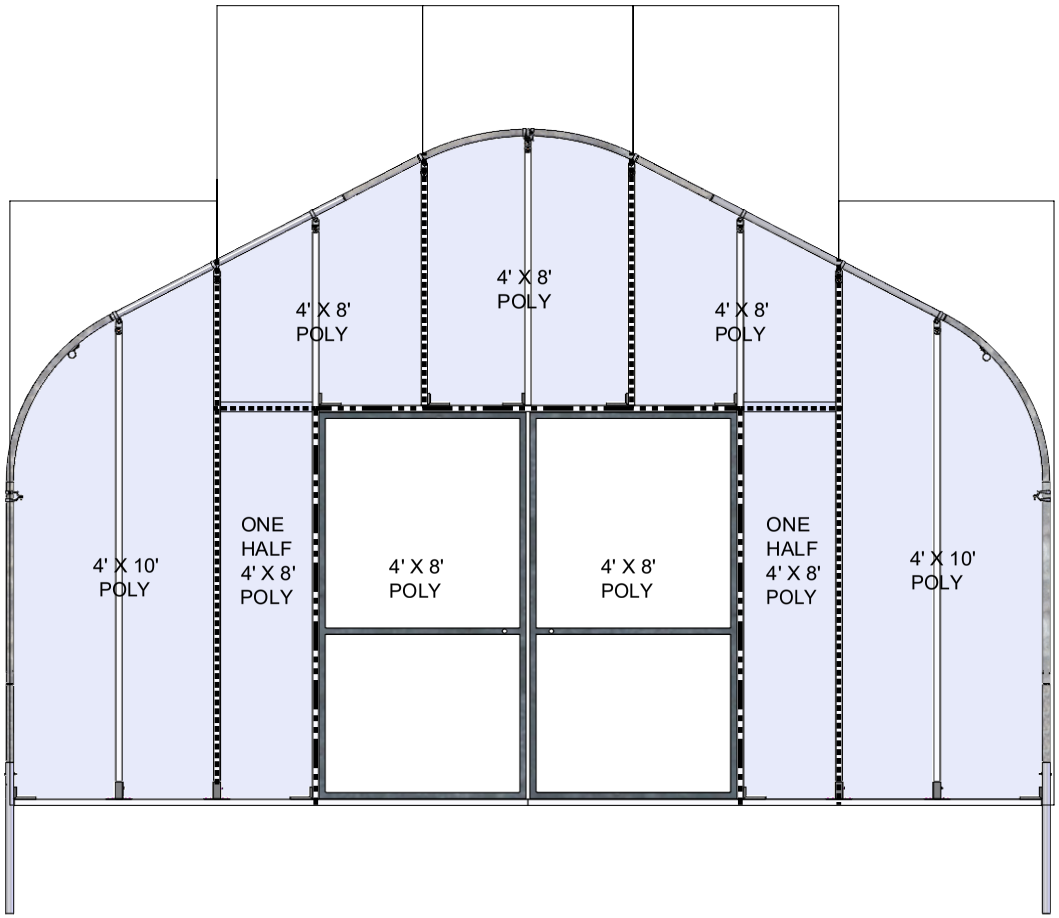
[B1] VIEW 3:
COLUMN TO BASE CONNECTION

END PANEL LOCATION DIAGRAM

NOTE: INSTALL UV PROTECTANT PANEL TO THE OUTSIDE.

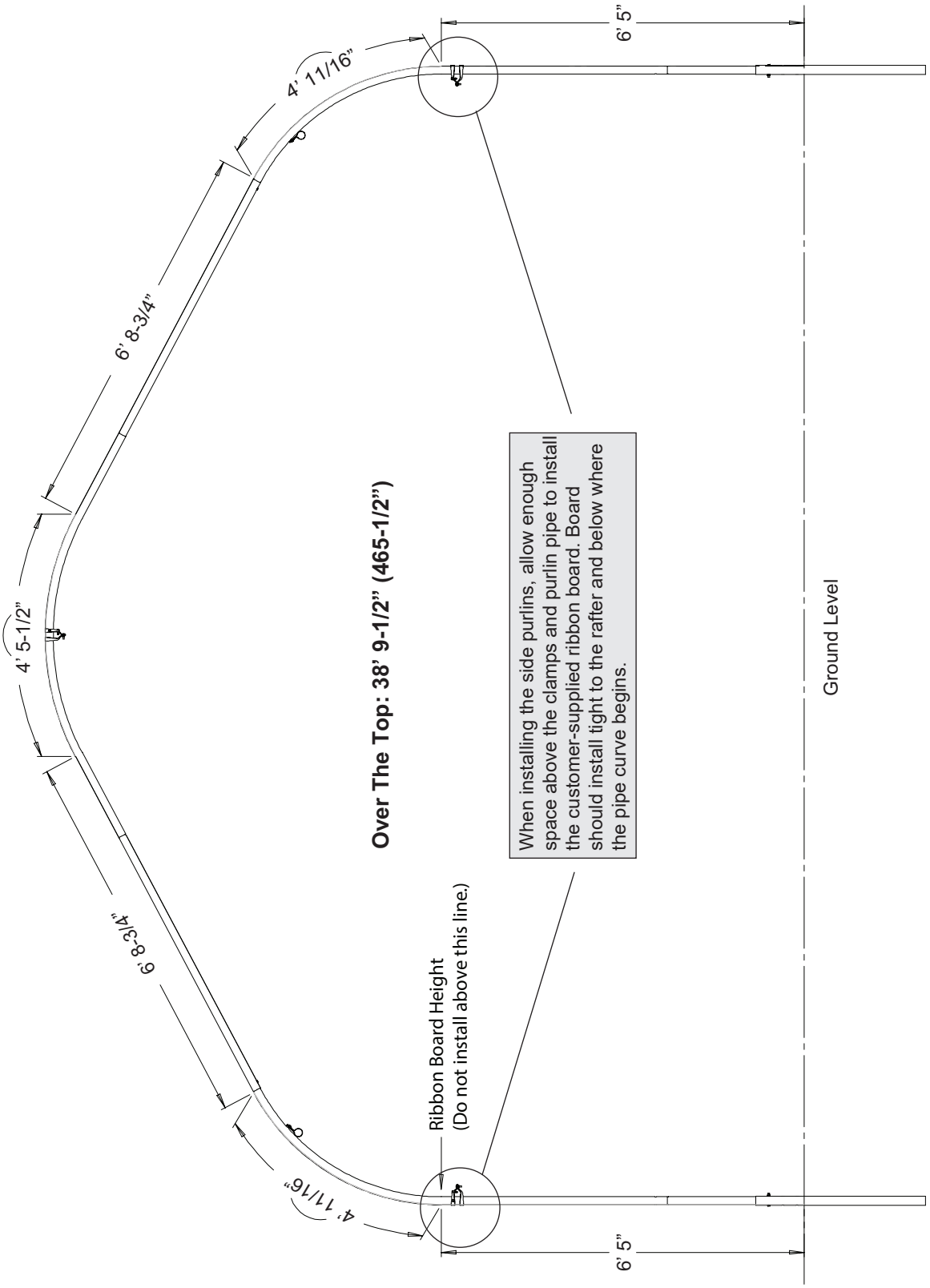
H-CHANNEL

U-CHANNEL

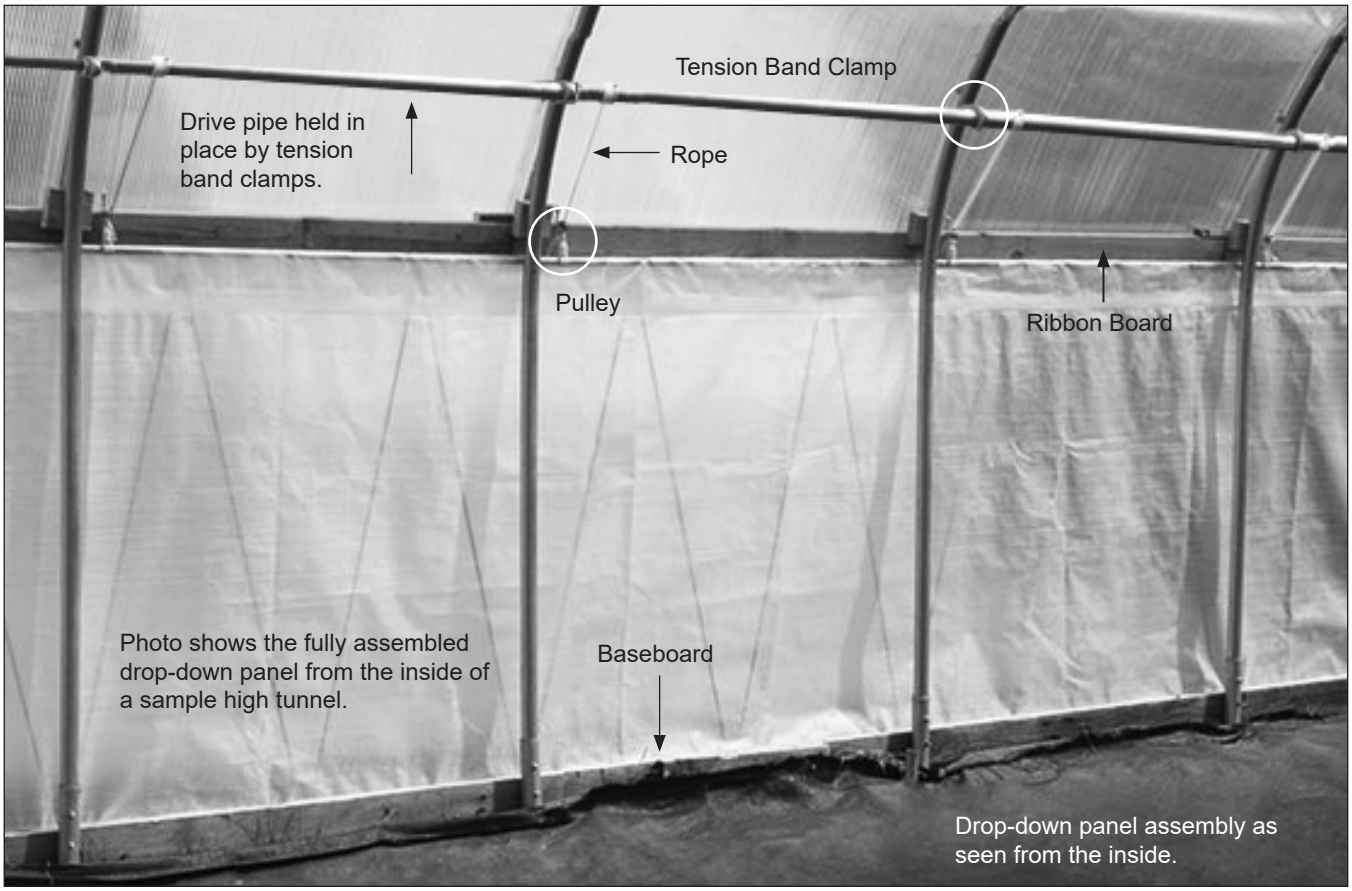


[C1] VIEW 1: PANEL LAYOUT

MAIN COVER DETAILS

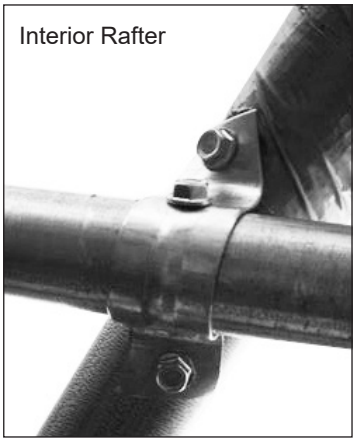


ADDITIONAL PHOTOS PAGE



The above photo shows a typical drop-down side panel as installed on a sample building. This photo applies to buildings equipped with drop-down sides only. It does not apply to buildings equipped with roll-up sides.







The above photo shows how to secure the angled purlin to the underside of the assembled rafters and frame. Use #14 x 1" Tek screws and 1" pipe straps.

Suggestions: Winterizing the High Tunnel

For added cold protection below ground, bury 2" foam insulation board down to the frost line around the perimeter of the building. Consult a qualified construction contractor **before erecting the high tunnel** to determine how best to install the customer-supplied 2" insulation board.

