OVERVIEW OF FEATURES

Railing frame components can be specified in a variety of materials: steel and stainless steel pipe; stainless steel flat bar; structural tubing; and wood. Please note that the ***Ultra-tec® Cable Railing System*** is not recommended for use with aluminum pipe or tube.

Type 316 stainless steel cable and hardware are used. Due to the increased amounts of nickel and the addition of molybdenum, type 316 stainless steel has excellent resistance to atmospheric and corrosive conditions.

Ultra-tec's® exclusive ***Invisiware®*** hardware is hidden inside the end posts making it virtually invisible. We also offer hardware that is visible when installed but with smooth, rounded corners. More compact than awkward turnbuckles intended for other uses, all hardware has been designed specifically for pedestrian cable railings.

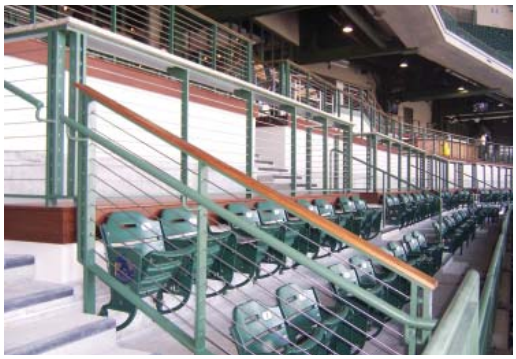
All ***Ultra-tec® Cable Railing System*** hardware can be swaged in the field by using one of our portable swaging tools. Swaging in the field permits intermediate post and braces to be bored just slightly larger than the diameter of the cable being used since only the cable will have to pass through. If purchased pre-swaged, the intermediate posts and braces have to be bored to allow for the larger diameter of the swaged fitting to pass through the intermediate post or brace.

If desired, fittings can be swaged onto one or both of the cable ends at the factory. New ***Ultra-tec® Push-Lock™*** fittings simplify installation – requiring only one end be pre-swaged with a tensioner and the other end field cut and assembled.

By using our pre-tensioning tool, runs of up to 150 feet and longer can be achieved while maintaining tight cable tension using ***Ultra-tec®*** hardware.

Refer to installation instructions on page 278 to 293.

Note: Due to the effects of thermal expansion and contraction, maximum run for exterior railings is 100 feet.



THE LADDER EFFECT

The 2000 International Residential Code (IRC) stated that guardrails shall not be constructed with horizontal members or other ornamental pattern that results in a ladder effect. The ladder effect has never been a part of the International Building Code (IBC).

The ladder effect was removed from the IRC during the 2001 code cycle and it was noted in the 2001 IRC supplement. The 2003, 2006 and 2009 IRC and IBC contain no reference to the ladder effect.

However, many local code authorities are using older codes based on BOCA – the creator of the ladder effect wording – and the 2000 IRC. Many local code inspectors are not aware of the 2001 change and may reject guardrailings with infills they interpret as creating a ladder effect.

It will take time for the 2001 IRC supplement and the newer model codes to trickle down to the local levels. In the meantime, be prepared to address this issue should it come up in your area.

Ultra-tec® Cable Railing System was created to address the deficiencies encountered in using standard tensioning mechanisms for cable barrier railings – sharp edges on retainers; long, bulky fittings; and uneven, hand-crimped shanks. Standard marine turnbuckles and stud fittings with exposed nuts and threads were the norm because that was all that was available – **until now**.

Railing styles shown in the ***Ultra-tec® Design & Fabrication Guide for Metal Framed Railings*** – available online – are made available to design professionals and steel fabricators. The guide is useful in designing a properly constructed cable railing. It highlights attractive pre-engineered metal frame styles that utilize standard *off the shelf* materials. Included are drawings and specifications that will ensure that the frame will perform successfully when all cables are properly tensioned.

Exclusive ***Ultra-tec® Cable Railing Hardware*** is designed especially for cable railings. ***Invisiware®*** terminals can be concealed within the railing end post. These precision machined Type 316 stainless steel fittings are engineered to interface with standard frame components detailed in our ***Design & Fabrication Guide for Metal Framed Railings. Ultra-tec®*** railing hardware can be factory swaged by us or field swaged by the customer, using an ***Ultra-tec®*** portable swaging tool. New ***Push-Lock™*** fittings now make field installation even easier.

A ***Cable Rail Sample Pack*** is available at a modest cost. It contains: ***3/16" Cable; Invisiware® Receiver, Radius Ferrule, Adjust-A-Body® with Hanger Bolt; Clip-On Stop and Fixed Jaw; Fixed Tab Weld Fitting; Weld Receiver, Grommets,*** and ***Threaded Tab***.

CRSAMPLE

FIELD INSTALLED PUSH-LOCK™ FITTINGS MAKE CABLE RAILINGS EASY TO INSTALL

NO FIELD SWAGING!

Cables come with a tensioner on one end. Install the tensioner on one end post, then cut the cable to length. Slip the ***Push-Lock™*** fitting into the other end post or mount it with the tab to the outside of the post.

Push the cable into the Push-Lock™ fitting, tension the cable and you're done.

Note: Push-Lock™ Tool Kit is required – see page 58.

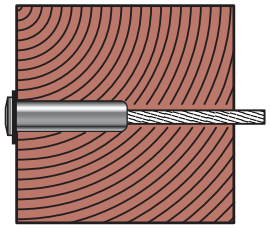
EASY TO ORDER – EASY TO INSTALL

Select the tensioners you wish to use and provide the length of each of your cable runs. The cables will be shipped with tensioners swaged on one end and bare cable on the other end. Pre-cut cable will be approximately 3" longer than required to allow for potential fraying. Cut each cable to a final length on site and push it into the opening in the ***Push-Lock™*** fitting.

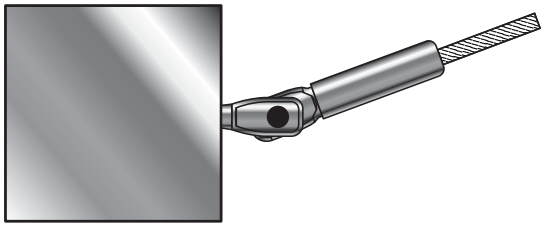
Two styles make your job easy – in metal or wood

Push-Lock™ fittings with rounded cap ends rest inside your metal or wood end posts on level runs. The fitting is hidden inside the post, with only the head exposed on the outside of the post.

Note: For ⅛" cable and straight pull applications only.

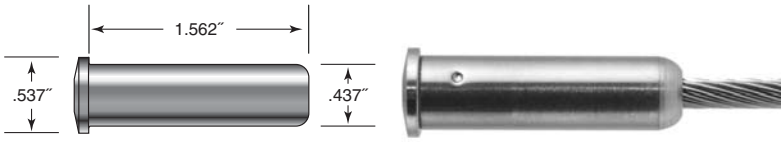


Push-Lock™ fittings with threaded eyes mount to lag eyes, tabs or holes on the outside of your metal or wood post for use on stairs and severe pitches.



PUSH-LOCK™ FOR LEVEL RUNS
Type 316 Stainless Steel

These ***Push-Lock™*** fittings with rounded ends are used on level runs. They rest in a hole in the end post. When used with an end post 1½" or more in thickness, the ***Push-Lock™*** fitting is hidden inside the end post with only the head exposed on the outside of the post. Pipe ends are counterbored so the full perimeter of the head will rest on a flat surface in the pipe. A ***Plastic Washer*** is included and acts as a scratch-resistant barrier between the ***Push-Lock™*** fitting and a metal post. The head rests on the outside wall of a flat-sided metal post or on a stainless steel washer on a wooden post. For wood applications, also order part number ***CR716SAE Washer***.

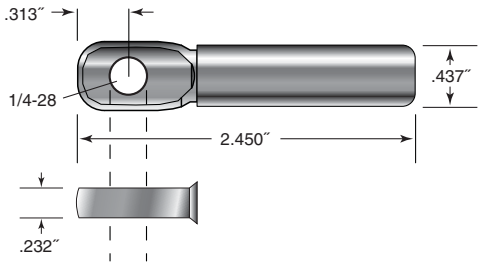


Cable Size	Frame Options	Stainless Steel	For Wood Post Use Washer #
⅛"	1.500" Tube	**CRPL4M**	**CR716SAE**
⅛"	1¼" Pipe	**CRPL4M**	**CR716SAE**
⅛"	Other Frames	**CRPL4**	**CR716SAE**

PUSH-LOCK™ FOR STAIRS OR SEVERE PITCHES
Type 316 Stainless Steel

These fittings have a ¼-28 threaded eye end and are for use on stairs. They attach to a wood end post with a ***CRLE6*** shown on page 55. For metal posts, use a ***Fixed Tab*** or ***Threaded Tab***. Mount with a ***CRSC6 Screw*** shown on page 55.

Cable Size	Stainless Steel	Use with Screw # (included)	For Wood Post Use Lag Eye #	For Stainless Post Use Fixed Tab #	For Stainless Post Use Threaded Tab #	For Steel Post Use Threaded Tab #
⅛"	**CRPLTE4**	**CRSC6**	**CRLE6**	**CRFT65B**	**CRTT6B**	**CRFT65A**



FIELD INSTALLED PULL-LOCK™ FITTINGS MAKE CABLE RAILINGS EASY TO INSTALL

NO FIELD SWAGING

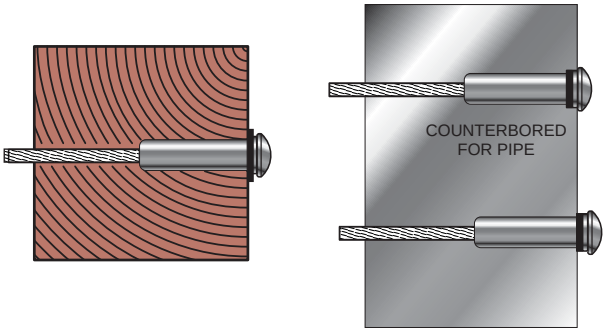
***Pull-Lock*™** fittings are designed for use with 1 × 19 L.H. lay strand only. They can be used with any tensioning device on the other end, but when used with our swageless tensioners, both ends can be put on the cable by hand without any swaging or special tools.

EASY TO INSTALL

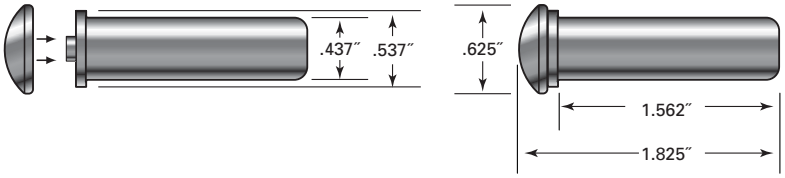
You can order your cables with a tensioner already on one end or you can install a tensioner on one end on site. Attach the tensioner on one end post, slip the ***Pull-Lock*™** fitting into the other end post and pull the cable all the way through the ***Pull-Lock*™** fitting. Tension the cables, then cut the excess cable off on the back side of the fitting with a 4" right angle grinder or a cutting wheel that is used with your hand drill. Press on the stainless steel cap to cover the bare cable end, and you're done!

USE WITH METAL OR WOOD POSTS

Pull-Lock*™** fittings are used with pipe and with round, square, or rectangular metal tubing. When used with an end post 1½" or more in thickness, the ***Pull-Lock*™** fitting is hidden inside the end post, with only the head exposed on the outside of the post. Pipe ends are counterbored so the full perimeter of the screw cap head rests on a flat surface in the pipe. The head rests on the outside wall of a flat-sided metal post. A ***Plastic Washer is included and acts as a scratch-resistant barrier between the screw cap head and the metal post. For wood applications, also order ***CR716SAE Stainless Steel Washer***.



PULL-LOCK™
Type 316 Stainless Steel

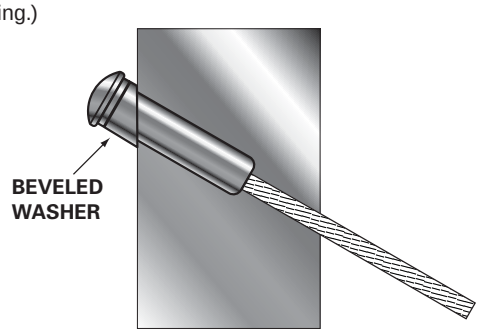


Cable Size	Frame Options	Stainless Steel	For Wood Post Use Washer #
⅛"	1.500" Tube	**CRPUL4M**	**CR716SAE**
⅛"	1¼" Pipe	**CRPUL4M**	**CR716SAE**
⅛"	Other Frames	**CRPUL4**	**CR716SAE**

USE PULL-LOCK™ STOP-END FITTINGS ON STAIRS WITH SPECIAL BEVELED WASHERS.

Special stainless steel beveled washers let you use ***Pull-Lock*™** fittings on stairs and severe pitches with flat-sided metal frames. (Not offered for pipe or round tubing.)

Pitch / Angle	⅛" Cable
30° - 33°	**CRBW326**
34° - 36°	**CRBW356**
37° - 39°	**CRBW386**



CONVENIENT CUTTING TOOL

To cut the cable flush with the end of the ***Pull-Lock*™** fitting, a 4" right angle grinder with a cut-off wheel is ideal. For those who do not have that type of hand tool, a cutting tool for use with a hand drill is available.

CUTTING TOOL
CRCUTOFFKIT

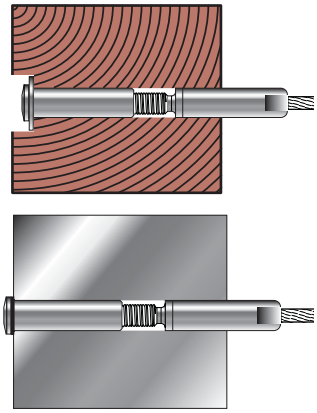
FIELD INSTALLED PUSH-LOCK™ STUDS REQUIRE NO SWAGING OR SPECIAL TOOLS

NO FIELD SWAGING
Similar to our ***Invisiware***® receivers but when used with ***Push-Lock***™ studs there is no need to swage the threaded stud onto the cable. ***Receivers*** with ***Push-Lock***™ swageless studs can be used with any fitting on the other end but when used with our other swageless fittings, both ends can be put on the cable by hand without any swaging or special tools.

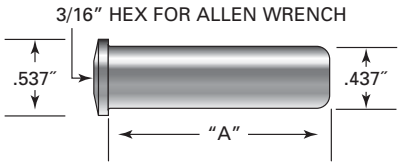
EASY TO INSTALL
Push-Lock™ studs are designed for use with 1 × 19 L.H. lay strand only. Push the cable into the ***Push-Lock***™ swageless stud, where it will be securely held inside the fitting. The receiver is female-threaded to accept the male-threaded end of the fitting. The head of the receiver is broached for an Allen wrench. To tension the cable, use an Allen wrench to rotate the receiver around the threaded end of the stud.

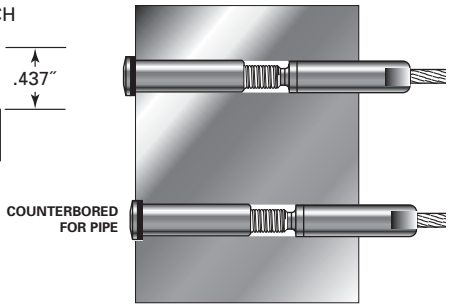
USE WITH METAL OR WOOD POSTS
The receiver with ***Push-Lock***™ stud rests inside your metal or wood end post.

For use in wood, the fitting can rest against the outside of the end post or the post can be counterbored with the fitting recessed in the post. For wood applications, a larger diameter washer is needed to distribute the load over a wider surface. See ***CR716SAE Stainless Steel Washer***.



PUSH-LOCK™
Type 316 Stainless Steel





Cable Size	Use With Swageless Stud #	A = Length of Receiver Body	Receiver
⅛"	**CRPLST4**	1.562"	**CRR612**
⅛"	**CRPLST4**	1.812"	**CRR622**
⅛"	**CRPLST4**	2.030"	**CRR632**
⅛"	**CRPLST4**	2.301"	**CRR642**
⅛"	**CRPLST4**	2.375"	**CRR672**
⅛"	**CRPLST4**	3.030"	**CRR652**
⅛"	**CRPLST4**	3.562"	**CRR662**

CABLE RELEASE
Releases cable from Push-Lock™ and Pull-Lock™ type fittings before cables are tensioned.

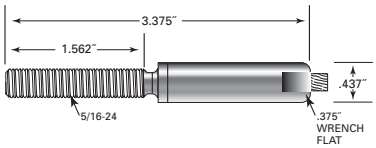
Cable Release	**CRPLKEY**

USE PUSH-LOCK™ FITTINGS ON STAIRS OR SEVERE PITCHES WITH SPECIAL BEVELED WASHERS.
Special stainless steel beveled washers let you use ***Push-Lock***™ tensioners on stairs or severe pitches with flat-sided metal posts. (Not offered for pipe or round tubing.)

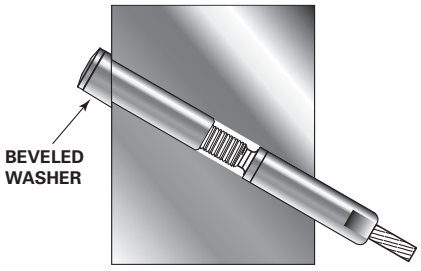
With wood posts, you need to counterbore a 1" diameter hole at an angle, to accept the over-sized stainless steel washer that distributes the load over a wider surface than is required with a metal post.

Pitch / Angle	⅛" Cable
30° - 33°	**CRBW326**
34° - 36°	**CRBW356**
37° - 39°	**CRBW386**

PUSH-LOCK™ SWAGELESS STUD
The Push-Lock™ swageless stud is installed onto the end of the cable by hand, by pushing the cable into the fitting where it is held securely inside. No swaging is required, and other than a cable cutter, no special tools are needed.



Cable Size	Stainless Steel
⅛"	**CRPLST4**



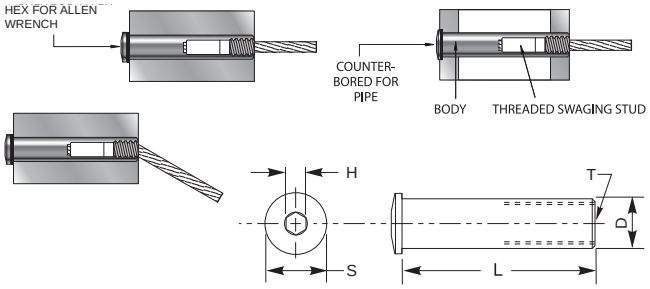
INVISIWARE® RECEIVER – TENSIONING DEVICE
Type 316 Stainless Steel

A tensioning device is hidden inside the end post with only the head of the ***Receiver*** exposed on the outside of the post. The inside is female-threaded to accept the male-threaded ***Invisiware® Swaging Stud*** that is attached to the cable. The head of the ***Receiver*** is broached for an Allen wrench. To tension the cable, insert the Allen wrench and rotate the ***Receiver*** around the male threads on the ***Swaging Stud***. This will draw the ***Swaging Stud*** further inside the Receiver as you continue to turn it with the Allen wrench.

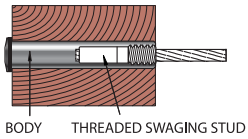
Pipe ends are counterbored so the full perimeter of the head of the ***Receiver*** will rest on a flat surface in the pipe. The head rests on the outside wall of a flat-sided post. Except where noted, a ***Plastic Washer*** is included and acts as a scratch resistant barrier between the Receiver head and the post.

Pipe Size	Actual Size	Cable Size	L	D	H	T	S	Use with Stud #	Stainless Steel
1¼"	1.660"	⅛"	1.562"	.437"	3/16"	5/16-24	.537"	**CRS4**	**CRR612**
1¼"	1.660"	3/16"	1.562"	.437"	3/16"	5/16-24	.537"	**CRS6**	**CRR612**
1½"	1.900"	⅛"	1.812"	.437"	3/16"	5/16-24	.537"	**CRS4**	**CRR622**
1½"	1.900"	3/16"	1.812"	.437"	3/16"	5/16-24	.537"	**CRS6**	**CRR622**
1½"	1.900"	¼"	1.812"	.531"	7/32"	7/16-20	.646"	**CRS8**	**CRR822**
2"	2.375"	⅛"	2.301"	.437"	3/16"	5/16-24	.537"	**CRS4**	**CRR642**
2"	2.375"	3/16"	2.301"	.437"	3/16"	5/16-24	.537"	**CRS6**	**CRR642**
2"	2.375"	¼"	2.301"	.531"	7/32"	7/16-20	.646"	**CRS8**	**CRR842**
2"	2.375"	5/16"	2.301"	.687"	5/16"	9/16-18	.865"	**CRS10**	**CRR1242**
2"	2.375"	⅜"	2.301"	.687"	5/16"	9/16-18	.865"	**CRS12**	**CRR1242**
	1" × 2"†	⅛"	3.030"	.437"	3/16"	5/16-24	.537"	**CRS4**	**CRR652**
	1" × 2"†	3/16"	3.030"	.437"	3/16"	5/16-24	.537"	**CRS6**	**CRR652**
	2" × 2"	⅛"	2.030"	.437"	3/16"	5/16-24	.537"	**CRS4**	**CRR632**
	2" × 2"	3/16"	2.030"	.437"	3/16"	5/16-24	.537"	**CRS6**	**CRR632**
	2" × 2"	¼"	2.030"	.531"	7/32"	7/16-20	.646"	**CRS8**	**CRR832**
	2" × 2"	5/16"	2.030"	.687"	5/16"	9/16-18	.865"	**CRS10**	**CRR1232**
	2" × 2"	⅜"	2.030"	.687"	5/16"	9/16-18	.865"	**CRS12**	**CRR1232**
	1" × 3"†	⅛"	3.030"	.437"	3/16"	5/16-24	.537"	**CRS4**	**CRR652**
	1" × 3"†	3/16"	3.030"	.437"	3/16"	5/16-24	.537"	**CRS6**	**CRR652**
	1" × 3"†	¼"	3.030"	.531"	7/32"	7/16-20	.646"	**CRS8**	**CRR852**
	1" × 3"†	5/16"	3.030"	.687"	5/16"	9/16-18	.865"	**CRS10**	**CRR1252**
	1" × 3"†	⅜"	3.030"	.687"	5/16"	9/16-18	.865"	**CRS12**	**CRR1252**
	3½" × 3½"*	⅛"	3.563"	.437"	3/16"	5/16-24	.537"	**CRS4**	**CRR662***
	3½" × 3½"*	3/16"	3.563"	.437"	3/16"	5/16-24	.537"	**CRS6**	**CRR662***

* Nominal 4" × 4" wood post – 3½" × 3½" actual. ***Washers*** not included.
† Use as double posts with spacer shown on page 57.



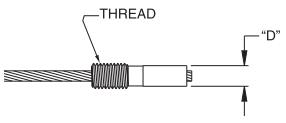
For use in wood, the ***Invisiware® Receiver*** can rest against the outside of the post or the post can be counterbored with the ***Receiver*** recessed in the post. For wood applications, also order ***CR716SAE Stainless Steel Washer***.



You do not have to drill your holes at an angle to use ***Invisiware® Receivers*** on stairs or severe pitches up to 35 degrees.

INVISIWARE® RECEIVER – THREADED SWAGING STUD
Type 316 Stainless Steel – Moly Coated

This part is swaged onto the end of the ***Cable*** and used with the ***Invisiware® Receiver***. When used with the ***Invisiware® Welded Receiver*** in a metal end post, it becomes a stop-end (non-tensioning end) fitting that is completely hidden inside the end post. The threaded surface is coated with a baked-on molybdenum-based dry film lubricant, to prevent the threads from binding when tensioned and in extreme environments.



Cable Size	Thread	D after Swaged	Stainless Steel
⅛"	5/16-24	.250"	**CRS4**
3/16"	5/16-24	.250"	**CRS6**
¼"	7/16-20	.375"	**CRS8**
5/16"	9/16-18	.500"	**CRS10**
⅜"	9/16-18	.500"	**CRS12**

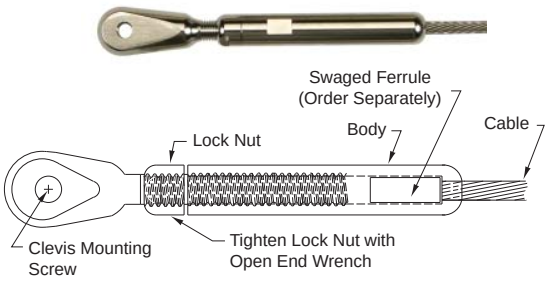
ADJUST-A-JAW® TENSIONER – CLEVIS STYLE
Type 316 Stainless Steel

The ***Adjust-A-Jaw® Tensioner*** is a precision machined, sleek, streamlined tensioning device that is used where a *high-tech* look is desired. It is suitable for level runs or stair pitches. The clevis portion of the fitting attaches to the end post with a button head socket screw that threads directly into a tapped hole on one side of the clevis fitting.

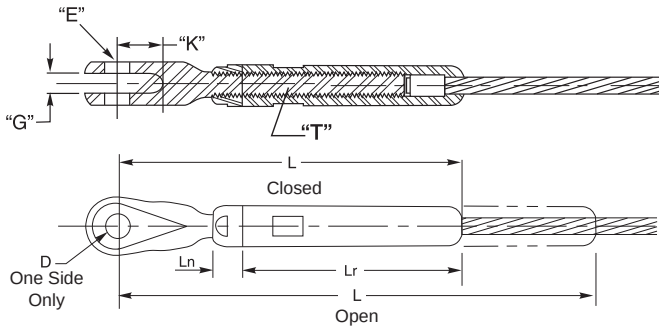
Unlike common turnbuckles, the ***Adjust-A-Jaw® Tensioner*** has no sharp edges, no crevices to collect dust and dirt, no large areas of exposed threads or exposed swaged shanks, and nothing that will scratch or snag. See the tabulated drawing to determine how to interface this fitting with your end post, or use our ***Fixed Tab*** or ***Threaded Tab*** fittings shown on page 54 of this catalog.

The Clevis has a male thread that mates with the female thread within the Body. The ***Invisiware® Swaging Ferrule*** is swaged onto the ***Cable*** and holds the cable inside the Body. The Body rotates on the cable and provides a considerable amount of take-up during tensioning with an open-end wrench. After tensioning, the ***Lock Nut*** locks the assembly in place.

Cable Size	D	E	G	K	Closed L	Open L	Ln	Lr	T	Use with Screw # (included)	Use with Ferrule #	Stainless Steel
⅛"	.260"	¼-28	.260"	.560"	4.300"	5.990"	.375"	2.750"	5/16-24 LH	**CRSC6**	**CRF4**	**CRAJ62**
3/16"	.260"	¼-28	.260"	.560"	4.300"	5.990"	.375"	2.750"	5/16-24 LH	**CRSC6**	**CRF6**	**CRAJ62**
¼"	.390"	⅜-24	.313"	.750"	4.870"	6.430"	.500"	3.000"	7/16-20 LH	**CRSC8**	**CRF8**	**CRAJ82**
5/16"	.390"	⅜-24	.348"	.870"	6.740"	9.280"	.620"	4.500"	9/16-18 RH	**CRSC8**	**CRF10**	**CRAJ122**
⅜"	.390"	⅜-24	.348"	.870"	6.740"	9.280"	.620"	4.500"	9/16-18 RH	**CRSC8**	**CRF12**	**CRAJ122**



Note: Order ferrule and screw separately.



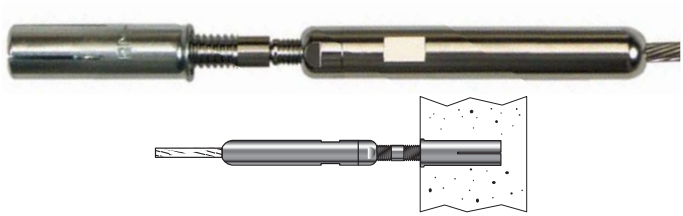
All metals have a recycled content and high reclamation rate. Contact Wagner for data relating to your specific product selections.

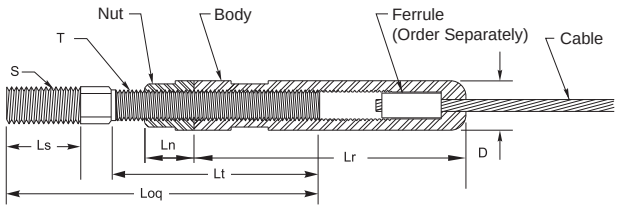
Photos courtesy of
Custom Architectural Products
Dunwoody, GA

ADJUST-A-BODY™ WITH CONCRETE BOLT TENSIONER

Similar to the Adjust-A-Body™ With Hanger Bolt Tensioner, it screws into a *Red Head* brand concrete anchor – available from your industrial supplier. It is an easy, practical way to attach your tensioner to a concrete wall. Adjusts with an open end wrench.

Cable Size	S	T	Ls	Lt	Loq	Ln	Lr	D	*Red Head®* Anchor* Steel	*Red Head®* Anchor* Stainless	Use with Ferrule #	Stainless Steel
⅛"	⅜-16	5/16-24 LH	.500"	2.313"	3.188"	.375"	2.750"	.500"	**RL-38**	**SSRM-38**	**CRF4**	**CRAJAB6**
3/16"	⅜-16	5/16-24 LH	.500"	2.313"	3.188"	.375"	2.750"	.500"	**RL-38**	**SSRM-38**	**CRF6**	**CRAJAB6**
¼"	½-13	7/16-20 LH	1.125"	2.500"	3.938"	.500"	3.000"	.625"	**RL-12**	**SSRM-12**	**CRF8**	**CRAJAB8**

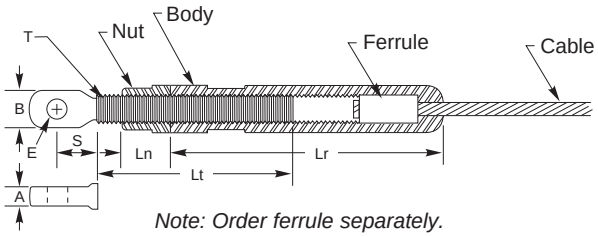




ADJUST-A-BODY™ WITH THREADED EYE TENSIONER
Type 316 Stainless Steel

Similar to the ***Adjust-A-Jaw® Tensioner***, **except it costs a lot less than the clevis-style *Adjust-A-Jaw® Tensioner*.** See the tabulated drawing to determine how to interface this fitting with your end post or use our ***Fixed Tab*** or ***Threaded Tab*** fittings shown on page 54 of this catalog. Tension with an open-end wrench.

Cable Size	E	A	B	S	T	Lt	Ln	Lr	D	Use with Screw # (included)	Use with Ferrule #	Stainless Steel
⅛"	¼-28	.233"/.229"	.500"	.440"	5/16-24 LH	2.000"	.375"	2.750"	.500"	**CRSC6**	**CRF4**	**CRAJTE6**
3/16"	¼-28	.233"/.229"	.500"	.440"	5/16-24 LH	2.000"	.375"	2.750"	.500"	**CRSC6**	**CRF6**	**CRAJTE6**
¼"	⅜-24	.295"/.285"	.844"	.680"	7/16-20 LH	2.500"	.500"	3.000"	.625"	**CRSC8**	**CRF8**	**CRAJTE8**

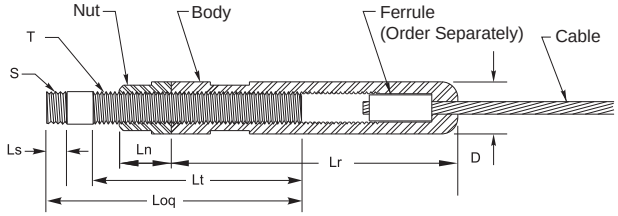


Note: Order ferrule separately.

ADJUST-A-BODY™ WITH THREADED BOLT TENSIONER
Type 316 Stainless Steel

Similar to the ***Adjust-A-Body™ With Hanger Bolt Tensioner***, it screws into a drilled and tapped hole in your steel end post and adjusts with an open end wrench. A real money-saver because there is no need for special tees with holes, welded on tabs or any other mounting device – and it's about half the price of the clevis-style ***Adjust-A-Jaw® Tensioner***.

Cable Size	S	T	Ls	Lt	Loq	Ln	Lr	D	Use with Ferrule #	Stainless Steel
⅛"	5/16-24	5/16-24 LH	.375"	2.000"	2.625"	.375"	2.750"	.500"	**CRF4**	**CRAJT6**
3/16"	5/16-24	5/16-24 LH	.375"	2.000"	2.650"	.375"	2.750"	.500"	**CRF6**	**CRAJT6**
¼"	5/16-24	7/16-20 LH	.375"	2.500"	3.125"	.500"	3.000"	.625"	**CRF8**	**CRAJT8**

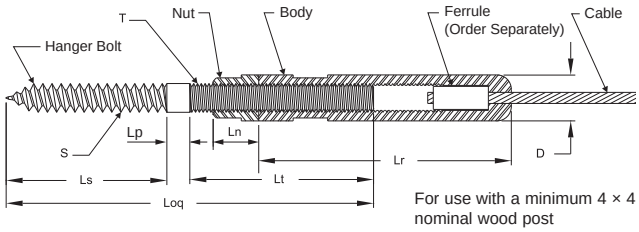


Recommended for level runs and when you are using a minimum schedule 80 pipe end post or a square or rectangular steel end post with a minimum .250" wall.

ADJUST-A-BODY™ WITH HANGER BOLT TENSIONER
Type 316 Stainless Steel

Similar to the ***Adjust-A-Jaw® Tensioner***, except it screws right into your wooden end post. No need for special mounting hardware. A sleek, economical tensioning device that is easy to install, adjusts with an open-end wrench. Now available with a 1½" longer hanger bolt for ⅛" or 3/16" ***Cable***.

Cable Size	S	T	Ls	Lp*	Lt	Loq	Ln	Lr	D	Use with Ferrule #	Stainless Steel
⅛"	5/16"	5/16-24 LH	1.500"	.250"	2.000"	3.750"	.375"	2.750"	.500"	**CRF4**	**CRAJB6**
3/16"	5/16"	5/16-24 LH	1.500"	.250"	2.000"	3.750"	.375"	2.750"	.500"	**CRF6**	**CRAJB6**
¼"	7/16"	7/16-20 LH	2.000"	.250"	2.500"	4.750"	.500"	3.000"	.625"	**CRF8**	**CRAJB8**
⅛"	5/16"	5/16-24 LH	1.500"	1.750"	2.000"	5.250"	.375"	2.750"	.500"	**CRF4**	**CRAJB6L**
3/16"	5/16"	5/16-24 LH	1.500"	1.750"	2.000"	5.250"	.375"	2.750"	.500"	**CRF6**	**CRAJB6L**



For use with a minimum 4 × 4 nominal wood post

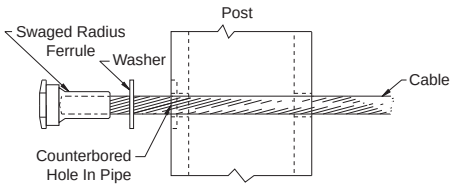
*Longer shaft – Lp – for use when mounting post has a fascia covering.

INVISIWARE® RADIUS FERRULE
Type 316 Stainless Steel

For use on the fixed, non-tensioning end of the cable, often in combination with the ***Invisiware® Receiver*** on the tensioning end. When installed, the fitting is hidden inside the end post with only the head exposed on the outside of the end post. Externally, it looks the same as the ***Invisiware® Receiver***, but costs much less.

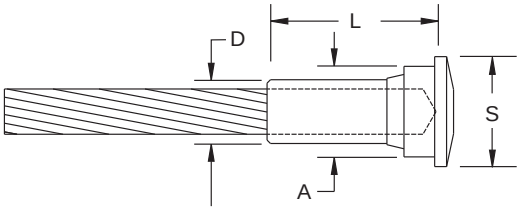
Pipe ends are counterbored so the full perimeter of the head of the ***Radius Ferrule*** will rest on a flat surface in the pipe. The head rests on the outside wall of a flat-sided post. A plastic washer is included and acts as a scratch resistant barrier between the ***Radius Ferrule*** head and the post.

For pipe and square tube railing only. The Radius Ferrule should not be used on rectangular, double post construction.



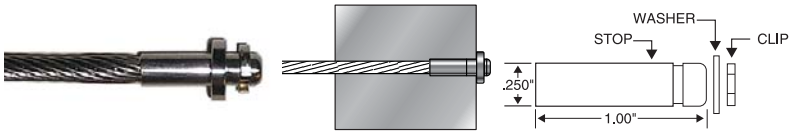
Cable Size*	L*	D*	S	A	Stainless Steel
1/8"	.750"	.250"	.537"	.437"	**CRRF4**
3/16"	.750"	.250"	.537"	.437"	**CRRF6**
1/4"	1.000"	.375"	.646"	.531"	**CRRF8**
5/16"	1.000"	.500"	.865"	.687'	**CRRF10**
3/8"	1.000"	.500'	.865"	.687"	**CRRF12**

* After Swaging



ULTRA-TEC® CLIP-ON STOP
Type 316 Stainless Steel

For use in posts with cables cut and fittings attached – preswaged – at the factory. No field swaging is required. A special clip and washer secure the ***Stop*** to the end post. Used on the non-tensioning end of the ***Cable***. An ***Adjust-A-Jaw®***, ***Adjust-A-Body™*** or ***Invisiware® Receiver*** is used on the opposite end to tension the cable. Available for 3/16" and 1/8" diameter ***Cable*** only. Includes ***Stop, Washer*** and ***Clip***. Refer to page 54 for ***Clip-On Fixed Jaw***.



Cable Size	Post Material	Washer Diameter	Stainless Steel
1/8"	Wood	.922"	**CRCOS4**
1/8"	Metal	.468"	**CRCOS4M**
3/16"	Wood	.922"	**CRCOS6**
3/16"	Metal	.468"	**CRCOS6M**

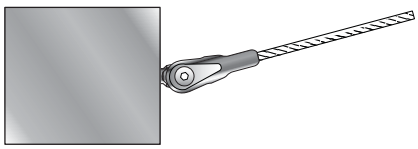
Ultra-tec® FIXED JAW
Type 316 Stainless Steel

Similar in appearance, the Ultra-Tec® Fixed Jaw is about one-half the price of the clevis-style **Adjust-A-Jaw®** Tensioner. Where you do not need a tensioner on both ends of the cable run, **the economical Ultra-tec® Fixed Jaw is frequently used on the fixed, non-tensioning end of the cable with the clevis-style Adjust-A-Jaw® Tensioner on the tensioning end.**

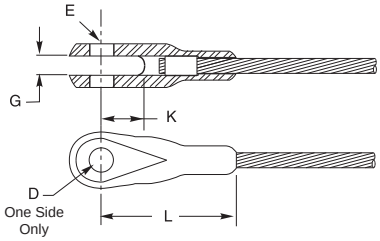
The ***Ultra-tec® Fixed Jaw*** makes a very attractive fitting where a *high-tech* look is desired on level runs as well as on pitches. The ***Invisiware® Swaging Ferrule*** is swaged onto the ***Cable*** and holds the ***Cable*** inside the clevis.

See the tabulated drawing to determine how to interface this fitting with your end post, or use our ***Fixed Tab*** or ***Threaded Tab*** fittings shown on page 54 of this catalog.

Cable Size	D	E	G	K	L	Use with Screw # (included)	Use with Ferrule #	Stainless Steel
1/8"	.260"	1/4-28	.260"	.560"	1.750"	**CRSC6**	**CRF4**	**CRFJ62**
3/16"	.260"	1/4-28	.260"	.560"	1.750"	**CRSC6**	**CRF6**	**CRFJ62**
1/4"	.390"	3/8-24	.313"	.750"	2.120"	**CRSC8**	**CRF8**	**CRFJ82**
5/16"	.390"	3/8-24	.348"	.870"	2.250"	**CRSC8**	**CRF10**	**CRFJ122**
3/8"	.390"	3/8-24	.348"	.870"	2.250"	**CRSC8**	**CRF12**	**CRFJ122**

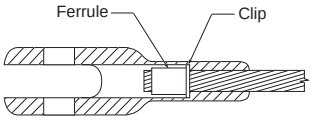


*Note: Order **Ferrule** separately.*



Ultra-tec® *Clip-on* FIXED JAW *for pre-swaged cable*
Type 316 Stainless Steel

Same as our regular ***Ultra-tec® Fixed Jaw***, except the cable attaches with a special clip that is installed by hand. All fittings are swaged on the cable at the factory, so no field swaging is required. An ***Adjust-A-Jaw®*** or ***Adjust-A-Body™*** style tensioner or ***Invisiware® Receiver*** is used on the opposite end. Order using part numbers below and check with the factory to determine Cable lengths to be provided with swaged fittings. Available for ⅛" and 3/16" ***Cable*** only. Refer to ***Clip-On Stop*** on page 53.



Cable Size	D	E	G	K	L	Use with Screw # (included)	Use with Ferrule #	Stainless Steel
⅛"	.260"	¼-28	.260"	.560"	1.750"	**CRSC6**	**CRF4**	**CRFJC2-6**
3/16"	.260"	¼-28	.260"	.560"	1.750"	**CRSC6**	**CRF6**	**CRFJC2-6**

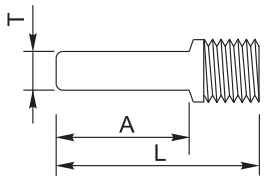
Note: Order ferrule separately.

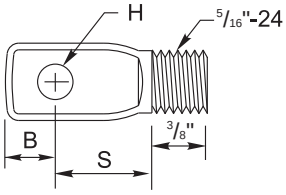
INVISIWARE® THREADED TAB
Type 316 Stainless Steel

Here's a real time and money-saver. The ***Invisiware® Threaded Tab*** screws into a drilled and tapped hole on the inside wall of the end post. **You save the expense of welding tees or tabs onto your end post**, for mounting ***Adjust-A-Jaw®*** or ***Adjust-A-Body™ Tensioners*** or ***Ultra-tec® Fixed Jaws***.

Recommended only when you are using a minimum schedule 80 pipe end post or a square or rectangular steel end post with a minimum .250" wall.

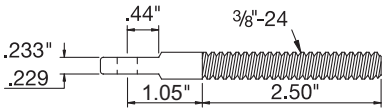
Cable Size	H	S	T	A	B	L	Use with Stud # (included)	Stainless Steel
⅛"	.265"	.500"	.233"/.229"	.813"	.313"	1.250"	**CRS4**	**CRTT6B**
3/16"	.265"	.500"	.233"/.229"	.813"	.313"	1.250"	**CRS6**	**CRTT6B**
¼"	.390"	.625"	.295"/.285"	1.250"	.375"	1.625"	**CRS8**	**CRTT8B**
5/16"	.390"	.625"	.295"/.285"	1.250"	.375"	1.625"	**CRS8**	**CRTT8B**
⅜"	.390"	.625"	.295"/.285"	1.250"	.375"	1.625"	**CRS8**	**CRTT8B**





INVISIWARE® EXTENDED LENGTH THREADED TAB

Extended length, same as above except there is no need to thread the hole in your end post. Cut to desired length and secure to end post with ***Acorn Nut*** and thread sealant or ***Lido-Weld Adhesive*** – see page 97. ***Acorn Nut – CRAN37524S*** – is included.

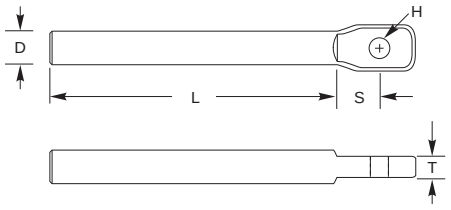


Cable Size	Stainless Steel
⅛"	**CRTT6BL**
3/16"	**CRTT6BL**

INVISIWARE® FIXED TAB
Steel or Stainless Steel

Welded into an end post to make a strong tab for use in mounting an ***Adjust-A-Jaw®*** or ***Adjust-A-Body™ Tensioner*** or ***Ultra-tec® Fixed Jaw***. The ***Invisiware® Fixed Tab*** is cut to length as necessary, inserted in a hole drilled through the post and welded to the outside wall. The welded surface is then ground to the post's original contour, thus hiding the weld.

Cable Size	D	H	S	T	L	Steel	Stainless Steel
⅛"	.375"	.265"	.440"	.233"/.229"	3.110"	**CRFT65A**	**CRFT65B**
3/16"	.375"	.265"	.440"	.233"/.229"	3.110"	**CRFT65A**	**CRFT65B**
¼"	.562"	.390"	.680"	.295"/.285"	3.000"	**CRFT85A**	**CRFT85B**

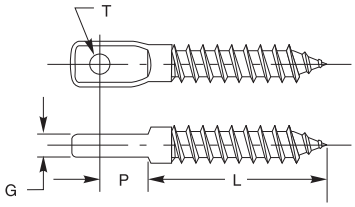


ULTRA-TEC® LAG EYE
Type 304 Stainless Steel

A convenient, easy-to-install means for attaching an ***Adjust-A-Jaw®*** or ***Adjust-A-Body™ Tensioner*** or ***Ultra-tec® Fixed Jaw*** to a wood post.

For use with a minimum 4" × 4" nominal wood post.

Cable Size	G	T	S	L	P	Stainless Steel
1/8"	.233"/.229"	.253"	.625"	1.500"	.500"	CRLE6
3/16"	.233"/.229"	.253"	.625"	1.500"	.500"	CRLE6
1/4"	.255"/.265"	.385"	1.188"	2.000"	.680"	CRLE8
1/8"	.233"/.229"	.253"	.625"	3.000"	.500"	CRLE6L
3/16"	.233"/.229"	.253"	.625"	3.000"	.500"	CRLE6L

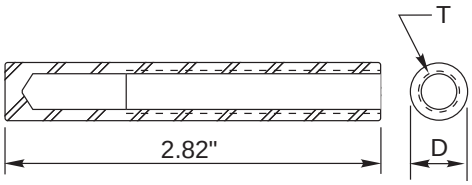


Victor • Polishing

INVISIWARE® WELDED RECEIVER
Steel or Stainless Steel

A fixed end, non-tensioning device, the ***Invisiware® Welded Receiver*** provides a sturdy, threaded receptacle in the end post for an ***Invisiware® Swaging Stud***. The ***Invisiware® Welded Receiver*** is cut to length as necessary, inserted in a hole drilled through the post and welded to the outside wall. The welded surface is then ground to the post's original contour, thus hiding the weld.

Cable Size	D	T	Use with Stud #	Steel	Stainless Steel
1/8"	.437"	5/16-24	CRS4	CRWR65A	CRWR65B
3/16"	.437"	5/16-24	CRS6	CRWR65A	CRWR65B
1/4"	.531"	7/16-20	CRS8	CRWR85A	CRWR85B



SCREWS
Type 316 Stainless Steel

For use with threaded fittings, as noted.

Cable Size	Screw Size	Stainless Steel
1/8"	1/4-28 × 1/2"	CRSC6
3/16"	1/4-28 × 1/2"	CRSC6
1/4"	3/8-24 × 3/4"	CRSC8
5/16"	3/8-24 × 3/4"	CRSC8
3/8"	3/8-24 × 3/4"	CRSC8

GREEN

WASHERS

Available in Stainless Steel and Delrin® plastic.

Cable Size	Outside Diam.	Inside Diam.	Stainless Steel	Delrin® Plastic
1/8"	59/64"	15/32"	CR716SAE	CRWR6B
3/16"	59/64"	15/32"	CR716SAE	CRWR6B
1/4"	1 1/16"	17/32"	CR050SAE	CRWR8B

Sue • Bending

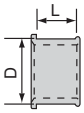
ULTRA-TEC® CABLE GROMMETS

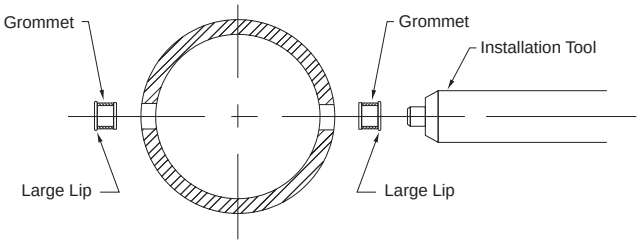
Cable Grommets are offered for popular cable diameters of ⅛", 3⁄16" and ¼". They help prevent rust in exterior applications or elsewhere where moisture is a factor by providing a barrier between the cable and the painted or powder coated surface through which the ***Cable*** is drawn when being installed.

Ultra-tec® Cable Grommets are installed – after the paint or powder coating is applied – into holes in ***Intermediate Posts, Cable Braces*** and – in the case of ***the Invisiware® Radius Ferrule*** – into the end post holes through which the cable exits. They are offered in black UV resistant Delrin®.

Cable Size	Intermediate Post Material Not slotted for Stairways: 1¼" to 2" Pipe	Intermediate Post Material Not slotted for Stairways: Square or Rectangular Tube with .120" Wall	Intermediate Post Material Not slotted for Stairways: ¼"Cable Brace	End Post Material Using Radius Ferrule, Push-Lock™ or Pull-Lock™ Fittings: 1¼" to 2" Pipe	End Post Material Using Radius Ferrule, Push-Lock™ or Pull-Lock™ Fittings: Square or Rectangular Tube with .250" Wall	Intermediate Post Material Slotted For Stairway Pitch Up To 37 Degrees: 1¼" to 2" Pipe	Intermediate Post Material Slotted For Stairway Pitch Up To 37 Degrees: Square or Rectangular Tube with .120" Wall	Intermediate Post Material Slotted For Stairway Pitch Up To 37 Degrees: ¼" Cable Brace
⅛"	**CRGC61100**	**CRGC62100**	**CRGC64100**	**CRGC63100**	**CRGC64100**	**CRGIC61100**	**CRGIC62100**	**CRGIC64100**
3⁄16"	**CRGC61100**	**CRGC62100**	**CRGC64100**	**CRGC63100**	**CRGC64100**	**CRGIC61100**	**CRGIC62100**	**CRGIC64100**
¼"	**CRGC81100**	**CRGC82100**	**CRGC84100**	**CRGC83100**	**CRGC84100**	**CRGIC81100**	**CRGIC82100**	**CRGIC84100**

Order ***Cable Grommets*** by diameter of ***Cable*** and post through which the ***Cable*** will be drawn. Sold in lots of 100. Specify quantity when ordering.





GROMMET IDENTIFICATION CHART

Part Number	D	L
CRGIC61100	.370"	.150"
CRGIC62100	.370"	.120"
CRGIC64100	.370"	.250"
Part Number	D	L
CRGC61100	.250"	.150"
CRGC62100	.250"	.120"
CRGC63100	.250"	.190"
CRGC64100	.250"	.250"
Part Number	D	L
CRGIC81100	.424"	.150"
CRGIC82100	.424"	.120"
CRGIC84100	.424"	.250"
Part Number	D	L
CRGC81100	.312"	.150"
CRGC82100	.312"	.120"
CRGC83100	.312"	.190"
CRGC84100	.312"	.250"

CABLE

Cable* Construction**: 1 × 9, Type 316 stainless steel ***Cable.
1 × 19 construction ***Cable*** is engineered to hold static loads without stretching and it is relatively stiff. Left hand lay cable for use with all Ultra-tec® ***Fittings***.

Design Parameters and Constraints: ***Cable*** has a very high tensile strength and is a suitable in-fill material for a guard-rail. Spacing between posts and/or braces should not exceed 42". Recommended maximum vertical spacing of 3" free opening between cables when they are installed. For most applications, 3⁄16" diameter ***Cable*** is recommended.

*Other **Cable** constructions can be used, such as 7 × 7 or 7 × 19, but they are rarely recommended because of their elevated levels of stretch and lower breaking strengths in comparison to 1 × 19 construction.*

CABLE

Cable Size	Minimum Breaking Strength	Stainless Steel
⅛"	1,780 lbs	**CR4AS2**
3⁄16"	4,000 lbs	**CR6AS2**
¼"	6,900 lbs	**CR8AS2**
5⁄16"	10,600 lbs	**CR10AS2**
⅜"	14,800 lbs	**CR12AS2**

Measuring Cable:
The factory can cut ***Cable*** and swage fittings on ***Cables*** up to 60 feet in length.

To measure ***Cable*** when ordering pre-cut and swaged ***Cable***:

- Clearly identify fittings – by part number – that are to be used with the ***Cable***.
- For ***Invisiware® Receiver***, ***Radius Ferrule*** or ***Clip-On Stop*** hardware, measure from *back side of the post*.
- For ***Adjust-A-Jaw®***, ***Adjust-A-BodyTM, Threaded Stud with Welded Receiver*** or ***Fixed Jaw*** hardware, measure from the *inside surface of the post* .
- For ***Adjust-A-Jaw®***, ***Adjust-A-BodyTM*** or ***Fixed Jaw*** hardware, you may also measure from the *center of the mounting hole*.
- Measure rail as if all are straight from tensioning post to anchor post. If rail is on a slope, measure on the slope.

Note: *Re-spooling charges apply for orders under 5,000 feet.*

Mike • Bending

Scott • Shipping

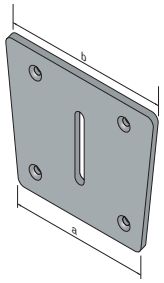
MOUNTING PLATES

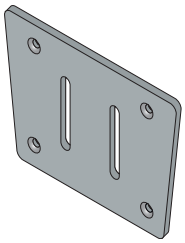
For installation details and mounting options using these components, refer to ***Cable Railing Mounting Options and Mounting Hardware Catalog*** available online or directly from **Wagner**.

FASCIA MOUNTING PLATE WITH WELD SLOTS AND FOUR HOLES

5" high. Four 7⁄16" holes for 3⁄8" mounting bolts. Attach to tube with 3⁄16" weld all around inside of 3⁄8" × 2½" slot. Weld to post from the back side. Use ***Spacer*** shown below between posts for double post applications. Double posts with 1" spacer will use plate with two slots as noted below.

Pipe Size	Tube Size	Double Post With 1" Spacer	a	b	Weld Slots	Steel 1018	Stainless Type 304
1¼"	1.660"		5"	6"	1	CRFAP4	CRFAP4S
1½"	1.900"		5"	6"	1	CRFAP4	CRFAP4S
2"	2.375"		6"	7"	1	CRFAP5	CRFAP5S
	1" × 3"		4"	5"	1	CRFAP1	CRFAP1S
	3" × 3"	1" × 3"	6"	7"	2	CRFAP3	CRFAP3S
	1" × 2"		4"	5"	1		CRFAP1S
	2" × 3"	1" × 2"	6"	7"	2		CRFAP3S
	2" × 2"		5"	6"	1		CRFAP2S





GREEN

Refer to LEED statement on page 263.

CABLE BRACE FLOOR PLATE

¼" thick. For ¼" × 1" ***Cable Braces***. Countersunk for 3⁄8" mounting bolts. Weld to cable brace from the back side of the ***Plate***.

Brace Size	Steel	Stainless
¼" × 1"	CRFLPCB	CRFLPCBS

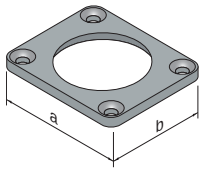
BEVELED WASHERS

Stainless steel. For use with solid bar or posts drilled at an angle.

Pitch / Angle	1⁄8" Cable	3⁄16" Cable	¼" Cable
30° - 33°	CRBW326	CRBW326	CRBW328
34° - 36°	CRBW356	CRBW356	CRBW358
37° - 39°	CRBW386	CRBW386	CRBW388

FLOOR PLATES WITH CENTER HOLE FOR PIPE

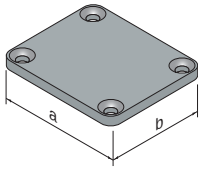
¼" thick. Countersunk for ¼" mounting screws. Weld to pipe from the back side.



Pipe Size	Outside Diameter	a	b	Steel 1018	Stainless Type 304
1¼"	1.660"	3"	2½"	CRFLP1M	CRFLP1MS
1½"	1.900"	3"	2½"	CRFLP2M	CRFLP2MS
2"	2.375"	3½"	3½"	CRFLP3M	CRFLP3MS

FOR SQUARE OR RECTANGULAR TUBING

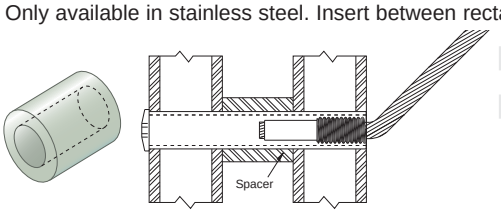
Countersunk for ¼" mounting screws. Use for square tube or rectangular tube. Use ***Spacer*** shown below to the right between posts for double post applications. Butt weld to tube.



Tube Size	Double Post With 1" Spacer	a	b	Steel 1018	Stainless Type 304
1" × 3"		3½"	3"	CRFLP7M	CRFLP7MS
3" × 3"	1" × 3"	5"	3½"	CRFLP8M	CRFLP8MS
1" × 2"		3"	2½"	CRFLP4M	CRFLP4MS
2" × 3"	1" × 2"	5"	2½"	CRFLP6M	CRFLP6MS
2" × 2"		4"	2½"	CRFLP5M	CRFLP5MS

SPACER

Only available in stainless steel. Insert between rectangular tube posts.



Cable	Diameter	Wall Thickness	Length	Stainless
1⁄8"	5⁄8"	.083"	.970"	CRSPCR6
3⁄16"	5⁄8"	.083"	.970"	CRSPCR6
¼"	7⁄8"	.035"	.970"	CRSPCR8

INSTALLATION TOOLS

Cable can be provided pre-swaged or you may purchase the ***Cable***, ***Tensioners*** and hardware as components and swage the fittings prior to install. Tools are available for purchase or rental. Rental includes all tools required for installation except for an air compressor.

Before beginning your project, download the ***Design and Fabrication Guide*** at ***www.wagnercablerailing.com*** and review installation instructions on pages 278 to 293 of this catalog.

CABLE CUTTER

To be used to cut ***Cable*** up to ¼". Proper leverage is required. Either lay ***Cable*** on a table below your waist or on the ground. Use both hands to operate.

Cable cutter for ⅛" cable - disposable	**CRC7HIT**
Cable cutter for ⅛" - ¼" cable	**CRCC**
Cable cutter for ⅛" - ⅜" cable	**CRCC12**

CABLE GRIPPING PLIERS

Locking pliers with machined jaws to grip the ***Cable*** as you are tensioning the cable. Keeps the ***Cable*** from turning and prevents damage to the ***Cable*** when ***Cable*** is being tensioned.

Pliers	**CRJP**

PUSH LOCK TOOL KIT

Kit includes ***Cable Cutter*** and ***Jawed Pliers***.

Pliers Kit	**CRPLTC**

RADIUS FERRULE/CLIP-ON STOP GAUGE

Use this ***Gauge*** to confirm that your fittings have been properly swaged. If the swaged fitting does not fit the appropriate slot, the fitting is not suitable for use.

Measuring Gauge	**CRMG**

Christine • Technical Services

Kenn • Shipping

Sandy • Shipping

GROMMET INSTALLATION TOOLS

Set of four for each size and shape of grommet.

Installation Tool	**CRGIT**

MODEL 610 SWAGER

For 3⁄16" ***Cable*** and smaller. Requires a hydraulic power source capable of 10,000 psi.

Model 610 Swager	**CR610**
Rental Kit	**CRWAGNER610**

SHIPPING CONTAINER/TOOL BOX

For ***Model 610 Swager***

With compartments for ***Cable*** cutting and installation tools.

Tool Box	**CR610TOOLBOX**

MODEL 650 SWAGER

For ⅛" - ⅜" ***Cable***. Requires a hydraulic power source capable of 10,000 psi.

Model 650 Swager	**CR650**
Rental Kit	**CRWAGNER650**

SHIPPING CONTAINER/TOOL BOX

For ***Model 650 Swager***

With compartments for ***Cable*** cutting and installation tools.

Tool Box	**CR650TOOLBOX**

AIR OVER HYDRAULIC PUMP

Air driven. Capable of delivering a maximum of 10,000 psi. A 20 gallon minimum tank size is recommended. A functional pressure regulator set at 100 psi maximum is required – **90 psi minimum to get swager to apply full force** – otherwise ***Swaging Pump*** may be damaged. Minimum ¼" ID air hose with a ¼" male pipe thread.

*Note: Should you experience any leakage during operation, discontinue use and contact **Wagner**.*

Hydraulic Pump	**CRHP**

ELECTRIC HYDRAULIC 120V PUMP

Increases swaging speed versus the ***Air Over Hydraulic Pump***.

Electric Hydraulic Pump	**CRHPE**

CABLE TENSIONING GAUGE

Check the tension on your ***Cables*** with this simple to use gauge.

Cable Size	Part #
⅛"	**CRPTCR**
3⁄16"	**CRPTCR**
¼"	**CRPTCR**
¼"	**CRPT3**
5⁄16"	**CRPT3**
⅜"	**CRPT3**

STAINLESS STEEL CLEANER AND PROTECTANT

Dissolves minor corrosion, then leaves a protective coating that lasts for months. Includes an 8-oz. spray-on rust and stain remover and a 4-oz. bottle of protectant.

Stainless Steel Cleaner	**CREZCLEAN**

JAWED PLIERS WITH PRE-TENSIONER

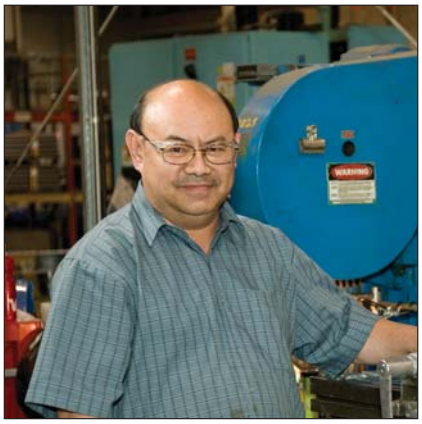
When tensioning, grip ***Cable*** with special ***Jawed Pliers*** to prevent damage to the ***Cable***. ***Pre-Tensioner*** can be used when installing longer runs of ***Invisiware***® since it may have a minimum take-up.

Pre-tensioner with Pliers	Part #
For ⅛" Cable	**CRPTP4**
For 3⁄16" Cable	**CRPTP6**
For ¼" Cable	**CRPTP8**
Jawed Pliers	**CRJP**

SWAGER / INSTALLATION EQUIPMENT AND TOOL RENTALS

You can rent the equipment and tools needed to cut the ***Cables*** and swage the fittings in the field. The standard rental package includes: ***Model 610 or 650 Swager, Air Over Hydraulic Pump, Cable Gripping Pliers, Cable Cutter, Radius Ferrule/ Clip-on Stop Gauge, Grommet Tool Set, Allen Wrench, Safety Glasses,*** and ***Tool Box, Pre-tensioner*** (included upon request).

You will need to provide an air compressor capable of delivering at least 5.8 c.f.m. at 90 p.s.i. and a minimum 20-gallon tank. Minimum ¼" I.D. air hose with a ¼" male pipe thread required (not included).



Nenglauj • Plant 2

CABLE RELEASE

Releases ***Cable*** from ***Push-Lock™*** and ***Pull-Lock™*** type fittings before ***Cables*** are tensioned.

Cable Release	**CRPLKEY**

HANGER BOLT DRIVER

Use to install ***Adjust-A-Body***® with Hanger Bolt tensioners. Makes driving hanger bolts fast and easy. Hanger Bolt not included.

Cable Size	Part #
⅛"	**CRDRIVERHB6N**
3⁄16"	**CRDRIVERHB6N**

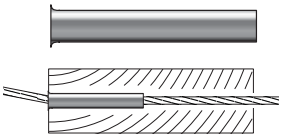
Cable Size	Part #
⅛"	**CRDRIVERHB6LG***
3⁄16"	**CRDRIVERHB6LG***
¼"	**CRDRIVERHB8LG***

*Use for large Jobs

CUT-OFF TOOL

Used to cut ***Cable*** flush with the end of ***Pull-Lock™*** fittings, and to cut excess threads off stud-type tensioners. Includes mandrel and two cut-off wheels.

Cut-Off Tool	**CRCUTOFFKIT**



STAINLESS STEEL POST PROTECTOR TUBE

The post protector tube is inserted into a wood post where the ***Cable*** enters/exits the post at an angle to keep the cable from biting into the wood.

	Stainless Steel
Post Protector Tube	**CRPPT**

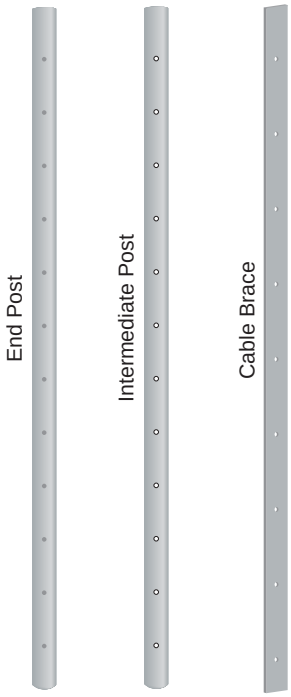
PRE-DRILLED POSTS FOR WELDED ASSEMBLY

All posts are custom made based on *customer provided*, detailed shop drawings. Upon request, **Wagner** can provide shop drawings – standard charges will apply.

- ***End Posts*** are drilled through or drilled and tapped on one side for use with Invisiware® Threaded Tab.
- ***Intermediate Posts*** are provided with through holes.

Wagner can also customize your posts with counterbored holes, coped connections, special bends, or miters. Download a ***Post Order Form*** at ***www.wagnercablerailing.com*** or Contact **Wagner** for pricing.

Material Options: Steel and Stainless Steel in sizes as indicated. When ordering, note size of ***Cable*** to be used. Wood posts – minimum 4 × 4 nominal lumber – are supplied by others.



CABLE BRACES

¼" × 1" ***Cable Braces*** are used to support the ***Cables*** between ***End*** or ***Intermediate Posts***. They keep the ***Cable*** from flexing excessively when a load is applied. ***Cable Braces*** are attached to the top rail and to the lower mounting surface – either a bottom rail or deck. Download a ***Cable Brace Order Form*** at ***www.wagnercablerailing.com.***

Pipe Size	Tube Size	Schedule	Wall
1¼"	1.660"	40	.140"
1¼"	1.660"	80	.191"
1½"	1.900"	40	.145"
1½"	1.900"	80	.200"
2"	2.375"	40	.154"
2"	2.375"	80	.218"
	1" × 2"		.120"
	1" × 3"		.120"
	2" × 2"		.120"
	2" × 2"		.250"

TYPICAL POST ASSEMBLY CONFIGURATIONS

These details are some of the more common Cable Rail configurations. For complete design and fabrication information, please download ***Product Design and Fabrication Guide for Metal Framed Railings*** at ***www.wagnercompanies.com/cable-railing.aspx.*** ***Cable*** must be supported every 42" mid run by either a ***Cable Brace*** or ***Intermediate Post***.

RECTANGULAR TUBE POST

End Post: Double 1" × 3" or 1" × 2" tube separated by stainless steel ***Spacer*** with ***Invisiware®*** fitting.

Cable Brace: ¼" × 1" bar with through holes for ***Cable***.

Intermediate Post: 1" × 3" or 1" × 2" tube with through hole and ***Grommets***.

SQUARE TUBE POST

End Post: 2" × 2" tube with 1" × 2" top rail.

Cable Brace: ¼" × 1" bar with through holes for ***Cable***.

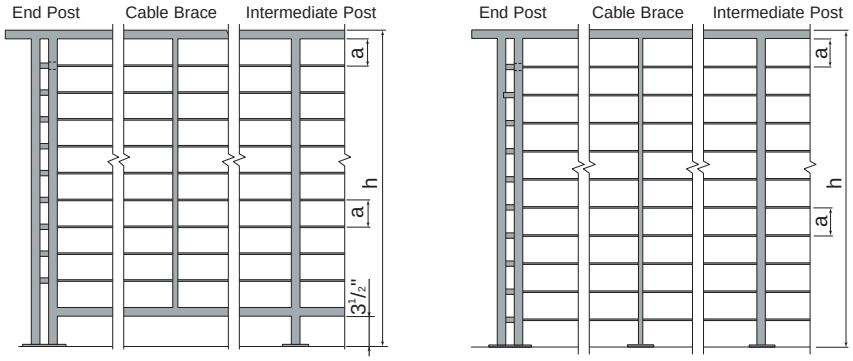
Intermediate Post: Double 1" × 2" tube with through hole and ***Grommets***.

BUILDING CODE ISSUES:

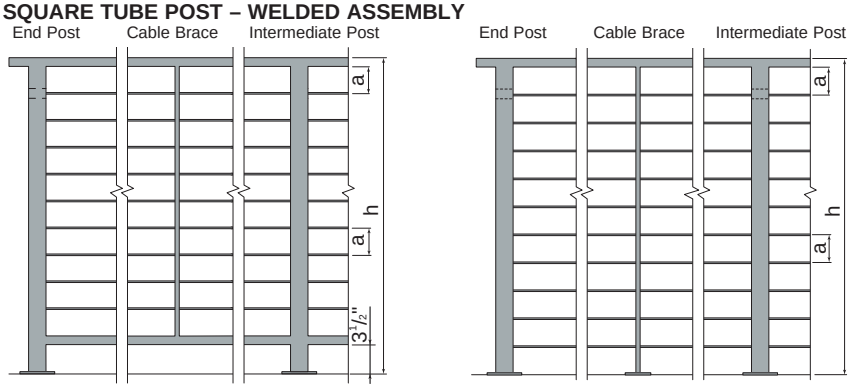
To meet most code requirements restricting guard openings, ***Cables*** are spaced between 3" and 3⅜" on center – depending on frame construction.

Refer to page 264 for information regarding the *ladder effect.*

RECTANGULAR TUBE POST – WELDED ASSEMBLY



SQUARE TUBE POST – WELDED ASSEMBLY



h	cable	a
36½"	9 lines	3.100"
42½"	10 lines	3.360"

h	cable	a
36½"	10 lines	3.230"
42½"	12 lines	3.190"

PIPE OR ROUND TUBE POST

End Post: 1¼" (1.660" OD), 1½" (1.900" OD), or 2" (2.375" OD), Schedule 80 pipe.

Cable Brace: ¼" × 1" bar, notched for pipe with through holes for ***Cable***.

Intermediate Post: Schedule 40 pipe with through holes for ***Cable***.

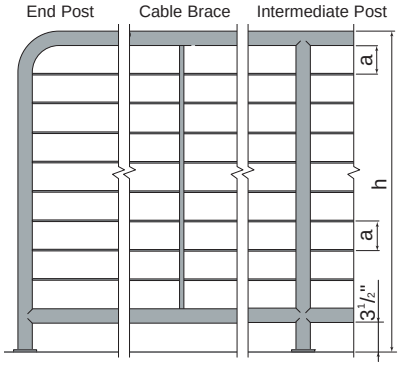
Seamed Elbow

90º FORMED ELBOWS

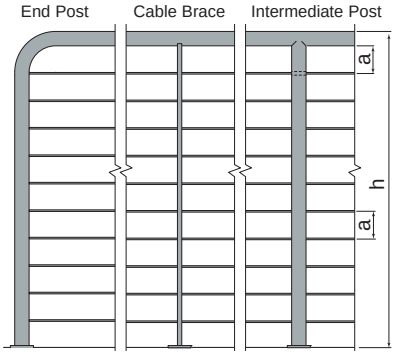
Pipe Size	r	OD	Steel	Stainless
1¼"	1⅝"	1.660"	**4434***	**4654**
1½"	1⅝"	1.900"	**4464***	**4684**
2"	1"	2.375"	**410**	**459-1**

***Note:** These elbows have a visible seam. For other elbows refer to pages 172 to 187.

PIPE OR ROUND TUBE POST – WELDED ASSEMBLY



Pipe	h	Cable	a
1¼"	36½"	8 lines	3.300"
1¼"	42½"	10 lines	3.240"
1½"	36½"	8 lines	3.240"
1½"	42½"	10 lines	3.200"
2"	36½"	8 lines	3.140"
2"	42½"	10 lines	3.110"



Pipe	h	Cable	a
1¼"	36½"	10 lines	3.170"
1¼"	42½"	12 lines	3.140"
1½"	36½"	10 lines	3.150"
1½"	42½"	12 lines	3.120"
2"	36½"	10 lines	3.100"
2"	42½"	12 lines	3.340"

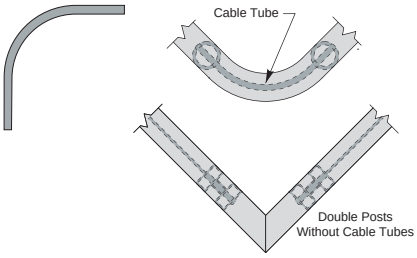
COMPONENTS FOR THE ASSEMBLY OF TUBE CORNER SECTIONS

These stylish tube corner sections allow a change in direction without risk of damage to the cables. At the same time, they offer the streamlined look of a continuous piece of cable – that runs through the tube – and eliminates the cost and visual obstruction of additional mounting and tensioning hardware.

These corner sections are provided as components: elbows, posts and cable tubes. Each post is custom designed per job requirements with holes pre-drilled to accept cable tubes. Posts can also be provided pre-coped and in various styles and angles. All posts are custom made based on *customer provided*, detailed shop drawings. Upon request, **Wagner** can provide shop drawings – standard charges will apply.

To use cable tubes, clear holes are drilled in the posts to accept these smaller diameter elbows. The cable tubes are then inserted through the holes and welded into place. The cable may now be inserted through the tube providing a uniquely attractive fabrication.

For complete design and fabrication information, download our *Product Design and Fabrication Guide for Metal Framed Railings* at www.wagnercablerailing.com.



CABLE TUBE

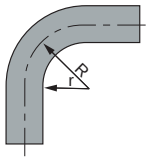
Two 3" tangents. Drill ⅝" through hole in post and chamfer one side for welding. Insert ***Cable Tube*** into pre-drilled posts and weld into place.

Tubing Diameter	Steel	#4 Satin Stainless
⅝"	**CR0113**	**CR0114.4**

ROUND TUBE OR PIPE CORNER POSTS

Welded tops and bases. Manufactured to eliminate distortion.

Pipe Size	Tube Size	Height	Steel	#4 Satin Stainless
1¼"	1.660"	36"	**CR166ST36**	**CR166SS36A**
1¼"	1.660"	42"	**CR166ST42**	**CR166SS42A**
1½"	1.900"	36"	**CR190ST36**	**CR190SS36A**
1½"	1.900"	42"	**CR190ST42**	**CR190SS42A**



90º ELBOW WITH TWO 2" TANGENTS

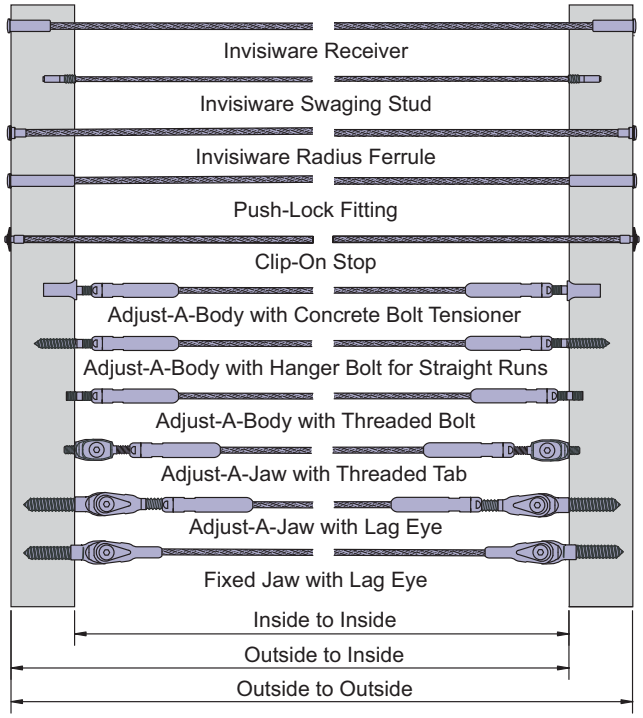
Pipe Size	r	OD	Steel	Stainless
1¼"	4"	1.660"	**5640**	**5656**
1½"	4"	1.900"	**5670**	**5690**

For other elbows, refer to pages 172 to 187.

CABLE RAILING WORKSHEETS

Use these two worksheets to assist in determining the requirements for your application. Larger versions of these sheets may be downloaded from our website.

Use our ***Online Configuration Tool*** to assist in determining pricing. Go to ***www.wagnercompanies.com*** for the latest information and changes to this product line.



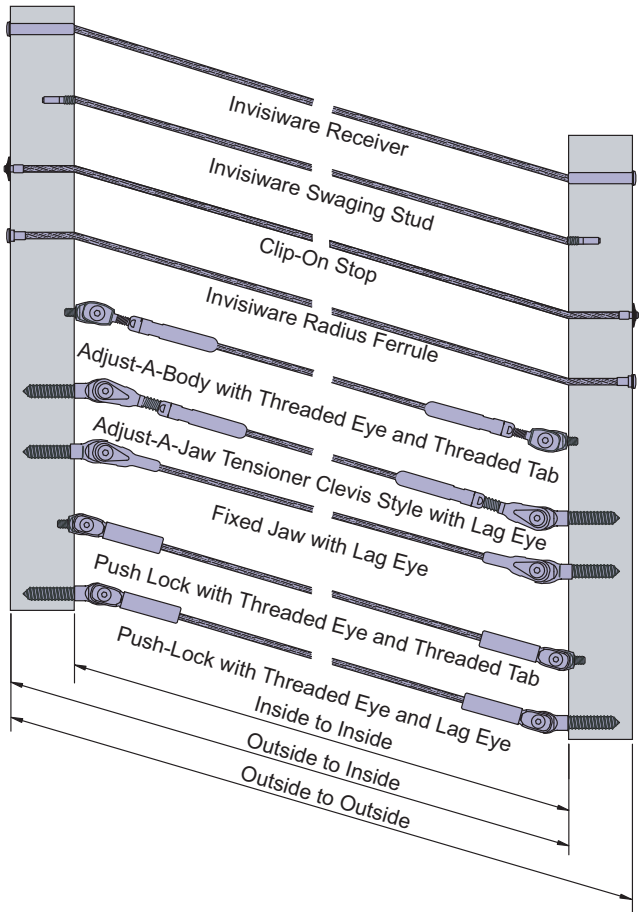


Photo courtesy of Don Duperault.

USING ULTRA-TEC® HARDWARE WITH WOOD POSTS

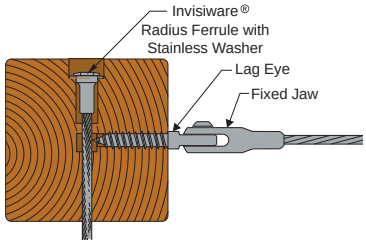
These drawings illustrate some of the ways ***Ultra-tec***® hardware is used in wood end and corner posts. A minimum of a nominal 4 × 4 (3½" × 3½" actual) is recommended for any post where ***Cable*** hardware is mounted.

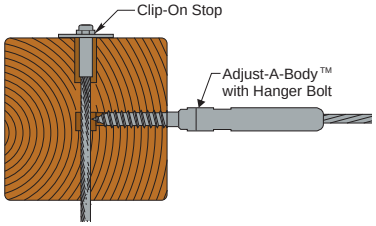
Cables should be spaced on end posts on centers of no more than 3.250", and the ***Cable*** should be supported in some fashion no more than every 42" along the ***Cable*** run.

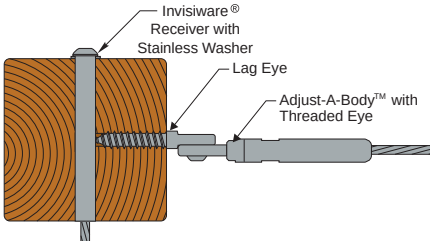
Cables can be cut and fittings swaged in the field using Ultra-tec® ***Swaging Equipment*** – available for rent or purchase.

With some hardware, the ***Cable*** can be cut to customer provided lengths and the fittings swaged on at the factory thus providing ready to install hardware.

Go to page 284 for more information on installing ***Ultra-tec***® cable rail with wood posts.







INVISIWARE® RECEIVERS, RADIUS FERRULES AND CLIP-ON STOP WITH WOODEN END POSTS

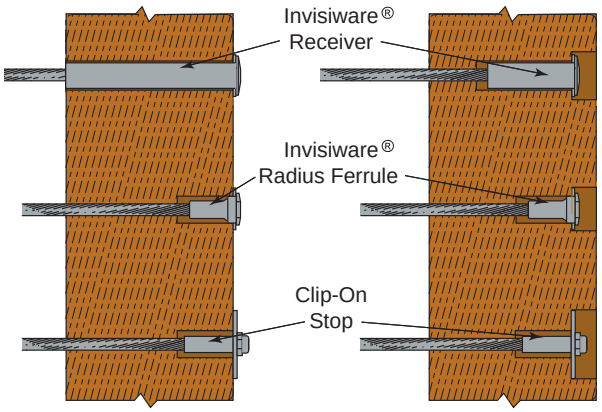
The ***Invisiware***® ***Receiver, Radius Ferrule*** and ***Clip-On Stop*** may be used with wooden end posts. We recommend one of these ways to accomplish this.

Surface Mount: Drill a hole in the post to accept the selected fitting such that the head sits on the outside of the post.

Counter Bore: Drill a counter bored hole to accept the appropriate fitting such that the head lies below the face of the post.

Stainless Steel Washers – page 55 – are required. They are supplied with the ***Clip-On Stop*** but are to be purchased separately for the ***Invisiware***® ***Receiver*** and Radius Ferrule.

Refer to page 284 for installation information.

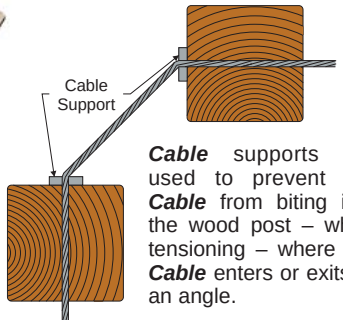


Note: ACQ pressure treated lumber is now being used in many parts of the country. Use only stainless steel or galvanized hardware with ACQ treated lumber.

CABLE SUPPORT

¼" × 1" flat bar.

Available in Steel and Satin Finished Stainless Steel.



Cable supports are used to prevent the ***Cable*** from biting into the wood post – when tensioning – where the ***Cable*** enters or exits at an angle.

DRILL GUIDE

Use ***Drill Guide*** to locate and drill the pilot holes necessary for your subsequent holes and counter bores. Simply clamp to post and drill. It is best to drill one side and then the other. When ordering, allow space for clamps. 6" overall length drill included that may be used to drill your ***Cable*** through-holes.

Download the ***Drill Guide Order Form and Cable Support Order Form*** from ***www.wagnercable-railing.com*** or contact **Wagner**.

STAINLESS STEEL POST PROTECTOR TUBE

The post protector tube is inserted into a wood post where the ***Cable*** enters/exits the post at an angle to keep the cable from biting into the wood.

	Stainless Steel
Post Protector Tube	**CRPPT**