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# Pan-Steel® Stainless Steel Systems

*Improved Productivity and Worker Safety for Bundling, Fastening, and Identification in Harsh Environments*



When strength, vibration, radiation, weathering, corrosion and temperature extremes are a factor, the Pan-Steel® System provides strong, reliable solutions for use in indoor, outdoor, and direct burial applications. This guide provides an overview of key design considerations and applications for bundling, fastening, and permanent identification in harsh environments.

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# PANDUIT®

## APPLICATION GUIDE

**Industrial**

**Oil Rigs**

**Refineries**

**Chemical Plants**

**Water Treatment Facilities**

**Wind Farms**

**Solar**

**Nuclear**

**Mining**

**Ships**

**Submarines**

**Cell Towers**

**Aerial Support**

**Telecommunications**

**Transportation**

**OEM**

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# Introduction

## Using this Guide

### **Applications**

This section includes product recommendations for typical applications, always verify product suitability based on your specific requirements and key selection criteria

### **Key Selection Criteria**

Utilize material and strength charts to help select the Panduit products required to deliver superior performance in your application

Select the appropriate tools to speed installation time and take advantage of our lowest installed cost solutions

Consider Panduit permanent identification solutions to help provide legibility in harsh environments; the complete system includes marker plates, tags and ties and is available for use with On-site Custom Marking Tools or through our Factory Custom Marking Service

### **Selection Guides**

Organized by part number, use each chart to assist with your product selection

## Pan-Steel® System

### **Reliable system performance:**

Delivers strength, long life and resistance to chemicals, vibration, radiation, weathering, and extreme temperatures

### **Increased job site safety:**

Features rounded edges to prevent installer injury and damage to cable bundles or finished product

### **Lowest installed cost:**

Includes reliable, ergonomic tooling and an innovative cable tie design to provide fast and reliable installation

### **Effectively identified workplace:**

Offers the most comprehensive selection of on-site and factory custom marking products in the industry

### **Standards compliance:**

Meets and exceeds the most stringent industry standards



## Stainless Steel Cable Ties

Panduit coated and uncoated self-locking stainless steel cable ties are engineered for safety, productivity and durability by providing rounded edges and smooth surfaces, easy threading and the highest loop tensile strength in the industry. Coated ties offer additional protection and separation of dissimilar metals for improved corrosion resistance.

## Retained Tension Ties

Panduit retained tension ties deliver a durable, secure fastening solution for mechanical applications. The system delivers the highest retained tension in the industry, providing tight fastening of rigid materials in high vibration and harsh environments.

## Stainless Steel Strapping

Panduit coated and uncoated stainless steel strapping is the ultimate solution for large mechanical applications. The buckle design and tension controlled installation tool offer a quick and safe installation.

## Aluminum Cable Ties

Panduit aluminum cable ties are available in multiple colors to bundle and identify cabling or secure aluminum marker plates and tags to cabling and devices. Aluminum cable ties are a lightweight, flexible bundling, and permanent identification solution.

## Permanent Identification

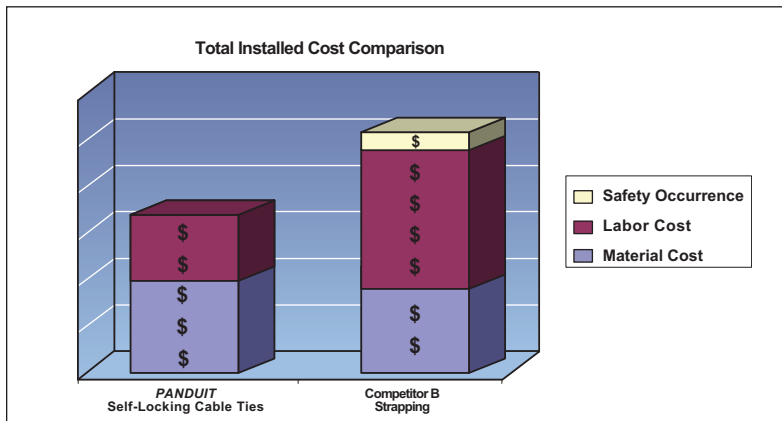
The widest range of permanent identification solutions available includes stainless steel and aluminum cable ties, marker plates and tags in a variety of shapes and sizes. Factory custom marking service delivers embossed or laser etched identification. On-site marking tools are excellent for quick and easy identification in the field.

## Installation Tools

Panduit cable ties and industry leading installation tools work together to provide repeatable high performance at the lowest installed cost. Ergonomic tools are available for low, medium, and high volume applications. Reliability is designed into every tool.



# Strong, safe, and reliable solutions for long service life and lowest installed cost in harsh environments



Panduit stainless steel cable ties and permanent identification solutions can deliver a useable life greater than 30 years. The combined value of material cost, labor savings, and improved safety results in the lowest total installed cost.

## Applications

Panduit offers a wide variety of metal cable bundling, mechanical fastening, and permanent identification solutions to meet your specific application requirements. Common applications include:

### Cable Tray, Outdoor – *Oil Rigs, Refineries*



**Description:** Electrical or Communication Cabling secured to cable tray in harsh environment.

**Selection Criteria:** Resistance to extreme temperatures, chemicals, salt-water spray, ultra-violet light.

**Product Recommendations:**

- For Horizontal, Stainless Steel Cable Tray – Use Uncoated Heavy 316 Stainless Steel Metal Locking Tie
- For Vertical, Stainless Steel Cable Tray – Use Uncoated Extra-Heavy 316 Stainless Steel Metal Locking Tie
- For Horizontal, Aluminum Cable Tray – Use Coated Heavy 316 Stainless Steel Metal Locking Tie
- For Short circuit – up to 71.5kA – Use Super-Heavy Double Loop 316 Stainless Steel Metal Locking Tie

### Cable Tray, Indoor – *Ships, Submarines, Chemical Plants, Industrial Facilities*



**Description:** Electrical or Communication Cabling secured to cable tray in harsh environment.

**Selection Criteria:** Resistance to extreme temperatures, chemicals, vibration, and shock.

**Product Recommendations:**

- For Horizontal, Stainless Steel Cable Tray – Use Uncoated Heavy 316 Stainless Steel Metal Locking Tie
- For Vertical, Stainless Steel Cable Tray – Use Uncoated Extra-Heavy 316 Stainless Steel Metal Locking Tie
- For Horizontal, Aluminum Cable Tray – Use Coated Heavy 316 Stainless Steel Metal Locking Tie
- For Short circuit – up to 71.5kA – Use Super-Heavy Double Loop 316 Stainless Steel Metal Locking Tie
- Cushion Sleeving available for military applications

### Instrument Tubing – *Oil Rigs, Refineries, Chemical Plants, Industrial Facilities*



**Description:** Instrument tubing secured to pipe or rail in harsh environment.

**Selection Criteria:** Retained tension, resistance to extreme temperatures, chemicals, salt-water spray, ultra-violet light.

**Product Recommendation:**

- Coated 1/2" Wide (12.7mm) 316 Stainless Steel Custom Length Strapping

## Pipe Insulation – *Chemical Plants, Refineries, Industrial Facilities*

**Description:** Secure metal shield over pipe insulation.

**Selection Criteria:** Resistance to extreme temperatures, chemicals, ultra-violet light.

**Product Recommendation:**

- Uncoated Extra-Heavy 15 304 Stainless Steel Metal Locking Tie



## Rubber Steering Rack Boot – *Trucks, Autos*

**Description:** Securing CV boots or steering rack boots on vehicles.

**Selection Criteria:** Resistance to high temperatures, salt spray and chemicals, retained tension, liquid tight seal.

**Product Recommendation:**

- Standard or Light-Heavy 360° Radial Seal 304 Stainless Steel Retained Tension Tie



## Heat Shields – *Motorcycles, Trucks, Autos, Aircraft*

**Description:** Secure heat shields on engines.

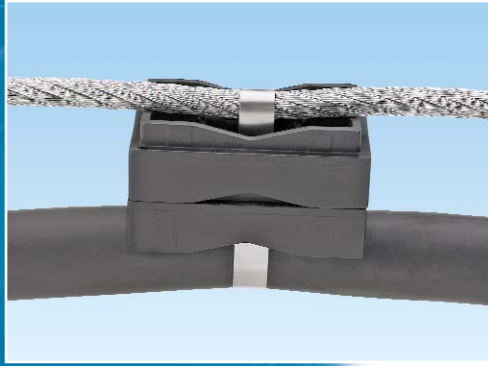
**Selection Criteria:** Retained tension, resistance to extreme temperatures, thermal expansion, salt spray, chemicals.

**Product Recommendation:**

- Standard, Light-Heavy, or Heavy 304 Stainless Steel Retained Tension Tie



## Aerial Support – *Railway, Power, and Communication Lines*



**Description:** Electrical or Communication Cabling secured to support structure.

**Selection Criteria:** Resistance to extreme temperatures, chemicals, ultra-violet light.

**Product Recommendations:**

- Uncoated Heavy or Extra-Heavy 304 Stainless Steel Metal Locking Tie
- Stackable spacers available

## Cable Identification – *Cell Towers, Oil Rigs, Ships, Submarines, Industrial Facilities, Mining*



**Description:** Electrical or Communication Cabling secured to support structure and identification.

**Selection Criteria:** Resistance to extreme temperatures, ultra-violet light.

**Product Recommendations:**

- Uncoated Heavy 304 Stainless Steel Metal Locking Tie
- 304 Stainless Steel Marker Plate (Embossed)
- Heavy Anodized Aluminum Metal Locking Tie
- Anodized Aluminum Marker Plate (Laser Etched)

## Pipe Identification – *Water Treatment Facilities, Refineries, Chemical Plants, Industrial Facilities*



**Description:** Securing stainless steel or aluminum tags onto valve, conduit, pipe, cable.

**Selection Criteria:** Resistance to chemicals, extreme temperatures, ultra-violet light.

**Product Recommendations:**

- Standard, Light-Heavy, or Heavy 304 Stainless Steel Retained Tension Tie
- 304 Stainless Steel Marker Plate

## Valve Identification – *Industrial Facilities*

**Description:** Securing stainless steel or brass tags to valve.

**Selection Criteria:** Resistance to extreme temperatures, ultra-violet light.

**Product Recommendations:**

- Standard 304 Stainless Steel Metal Locking Tie
- Brass Marker Tag



## General Mechanical – *Industrial Facilities*

**Description:** Securing safety signs to fencing outdoors.

**Selection Criteria:** Resistance to extreme temperatures, ultra-violet light.

**Product Recommendations:**

- Aluminum Metal Locking Tie
- Heavy Cross Section 304 Stainless Steel Retained Tension Tie



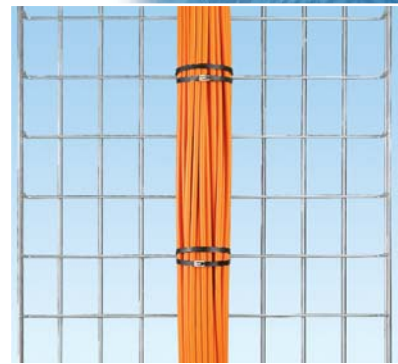
## Telecommunications Backbone – *Commercial Building*

**Description:** Bundling Fiber Optic Cabling to aluminum cable tray.

**Selection Criteria:** Strength, cable protection and corrosion resistance.

**Product Recommendation:**

- Coated Heavy 316 Stainless Steel Metal Locking Tie (apply at lowest tension setting)





# Key Selection Criteria

Variables such as exposure to extreme temperatures, salt spray, and weather have differing effects on the performance of stainless steel and aluminum. Each of these factors contributes to the useful life of a cable tie, marker plate, or tag. Use the following sections as a guide to select the optimum Pan-Steel® Solution for your application.

- Performance in harsh environments
- Strength for application
- Workplace safety and abrasion protection
- Lowest installed cost
- Effective identification
- Compliance with industry standards

Panduit  
stainless steel  
cable ties  
perform  
exceptionally  
well in  
temperature,  
chemical, and  
environmental  
extremes.

## Performance in Harsh Environments

### Materials

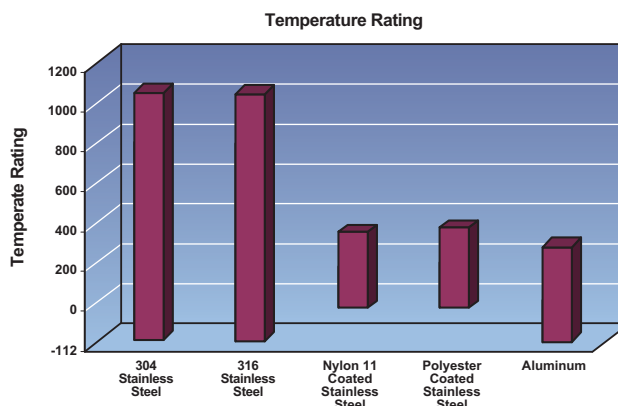
**Stainless steel:** Recommended for harsh environment and general purpose applications where strength and/or resistance to severe conditions are required.

**Aluminum:** Recommended in applications where light weight and flexibility are required. It is also well suited for use with aluminum cable tray to avoid corrosion from dissimilar metals.

Material	Loop Tensile Strength	U.V. Resistance	Extreme Temps.	Salt Spray	Chemicals	Contact with Aluminum	Flammability
<b>304 Stainless Steel</b>	Best	Best	Best	Good	Better	Not Recommended	None
<b>316 Stainless Steel</b>	Best	Best	Best	Best	Best	Not Recommended	None
<b>Coated 316 Stainless Steel</b>	Better	Good	Better	Good	Good	Best	UL94V-2
<b>Aluminum</b>	Good	Best	Good	Good	Good	Best	None

## Material Selection for Temperature Resistance

The following are recommended operating temperature ranges for stainless steel and aluminum. The operating temperature for uncoated and coated stainless steel is -112°F (-80°C) to 1,000°F (538°C) (Uncoated), -40°F (-40°C) to 285°F (140°C) (Nylon) and -40°F (-40°C) to 302°F (150°C) (Polyester). The operating temperature for Aluminum is -112°F (-80°C) to 212°F (100°C).



## Material Selection for Salt Spray Resistance

Panduit cable ties were subjected to salt spray testing for 2,000 hours at 95°F (35°C). Both materials showed no signs of corrosion. The 316 Stainless Steel had trace surface staining and is recommended for mission critical applications. The 304 Stainless Steel had moderate surface staining and is recommended for general applications.



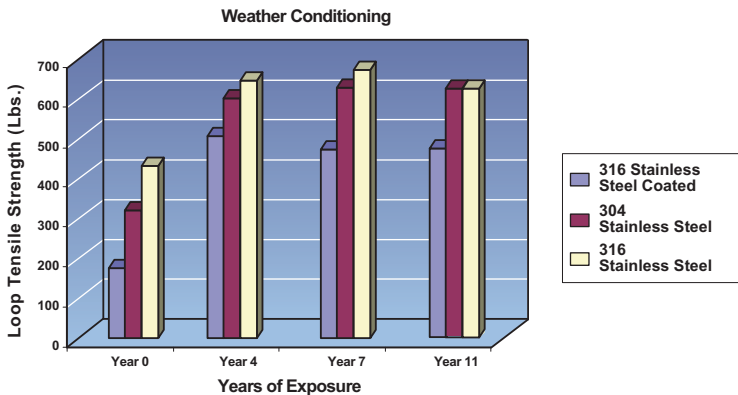
2,000 Hours



95°F (35°C)

## Material Selection for Weather Exposure

Panduit cable ties were exposed to weather for prolonged lengths of time outside our manufacturing facility in New Lenox, Illinois, USA, without loss of performance or signs of corrosion. Loop tensile strength increased from year one to year four and remained stable over time.



## Effective Identification

Panduit offers the broadest range of permanent identification solutions in the industry to withstand and provide legibility in harsh environments. Safe, quick, and easy to install, permanent identification solutions include stainless steel and aluminum marker plates, tags, marking tools, and ties to deliver improved productivity and workplace safety.

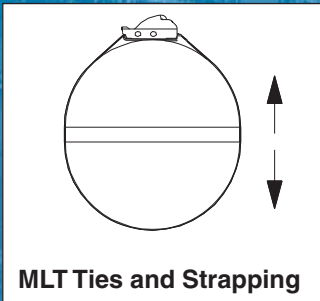
On-site Custom Marking Tools provide portability for permanent identification and demand. Panduit also offers a Factory Custom Marking Service for embossed or laser etched marker plates, tags, and ties to speed installation time and reduce labor costs. This global custom marking service provides rapid response and quick product availability to keep projects on schedule and within budget.



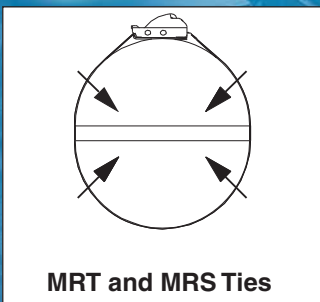
## Split Mandrel

The split mandrel test fixture is used to measure loop tensile strength and retained tension of an installed cable tie.

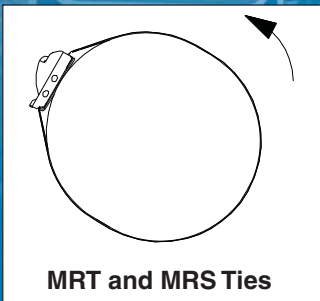
### Loop Tensile Strength



### Retained Tension



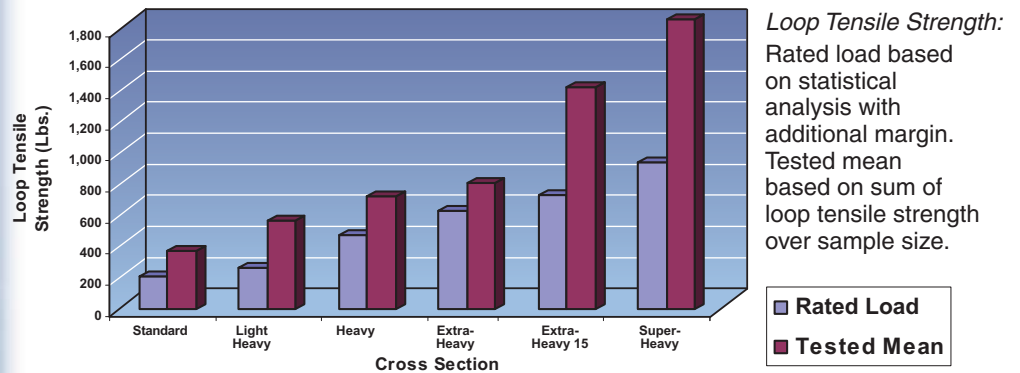
### Rotational Torque



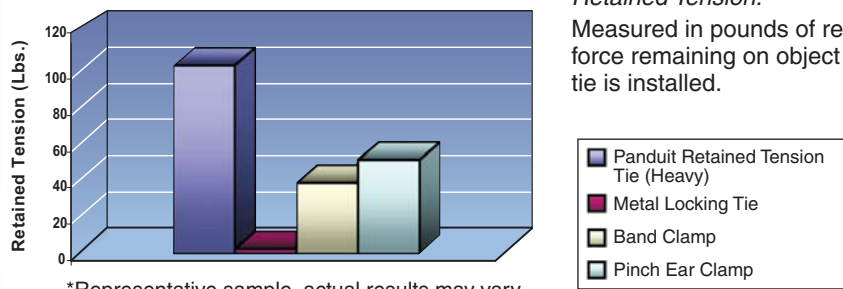
# Strength for Application

Cable tie design, material selection, and installation tooling determine the resulting strength of a system. Use the following table as a guide to determine the strength of various Panduit stainless steel cable ties and strapping for your applications.

Loop Tensile Strength Performance



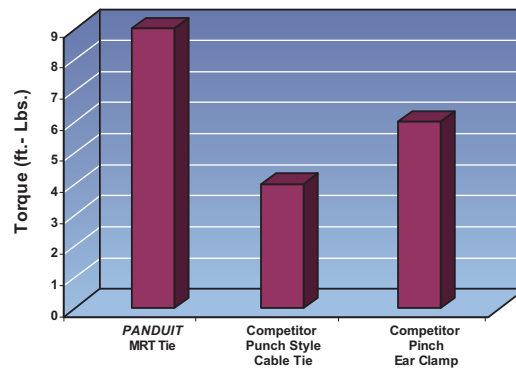
Retained Tension Performance Comparison



*Retained Tension:* Measured in pounds of residual force remaining on object after tie is installed.

\*Representative sample, actual results may vary.

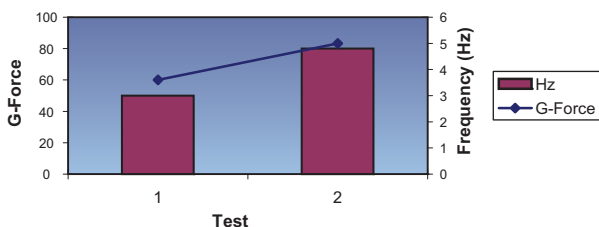
Rotational Torque



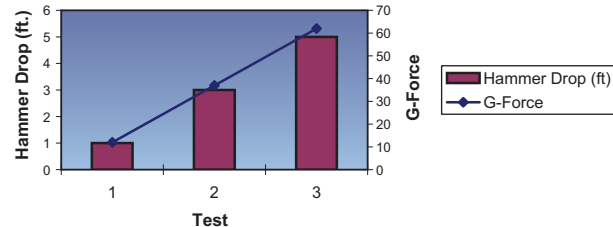
*Rotational torque:* Measured in pounds of force required to cause deflection of the tie or strapping when applied to a non-resistant object.

**Vibration and Shock:** Electrical cables were secured to cable tray using Panduit stainless steel cable ties. The cable assemblies were subjected to multiple levels of severe vibration and shock loading. No damage occurred to the cable ties or cable insulation jacket, which prevented short circuits from occurring.

Vibration Test



Shock Test

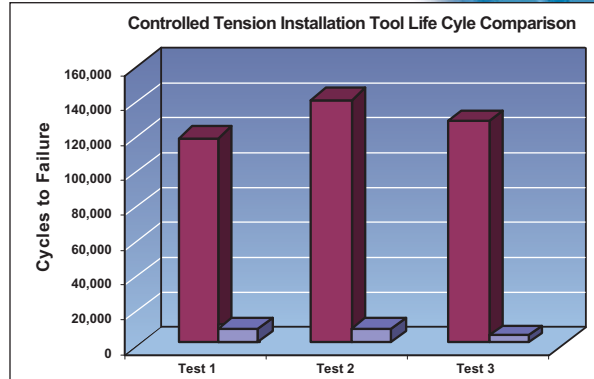


## Lowest Installed Cost

Factors that influence installation time include assembly time, thread force, and reliability of tooling. Panduit tools and ties combine to speed installation time and deliver the lowest installed cost. Use the following tables as a guide to select Pan-Steel® solutions and tooling.

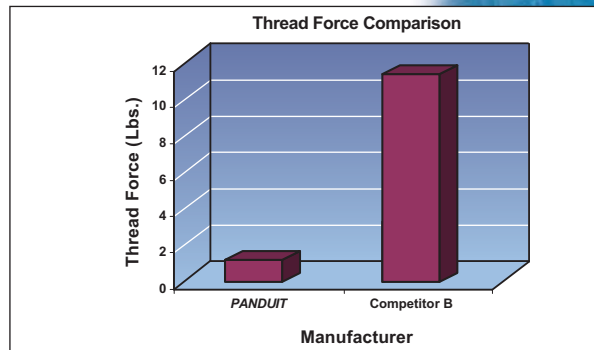
## Reliability

The following is an example of Life Cycle Comparison Data demonstrating the superiority of Panduit tooling, with a very low failure rate, versus a leading competitor. Life Cycle Performance may vary depending on environment and use.



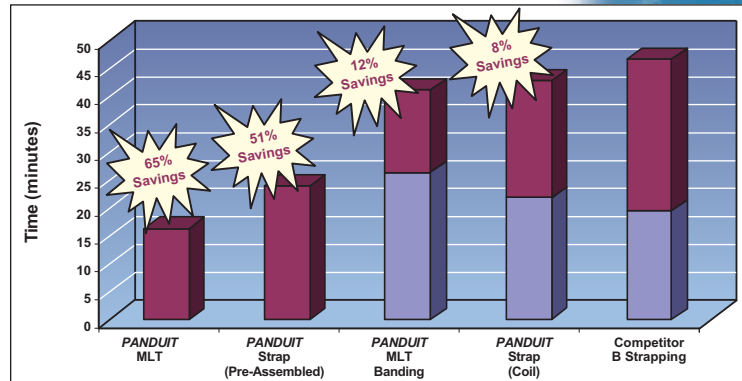
## Thread Force

Thread force is the measurement of force required to insert the end of a cable tie into the head. Panduit cable ties feature low thread force for extremely fast installation, improved productivity, and worker safety.



## Assembly Time

Panduit ties, strap, and banding are fast to assemble and install versus standard banding.



## Workplace Safety and Abrasion Protection

Panduit stainless steel solutions feature fully rounded edges and a flush cutoff to protect the bundle from abrasion during and after installation. Both of these features are also critical to ensuring worker safety.

On the job injuries due to laceration caused by a sharp edge or poor cutoff have several associated costs. The Occupational Health and Safety Organization (OSHA) reports that dollars spent on direct injuries are a fraction of the total costs of a lost time incident, other costs includes:

- Productive time lost by an injured employee and impacted supervisors
- Cost of continuing all or part of the employee's wages
- Increased workers' compensation insurance rates
- Time to hire or to retrain other individuals to replace the injured worker
- Time and cost for repair or replacement of any damaged equipment or materials
- Clean up and start up of operations interrupted by the accident



Panduit



Competitor A

Cross sectional view of Panduit tie body versus competitor - magnified 150X -

The costs associated with these factors can approach \$10,000 per laceration.

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# Product Selection Guides

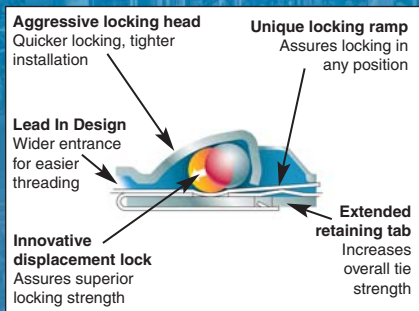
## Cable Ties

Variables such as chemical concentration, temperature, stress and ultra-violet light have differing effects on stainless steel. Each of these factors contributes to the useful life of a cable tie or tag.

Cable tie selection depends on the resiliency of the object in your application. MLT ties are ideally suited for resilient Cable Bundling Applications. MRT application ties, MRS ties and strapping are recommended for non-resilient Mechanical Fastening Applications.

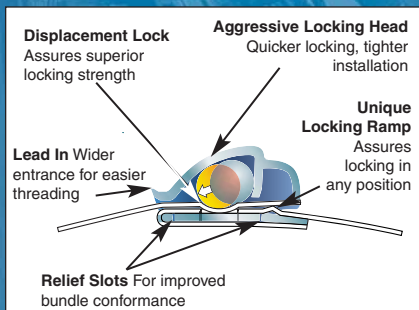
Use the following table as a guide to select the appropriate tie for your applications.

### Pan-Steel® Stainless Steel Ties Self-Locking Head Construction\*



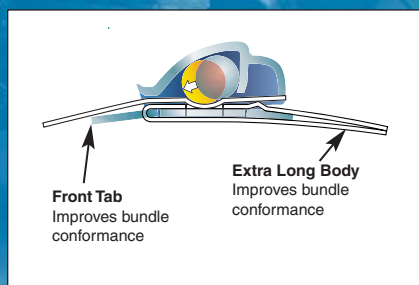
\*Patents Applied For

### Retained Tension Ties (MRT and MRS Series)\*



\*Patents Applied For

### Additional Features of 360° Radial Seal Retained Tension Ties (MRS Series Only)\*



\*Patents Applied For

Part Number	Material	Length		Width		Min. Loop Tensile Strength		Application
		In.	mm	In.	mm	Lbs.	N	

#### Stainless Steel Self-Locking Cable Ties

##### Standard Cross Section

MLT2S-CP	304SS	7.9	201	.18	4.6	200	890	Identification
MLT2S-CP316	316SS	7.9	201	.18	4.6	200	890	Identification extra corrosion resistance
MLT4S-CP	304SS	14.3	362	.18	4.6	200	890	Identification
MLT4S-CP316	316SS	14.3	362	.18	4.6	200	890	Identification extra corrosion resistance

##### Heavy Cross Section

MLT2H-LP	304SS	7.9	201	.31	7.9	450	2000	General Purpose, Aerial support, Identification
MLT2H-LP316	316SS	7.9	201	.31	7.9	450	2000	Cable tray (indoors/outdoors)
MLT4H-LP	304SS	14.3	362	.31	7.9	450	2000	General Purpose, Aerial support, Identification
MLT4H-LP316	316SS	14.3	362	.31	7.9	450	2000	Cable tray (indoors/outdoors)

##### Extra-Heavy Cross Section

MLT4EH-LP	304SS	17.1	434	.5	12.7	600	2670	Aerial support, Cable tray (indoors/outdoors)
MLT4EH-LP316	316SS	17.1	434	.5	12.7	600	2670	Cable tray (indoors/outdoors)
MLT6EH-LP	304SS	23.4	594	.5	12.7	600	2670	Aerial support, Cable tray (indoors/outdoors)
MLT6EH-LP316	316SS	23.4	594	.5	12.7	600	2670	Cable tray (indoors/outdoors)

##### Extra-Heavy 15 Cross Section

MLT8EH15-LP	304SS	29.7	754	.5	12.7	700	3115	Pipe insulation
MLT12EH15-Q	304SS	42.2	1072	.5	12.7	700	3115	Pipe insulation

##### Super-Heavy Cross Section

MLT4SH-LP316	316SS	17.1	434	.63	15.9	900	4005	Shipboard Cable Bundling
MLT6SH-LP316	316SS	23.4	594	.63	15.9	900	4005	Shipboard Cable Bundling
MLT6DSH-Q316	316SS	41.5	1054	.63	15.9	1200	5340	Double Loop short circuit — up to 71.5kA
MLT8DSH-Q316	316SS	53.5	1359	.63	15.9	1200	5340	Double Loop short circuit — up to 71.5kA

#### Stainless Steel Retained Tension Ties

##### Heavy Cross Section

MRT2H-L4	304SS	11.3	287	.31	7.9	400	1780	Heat Shields and General Mechanical
MRT4H-L4	304SS	17.6	447	.31	7.9	400	1780	Heat Shields and General Mechanical

#### Stainless Steel 360° Radial Seal Retained Tension Ties

##### Standard Cross Section

MRS1S-C4	304SS	8.1	205	.18	4.4	180	800	Rubber Boots, Hoses
MRS4S-C4	304SS	17.6	447	.18	4.4	180	800	Rubber Boots, Hoses

##### Light-Heavy Cross Section

MRS1.5LH-L4	304SS	9.7	246	.25	6.4	225	1000	Rubber Boots, Hoses
MRS4LH-L4	304SS					225	1000	Rubber Boots, Hoses

Refer to tool selection guide on page 13 for recommended tool.  
Representative offering only, consult [www.panduit.com](http://www.panduit.com) for complete listing of products.

# Cable Ties (continued)

Part Number	Material	Length		Width		Min. Loop Tensile Strength		Application
		In.	mm	In.	mm	Lbs.	N	

## Pan-Alum™ Aluminum Self-Locking Cable Ties Heavy Cross Section

MLT4H-LPAL	Aluminum	14.3	362	.31	7.9	50	222	Identification
MLT4H-LPALRD	Red	14.3	362	.31	7.9	50	222	Identification
MLT4H-LPALBU	Blue	14.3	362	.31	7.9	50	222	Identification
MLT4H-LPALGR	Green	14.3	362	.31	7.9	50	222	Identification
MLT4H-LPALBL	Black	14.3	362	.31	7.9	50	222	Identification
MLT4H-LPALYL	Yellow	14.3	362	.31	7.9	50	222	Identification

## Fully Coated Stainless Steel Self-Locking Cable Ties Standard Cross Section

MLTFC2S-CP316	Coated 316SS	7.9	201	.18	4.6	100	445	Cable tray (indoor/outdoor), Telco backbone
MLTFC4S-CP316	Coated 316SS	14.3	362	.18	4.6	100	445	Cable tray (indoor/outdoor), Telco backbone

## Heavy Cross Section

MLTFC2H-LP316	Coated 316SS	7.9	201	.31	7.9	250	1112	Cable tray (indoors/outdoors)
MLTFC4H-LP316	Coated 316SS	14.3	362	.31	7.9	250	1112	Cable tray (indoors/outdoors)

## Extra-Heavy Cross Section

MLTFC4EH-LP316	Coated 316SS	17.1	434	.5	12.7	300	1335	Shipboard Cable Bundling
MLTFC6EH-LP316	Coated 316SS	23.4	594	.5	12.7	300	1335	Shipboard Cable Bundling

## Super-Heavy Cross Section

MLTFC4SH-LP316	Coated 316SS	17.1	434	.63	15.9	450	2000	Shipboard Cable Bundling
MLTFC6SH-LP316	Coated 316SS	23.4	594	.63	15.9	450	2000	Shipboard Cable Bundling

## Custom Length Strapping and Loose Piece Head

MSCNW50T15-QR6	Coated 316SS	82.5 ft	100 M	.5	12.7	700	3115	Instrument tubing
MSBW50-C6	316SS	N/A	N/A	N/A	N/A	N/A	N/A	Instrument tubing

## Cushion Sleeve

PCSSH-B-CR	Neoprene	100 ft	30.5 M	.91	23.1	N/A	N/A	Cable tray (indoor/outdoor) military applications
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Representative offering only, consult [www.panduit.com](http://www.panduit.com) for complete listing of products.

**Panduit  
stainless steel  
cable ties and  
tooling deliver  
safe, fast, and  
reliable  
installations.**

## Pan-Steel® Stainless Steel Strapping Unique Locking Method\*



\*Patented  
The buckle design and tension controlled installation tool offer a quick and safe installation for all harsh environments.

## Installation Tools



**PPTMT**

**GS4MT**

**RT1HT**

**RT1HTN**

**ST2MT**

**HTMT**

**MTRTH**

Part Number	Tie/Strap Size	Best for Annual Usage	Controlled Tension	Cut-off	Manual / Pneumatic	Time to Install
PPTMT	Standard, Light-Heavy, Heavy, MLT	Over 50,000	Yes	Auto Cut-off	Pneumatic	Best
GS4MT	Standard, Light-Heavy, Heavy, MLT	Under 50,000	Yes	Auto Cut-off	Manual	Better
RT1HT	Extra-Heavy and Super-Heavy, MLT	Under 50,000	Yes	Lever Cut-off	Manual	Better
RT1HTN	Extra-Heavy and Super-Heavy, MLT	Under 50,000	Yes	Narrow Nose Lever Cut-off	Manual	Better
ST2MT	Standard, Light-Heavy, Heavy, Extra Heavy, MLT	Under 10,000	No	Twist Cut-off	Manual	Better
HTMT	Standard, Light Heavy, Heavy, MRT	Under 10,000	No	No	Manual	Good
MTRTH	Heavy, MRT/MRS	Under 50,000*	Yes	Lever Cut-off	Manual	Better
BT1HT	3/8", 1/2" and 5/8" Wide Strapping	Under 50,000	Yes	Auto Cut-off	Manual	Good

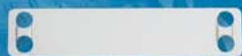
\* Contact customer service for high volume applications.



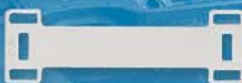
**BT1HT**

# Permanent Identification System

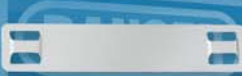
Panduit  
permanent  
identification  
solutions offer  
flexibility and  
long service life.



MMP350-C316



MMP350DB-C316



MMP350H-C



MTB150D-Q



MEHT



MIM

Part Number	Material	Color	Length		Width		Max. 3/16" (4.77mm) Characters per line	Max. lines	Recommended Tie Cross Section	
			In.	mm	In.	mm			Standard	Heavy

## Metal Marker Plates – Dual Cable Tie Installation

### Stainless Steel Marker Plates

MMP350-C	304SS	Natural	3.5	89	.75	19	23	3	X	
MMP350-C316	316SS	Natural	3.5	89	.75	19	23	3	X	
MMP350H-C	304SS	Natural	3.5	89	.75	19	20	3		X
MMP350H-C316	316SS	Natural	3.5	89	.75	19	20	3		X
MMP350DB-C	304SS	Natural	3.5	89	1.12	29	20	3		X
MMP350DB-C316	316SS	Natural	3.5	89	1.12	29	20	3		X
MMP350W38-C	304SS	Natural	3.5	89	.38	10	23	1	X	
MMP350W38-C316	316SS	Natural	3.5	89	.38	10	23	1	X	
MMP172-C	304SS	Natural	1.72	44	.75	19	9	3	X	
MMP172-C316	316SS	Natural	1.72	44	.75	19	9	3	X	
MMP172W38-C	304SS	Natural	1.72	44	.38	10	9	1	X	
MMP172W38-C316	316SS	Natural	1.72	44	.38	10	9	1	X	

### Aluminum Marker Plates

MMP350H-CAL	Aluminum	Natural	3.5	89	.75	19	20	3		X
MMP350H-CALBL	Aluminum	Black	3.5	89	.75	19	20	3		X
MMP350H-CALBU	Aluminum	Blue	3.5	89	.75	19	20	3		X
MMP350H-CALGR	Aluminum	Green	3.5	89	.75	19	20	3		X
MMP350H-CALRD	Aluminum	Red	3.5	89	.75	19	20	3		X
MMP350H-CALYL	Aluminum	Yellow	3.5	89	.75	19	20	3		X

## Metal Tags – Single Cable Tie Installation

### Stainless Steel Tags

MT350-C	304SS	Natural	3.5	89	.75	19	23	3	X	
MT350-C316	316SS	Natural	3.5	89	.75	19	23	3	X	
MT172-C	304SS	Natural	1.72	44	.75	19	8	2	X	
MT172-C316	316SS	Natural	1.72	44	.75	19	8	2	X	
MT1D-Q	304SS	Natural	1*	25**	N/A	N/A	5	1	X	
MT150D-Q	304SS	Natural	1.5*	38**	N/A	N/A	5, 9, 6	3	X	
MT213D-Q	304SS	Natural	2.13*	54**	N/A	N/A	6, 12, 8	3	X	

### Brass Tags

MTB1D-Q	Brass	Natural	1*	25**	N/A	N/A	5	1	X	
MTB150D-Q	Brass	Natural	1.5*	38**	N/A	N/A	5, 9, 6	3	X	
MTB213D-Q	Brass	Natural	2.13*	54**	N/A	N/A	6, 12, 8	3	X	

\*Diameter (In.) \*\*Diameter (mm).

Representative offering only, consult [www.panduit.com](http://www.panduit.com) for complete listing of product.

## On-Site Custom Marking Tools

Part Number	Hand or Tabletop	Volume	Marking Type	Marker Materials	Character Fonts
MEHT	Hand	Low	Embossing	Metal Tape: Stainless Steel, Aluminum	3/16" (4.77mm)
MIM094	Tabletop	Medium	Indenting	Marker Plates or Tags: Stainless Steel, Aluminum, Brass	3/32" (2.38mm)
MIM125					1/8" (3.18mm)
MIM187					3/16" (4.77mm)



## Custom Marking Service

Panduit Factory Custom Marking Service simplifies identification with high quality, made-to-order custom embossed marker plates and tags or laser etched cable ties, marker plates, and tags. To select and order custom embossed marker plates and tags use on-line order form (C2-0677) at [www.panduit.com/permanent](http://www.panduit.com/permanent) ID. Panduit offers fast turn around on custom marking orders worldwide. Partner with Panduit to create an effectively identified workplace.

# Compliance with Industry Standards

Panduit stainless steel cable ties, strapping, and installation tools meet and exceed the most stringent industry standards. Refer to the following chart for approvals and corresponding products. Contact Panduit for additional information and approvals.

## Pan-Steel® System Approvals



Logo (Symbol)	Agency	Spec /Approval	Requirement	Applicable Products
	Underwriters Laboratories, Inc.	Listing E56854	Dimensional, tensile, temp., cycling, humidity	MLT-S, MLT-LH, MLT-H, MLTEH15, MLTSH, MLTDEH and MLTDSH in 304, 316. MSW38T15, MSW50T15, MSBW38, MSBW50, MSBW63 in both 304 and 316 material. MSCW38T15, MSCW50T15, MSCW63T15, MSCNW38T15, MLTFCs, SH, MLTCH, MSCNW50T15, and MSW63T15 in 316 material
	Conformite European	Low Voltage Directive 73/23/EEC (amended 93/68/EEC) MLT cable ties and MS straps also meet the requirements from EN50146	CE Marking is required for products sold within the European Union. CE Marking Directives specify the minimum performance of these products. Applying the CE mark signifies compliance with essential requirements of specific directives.	All MLT, MRT, MRS ties and MS straps
	Amer. Bureau of Shipping	Cert. # 03-HS373867-PDA, 04-HS476898-PDA, 05-HS118592C/1-PDA, 06-HS152579-PDA, 05-HS118592A/2-PDA	Mechanical	All MLT ties and MS straps
	Bureau Veritas	Cert. # 04048/D2 BV	Material specification, dimensional, visual	All uncoated MLT ties in 304 and 316 material
	Det Norske Veritas	Cert. # E-6540 E-6539	Salt mist test, tensile test, accelerated aging, vibration tests	All uncoated MLTS, MLTH, MLTE15, MLTDEH15, MLMTSH, and MS strap coated and uncoated 316 material
	Germanischer Lloyd	Cert. # 32666-83HH 51796-89HH	Mechanical	All uncoated stainless steel ties and all MS straps
	Lloyd's Register of Shipping	Cert. # 89/60123	Material specification, tensile test, vibration tests	All uncoated stainless steel MLT ties and all MS straps
	RINA	Cert. # ELE71502CS	Mechanical	All uncoated stainless steel MLT ties and all MS straps
	SAE Int'l formerly US MIL	AS23190 formerly MS23109E	Dimensional, visual, vibration, temp. cycling, immersion	MLT-S and MLT-H ties in 304 and 316 material
	US Coast Guard	File No. 16703/46	Mechanical	MLT-H series cable ties
	US Military	MIL-T-81306A/ MS90387-3	Mechanical	GS4MT installation tools

**Panduit®**  
**Pan-Steel®**  
**Stainless Steel**  
**Systems meet**  
**and exceed the**  
**most stringent**  
**industry**  
**standards.**



World Leading Technology  
World-Class Service

# PANDUIT®

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- Solar
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For a copy of Panduit product warranties,  
log on to [www.panduit.com/warranty](http://www.panduit.com/warranty)

For more information

Visit us at [www.panduit.com](http://www.panduit.com)

Contact Customer Service by email: [cs@panduit.com](mailto:cs@panduit.com)  
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## Panduit Difference

At Panduit, servicing customers is a top priority. Our world-class sales force and comprehensive customer service and technical support provide dedicated and market-focused expertise to assist you in evaluating, designing, implementing, and purchasing the products and services you need to solve your unique business challenges.

Customers count on the Panduit service advantage and global product availability to keep their projects on schedule and on budget. Whether you need product information, on-site application guidance, answers to technical questions, or a referral to one of our best-in-class partners, Panduit representatives are highly trained to provide the required assistance.

The Panduit website ([www.panduit.com](http://www.panduit.com)) provides access to interactive roadmaps, design tools, product specifications, technical guides and extensive downloads to help you select, design, and install Panduit solutions. The website also helps you connect with local Panduit service experts and distributors.

## Complete Solutions from Panduit

Panduit harsh environment solutions include the Pan-Steel® System, power and grounding connectors, identification and safety, abrasion protection, heat shrink, wiring duct, industrial ethernet, and cable tie solutions. These solutions feature Panduit world-class quality, rigorously tested to deliver the highest performance, and lowest total cost of ownership.



Stainless Steel System



Power and Grounding Connectors



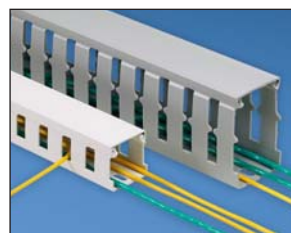
Identification and Safety



Abrasion Protection



Heat Shrink



Wiring Duct



Industrial Ethernet



Cable Ties