



**ClearSpan™ Storage Master  
Solarguard™ Buildings  
28' Wide**



*Photo may show a different but similar model. End panels and doors not included.*

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

STK#	DIMENSIONS
PB02524R6	28' W x 36' L

Revision date: 05.16.08

**YOU MUST READ THIS DOCUMENT BEFORE YOU BEGIN TO ASSEMBLE THE SHELTER.**

Thank you for purchasing this ClearSpan™ shelter. 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 shelter. Please read these instructions **before** you begin.

If you have any questions during the assembly, contact Customer Service 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 shelter or framing during or after construction.
- Do not occupy the shelter during high winds, tornadoes, or hurricanes.
- Provide adequate ventilation if the structure is enclosed.
- Do not store hazardous materials in the shelter.
- Provide proper ingress and egress to prevent entrapment.

**ANCHORING INSTRUCTIONS**

Prior to assembling this shelter, please read the anchoring precautions and instructions included with the kit. Anchoring instructions are included in the **MUST READ** document. *You must anchor the building after the frame is assembled and before the cover is installed.*

**⚠ WARNING:** The anchor assembly is an integral part of the shelter construction. Improper anchoring may cause shelter instability and failure of the structure. Failing to anchor the shelter 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.

The following suggestions and precautions will help you determine whether your selected location is the best location.

- 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 shelter where large loads such as snow and ice, large tree branches, or other overhead obstacles could fall.

**SITE**

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

- The support structure must be level to properly and safely erect and anchor the frame.
- If the site is not level, use footing to provide a secure base for the structure. Pre-cast concrete blocks, pressure-treated wood posts, or poured footings are all acceptable when properly used.
- 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.*

## ASSEMBLY PROCEDURE

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

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 assembling the shelter.
3. Gather the tools, bracing, ladders (and lifts), and assistants needed to assemble the shelter.
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 the information and precautions presented in the documentation included with the shipment.
6. Lay out the site (if this has not been completed).
7. Assemble the frame components in the order they are presented in these instructions.
8. Assemble the frame including the bracing (if equipped).
9. Consult the Must Read document for anchoring comments and instructions.
10. Install, tighten, and secure the end panel (if equipped) and main cover. This applies to fabric covers that stretch over the frame assembly.
11. Read the care and maintenance information at the end of these instructions.
12. Complete and return all warranty information as instructed.

## LIST OF WORDS AND PHRASES

Before you begin, it is important to become familiar with the words and phrases used in this instruction manual.

These words and phrases are common to most ClearSpan™ shelters and identify the different parts of the shelter. (Some are used in this document. Others may not apply to this particular shelter.) These terms describe the shipped parts and can also be found on the materials list/spec sheets included with the shipment. To aid in the assembly, read through the following definitions before you begin to assemble your shelter.

- **Chord:** The assembly of pipes that spans from one rafter leg to the other (on the same rafter assembly). For strength, brackets are used to attach struts between the chord and the rafter.
- **Conduit:** An assembly of pipes used to secure the main cover and end panels (if equipped). Purlins and some strut assemblies also consist of connected pipes to form a conduit. Each pipe joint of a conduit assembly is secured with a self-tapping Tek screw.
- **Coupler or Fitting:** A part of the frame assembly where legs, purlins and rafter pipes are inserted and secured. In most instances, 3-way and 4-way couplers are used. In some larger applications, couplers are used to secure the joints of the different rafter sections during the assembly of the rafters. Some shelters do not use couplers.
- **Foot, Rafter Foot , or Base Plate:** The part attached to and found at the base of the rafter or leg of the shelter. Depending on the shelter, the foot is an optional purchase. Some shelters do not offer an optional foot. Some use 1-way connectors; others use ground posts.
- **Must Read Document:** This document includes building and shelter anchoring instructions, steps for end wall reinforcement, safety precautions, and notices and warnings. The Must Read document is sent with all shelters and buildings. If you did not receive a Must Read document, contact Customer Service to request one.
- **On-Center:** Term used to describe a measurement taken from the vertical center of the rafter or frame member to the vertical center of another.
- **Purlin or Angled (or Lateral) Bracing:** The pipe assemblies that run perpendicular to the rafters or framework that supports the main cover. These assemblies are found on the sides and roof areas of the assembled frame, are evenly spaced, and typically run from the front to the back of the shelter.
- **Plain or Straight Pipe:** A term used to describe a pipe that has the same diameter or width throughout its entire length.
- **Strut:** A strut is usually a length of pipe with two flattened ends and is used for diagonal bracing of the shelter frame. A strut is typically secured to the frame work by special brackets, bolts, and/or clamps.
- **Swaged End or Swaged Pipe:** The term "swaged" refers to the tapered end of the pipe or tube. Swaged ends of a pipe can be inserted into couplers and the straight ends of other pipes of the same diameter.
- **Tek Screw:** A self-tapping fastener used to secure pipe joints and to fasten brackets to rafters.

## CLEARSPAN™ STORAGE MASTER

### REQUIRED TOOLS

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

- Tape measure or measuring device
- Fine point marker to mark the location on tubing
- Variable speed drill and impact driver (cordless with extra batteries works best)
- Wrenches or ratchet and socket set (recommended)
- Metal-cutting saw
- Adjustable pliers and self-locking pliers
- Scissors or utility knife to cut cover material and strap
- Tool to cut cable to the required length
- Hammers and gloves
- Ladders, work platforms, and other machinery for lifting designed to work safely at the height of the shelter
- Rope (or straps) for cover installation

### UNPACK AND IDENTIFY PARTS

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

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 shelter diagrams throughout these instructions for clarification, or contact Customer Service.

**NOTE:** At this time, you do not need to open the plastic bags containing the fasteners (if used).

### QUICK START GUIDE

For a quick overview of this shelter and its components, consult the Quick Start Guide near the back of these instructions.

The pages of the Quick Start Guide show exploded views of all critical connections. Use the diagrams in the Quick Start section to assemble the frame of your building.

Consult the remainder of these instructions for important details that will help during the construction.

### SPECIAL NOTE: Baseboards for Frame

These instructions describe installing a baseboard (strongly recommended) on each side of the frame. The baseboard runs from the front to the back of the frame.

This baseboard is *not included* with the shipment and must be supplied by the customer. Treated or recycled plastic lumber works well for a baseboard.

The baseboard, when installed properly, helps prevent the shelter from sinking into the ground when anchored. Baseboards also provide a surface to attach rafter feet or other building components.

Consult these instructions, or contact Customer Service for additional information regarding baseboards.



The following graphics and photos will help you identify the different parts of the building. Consult the Quick Start Guide for additional details and diagrams. (All parts are not shown.)



FA4482B  
Tek Screw



QH1061  
1" Ratchet



100441  
Nut Setter



QH1065  
2" Ratchet



QH1070  
Pipe Strap



102546  
2.375" Cross Connector



102548  
1.66" Cross Connector



103856  
2.375" Band Clamp



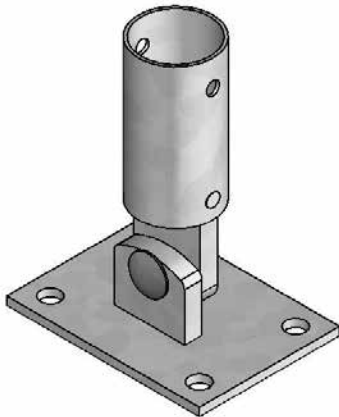
AS1094  
1/4" Cable Thimble



AS1003  
3/16" Cable Clamp



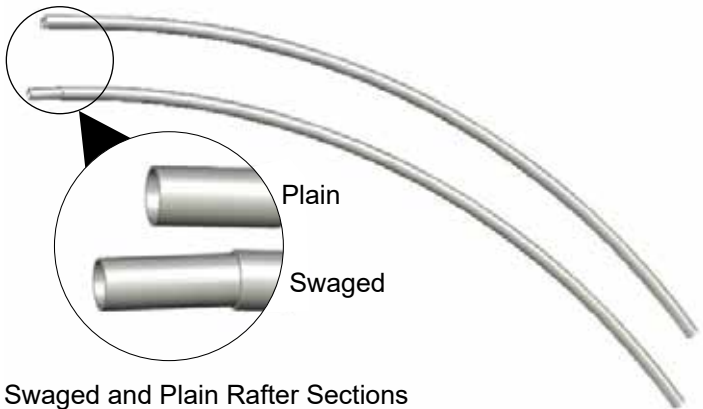
QH1402  
1.66" Band Clamp



104302  
Pipe Fitting with Base



104189 Turnbuckle



Swaged and Plain Rafter Sections  
(not all pieces are shown)



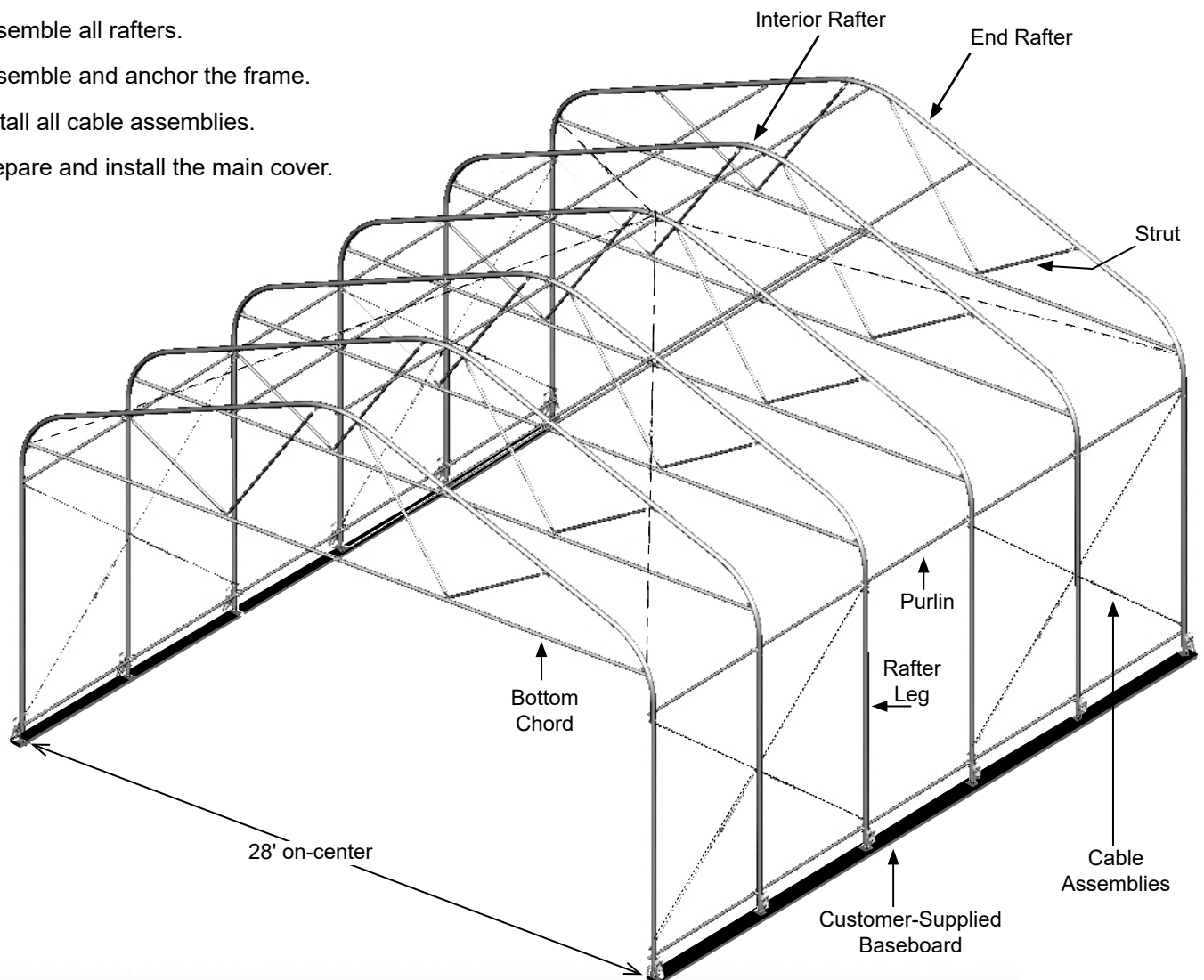


## ClearSpan™ Storage Master Solarguard™ Buildings

### OVERVIEW

This section describes assembling your building. For details of each assembly procedure, consult the Quick Start Guide and the individual sections of these instructions. See illustration below to identify main parts of shelter.

1. Mark the location of the building and identify the required parts for each assembly procedure.
2. Assemble all rafters.
3. Assemble and anchor the frame.
4. Install all cable assemblies.
5. Prepare and install the main cover.



## LAY OUT THE BUILDING SITE

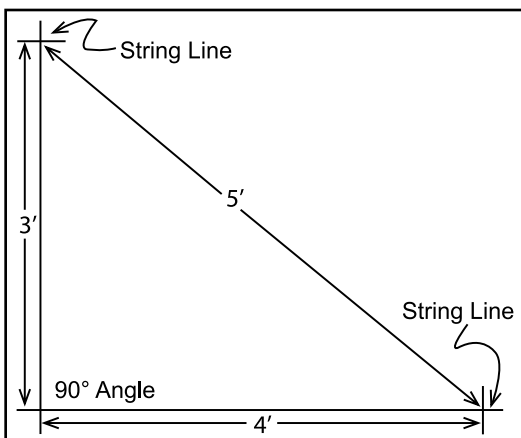
After the site is prepared, identify the location of the shelter corners helps to square the frame after it is assembled.

Taking these steps **before** assembling the shelter saves time and ensures that the structure is positioned as desired. The following procedure is a suggested method. Its use depends on the size of the shelter, shelter application, the footings, and the method used to anchor the shelter.

## SQUARE THE SITE

1. Identify a corner where a building rafter will be positioned, drive in a stake, and string a line the exact width of the building and stake in place. (Width of the rafter is measured from center-to-center of the rafter legs.)
2. Sting 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.



3. After squaring the position of the building and placing a stake at all corners, string a line between the stakes to mark the base of the building.

**NOTE:** The example that follows shows treated baseboards set on the site. After marking the rafter spacing on the boards, the rafter feet are secured in place.

4. Consult the Framework Assembly instructions for the building and mark on the ground (or treated baseboards as recommended) the positions of the rafter feet.
5. After marking the on-center positions of all rafters (on the boards or site), remove the strings and continue with the attaching rafter feet to the baseboards.

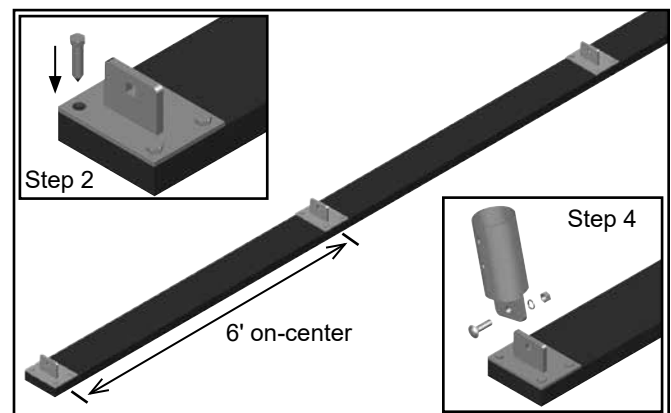
## ATTACH RAFTER FEET TO BASEBOARDS

The following is an example of one way to position the rafter feet after the site has been prepared. *This is an example only.*

The site, anchoring system, and other factors affect preparing for the rafters. *Consult a knowledgeable construction professional for suggestions and other safe and acceptable alternatives.*

**ATTENTION:** Placing treated baseboards under the rafter feet is strongly recommended.

**WARNING:** Securing the rafter feet to a baseboard as shown *does not* anchor the shelter. The shelter must be anchored as stated in the MUST READ document included in the shipment.



1. The above photo shows the rafter feet set at intervals of six foot (6') on center which is the rafter spacing of the shelter used in this example.
2. Anchor each rafter foot base to the boards using the appropriate customer-supplied fasteners.
3. Drive a short length of rebar inserted through a hole drilled in the boards into the ground to keep the boards in place as rafters are attached.
4. After the boards are set and the bases are fastened in place, attach the top of the rafter foot.

**NOTE:** At this time, DO NOT tighten the bolt that connects the two rafter foot parts. The upper part will be adjusted when the rafters are set in place.

5. Continue with the END RAFTER AND INTERIOR RAFTER ASSEMBLY procedures that follow.

## CLEARSPAN™ STORAGE MASTER

### ASSEMBLING THE STORAGE MASTER BUILDING COMPONENTS

**NOTE:** Assistance is required to assemble the shelter.

After the site is prepared and squared, the rafter feet are assembled and anchored in place (if applicable to your shelter), and an inventory of parts is complete, assemble the rafters.

### RAFTER ASSEMBLY

Gather the parts:

- Rafter pipe (#20SM23P2)
- Rafter pipe (#28SM23S1) & rafter pipe (#2375S124D)
- Pipe 1.66" x 99" swaged (#166S099)
- Pipe 1.66" x 40" plain (#166P040)
- Band clamps (#QH1402 & 103856)
- Pipe strap (#QH1070)
- Tek screws (#FA4482)

Each rafter assembly consists of five (5) rafter sections: 1 curved center pipe (for the top or peak), 2 leg pipes that include *drilled holes near the bottom* to connect the rafter feet, and 2 curved pipes that connect the legs to the top center pipe.

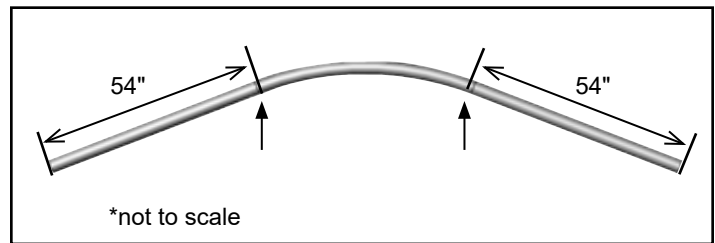
#### Interior Rafter Assembly Procedure

1. Select the five (5) pipes needed to assemble a rafter and arrange these on a flat surface as shown below for assembly.

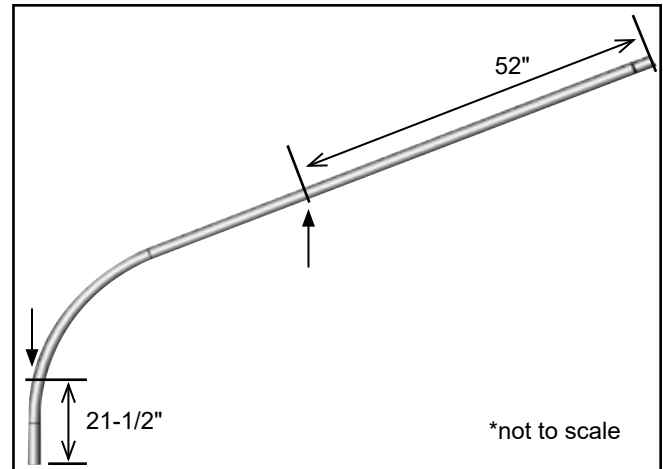


**NOTE:** *DO NOT* join sections at this time.

2. Using a tape measure, measure the following clamp locations on the pipe and mark locations with a marker.

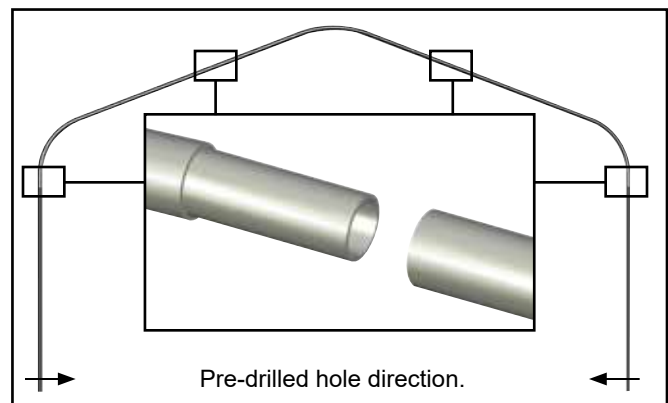


Mark these locations (shown below) on the remaining curved pipe for the opposite side of the rafter assembly.



**NOTE:** Measurements are for reference only. Once the struts are attached, reposition the clamps as needed.

3. After marking the clamp locations, take six (6) of the larger band clamps (#103856) and slide these onto the different rafter pipes and position them near the marked locations. *Do not secure these clamps at this time.*
4. Slide the swaged portion of each rafter pipe into the plain end of the pipe.

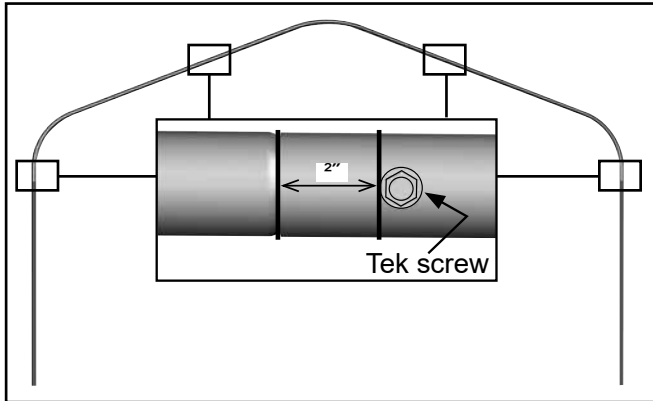


**IMPORTANT:** The rafter foot mounting holes drilled in the sides near the bottom of each rafter leg must be *parallel with the ground* when viewed looking down at the rafter assembly on the ground.

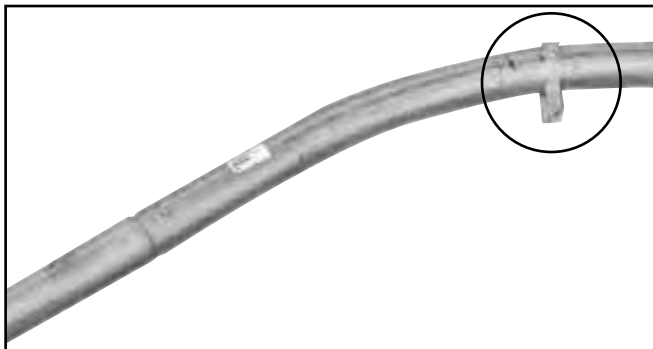
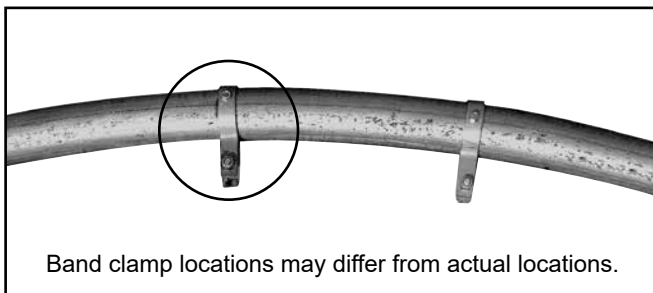


**RAFTER ASSEMBLY (CONTINUED)**

5. With the main rafter pipes seated at each joint and the rafter positioned on a flat surface, secure each joint with a single self-tapping Tek screw. Position Tek screw approximately 2" from pipe joint.



6. Move the band clamps into position by sliding each to its location marked on the rafter in Step 2.



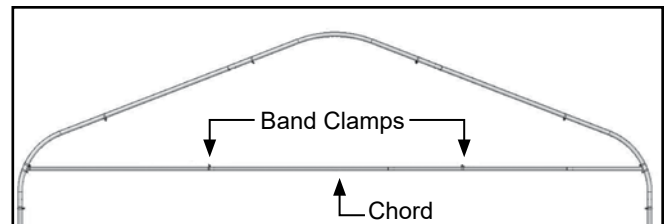
7. After assembling the rafter, securing the joints, and setting the band clamps in position, cut a length of rope (or cable) that is the width of the shelter plus and additional 12 inches.

8. After the rope (or cable) is cut, insert approximately 6" through the rafter foot mounting holes at the bottom of the rafter leg and clamp the rope in place with the clamp on the outside as shown below.



9. Insert the remaining end of the cable through the other rafter bolt holes, measure the 28' on-center width dimension, and clamp the legs in place to prevent the rafter from spreading as the struts are attached.

10. Position three (3) sections of the 166S099 pipe (99" each) and one (1) 166P040 pipe (40") on the ground between the rafter legs, slide two (2) of the smaller band clamps (QH1402) onto one of the center pipe sections, and assemble the chord.



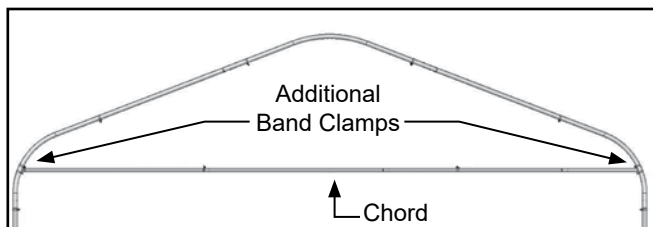
11. Secure each pipe joint of the chord with one FA4482 Tek screw. Standing on the chord assembly helps to keep the pipes from turning as the screws are installed. Be certain each joint is properly seated before installing the screw.



## CLEARSPAN™ STORAGE MASTER

### RAFTER ASSEMBLY (CONTINUED)

12. After the chord is assembled, slide one additional band clamp (QH1402) onto each end of the chord assembly.

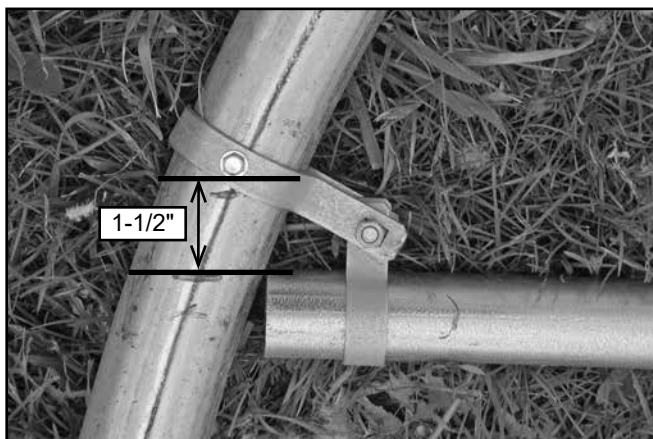


13. Position the assembled chord between the rafter legs and connect the chord to the rafter as shown above.



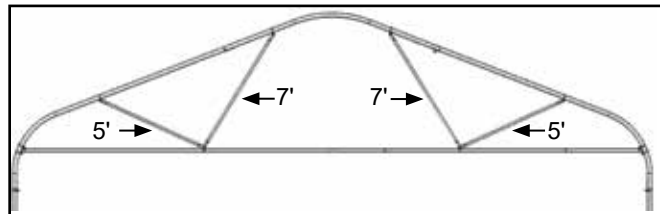
Adjustable pliers can be used to squeeze the two band clamps if needed to thread the nut onto the bolt.

**NOTE:** Remove one nut and bolt from either clamp. (It will not be used.) The top of the chord will be about 1-1/2" down from the band clamp as shown below.

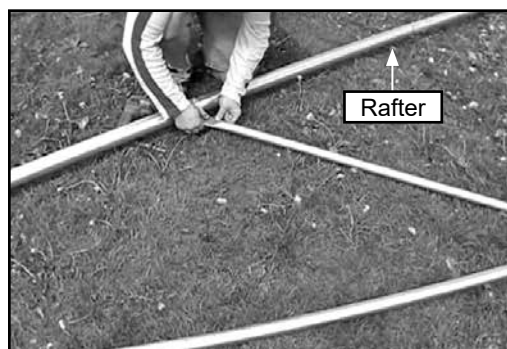


**NOTE:** If the chord height needs to be lower, it can be slid down slightly at this time.

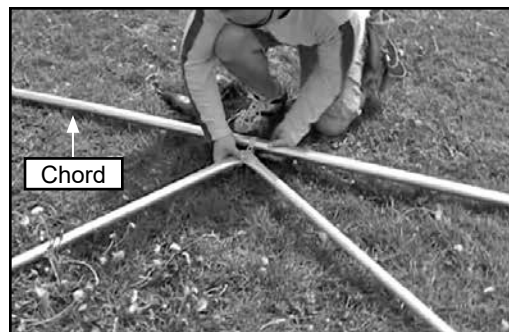
14. Select two (2) of the 5' struts (QH1304) and two (2) of the 7' struts (QH1308) and position them on the ground between the upper part of the assembled rafter and the assembled chord. *Strut pattern shown may vary slightly from actual rafter.*



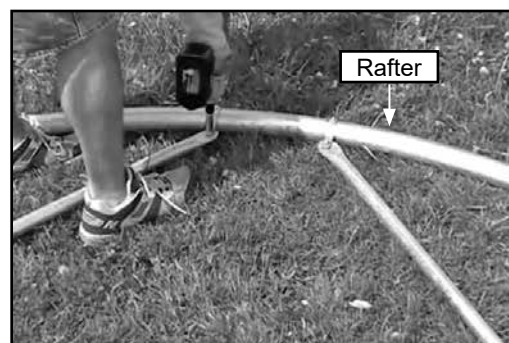
15. Connect one end of a 5' strut to the clamp on the rafter. *Do not tighten at this time.* (Consult the connection details in the Quick Start section located at the back of these instructions.)



16. Connect the other end of the same 5' strut and one end of a 7' strut to the band clamp on the chord assembly. *Do not tighten.*



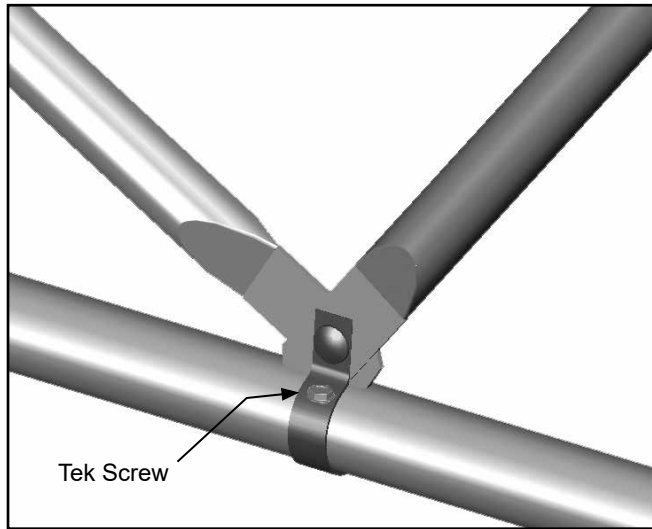
17. Attach the remaining end of the 7' strut to the band clamp located near the peak of the rafter.



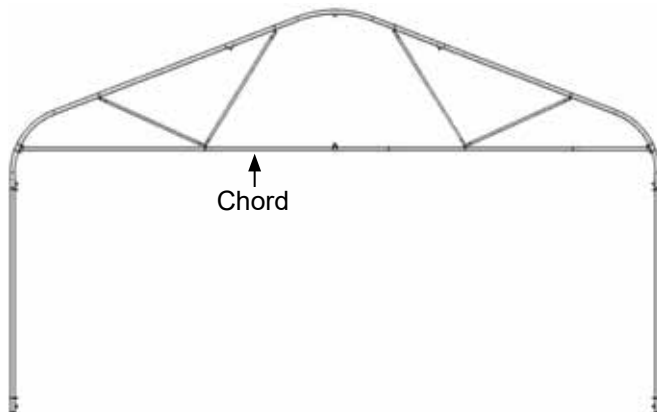
18. Repeat Steps 15-17 to attach the remaining struts for this rafter assembly.

**RAFTER ASSEMBLY (CONTINUED)**

19. After attaching the struts and verifying that all band clamps are tightened, secure each band clamp to the chord using a FA4482 Tek screw.



The assembled rafter should resemble the rafter in the drawing shown below.



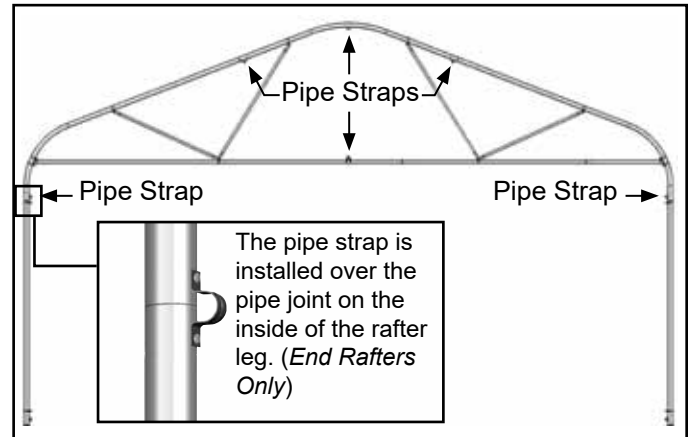
**SPECIAL NOTE FOR LONGER SHELTERS:** For longer shelters, conserve site space by assembling and setting the rafters as you work toward the end of the shelter.

20. Complete the next steps for END RAFTERS ONLY.

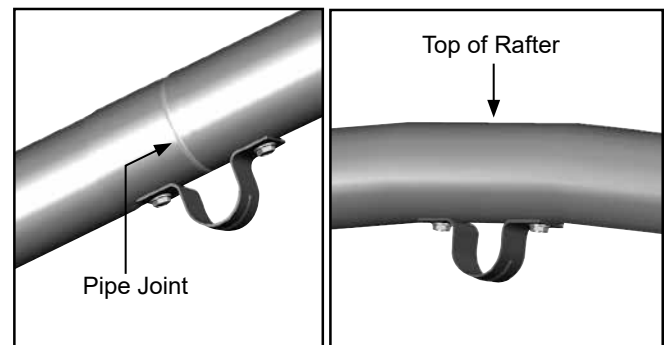
**End Rafter Assembly Procedure**

Complete the following steps *for the two end rafters only*.

1. Assemble the two end rafters on a flat surface using the same procedure as an interior rafter.
2. Attach one pipe strap (QH1070) to each end rafter in the locations shown below.



These pipe straps are located on the inside of the rafter legs, underside of the rafter pipe (peak), and on top of the chord. *Do not tighten at this time.* These will be tightened after the purlin is installed.



**NOTE:** Except for the pipe strap located at the top of the rafter and on top of the chord, all remaining pipe straps shown above are installed over the pipe joints at that location.

3. Continue with the FRAME ASSEMBLY instructions that follow.



## CLEARSPAN™ STORAGE MASTER

### FRAME ASSEMBLY

After all rafters are assembled, assemble the frame.

**NOTE:** The baseboards (strongly recommended) shown in the diagrams throughout these instructions are not included and are supplied by the customer.

### ASSEMBLE AND PRE-MARK THE PURLINS

The following steps describe one way to speed the assembly process and eliminate the need to measure each purlin as it is installed. Pre-marking the purlins ensures that an accurate spacing of the rafter assemblies is achieved and maintained during assembly. Experienced contractors may elect to skip this procedure and continue with the Frame Assembly steps.

Gather the parts:

- Pipe 1.315" x 75" swaged (#131S075)
- Pipe 1.315" x 73.5" plain (#131P0735)
- Marker and tape measure

**NOTE:** The purlins are part of the assembled frame and run perpendicular to the rafter assemblies. Each purlin consists of five (5) 1.315" x 75" (#131S075) swaged pipes and one (1) 1.315" x 73.5" (#131P0735) plain pipe.

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.

**NOTE:** Assemble the purlins in a location that is accessible during the assembly of the frame, but will not interfere with the process of lifting and setting the rafters.

2. Verify that each pipe joint is properly seated.

**NOTE:** These pipes must be separated during the assembly procedure. Do not fasten them together at this time.

3. For the 6' rafter spacing, measure six feet and three-quarters inches (6' 1") from one end of the assembled purlin and mark the distance on the pipe.

**NOTE:** This first measurement is one (1) inch longer than the on-center rafter spacing to account for the length of purlin pipe that extends through the end purlin clamp of the first end rafter.

4. From the location marked in the previous step, measure six feet (6') and make another mark on the assembled purlin.

5. Continue to mark the purlin in 6' intervals until all locations are marked. These marks help to maintain the 6' on-center rafter spacing of the shelter during assembly.
6. Repeat this procedure until all assembled purlins are marked.
7. After assembling all rafters and pre-marking the purlins, assemble the frame.

### FRAME ASSEMBLY PROCEDURE

After all rafters are constructed and placed in an orderly fashion for frame assembly, proceed with standing the first end rafter.

**WARNING:** Rafter assemblies are heavy with most weight at the top. Forklifts and personnel booms are recommended for lifting and setting the rafters. Consult a construction professional if you are not familiar with construction techniques and erecting similar structures.

The following instructions assume that the rafter feet are properly spaced and are secured to concrete or a level surface as shown in the example on the Lay Out the Building Site page of this document.

**ATTENTION:** If your site does not include a level surface as recommended and you will not be securing the rafter feet to concrete or wood planks as shown in the example on the Lay Out the Building Site page, you will need to alter these instructions to accommodate the variations.

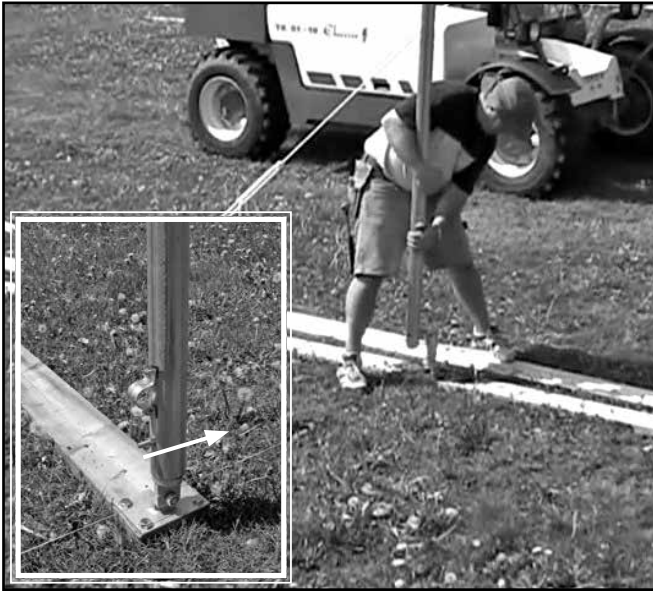
**NOTE:** The FA4482 Tek screw is used throughout this assembly.

1. With the proper lift, lift the *first end rafter*. This rafter includes pipe straps (installed earlier).



**FRAME ASSEMBLY (CONTINUED)**

2. Set the rafter on the first set of rafter feet at one end of the shelter and secure with 3/8" nut and 3" bolt (FAG363B).



**ATTENTION:** Position the FAG363 bolt head to the outside of the building. Arrow in the above photo points to the outside of the frame assembly.

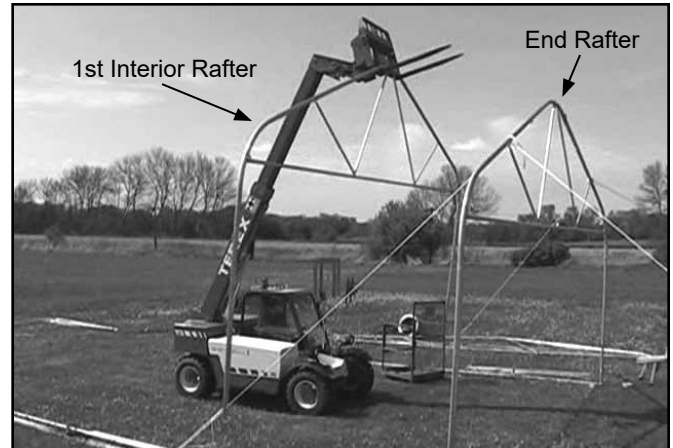
*Exercise caution when setting the rafter leg on the rafter foot.*

3. Anchor the first rafter with ropes or other temporary bracing. *Verify that the rafter is plumb (straight).*



**NOTE:** In the above photo, ropes (identified by white lines for clarity) were used to temporarily anchor the rafter in place. For this first end rafter, all temporary bracing *must remain* in place until other rafters are set in place and attached to the first rafter and to each other.

4. Set the second rafter (first inside rafter) in place and secure it to the rafter feet.



**NOTE:** After securing the inside rafter to the rafter feet, position someone at each leg to stabilize the rafter as the lift is removed.

5. Place a cross-connector (#102546) over the peak of the inside rafter.

Photo to the right shows purlin inserted through the cross-connector at the top of an interior rafter.



6. Insert the first section of purlin (2 pieces of pipe) through the cross-connector on the inside rafter and the pipe strap at the peak of the end rafter.



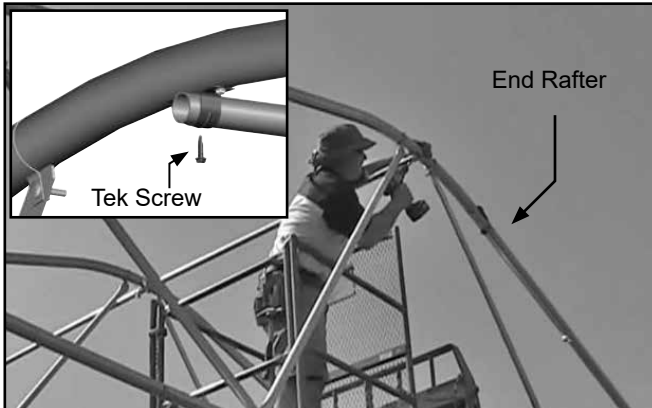
**IMPORTANT NOTE:** The purlin should extend through the pipe strap at the peak of the end rafter by one-half inch. The purlin must not extend beyond the end rafter, as it will damage the main cover when it is installed.



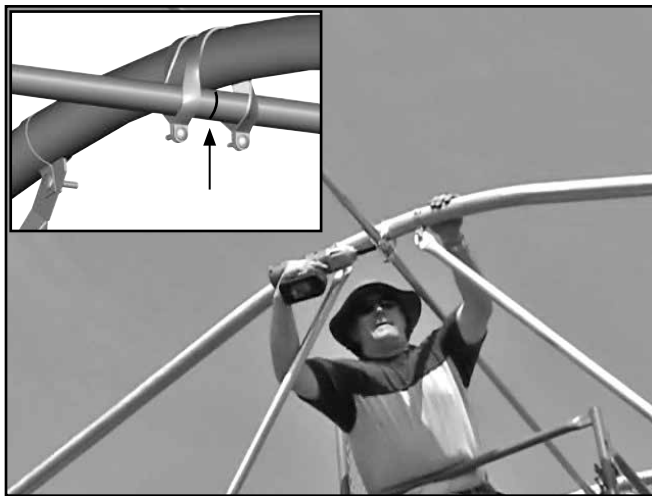
## CLEARSPAN™ STORAGE MASTER

### FRAME ASSEMBLY (CONTINUED)

7. With the purlin in position, tighten the pipe strap at the peak and secure the purlin in the pipe strap using a Tek screw.

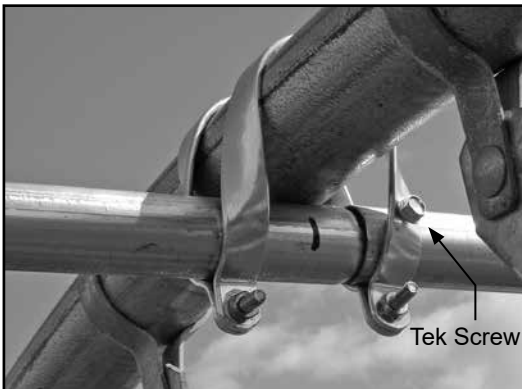


8. Align the pre-marked location on the purlin with the center of the inside rafter to achieve the proper rafter spacing and tighten the cross-connector (#102546).



**NOTE:** If needed, use a hammer to tap the cross-connector and the purlin to center it between the brackets that secure the struts.

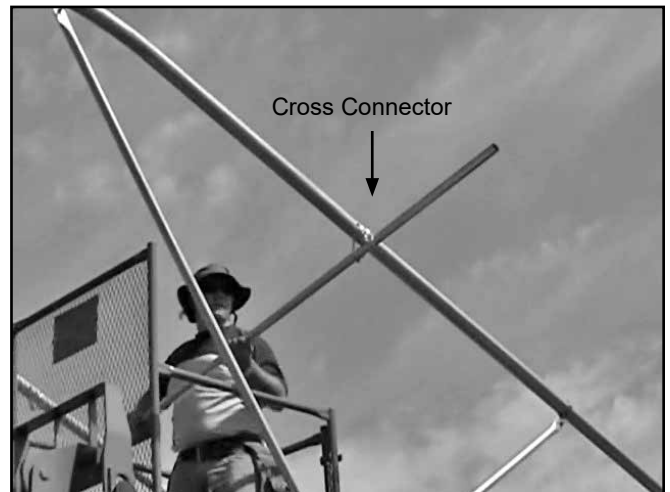
9. After tightening the cross-connector, install a Tek screw (FA4482) through the cross-connector and into the purlin. *Position the Tek screw so that it also secures the joint of the purlin pipes.*



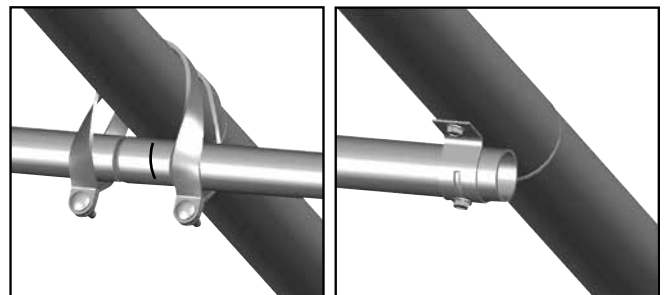
The first purlin and the first two rafters should appear as shown:



10. Move down the rafters to the first rafter joint and place a cross-connector over the inside rafter at that joint.
11. Select the first two sections of the second pre-marked purlin and install it as you did the top/center purlin.



12. Position the cross-connector and the purlin over the pipe joint of the rafter assembly and align the mark on the purlin with the center of the rafter.



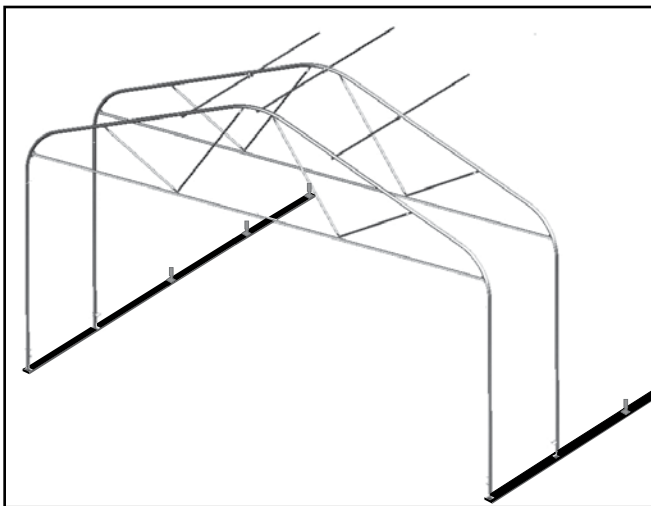
**Remember:** To prevent damage to the main cover and end panels, do not allow the purlin to extend beyond the edge of the end rafter.

**FRAME ASSEMBLY (CONTINUED)**

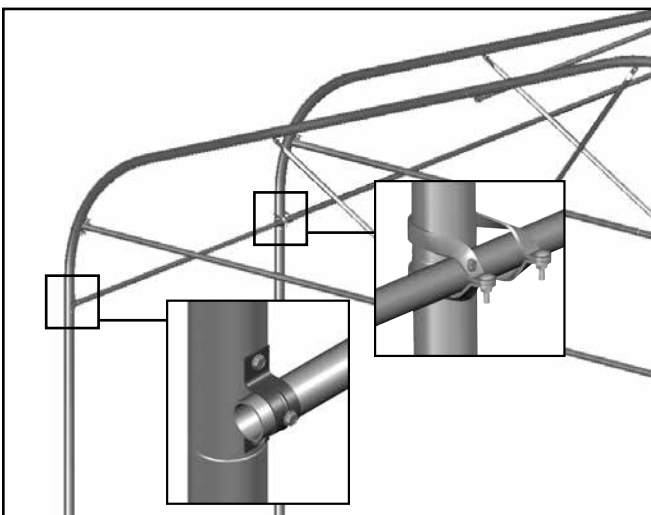
13. Tighten the cross-connector and install a Tek screw as shown to secure the purlin pipe joint and to secure the purlin to the cross-connector.
14. Move to the other upper pipe joint on the inside rafter, place a cross-connector over the joint, and repeat the steps to install the first two sections of the last overhead purlin.

**NOTE:** Position the cross-connector and purlin on the rafter pipe joint. Do not remove the temporary bracing until additional rafters are in place.

To this point, the assembled frame includes two rafters and three top purlins as shown.

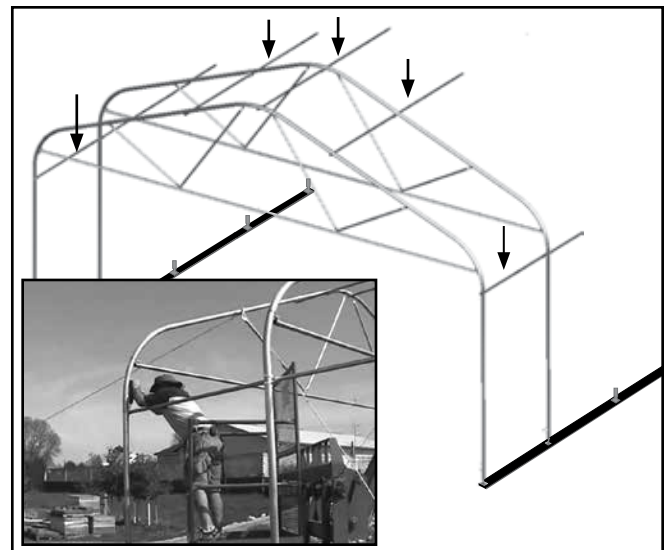


15. After attaching the last overhead purlin to the inside rafter, move down the rafter assembly to the pipe joint below the bottom chord and place a cross-connector (#102546) over the rafter pipe.



This inserts shows the purlin, clamp and cross-connector as seen from the inside of the building.

16. Insert the first two sections of the pre-marked purlin through the cross-connector and into the pipe strap in the same position on the end rafter. Tighten the pipe strap and secure the purlin to the pipe strap using a Tek screw (FA4482).
17. Align the mark on the purlin with the center of the rafter leg and tighten the cross-connector. The purlin should be saddled in the pipe joint on the rafter.
18. Install a Tek screw (FA4482) through the cross-connector and through the joint in the purlin to prevent separation of the purlin pipe joint.
19. Move to the remaining joint below the bottom chord on the inside rafter and attach the first two sections of the next purlin.



The drawing above shows the top 5 purlins in position.

20. Set the next *inside rafter assembly* in position and secure it to the feet as previously instructed.



21. Continue to add the cross-connectors and the pre-marked sections of purlins and secure these to the rafter assemblies as previously instructed.

## CLEARSPAN™ STORAGE MASTER

### FRAME ASSEMBLY (CONTINUED)

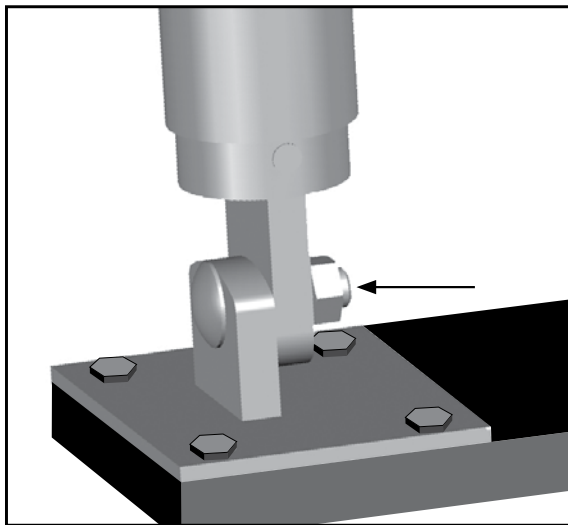
**ATTENTION:** The last rafter to place in position will be the remaining end rafter. This end rafter includes the pipe straps attached during the rafter assembly procedures and is identical to the first end rafter set in place.

22. Set the end rafter in place and align the purlins with the pipe straps (previously attached to the rafter). Insert the rafter feet mounting bolts (bolt head to the outside) and tighten as previously instructed.
23. Begin with the top pipe strap and ensure that approximately half an inch of the purlin extends through the pipe strap and tightened the pipe strap mounting bolts.
24. Verify that the end rafter is plumb.

**NOTE:** If the rafter is not plumb (straight up and down) and more of the purlin pipe needs to extend through the pipe strap and beyond the edge of the rafter, it may be necessary to cut the purlin to the required length.

To prevent cover damage, *do not allow the purlin to extend beyond the edge of the rafter.*

25. With all rafters in place and the top five (5) purlins installed and tightened, return to the rafter feet and tighten the main bolt that attaches the bottom plate of the rafter foot to the upper portion of the foot.



26. Complete the ATTACH THE BOTTOM and ATTACH THE CENTER PURLIN procedures that follow.

### ATTACH THE BOTTOM PURLINS

After the top five (5) runs of purlins are in place and secure, complete these steps to install the remaining purlins.

Required tools:

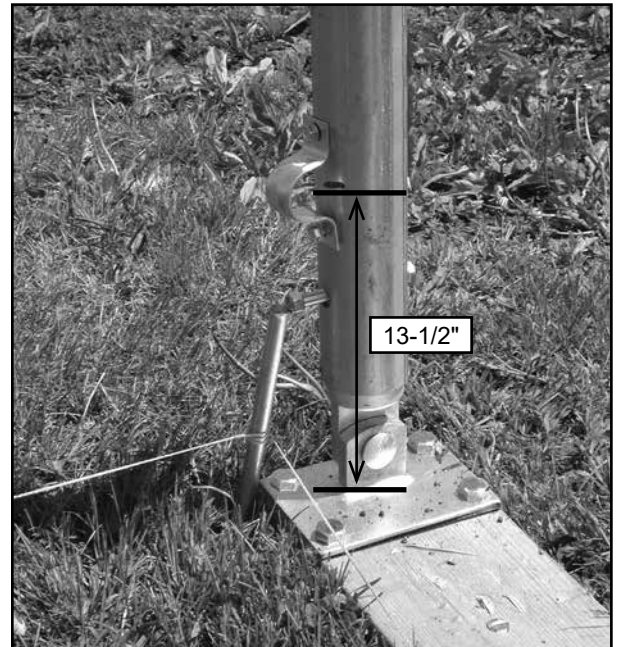
- Tape measure
- Permanent marker

**ATTENTION:** The bottom purlins run on the inside of the rafter legs near the bottom of those rafter legs.

1. Begin at one end of the frame assembly and measure up 13 1/2" from the rafter foot mounting plate on the end rafter and make a mark on the inside of the rafter leg.

**NOTE:** This mark and the remaining marks identify the location of the bottom purlin for each side. *The mark identifies the center of the purlin.*

2. After marking the end rafter, attach a pipe strap to the inside of the rafter leg so that the strap is positioned with the mark at its center. Do not tighten the strap Tek screws at this time.



3. Move to the remaining leg on the same rafter assembly and mark as instructed in the previous steps.
4. Repeat Steps 1-3 for the remaining end rafter assembly.
5. On the first inside rafter assembly, measure the same distance (13-1/2") up the rafter leg from the foot base and make a mark on the outside of the leg.

## FRAME ASSEMBLY (CONTINUED)

6. After marking the location of the center of the bottom purlins on the legs, place a cross-connector at the base of each leg of each inside rafter assembly (Figure 1).

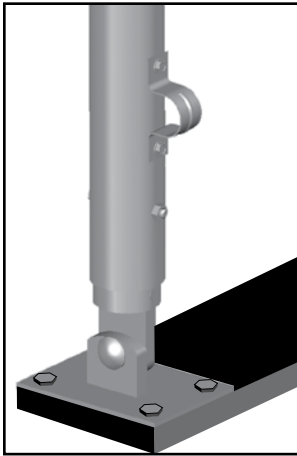


Figure 1

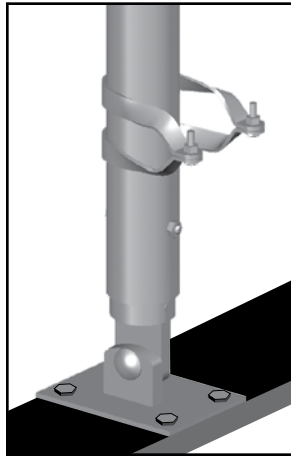
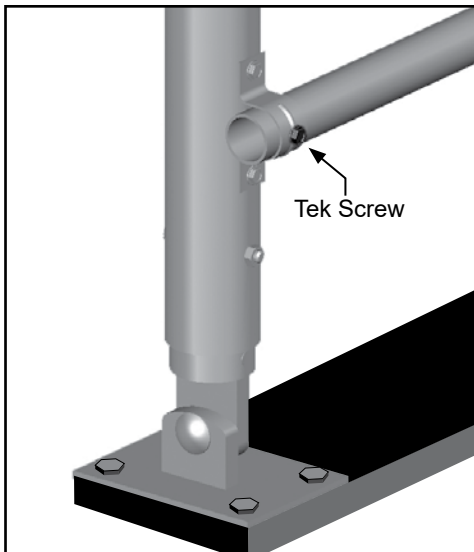


Figure 2

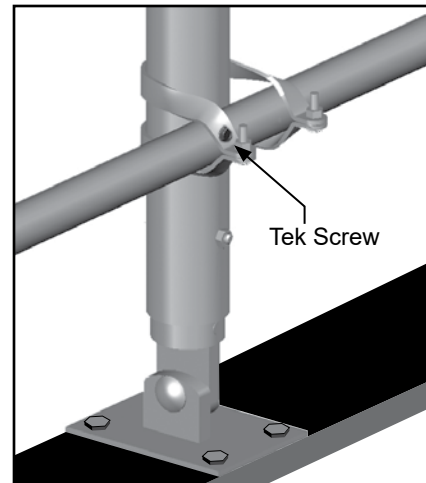
**ATTENTION:** Attach pipe straps to the end rafters only (Fig. 1). Cross-connectors are used to secure the bottom purlins to the inside rafter assemblies (Fig. 2).

7. Choose the first two sections of one remaining purlin assembly, insert the purlin section through the cross-connector on the inside rafter leg, and insert the end into the pipe strap attached to the end rafter (below).
8. Tighten the Tek screws to secure the pipe strap to the end rafter leg as described for the other purlins.



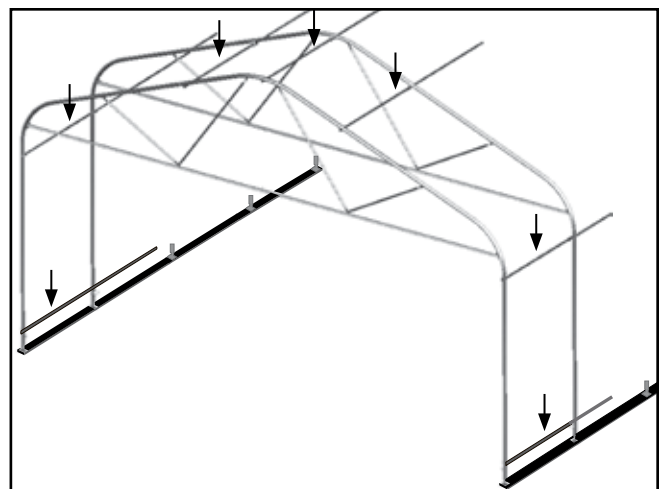
9. Install a Tek screw (FA4482) through the pipe strap and into the purlin to anchor the purlin in place.

10. Using the mark on the inside of the rafter leg as a guide, slide the cross-connector (#102546) and purlin so that the center of the purlin pipe is in line with the mark on the rafter leg.
11. Tighten the bolts on the cross-connector to secure the purlin.
12. Install a Tek screw (FA4482) through the cross-connector and through the pipe joint of the purlin to keep the joint tight.
13. Continue to assemble and attach the remainder of the same bottom purlin until the entire purlin is secured to the frame.



14. Repeat the above steps for the remaining bottom purlin.

The frame with the purlins assembled to this point should resemble the drawing below. There are seven (7) purlins in the drawing. (See the arrows for location.)



**NOTE:** The FA4482 Tek screw is used throughout this assembly.



## CLEARSPAN™ STORAGE MASTER

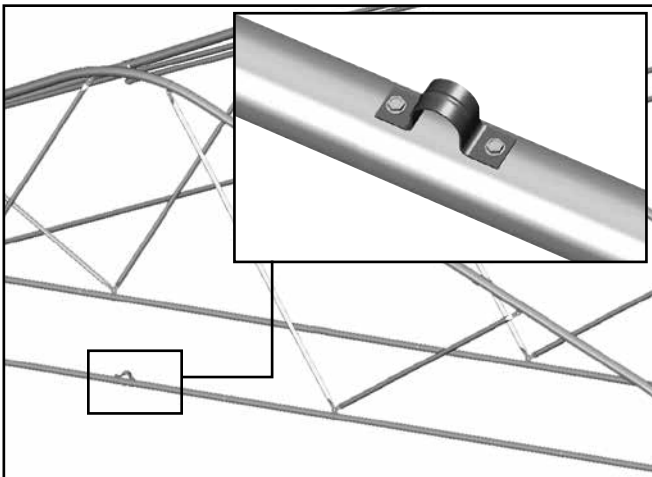
### FRAME ASSEMBLY (CONTINUED)

#### ATTACH THE CENTER PURLIN

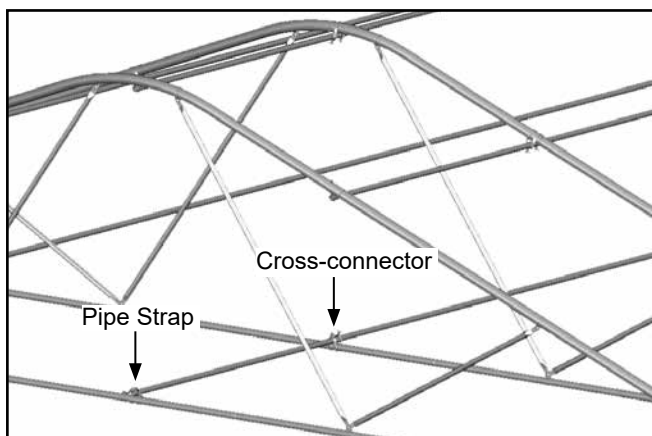
The center purlin is attached to the bottom chord and runs *on top of the chord* the length of the shelter. As before, regarding *all end rafter purlin connections*, the center purlin is attached using a pipe strap. A cross-connector (#102548) is used to secure the center purlin to the bottom chord of the inside rafters only.

Complete these steps:

1. Locate the center of the bottom chord of the end rafter and install a pipe strap at that location *on top of the chord* (if not installed earlier). **Do not tighten at this time.**

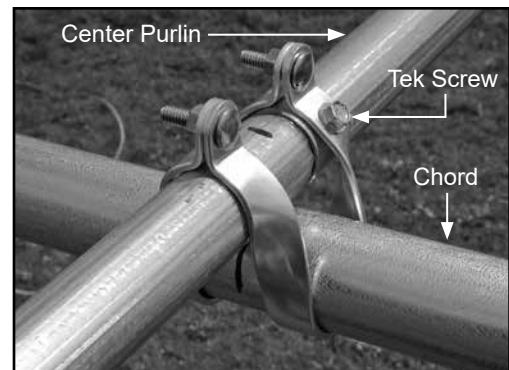


2. Measuring from end-to-end on the bottom chord, locate the center of the bottom chord on the inside rafter and mark the location.
3. Position a cross-connector (#102548) over the bottom chord and remove the first two sections of the remaining purlin assembly.
4. Insert the purlin through the pipe strap (#QH1070) on the bottom chord (end rafter) and through the cross-connector on the bottom chord of the inside rafter.



**REMEMBER:** The center purlin runs *on top of* the bottom chord.

5. Position the purlin as needed and tighten the cross-connector bolts.



6. Install a Tek screw through the cross-connector and through the pipe joint in the purlin as shown above.
7. Return to the end rafter and verify that approximately half-an-inch of the center purlin extends through the pipe strap. Move the bottom chord if needed and tighten the Tek screws that secure the pipe strap to the bottom chord.

**REMEMBER:** To prevent damage to the end panels, the center purlin must not extend beyond the edge of the bottom chord.

8. Install a Tek screw through the pipe strap and into the center purlin.
9. Repeat the above steps for the remaining inside rafter assemblies and work toward the remaining end of the shelter.

**NOTE:** Differences in how the rafters were assembled and how the center was located on the bottom chord can cause the center purlin to appear off center. It may be necessary to "adjust" the center purlin so that its appearance is in line with the purlin at the top or peak of the rafter.

To achieve this, the cross-connectors can remain loose after the purlin is inserted to allow a final viewing to see if the purlin is centered. With the cross-connectors loose, the purlin can then be tapped into the desired position.

When the purlin appears centered, return to each cross-connector, check to see that the pipes of the purlin are properly seated, and tighten the bolts. Once each cross-connector is tight, install a Tek screw through the cross-connector and into the pipe joint of the purlin.

10. At the remaining end rafter, repeat the steps to secure the center purlin to the bottom chord of the end rafter.
11. After the final purlin is attached to the end rafter, continue with squaring the assembled frame.



## SQUARING THE ASSEMBLED FRAME

If the *Lay Out the Building Site* procedure was completed as presented near the beginning of this document, use the lines marked on the site to align the rafters and to adjust the width of the rafters as needed.

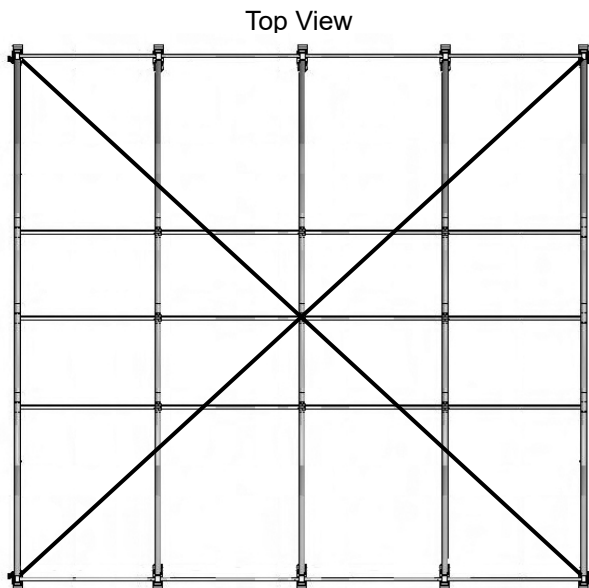
Rafter width is measured from center of one leg to the center of the other leg on the same rafter assembly.

If the framework was assembled on the site without using the recommended treated lumber, complete these step to square the assembled frame.

1. Align all rafters using a straight line (if needed) or the marks on the site from the *Lay Out the Building Site* procedure completed earlier.
2. Beginning with the first rafter, verify that the distance between the rafter feet for that rafter is equal to the width of the building and adjust if needed.

To insure that the proper on-center width is maintained for the length of the building and for each rafter, it is important to measure between the rafter feet of each rafter and to adjust the width (if needed) to maintain a consistent width. Pulling the feet together can do this. Width is measured center-to-center.

3. After adjusting the rafters, perform a final square of the structure by measuring diagonally (corner-to-corner), and make sure that the two measurements are equal.



*Frame shown is a different length.*

4. Examine the framework and remove any sharp edges from the frame or reposition clamps and screws so they do not come in contact with the end panels or the main cover.

5. Tape all rafter splices with duct tape to protect the main cover when it is installed.
6. Verify that *all pipe splices* are secured using Tek screws.
7. After the framework is squared, read or reread the MUST READ document and anchor the framework in place.

## ANCHOR THE SHELTER

At this point, anchor the frame. Once the frame is anchored properly, continue with these instructions.

**⚠ WARNING:** Securing the rafter footings to wood boards set on the site is not a substitute for properly anchoring the shelter. You must anchor the shelter as described in the MUST READ document.

**FAILING TO PROPERLY ANCHOR THE SHELTER WILL RESULT IN DAMAGE TO THE SHELTER AND MAY CAUSE PERSONAL INJURY.**

**READ THE MUST READ DOCUMENT TO PROPERLY ANCHOR THE SHELTER.**



The photo above shows how an auger anchor is attached to one rafter leg.

Consult the MUST READ document for additional information about anchoring the shelter.

## FINISH ROUGH EDGES

Gather the parts:

- Duct tape
- Metal file (may not be needed)

1. Check for sharp edges on the frame. If present, file these smooth so they will not cut the cover.
2. Apply two layers of heavy duct tape over all pipe connections and clamps that may contact the cover.
3. Install band clamps for the cabling.

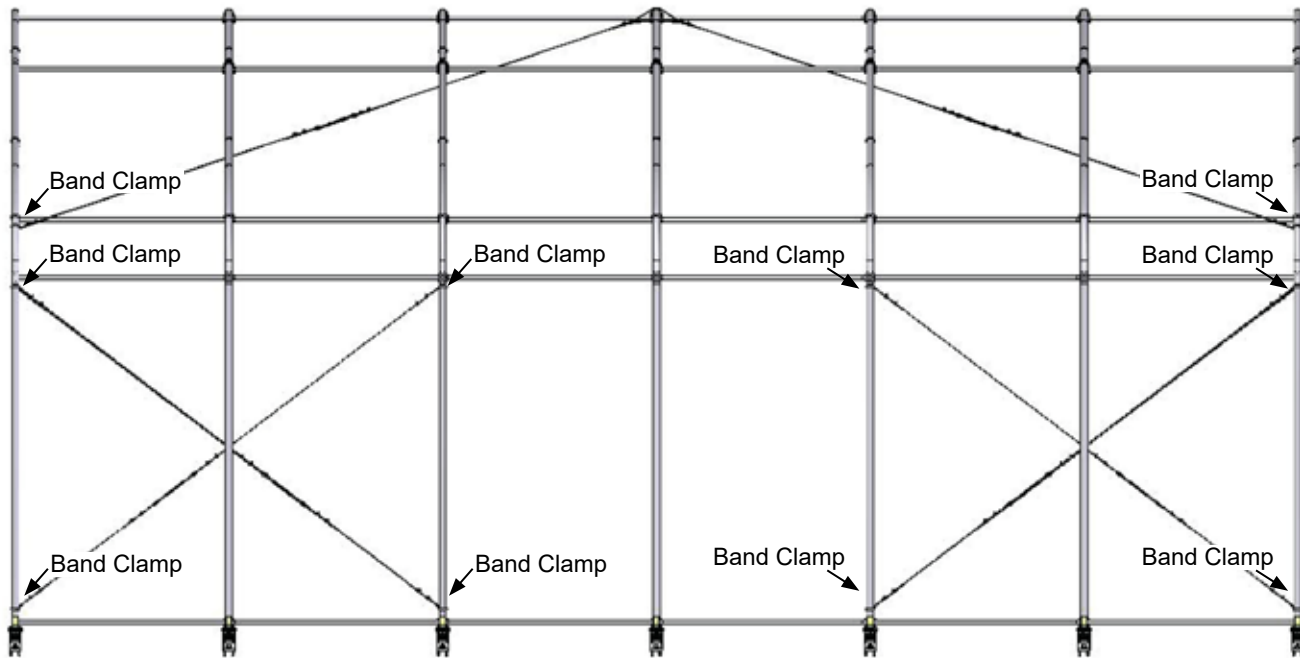
## CLEARSPAN™ STORAGE MASTER

### ATTACH BAND CLAMPS FOR CABLING

Space below is reserved for customer notes.

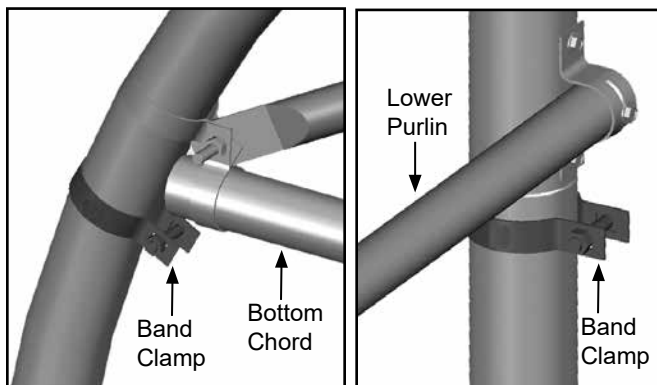
Cables attached to both ends of the shelter provide the diagonal bracing for the shelter. Band clamps secure the cable bracing to the shelter.

Ten (10) band clamps (#103856) are used on each side of the frame to secure the cable ends. Consult the diagram below and in the Quick Start section for cable locations.



Complete these steps to install the band clamps:

1. Remove the nut and bolt from the clamp, carefully bend the band clamp open, and slide it over rafter in the proper location.
2. With the clamp in place, use a channel lock pliers to squeeze the clamp back into shape and reinstall the bolt and nut. *Do not fully tighten at this time.*



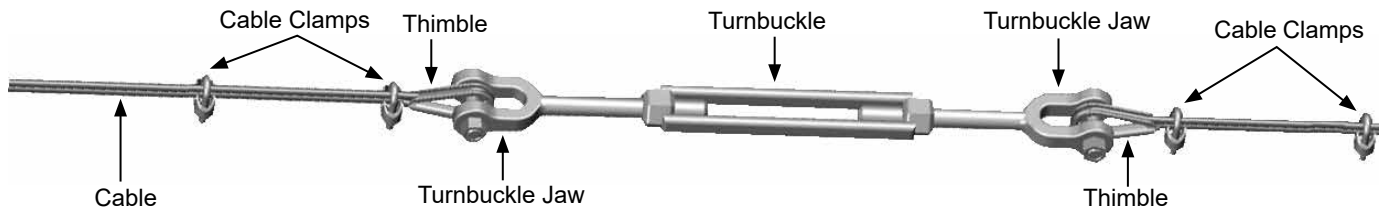
Band Clamp Location

3. Slightly tighten the nut and bolt or use a small piece of duct tape to hold the clamp in position.
4. Continue by assembling the cables.

## CABLE ASSEMBLY

Cable assemblies provide diagonal bracing for the building. Each cable assembly includes the following items:

- Two (2) lengths of cable (Measure from point-to-point on the frame and cut as needed.)
- Turnbuckle (1)
- Cable thimbles (4) and cable clamps (4)



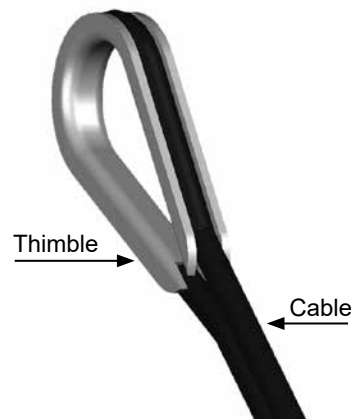
*Typical Turnbuckle Assembly*

**NOTE:** For each cable assembly, two (2) additional thimbles and four (4) additional cable clamps are used to attach the cable assembly to the purlin clamps. Consult the Cable Diagram on the following page and the All Frame Diagram for clarification and cable locations.

### Cable Assembly Procedure:

1. Using the Side Profile diagram (and others) in the Quick Start section as a guide, measure the distance needed on the frame and cut the cable to the proper length for each assembly. Extra cable has been sent for the cabling. (Make a single assembly *before* making them all. This allows a check to be sure the correct length has been cut.) Make the necessary length adjustments as needed.
2. Place one cable thimble approximately twelve inches (12") from the end of a cable section and wrap the cable around the thimble as shown in the figure to the right.
3. Grasp both sections of the cable near the thimble and position one cable clamp one inch away from the thimble as shown above.

**NOTE:** Position the clamp on the cable with its U-bolt portion over the short/dead section of the cable.



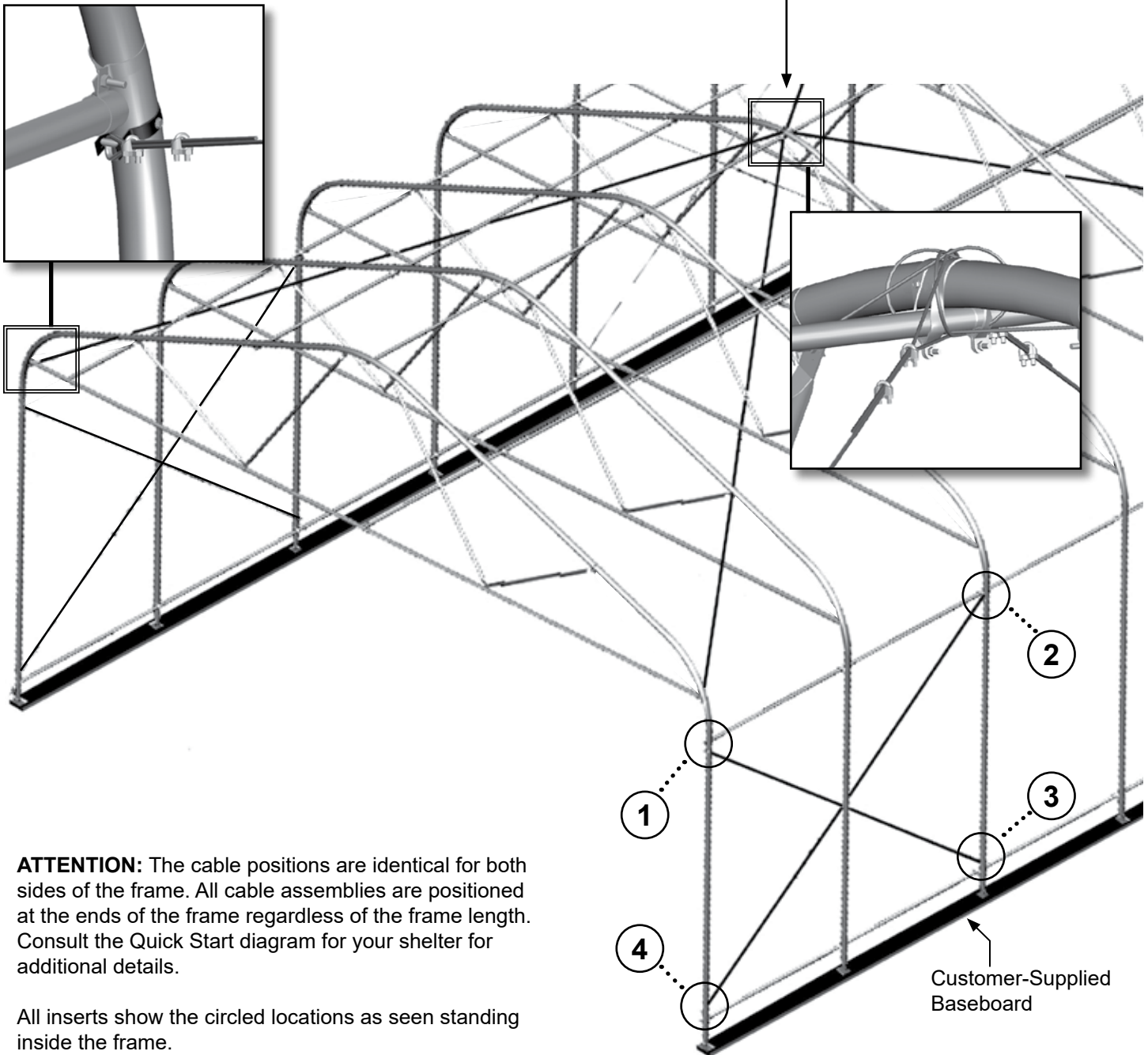
4. With the saddle portion of the cable clamp in position, thread the nuts onto the U-bolt section of the clamp and tighten slightly to maintain the position of the clamp on the cable.
5. Install a second cable clamp on the cable six to eight (6"-8") inches from the first clamp.
6. Tighten both clamps.
7. Remove the bolt from the jaw of the turnbuckle and position the cable end with the thimble into the jaw of the turnbuckle.
8. Insert the bolt through the eye of the turnbuckle and the cable thimble, thread the nut onto the bolt, and tighten.
9. Repeat Steps 2-8 for the remaining length of cable for this assembly.
10. Open the turnbuckle to its longest position.
11. Repeat the above procedure for all remaining side and upper cable assemblies.

## CLEARSPAN™ STORAGE MASTER

### CABLE PLACEMENT

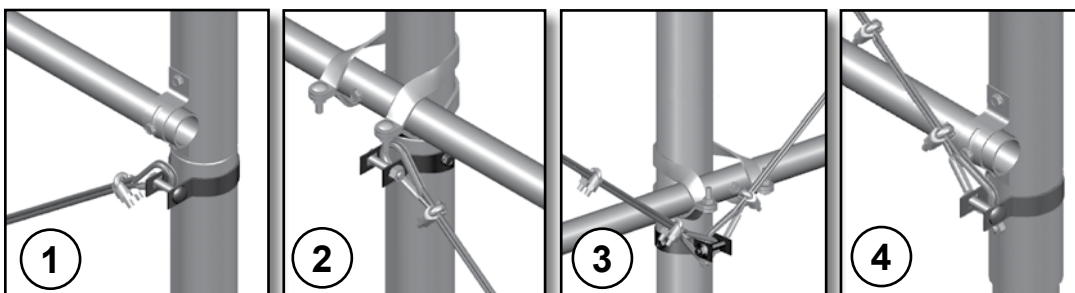
The diagram and inserts below identify the placement and proper way to attach the cable assemblies to the building using **103856** band clamps.

**ATTENTION:** Wrap this cable connection using duct tape to protect the cover.



**ATTENTION:** The cable positions are identical for both sides of the frame. All cable assemblies are positioned at the ends of the frame regardless of the frame length. Consult the Quick Start diagram for your shelter for additional details.

All inserts show the circled locations as seen standing inside the frame.



## TIGHTEN THE CABLING

The positions of the cable assemblies are identical for the opposite side and the remaining end of the building that are not shown in the previous diagram. For cable locations for your building, consult the Side Profile diagram.

1. After attaching all cable assemblies to the building frame, return to the first set of turnbuckles and tighten the cables.

**NOTE:** Tighten the cables in each section evenly so that the frame remains plumb.

2. After one set of cables is tightened, move to another set and repeat the tightening steps.
3. Repeat this process until all cables are tight.
4. Continue with installing the ratchets for the main cover.

## INSTALL THE RATCHETS FOR THE MAIN COVER

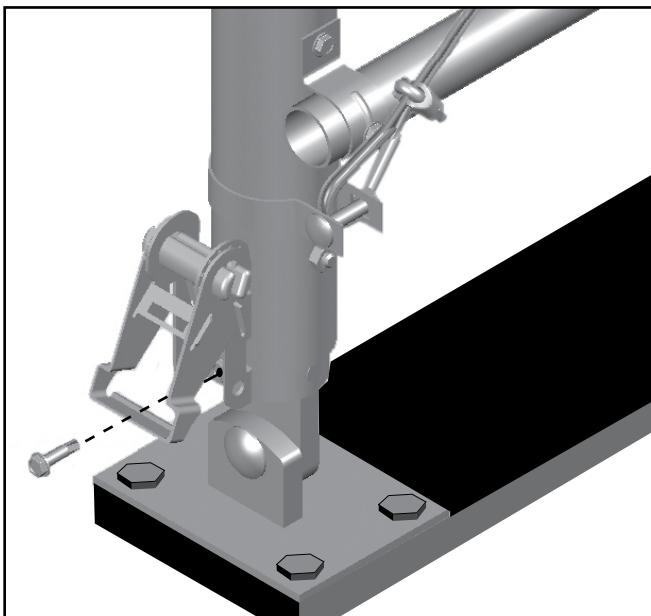
All ratchets are *attached on the outside of the assembled frame*. Complete the following steps to position and secure the ratchets to the frame.

Gather the parts:

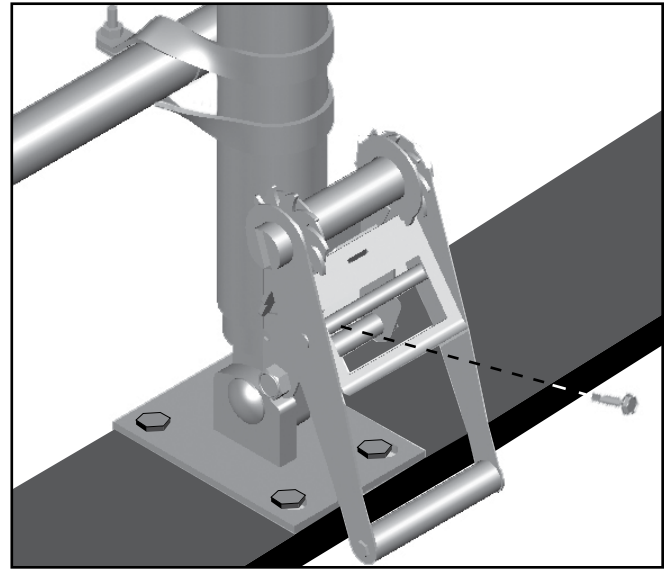
- Small ratchet (#QH1061)
- Large ratchet (#QH1065)
- Tek screws (#FA4482)

Complete the following steps to locate and secure the ratchets to the rafter legs.

1. Locate the four (4) small ratchets (#QH1061) and attach these to the outside of the two end rafters as shown in the diagram below. These ratchets are attached using Tek screws (FA4482).



2. After attaching the four (4) small ratchets (#QH1061), locate all QH1065 ratchets and divide the quantity in half. Use half for each side of the frame.
3. Place the QH1065 ratchets on the ground next to each rafter.
4. Attach the QH1065 ratchet to the rafter foot using a Tek screw as shown below.



**ATTENTION:** Ratchets are spaced along each side of the shelter and directly across from each other on the *same rafter assembly*.

5. After all side ratchets are installed and a final frame check complete, continue with the cover installation procedures.

## FINAL FRAME CHECK

1. Verify that all rafter pipe splices and purlin splices are secured with a Tek screw.
2. Recheck the frame assembly for sharp edges or clamps and bolts that may interfere with the installation of the cover. Reposition clamps and bolts as needed. Tape all rafter pipe joints with duct tape to protect the cover.
3. Check all turnbuckles to verify that they are tight.
4. Tape the loose or frayed ends of all cables to protect the cover.
5. Verify that all bolts and clamps are tight.



## CLEARSPAN™ STORAGE MASTER

### PREPARE MAIN COVER

Gather the parts:

- Pipe 1.315" x 75" swaged
- Pipe 1.315" x 73.5" plain
- Main cover
- Tek screws

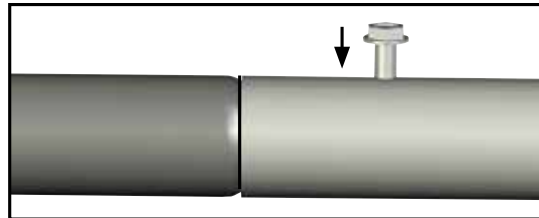
#### Assembly Procedure

**NOTE:** When handling the main cover and setting it in position, do not pull on the end straps. They will pull out of the cover. Position the pre-installed straps of the main cover at the ends of the assembled and anchored frame.

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

1. Assemble two main cover conduits. Start each conduit assembly with one (1) plain pipe and add swaged pipes to arrive at the correct length. *This conduit is identical to the length of the purlin pipe assemblies.*

- a. Locate all sections of pipe needed to assemble the cover conduit.
- b. Insert the swaged end of each pipe into the plain end of another pipe until the conduit is assembled.
- c. Secure each pipe joint with a Tek screw.



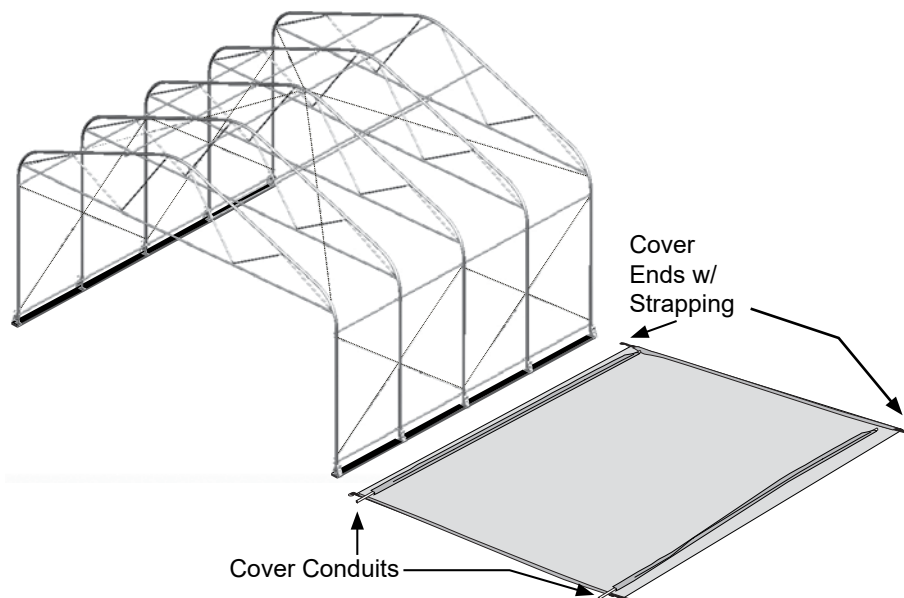
**NOTE:** Duct tape over the Tek screws to prevent damage to main cover.

These cover conduits are inserted into the pockets sealed into the main cover. The conduits are used to tighten and secure the main cover.

2. After assembling the cover conduits, locate the main cover and unfold it on a clean, smooth surface near the frame.

**NOTE:** Unfold the main cover with the inside surface facing up.

3. Locate the cover ends with strapping and align with the front and back of the shelter.
4. Insert the cover conduits into the pockets of the main cover.



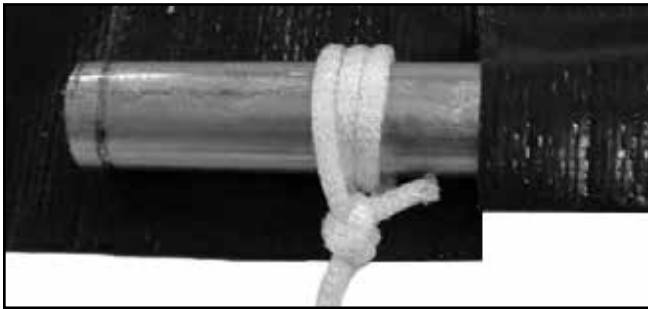
## ATTACH MAIN COVER

Gather the parts:

- Main cover (with conduits already inserted)
- Ropes long enough to reach over the frame (provided by customer)
- Box cutter or utility knife

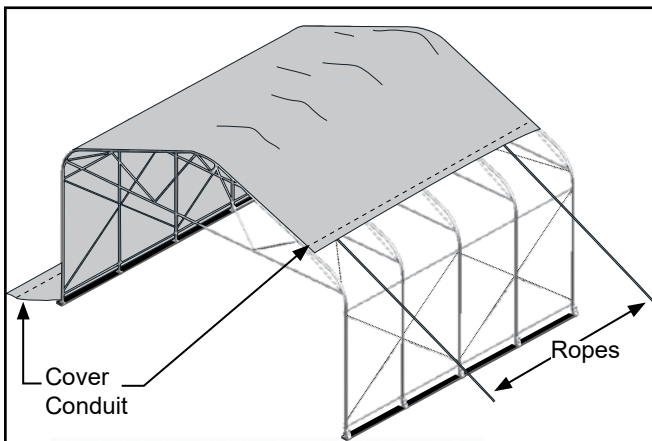
### Assembly Procedure

1. To pull the cover over the frame, attach ropes to both ends of the cover conduit. Wrap the rope around the conduit a few times to prevent it from slipping off.



**NOTE:** Depending on the length of the cover it may be necessary to attach additional ropes to the cover conduit between the end ropes by cutting a small opening in the cover pocket and tying the rope around the conduit. **DO NOT** cut through the main cover. *Cut through the conduit pocket only.*

2. With all ropes attached to the cover conduit, lift the conduit and carry the cover toward the base of the frame.
3. Toss the ropes over the frame and pull the cover into position. One person is required at each rope.



Shelter shown above may be a different length.

**NOTE:** Use lifts and additional assistants (if needed) to help pull the cover up and over the frame.

4. Once the main cover is pulled into position, center the cover on the frame and remove the ropes. Loosely secure the ends of the cover to the ratchets attached to the front and back end rafters.

**⚠ WARNING:** To prevent damage and injury, do not leave the cover unattended if it has not been properly secured. The ropes can be used to temporarily keep the cover from blowing off the frame.

5. Locate the black straps at the front and rear hems and feed the straps through the center slot in the end ratchets located on outside each end rafter.

**NOTE:** Do not tighten completely at this time. This helps to temporarily secure the cover.

6. Tie the ropes (or straps), used to pull the cover into position, to the frame to help hold the cover.
7. Move to the other side conduit of the cover and temporarily secure that side of the cover to the frame.

**NOTE:** Tie ropes to the ends of the side conduit and directly across from the ropes or straps tied to the other side conduit to temporarily secure the cover to the frame. Once side straps are installed and slightly tightened, the cover is stretched end-to-end.

8. Continue with the installation of the side straps.

## CLEARSPAN™ STORAGE MASTER

### INSTALL THE MAIN COVER SIDE STRAPS

The side straps wrap around slits created in the side conduit pocket. The strap ends of each strap are then fed into each side ratchet attached to the rafter legs and slightly tightened to keep the cover in position.

Required parts and tools:

- 2" yellow bulk strap (The following photos may show a different strap; procedure is the same.)
- Tool to cut slits in cover conduit pockets

Complete these steps to install the side straps:

1. Move to one side ratchet attached to a rafter and cut a slit in the *conduit pocket* just above the conduit and in line with the ratchet.



Photos above show using a utility knife to cut a slit above the conduit, which has been inserted into the main cover side pocket. Cover, rafter, and frame design differ from actual shelter. Procedure is the same.

**NOTE:** If ropes were used at these locations when the main cover was pulled in place, a slit in the cover pocket may already be present.

When creating the slit in the pocket for the strap, *do not cut the main cover. Cut only the pocket material.*

2. Using the ratchet and conduit positions as guides, measure and cut a tie down strap from the bulk yellow strap that shipped with the building.



**NOTE:** Cut the strap length so that the strap can wrap around the cover conduit and both ends can be inserted into the ratchet.

3. After cutting the strap, feed one end through the slot in the cover pocket and around the conduit.
4. Feed both ends of the strap through the slot in the ratchet and slightly tighten the ratchet.



**NOTE:** Do not tighten completely at this time.

Frame and ratchet location differ from actual frame. Steps to install the main cover are similar however.

5. Repeat the previous steps to install and slightly tighten the remaining straps.



**NOTE:** Do not tighten completely at this time.

6. After all side security straps are in place and slightly tightened and the cover is centered evenly on the frame side-to-side and end-to-end, complete the following steps to tighten the ratchets.

## TIGHTEN THE SIDE RATCHETS

Before continuing, verify that the cover is in the desired position and centered on the frame. (Loosen and reposition if needed.) Continue with these steps to tighten the side ratchets.

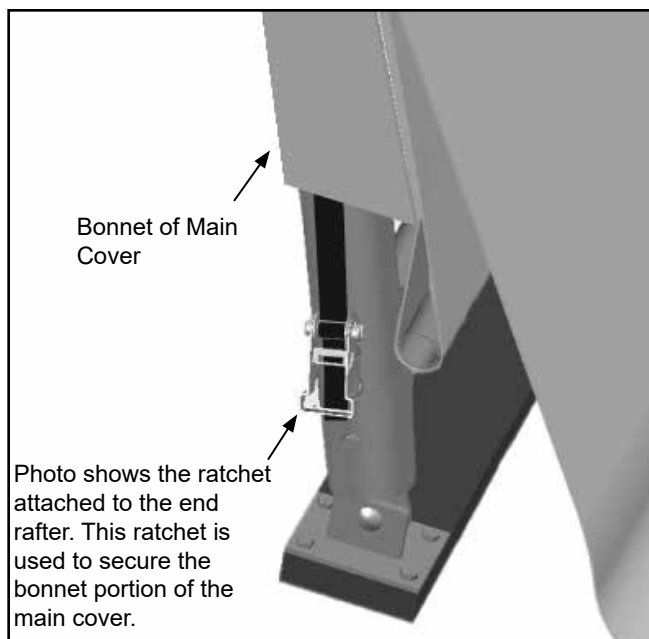
1. Move to the side ratchets attached to each leg of one rafter. Begin at an inside rafter near the center of the frame.
2. With an assistant at one side ratchet and someone at the other side ratchet on the same rafter, tighten the ratchets to secure the cover.

Tightening the ratchets at the same time on the same rafter helps keep the cover centered and results in a more uniform appearance.

3. Move to another rafter and repeat the steps to tighten the side ratchets attached to that rafter.

**NOTE:** If the strap builds up in the ratchet, loosen the ratchet, remove some of the strap, and retighten.

4. After all side ratchets are tight, position someone at each ratchet attached to the end rafter where the bonnet straps of the cover were previously inserted.



5. Tighten the end ratchets to secure the bonnet portion of the main cover.
6. Move to the other end of the building and secure the bonnet at that end.
7. Read the Care and Maintenance information that follows.

## SHELTER CARE AND MAINTENANCE

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

- Regularly check the main cover and panels (if equipped) to see that these remain tight and in proper repair.
- Check the cable turnbuckles and cable clamps to see that these remain tight. Tighten as needed. Check the cable to verify that it is not worn or wearing on a frame member.
- Check connections and all fasteners to verify that they remain tight.
- Do not climb or stand on the shelter at anytime.
- Remove debris and objects that may accumulate on the shelter. Use tools that will not damage the cover when removing debris.
- Remove snow to prevent excess accumulation. Use tools that will not damage the cover when removing snow.
- Check the contents of the shelter to verify that nothing is touching the cover or the side panels that could cause damage.
- Check the anchoring system to ensure that all components are tight and in good repair.
- If the shelter is moved, inspect all parts and connections before reassembling.
- For replacement or missing parts, call 1-800-245-9881 for assistance.

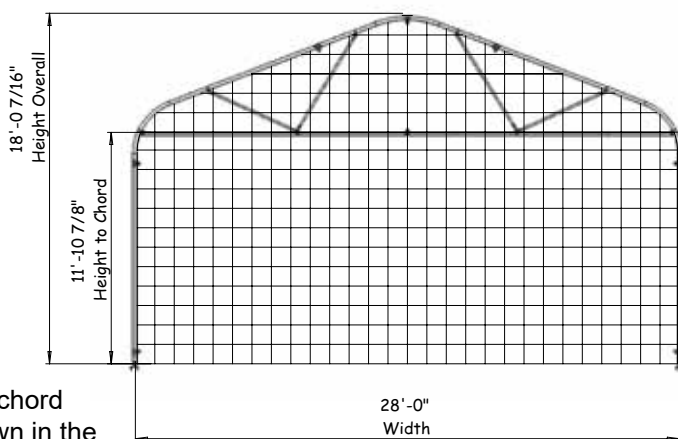
**NOTE:** With the exception of Truss Arch buildings, ClearSpan™ shelters and greenhouses *do not* have any tested loading criteria.





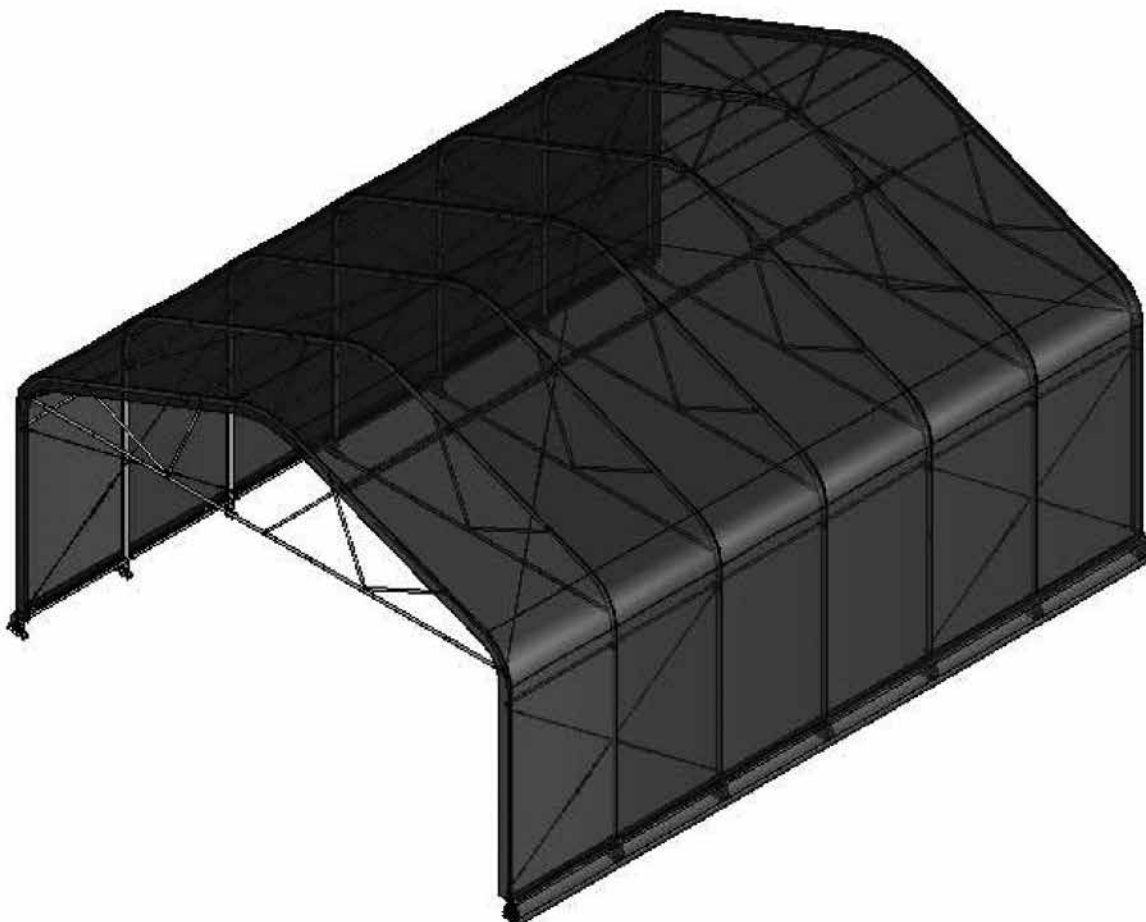
## QUICK START GUIDE

28' Wide Storage Master Building



**NOTE:** Actual height of the chord may differ from what is shown in the diagram.

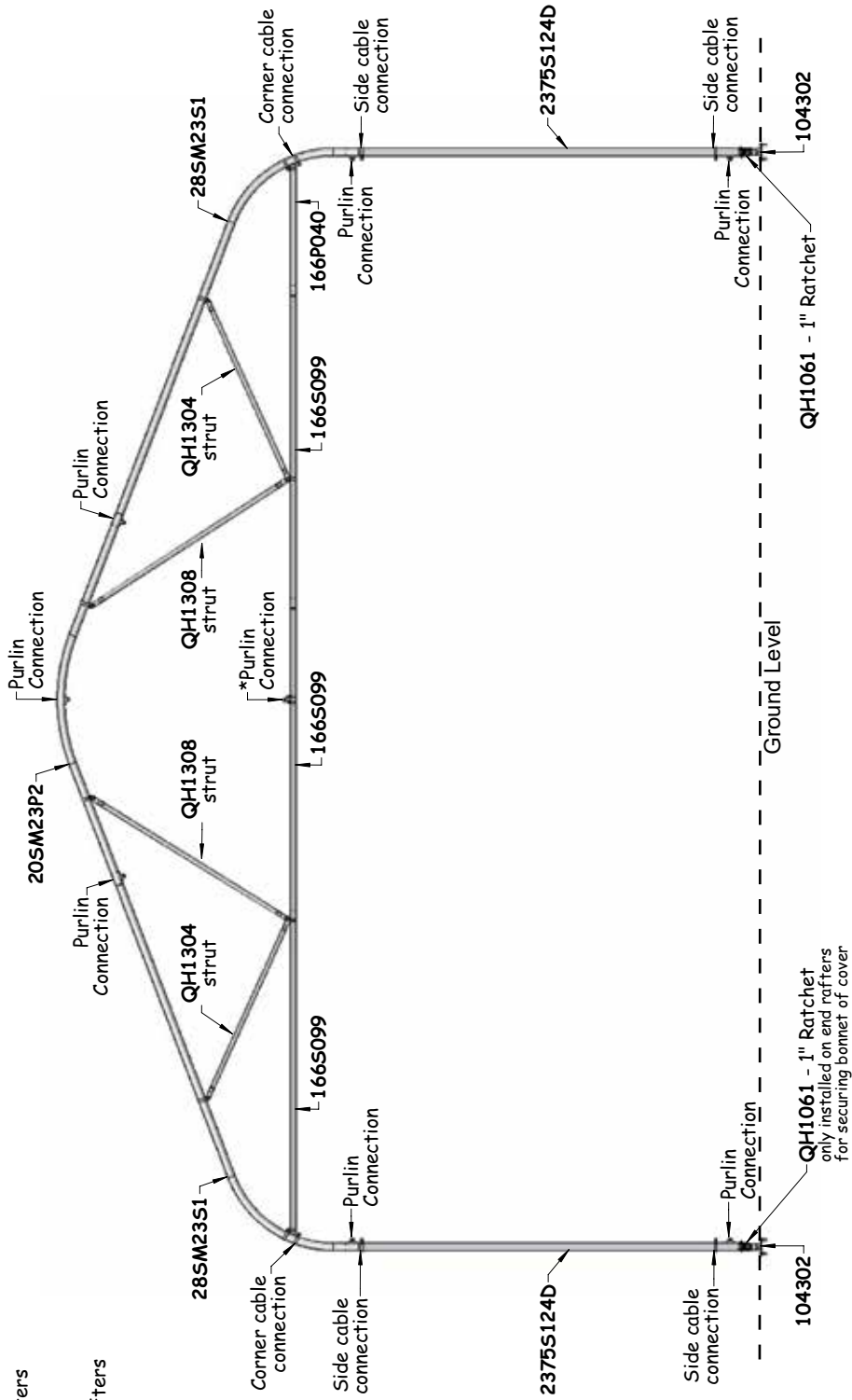
**FRONT**  
Grid Represents 12" Squares



# FRONT PROFILE

**Purlin Connection Note:**

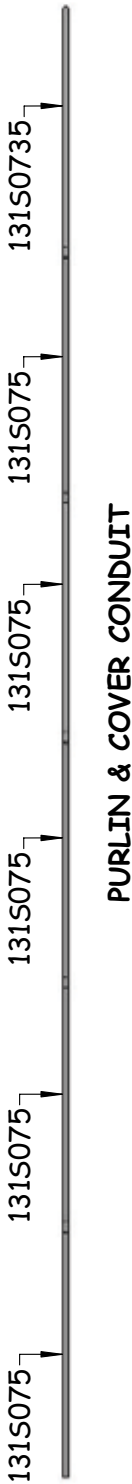
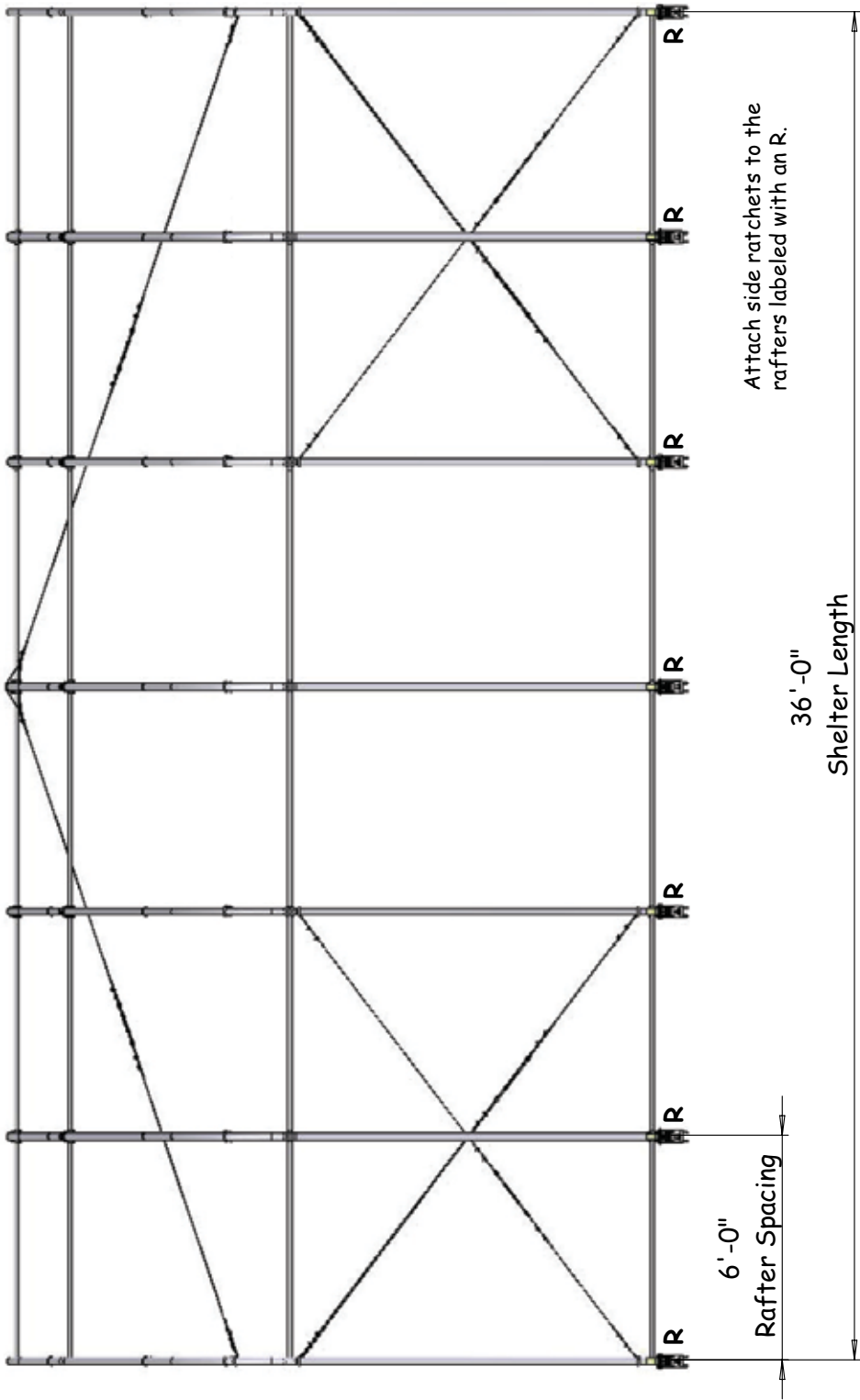
- Purlin connected to end rafters using **QH1070** pipe strap.
- \*One purlin run connected to end rafter using **QH1070** pipe strap.
- Purlin connected to mid rafters using **102546** 2.375" cross connectors.
- \*Purlin connected to mid rafters using **102548** 1.66" cross connectors.



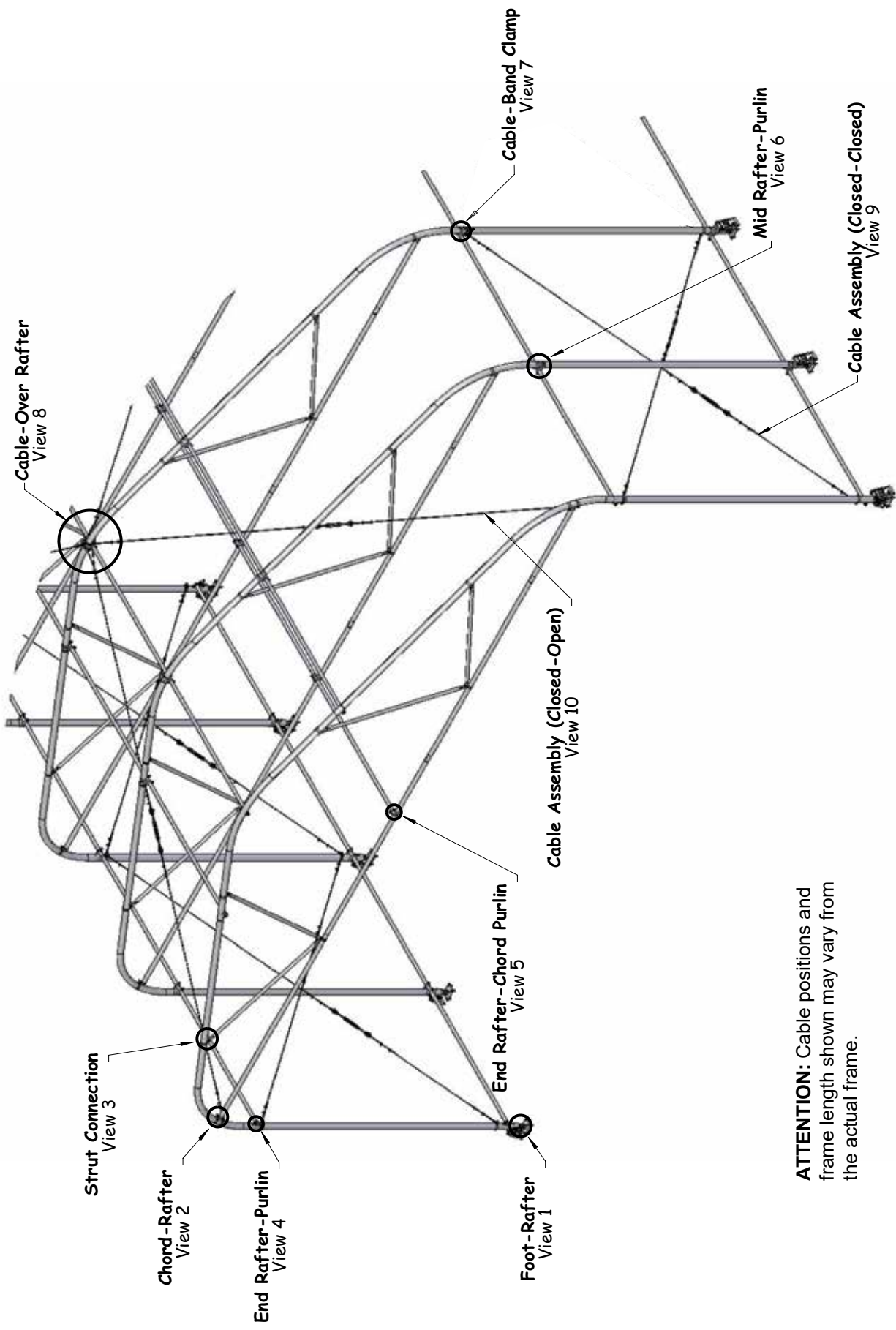
**Cable Connection Note:**

- Clamps used for cable connections are not installed on every rafter.
- Sidewall cable connections installed on end and 2nd from end rafters only.
- Corner cable connections installed on end rafters only.

SIDE PROFILE - PB02524R6



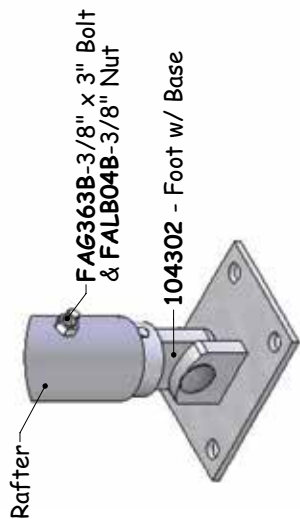
# CONNECTIONS



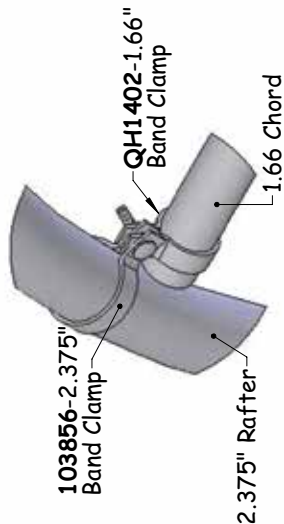
**ATTENTION:** Cable positions and frame length shown may vary from the actual frame.



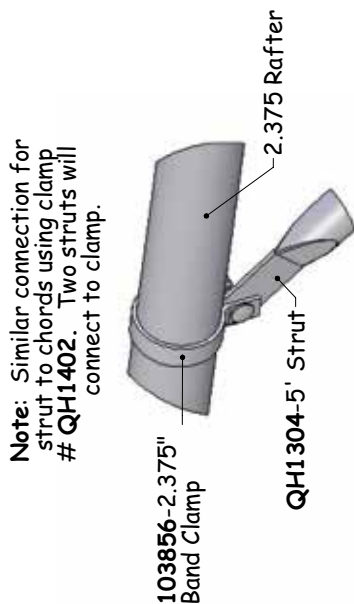
# CONNECTION - DETAILS 1-6



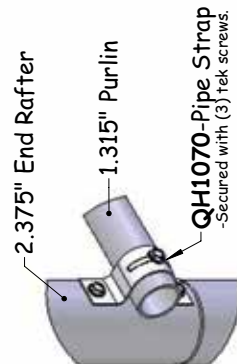
**Foot-Rafter**  
View 1



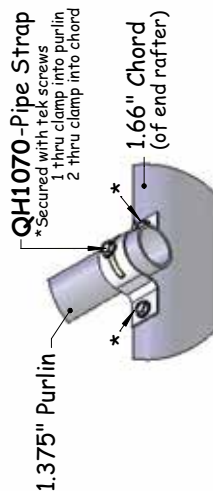
**Chord-Rafter**  
View 2



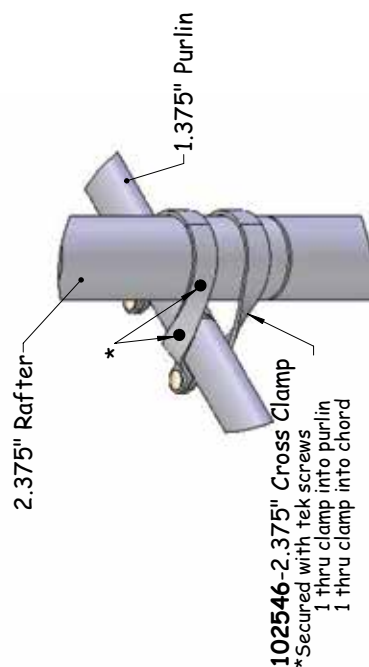
**Strut Connection**  
View 3



**End Rafter-Purlin**  
View 4



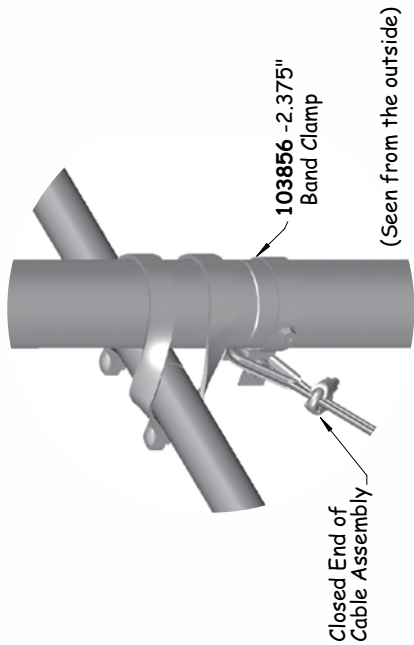
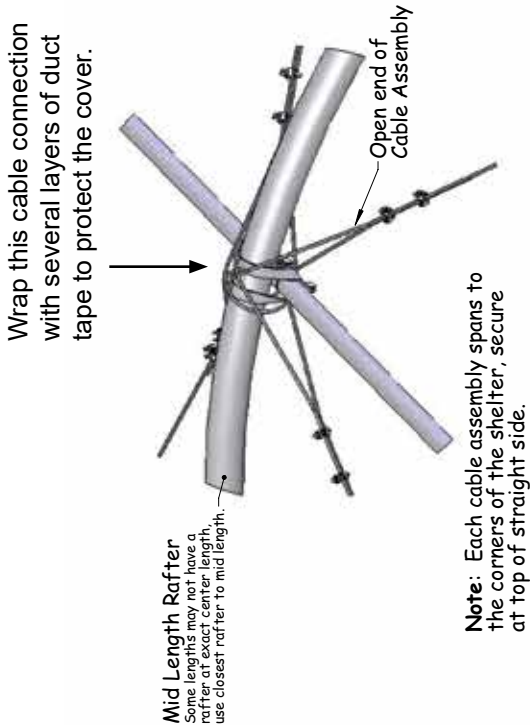
**End Rafter-Chord Purlin**  
View 5



Note: Similar connection for purlin to mid chords using clamp # 102548

**Mid Rafter-Purlin**  
View 6

# CONNECTION - DETAILS 7-10

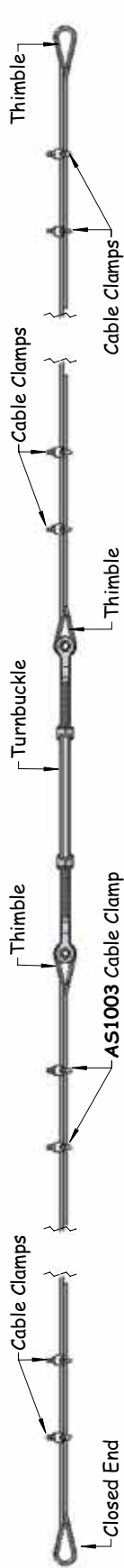


**Cable-Band Clamp**

View 7

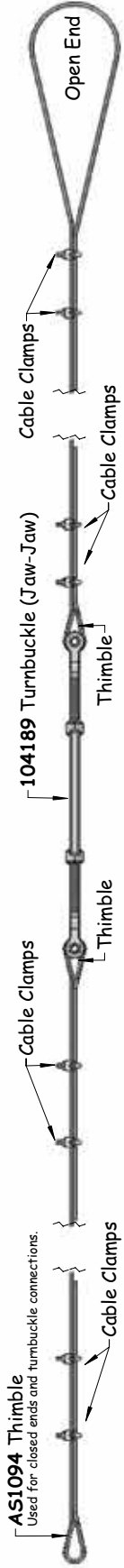
**Cable-Over Rafter**

View 8



**Cable Assembly (Closed-Closed)**

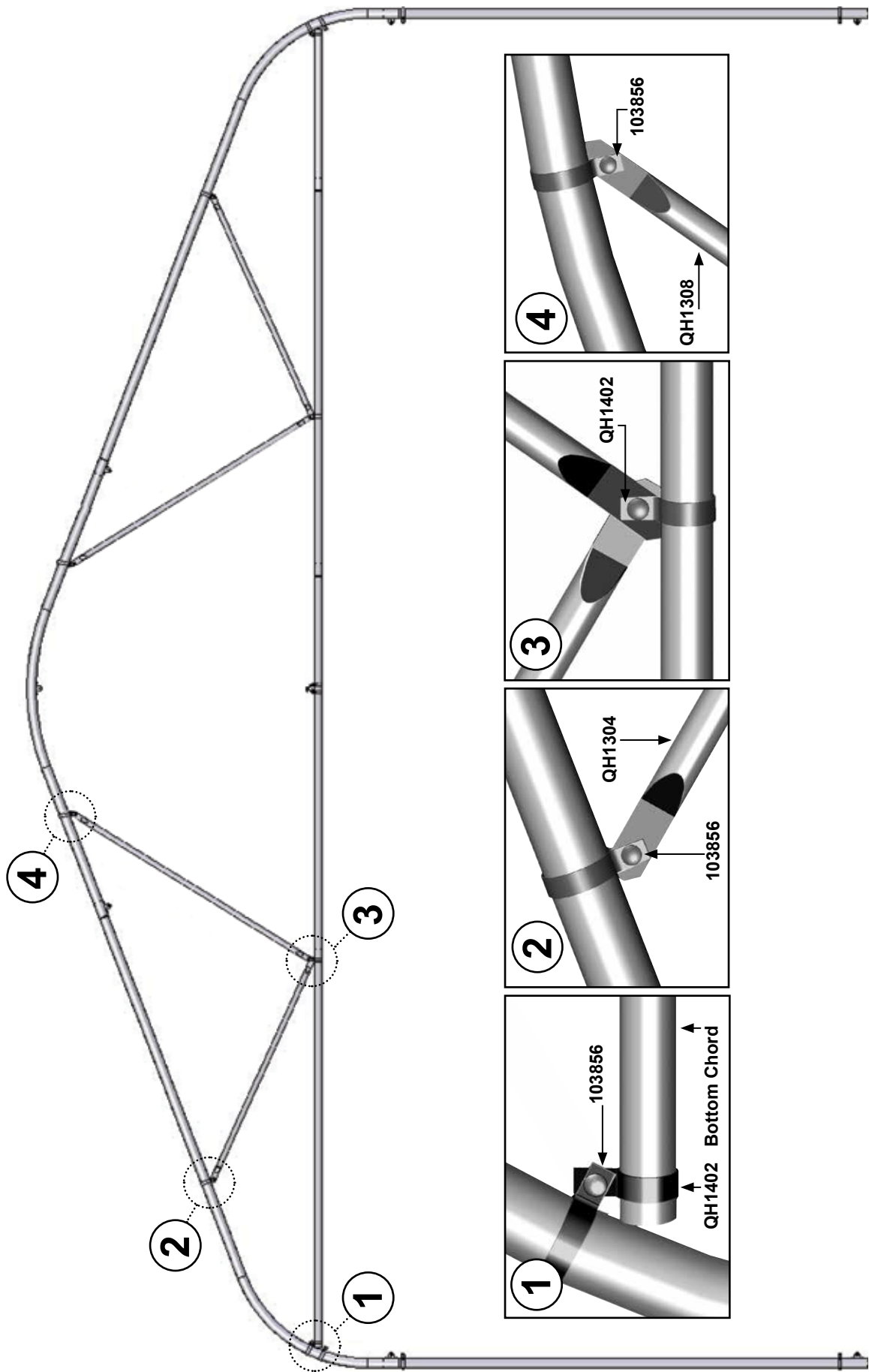
View 9



**Cable Assembly (Closed-Open)**

View 10

# CONNECTIONS- RAFTER





Space below is reserved for customer notes.