



## **Guide for Cable Railing Systems**

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These systems and parts cannot be returned due to safety risks associated with used materials

*This document is intended to provide you with a basic understanding about cable assemblies and offers guidelines to determine what materials you might need for your cable railing system. We recommend consulting with a reputable contractor when preparing your cable railing design. US Cargo Control cable railing parts and systems cannot be returned due to safety risks associated with used materials.*

## **An Important Note Regarding Building Codes:**

Before designing your cable railing system it is important to research your local building requirements. Building codes vary by city and county. Any installation and railing design, guidelines, and instructions on this website do not necessarily ensure compliance with your local building codes.

## **Cable Assembly Systems:**

US Cargo Control offers endless options of Type 316 Stainless Steel Cable Railing hardware and complete assemblies in our most popular styles. These assemblies are intended to run horizontally from a fixed end, through intermediate posts, and secured or tensioned at opposite end posts. This process provides a durable railing system with an unobstructed view.

Our popular cable assemblies contain:

### **Cable**

- Cable cut to the length specified
- Our standard assemblies are designed with 1/8", 3/16", or 1/4" type 316 stainless steel cable

### **End Fittings**

Terminal fittings, or studs, attach the cable to the post. One end connects to the cable and the other end connects to the post. End fittings can be fixed or adjustable.

- Two end fittings (assemblies) to secure the cable to the post
- Washers to protect the post from the end fitting (if applicable)

### **Turnbuckle**

A turnbuckle is a device for adjusting the tension or length of the cable. One end connects to the cable and the other end typically connects to the post. Our popular turnbuckle assemblies contain cable, an end fitting, washers and a turnbuckle. Turnbuckles aren't required for spans less than 28' however we strongly recommend them in order to properly tension the cable.

## **Cable:**

### **Types of Cable**

Standard cable railing construction applications generally use uncoated 1x19 cable of type 316 stainless steel for strength and durability.



- 1x19 – Constructed of 19 individual wires which are twisted into a single strand. This design yields a semi-rigid product with minimal stretch. Generally, 1x19 cable can be used for most railing applications as it works well for straight runs or slight bends (up to 45°).

## **Cable Diameter**

The most common railing is 1/8", 3/16", and 1/4" diameter cable. The most popular thickness is 3/16" as it can be used for most residential and commercial applications. 1/4" cable is recommended in certain high traffic commercial applications such as airports, amusement parks, or stadiums. 1/8" cable works well for decorative residential applications.

## **Configuring Post Layout and Determining Number of Assemblies:**

The construction and location of your terminal and intermediate posts is the first step in configuring your cable railing system design. This is necessary in order to determine your cable length, number of cables and fittings, and any additional hardware necessary for attaching to the post, rounding corners, and accommodating angled runs. We recommend installing posts prior to gathering cable measurements.

### **Terminal and Corner Posts**

Terminal (end) posts are located at each starting and stopping point for each cable run. The distance between the starting end post and the terminating end post is considered one cable span. Typically, end posts are placed at least 3"- 4" away from the house or wall to allow access for attaching cable end fittings. Corner posts commonly refer to the post located at each change in direction. A complete assembly (end fitting, cable, and if applicable, a turnbuckle) is needed for each cable span.

### **Intermediate Posts**

Intermediate posts do not support any tension load. Their primary functions are to keep the cable spread and to support the cap rail requirement. Intermediate posts should be sized and spaced according to your local building codes. Suggested maximum intermediate post spacing is 4' for horizontal railing. We recommend using grommets or post protectors when cables span through intermediate posts.

### **Post Attachment**

The attachment of the posts to the surface or decking is important as the posts will need to support the entire tension of the cables. If posts are not strong enough or if posts are not secured properly to the surface they may bow and cause the cables to sag. Most local building codes have specific requirements regarding post load support and placement.

### **Post Thickness and Composition**

The end and corner posts must be strong enough to support the tension of the cable assemblies (typically 350 lbs. per cable assembly). Our cable railing assemblies will work with wood or metal posts. Composite posts are not recommended as they can warp when the cables are tightened.

The most common posts are:

- Wood – 4"x6" for end posts and 4"x4" for intermediate posts
- Square tube – 2" wide x 1/4" wall (thickness)
- Round tube – Schedule 80 or thicker
- Angle post – 2" wide x 1/2" thick
- Flat bar – 1/2" thick with double bar and bridged between 2 bars measuring 2" wide x 1" thick

## Cable Run Lengths

The number of end and corner posts needed will be determined in part by the allowable run span of the cable. Typically, cable lengths need to be kept less than 50' in length for conventional turnbuckles and less than 28' in length for other assemblies.

- Simple End Fitting Assemblies – Runs up to 28'
- Turnbuckle Assemblies – Spans up to 50'

## Cable Spans with Corners

In most cases for cable runs with corners, it is recommended to terminate the cable and start a new run at the change in direction. Experienced contractors will sometimes set up continuous runs around corners; this impacts the allowable cable span. To preserve the integrity of the cable, the maximum allowable corner angle is generally 45° for 1x19 cable and is often achieved by using a two post corner.

## Rail Height and Horizontal Cable Spacing

The requirements for rail height and horizontal cable spacing will determine the number of cables and assemblies needed for each cable span. Typically, the rail height must be a minimum of 36" from the surface for residential applications and 42" for commercial applications. Stair railings, or grip railings, may have different height requirements. Most building code requirements recommend horizontal cable to be spaced no more than 4" apart on center.

Common horizontal railing assembly configuration:

- 36" Rail height – typically 11 horizontal cables
- 42" Rail height – typically 12 horizontal cables

## Cable Attachment

Cable attachment refers to the method by which the cable is secured to the fitting or turnbuckle. The cable can be attached, or swaged, to the fittings by three common methods:

### Machine Swage

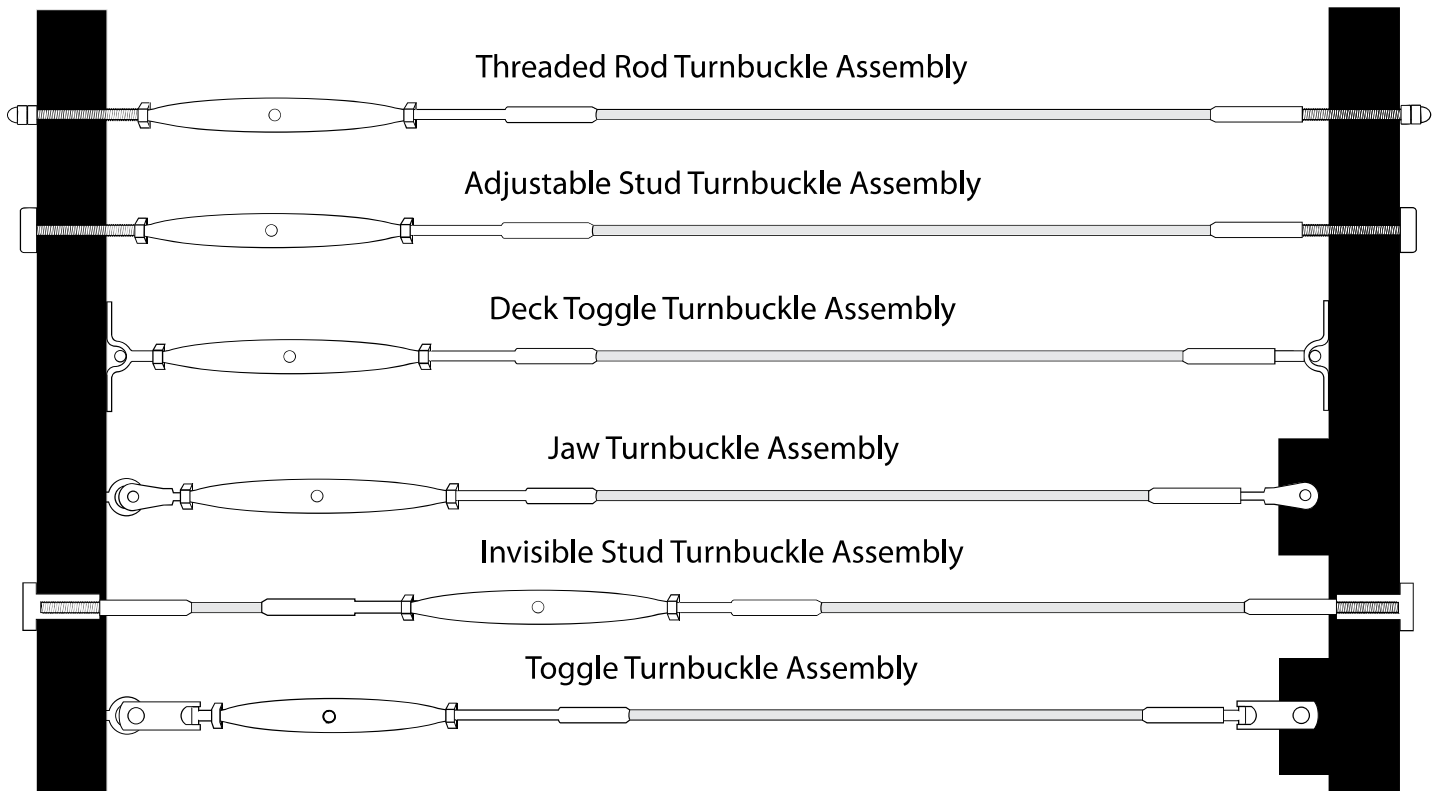
Machine swage fittings are attached to the cable by a special roller machine. These fittings have a uniform appearance and maintain 100% of the safety and load limit of the assembly. This process must be performed with a specialized swaging machine and is typically done by a professional service or at the manufacturer. Machine swaging requires precise cable measurements. Our standard cable assemblies can be machine swaged.

### Hand Swage/Hand Crimp

Hand swaged fittings are secured using a special hand crimp tool. This allows for onsite installation with a crimping tool. The hand swage tool can be expensive for small, one time applications. Since the hand swaging process is not as uniform as the machine swaging process, it usually results in reduced strength. Cable length measurements are not required to be as precise for hand swaging, as in the case of machine swaging, as cable length can be adjusted on site before swaging. Our standard cable assemblies can be hand swaged.

### Mechanical or Swageless

Swageless fittings are attached by a simple process with common hand tools. These fittings tend to be more expensive than other means of attachment but don't require special tools.



## End Fitting Attachment:

While end fittings are selected primarily based on style, consideration should be given to how the fitting will attach to the post. See Figure below with recommended fittings based on function. The three most common attachment methods include:

### Face Mount

Ideally, end posts should be placed at least 3" - 4" away from the house or wall to allow access for attaching the cable and fittings. If this is not feasible, the cable will need to be face mounted. Measurement for the cable span is generally taken from the inside of the starting post to the inside of the terminating post for face mount assemblies. Our **Deck Toggle** assembly is ideal for face mounting.

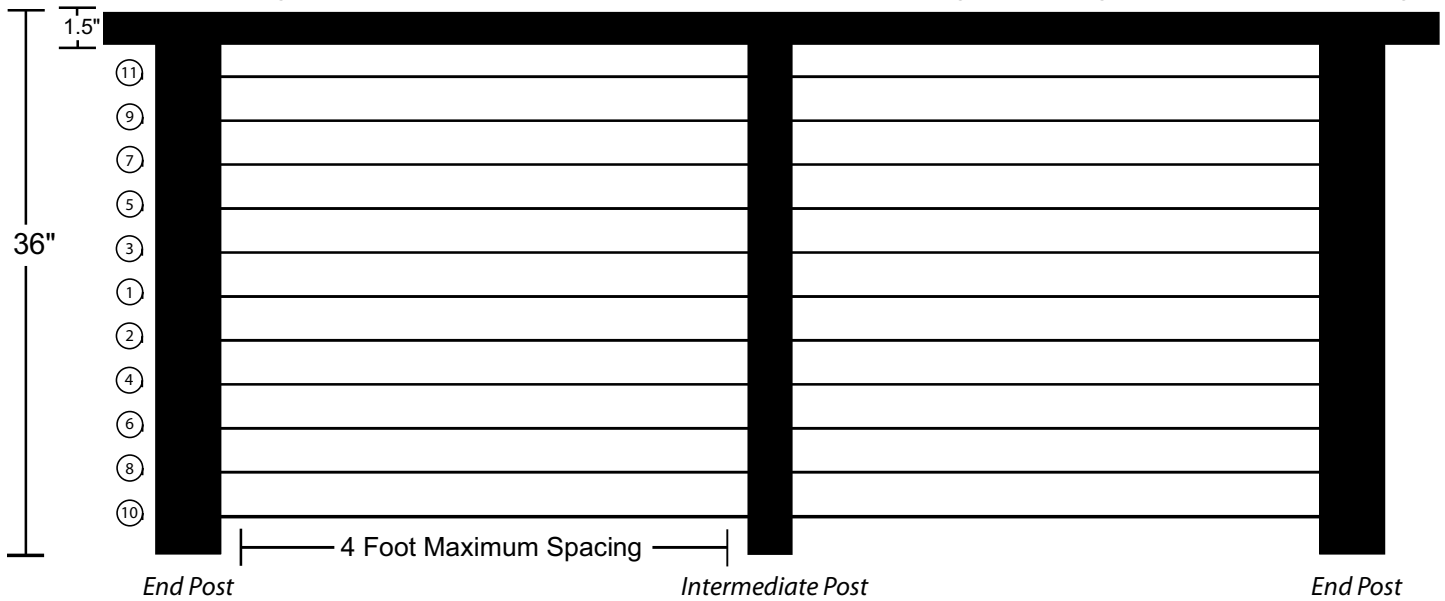
### Through Mount

Posts can be pre-drilled to allow fittings to pass through the hole and secure with a nut or part of the end fitting on the backside of the post. Measurement for the cable span is generally taken from the outside of the starting post to the outside of the terminating post for face mount assemblies. Our **Threaded Rod**, **Adjustable Stud** and **Invisible Stud** assemblies are great for through mounting.

### Tab or Eye Mount

Some metal posts have tabs or eyes designed for fitting attachment. For these posts, end fittings with pins work great for securing through the tab or eye. Eye bolts are often purchased to mount to the face of wood posts and attach to fittings with pins. Measurement for the cable span is generally taken from the center of the eye on the starting post to the center of the eye on the terminating post for tab or eye mount assemblies. Our **Toggle** and **Jaw** assemblies can be secured through an eye or tab.

Common tensioning sequence for 11 cable assemblies of a residential railing with a height of 36" (4" max spacing)



## Tensioning the Cable

The cable in your railing system will need to be tensioned appropriately. This is critical during the initial set up and adjustments may be needed overtime as the cable may stretch from people leaning against it or as the building structure settles. Generally, cable is recommended to be tensioned at 350 lbs. in order to maintain the integrity of the railing and to meet standard code. Code requirements vary; end posts should typically be able to withstand a minimum tension of 350 lbs.

## Additional Hardware:

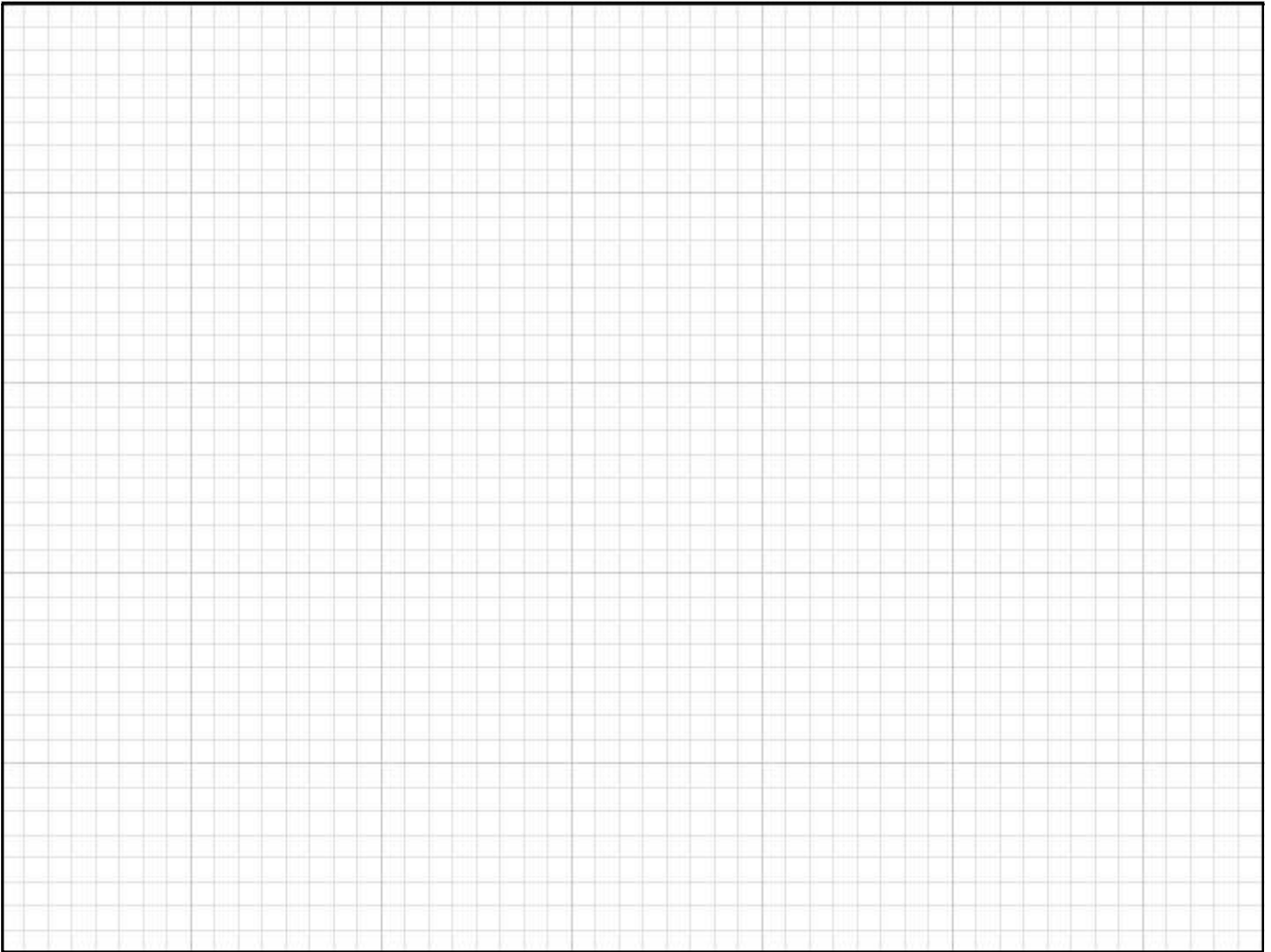
### Straight or Angled Runs

Our packaged assemblies contain the basic hardware needed to secure most straight run assemblies. Certain assemblies like our deck toggle or toggle jaw, are designed to accommodate angled runs. Most other assemblies can be used for angled runs with the addition of beveled washers. These washers fit snugly against the fitting and post and can reduce the likelihood of the cable or fitting cutting into the post.

## Purchasing Your Cable Railing System

We appreciate your decision to invest in our cable railing systems. We understand that choosing the right cable railing system can be a complex process. That is why our knowledgeable sales specialists are available at **(888) 794-0584 Monday through Friday 7:00 AM - 5:00 PM (CDT)** to help you make your purchasing decision. US Cargo Control cable railing parts and systems cannot be returned due to safety risks associated with used materials.

# Architectural Cable Railing Graph Worksheet



Use this grid worksheet to help you calculate your cable railing system. If you have questions, please call our sales specialists at **888-794-0584** M-F (7am - 5pm CDT) or email us anytime at **customerservice@uscargocontrol.com**

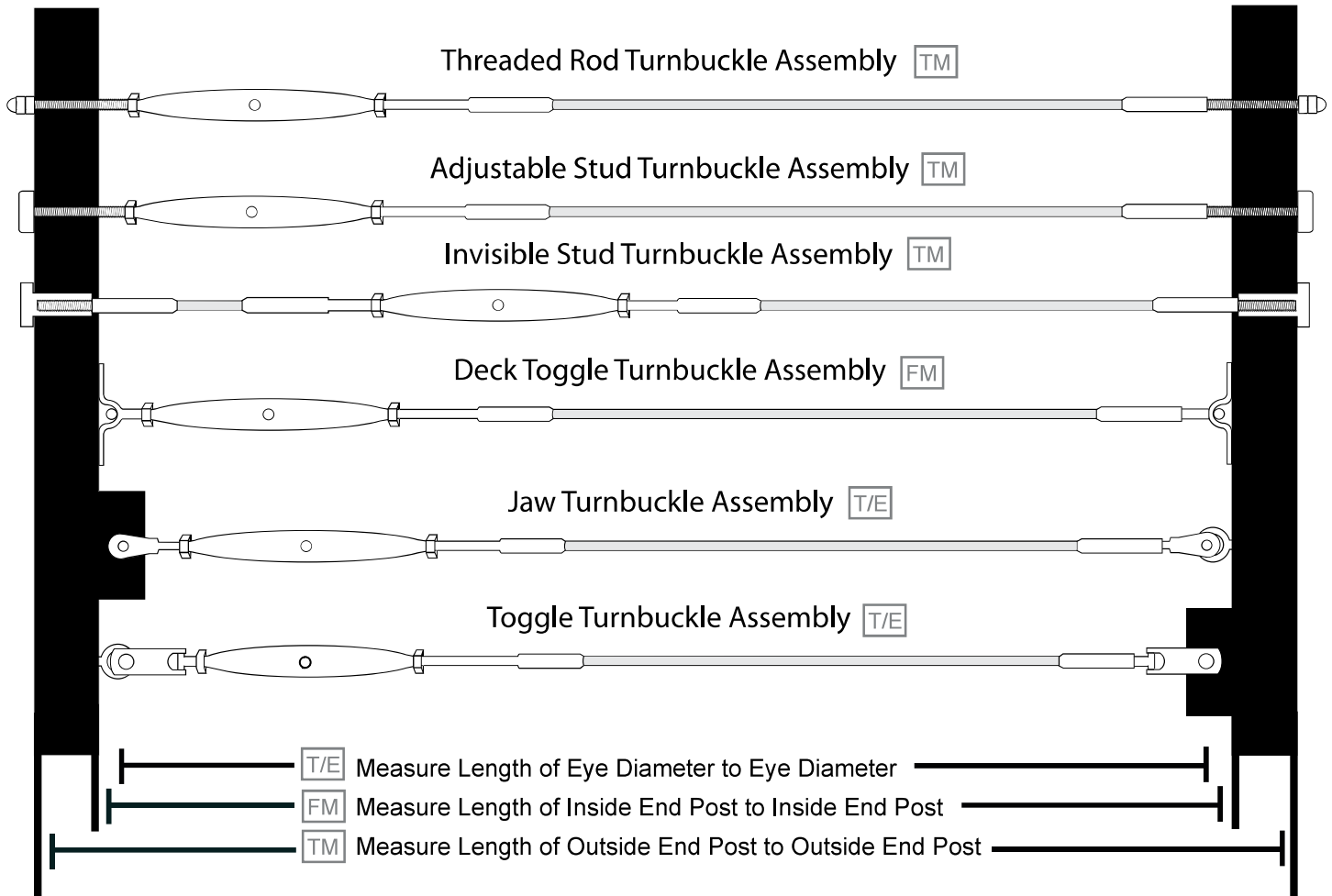
## Tips:

- Review your local building code prior to establishing the number of cable assemblies in your system
- If you are concerned with the construction of your cable railing assembly, consult with an expert
- Turnbuckles are recommended to maintain continuous cable tension over time
- Label your cable runs with a letter (i.e. Run A, Run B, Run C, etc.)

Run A Length: _____	# of Assemblies for this Panel: _____	Straight Run <input type="checkbox"/>	Angled Run <input type="checkbox"/>
Run B Length: _____	# of Assemblies for this Panel: _____	Straight Run <input type="checkbox"/>	Angled Run <input type="checkbox"/>
Run C Length: _____	# of Assemblies for this Panel: _____	Straight Run <input type="checkbox"/>	Angled Run <input type="checkbox"/>
Run D Length: _____	# of Assemblies for this Panel: _____	Straight Run <input type="checkbox"/>	Angled Run <input type="checkbox"/>
Run E Length: _____	# of Assemblies for this Panel: _____	Straight Run <input type="checkbox"/>	Angled Run <input type="checkbox"/>



# Architectural Cable Railing Assembly Styles



## Cable Railing Setup:

*Note: US Cargo Control does not currently offer cable railing posts. This worksheet is to help you determine your setup and hardware*

End Post Size: \_\_\_\_\_ Intermediate Post Size: \_\_\_\_\_ Material: Wood ☐ Metal ☐ Railing Height: \_\_\_\_\_

Railing Application: Residential ☐ Commercial ☐ Type of Cable: \_\_\_\_\_ Cable Diameter: 1/8" ☐ 3/16" ☐ 1/4" ☐

## Cable Assemblies:

*Note: Certain Assemblies may need eye bolts for installation and angled runs may need beveled washers*

Run A Cable Length: \_\_\_\_\_ # of Assemblies: \_\_\_\_\_ Style: \_\_\_\_\_ Straight Run ☐ Angled Run ☐

Run B Cable Length: \_\_\_\_\_ # of Assemblies: \_\_\_\_\_ Style: \_\_\_\_\_ Straight Run ☐ Angled Run ☐

Run C Cable Length: \_\_\_\_\_ # of Assemblies: \_\_\_\_\_ Style: \_\_\_\_\_ Straight Run ☐ Angled Run ☐

Run D Cable Length: \_\_\_\_\_ # of Assemblies: \_\_\_\_\_ Style: \_\_\_\_\_ Straight Run ☐ Angled Run ☐

Run E Cable Length: \_\_\_\_\_ # of Assemblies: \_\_\_\_\_ Style: \_\_\_\_\_ Straight Run ☐ Angled Run ☐

Method of Attachment: Machine Swage Both Ends ☐ Machine Swage One End ☐ Hand Swage ☐

## Additional Hardware:

# Angled Washers: \_\_\_\_\_ # Tensioning Devices: \_\_\_\_\_ # Eye/Lag Bolts: \_\_\_\_\_ # Lag Inserts: \_\_\_\_\_