ARCHITECTURAL WIRE ROPE RAILING

RAIL-CO™

Clean. Sturdy. Restrained.

A custom architectural railing system like the ones found in this catalog stand on their own as a safe, durable, and unique choice in both residential and commercial applications. In a residential setting, the low profile nature of a stainless steel wire rope railing provides a virtually unobstructed view; removing the boundary between your deck and a relaxing sunset. In a public setting, the railing system ensures a safe environment while not detracting from the surrounding design or architectural elements.

RAIL-CO is part of ***West Coast*** *Wire Rope & Rigging, Inc., a family-owned business that has been fabricating cable railing systems for nearly 60 years. We are uniquely qualified to work directly with engineers, architects, contractors, and property owners. We are happy to work with you in order to come up a system that fits with your specific project needs/desires. We can provide both completed systems as well as individual components.*

Hardware solutions found in this catalog were developed for and taken directly from marine applications. These fittings and wire rope line are made from Type 316 stainless steel and have been time-tested in a rough saltwater environment. You can be confident that a stainless steel architectural railing system from RAIL-CO will stand up to any type of weather while maintaining its unique and elegant appearance for years to come.

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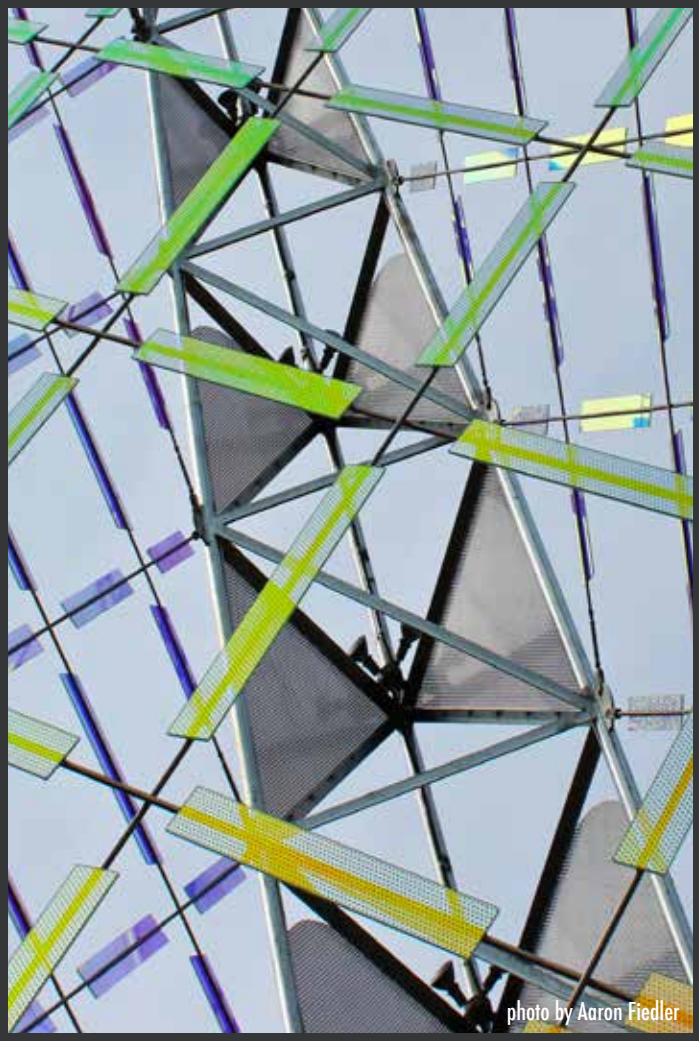


photo by Aaron Fiedler

REQUEST FOR QUOTATION, PLACEMENT, OR ACCEPTANCE OF ORDER

A request for quotation, placement, or acceptance of an order by Buyer shall constitute an acceptance of the Terms and Conditions contained herein. Any of the Buyer's Terms and Conditions which are in addition to, or different from, those contained herein, which are not separately agreed to by Seller in writing, and hereby objected to and shall be of no effect. All offers shall be deemed accepted by buyer upon transmission to Seller of Buyer's acceptance of the offer in any reasonable manner.

TAXES

Applicable state Sales and/or Use Tax will be added unless Seller has a signed Sales Tax Exempt certificate on file. Taxes are not included in quoted price.

PRICE

Published prices and quoted prices, unless otherwise specified, are subject to change without notice. Seller reserves the right to revise the pricing if there is any change in quantity, inventory availability, size, finish, or method of shipment different from those contained in the original order.

INSPECTION

Buyer shall promptly inspect goods upon receipt and notify Seller of any defect in workmanship, transit damage, or otherwise not in conformity with the requirements of the order. Seller, at its option, may correct or have corrected the nonconformity. Seller will cooperate with Buyer in filing claims with freight carriers. All claims for shortages, shipping, or clerical errors shall be made in writing no later than ten (10) days after Buyer's receipt of the products.

RETURNS

No product may be returned without the Seller's consent or knowledge. Seller shall furnish instructions regarding disposition or rejected products. All returned merchandise is subject to inspection. The Seller reserves the right to impose a 20% restocking charge. Payment for all in-bound and out-bound freight charges will be the responsibility of the Buyer unless prior arrangements have been made. Seller will not accept the return of merchandise purchased over 90 days based on the original invoice date. Cut lengths of wire rope are not subject to return except upon written consent of the Seller. Any use of the goods by Buyer, or any failure to make a claim within the applicable time periods shall automatically constitute an irrevocable acceptance of the goods and an admission that the goods fully complied with the terms and conditions of the sale. A claim that product is non-conforming shall not entitle Buyer to deduct any sum from any invoice unless such claim has been allowed in writing by Seller.

PAYMENT TERMS

Terms of payment shall be set forth on the face of the quotation or invoice. Terms are figured from the date of invoice. All payments are to be made in U.S. Dollars. Any unpaid balance after the required payment date shall be subject to a finance charge of 1-12% (18% per annum) per month from such date. Payments shall be made without right of setoff. Title of goods shall not pass to the Buyer until the entire purchase price and all other obligations of the Buyer under these terms of sale are paid performed in full. Seller shall have the right to suspend credit or to modify credit terms, or to withhold deliveries, when the Buyer's financial condition so warrants. In the event the Seller is required to institute any type of action or proceeding to recover any obligations due Seller by Buyer, Seller shall be entitled to receive, as an additional item of damages, reasonable collection and/or attorney fees incurred by Seller in pursuit of Buyer.

SHIPMENT

All material shall be properly packed for shipment. The Seller shall comply with the Buyer's routing and written shipping instructions. If such instructions are not previously received, Seller reserves the right to select carrier and routing. All shipments are F.O.B. Origin, unless other arrangements have been made.

DELIVERY

All goods quoted upon are subject to prior sales. In no event will the Seller be responsible for loss or damages due to failure to make delivery in accordance to the delivery estimate. In addition, the Seller shall not be liable for failure in shipment or delivery caused by fires, strikes, casualties, delays in transportation, acts of God, or other causes beyond the Seller's control. Seller's judgments shall be final and shall not subject Seller to any claim for damages by virtue of any shortages or failure to deliver.

TITLE-SECURITY

For security, title of goods shall not pass to the customer until the entire purchase price and all other obligations of the customer under these terms of sale are performed in full.

ARBITRATION

All disputes that may arise between the parties regarding the interpretation of the contract and the legal effect of the contract shall, to the exclusion of any court of law, be arbitrated and determined in accordance with the latest Commercial Arbitration Rules of the American Arbitration Association. The arbitration proceeding shall be held in the city in that state where the principal office of the Seller is located. The parties recognize and consent to the above mentioned arbitration association's jurisdiction over each and every one of them.

GOVERNING PROVISIONS

The parties hereto irrevocably submit to the venue and jurisdiction of the Federal and State courts sitting in Multnomah County, Oregon and waive claims as to inconvenient forum. In the event this agreement pertains to the sale of any goods outside the United States, the parties agree that the United Nations Convention for the International Sale of Goods shall not apply to this agreement.

WARRANTY AND LIMITATION OF REMEDIES

Except for the warranty that the product manufactured by Seller shall be made in a good and workmanlike manner and in accordance with the specifications therefore supplied or agreed to by Buyer, SELLER MAKES NO WARRANTY, EXPRESSED OR IMPLIED, AND ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEEDS THE FOREGOING WARRANTY IS HEREBY DISCLAIMED BY THE SELLER AND EXCLUDED FROM THIS AGREEMENT. The above warranty shall only apply during the first ninety (90) days following delivery of the Product to Buyer. Seller shall not be liable for any consequential or incidental damages, lost profits, punitive damages or losses or expenses of any kind. Buyer's sole and exclusive remedy shall be the repair or replacement, at Sellers option, of product proven to be defective. Seller is hereby specifically granted the right to cure any proven or acknowledged defects. In any event, Seller's maximum liability herein above shall not exceed the contract price for the Product proven to be defective. Notwithstanding anything to the contrary hereinabove, the limited warranties provided hereinabove shall not apply to any component parts or equipment not manufactured by the Seller, but purchased by Seller from other manufactures or are sold as is or assembled with Seller's product. In those instances, all warranties are those made by the manufacturer and Seller herby disclaims any warranties, whether express or implied, INCLUDING ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Seller's limited warranty shall become null and void should Buyer attempt any repairs or alterations to the Product without Seller's prior written consent. Seller's limited warranty shall likewise not apply to any damage caused by misuse or neglect. Seller does not authorize any person, including its agents, employees, sales representatives, or distributors, to create, modify, expand, or extend any warranty or representation about the Product other than contained in the preceding sentences.

RAIL-CO's position in the architectural railing industry is unique in that we have considerable experience in quoting, creating, and assembling wire rope systems for all types of clients/customers. We take pride in our ability to address the unique challenges and details that custom projects can contain.

We work with architects, home/property owners, and everyone else in between. If you are new to wire rope architectural railing, this catalog will provide you with the information you need to get you on your way to designing your new railing. If you are familiar with these railing systems, we haven't forgotten about you. You will be happy to see that we've included a considerable amount of technical details and product options to ensure the project you are working on comes together as easily as possible.

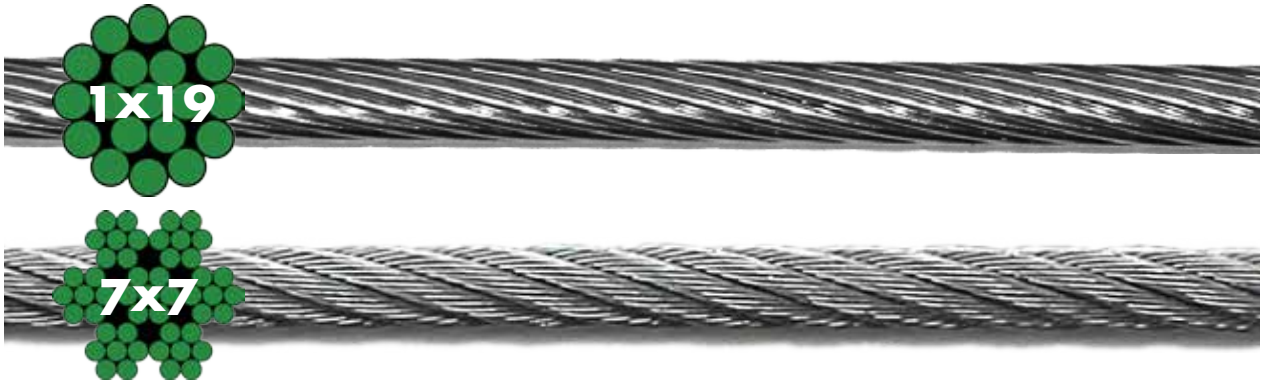
Let's begin, shall we?

Types of Wire Rope:

When it comes to architectural wire rope railings, two types (also called "constructions") of rope are available through RAIL-CO; 1x19 and 7x7. If you are not familiar with wire rope, here is a quick lesson.

Wire rope is constructed by combining strands of **wires**. Individual wires are twisted into **strands**, and those strands are twisted into the final rope. A 1x19 rope contains one strand of 19 wires... A 7x7 rope contains seven strands, each made up of 7 wires.

7x7 rope is more flexible than 1x19 due to the smaller diameter of the individual wires. If your project is going to have any curve or angle to it, 7x7 might be a better option than 1x19. Since the two ropes are constructed differently, they are going to have a different aesthetic. Here is an example of each rope type to help you decide which is going to be best for your project.



Cable Set-up:

- Cable assemblies should be spaced 3.5 inches apart to meet the 4 inch code present in most areas.
- End posts need to be strong enough to support the number of cable assemblies used and tensioned to 350 lbs. per cable assembly.
- Intermediate posts need to be placed every 4 feet to prevent line deflection of more than 4".
- Cable lengths need to be kept under 50 feet for most railing systems in order to maintain proper tensioning. Exceptions can be made when utilizing a Swage-to-Swage Turnbuckle **(pg. 32)**.

Cable Assemblies:

A complete cable assembly must have the following elements–

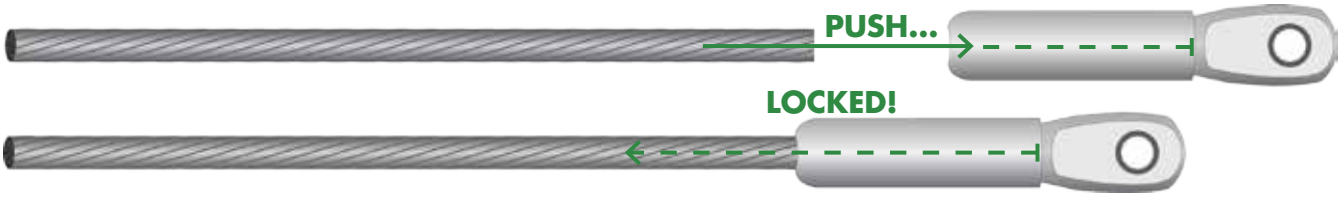
1) A turnbuckle or adjustable threaded terminal to tension the cable.
2) An attachment point at each end, with an end fitting, that will support the tension of the cable.

Without these two elements, you do not have a proper cable assembly...

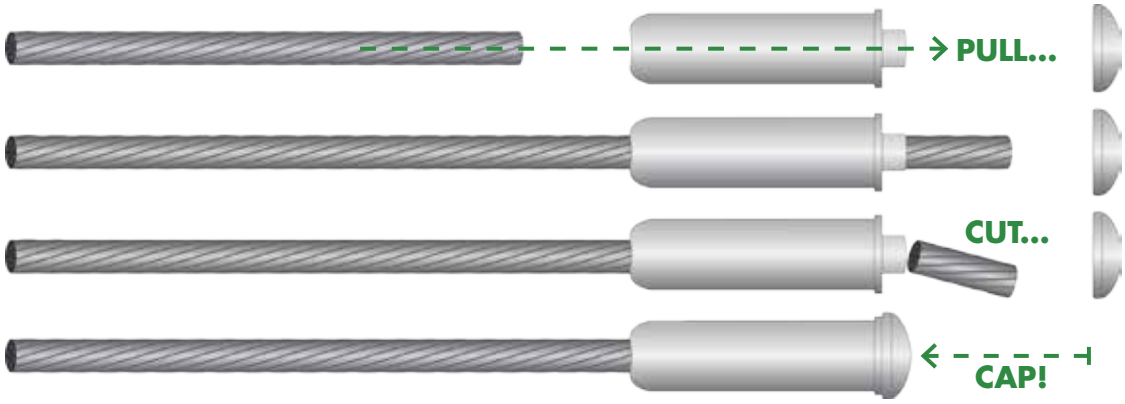
Clearly, aesthetics are very important to your design. Knowing this, RAIL-CO has provided a number of different fittings that function the same way, but have different form factors. You can mix & match end fittings to achieve the exact assembly that you want.

Fitting Types:

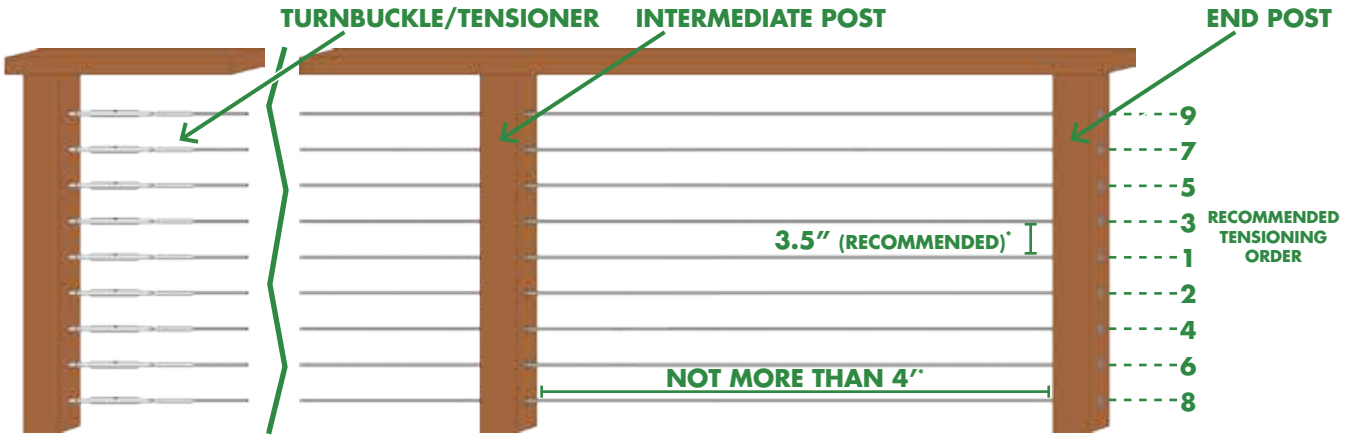
- **Machine Swage** (prounounced "swedj") fittings are attached by using a cold forming press. The completed fitting has a smooth, uniform appearance. Swaging services can be performed by your nearest RAIL-CO shop, or you can rent a swaging machine and do it yourself on-site.
- **Crimp** fittings are attached to the wire rope by a simple hand tool. Crimp fittings will only provide 60-70% of the wire rope's strength. This loss in system strength must be accounted for in the design stage of your project. Crimp fittings are only available for 1/8" and 3/16" wire rope. A crimping tool is available to borrow from RAIL-CO at no extra charge when you purchase your hardware from us.
- **Mechanical** fittings are generally more expensive than the Swage or Crimp fittings, but their main advantage is that they do not require any special tools for installation. If your project is on the smaller side, the extra cost of the mechanical fittings can be offset by the speed and ease of installation.
- **Push-to-Lock** fittings are **only** available for 1x19LH wire rope. Simply insert the wire rope end into a fitting on one side of your run and install a tensioner on the other end, then tension the line. A cable release tool is available for order **(pg. 33)**.
  Please note, this tool will only work on fittings that have not yet been tensioned.



- **Pull-to Lock** fittings are **only** available for 1x19LH wire rope and are also quite simple to install. Attach a tensioner on one end post, slip the end fitting into a pre-drilled hole in the other end post and pull the cable all the way through the end fitting. Tension the cable, then cut the excess cable off and press on the cap to cover the bare cable end. That's it!



- **Basic Railing Framework:** Cable runs less than 50 feet (from **End Post** to **End Post**) are recommended. If your application requires a run of more than 50 feet, Swage to Swage Turnbuckles **(pg. 32)** are required. Regardless of total cable run length, **Intermediate Posts** should be used every 4 feet. Most codes stipulate that a 4" ball not be able to fit between two rails with a 25 pound load on one line. We recommend 3.5" rail spacing to ensure your project meets this requirement.*



To ensure your project meets code, always check your local building authority.

FREQUENTLY ASKED QUESTIONS

While we can't know all of the questions you might have regarding your future project, we've worked on a lot of projects that are probably similar. We have developed a good feel for some of the questions you most likely have right about now.

We've put together the following FAQ section with the hope that the information found in this catalog helps move your process forward rather than just creates more questions. If there is a detail that remains unclear or you still have a question or two after reading through the FAQs, please feel free to shoot us an e-mail or give us a call. Who knows, you just might help us add a question or two to future versions of this catalog!

Are Steel or Galvanized Fittings Available from RAIL-CO?

No. RAIL-CO does not carry steel or galvanized fittings for commercial or residential line systems. We believe that these materials simply are not able to hold up to the elements like stainless steel does.

What Grade of Stainless Steel is Used in Fittings Sold by RAIL-CO?

All materials sold by RAIL-CO are made out of Type 316 stainless steel.

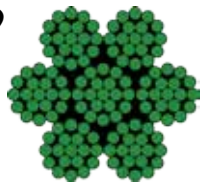
What Type of Wire Rope Should I Use?

Generally, 1x19 cable should be used for all railing applications. 1x19 cable is stiff and low-stretch, perfect for railings with runs up to 50 feet. 7x7 cable is more flexible with more stretch and can be used for railings with very short runs. 7x19 cable is very flexible but the smaller wires make it less durable.

1x19

7x7

7x19



What Size Wire Rope Do I Use?

3/16" wire rope is the most popular size and good for most railing applications. In high traffic applications such as airports, stadiums, or amusement parks, 1/4" rope is highly recommended. For residential applications where view and unobtrusiveness are paramount, 1/8" rope works well.

Can I Make my Framework Out of Aluminum?

Generally, aluminum is too soft for wire rope railings. There is also the possibility of aluminum and stainless steel reacting where moisture is present and causing electrolysis (corrosion).

What is a Machine Swage Fitting?

A machine swage fitting is attached to the wire rope by a cold forming process fixing the fitting directly to the rope. A swage fitting should not be confused with Hand Crimp fittings or Mechanical fittings. Swaged fittings, when properly assembled, maintain the full rope strength. Swage fittings can NOT be attached to a cable by any means other than a swageing machine.

What is a Hand Crimp Fitting?

Hand crimp fittings are designed to be fixed to the wire rope by using a special crimping tool. These fittings are popular due to their ease of installation, but that ease comes with reduced strength that needs to be compensated for during the planning stage.

What is a Mechanical Fitting?

A mechanical fitting is attached to the wire rope by the fitting compressing the cable with a cone inside the fitting and/or the cable. Mechanical fittings are assembled to the cable with simple hand tools. Mechanical fittings are larger in diameter than Swage or Hand Crimp fittings and can be reused after replacing an internal piece, but carry a hefty price tag.

What is a Swageless Fitting?

Swageless fittings are installed onto the wire rope by hand at the job site and do not require special equipment. Since the fittings can be installed onto the ends of the rope at the job site, the intermediate holes (holes in the supporting railing posts) only need to be large enough for the rope to pass through. Swageless fittings are generally more costly than fittings that are swaged. However, on smaller projects, the ease of using swageless fittings may be worth it to you. Swageless fittings are offered for use with 1x19 constructed 1/8" and 3/16" diameter rope.

Pull-to-Lock type fitting

Push-to-Lock type fitting

How Long can I Run a Single Piece of Wire Rope?

For architectural railing purposes, wire rope needs to be tensioned mechanically. The most common way to do this is with a turnbuckle. Generally, a conventional turnbuckle can tension up to 50 feet of line in a straight run and still meet code. Runs longer than 50 feet can be accomplished by using the Swage to Swage Turnbuckle (**Pg. 32**).

What is a Turnbuckle?

A **turnbuckle** is a metal coupling device consisting of right- and left-hand threaded members screwed into an internally threaded body which when rotated, expands or contracts.

Do I Need a Tensioner in my Cable Assembly?

Yes. Cable works great for railing but only if you have the ability to tighten it with a turnbuckle or with a through-bolted threaded terminal. Even if you had some way of pre-tensioning the rope and attaching it without a turnbuckle or threaded terminal, the rope would eventually stretch through people leaning against it, children climbing, the building settling, etc. You want the ability to go back at a later date and tighten everything up.

How Much Tension Do I Need?

The manufacturers of our products recommend 350 lbs. of tension on each rope assembly for a cable railing.

Can a Wire Rope Line go Around a 90° Corner?

No. A true 90° corner will damage the wire rope no matter what construction of cable is used. The physics of rope does not allow the tension to be equally transmitted from one side of a corner to another side. Tension has to be maintained throughout the entire length of the cable run to meet code. An end fitting should be used to make the corner transition and keep the cable tension in a straight line.

Why are the Guidelines on Spacing, Tension, and Framework so Strict?

Spacing, tension, and framework guidelines are strict to ensure your final product meets code and is safe. Wire rope railing is not a new business and these guidelines are time-tested standards.

How Can I Tell Right-hand Thread from Left-hand Thread?

When the fitting is held vertically, threads slope up and to the right for right-hand thread or up and to the left for left-hand thread.

Can I Swage My Cable Sections Myself or Do I Need to Have RAIL-CO Fabricate Them?

With a comprehensive order form completed, associates at any of our three RAIL-CO facilities can fabricate all the cable sections you might need. If you're the adventureous type, RAIL-CO has all the tools and machines needed to let you fabricate your lines on site! If you're interested, complemenetary 2-day equipment rental comes with every RAIL-CO order. If you need more time, equipment is available for $50/day afterwards.

THREADED STUD SYSTEM

Hands down the most cost effective cable attachment and tensioning solution offered by RAIL-CO is the **Threaded Stud** system. This system normally uses a Flat Washer **(pg. 31)** and a Hex Nut **(pg. 33)** for tensioning against the end verticals/posts in the run. An Acorn Nut is installed on the protruding threads to finish off the attachment and lock the tensioning nut in position.

Threaded Stud

SWAGE FITTING			
Thread Size	Wire Size	Thread Length	Part Number
10-32 UNF	1/8"	3/8"	10TJLL18S
10-32 UNF	1/8"	1-3/4"	10LL18RH
1/4-28 UNF	1/8"	7/16"	14TJLL18S
1/4-28 UNF	1/8"	1-1/2"	14LLP18RH
1/4-28 UNF	1/8"	2-1/4"	14LL18RH
1/4-28 UNF	1/8"	3-1/4"	14ASLL18RH
1/4-28 UNF	3/16"	7/16"	14TJLL316S
1/4-28 UNF	3/16"	1-1/2"	14LLP316RH
1/4-28 UNF	3/16"	2-1/4"	14LL316RH
1/4-28 UNF	3/16"	3-1/4"	14ASLL532RH
5/16-24 UNF	3/16"	7/16"	516LLE316RH
5/16-24 UNF	3/16"	1-1/2"	516LLP316RH
5/16-24 UNF	3/16"	2-3/8"	516LL316RH
5/16-24 UNF	1/4"	7/16"	516TJLL14S
5/16-24 UNF	1/4"	1-1/2"	516LLP14RH
5/16-24 UNF	1/4"	2-3/8"	516LL14RH
3/8-24 UNF	1/4"	7/16"	38TJLL14S
3/8-24 UNF	1/4"	1-1/2"	38LLP14RH
3/8-24 UNF	1/4"	2-3/4"	38LL14RH

CRIMP FITTING			
Thread Size	Wire Size	Thread Length	Part Number
1/4-28 UNF	1/8"	7/16"	14CLLE18RH
1/4-28 UNF	1/8"	1-1/2"	14CLLP18RH
1/4-28 UNF	1/8"	2-1/4"	14CLL18RH
1/4-28 UNF	3/16"	7/16"	14TJCLL316S
1/4-28 UNF	3/16"	1-1/2"	14CLLP316RH
1/4-28 UNF	3/16"	2-1/4"	14CLL316RH
5/16-24 UNF	3/16"	7/16"	516CLLE316RH
5/16-24 UNF	3/16"	1-1/2"	516CLLP316RH
5/16-24 UNF	3/16"	2-3/8"	516CLL316RH

MECHANICAL FITTING			
Thread Size	Wire Size	Thread Length	Part Number
1/4-28 UNF	1/8"	2-1/4"	Left-hand-14HG18LH, Right-hand-14HG18RH
1/4-28 UNF	3/16"	2-1/4"	Left-hand-14HG316LH, Right-hand-14HG316RH

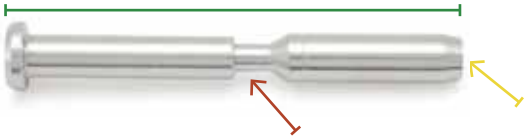
Threaded Stud with Wrench Flat

SWAGE FITTING			
Thread Size	Wire Size	Thread Length	Part Number
1/4-28 UNF LH	3/16"	2-1/4"	14LL316FLH
1/4-28 UNF	3/16"	2-1/4"	14LL316FRH
5/16-24 UNF LH	3/16"	2-3/8"	516LL316FLH
5/16-24 UNF	3/16"	2-3/8"	516LL316FRH
5/16-24 UNF LH	1/4"	2-3/8"	516LL14FLH
5/16-24 UNF	1/4"	2-3/8"	516LL14FRH
3/8-24 UNF LH	1/4"	2-3/4"	38LL14FLH
3/8-24 UNF	1/4"	2-3/4"	38LL14FRH

STUD TENSIONING INTERNAL ADJUSTER SYSTEM

This simple and economical tensioning system provides for an extremely "clean" look concealing the adjusting threads internally. The typical application is for short to medium length cable runs in wire sizes ranging from 1/8" to 1/4". Cable tensioning is easily accomplished with the use of an Allen wrench.

Additionally, the stud tensioners can be used in conjunction with other stud length combinations and systems to meet your design criteria.



Stud Tensioning Internal Adjuster - Assembly

1x19 7x7 7x19

SWAGE FITTING					
Thread	Wire Size	Closed Length	Open Length	Part Number	Rec. Hole Size
1/4-28 UNF	1/8"	1.625"	2.375"	ST06A18	21/64"
1/4-28 UNF	3/16"	1.750"	2.500"	ST06A316	21/64"
5/16-24 UNF	3/16"	1.687"	2.437"	STO8A316	25/64"
5/16-24 UNF	1/4"	1.750"	2.500"	ST08A14	25/64"
CRIMP FITTING					
Thread	Wire Size	Closed Length	Open Length	Part Number	Rec. Hole Size
1/4-28 UNF	1/8"	1.975"	2.725"	ST06A18C	21/64"
1/4-28 UNF	3/16"	1.812"	2.562"	ST06A316C	21/64"
5/16-24 UNF	3/16"	1.875"	2.625"	ST08316C	25/64"
MECHANICAL FITTING					
Thread	Wire Size	Closed Length	Open Length	Part Number	Rec. Hole Size
1/4-28 UNF	1/8"	2-1/8"	3"	ST06A18-HG	21/64"
5/16-24 UNF	3/16"	2-1/8"	3"	ST08A316-HG	25/64"

Stud Tensioning Internal Adjuster Stud

1x19 7x7 7x19

SWAGE FITTING			
Thread	Wire Size	Length	Part Number
1/4-28 UNF	1/8"	1.500"	14LLST18RH
1/4-28 UNF	3/16"	1.500"	14LLST316RH
5/16-24 UNF	3/16"	1.500"	516LLST316RH
5/16-24 UNF	1/4"	1.500"	516LLST14RH
CRIMP FITTING			
Thread	Wire Size	Length	Part Number
1/4-28 UNF	1/8"	1.500"	14CLLST18RH
1/4-28 UNF	3/16"	1.500"	14CLLST316RH
5/16-24 UNF	3/16"	1.500"	516CLLST316RH
MECHANICAL FITTING			
Thread	Wire Size	Length	Part Number
1/4-28 UNF	1/8"	1-5/8"	14HGST18RH
5/16-24 UNF	3/16"	1-5/8"	516HGST316RH

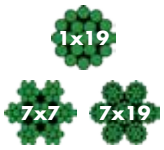
Stud Tensioning Internal Adjuster

Thread	Cap Size	Body Out. Dim.	Body Length	Total Length	Part Number	Rec. Hole Size
1/4-28 UNF	1/2"	5/16"	1.500"	1.625"	ST06	21/64"
1/4-28 UNF	1/2"	5/16"	0.562"	0.687"	ST06S	21/64"
5/16-24 UNF	9/16"	3/8"	1.500"	1.625"	ST08	25/64"
5/16-24 UNF	9/16"	3/8"	0.562"	0.687"	ST08S	25/64"

TERMINATION STUD SYSTEM

This cost effective cable tensioning system utilizes high quality closed turnbuckle assemblies and surface mount **Termination Studs**. Installation is made easy by simply drilling holes in your verticals for the cable to pass through. Tensioning is accomplished by the Termination Stud cap pulling against the end verticals/posts in the run. This system supports any type or style of post available for wire sizes of 1/8", 3/16", and 1/4". Standard Termination Stud end fittings listed are for 2", 4", and 6" thick post configurations; however, Termination Studs are available for up to 12" thick post configurations (ask for pricing).

(In addition to new projects, this system has proven a popular choice for retrofitting existing rails to meet current codes.)



Termination Stud Turnbuckle

SWAGE FITTING						
Thread	Wire Size	Body Length	Closed Length	Open Length	Rod Length	Part Number
1/4-28 UNF	1/8"	4-1/4"	6-1/4"	9-1/4"	1-1/4"	14TTLL18TS1
1/4-28 UNF	1/8"	4-1/4"	7-1/8"	10-1/4"	2-1/4"	14TTLL18TS
1/4-28 UNF	1/8"	4-1/4"	9-1/8"	12-1/4"	4-1/4"	14TTLL18TS4
1/4-28 UNF	1/8"	4-1/4"	14-1/4"	11-1/8"	6-1/4"	14TTLL18TS6
1/4-28 UNF	3/16"	4-1/4"	6-1/2"	9-1/2"	1-1/4"	14TTLL316TS1
1/4-28 UNF	3/16"	4-1/4"	7-1/2"	10-1/2"	2-1/4"	14TTLL316TS
1/4-28 UNF	3/16"	4-1/4"	9-1/2"	12-1/2"	4-1/4"	14TTLL316TS4
1/4-28 UNF	3/16"	4-1/4"	11-1/2"	14-1/2"	6-1/4"	14TTLL316TS6
5/16-24 UNF	3/16"	4-3/4"	8"	10-3/4"	2-1/4"	516TTLL316TS
5/16-24 UNF	1/4"	4-3/4"	8-1/8"	10-3/4"	2-1/4"	516TTLL14TS
CRIMP FITTING						
Thread	Wire Size	Body Length	Closed Length	Open Length	Rod Length	Part Number
1/4-28 UNF	1/8"	4 1/4"	6-1/4"	9-1/4"	1-1/4"	14TTCLL18TS1
1/4-28 UNF	1/8"	4 1/4"	7-1/8"	10-1/4"	2-1/4"	14TTCLL18TS
1/4-28 UNF	1/8"	4 1/4"	9-1/8"	12-1/4"	4-1/4"	14TTCLL18TS4
1/4-28 UNF	1/8"	4 1/4"	11-1/8"	14-1/4"	6-1/4"	14TTCLL18TS6
1/4-28 UNF	3/16"	4 1/4"	6-1/2"	9-1/2"	1-1/4"	14TTCLL316TS1
1/4-28 UNF	3/16"	4 1/4"	7-1/2"	10-1/2"	2-1/4"	14TTCLL316TS
1/4-28 UNF	3/16"	4 1/4"	9-1/2"	12-1/2"	4-1/4"	14TTCLL316TS4
1/4-28 UNF	3/16"	4 1/4"	11-1/2"	14-1/2"	6-1/4"	14TTCLL316TS6
MECHANICAL FITTING						
Thread	Wire Size	Body Length	Closed Length	Open Length	Rod Length	Part Number
1/4-28 UNF	1/8"	4-1/4"	7"	9-1/4"	1-1/4"	14TTHG18TS1
1/4-28 UNF	1/8"	4-1/4"	8"	10-1/4"	2-1/4"	14TTHG18TS
1/4-28 UNF	1/8"	4-1/4"	10"	12-1/4"	2-1/4"	14TTHG18TS4
1/4-28 UNF	1/8"	4-1/4"	12"	14-1/4"	2-1/4"	14TTHG18TS6
1/4-28 UNF	1/8"	4-1/4"	7"	9-1/4"	1-1/4"	14TTHG316TS1
1/4-28 UNF	1/8"	4-1/4"	8"	10-1/4"	2-1/4"	14TTHG316TS
1/4-28 UNF	1/8"	4-1/4"	10"	12-1/4"	2-1/4"	14TTHG316TS4
1/4-28 UNF	1/8"	4-1/4"	12"	14-1/4"	2-1/4"	14TTHG316TS6

Termination Stud

SWAGE FITTING						
Wire Size	Cap Size	Cap Thick.	Body Out. Dim.*	Body Length	Part Number	Rec. Hole Size
1/8"	1/2"	.205"	.250"	1.50"	TSLL18	1/4"
3/16"	9/16"	.205"	.359"	1.75"	TSLL316	3/8"
1/4"	9/16"	.220"	.427"	2.30"	TSLL14	7/16"
CRIMP FITTING						
Wire Size	Cap Size	Cap Thick.	Body Out. Dim.*	Body Length	Part Number	Rec. Hole Size
1/8"	1/2"	.205"	.210"	2.00"	TS3C	7/32"
1/8"	9/16"	.205"	.292"	2.187"	TS5C	5/16"
MECHANICAL FITTING						
Wire Size	Cap Size	Cap Thick.	Body Out. Dim.*	Body Length	Part Number	Rec. Hole Size
1/8"	9/16"	1/8"	0.375"	1-1/4"	TSHG18	13/32"
3/16"	5/8"	1/8"	0.436"	1-1/4"	TSHG316	7/16"

*before swage

COUNTERSUNK TERMINATION STUD SYSTEM

The C**ountersunk Termination Stud** system has similar features to the Termination Stud system, except the end fittings are sunk into the end verticals in the run for a flush look. This system supports flat bar or tube style posts in wire sizes ranging from 1/8" to 3/16". Countersunk Termination Stud end fittings listed are for 2", 4", or 6" thick post configurations.

Installation is simple. When you use a standard 82° countersink on your end verticals/posts, the fitting will insert flush with the face.

Countersunk Termination Stud Turnbuckle

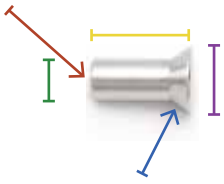
1x19 7x7 7x19

SWAGE FITTING							
Thread	Wire Size	Body Length	Closed Length	Open Length	Cap Size	Part Number	Rec. Hole Size
1/4-28 UNF	1/8"	4-1/4"	8-1/4"	10-5/8"	9/16"	14TTLL18CTS	23/64"
1/4-28 UNF	1/8"	4-1/4"	10-1/4"	12-5/8"	9/16"	14TTLL18CTS4	23/64"
1/4-28 UNF	1/8"	4-1/4"	12-1/4"	14-5/8"	9/16"	14TTLL18CTS6	23/64"
1/4-28 UNF	3/16"	4-1/4"	8-3/8"	11-1/8"	9/16"	14TTLL316CTS	23/64"
1/4-28 UNF	3/16"	4-1/4"	10-3/8"	13-1/8"	9/16"	14TTLL316CTS4	23/64"
1/4-28 UNF	3/16"	4-1/4"	12-3/8"	15-1/8"	9/16"	14TTLL316CTS6	23/64"
CRIMP FITTING							
Thread	Wire Size	Body Length	Closed Length	Open Length	Cap Size	Part Number	Rec. Hole Size
1/4-28 UNF	1/8"	4-1/4"	8-3/8"	11-1/4"	9/16"	14TTCLL18CTS	23/64"
1/4-28 UNF	1/8"	4-1/4"	10-3/8"	13-1/4"	9/16"	14TTCLL18CTS4	23/64"
1/4-28 UNF	1/8"	4-1/4"	12-3/8"	15-1/4"	9/16"	14TTCLL18CTS6	23/64"
1/4-28 UNF	3/16"	4-1/4"	8-1/4"	11"	9/16"	14TTCLL316CTS	23/64"
1/4-28 UNF	3/16"	4-1/4"	10-1/4"	13"	9/16"	14TTCLL316CTS4	23/64"
1/4-28 UNF	3/16"	4-1/4"	12-1/4"	15"	9/16"	14TTCLL316CTS6	23/64"

Countersunk Termination Stud

1x19 7x7 7x19

SWAGE FITTING						
Wire Size	Cap Size	Cap Angle	Body Out. Dim.	Body Length	Part Number	Rec. Hole Size
1/8"	1/2"	82°	0.250"	1.500"	CTSLL18	17/64"
3/16"	9/16"	82°	0.359"	1.750"	CTSLL316	21/64"
CRIMP FITTING						
Thread	Wire Size	Cap Angle	Body Out. Dim.	Body Length	Part Number	Rec. Hole Size
1/8"	1/2"	82°	0.210"	2.625"	CTSCLL18	15/64"
3/16"	6/16"	82°	0.292"	2.750"	CTSCLL316	5/16"



Countersunk Termination Stud Thread-on Cap

Thread	Body Length	Body Out. Dim.	Cap Angle	Cap Size	Part Number	Rec. Hole Size
1/4-28 UNF	9/16"	0.359"	82°	9/16"	CTST14	23/64"

THREADED TERMINATION STUD SYSTEM

Designed for ease of installation in a confined space (within 4-1/2" of an obstruction such as an adjacent wall or post), this cable tensioning system utilizes closed turnbuckle assemblies and surface mount End Fitting hardware.

End Fitting options include Acorn Nuts **(pg. 33)**, Hex Nuts **(pg. 33)**, Dome Nuts **(pg. 30)**, and Ball Ends **(pg. 31)**. Installation is easy, just drill holes in your verticals for the wire rope to pass through. Tensioning is accomplished by the End Fitting pulling against the end verticals/posts in the run. This system supports any type or style of post and is available in 1/4", 3/16", and1/4" wire sizes. Standard Termination Stud end fittings listed are for 2", 4" or 6" thick post configurations; but Termination Studs are also available for up to 12" thick post configurations (ask for more details).

Threaded Termination Stud Turnbuckle

SWAGE FITTING					
Thread	Wire Size	Body Length	Closed Length	Open Length	Part Number
1/4-28 UNF	1/8"	4-1/4"	7-5/8"	10-1/4"	14TTLL18S
1/4-28 UNF	1/8"	4-1/4"	9-5/8"	12-1/4"	14TTLL18S4
1/4-28 UNF	1/8"	4-1/4"	11-5/8"	14-1/4"	14TTLL18S6
1/4-28 UNF	3/16"	4-1/4"	7-3/4"	10-1/2"	14TTLL316S
1/4-28 UNF	3/16"	4-1/4"	9-3/4"	12-1/2"	14TTLL316S4
1/4-28 UNF	3/16"	4-1/4"	11-3/4"	14-1/2"	14TTLL316S6
5/16-24 UNF	3/16"	4-3/4"	8-5/8"	11-5/8"	516TTLL316S
5/16-24 UNF	1/4"	4-3/4"	8-1/2"	12"	516TTLL14S
CRIMP FITTING					
Thread	Wire Size	Body Length	Closed Length	Open Length	Part Number
1/4-28 UNF	1/8"	4-1/4"	7-15/16"	10-5/8"	14TTCLL18S
1/4-28 UNF	1/8"	4-1/4"	9-15/16"	12-5/8"	14TTCLL18S4
1/4-28 UNF	1/8"	4-1/4"	11-15/16"	14-5/8"	14TTCLL18S6
1/4-28 UNF	3/16"	4-1/4"	7-7/8"	10-1/2"	14TTCLL316S
1/4-28 UNF	3/16"	4-1/4"	9-7/8"	12-1/2"	14TTCLL316S4
1/4-28 UNF	3/16"	4-1/4"	11-7/8"	14-1/2"	14TTCLL316S6
MECHANICAL FITTING					
Thread	Wire Size	Body Length	Closed Length	Open Length	Part Number
1/4-28 UNF	1/8"	4-1/4"	8-1/8"	10-3/8"	14TTHG18S
1/4-28 UNF	1/8"	4-1/4"	10-1/8"	12-3/8"	14TTHG18S4
1/4-28 UNF	1/8"	4-1/4"	12-1/8"	14-3/8"	14TTHG18S6
1/4-28 UNF	3/16"	4-1/4"	8-1/8"	10-3/8"	14TTHG316S
1/4-28 UNF	3/16"	4-1/4"	10-1/8"	12-3/8"	14TTHG316S4
1/4-28 UNF	3/16"	4-1/4"	12-1/8"	14-3/8"	14TTHG316S6

Threaded Termination Stud

SWAGE FITTING			
Thread	Wire Size	Length	Part Number
1/4-28 UNF	1/8"	3/4"	14TJLL18S
1/4-28 UNF	3/16"	15/16"	14TJLL316S
5/16-24 UNF	3/16"	15/16"	516TJLL316S
5/16-24 UNF	1/4"	1-1/8"	516TJLL14S
CRIMP FITTING			
Thread	Wire Size	Length	Part Number
1/4-28 UNF	1/8"	15/16"	14TJCLL18S
1/4-28 UNF	3/16"	13/16"	14TJCLL316S
MECHANICAL FITTING			
Thread	Wire Size	Length	Part Number
1/4-28 UNF	1/8"	1-5/8"	14HGST18RH
5/16-24 UNF	3/16"	1-5/8"	516HGST316RH

TOGGLE JAW SYSTEM

Utilizing clevis style ends for cable attachment, the **Toggle Jaw** system allows for connection to eye bolts, tee-stock, angle iron, flat bar, loops, etc. The toggling feature allows for angled takeoff without the use of additional hardware. Toggle ends come standard with screws and lock nuts.

Toggle Jaw Turnbuckle

SWAGE FITTING								
Thread	Wire Size	Body Length	Closed Length	Open Length	Jaw Depth	Screw Size	Jaw Width	Part Number
10-32 UNF	1/8"	3-1/2"	5-7/16"	7-3/4"	7/16"	#10	1/4"	10TTLL18A
1/4-28 UNF	1/8"	4-1/4"	6-5/8"	9-1/4"	11/16"	1/4"	1/4"	14TTLL18A
1/4-28 UNF	3/16"	4-1/4"	6-3/4"	9-5/16"	11/16"	1/4"	1/4"	14TTLL316A
5/16-24 UNF	3/16"	4-3/4"	7-1/2"	1--1/4"	11/16"	5/16"	5/16"	516TTLL316A
5/16-24 UNF	1/4"	4-3/4"	7-3/8"	10-3/8"	11/16"	5/16"	5/16"	516TTLL14A
3/8-24 UNF	1/4"	5-1/4"	8-1/4"	11-1/2"	11/16"	3/8"	3/8"	38TTLL14A
CRIMP FITTING								
Thread	Wire Size	Body Length	Closed Length	Open Length	Jaw Depth	Screw Size	Jaw Width	Part Number
1/4-28 UNF	1/8"	4-1/4"	6-7/8"	9-1/2"	11/16"	1/4"	1/4"	14TTCLL18A
1/4-28 UNF	3/16"	4-1/4"	6-3/4"	9-3/8"	11/16"	1/4"	1/4"	14TTCLL316A
MECHANICAL FITTING								
Thread	Wire Size	Body Length	Closed Length	Open Length	Jaw Depth	Screw Size	Jaw Width	Part Number
1/4-28 UNF	1/8"	4-1/4"	7-3/8"	9-5/8"	11/16"	1/4"	1/4"	14TTHG18A
1/4-28 UNF	3/16"	4-1/4"	7-3/8"	9-5/8"	11/16"	1/4"	1/4"	14TTHG316A

Toggle Jaw

SWAGE FITTING					
Wire Size	Jaw Width	Screw Size	Jaw Depth	Body Length	Part Number
1/8"	1/4"	1/4"	11/16"	2-9/16"	14TJLL18A
3/16"	1/4"	1/4"	11/16"	2"	14TJLL316A
3/16"	5/16"	5/16"	11/16"	2-1/2"	516TJLL316A
1/4"	5/16"	5/16"	11/16"	2-1/4"	516TJLL14A
1/4"	3/8"	3/8"	15/16"	2-1/2"	38TJLL14A
CRIMP FITTING					
Wire Size	Jaw Width	Screw Size	Jaw Depth	Body Length	Part Number
1/8"	1/4"	1/4"	11/16"	2-1/4"	14TJCLL18A
3/16"	1/4"	1/4"	11/16"	2-1/8"	14TJCLL316A
MECHANICAL FITTING					
Wire Size	Jaw Width	Screw Size	Jaw Depth	Body Length	Part Number
1/8"	1/4"	1/4"	11/16"	2-1/4"	14TJCLL18A
3/16"	1/4"	1/4"	11/16"	2-1/4"	14TJCLL316A

Weld-On Loop for Toggle Jaw–Part Number #WL

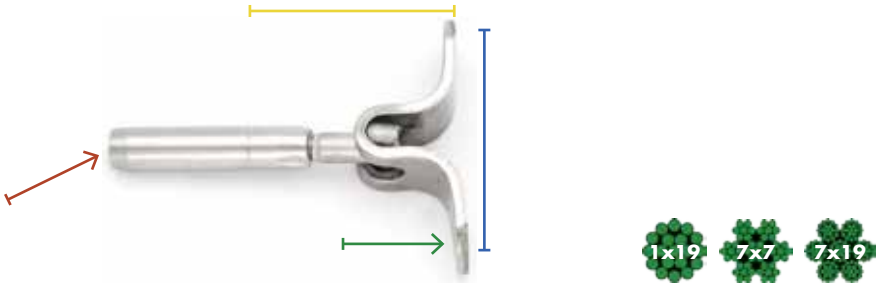
DECK TOGGLE SYSTEM

The **Deck Toggle** tensioning system utilizes "Deck" toggles which provide a face mount solution while allowing for angled takeoff. The Deck Toggle fittings are attached utilizing two screws through the Deck Toggle base. The mounting surfaces include wood posts or blocking (a minimum of 3" wood blocking is required) on either side of a common post by through bolting, or drilling and tapping a metallic post. The articulation range of the Deck Toggle end fittings is greater than 180°.

The strength of the cable assembly is limited to the screw strength and attaching base material(s).

Deck Toggle Turnbuckle

SWAGE FITTING							
Thread	Wire Size	Body Length	Closed Length	Open Length	Screw Size	Hole Spacing	Part Number
1/4-28 UNF	1/8"	4-1/4"	6-3/8"	9-1/8"	1/4"	1-1/2"	14TTLL18DT
1/4-28 UNF	3/16"	4-1/4"	6-1/2"	9-1/4"	1/4"	1-1/2"	14TTLL316DT
5/16-24 UNF	3/16"	4-3/4"	7-1/8"	10-1/8"	5/16"	1-3/4"	516TTLL316DT
5/16-24 UNF	1/4"	4-3/4"	7-1/8"	10-1/4"	5/16"	1-3/4"	516TTLL14DT
3/8-24 UNF	1/4"	5-1/4"	7-3/4"	11-1/8"	3/8"	2"	38TTLL14DT
CRIMP FITTING							
Thread	Wire Size	Body Length	Closed Length	Open Length	Screw Size	Hole Spacing	Part Number
1/4-28 UNF	1/8"	4-1/4"	6-5/8"	9-3/8"	1/4"	1-1/2"	14TTCLL18DT
1/4-28 UNF	3/16"	4-1/4"	6-1/2"	9-1/4"	1/4"	1-1/2"	14TTCLL316DT
5/16-24 UNF	3/16"	4-3/4"	7-1/8"	10-1/8"	5/16"	1-3/4"	516TTCLL316DT
MECHANICAL FITTING							
Thread	Wire Size	Body Length	Closed Length	Open Length	Screw Size	Hole Spacing	Part Number
1/4-28 UNF	1/8"	4-1/4"	6-1/2"	8-3/4"	1/4"	1-1/2"	14TTHG18DT
1/4-28 UNF	3/16"	4-1/4"	6-1/2"	8-3/4"	1/4"	1-1/2"	14TTHG316DT



Deck Toggle Jaw

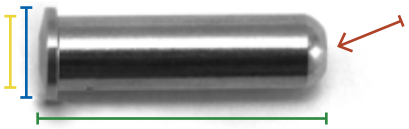
SWAGE FITTING				
Wire Size	Length	Screw Size	Hole Spacing	Part Number
1/8"	2-1/8"	1/4"	1-1/2"	14TJLL18DT
3/16"	1-5/8"	1/4"	1-1/2"	14TJLL316DT
3/16"	2-1/8"	5/16"	1-3/4"	516TJLL316DT
1/4"	2"	5/16"	1-3/4"	516TJLL14DT
1/4"	2-1/8"	3/8"	2"	38TJLL14DT
CRIMP FITTING				
Wire Size	Length	Screw Size	Hole Spacing	Part Number
1/8"	2-1/8"	1/4"	1-1/2"	14TJCLL18DT
3/16"	1-13/16"	1/4"	1-1/2"	14TJCLL316DT
MECHANICAL FITTING				
Wire Size	Length	Screw Size	Hole Spacing	Part Number
1/8"	1-3/4"	1/4"	1-1/2"	14TJHG18DT
3/16"	1-3/4"	1/4"	1-1/2"	14TJHG316DT

ROUND HEAD SYSTEM

The **Round Head** system's extremely clean look comes from it's lack of a turnbuckle and the fact that the fittings are concealed within the end posts. The system consists of an end fitting and a end tensioner. This system is intended for use in level runs.

The push-to-lock and pull-to-lock fittings can be installed "in the field" with no swaging or special tools required. These -lock fittings are designed to be used with 1x19LH wire rope **only**.

Round Head Fitting



1x19 LH

PUSH TO LOCK

Wire Size	Body Diameter	Body Length	Cap Diameter	Rec. Hole Size	Part Number
1/8"	.437"	1.562"	.537"	7/16"	PL-4
3/16"	.437"	1.562"	.537"	7/16"	PL-6

1x19 LH

PULL TO LOCK

Wire Size	Body Dia.	Body Length	Step Dia.	Cap Dia.	Total Length	Rec. Hole Size	Part Number
1/8"	.437"	1.562"	.537"	.625"	1.825"	7/16"	PUL-4
3/16"	.437"	1.562"	.537"	.625"	1.825"	7/16"	PUL-6
1/8"	.437"	1.562"	.537"	.625"	1.825"	7/16"	PUL-4-12
3/16"	.437"	1.562"	.537"	.625"	1.825"	7/16"	PUL_6-12
1/8"	.437"	2.03"	.537"	.625"	2.266"	7/16"	PUL-4-12-2.030
3/16"	.437"	2.03"	.537"	.625"	2.266"	7/16"	PUL-6-12-2.030
1/8"	.437"	3.03"	.537"	.625"	3.266"	7/16"	PUL-4-3.03C4

Round Head Stud Tensioner

1x19 LH

PUSH TO LOCK

Thread	Wire Size	Body Diameter	Body Length	Cap Diameter	Rec. Hole Size	Part Number
5/16-24	1/8" or 3/16"	.437"	1.582"	.537"	7/16"	R-6-12
5/16-24	1/8" or 3/16"	.437"	1.812"	.537"	7/16"	R-6-22
5/16-24	1/8" or 3/16"	.437"	2.030"	.537"	7/16"	R-6-32
5/16-24	1/8" or 3/16"	.437"	2.301"	.537"	7/16"	R-6-42
5/16-24	1/8" or 3/16"	.437"	2.375"	.537"	7/16"	R-6-72
5/16-24	1/8" or 3/16"	.437"	2.530"	.537"	7/16"	R-6-82
5/16-24	1/8" or 3/16"	.437"	3.030"	.537"	7/16"	R-6-52
5/16-24	1/8" or 3/16"	.437"	3.563"	.537"	7/16"	R-6-62

Round Head Stud

1x19 LH

PUSH TO LOCK

Thread	Thread Length	Wire Size	Body Diameter	Body Length	Part Number
5/16-24	1.562"	1/8"	.437"	3.375"	PLST-4
5/16-24	1.562"	3/16"	.437"	3.375"	PLST-6

THREADED EYE SYSTEM

The **Threaded Eye** system is a time and headache saver when it comes to stairs or severly pitched railings. Both the Threaded Eye Turnbuckle, Fitting, and Tensioners have a 180° range of motion, making this system extremely versatile and removing the need to drill angled holes into your end posts.

The push-to-lock and pull-to-lock fittings can be installed "in the field" with no swaging or special tools required. These -lock fittings are designed to be used with 1x19LH wire rope **only**.

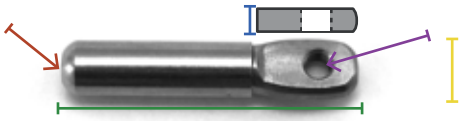
Threaded Eye Turnbuckle

1x19 LH

PUSH TO LOCK

Thread	Wire Size	Body Dia.	Closed Length	Open Length	Head Thick.	Hole Thread	Part Number
5/16-24	1/8"	.437"	6.25"	7.5"	.232"	1/4-20	PL-TB4
5/16-24	3/16"	.437"	6.25"	7.5"	.232"	1/4-20	PL-TB6

Threaded Eye End Fitting



1x19 LH

PUSH TO LOCK

Wire Size	Body Diameter	Body Length	Head Thickness	Hole Thread	Hole Depth	Part Number
1/8"	.437"	2.450"	.232"	1/4-28	.313"	PL-TE4
3/16"	.437"	2.450"	.232"	1/4-28	.313"	PL-TE6

Threaded Eye Tensioner

1x19 7x7

SWAGE FITTING

Thread	Wire Size	Body Dia.	Body L.	Thread L.	Head W.	Head Thick.	Hole Th.	Hole D.	Part #
5/16-24	1/8"	.5"	3.125"	2"	.5"	.233"	1/4-28	.44"	A-JTE6
5/16-24	3/16"	.5"	3.125"	2"	.5"	.233"	1/4-28	.44"	A-JTE6
7/16-20	1/4"	.625"	3.5"	2.5"	.844"	.295"	3/8-24	.68"	A-JTE8

Threaded Jaw Tensioner

1x19 7x7

SWAGE FITTING

Thread	Wire Size	Body Dia.	Closed L.	Open L.	Jaw W.	Jaw D.	Hole Th.	Hole Dia.	Part #
5/16-24	1/8"	.5"	4.3"	5.99"	.26"	.56"	1/4-28	.26"	A-J62
5/16-24	3/16"	.5"	4.3"	5.99"	.26"	.56"	1/4-28	.26"	A-J62
7/16-20	1/4"	.625"	4.87"	6.43"	.313"	.75"	3/8-24	.39"	A-J82

Fixed Jaw End Fitting

1x19 7x7

SWAGE FITTING

Wire Size	Body Length	Jaw Width	Jaw Depth	Hole Thread	Part Number
1/8"	1.75"	.26"	.56"	1/4-28	F-J62
3/16"	1.75"	.26"	.56"	1/4-28	F-J62
1/4"	2.12"	.39"	.75"	3/8-24	F-J82

Swaged Ferrule

Ferrules are **REQUIRED** for all Swage fittings on this page.

Wire Size	Part Number
1/8"	F-4
3/16"	F-6
1/4"	F-8

Mounting Screw

Hardware Wire Size	Part Number
1/8"	SC-6
3/16"	SC-6
1/4"	SC-8

Invisiware® fittings are the ultimate in low-profile railing solutions. The Stud and Receiver are designed so that the tensioning happens within the post. There is no need for an external turnbuckle tensioner.

Invisiware® receivers are used with wood posts and metal tube or pipe. Pipe ends are counterbored so the full perimeter of the head rests 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 barrier between the receiver and the metal post. For wood posts, the receiver can rest against the outside of the post or the post can be counterbored with the receiver head recessed in the post. For wood applications, don't forget to order 7/16 SAE washers (**pg. 31**).

Invisiware® Threaded Stud

1x19 7x7

SWAGE FITTING

Thread	Wire Size	Body Diameter*	Part Number
5/16-24	1/8"	.250"	S-4
5/16-24	3/16"	.250"	S-6
7/16-20	1/4"	.375"	S-8

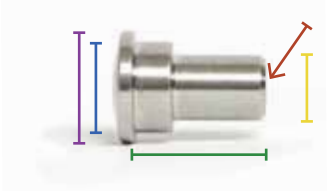
*after swage

Invisiware® Threaded Receiver

Thread	Wire Size	Body Dia.	Body Length	Cap Diameter	Rec. Hole Size	Part Number
5/16-24	1/8"	.437"	1.562"	.537"	7/16"	R-6-12
5/16-24	3/16"	.437"	1.562"	.537"	7/16"	R-6-12
5/16-24	1/8"	.437"	1.812"	.537"	7/16"	R-6-22
5/16-24	3/16"	.437"	1.812"	.537"	7/16"	R-6-22
7/16-20	1/4"	.531"	1.812"	.646"	17/32"	R-8-22
5/16-24	1/8"	.437"	2.030"	.537"	7/16"	R-6-32
5/16-24	3/16"	.437"	2.030"	.537"	7/16"	R-6-32
7/16-20	1/4"	.531"	2.030"	.646"	17/32"	R-8-32
5/16-24	1/8"	.437"	2.301"	.537"	7/16"	R-6-42
5/16-24	3/16"	.437"	2.301"	.537"	7/16"	R-6-42
7/16-20	1/4"	.531"	2.301"	.646"	17/32"	R-8-42
5/16-24	1/8"	.437"	2.375"	.537"	7/16"	R-6-72
5/16-24	3/16"	.437"	2.375"	.537"	7/16"	R-6-72
5/16-24	1/8"	.437"	2.530"	.537"	7/16"	R-6-82
5/16-24	3/16"	.437"	2.530"	.537"	7/16"	R-6-82
5/16-24	1/8"	.437"	3.030"	.537"	7/16"	R-6-52
5/16-24	3/16"	.437"	3.030"	.537"	7/16"	R-6-52
7/16-20	1/4"	.531"	3.030"	.646"	17/32"	R-8-52

Invisiware® Radius Ferrule

For use on a stairwell, you do not have to drill holes at an angle. Invisiware® receivers can accept an angle of up to 35°.



1x19 7x7

SWAGE FITTING

Wire Size	Body Dia.*	Body Length	Shoulder Dia.	Cap Dia.	Part Number
1/8"	.250"	.750"	.437"	.537"	RF-4
3/16"	.250"	.750"	.437"	.537"	RF-6
1/4"	.375"	1.00"	.531"	.646"	RF-8

*after swage

THREADED BOLT SYSTEM

The **Threaded Bolt** system is another tasteful railing system. The Threaded Bolt Tensioner and End Fitting thread into pre-drilled and tapped holes in your end posts. When you are using at least Schedule 80 pipe or square tubing with a minimum 1/4" wall, you can mount these fittings directly into the post with no need for special brackets or extra welding... A real time and money saver.

Threaded Bolt Tensioner

1x19 7x7

SWAGE FITTING

Thread	Wire Size	Body Dia.	Body L.	Thread L.	End Thread Length	Part #
5/16-24	1/8"	.5"	3.125"	2"	.375"	A-JTB6
5/16-24	3/16"	.5"	3.125"	2"	.375"	A-JTB6
7/16-20	1/4"	.625"	3.5"	2.5"	.375"	A-JTB8

Threaded Bolt End Fitting

1x19 LH

PUSH TO LOCK

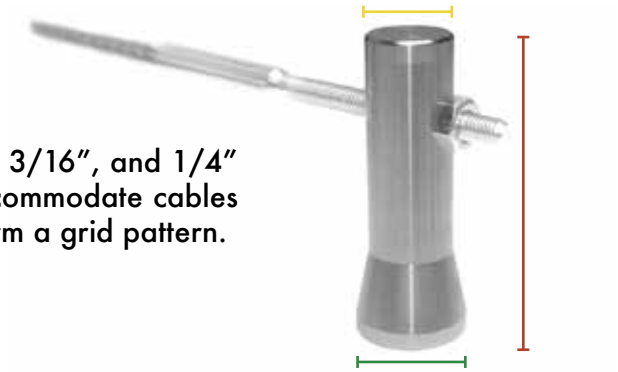
Wire Size	Body Diameter	Body Length	Thread	Thread Length	Part Number
1/8"	.437"	2.5"	5/16-24	2.5"	PL-TH4
3/16"	.437"	2.5"	5/16-24	2.5"	PL-TH6

Swaged Ferrule

Ferrules are **REQUIRED** for all Swage fittings on this page.

Wire Size	Part Number
1/8"	F-4
3/16"	F-6
1/4"	F-8

Trellis System hardware is available for 1/8", 3/16", and 1/4" wire diameters. The system is designed to accommodate cables attaching perpendicularly to each other to form a grid pattern.



Trellis Post

POST BASE							
Wire Size	**Length**	**Body Dia.**	**Base Dia.**	**Through Holes**	**Hole Dia.**	**Mount Screw**	**Part Number**
1/8"	3"	3/4"	1"	1	17/64"	3/8"	LP63-2
1/8"	4"	3/4"	1"	1	17/64"	3/8"	LP64-2
1/8"	4"	3/4"	1"	2	17/64"	3/8"	LP63-4
1/8"	4"	3/4"	1"	2	17/64"	3/8"	LP64-4
3/16-1/4"	4"	1"	1-1/4"	1	25/64"	3/8"	LP104-2ASSY
3/16-1/4"	4"	1"	1-1/4"	2	25/64"	3/8"	LP104-4ASSY

WIDE POST BASE *(for use with LP6x-x trellis posts)*			
Outside Dia.	**Thickness**	**Mount Screw Siz.**	**Part Number**
1-3/4"	1/4"	3/8"	LP6-BASE

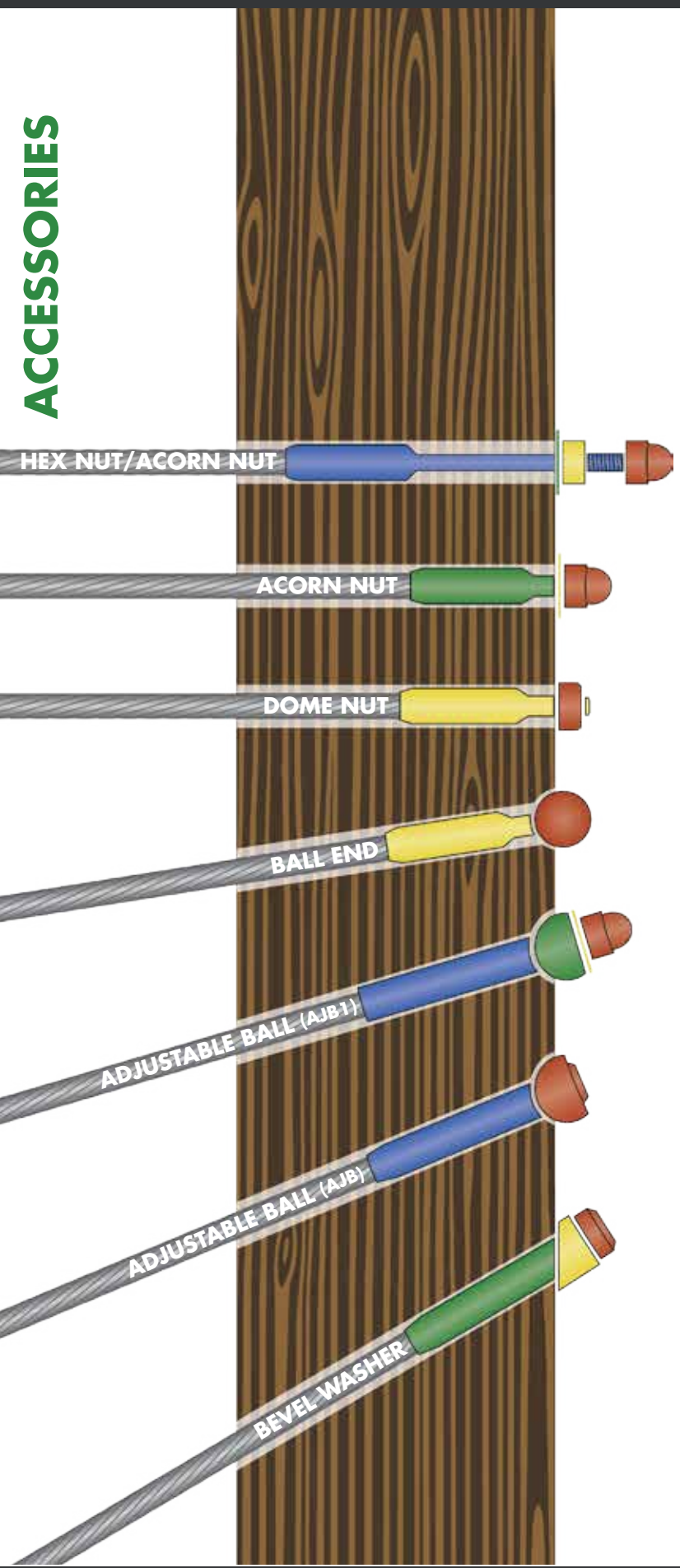
MOUNT SCREWS		
Thread Size	**Length**	**Part Number**
3/8-16 UNC	2"	SC38CS2
3/8-16 UNC	3"	SC38CS3

Cross Clamp

Cross Clamps are used in conjunction with trellis posts. They are used in two different ways: To act as a stiffener at the cable intersection points where no post exists and to attach horizontal/vertical interior cables to the perimeter cables.

CROSS CLAMPS	
Thread Size	**Part Number**
3/8-16 UNC	SC38CS2
3/8-16 UNC	SC38CS3

ACCESSORIES



Dome Nuts

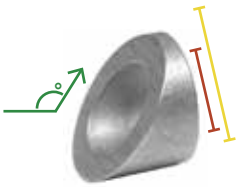
The **Dome Nuts** serve as a cap on the Termination Stud hardware **(pg. 12)**, creating an attachment point on the end verticals/posts.

THROUGH HOLE

Thread Size	Out. Dia.	Thickness	Part #
1/4-28 UNF RH	6/16"	1/4"	DN6
5/16-24 UNF RH	3/4"	9/32"	DN8

NO THROUGH HOLE

Thread Size	Out. Dia.	Thickness	Part #
1/4-28 UNF RH	6/16"	1/4"	DN6S
5/16-24 UNF RH	3/4"	9/32"	DN8S



Bevel Washers

Designed for use with many of our end fitting options without post modifications. Angles provided will work with most conventional stair systems.

ONLY FOR USE WITH SYSTEMS ON PGS. 8-21

Inner Dia.	Out. Dia.	Bevel Angle	Part #
1/4"	1/2"	31°	BW5
25/64"	5/8"	31°	BW6
1/4"	5/8"	31°	BW7
5/16"	5/8"	31°	BW8
1/4"	1/2"	37°	BW9
25/64"	5/8"	37°	BW10
1/4"	5/8"	37°	BW11
5/16"	5/8"	37°	BW12
7/16"	5/8"	31°	BW13
7/16"	5/8"	37°	BW14

ONLY FOR USE WITH SYSTEMS ON PGS. 22-28

Wire Size	Bevel Angle	Part #
1/8" or 3/16"	30-33°	BW32-6
1/8" or 3/16"	34-36°	BW35-6
1/8" or 3/16"	37-39°	BW38-6
1/4"	30-33°	BW32-8
1/4"	34-36°	BW35-8
1/4"	37-39°	BW38-8

Adjustable Ball Fittings

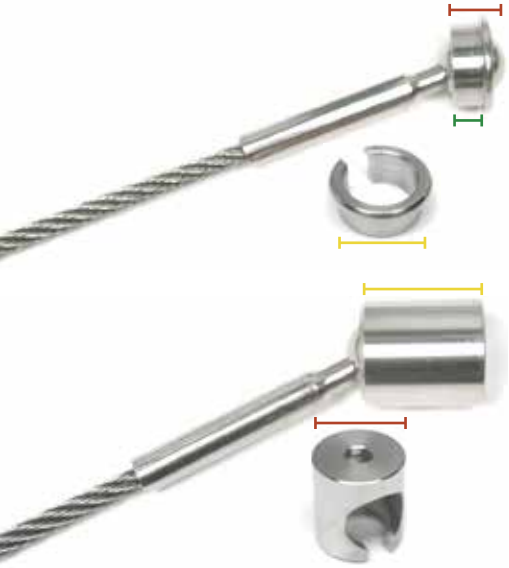
Adjustable Ball Fittings are an excellent choice for most angle compensation applications. An 11/16" hole in the end verticals/posts acts as a mounting socket. Flat bar applications utilize an 11/16" outside diameter chamfer.

Ball Dia.	Style	Hole Dia.	Part Number
3/4"	Term. Stud	3/8"	AJB
3/4"	Threaded Stud	3/8"	AJB1

Ball End Fittings

The thread-on **Ball End Fittings** are available in both 1/4–28 and 5/16–24 thread configurations. Both options are designed to be used with the Threaded Termination Studs and Threaded Termination Stud Turnbuckle **(pg. 16)** assemblies as well as our Surface and Back Mounting Ball and Socket System. *(Post hole should be 1/2").*

Thread Size	Outside Dia.	Part Number
1/4–28 UNF RH	5/8"	BALL6
5/16–24 UNF RH	5/8"	BALL8



Surface and Back Mounting Ball Sockets

BACK MOUNT							
Ball Dia.	**Thick.**	**Post Hole Dia.**	**Cap Thick.**	**Cap Dia.**	**Pivot Angle**	**Slot**	**Part #**
5/8"	9/32"	3/4"	3/16"	7/8"	40°	No	BCM6
5/8"	9/32"	3/4"	3/16"	7/8"	40°	Y–1/4"	BCM6-C

SURFACE MOUNT						
Ball Dia.	**Out. Dia**	**Thick.**	**Length**	**Screw Size**	**Pivot Angle**	**Part #**
5/8"	7/8"	1"	13/16"	1/4"	40°	BCFM6-C
5/8"	7/8"	1"	13/16"	6mmx1.25 thread	40°	BCFM6

Washers

FLAT	
Nominal Size	**Part Number**
3/16"	10WAS
1/4"	14WAS
5/16"	516WAS
3/8"	38WAS
1/2"	12WAS
5/8"	58WAS
3/4"	34WAS
7/8"	78WAS
1"	1WAS

LOCK	
Nominal Size	**Part Number**
3/16"	10WAS
1/4"	14WAS
5/16"	516WAS
3/8"	38WAS

FENDER	
Nominal Size	**Part Number**
3/16"	10WAS
1/4"	14WAS
5/16"	516WAS
3/8"	38WAS

Swage to Swage Turnbuckle

1x19 7x7

Swage to Swage Turnbuckles are utilized in longer cable runs every 30-40' to compensate for cable stretch so that proper tensioning can be achieved. Additionally, these turnbuckles can also be used to achieve a certain desired look in shorter cable runs. Depending on the look desired, positioning of the turnbuckles is up to the designer. These fittings are fully compatible with any of the available termination style fittings.

SWAGE FITTING

Thread	Wire Size	Body Length	Closed Length	Open Length	Part Number
10–32 UNF	1/8"	3–1/2"	4–1/2"	6–7/8"	10TTLL18SS
10–32 UNF	1/8"	4–1/4"	5–3/8"	8–1/8"	14TTLL18SS
1/4–28–UNF	3/16"	4–1/4"	5–1/2"	8–1/2"	14TTLL316SS
5/16–24 UNF	3/16"	4–3/4"	6–1/2"	9–3/8"	516TTLL316SS
5/16–24 UNF	1/4"	4–3/4"	6–1/4"	9–5/8"	516TTLL14SS
3/8–24 UNF	1/4"	5–1/4"	6–3/4"	10–1/4"	38TTLL14SS

CRIMP FITTING

Thread	Wire Size	Body Length	Closed Length	Open Length	Part Number
1/4-28 UNF	1/8"	4-1/4"	5-3/4"	8-3/4"	14TTCLL18SS
1/4-28 UNF	3/16"	4-1/4"	5-3/8"	8-1/4"	14TTCLL316SS

Swage Forks

1x19 7x7

Wire Size	Pin Size	Fork Depth	Length	Part Number
1/8"	1/4"	1-1/2"	2.756"	SF03
3/16"	3/8"	2"	3.819"	SF05
1/4"	7/16"	2-1/2"	4.449"	SF07
1/4"	1/2"	2-1/2"	4.700"	SF07A

Tubular Turnbuckle Bodies

Thread	Body Length	Part Number
10-32 UNF	2-1/4"	10TB2
10-32 UNF	3-1/2"	10TB
1/4-28-UNF	2-3/4"	14TB2
1/4-28-UNF	4-1/4"	14TB
5/16-24 UNF	5"	516TB
3/8-24 UNF	5-1/4"	38TB

Cable Grommets/Bushings

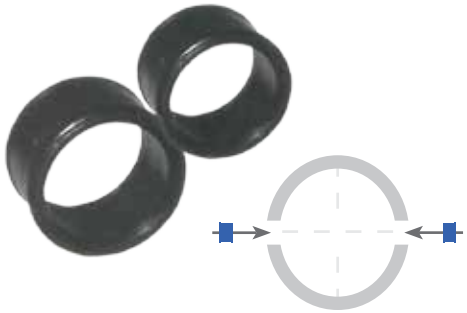
Grommets help prevent rust in exterior applications or where moisture is a factor. Grommets are installed after your railing is painted/powder-coated but before you run the lines.

GROMMETS ARE ONLY FOR USE WITH SYSTEMS ON PGS. 22-28.

Wire Size	Post Material	Type of Post	Part Number
1/8" or 3/16"	Schedule 40 Pipe	Intermediate (level)	G-C6-1
1/4"	Schedule 40 Pipe	Intermediate (level)	G-C8-1
1/8" or 3/16"	.120" wall Tubing	Intermediate (level)	G-C6-2
1/4"	.120" wall Tubing	Intermediate (level)	G-C8-2
1/8" or 3/16"	.250" wall Tubing	Intermediate (level)	G-C6-4
1/4"	.250" wall Tubing	Intermediate (level)	G-C8-4
1/8" or 3/16"	Schedule 80 Pipe	End Post	G-C6-3
1/4"	Schedule 80 Pipe	End Post	G-C8-3
1/8" or 3/16"	.250" wall Tubing	End Post	G-C6-4
1/4"	.250" wall Tubing	End Post	G-C8-4
1/8" or 3/16"	Schedule 40 Pipe	Intermediate (angle up to 37°)	GI-C6-1
1/4"	Schedule 40 Pipe	Intermediate (angle up to 37°)	GI-C8-1
1/8" or 3/16"	.120" wall Tubing	Intermediate (angle up to 37°)	GI-C6-2
1/4"	.120" wall Tubing	Intermediate (angle up to 37°)	GI-C8-2
1/8" or 3/16"	.250" wall Tubing	Intermediate (angle up to 37°)	GI-C6-4
1/4"	.250" wall Tubing	Intermediate (angle up to 37°)	GI-C8-4

BUSHINGS ARE ONLY FOR USE WITH SYSTEMS ON PGS. 8-21.

Wire Size	Post Hole Size	Type of Post	Part Number
1/8"	23/64"	Level	BUSHING-4MMB
3/16"	25/64"	Level	BUSHING-6MMB
1/8"	23/64"	31°	BUSHING-4MMAB
3/16"	25/64"	31°	BUSHING-6MMAB



Installation Kit-Part Number # GROMMET TOOL SET

Place grommet on tool, align with hole, then tap gently with a hammer...
Kit is needed to properly install grommets from top section of chart (Part #'s beginning with G).

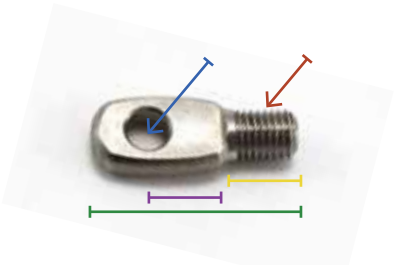
Nuts

ACORN	
Thread Size	**Part Number**
10-32 UNF	10LNL
10-32 UNF	10LNR
1/4-28 UNF	14LNL
1/4-28 UNF	14LNR
5/16-24 UNF	516LNL
5/16-24 UNF	516LNR
3/8-24 UNF	38LNL
3/8-24 UNF	38LNR

HEX	
Nominal Size	**Part Number**
1/4-28 UNF RH	14CAP
5/16-24 UNF RH	516CAP
3/8-24 UNF RH	38CAP

Cable Release Tool-Part Number #PL-KEY

Releases cable from Push-to-Lock and Pull-to-Lock type fittings before lines are tensioned.



Threaded Tabs

A real time and money saver! The threaded tab screws into a drilled and tapped hole on the inside wall of an end post. No need for welding... Be sure to use at least schedule 80 pipe or square tubing with a minimum 1/4" thick wall.

THREADED

Wire Size	Thread	Thread Length	Body Length	Hole Dia.	Hole Depth	Tab Thickness	Part #
1/8"	5/16-24	.375"	1.250"	.265"	.313"	.233"	TT-6B
3/16"	5/16-24	.375"	1.250"	.265"	.313"	.233"	TT-6B
1/4"	5/16-24	.375"	1.625"	.390"	.375"	.295"	TT-8B

Extended length, same as above except there is no need to tap the hole in your end post (3/8" hole for 1/8" or 3/16" fittings and 9/16" hole for 1/4" fittings). Cut to desired length and secure to end post with an acorn nut **(pg. 33)** and thread sealant.

THREADED, EXTENDED LENGTH

Wire Size	Thread	Thread Length	Body Length	Hole Dia.	Hole Depth	Tab Thickness	Part #
1/8"	3/8-24	2.5"	3.923"	.265"	.313"	.233"	TT-6B-L
3/16"	3/8-24	2.5"	3.923"	.265"	.313"	.233"	TT-6B-L

Lag Eye Bolt

A convenient, easy-to-install means for attaching a Threaded Eye or Threaded Jaw tensioner to a wood post.

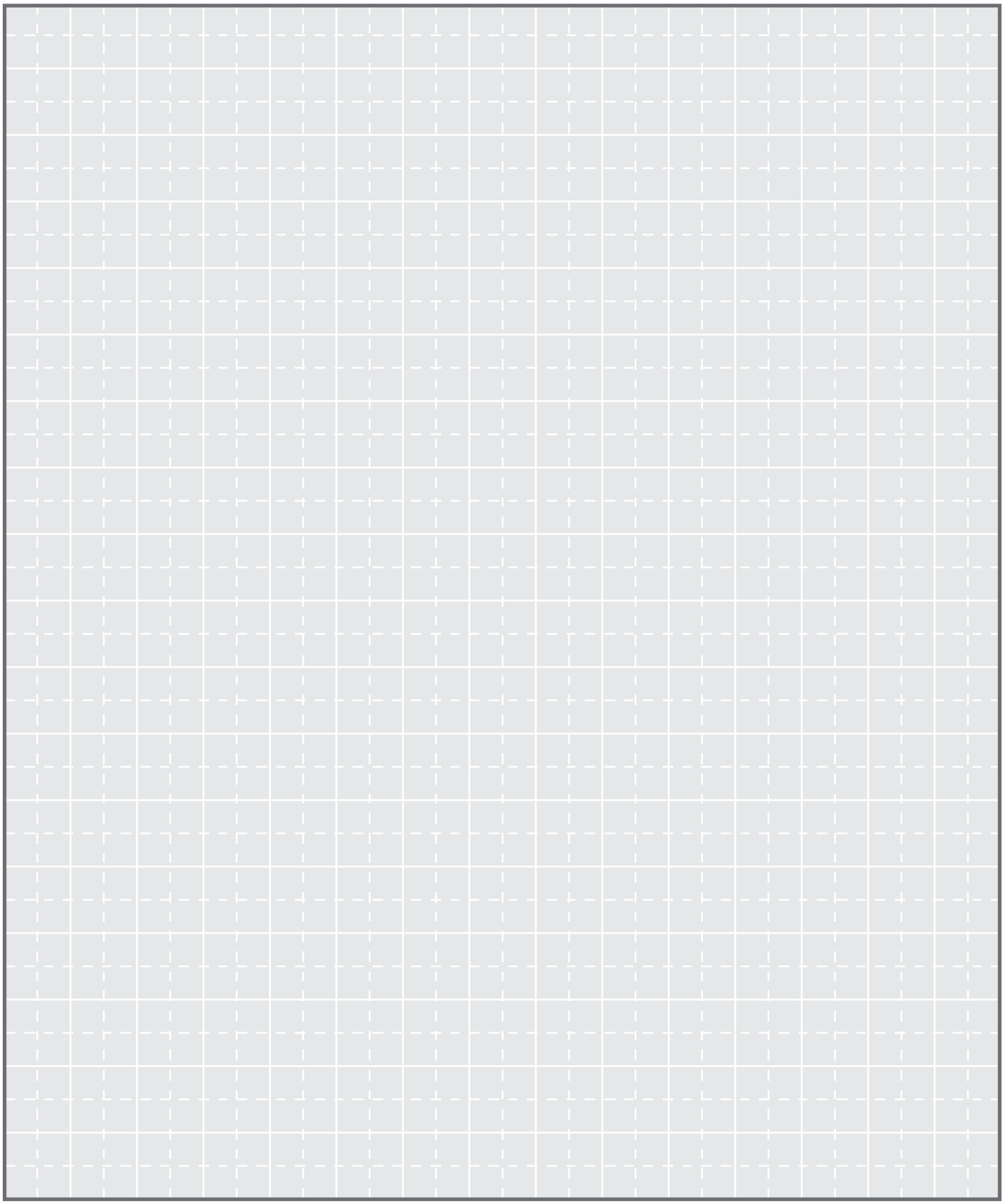
Wire Size	Thread Length	Hole Depth	Tab Thickness	Drill Size Reqd.	Part #
1/8"	1.5"	.420"	.232"/.228"	17/64"	LE-6
3/16"	1.5"	.420"	.232"/.228"	17/64"	LE-6
1/4"	1.5"	1.188"	.255"/.265"	3/8"	LE-8

EXTENDED LENGTH

Wire Size	Thread Length	Hole Depth	Tab Thickness	Drill Size Reqd.	Part #
1/8"	3.0"	.420"	.232"/.228"	17/64"	LE-6L
3/16"	3.0"	.420"	.232"/.228"	17/64"	LE-6L

Customer Name _____

RAILING SYSTEM WORKSHEET



1 Square = ___ foot/feet

Use this blank worksheet to help plan out your project.* You can use this sheet to map out an overhead view, or an a side elevation view (for things like stairs, etc.).
Make as many copies of this sheet as you need. Feel free to send your plan ideas along with the worksheet on the following page to give us the best idea of what you're working on.

**Worksheet is intended only as a planning aid. To ensure your project meets code, check with your local authority.*

RAILING SYSTEM WORKSHEET

Name _____ **Contact Information** _____

1) What type of wire rope will be used in your project? 1x19 ☐ 7x7 ☐ 7x19 ☐

2) What size of wire rope will be used in your project? 1/8" ☐ 3/16" ☐ 1/4" ☐

Based on your drawing (from the previous page, or otherwise), complete the following questions:

3) How many railing segments will your project have? What are their lengths?

Segment a. _____ inches Segment b. _____ inches Segment c. _____ inches Segment d. _____ inches

4) How many Intermediate Posts do you need to plan for (round your answers up)?

a. _____ inches from #3a/48 inches= _____ posts needed
b. _____ inches from #3b/48 inches= _____ posts needed
c. _____ inches from #3c/48 inches= _____ posts needed
d. _____ inches from #3d/48 inches= _____ posts needed

5) How tall will each railing segment be?

a. _____ inches b. _____ inches c. _____ inches d. _____ inches

6) How many lines per segment do you need to plan for (round your answers up)?

a. _____ inches/3 inches= _____ lines needed to meet code*
b. _____ inches/3 inches= _____ number of lines needed
c. _____ inches/3 inches= _____ number of lines needed
d. _____ inches/3 inches= _____ number of lines needed

7) Choose your desired/needed fittings from pgs. 8-28:

a. End Fitting Part # _____, Tensioner Part # _____, End Fitting #2 Part # (if needed) _____.
End Fitting Body Length _____, Tensioner Open Length _____, End Fitting #2 Body Length (if needed) _____.
TOTAL Fitting Length _____ **inches**

b. End Fitting Part # _____, Tensioner Part # _____, End Fitting #2 Part # (if needed) _____.
End Fitting Body Length _____, Tensioner Open Length _____, End Fitting #2 Body Length (if needed) _____.
TOTAL Fitting Length _____ **inches**

c. End Fitting Part # _____, Tensioner Part # _____, End Fitting #2 Part # (if needed) _____.
End Fitting Body Length _____, Tensioner Open Length _____, End Fitting #2 Body Length (if needed) _____.
TOTAL Fitting Length _____ **inches**

d. End Fitting Part # _____, Tensioner Part # _____, End Fitting #2 Part # (if needed) _____.
End Fitting Body Length _____, Tensioner Open Length _____, End Fitting #2 Body Length (if needed) _____.
TOTAL Fitting Length _____ **inches**

8) How much wire rope are you going to need to order?

a. length from #3a _____ inches–TOTAL Fitting Length from #7a _____ inches= _____ inches
b. length from #3b _____ inches–TOTAL Fitting Length from #7b _____ inches= _____ inches
c. length from #3c _____ inches–TOTAL Fitting Length from #7c _____ inches= _____ inches
d. length from #3d _____ inches–TOTAL Fitting Length from #7d _____ inches= _____ inches

TOTAL Wire Rope Needed _____ **inches**

9) How many fittings are you going to need to order?

a. End Fitting= # of Lines from #6a _____, Tensioners= # of Lines from #6a _____, End Fitting #2 (if needed)= # of Lines from #6a _____
b. End Fitting= # of Lines from #6b _____, Tensioners= # of Lines from #6b _____, End Fitting #2 (if needed)= # of Lines from #6b _____
c. End Fitting= # of Lines from #6c _____, Tensioners= # of Lines from #6c _____, End Fitting #2 (if needed)= # of Lines from #6c _____
d. End Fitting= # of Lines from #6d _____, Tensioners= # of Lines from #6d _____, End Fitting #2 (if needed)= # of Lines from #6d _____

TOTAL End Fittings _____, **TOTAL Tensioners** _____, **TOTAL End Fitting #2** _____

9) Are any accessories needed (Angle Bevels, Nuts, Washers, Trellis Hardware, Adjustable Ball Fittings, etc.)?

a. Part # _____ Description _____ Qty. _____, Part # _____ Description _____ Qty. _____,
Part # _____ Description _____ Qty. _____, Part # _____ Description _____ Qty. _____

b. Part # _____ Description _____ Qty. _____, Part # _____ Description _____ Qty. _____,
Part # _____ Description _____ Qty. _____, Part # _____ Description _____ Qty. _____

c. Part # _____ Description _____ Qty. _____, Part # _____ Description _____ Qty. _____,
Part # _____ Description _____ Qty. _____, Part # _____ Description _____ Qty. _____

d. Part # _____ Description _____ Qty. _____, Part # _____ Description _____ Qty. _____,
Part # _____ Description _____ Qty. _____, Part # _____ Description _____ Qty. _____

This worksheet can be faxed or e-mailed to sales@RAIL-CO.net. This form is also available online at www.RAIL-CO.net.
**Worksheet is intended only as a planning aid. To ensure your project meets code, check with your local authority.*

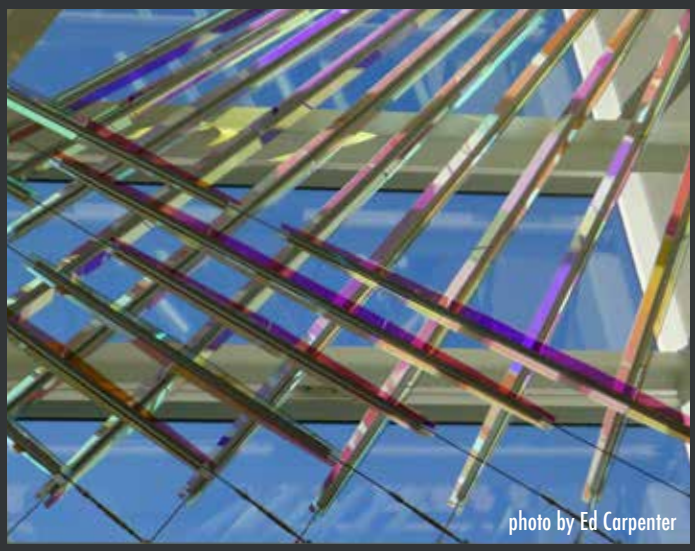


photo by Ed Carpenter

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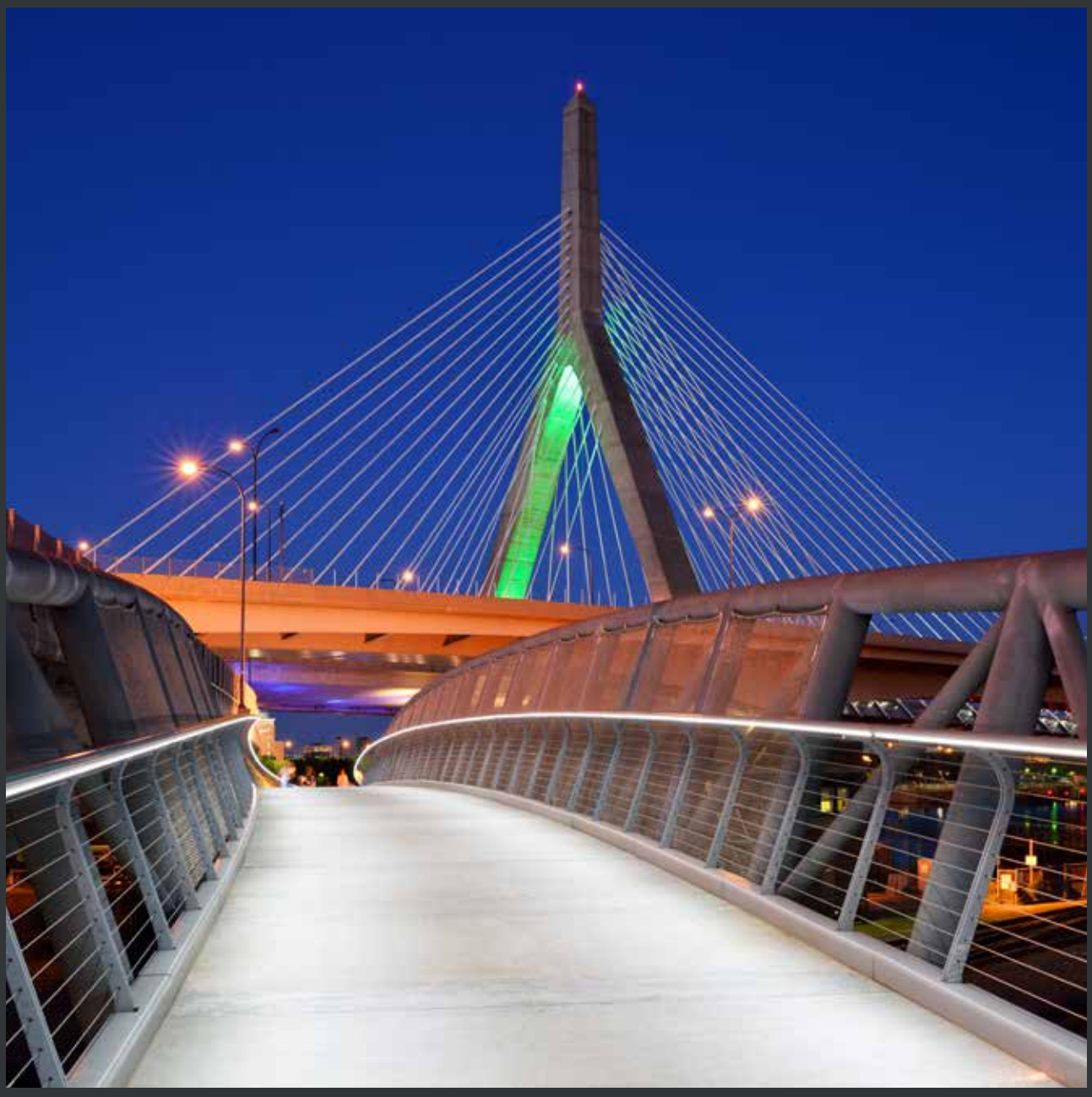

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