World Leader in Cable Ties and Wiring Accessories

Panduit is the world's largest producer of cable ties and wiring accessories, offering the most complete selection of sizes, styles and materials. We continually provide new cable tie and wiring accessory designs to meet the changing application challenges encountered by our customers while providing lowest installed costs.

Panduit also offers the largest selection of ergonomic cable tie installation tools—from high speed automatic systems to hand operated tools. So, whatever the need, Panduit has the tool to help lower your total installed cost.

Assured Quality

To help assure optimum quality, Panduit products are designed and manufactured to meet applicable international, UL, military and customer standards:

ISO 9000

The International Standards Organization (ISO) establishes worldwide standards for products and services in recognition of increasing globalization of markets. The ISO program sets up the requirements for quality assurance systems of these worldwide standards. Panduit is registered to ISO 9001, the most comprehensive model in the standard, meant for companies who design, manufacture, install and service the products they sell. Registration has been awarded by Underwriters' Laboratories (Certificate No. A2269) after extensive audit of QA systems employed at Panduit.

Underwriters' Laboratories, Inc. (File E56854)

Most Panduit miniature, intermediate, standard, light heavy and heavy cross-section ties are Recognized or Listed by Underwriters' Laboratories in their Directory under the category "Wire Positioning Devices" (ZODZ(2)). Natural, pigmented and weather resistant cable ties are recognized for indoor use at temperatures up to 85°C (185°F). Heat stabilized ties are U.L. recognized for indoor use at temperatures up to 105°C (221°F).

Military Specification: MIL-S-23190E

Military Specification MIL-S-23190E covers the actual test requirements on cable ties. Panduit cable ties, when tested, either meet or exceed the requirements of this specification.

Nuclear Regulatory Commission

The NRC developed rules and regulations concerning Quality Assurance Criteria for Nuclear Power Plants or Title 10, Chapter 10, Part 50, Appendix B (10CFR50). Panduit Corp's Quality Assurance program is designed to satisfy the 18 criteria set forth in NRC 10CFR50, Appendix B, Military Specification MIL-Q-9858A.

Ford Motor Company

Panduit has received Q1 certification status from Ford Motor Company. Q1 certification enables all Panduit cable tie manufacturing facilities to approve all initial samples and production shipments of the parts destined for Ford operations throughout the world.

InternationalApprovals Independent Testing Facilities

German (VG) Military

Lloyd's Register of Shipping

RINA

Germanischer Lloyd

Nippon Kaiji Kyokai

Det Norske Veritas

Bureau Veritas

PANDUIT® Styles of Cable Ties

Selection of Styles

PAN-TY® Cable Ties

This line offers the largest selection of styles, materials, and sizes. The ties are available in 6.6 nylon, nylon 12, polypropylene, HALAR▲ and TEFZEL■ material. Available in sizes from .60" (15mm) maximum bundle diameter up to 13" (330mm) maximum bundle diameter. All are self-locking and many sizes are available in both releasable and non-releasable types. ***PAN-TY*** Cable Ties are quickly installed by hand or with ***PANDUIT*** installation tools.

DOME-TOP® *BARB-TY*® Cable Ties

These cable ties provide consistent performance and reliability for those users who prefer a cable tie with a stainless steel locking barb. They are infinitely adjustable through their entire bundle range. On selected popular sizes, the additional length of ***BARB-TY*** Cable Ties provides an average of 30% more bundle area than other metal barb cable ties. Available in sizes from .90" (23mm) maximum bundle diameter up to 9.0" (229mm) maximum bundle diameter and may be installed by hand or with ***PANDUIT*** installation tools.

Specialty Ties

Panduit continually develops new products to help solve the unique application problems of our customers. One of these products is the aerial support tie which typifies the design/manufacturing capability of Panduit to respond to these special needs.

Stainless Steel Ties and Strapping

Underground, underwater, indoors, outdoors—however hostile the environment—***PANDUIT*** Stainless Steel Ties and Strapping let you fasten and identify components and cables quickly and easily. Stainless steel ties stand up to most chemicals, to nuclear and ultraviolet radiation, to seawater and direct burial in any soil, and to temperature extremes from -112°F to 1700°F (-80°C to 925°C).

For Technical Information in the U.S.A.
Call 888-506-5400 or 708-532-1800 -- Extension 1483

Other countries, see the Home Page for local Sales Office information

▲HALAR is the Registered Trademark for Ausimont, Inc. fluoropolymer.

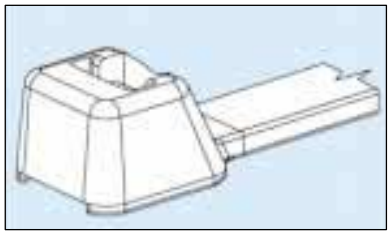
■TEFZEL is the Registered Trademark of E.I. DuPont Co., fluoropolymer.

PAN-TY® Cable Tie Features/Benefits:

1. ONE PIECE CONSTRUCTION

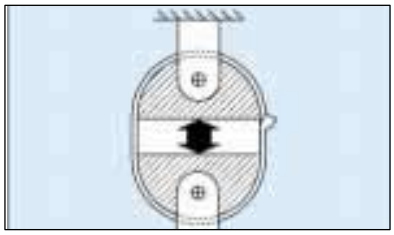
- Consistent performance and reliability.
- Available in lengths from 2.8" (71mm) up to 43.3" (1100mm) to meet a variety of application requirements.

2. SMOOTH, ROUND EDGES



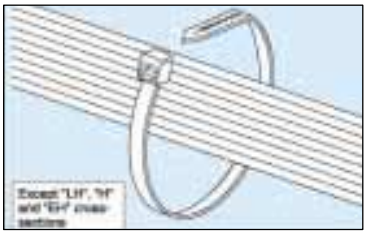
- No irritation to installer's hands, increases productivity.
- Prevents damage to wire insulation.

3. TENSILE STRENGTH



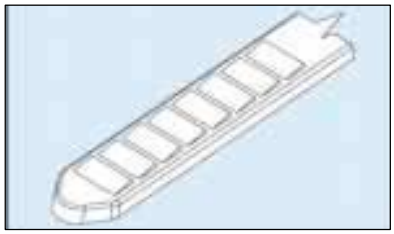
- Exceeds Industry and Military (MIL-S-23190E) standards
- Available in seven loop tensile strengths from 8 lbs. (36N) up to 250 lbs. (1112N) to provide an economical selection from which to choose.

4. CURVED TIP



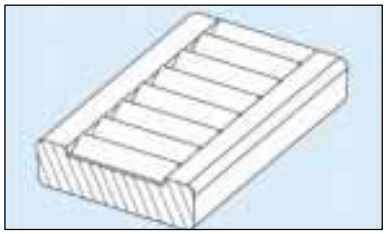
- Orients tip toward head to speed installation—lowers installed cost.
- Faster initial threading.
- Easier to pick up from flat surfaces.

5. FINGER TIP GRIP



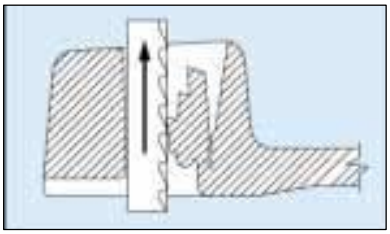
- Finger tip grip on selected sizes assures positive grip during threading of the tie.
- Grip prevents tip from slipping out of cable tie head during threading.

6. MORE TEETH PER INCH



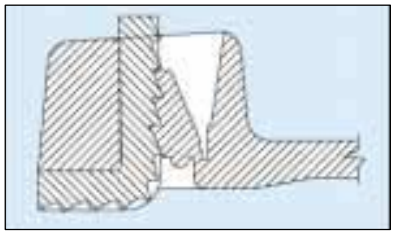
- Greater number of small uniform teeth provides tighter bundles.
- Because they're flush with surface they provide proper wire bundle grip without wire insulation damage.

7. LOW THREADING FORCE



- Lowest threading force of any one-piece cable tie in the industry.
- Reduces operator fatigue.
- Thin tapered tip facilitates threading, easier initial insertion.

8. ONE PIECE LOCKING DESIGN



- Multiple locking tooth design provides greater strength and reliability.
- Available in self locking or releasable styles for use in applications where changes are anticipated.

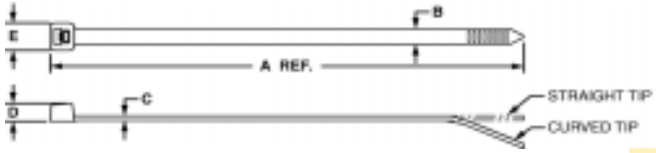
9. MATERIAL AVAILABILITY

- Available in a variety of materials to meet the needs of special environments.
- Properly selected ties can be used indoors or outdoors with assurance of long lasting performance.

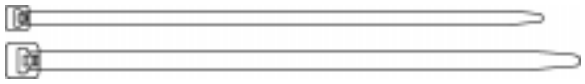
PAN-TY® Nylon 6.6 Locking Cable Ties

These versatile fasteners can be used in countless applications wherever you need to bundle wire, cable, or hose. They tie bundle diameters up to 13 inches (can also be joined together for even larger diameters) and have minimum loop tensile strengths from 12 to 175 pounds. Colors are available for specific color-coding applications (*See Page 37 to 39* for color and material availability chart).

All PLT cable ties (except -DTP, -XMR, -VMR, -5K, heavy and extra heavy cross section) have curved tip design for faster threading.



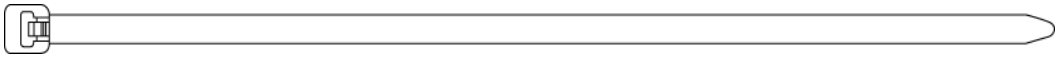
SUB-MINIATURE AND MINIATURE CROSS SECTION



Cable Ties for Automatic Tools— *See Page 46*

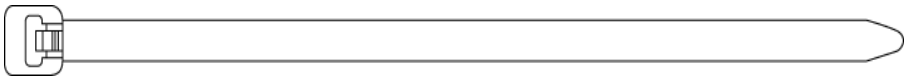
Part Number†	Length A In. (mm)	Width B In. (mm)	Thickness C In. (mm)	Head Height D In. (mm)	Head Width E In. (mm)	Max. Bundle Dia. In. (mm)	Min. Loop Tensile Strength Lbs. (N)	Recommended PANDUIT® Installation Tool Part No.	Packaging* Std. Pkg. Qty.	Std. Ctn. Qty.	Bulk Pkg. Qty.	Bulk Ctn. Qty.
PLT.6SM-C	2.8 (71)	.070 (1.8)	.030 (.76)	.095 (2.4)	.125 (3.2)	.6 (15.2)	8 (36)	GS2B	100	1000	1000	50000
PLT.7M-C	3.1 (79)	.090 (2.3)	.032 (.9)	.115 (2.9)	.180 (4.6)	.68 (17.3)	18 (80)		100	1000	1000	50000
PLT1M-C	3.9 (99)	.098 (2.5)	.043 (1.1)	.154 (3.9)	.180 (4.6)	.87 (22)	18 (80)		100	1000	1000	50000
PLT1.5M-C	5.6 (142)	.098 (2.5)	.043 (1.1)	.154 (3.9)	.180 (4.6)	1.25 (32)	18 (80)	GS2B,PPTS or STS2	100	1000	1000	50000
PLT2M-C	8.0 (203)	.098 (2.5)	.043 (1.1)	.154 (3.9)	.180 (4.6)	2.00 (51)	18 (80)		100	1000	1000	25000

INTERMEDIATE CROSS SECTION



PLT1.5I-C	5.6 (142)	.142 (3.6)	.045 (1.2)		.240 (6.1)	1.38 (35)			100	1000	1000	25000
PLT2I-C	8.0 (203)	.142 (3.6)	.045 (1.2)		.240 (6.1)	2.00 (51)			100	1000	1000	25000
PLT2.5I-C	9.7 (246)	.142 (3.6)	.052 (1.3)	.180 (4.6)	.240 (6.1)	2.50 (64)	40 (178)	GS2B, PPTS or STS2	100	1000	1000	10000
PLT3I-C	11.4 (290)	.145 (3.7).	.052 (1.3)		.260 (6.6)	3.00 (76)			100	1000	1000	10000
PLT4I-C	14.6 (371)	.145 (3.7)	.052 (1.3)		.260 (6.6)	4.00 (102)			100	1000	1000	10000

STANDARD CROSS SECTION



PLT1S-C	4.8 (122)				.316 (8.0)	1.00 (25)			100	1000	1000	25000
PLT1.5S-C	6.2 (157)				.316 (8.0)	1.50 (38)			100	1000	1000	25000
PLT2S-C	7.4 (188)				.316 (8.0)	1.88 (48)			100	1000	1000	10000
PLT2.5S-C	9.8 (249)				.337 (8.6)	2.50 (64)			100	1000	1000	10000
PLT3S-C	11.5 (292)	.190 (4.8)	.052 (1.3)	.220 (5.6)	.337 (8.6)	3.00 (76)	50 (222)	GS2B, GS4H, PPTS, STS2 or STH2	100	1000	1000	10000
PLT3.5S-C	13.0 (330)				.337 (8.6)	3.50 (89)			100	1000	1000	10000
PLT4S-C	14.5 (368)				.337 (8.6)	4.00 (102)			100	1000	1000	5000
PLT4.5S-C	15.5 (394)				.337 (8.6)	4.50 (114)			100	1000	1000	5000
PLT5S-C	17.5 (445)				.337 (8.6)	5.00 (127)			100	500	1000	5000

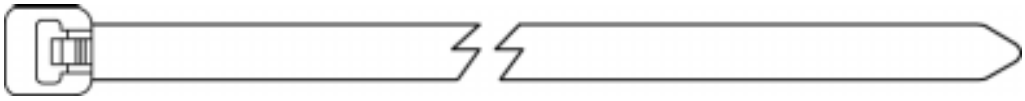
Most commonly used parts appear in **BOLD**.

*Order the Number of Pieces Required in Multiples of Packaging Quantities.
†Part Number shown for Standard Package Quantity. For Bulk Pack Part Numbers, *See Page 40 to Page 41*.

For colors and other materials, *See Page 36 to 39.*

PANDUIT® Nylon 6.6 Locking Cable Ties (PLT Series)

LIGHT HEAVY AND HEAVY CROSS SECTION

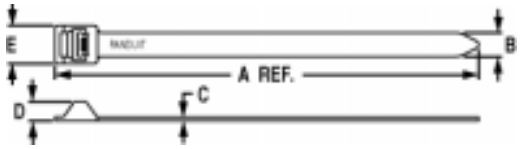


Part Number†	Length A In. (mm)	Width B In. (mm)	Thickness C In. (mm)	Head Height D In. (mm)	Head Width E In. (mm)	Max. Bundle Dia. In. (mm)	Min. Loop Tensile Strength Lbs. (N)	Recommended PANDUIT® Installation Tool Part No.	Packaging* Std. Pkg. Qty.	Std. Ctn. Qty.	Bulk Pkg. Qty.	Bulk Ctn. Qty.
120 Lb. Minimum Loop Tensile												
PLT2H-L	8.1 (206)	.300 (7.6)	.075 (1.9)	.290 (7.4)	.480 (12.2)	2.00 (51)	120 (534)	GS4H, GS4EH PPTEH or STH2	50	500	250	2500
PLT2.5H-L	10.0 (254)			.290 (7.4)		2.50 (64)			50	500	250	2500
PLT3H-L	11.4 (290)			.290 (7.4)		3.00 (76)			50	500	250	2500
PLT4H-L	14.5 (368)			.290 (7.4)		4.00 (102)			50	500	250	2500
PLT6LH-L	21.9 (556)			.325 (8.3)		6.00 (152)			50	500	100	2000
PLT7LH-L	24.7 (627)			.325 (8.3)		7.00 (178)			50	500	100	2000
PLT8LH-L	27.6 (701)			.325 (8.3)		8.00 (203)			50	500	100	2000
PLT9LH-L	30.5 (775)			.325 (8.3)		9.00 (229)			50	500	100	1000
PLT10LH-L	34.3 (871)			.325 (8.3)		10.31 (262)			50	1000	100	1000
175 Lb. Minimum Loop Tensile												
PLT5H-L	17.7 (450)	.350 (8.9)	.078 (2.0)	.340 (8.6)	.560 (14.2)	5.00 (127)	175 (778)	GS4H, GS4EH PPTEH or STH2	50	500	100	2500
PLT6H-L	20.9 (530)					6.00 (152)			50	500	100	2000
PLT8H-L	30.6 (779)					9.00 (229)			50	500	100	1000
PLT13H-Q	43.3 (1100)					13.00 (330)			25	500	100	500

Most commonly used parts appear in **BOLD**.

PAN-TY® Locking Lashing Ties

Lashing Ties typically are used on heavy duty jobs such as securing conduit or large cable bundles to permanent structures, indoors or out. Can be used with MCEH mounting clip (*See Page 15*).



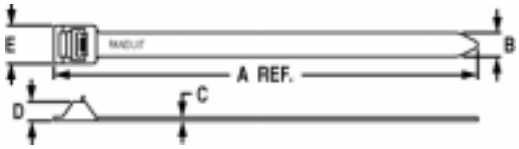
Part Number†	Length A In. (mm)	Width B In. (mm)	Thickness C In. (mm)	Head Height D In. (mm)	Head Width E In. (mm)	Max. Bundle Dia. In. (mm)	Min. Loop Tensile Strength Lbs. (N)	Recommended PANDUIT® Installation Tool Part No.	Packaging* Std. Pkg. Qty.	Std. Ctn. Qty.	Bulk Pkg. Qty.	Bulk Ctn. Qty.
Nylon 6.6 for Indoor Use												
PLT2EH-C	9.0 (229)	.500 (12.7)	.075 (1.9)	.40 (10.2)	.80 (20.3)	2.0 (51)	250 (1112)	GS4H, GS4EH PPTEH or STH2	—	—	100	1000
PLT5EH-Q	20.1 (510)		.075 (1.9)			5.0 (127)			25	250	100	1000
PLT6EH-Q	22.2 (563)		.075 (1.9)			6.0 (152.4)			25	250	100	1000
PLT8EH-C	28.3 (718)		.085 (2.2)			8.0 (203.2)			—	—	100	1000
PLT10EH-C	34.2 (868)		.085 (2.2)			10.0 (254)			—	—	100	500
PLT12EH-C	40.1 (1018)		.085 (2.2)			12.0 (304.8)			—	—	100	500

Most commonly used parts appear in **BOLD**.

*Order the Number of Pieces Required in Multiples of Packaging Quantities.
†Part Number shown for Standard Package Quantity. For Bulk Pack Part Numbers, *See Page 40 to Page 41*.

For colors and other materials, *See Page 36 to 39.*

PAN-TY® Releasable Lashing Ties

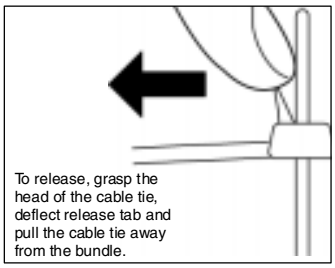


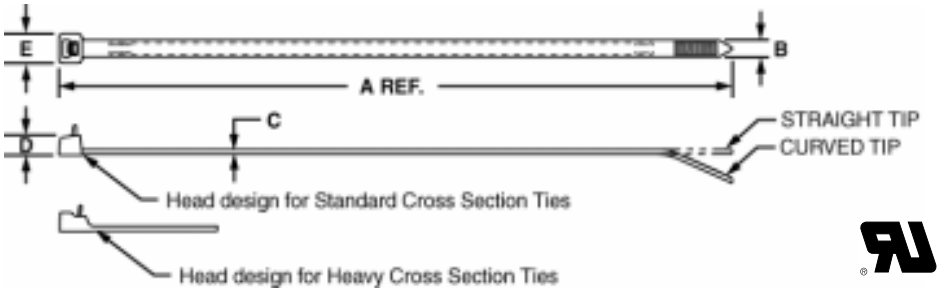
Part Number†	Length A In. (mm)	Width B In. (mm)	Thickness C In. (mm)	Head Height D In. (mm)	Head Width E In. (mm)	Max. Bundle Dia. In. (mm)	Min. Loop Tensile Strength Lbs. (N)	Recommended PANDUIT® Installation Tool Part No.	Packaging* Std. Pkg. Qty.	Std. Ctn. Qty.	Bulk Pkg. Qty.	Bulk Ctn. Qty.
Nylon 6.6 for Indoor Use												
PRT2EH-C	9.0 (229)	.500 (12.7)	.075 (1.9)	.40 (10.2)	.80 (20.3)	2.0 (51)	250 (1112)	Hand Installed Only	—	—	100	1000
PRT5EH-Q	20.1 (510)		.075 (1.9)			5.0 (127)			25	250	100	1000
PRT6EH-Q	22.2 (563)		.075 (1.9)			6.0 (152)			25	250	100	1000
PRT8EH-C	28.3 (718)		.085 (2.2)			8.0 (203)			—	—	100	1000
PRT10EH-C	34.2 (868)		.085 (2.2)			10.0 (254)			—	—	100	500
PRT12EH-C	40.1 (1018)		.085 (2.2)			12.0 (305)			—	—	100	500

Most commonly used parts appear in **BOLD**.

PAN-TY® Releasable Nylon 6.6 Cable Ties

The extended tab end of releasable cable ties permits easy release and reuse even after tie has been pulled up snug by hand. Releasable ties are particularly useful in harnessing where changes are anticipated during development, production or servicing in the field.


To release, grasp the head of the cable tie, deflect release tab and pull the cable tie away from the bundle.



Part Number†	Length A In. (mm)	Width B In. (mm)	Thickness C In. (mm)	Head Height D In. (mm)	Head Width E In. (mm)	Max. Bundle Dia. In. (mm)	Min. Loop Tensile Strength Lbs. (N)	Recommended PANDUIT® Installation Tool Part No.	Packaging* Std. Pkg. Qty.	Std. Ctn. Qty.	Bulk Pkg. Qty.	Bulk Ctn. Qty.
Standard Cross Section												
PRT1S-C	4.8 (122)	.190 (4.8)	.052 (1.3)	.219 (5.6)	.316 (8.0)	1.00 (25)	50 (222)	Hand Installed Only	100	1000	100	10000
PRT1.5S-C	6.3 (160)				.316 (8.0)	1.50 (38)			100	1000	100	10000
PRT2S-C	7.4 (188)				.316 (8.0)	1.88 (48)			100	1000	100	10000
PRT3S-C	11.5 (292)				.337 (8.6)	3.00 (76)			100	1000	100	10000
PRT4S-C	14.5 (368)				.337 (8.6)	4.00 (102)			100	1000	100	5000
Heavy Cross Section												
PRT2H-L	8.4 (213)	.300 (7.6)	.075 (1.9)	.300 (7.6)	.480 (12.2)	2.00 (51)	80 (356)		50	500	250	2500
PRT3H-L	11.4 (290)					3.00 (76)			50	500	250	2500
PRT4H-L	14.5 (368)					4.00 (102)			50	500	250	2500

Most commonly used parts appear in **BOLD**.

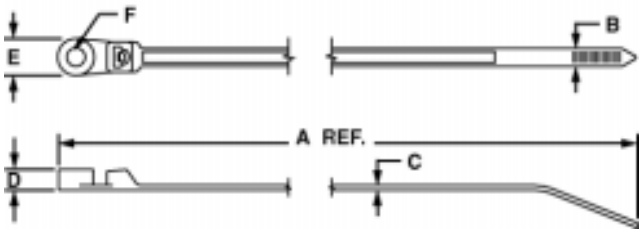
*Order the Number of Pieces Required in Multiples of Packaging Quantities.
†Part Number shown for Standard Package Quantity. For Bulk Pack Part Numbers, See Page 40 to 41.

For colors and other materials, See Page 36 to 39.

PANDUIT® Nylon 6.6 LockingClamp Ties *(PLC Series)*

PAN-TY® Nylon 6.6 Clamp Ties

Clamps are used to attach a bundle to another surface such as a control panel, wall or ceiling using another fastener. The design allows for bundling before or after screwing clamp in place.



Part Number†	Length A In. (mm)	Width B In. (mm)	Thickness C In. (mm)	Boss Height D In. (mm)	Head Width E In. (mm)	Hole Dia. F In. (mm)	Screw Size	Max. Bundle Dia. In. (mm)	Min. Loop Tensile Strength Lbs. (N)	Recommended *PANDUIT*® Installation Tool Part No.	Packaging* Std. Pkg. Qty.	Std. Ctn. Qty.	Bulk Pkg. Qty.	Bulk Ctn. Qty.
Miniature Cross Section														
PLC1M-S4-C	4.3 (110)	.100 (2.5)	.045 (1.2)	.153 (3.9)	.239 (6.1)	.118 (3.0)	#4 (M2.5)	.75 (20)	18 (80)	GS2B, PPTS or STS2	100	1000	1000	50000
Intermediate Cross Section														
PLC1.5I-C	6.1 (156)	.135 (3.4)	.045 (1.2)	.166 (4.2)	.335 (8.5)	.172 (4.4)	#8 (M4)	1.25 (32)	40 (178)	GS2B, PPTS or STS2	100	1000	1000	25000
Standard Cross Section														
PLC2S-S6-C	7.9 (201)	.190 (4.8)	.047 (1.2)	.160 (4.1)	.373 (9.5)	.145 (3.7)	#6 (M3)	1.84 (47)	50 (222)	GS2B, GS4H PPTS, STS2 or STH2	100	1000	1000	10000
PLC2S-S10-C	7.9 (201)		.047 (1.2)	.160 (4.1)		.206 (5.2)	#10 (M5)	1.84 (47)			100	1000	1000	10000
PLC3S-S10-C	12.0 (305)		.052 (1.3)	.220 (5.6)		.206 (5.2)	#10 (M5)	3.00 (76)			100	1000	1000	5000
PLC4S-S10-C	15.0 (381)		.052 (1.3)	.220 (5.6)		.206 (5.2)	#10 (M5)	4.00 (102)			100	1000	1000	5000
Heavy Cross Section														
PLC2H-S25-L	9.0 (228)	.300 (7.6)	.075 (1.9)	.265 (6.7)	.500 (12.7)	.260 (6.6)	1/4 (M6)	2.00 (51)	120 (534)	GS4H, GS4EH PPTEH or STH2	50	500	250	2500
PLC3H-S25-L	12.0 (305)							3.00 (76)			50	500	250	2500
PLC4H-S25-L	15.1 (384)							4.00 (102)			50	500	250	2500

Most commonly used parts appear in **BOLD**.

For Heavy Duty Vibration and Loading Applications

Tie features reinforcing ribs between tie head and mounting boss that strengthen and stabilize this area of the tie, making it ideal for heavy duty applications.

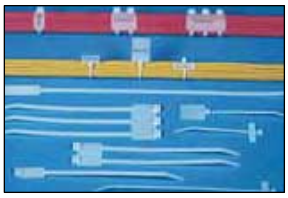
PLCR4H-S25-L	15.1 (384)	.300 (7.6)	.075 (1.9)	.265 (6.7)	.500 (12.7)	.260 (6.6)	1/4 (M6)	4.00 (102)	120 (534)	GS4H, GS4EH, PPTEH, STH2	50	500	250	2500

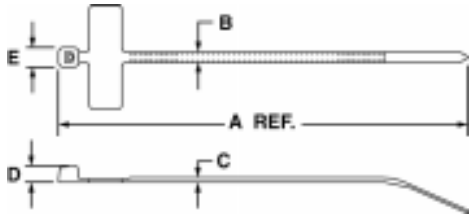
*Order the Number of Pieces Required in Multiples of Packaging Quantities.
†Part Number shown for Standard Package Quantity. For Bulk Pack Part Numbers, *See Page 40 to Page 41*.

For colors and other materials, *See Page 36 to 39.*

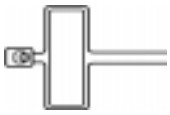
PAN-TY® Nylon 6.6 Marker Ties

Marker Ties fasten and identify bundles at the same time. They can be marked with ***PANDUIT*** Marker Pens or you can use Panduit's custom hot stamping service.

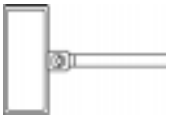




MINIATURE CROSS SECTION

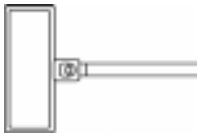


PLM1M
PLM2M



PLF1M

PLF1MA



PLF1MB

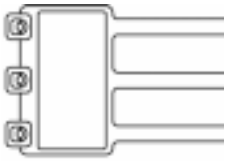
Part Number†	Length A In. (mm)	Width B In. (mm)	Thickness C In. (mm)	Head Height D In. (mm)	Head Width E In. (mm)	Write-on Area In. (mm)	Max. Bundle Dia. In. (mm)	Min. Loop Tensile Strength Lbs. (N)	Recommended ***PANDUIT***® Installation Tool Part No.	Packaging* Std. Pkg. Qty.	Std. Ctn. Qty.	Bulk Pkg. Qty.	Bulk Ctn. Qty.
PLM1M-C	3.9 (99)	.098 (2.5)	.035 (.9)	.154 (3.9)	.180 (4.6)	.26 x .95 (6.6 x 24.1)	.75 (20)	18 (80)	GS2B, PPTS or STS2	100	1000	1000	25000
PLM2M-C	8.0 (203)						2.0 (51)			100	1000	1000	25000
PLF1M-C	4.3 (109)		.045 (1.1)			.31 x .75 (7.9 x 19.1)	.87 (22)			100	1000	1000	25000
PLF1MA-C	5.1 (130)					.76 x 1.04 (19.1 x 26.4)	.87 (22)			100	1000	1000	10000
PLF1MB-C	4.0 (102)					.31 x .92 (7.9 x 23.4)	.75 (20)			100	1000	1000	10000

Most commonly used parts appear in **BOLD**.

STANDARD CROSS SECTION

PLM2S
PLM4S

PL2M2S



PL3M2S

PLM2S-C	7.4 (188)	.185 (4.7)	.052 (1.3)	.220 (5.6)	.320 (8.1)	.44 x .87 (11.1 x 22.1)	1.75 (45)	50 (222)	GS2B, GS4H PPTS, STS2 or STH2	100	1000	500	10000
PLM4S-C	14.6 (371)					.44 x 2.00 (11.1 x 50.8)	4.00 (102)			100	1000	500	5000
PL2M2S-L	7.4 (188)					.87 x 1.07 (22.1 x 27.2)	1.75 (45)			50	500	500	2500
PL3M2S-L	7.4 (188)					.87 x 1.79 (22.1 x 45.5)	1.75 (45)			50	500	500	2500

Marker Ties are also available in weather resistant black nylon for outdoor use. May be marked with ***PANDUIT*** PX-10 White Marking Pen. Most commonly used parts appear in **BOLD**.

MARKERS ON REELS (2000 reel - 2 reels/pkg.)

PLM1M-4KR	3.9 (99)	.098 (2.5)	.035 (.9)	.154 (3.9)	.180 (4.6)	.26 x .95 (6.6 x 24.1)	.87 (22)	18 (80)		—	—	4000	—
PLF1MB-4KR	4.0 (102)		.045 (1.1)			.31 x .92 (7.9 x 23.4)	.75 (19)			—	—	4000	—

Custom Hot Stamping Available; *See Page 35*.

Marking Pens Available; *See Page 100*.

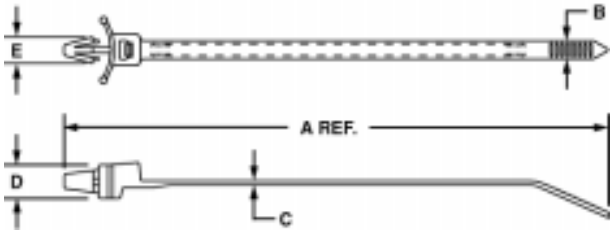
*Order the Number of Pieces Required in Multiples of Packaging Quantities.
†Part Number shown for Standard Package Quantity. For Bulk Pack Part Numbers, *See Page 40 to Page 41*.

For colors and other materials, *See Page 36 to 39.*

PANDUIT® Nylon 6.6 Winged Push Mount Ties *(PLWP Series)*

PAN-TY® Nylon 6.6 Push Mount Ties

Push mount ties are used to attach a bundle to another surface such as a control panel. The mount portion is easily pressed into a pre-drilled hole and locks in place. Push mount tie wings provide constant tension when installed in less than maximum panel thickness creating a stable, secure fixture and rattle-free installation.



Winged Push Mount Ties

Part Number†	Cross Section	Length A In. (mm)	Width B In. (mm)	Thickness C In. (mm)	Head Height D In. (mm)	Hole Dia. In. (mm)	Max. Panel Thickness In. (mm)	Max. Bundle Dia. In. (mm)	Min. Loop Tensile Strength Lbs. (N)	Recommended *PANDUIT*® Installation Tool Part No.	Packaging* Std. Pkg. Qty.	Std. Ctn. Qty.	Bulk Pkg. Qty.	Bulk Ctn. Qty.
Style PLWP (locking)														
PLWP1M-C	Min.	4.3 (109)	.098 (2.5)	.044 (1.1)	.220 (5.6)	.187 (4.7)	.093 (2.4)	.87 (22)	18 (80)	GS2B, PPTS or STS2	100	1000	500	5000
PLWP1.5I-C	Int.	6.0 (152)	.135 (3.4)	.045 (1.2)	.280 (7.1)	.187 (4.7)	.093 (2.4)	1.25 (32)	40 (177)		100	1000	500	5000
PLWP1S-C		5.2 (132)				.252 (6.4)	.105 (2.7)	1.00 (25)			100	1000	500	5000
PLWP1SA-C		5.1 (130)				.187 (4.7)	.093 (2.4)	1.00 (25)			100	1000	500	5000
PLWP1SB-D		5.2 (132)				.187 (4.7)	.157 (4.0)	1.00 (25)			—	—	500	5000
PLWP1.5S-C		6.8 (173)				.252 (6.4)	.105 (2.7)	1.50 (38)		GS2B, GS4H, PPTS, STS2 or STH2	100	1000	500	5000
PLWP1.5SA-C	Std.	6.7 (170)	.190 (4.8)	.052 (1.3)	.370 (9.4)	.187 (4.7)	.093 (2.4)	1.50 (38)	50 (222)		100	1000	500	5000
PLWP1.5SB-C		6.7 (170)				.187 (4.7)	.157 (4.0)	1.50 (38)			100	1000	500	5000
PLWP2S-C		7.8 (198)				.252 (6.4)	.105 (2.7)	1.75 (45)			100	1000	500	5000
PLWP2SA-C		7.7 (196)				.187 (4.7)	.093 (2.4)	1.75 (45)			100	1000	500	5000
PLWP2SB-D		7.8 (198)				.187 (4.7)	.157 (4.0)	1.75 (45)			—	—	500	5000
PLWP2H-TL	Hvy.	8.9 (226)	.300 (7.6)	.075 (1.9)	.370 (9.4)	.252 (6.4)	.105 (2.7)	2.00 (51)	120 (534)	GS4H, STH2 PPTEH	—	—	250	2500
PLWP3H-TL		12.0 (305)						3.00 (76)			—	—	250	2500
Style PRWP (releasable)														
PRWP1.5I-C	Int.	6.0 (152)	.135 (3.4)	.045 (1.2)	.220 (5.6)	.187 (4.7)	.093 (2.4)	1.25 (32)	40 (177)		100	1000	500	5000
PRWP1S-C		5.2 (132)				.252 (6.4)	.105 (2.7)	1.00 (25)			100	1000	500	5000
PRWP1SA-C		5.1 (130)				.187 (4.7)	.093 (2.4)	1.00 (25)			100	1000	500	5000
PRWP1SB-D		5.2 (132)				.187 (4.7)	.157 (4.0)	1.00 (25)			—	—	500	5000
PRWP1.5S-C		6.8 (173)				.252 (6.4)	.105 (2.7)	1.50 (38)			100	1000	500	5000
PRWP1.5SA-D	Std.	6.7 (170)	.190 (4.8)	.052 (1.3)	.370 (9.4)	.187 (4.7)	.093 (2.4)	1.50 (38)	50 (222)	Hand Installed only	—	—	500	5000
PRWP1.5SB-D		6.8 (173)				.187 (4.7)	.157 (4.0)	1.50 (38)			—	—	500	5000
PRWP2S-C		7.8 (198)				.252 (6.4)	.105 (2.7)	1.75 (45)			100	1000	500	5000
PRWP2SA-D		7.7 (196)				.187 (4.7)	.093 (2.4)	1.75 (45)			—	—	500	5000
PRWP2SB-D		7.8 (198)				.187 (4.7)	.157 (4.0)	1.75 (45)			—	—	500	5000
PRWP2H-TL	Hvy.	8.9 (226)	.300 (7.6)	.075 (1.9)	.370 (9.4)	.252 (6.4)	.105 (2.7)	2.00 (51)	120 (534)		—	—	250	2500
PRWP3H-TL		12.0 (305)						3.00 (76)			—	—	250	2500

Most commonly used parts appear in **BOLD**.

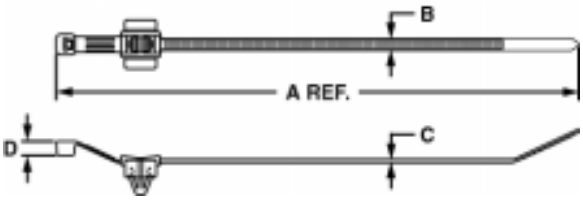
*Order the Number of Pieces Required in Multiples of Packaging Quantities.
†Part Number shown for Standard Package Quantity. For Bulk Pack Part Numbers, *See Page 40 to 41*.

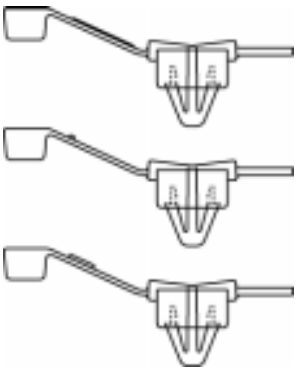
For colors and other materials, *See Page 36 to 39.*

PANDUIT® Heat Stabilized Nylon 6.6 Push Mount Ties

PAN-TY® Center Mounted Heat Stabilized Nylon 6.6 Wing Push Mount Ties

Center-mounted wing push-mount cable ties center the bundle on all bundle diameters.





PLWP30, 40 50SC winged push-mount cable ties are for normal wire bundles.

PLWP30, 40, 50SD winged push-mount cable ties with convoluted tubing bump that prevents lateral and axial movement on convoluted tubing.

PLWP30, 40, 50SE winged push-mount cable ties with convoluted tubing bump that prevents lateral movement on convoluted tubing.

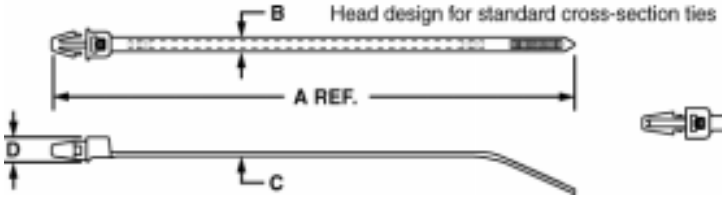
BUNDLE DIAMETERS from .19" to 1.97" (4.8 to 50 mm)

Part Number†	Cross Section	Length A In. (mm)	Width B In. (mm)	Thickness C In. (mm)	Head Height D In. (mm)	Hole Dia. In. (mm)	Panel Thickness In. (mm)	Max. Bundle Dia. In. (mm)	Min. Loop Tensile Strength Lbs. (N)	Recommended PANDUIT® Installation Tool Part No.	Packaging* Std. Pkg. Qty.	Std. Ctn. Qty.	Bulk Pkg. Qty.	Bulk Ctn. Qty.
PLWP30SC-D30	Std.	5.8 (147.6)	.19 (4.8)	.050 (1.27)	.220 (5.6)	.283 (7.2)	.118 (3.0)	1.18 (30)	50 (222)	GS2B, GS4H, PPTS, STS2, or STH2	—	—	500	5000
PLWP40SC-D30		7.0 (178.6)						1.58 (40)			—	—	500	5000
PLWP50SC-D30		8.2 (208.3)						1.97 (50)			—	—	500	5000
PLWP30SD-D30		5.8 (147.6)						1.18 (30)			—	—	500	5000
PLWP40SD-D30		7.0 (178.6)						1.58 (40)			—	—	500	5000
PLWP50SD-D30		8.2 (208.3)						1.97 (50)			—	—	500	5000
PLWP30SE-D30		5.8 (147.6)						1.18 (30)			—	—	500	5000
PLWP40SE-D30		7.0 (178.6)						1.58 (40)			—	—	500	5000
PLWP50SE-D30		8.2 (208.3)						1.97 (50)			—	—	500	5000

Most commonly used parts appear in **BOLD**.

PAN-TY® Nylon 6.6 Push Mount Ties

Style PLP



Head design for intermediate cross-section ties

Economical push mount tie style.

PLP1.5I-C	Int.	6.13 (155)	.135 (3.4)	.045 (1.1)	.236 (6.0)	.187 (4.7)	.093 (2.4)	1.25 (31.8)	40 (178)	GS2B, PPTS orSTS2	100	1000	1000	25000
PLP1S-C	Std.	5.3 (134)	.180 (4.6)	.050 (1.3)	.354 (9.0)	.250 (6.4)	.125 (3.2)	1.00 (25.4)	50 (222)	GS2B, GS4H PPTS, STS2 or STH2	100	1000	1000	10000
PLP1.5S-C		6.7 (170)						1.50 (38)			100	1000	1000	10000
PLP2S-C		7.87 (199)						1.75 (44.5)			100	1000	1000	10000

Most commonly used parts appear in **BOLD**.

*Order the Number of Pieces Required in Multiples of Packaging Quantities.

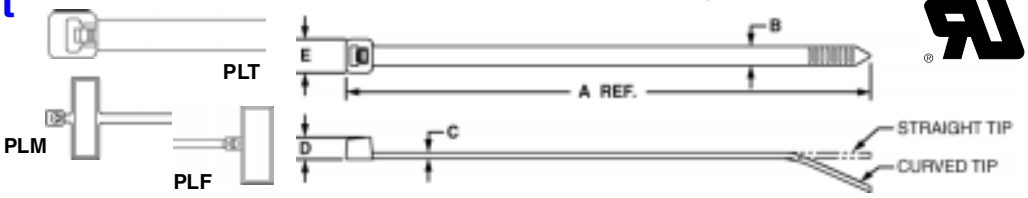
†Part Number shown for PLP parts is Standard Package Quantity. For Bulk Package Part Numbers, *See Page 40 to 41*.
Part Number shown for PLWP parts is Bulk Package Quantity. Releasable styles available—contact factory.

For colors and other materials, *See Page 36 to 39.*

PANDUIT® Flame Retardant Nylon 6.6 Cable Ties

PAN-TY® Flame Retardant Nylon 6.6 Cable Ties and Marker Ties

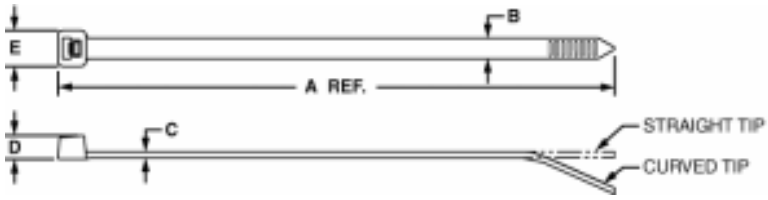
Flame Retardant Nylon 6.6 meets the requirements of U.L. 94V-0. Can be used with flame retardant cable tie mounts. *See Page 84*.



Part Number†	Cross Section	Length A In. (mm)	Width B In. (mm)	Thickness C In. (mm)	Head Height D In. (mm)	Head Width E In. (mm)	Marker Write-on Area In. (mm)	Max. Bundle Dia. In. (mm)	Min. Loop Tensile Strength Lbs. (N)	Recommended PANDUIT® Installation Tool Part No.	Packaging* Bulk Pkg. Qty.	Packaging* Bulk Ctn. Qty.
Off White Flame Retardant Nylon 6.6												
PLF1M-M69	Min.	4.3 (109)	.098 (2.5)	.045 (1.1)	.154 (3.9)	.180 (4.6)	.31 x .75 (7.9 x 19.1)	.87 (22)	18 (80)	GS2B, PPTS or STS2	1000	25000
PLM1M-M69		3.9 (99)	.098 (2.5)	.035 (.9)	.154 (3.9)	.180 (4.6)	.26 x .95 (6.6 x 24.1)	.75 (20)			1000	25000
PLT1M-M69		4.0 (102)	.098 (2.5)	.043 (1.1)	.154 (3.9)	.188 (4.8)	—	.87 (22)			1000	25000
PLT2M-M69		8.0 (203)	.098 (2.5)	.043 (1.1)	.154 (3.9)	.188 (4.8)		2.00 (51)			1000	25000
PLT1.5I-M69	Int.	5.6 (142)	.139 (3.5)	.044 (1.1)	.177 (4.5)	.239 (6.1)	—	1.38 (35)	40 (178)	GS2B, PPTS or STS2	1000	25000
PLT2I-M69		8.0 (203)	.142 (3.6)	.044 (1.1)	.177 (4.5)	.239 (6.1)		2.00 (51)			1000	25000
PLT2S-M69	Std.	7.4 (188)	.190 (4.8)	.055 (1.4)	.220 (5.6)	.320 (8.1)	—	1.88 (48)	50 (222)	GS2B, GS4H, PPTS, STS2 or STH2	1000	10000
PLT4S-M69		14.5 (368)	.190 (4.8)	.052 (1.3)	.220 (5.6)	.337 (8.6)		4.00 (102)			1000	5000
PLT4H-TL69	Hvy.	14.6 (371)	0.3 (7.6)	.075 (1.9)	.360 (9.1)	.480 (12.2)	—	4.00 (102)	120 (533)	GS4H, GS4EH, PPTEH or STH2	250	2500
Black Flame Retardant Nylon 6.6												
PLT1M-M60	Min.	4.0 (102)	.098 (2.5)	.043 (1.1)	.154 (3.9)	.188 (4.8)	—	.87 (22)	18 (80)	GS2B, PPTS or STS2	1000	25000
PLT2M-M60		8.0 (203)	.098 (2.5)	.043 (1.1)	.154 (3.9)	.188 (4.8)		2.00 (51)			1000	25000
PLT2S-M60	Std.	7.4 (188)	.190 (4.8)	.055 (1.4)	.220 (5.6)	.320 (8.1)	—	1.88 (48)	50 (222)	GS2B, GS4H, PPTS, STS2 or STH2	1000	10000
PLT4S-M60		14.5 (368)	.190 (4.8)	.052 (1.3)	.220 (5.6)	.337 (8.6)		4.00 (102)			1000	5000

PAN-TY® Weather Resistant Nylon 12 Cable Ties

For high moisture, corrosive (zinc chloride and dilute acids) and low temperature indoor or outdoor applications.



Part Number†	Cross Section	Length A In. (mm)	Width B In. (mm)	Thickness C In. (mm)	Head Height D In. (mm)	Head Width E In. (mm)	Max. Bundle Dia. In. (mm)	Min. Loop Tensile Strength Lbs. (N)	Recommended PANDUIT® Installation Tool Part No.	Packaging* Bulk Pkg. Qty.	Packaging* Bulk Ctn. Qty.
PLT1.5I-M120	Min.	5.6 (142)	.142 (3.6)	.045 (1.2)	.180 (4.6)	.240 (6.1)	1.38 (35)	25 (111)	GS2B, PPTS or STS2	1000	25000
PLT2S-M120	Std.	7.4 (188)	.190 (4.8)	.052 (1.3)	.220 (5.6)	.316 (8.0)	1.88 (48)	40 (178)	GS2B, GS4H, PPTS, STS2 or STH2	1000	10000
PLT4S-M120		14.5 (368)	.190 (4.8)	.052 (1.3)	.220 (5.6)	.337 (8.6)	4.00 (102)	40 (178)		1000	5000
PLT4H-TL120	Hvy.	14.5 (368)	.300 (7.6)	.075 (1.9)	.290 (7.4)	.480 (12.2)	4.00 (102)	90 (399)	GS4H, GS4EH, PPTEH or STH2	250	2500
PLT8LH-C120	Lt. Hvy.	27.6 (701)	.300 (7.6)	.075 (1.9)	.290 (7.4)	.480 (12.2)	8.00 (203)	90 (399)		100	2000

Most commonly used parts appear in **BOLD**.

*Order the Number of Pieces Required in Multiples of Packaging Quantities.
†Part Number shown for Bulk Package Quantity. Most commonly used parts appear in **BOLD**.

Cable Tie Kits in Plastic Boxes

KP-506A/KP-506-0 Cable Ties and Accessories Kit

KP-509 Designer's Kit

Cable Tie Kits in Steel Boxes

K-504 Cable Ties and Accessories Kit

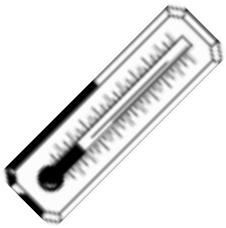
K-205 Cable Ties and Terminal Kit

Part Number	Description	Std. Pkg. Qty.
KP-506A	Contains natural nylon ties for indoor use: (100) PLT1M-C Cable Ties (100) PLT1.5I-C Cable Ties (100) PLT2S-C Cable Ties (50) ABM2S-A Mounts (1) KP-505 Plastic Kit Box	1
KP-506A-0	Contains weather resistant cable ties and mounts for outdoor use: (100) PLT1M-C0 Black Weather Resistant Cable Ties (100) PLT1.5I-C0 Black Weather Resistant Cable Ties (100) PLT2S-C0 Black Weather Resistant Cable Ties (50) ABM2S-AT-0 Black Weather Resistant Mounts (1) KP-505 Plastic Kit Box	1
KP-509	A special collection of cable ties and wiring accessories for prototyping and new product development Contains (over 600 pieces): Including ***PAN-TY***® Cable Ties (in different styles, sizes, colors and materials); 25 different cable tie mounts; 30 different wiring accessories; (1) KP-510 plastic kit box	1
KB-550	Assortment Pack contains natural and weather resistant ***PAN-TY*** nylon cable ties: (15) PLT1M-C Cable Ties (10) PLT1M-C0 Black Weather Resistant Cable Ties (15) PLT1.5I-C Cable Ties (10) PLT1.5I-C0 Black Weather Resistant Cable Ties (15) PLT2S-C Cable Ties (10) PLT2S-C0 Black Weather Resistant Cable Ties (15) PLT3S-C Cable Ties (10) PLT3S-C0 Black Weather Resistant Cable Ties	1
KB-551	Assortment Pack contains natural and weather resistant ***DOME-TOP***® ***BARB-TY***® nylon cable ties: (15) BT1M-C Cable Ties (10) BT1M-C0 Black Weather Resistant Cable Ties (15) BT1.5I-C Cable Ties (10) BT1.5I-C0 Black Weather Resistant Cable Ties (15) BT2S-C Cable Ties (10) BT2S-C0 Black Weather Resistant Cable Ties (15) BT3S-C Cable Ties (10) BT3S-C0 Black Weather Resistant Cable Ties	1
K-504	Contains cable ties, adhesive backed mounts and cable tie installation tool: (100) PLT1M-C Cable Ties (100) PLT1.5I-C Cable Ties (100) PLT2S-C Cable Ties (100) PLC2S-S10-C Clamp Ties (100) TM2S8-C Mounts (100) ABM2S-A-C Mounts (1) STS2 Tool (1) K-503 Steel Kit Box	1
SR2	2-Drawer Slide Rack to hold K-504 Kit or K-1100 Series Terminal Kits See Panduit Terminal Catalog, SA101N21A.	1
SR4	4-Drawer Slide Rack to hold K-504 Kit or K-1100 Series Terminal Kits See Panduit Terminal Catalog, SA101N21A.	1
SR6	6-Drawer Slide Rack to hold K-504 Kit or K-1100 Series Terminal Kits See Panduit Terminal Catalog, SA101N21A.	1
SRB	Base accommodates SR2, SR4 and SR6 Slide Racks	1
K-205	Contains 300 cable ties, 600 terminals and 2 installation tools: (100) PLT1M-C Cable Ties (100) PLT1.5I-C Cable Ties (100) PLT2S-C Cable Ties (1) GS2B Cable Tie Installation Tool (100) PV18-6LF-C Terminals (100) PV14-8LF-C Terminals (100) PV14-10LF-C Terminals (50) PV10-10LF-C Terminals (100) BSV18X-C Splices (100) BSV14X-C Splices (50) BSV10X-C Splices (1) CT-100 Crimping Tool (1) K-200 Steel Kit Box	1

Cable Tie Selection and Specification Guidelines

Selecting the Proper Cable Tie Material for Your Application




By using this information as a guide, the user will be better equipped to select the best suited cable tie and material to perform its intended function over a long period of time.

For long life and dependable service, there are many factors to consider when selecting the proper cable tie for each application. Since it is impossible for Panduit to provide data on all the various combinations of conditions which may arise, it is suggested that this data be used as a guideline and that sample cable ties be tested under actual end-use conditions to determine the correct cable tie for the application.

To select the optimum cable tie for a specific application, the following table can be used as a quick reference. First, determine the most critical design criteria and then read across the table to find which material is most suitable to meet this need (10 = Most Suitable and 1 = Least Suitable). Next, review the other criteria by scanning in a vertical direction on the chart and then make your final selection.

Design Criteria	Natural 6.6 Nylon	Weather Resistant 6.6 Nylon	Heat Stabilized Black 6.6 Nylon	Heat Stabilized Natural 6.6 Nylon	Heat Stabilized Weather Resistant 6.6 Nylon	Flame Retardant Black 6.6 Nylon	Flame Retardant 6.6 Nylon	Weather Resistant Nylon 12	Natural Polypropylene	Weather Resistant Polypropylene	TEFZEL ■	HALAR▲	Stainless Steel
Part Number Suffix Material Designation		-0	-30	-39	-300	-60	-69	-120	-109	-100	-76	-702	
Loop Tensile Strength	7	7	7	7	7	7	7	6	5	5	7	5	10
Low Temperature Service	6	6	6	6	6	5	5	6	6	6	7	7	10
High Temperature Service	5	5	6	6	6	5	5	5	5	5	8	7	10
Flammability	6	6	6	6	6	8	8	3	2	2	9	9	10
Ultraviolet Resistance	1	6	4	1	6	1	1	7	1	6	9	9	10
Radiation Resistance	3	3	3	3	3	3	3	4	5	5	9	9	10
Overall Chemical Resistance **–Hydrocarbons** **–Chlorinated Hydrocarbons** **–Acids** **–Bases** **–Salts**	6 9 7 2 7 3	6 9 7 2 7 3	6 9 7 2 7 3	6 9 7 2 7 3	6 9 7 2 7 3	6 9 7 2 7 3	6 9 7 2 7 3	8 9 8 6 7 8	8 6 5 9 9 10	8 6 5 9 9 10	10 10 10 10 10 10	10 10 10 10 10 10	9 10 10 10 8 9
Relative Price	Low	Low	Low	Low	Med.	Med.	Med.	Med.	Low	Low	High	High	High

Example No. 1:

Application	Selection
If your application requires high radiation (2 x 10^8 rads) resistance, excellent resistance to hydrocarbons and the price is not critical.	Your best choice is TEFZEL or stainless steel. The price is higher than other materials, but both have high ratings in resistance to radiation and hydrocarbons.

Example No. 2:

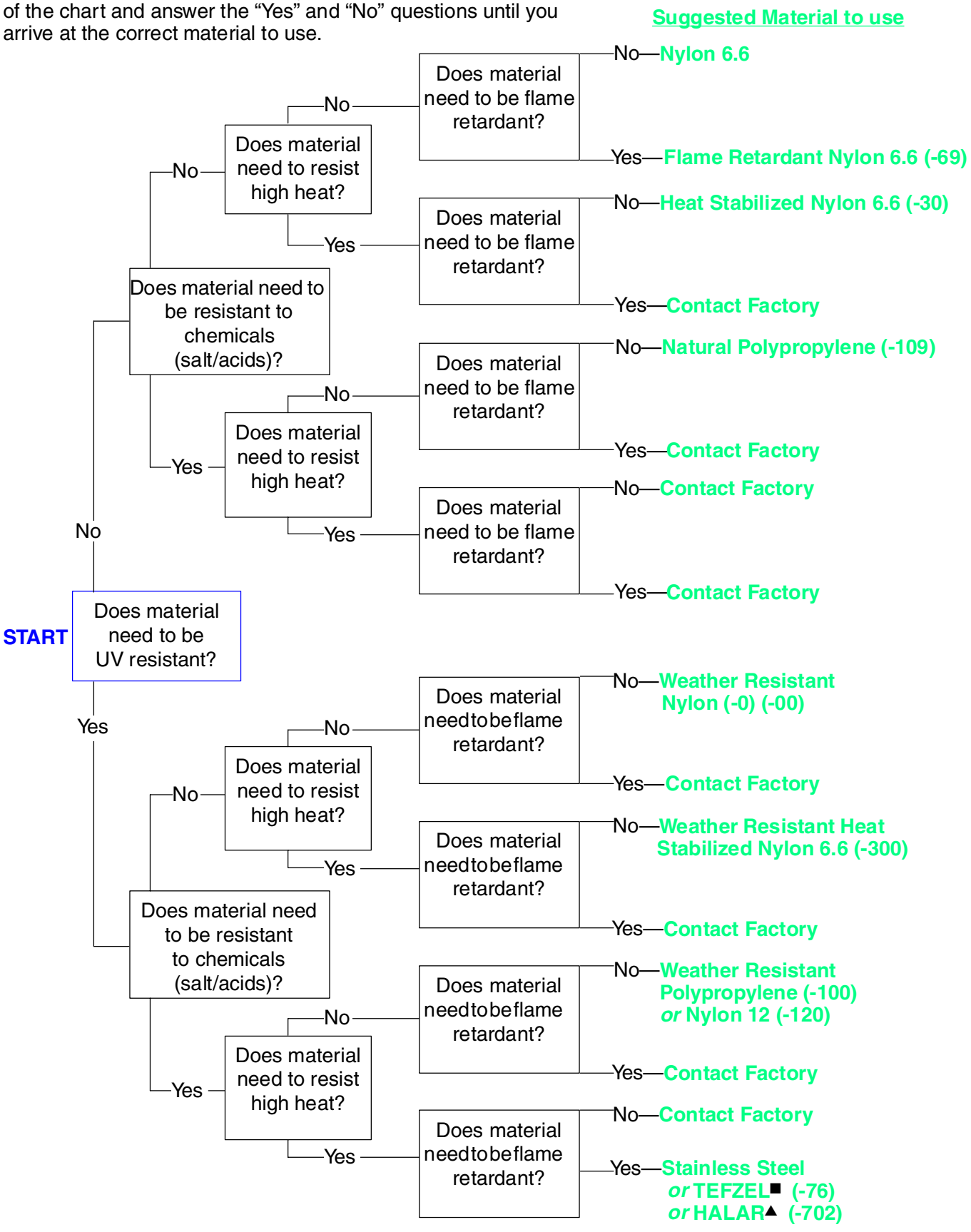
Application	Selection
If your application requires a low cost material, good ultraviolet resistance and good resistance to acid rains.	Your best choice is weather-resistant polpropylene which is less expensive, 6 rating in ultraviolet resistance and 9 rating on resistance to acids.

▲HALAR is the Registered Trademark for Ausimont Inc. fluoropolymer
See Table C for chemical resistance of 304 & 316 stainless steel.

■ TEFZEL is the Registered Trademark of E. I. DuPont Co., fluoropolymer
See Table C for chemical resistance of 304 & 316 stainless steel.

PANDUIT® Material Selection Guide

To select the proper cable tie for your application, start at the left of the chart and answer the "Yes" and "No" questions until you arrive at the correct material to use.



▲HALAR is the Registered Trademark for Ausimont Inc. fluoropolymer

■ TEFZEL is the Registered Trademark of E. I. DuPont Co., fluoropolymer

Weathering

Ultraviolet light (which is a component of sunlight) attacks, over a period of time, most plastic materials and reduces their properties by breaking the molecular chain. The material breakdown is accompanied by reductions in tensile strength and elongation, increased brittleness, color changes and loss of surface gloss.

Carbon black, which is used in ***PANDUIT***® nylon and polypropylene cable ties, is one of the most effective stabilizers known today. A uniform dispersion of carbon black provides good ultraviolet light resistance without adversely affecting physical properties. The addition of carbon black, or any other ultraviolet light stabilizer, prolongs the useful life of plastic products used outdoors, but it does not totally eliminate the destructive effects of the light. Some plastics, such as TEFZEL■ or HALAR▲, are intrinsically very resistant to ultraviolet light and do not require stabilizing additives.

Weathering Test Methods

In order to monitor the effects of ultraviolet light and the effectiveness of ultraviolet stabilizers, Panduit, in conformance with industry standards, adopted two methods of weatherability testing: Outdoor Aging and Accelerated Weather Aging.

Outdoor Aging

The Outdoor Aging method is probably the best and most realistic method of the two. It is conducted in accordance with ASTM D1435-85 Recommended Practice for Outdoor Weathering of Plastics, and allows the material to be affected by not only ultraviolet light, but by all other outdoor elements as well. Although this may more closely approximate an actual application, two drawbacks do exist. The period of time required to produce property decay and material failure may be quite long and varying adverse chemical environments cannot be tested.

Accelerated Weather Aging

Accelerated weathering tests have been used in order to increase the rate of degradation due to a combination of ultraviolet light, temperature and moisture. The methods used are in accordance with the following standards:

- ASTM D1499-84, Operating Light and Water Exposure Apparatus (Carbon-Arc type) for exposure to plastics
- ASTM G53-84, Operating Light and Water Exposure (Fluorescent U.V. Condensation type) for exposure of non-metallic materials

The condition specified in ASTM D1499-84 utilizes a carbon arc to simulate natural sunshine and a water spray. The test chamber is operated 20 hrs/day with a two hour cycle of 108 minutes of simulated sunshine and 12 minutes of sunshine and water spray. The temperature of a black body inside the chamber is approximately 63°C (145°F) during the “Sunshine Only” portion of the cycle. Humidity is not controlled inside the chamber.

The test chamber per ASTM D53-84 uses fluorescent sun lamps to generate ultraviolet light only. A heated water pan produces condensation during a portion of the cycle.The daily cycle is composed of 20 hours of light followed by 4 hours of condensation. Black body temperatures during the light cycle are 50°C (122°F) and 40°C (104°F) during the condensation cycle.

Panduit has also designed a special chamber which is used to simulate the effect of acid rain and ultraviolet light on cable tie materials. The effect of other common chemicals, such as road salt, are also evaluated in this chamber.

These methods are effective in quickly determining the ultraviolet light resistance of the various cable tie materials, but it must be emphasized that there are no exact correlations between accelerated aging and actual outdoor exposure.

▲HALAR is the Registered Trademark for Ausimont Inc. fluoropolymer

■TEFZEL is the Registered Trademark of E. I. DuPont Co., fluoropolymer

Weathering

Material Failure Testing

Property decay can lead to three different modes of failure: loss of strength, loss of toughness or change in appearance. The critical mode for any given application would depend upon the application and the requirements it places upon the material itself.

Loss of strength is monitored by tensile testing samples of the material before and after it has been weathered. This test will reveal the decreasing strength accompanied by extended weathering.

Loss of toughness can be monitored by measuring changes in elongation and impact strength. As ultraviolet light exposure time increases and the material becomes brittle, its elongation and impact strength are greatly reduced. It is important to note that brittle failures can occur even when the tensile strength shows no change.

Although change in appearance is normally not a failure mode for cable ties, the plastic does tend to discolor and lose its surface gloss as exposure increases. These changes can be measured by color difference using Adams units which are similar to National Bureau of Standard units.

Panduit has its own weathering test program to determine estimated life of various cable tie materials.This includes examining many previously aged samples obtained throughout the world.

In all cases, the amount of property decay increased with increasing exposure to ultraviolet light. The principal signs of degradation were found to be brittleness, cracking and loss of surface gloss. It was also determined that the time for failure to occur was shorter than indicated from industry tests performed on material samples. This discrepancy is in part due to the fact that cable ties were tested in an end use, stressed condition, while most plastic resin suppliers conduct weathering tests using unstressed test bars.

Three cable tie materials (TEFZEL■, HALAR▲ and stainless steel) have superior ultraviolet light resistance. In tests conducted to date, both have shown no significant signs of degradation.

Determining the outdoor life expectancy of any material is difficult since there are other factors, besides ultraviolet light stability, which have to be considered. These factors are listed below and should be considered before specifying a cable tie material.

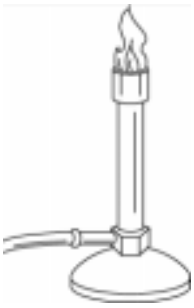
Table A - External Factors Which Affect the Life of a Cable Tie

FACTORS	DECREASED LIFE
Chemicals	Applications which have chemicals present can reduce the life. **This is the most detrimental factor to the life of a tie.**
Bundle Diameter	As the bundle diameter is reduced, the tie has more bending stress. A thick strap on small diameter has more stress.
Loading	If the tie is under high loading, this will add additional stress on the tie body.
Thickness	A thinner tie will have a decreased life since surface cracks will penetrate the thickness of the tie faster.
Vibration	Applications with high vibrations will cause impact which will propagate any surface cracks.
Degree of Exposure	No shield or shade, southern exposure, higher altitudes and high temperatures decrease the life of the cable tie.
Moisture	Dry environments cause nylon 6.6 ties to become more brittle. High humidity plus high temperatures can result in degradation due to hydrolysis in nylon.
Galvanized Metals	Acid rain and acid moisture acting on galvanized metals release chemicals known to attack nylon 6.6.

WEATHERING LIFE EXPECTANCY	
Materials (P/N Suffix)	**Years***
Natural Polypropylene (-109)	1
Natural 6.6 Nylon	1-2
Flame Retardant Black 6.6 Nylon (-60)	1-2
Flame Retardant 6.6 Nylon (-69)	1-2
Heat Stabilized 6.6 Nylon (-30)	4-5
Heat Stabilized Natural 6.6 Nylon (-39)	1-2
Weather Resistant 6.6 Nylon (-0 & -00)	7-9
Heat Stabilized Weather Resistant 6.6 Nylon (-300)	7-9
Weather Resistant Polypropylene (-100)	7-9
Weather Resistant Nylon 12 (-120)	12-15
TEFZEL (-76)	>15
HALAR (-702)	>15
Stainless Steel (MLT prefix)	>30

*Based on assumption of minimum loading, no chemical attack and impact-free conditions.

Flammability



A number of test procedures have been developed which can be used for the evaluation and comparison of various materials to support combustion.

UL94 Vertical Burning Test

Samples of a material, with dimensions 127mm by 12.7mm and the thickness of the intended end use product, are tested in an unaged “as manufactured” state and in an aged state (7 days at 158°F, 70°C). The test requires the placement of a precisely controlled flame under a vertically supported specimen for a 10 second period. The flame is removed and the duration of flaming is recorded. If the flame extinguishes, the specimen is immediately subjected to a second 10 second ignition period. Duration of flaming is again recorded. A piece of surgical cotton is placed under the specimen. If drips ignite the cotton, this fact is also recorded.

Materials Classed 94V-0

Materials classed 94V-0 shall:

- Not have any specimens which burn with flaming combustion for more than 10 seconds after either application of the test flame
- Not have a total flaming combustion time exceeding 50 seconds for the 10 flame applications for each set of five specimens.
- Not have any specimens which burn with flaming or glowing combustion up to the holding clamp.
- Not have any specimens which drip flaming particles that ignite the dry absorbent surgical cotton located 12" (305mm) below the test specimen.
- Not have any specimens with glowing combustion which persists for more than 30 seconds after the second removal of the test flame.

Materials Classed 94V-1

Materials classed 94V-1 shall:

- Not have any specimens which burn with flaming combustion for more than 30 seconds after either application of the test flame.
- Not have a total flaming combustion time exceeding 250 seconds for the 10 flame applications for each set of five specimens.
- Not have any specimens which burn with flaming or glowing combustion up to the holding clamp.
- Not have any specimens which drip flaming particles that ignite the dry absorbent surgical cotton located 12" (305mm) below the test specimen.
- Not have any specimens with glowing combustion which persists for more than 60 seconds after the second removal of the test flame.

Materials Classed 94V-2

- Not have any specimens which burn with flaming combustion for more than 30 seconds after either application of the test flame
- Not have a total flaming combustion time exceeding 250 seconds for the 10 flame applications for each set of five specimens.
- Not have any specimens which burn with flaming or glowing combustion up to the holding clamp.
- Be permitted to have specimens that drip flaming particles which burn only briefly, some of which ignite the dry absorbent surgical cotton placed 12" (305mm) below the test specimen.
- Not have any specimens with glowing combustion which persists for more than 60 seconds after the second removal of the test flame.

Flammability

ASTM D 635

Samples of a material, with dimensions 125mm by 12.5mm and the thickness of the intended end use product, are tested in an unaged “as manufactured” state. A precisely controlled flame is applied to the specimen and a stopwatch is started. The flame is applied for 30 seconds. The stopwatch is stopped when burning or glowing combustion ceases or when the flame has proceeded to a mark 100mm from the free end. Ten specimens are tested.

- Burning Rate
- If two or more specimens have burned to the 100mm mark then Average Burning Rate (cm/min) shall be reported as the average of the burning rates of all specimens which have burned to the 100mm mark.
- Average Time of Burning and Average Extent of Burning
- Average time of burning and average extent of burning of the sample shall be reported if none of ten samples or no more than one of twenty specimens have burned to the 100mm mark.
- Average Time of Burning (ATB):

$$ATB,s = \frac{\sum_{0}^{10}(t - 30s)}{\text{Number of Specimens}}$$

Rounded to the nearest 5 sec.

- Average Extent of Burning (AEB):

$$AEB,mm = \frac{\sum_{0}^{10}(100 - \text{unburned length})}{\text{Number of Specimens}}$$

Rounded to the nearest 5mm

Flammability Ratings

Materials	UL94	ASTM D635
Natural 6.6 Nylon	94V-2 (1/16")	AEB = 20mm ATB = 5 seconds
Weather Resistant 6.6 Nylon (-00)	94V-2 (1/16")	AEB = 20mm ATB = 5 seconds
Weather Resistant 6.6 Nylon (-0)**	94V-2 (1/16")	AEB = 20mm** ATB = 5 seconds**
Heat Stabilized 6.6 Nylon (-30)	94V-2 (1/16")	AEB = 20mm ATB = 5 seconds
Heat Stabilized Natural 6.6 Nylon (-39)	94V-2 (1/16")	AEB = 20mm ATB = 5 seconds
Heat Stabilized Weather Resistant 6.6 Nylon (-300)	94V-2 (1/16")	AEB = 20mm ATB = 5 seconds
Flame Retardant Black 6.6 Nylon (-60)	94V-0 (1/64")	AEB =15mm ATB < 5 seconds
Flame Retardant 6.6 Nylon (-69)	94V-0 (1/64")	AEB = 15mm ATB < 5 seconds
Weather Resistant Nylon 12 (-120)	Not Recognized	Ave. Burning Rate 1.6cm/min.
Natural Polypropylene (-109)	Not Recognized	Ave. Burning Rate 2 cm/min.
Weather Resistant Polypropylene (-100)	Not Recognized	Ave. Burning Rate 2 cm/min.
TEFZEL■ (-76)	94V-0(1/16")	AEB < 15mm ATB < 5 seconds
HALAR▲ (-702)	94V-0(1/16")	AEB = 15 min. ATB < 5 seconds*
Stainless (MLT prefix)	Not Applicable	Not Applicable

*Rating based on 1/8" thick test samples.
**Consult factory for specific tie sizes.

Radiation/Moisture/Temperature/Tensile Strength

Radiation

Installed cable ties of various materials have been exposed to different amounts of radiation to determine the maximum acceptable limit. These tests were conducted by Panduit mainly to determine the acceptability for use in various areas of nuclear power plants (accumulated over 40 year life). See Table B for radiation resistance rating.

Moisture

Many plastics when exposed to high relative humidity absorb water and, as such, the tensile strength of the material can change dramatically. Nylon 6.6 when exposed to 100% relative humidity, will absorb as much as 8.5% water which will reduce tensile strength by 50% when compared to a dry cable tie. Polypropylene, HALAR▲ , Type 12 Nylon, and TEFZEL■ are low water absorbing materials and, as such, the effect of water is minimal. See Table B for moisture absorption.

Temperature

Plastic materials normally undergo property loss during exposure to high temperature due to oxidation. The maximum temperature for successful service depends upon the material used as well as environmental conditions. Initially, plastics become more flexible and weaker when exposed to high temperatures. After a period of time, oxidation may occur which will cause embrittlement, making plastic cable ties more susceptible to failure from impact and vibration. Low temperature exposure will also make most plastics more brittle during this exposure, but little property loss occurs when the material is returned to room temperatures. The minimum continuous use temperature after installation is stated in Table B.

Tensile Strength

Most cable ties are selected based on material, length and minimum loop tensile strength. Minimum loop tensile strength was established under Military Specification MIL-S-23190. Each cross section cable tie (Miniature-M, Intermediate-I, Standard-S, Heavy-H and Extra Heavy-EH) has a different loop tensile strength when testing per MIL-S-23190.

The cable tie is first conditioned at 49°C (120°F), 20% relative humidity for 24 hours, then the cable tie is installed on a split mandrel and the halves of the mandrel separated at a rate of 1" (25.4mm) per minute (Fig.1). The separating force required to unlock or break the cable tie is the loop tensile strength. Loop tensile strength is dependent both on the locking design and the tensile strength (psi) of the material. As an example, the tensile strength of polypropylene material is approximately 1/2 to 1/3 of nylon 6.6; thus the loop tensile strength of a given cross section tie made of polypropylene would be much less than a tie made of nylon 6.6. This is another property to be considered when selecting a cable tie. The various representative loop tensile strengths are listed in Table B.

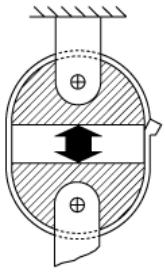


Fig. 1

▲HALAR is the Registered Trademark for Ausimont Inc. fluoropolymer

■TEFZEL is the Registered Trademark of E. I. DuPont Co., fluoropolymer

Physical Characteristics of Cable Tie Materials

Table B — Physical Characteristics of Various Cable Tie Materials

Design Criteria		Natural 6.6 Nylon	Weather Resistant 6.6 Nylon	Heat Stabilized Black 6.6 Nylon	Heat Stabilized Natural 6.6 Nylon	Heat Stabilized Weather Resistant 6.6 Nylon	Flame Retardant Black 6.6 Nylon	Flame Retardant 6.6 Nylon	Weather Resistant Nylon 12	Natural Polypropylene	Weather Resistant Polypropylene	TEFZEL ■	HALAR® ▲	Stainless Steel
Tensile Strength 73°F (psi)		12,000[1]	12,000[1]	12,000[1]	12,000[1]	12,000[1]	12,000[1]	12,000[1]	8,100[1]	4,100[1]	4,100[1]	7,500[1]	7,000[1]	90,000[2]
Color		Natural	Black	Black	Natural	Black	Black	Ivory	Black	Green	Black	Aqua	Maroon	Stain-less
UL Flammability		See Page 62												
Oxygen Index		28	28	26	26	26	34	34	NA	NA	NA	30	60	NA
Radiation Resistance		1 x 10^5 Rads	1 x 10^5 Rads	1 x 10^5 Rads	1 x 10^5 Rads	1 x 10^5 Rads	1 x 10^5 Rads	1 x 10^5 Rads	3.5 x 10^6 Rads	1 x 10^6 Rads	1 x 10^6 Rads	2 x 10^8 Rads	2 x 10^8 Rads	2 x 10^8 Rads
Water Absorption (24 hours)		1.2%	1.2%	1.2%	1.2%	1.2%	1.1%	1.1%	0.3%	0.1%	0.1%	<0.03%	<0.05%	None
Ultraviolet Light Resis-tance		Poor	Good	Fair	Poor	Good	Poor	Poor	Good	Poor	Good	Excellent	Excellent	Excellent
Max. Continuous Use Temperature		185°F 85°C	185°F 85°C	221°F 105°C	221°F 105°C	205°F[3] 96 °C	221°F 105 °C	221°F 105 °C	176 °F 80 °C	185 °F 85 °C	185 °F 85°C	302°F[6] 150 °C	284 °F[7] 140 °C	1000 °F[5] 537 °C
Min. Continuous Use Temperature [4]		-40 °F -40°C	-40 °F -40°C	-40 °F -40°C	-40 °F -40°C	-40 °F -40°C	-40 °F -40°C	-40 °F -40°C	-40°F -40°C	-40°F -40°C	-40°F -40°C	-50°F -46°C	-50°F -46°C	-112°F -80°C
Minimum Loop Tensile Strength @120 °F; 20% RH	Submin.>	12 lb.	12 lb.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Min.>	18 lb.	18 lb.	18 lb.	18 lb.	18 lb.	18 lb.	18 lb.	N/A	12 lb.	12 lb.	18 lb.	18 lb.	N/A
	Int.>	30/40 lb.	30/40 lb.	30/40 lb.	30/40 lb.	30 lb.	30 lb.	40 lb.	25 lb.	N/A	N/A	25 lb.	N/A	N/A
	Std.>	50 lb.	50 lb.	50 lb.	50 lb.	50 lb.	50 lb.	50 lb.	40 lb.	30 lb.	30 lb.	50 lb.	65 lb.	100 lb.
	Hvy.>	120/175 lb.	120/175 lb.	120/175 lb.	120/175 lb.	120 lb.	120 lb.	120 lb.	90 lb.	50 lb.	50 lb.	120 lb.	N/A	250 lb.
	EH>	250 lb.	250 lb.	250 lb.	250 lb.	N/A	N/A	N/A	N/A	90 lb.	90 lb.	N/A	N/A	N/A
	DH													600 lb.
Tool Installed		GS2B GS2BL GS4H GS4EH STS2 STH2 ST2EH STHV PPTS PPTEH	GS2B GS2BL GS4H GS4EH STS2 STH2 ST2EH STHV PPTS PPTEH	GS2B GS2BL GS4H STS2 STH2 ST2EH STHV PPTS	GS2B GS2BL GS4H STS2 STH2 ST2EH STHV PPTS	GS2B GS2BL GS4H STS2 STH2 ST2EH STHV PPTS	GS2B GS2BL GS4H STS2 STH2 ST2EH STHV PPTS	GS2B GS2BL GS4H STS2 STH2 ST2EH STHV PPTS	GS2B GS2BL GS4H STS2 STH2 ST2EH STHV PPTS	GS2B GS3BL GS4H GS4EH STS2 STH2 ST2EH STHV PPTEH PPTS	GS2B GS2BL GS4H GS4EH STS2 STH2 ST2EH STHV PPTEH PPTS	GS2B GS2BL GS4H STS2 STH2 ST2EH STHV PPTS	GS2B GS2BL GS4H STS2 STH2 ST2EH STHV PPTS	GS4MT ST2MT PPTMT HTMT
Part Number Suffix/ Material Designation		None	-0 and -00	-30	-39	-300	-60	-69	-120	-109	-100	-76	-702	

1. ASTM D638-878
2. ASTME8
3. Estimated
4. After installation
5. (-321) goes to 1700 ° (923°C)
6. U.L. component recognized at 170 °C
7. U.L. component recognized at 125 °C

Based on assumption of minimum loading, chemical attack, and impact-free conditions.

▲HALAR is the Registered Trademark for Ausimont Inc. fluoropolymer ■TEFZEL is the Registered Trademark of E. I. DuPont Co., fluoropolymer

Chemical Resistance

Chemical Resistance

Many factors combine to determine the useful life of a cable tie material and none is as important as chemical exposure. Various chemicals will have different effects on plastics depending on such things as chemical concentrations, temperature, stress and ultraviolet light. Table C is an excellent guideline for the selection of the best cable tie material. It should be noted that the exposure temperature for this chemical resistance chart is 70° F.

Table C — Resistance of PANDUIT® Cable Tie Materials to Chemical Attack at 70°F

— = Not Tested
E = Excellent
S = Satisfactory
B = Slight Attack
U = Attacked

[1] = Pitting occurs under some conditions
[2] = Attack may occur if sulfuric acid present
Aq. = Aqueous
C.S. = Cold Saturated

Agent	Percent Concentration	* Nylon 6.6	Nylon 12	Polypropylene	TEFZEL■	HALAR▲	304 Stainless Steel	316 Stainless Steel
Acetaldehyde	90	S	—	B	E	E	—	—
Acetic Acid	97	U	U	E	E	E	E	E
Acentic Acid	10	B	S	E	E	E	E	E
Acetic Anyhdride	90	—	S	E	E	E	E	E
Acetone	100	E	E	E	E	E	E	E
Acetophenone	100	—	—	S	E	E	E	E
Acetylene	100	—	—	E	E	E	E	E
Aluminum Chloride	10	S	E	E	E	E	U	B
Aluminum Fluoride	10	S	E	E	E	E	U	B
Aluminum Hydroxide	Aq. C.S.	—	E	E	E	E	E	E
Aluminum Potassium Sulfate	10	S	E	E	E	E	E[1]	E
Ammonia	All	—	E	E	E	E	E	E
Ammonium Carbonate	1 to 5	—	E	—	E	E	E	E
Ammonium Chloride	10 to 25	U	E	E	E	E	E[1]	E
Ammonium Hydroxide	10	E	—	—	E	E	—	—
Ammonium Nitrate	100	—	E	E	E	E	E	E
Ammonium Sulfate	10	—	E	E	E	E	E[1]	E[1]
Amyl Acetate	100	—	—	B	E	E	E	E
Aniline	100	—	S	E	E	E	E	E
Antimony Trichloride	All	U	—	E	E	E	E	E
Arsenic Acid	1 to 80	—	—	E	E	E	E	E
Barium Carbonate	All	—	E	E	E	E	E	E
Barium Chloride	All	—	E	E	E	E	E[1]	E
Barium Sulfate	All	—	E	E	E	E	E	E
Barium Sulfide	All	—	E	E	E	E	E	E
Benzene	100	E	E	B	E	E	E	E
Benzoic Acid	100	U	E	E	E	E	E	E
Benzoyl Chloride	100	—	—	B	E	E	—	—
Benzyl Alcohol	100	—	—	E	E	E	—	—
Boric Acid	All	U	E	E	E	E	S	—
Bromine	100	U	U	U	E	E	U	U
Butadiene	100	—	—	B	E	E	E	E
Butane	100	—	E	E	E	E	E	E
Butanediol	100	—	—	E	E	E	—	—
Butyl Acetate	100	—	E	B	E	E	—	—
N. Butyl Alcohol	100	—	E	E	E	E	E	E
Butyl Phthalate	100	—	—	E	E	E	—	—
Butyraldehyde	100	—	—	E	E	E	—	—
Butyric Acid	10 to 100	U	—	E	E	E	E	E
Calcium Carbonate	Aq. C.S.	—	—	E	E	E	E	E
Calcium Chlorate	Aq. C.S.	—	—	E	E	E	E	E
Calcium Chloride	5	B	E	E	E	E	E[1]	E[1]

*INCLUDES ALL 6.6 NYLONS (SUCH AS WEATHER RESISTANT, HEAT STABILIZED AND FLAME RETARDANT)

▲HALAR is the Registered Trademark for Ausimont Inc. fluoropolymer

■TEFZEL is the Registered Trademark of E. I. DuPont Co., fluoropolymer

Chemical Resistance

Table C — Resistance of PANDUIT® Cable Tie Materials to Chemical Attack at 70°F (Continued)

Agent	Percent Concentration	* Nylon 6.6	Nylon 12	Polypropylene	TEFZEL■	HALAR▲	304 Stainless Steel	316 Stainless Steel
Calcium Hydroxide	50	—	—	E	E	E	E	E
Calcium Hypochlorite	2	U	—	E	E	E	E[1]	E[1]
Calcium Nitrate	50	—	E	E	E	E	—	—
Calcium Sulfate	2	B	—	E	E	E	E	E
Carbon Tetrachloride	100	E	E	U	E	E	E	E
Carbon Tetrachloride	Aq. 10	—	—	—	—	E	B[1]	E[1]
Chlorine	Dry	—	U	U	E	E	B	B
Chlorine	Wet	—	U	B	E	E	U	U
Chloroacetic Acid	10 to 50	U	—	E	E	E	U	B
Chlorobenzene	100	—	B	E	E	E	—	—
Chloroform	100	E	B	B	E	E	E	E
Chlorosulphonic Acid	10 to 100	U	U	U	S	E	U	U
Chromic Acid	10 to 50	U	U	E	E	E	B	B
Citric Acid	10 to 50	S	S	E	—	E	E	E
Copper Chloride	1 to 10	U	—	E	E	E	E[1] to U	E[1] to B[1]
Copper Cyanide	Aq. C.S.	—	—	E	E	E	E	E
Copper Nitrate	50	—	—	E	E	E	E	E
Cresol	100	U	U	—	E	E	E	E
Crotonaldehyde	100	—	—	E	E	E	—	—
Cyclohexane	100	—	E	B	E	E	E	—
Cyclohexanol	100	—	E	E	E	E	E	—
Cyclohexanone	100	—	E	B	E	E	E	—
Dibutyl Phthalate	100	—	—	E	E	E	—	—
Dichloroethane	100	—	—	E	—	E	E	E
Dichloroethylene	100	—	—	B	E	E	—	—
Diesel Fuel	100	—	E	B	E	E	E	E
Diethyl Ether	100	—	E	E	E	E	E	E
Diglycolic Acid	Aq.C.S.	—	—	E	E	E	—	—
Disobutyl Ketone	100	—	—	E	E	E	—	—
Dimethyl Amine	100	—	—	E	E	E	—	—
Dimethyl Formamide	100	—	E	E	E	E	E	—
Dimethyl Sulfate	100	—	—	B	E	E	—	—
Dioctyl Phthalate	100	—	—	E	E	E	E	—
1, 4-Dioxane	100	—	S	B	E	E	E	—
Ethyl Acetate	100	E	E	S	E	E	E	E
Ethyl Alcohol	100	E	E	E	E	E	E	E
Ethyl Chroride	100	—	—	B	E	E	E	E
Ethylene Chloride	100	E	B	B	E	E	E	E
Ethylene Glycol	100	E	E	E	E	E	E	E
Ethylene Oxide	100	—	—	B	E	E	—	—
Fatty Acids	100	—	—	E	E	E	—	—
Ferric Chloride	50	U	—	E	E	E	U	U
Ferric Hydroxide	All	—	—	E	E	E	E	E
Ferric Nitrate	All	—	—	E	E	E	E	E
Ferrous Chloride	Aq. C.S.	U	—	E	E	E	U	B
Ferrous Sulfate	10	—	—	E	E	E	E[1]	E
Fluorine (Dry)	100	—	—	U	E	—	U	U
Formaldehyde	40	E	S	E	E	E	E[1]	E
Formic Acid	All	U	U	E	E	E	E	E
Freons	100	E	—	—	E	E	—	—
Fuel Oil	100	—	E	—	E	E	E	E
Furfural	100	E	—	—	E	E	E	E
Gallic Acid	Aq. C.S.	—	—	—	E	E	E	E
Gasoline	100	E	—	B	E	E	E	E
Glycerin	100	—	E	E	—	E	E	E

*INCLUDES ALL 6.6 NYLONS (SUCH AS WEATHER RESISTANT, HEAT STABILIZED AND FLAME RETARDANT)

▲HALAR is the Registered Trademark for Ausimont Inc. fluoropolymer ■TEFZEL is the Registered Trademark of E. I. DuPont Co., fluoropolymer

Chemical Resistance

Table C — Resistance of PANDUIT® Cable Tie Materials to Chemical Attack at 70°F (Continued)

Agent	Percent Concentration	* Nylon 6.6	Nylon 12	Polypropylene	TEFZEL■	HALAR▲	304 Stainless Steel	316 Stainless Steel
Glycolic Acid	40	U	—	E	E	E	—	—
Heptane	100	—	E	E	E	E	E	E
Hexane	100	—	E	E	E	E	E	E
Hydrobromic Acid	All	U	U	E	E	E	U	U
Hydrochloric Acid	All	U	U	E	E	E	U	U
Hydrocyanic Acid	All	—	U	E	E	E	B	B
Hydrofluoric Acid	All	U	U	E	E	E	U	U
Hydrofluorosiliac Acid	30	—	U	E	E	E	U	U
Hydrogen Peroxide	30	U	S	S	E	E	S	E
Hydrogen Sulfide	Dry	—	—	E	E	E	E	E
Hydrogen Sulfide	Wet	U	—	E	E	E	B[2]	E[2]
Hydroquinone	100	—	—	E	E	E	—	—
Iodine	100	—	—	E	E	E	U	U
Iodoform	100	—	—	—	E	E	E	E
Isopropyl Alcohol	100	E	E	E	E	E	E	E
Jet Fuel	100	E	—	E	E	E	E	E
Lactic Acid	10	E	S	E	E	E	E	E
Lanolin	10	E	E	E	E	E	E	E
Lead Acetate	Aq. C.S.	—	—	E	E	E	E	E
Linseed Oil	100	E	E	E	E	E	E	E
Magnesium Carbonate	Aq. C.S.	—	E	E	E	E	E	E
Magnesium Chloride	Aq. C.S.	B	E	E	E	E	E[1]	E[1]
Magnesium Nitrate	Aq. C.S.	—	E	E	E	E	E	E
Maleic Acid	100	—	—	E	E	E	—	—
Malic Acid	Aq. C.S.	—	—	E	E	E	E	E
Mercuric Chloride	Dilute	—	E	E	E	E	U	U
Mercury	100	—	E	E	E	E	E	E
Methyl Alcohol	100	E	E	E	E	E	E	E
Methyl Bromide	100	—	—	U	E	E	—	—
Methyl Chloride	100	—	—	B	E	E	—	E
Methyl Chloroform	100	E	—	B	E	E	—	—
Methyl Ethyl Ketone	100	—	E	B	E	E	E	E
Methyl Isobutyl Ketone	100	E	—	B	E	E	E	E
Methylene Chloride	100	B	U	B	E	E	E	E
Naptha	100	—	—	E	E	E	E	E
Naphthalene	100	—	S	E	E	E	E	E
Nickel Chloride	Aq. C.S.	—	E	E	E	E	E[1]	E[1]
Nickel Sulfate	Aq. C.S.	—	E	E	E	E	E[1]	E[1]
Nitric Acid	10 to 30	U	U	E	E	E	E	E
Nitric Acid	30 to 68	U	U	U	S	E	E	E
Nitro Benzene	100	—	B	B	E	E	E	E
Nitro Methane	100	E	—	—	E	E	—	—
Nitrous Acid	5	—	—	—	E	E	E	E
Oleic Acid	100	—	B	E	E	E	E	E
Oxalic Acid	10	—	B	E	E	E	E	E
Oxygen	All	—	—	E	E	E	—	—
Paraffin	100	E	E	E	E	E	E	E
Perchlorethylene	100	—	—	B	E	E	E	E
Petroleum Ether	100	—	E	E	E	E	E	E
Phenol	90	U	U	E	E	E	E	E
Phosphoric Acid	10	U	U	E	E	E	E	E
Phosphorus Pentoxide	100	—	U	E	E	E	—	—
Phosphorus Trichloride	100	—	U	B	E	E	E	E
Phthalic Acid	50	—	—	B	E	E	E	E
Pictic Acid	1	—	—	E	E	E	E	E

***INCLUDES ALL 6.6 NYLONS (SUCH AS WEATHER RESISTANT, HEAT STABILIZED AND FLAME RETARDANT)**

▲HALAR is the Registered Trademark for Ausimont Inc. fluoropolymer ■TEFZEL is the Registered Trademark of E. I. DuPont Co., fluoropolymer

Chemical Resistance

Table C — Resistance of PANDUIT® Cable Tie Materials to Chemical Attack at 70°F (Continued)

Agent	Percent Concentration	* Nylon 6.6	Nylon 12	Polypropylene	TEFZEL■	HALAR▲	304 Stainless Steel	316 Stainless Steel
Potassium Borate	1	—	—	E	E	E	—	—
Potassium Bromide	Aq. C.S.	—	—	E	E	E	E[1]	E[1]
Potassium Carbonate	Aq. C.S.	—	B	E	E	E	E	E
Potassium Chlorate	Aq. C.S.	—	S	E	E	E	E	E
Potassium Chloride	5	—	E	E	E	E	E[1]	E[1]
Potassium Dichromate	Aq. C.S.	—	U	E	E	E	E	E
Potassium Ferrocyanide	25	—	—	E	E	E	E	E
Potassium Hydroxide	30	B	—	E	E	E	B	B
Potassium Iodide	Aq. C.S.	—	E	E	—	E	E	E
Potassium Nitrate	Aq. C.S.	—	E	E	E	E	E	E
Potassium Perchlorate	1	—	—	E	E	E	—	—
Potassium Permanganate	5	U	U	E	E	E	E	E
Potassium Persulfate	All	—	—	E	E	E	—	—
Potassium Sulfate	Aq. C.S.	—	E	E	E	E	E	E
Potassium Sulfide	Aq. C.S.	—	—	E	E	E	E	E
Propionic Acid	50	—	—	E	E	E	—	—
Propyl Alcohol	100	E	—	E	E	E	E	E
Pyridine	100	—	E	B	E	E	B	B
Sea Water	100	—	E	E	E	E	E[1]	E
Silver Chloride	Aq. C.S.	—	E	E	E	E	U	U
Silver Nitrate	10	—	E	E	E	E	E	E
Sodium Acetate	Aq. C.S.	E	—	E	E	E	E[1]	E
Sodium Benzoate	Aq. C.S.	—	—	E	E	E	—	—
Sodium Bicarbonate	Aq. C. S.	E	E	E	E	E	E	E
Sodium Bisulfate	10	—	—	E	E	E	E	E
Sodium Bisulfite	Aq. C.S.	—	S	E	E	E	E	E
Sodium Borate	Aq. C.S.	—	—	E	E	E	E	E
Sodium Carbonate	2	E	E	E	E	E	E	E
Sodium Chlorate	25	—	B	E	E	E	E	E
Sodium Chloride	10	E	E	E	E	E	E[1]	E[1]
Sodium Chromate	Aq. C.S.	U	—	E	E	E	E	E
Sodium Fluoride	5	—	—	E	E	E	E[1]	E[1]
Sodium Hydroxide	10	E	E	E	E	E	E	E
Sodium Hypochlorite	5	S	B	E	E	E	B[1]	E[1]
Sodium Hyposulfite	Aq. C.S.	—	—	—	E	E	E	E
Sodium Nitrate	5	E	E	E	E	E	E	E
Sodium Nitrite	Aq. C.S.	—	B	E	E	E	E	E
Sodium Perborate	Aq. C.S.	—	S	E	E	E	—	B
Sodium Perchlorate	10	—	—	—	E	E	E	E
Sodium Phosphate	5	—	E	E	E	E	E	E
Sodium Sulfate	5	—	E	E	E	E	E	E
Sodium Sulfide	5	—	E	E	E	E	E[1]	E
Sodium Thiosulfate	25	—	E	E	E	E	E[2]	E[2]
Stannic Chloride	Aq. C.S.	U	—	E	E	E	U	B
Stannous Chloride	Aq. C.S.	—	E	E	E	E	B	S
Stearic Acid	100	—	B	E	E	E	E	E
Succinic Acid	100	—	S	E	E	E	—	—
Sulfur	100	—	E	E	E	E	S	B
Sulfer Dioxide	All	U	—	B	E	E	E	E
Sulfuric Acid	5	U	B	E	E	E	B	E
Sulfuric Acid	50	U	U	E	E	E	U	B
Sulfuric Acid	Concentrate	U	U	B	E	E	B	B

*INCLUDES ALL 6.6 NYLONS (SUCH AS WEATHER RESISTANT, HEAT STABILIZED AND FLAME RETARDANT)

▲HALAR is the Registered Trademark for Ausimont Inc. fluoropolymer ■TEFZEL is the Registered Trademark of E. I. DuPont Co., fluoropolymer

Chemical Resistance

Table C — Resistance of PANDUIT® Cable Tie Materials to Chemical Attack at 70°F (Continued)

Agent	Percent Concentration	* Nylon 6.6	Nylon 12	Polypropylene	TEFZEL■	HALAR▲	304 Stainless Steel	316 Stainless Steel
Sulfurous Acid	10	E	—	E	E	E	B[1]	E[1]
Tannic Acid	10	—	E	E	E	E	E	E
Tartaric Acid	50	—	S	E	E	E	E	E
Tetrahydrofuran	100	—	B	B	E	E	E	E
Toluene	100	E	E	B	E	E	E	E
Trichloroacetic Acid	10	U	—	S	E	E	U	U
Trichloroethylene	100	—	U	B	E	E	E[1]	E[1]
Turpentine	100	—	S	U	E	E	E	E
Urea	50	—	E	E	E	E	—	—
Vinyl Acetate	100	—	—	E	E	E	—	—
Xylene	100	E	—	U	E	E	E	E
Zinc Chloride	70	U	E	E	E	E	E	E
Zinc Nitrate	Aq. C.S.	—	E	E	E	E	E	E
Zinc Sulfate	Aq. C.S.	—	E	E	E	E	E	E

*INCLUDES ALL 6.6 NYLONS (SUCH AS WEATHER RESISTANT, HEAT STABILIZED AND FLAME RETARDANT)

▲HALAR is the Registered Trademark for Ausimont Inc. fluoropolymer ■TEFZEL is the Registered Trademark of E. I. DuPont Co., fluoropolymer


PANDUIT
PAN-STEEL™ System
For All Harsh Environments
• High Strength
• Long Life
• Weather Resistance
• Chemical Resistance
• Temperature Extremes
• Radiation Resistance
• Permanent Identification
Sold exclusively through your local Panduit Distributor

PANDUIT® Stainless Steel Cable Ties and Accessories

PAN-STEEL™ Stainless Steel Tie System

RELIABLE PERFORMANCE IN SEVERE ENVIRONMENTAL CONDITIONS

- Perfect for indoor, outdoor and underground applications—excellent resistance to abrasion, radiation, weathering, corrosion and temperature extremes
- Ties are self-locking for fast cabling and can be installed by hand or with unique ***PANDUIT*** tools
- Safe to handle, safe for wires—no sharp edges (fully rounded sides)

TIES

Standard Sizes

- Fully radiused sides
- Fast and easy to install (self-locking)
- 304 Stainless Steel
- Standard cross-section ties are MIL-S-23190 approved
- For more corrosive applications 316 stainless is available
- Det Norske Veritas approved on 316 material
- For extreme high temperature applications, 321 material is available

PANDUIT Part No.	Max. Bundle Dia. Inches (mm)	Length Inches (mm)	Width Inches (mm)	Min. Loop Tensile Strength Lbs. (N)	Pkg. Qty.	Ctn. Qty.
MLT1S-CP	1.00 (25)	5.0 (127)	.18 (5)	100 (445)	100	500
MLT2S-CP	2.00 (50)	7.9 (201)			100	500
MLT2.7S-CP	2.70 (69)	10.2 (259)			100	500
MLT4S-CP	4.00 (102)	14.2 (360)			100	500
MLT6S-CP	6.00 (152)	20.4 (520)			100	500
MLT8S-CP	8.00 (203	26.8 (679)			100	500
MLT10S-CP	10.00 (254)	33.0 (838)			100	500
MLT12S-Q	12.00 (305)	42.0 (1067)			25	125
MLT14S-Q	14.00 (356)	47.0 (1194)			25	125
MLT2H-LP	2.00 (50)	7.9 (201)	.31 (8)	250 (1112)	50	250
MLT2.7H-LP	2.70 (69)	10.2 (259)			50	250
MLT4H-LP	4.00 (102	14.2 (360)			50	250
MLT6H-LP	6.00 (152)	20.4 (520)			50	250
MLT8H-LP	8.00 (203	26.8 (679)			50	250
MLT10H-LP	10.00 (254)	33.0 (838)			50	250
MLT12H-Q	12.00 (305)	42.0 (1067)			25	125
MLT14H-Q	14.00 (356)	47.0 (1194)			25	125

Custom Length Banding System

- For applications that require bundling various bundle diameters
- Provides versatility on job sites for any diameter with minimum inventory
- 304 Stainless Steel (316 available). Contact factory

CUSTOM LENGTH BANDING SYSTEM						
MBS-TLR	Any	n/a	5	n/a	1*	n/a
MBS-MR					1*	n/a
MBH-TLR	Any	n/a	8	n/a	1*	n/a
MBH-MR					1*	n/a
BANDING HEADS						
MTHS-C	n/a	n/a	n/a	n/a	100	1000
MTHH-C	n/a	n/a	n/a	n/a	100	1000

*Order number of reels required. Std. Pkg. -TLR = 76M reel and Bulk Pkg. - MR = 305M reel.
Premier products are shown in **BOLD** print.

Double Wrap Metal Locking Ties

Cable ties body wraps around two times entering the locking head twice.

- Double wrapped stainless steel ties in 304 material for extra high strength in critical applications
- Double wrapped stainless steel ties allow for tighter tensioning on non-resilient bundles
- Available in .31" (7.9mm) width for bundle diameters ranging from 1.00"-10.00" (25mm-250mm)
- Loop tensile strength of 600 lbs. (2669N)
- Self-locking ties, no tools required
- Optional tooling is available to speed installation and lower installed costs (see page 74)

MLT2DH-L	2.00 (50)	18.5 (470)	.31 (8)	600 (2669)	50	250
MLT3DH-L	3.00 (75)	22.0 (559)			50	250
MLT4DH-L	4.00 (102)	28.0 (711)			50	250
MLT5DH-L	5.00 (125)	34.0 (863)			50	250
MLT6DH-Q	6.00 (152)	40.0 (1016)			25	250
MLT7DH-Q	7.00 (175)	46.5 (1181)			25	250
MLT8DH-Q	8.00 (203)	53.0 (1345)			25	250
MLT9DH-Q	9.00 (225)	59.0 (1500)			25	250
MLT10DH-Q	10.00 (254)	65.0 (1652)			25	250

Order number of ties required in multiples of Pkg. Qty.

Nylon 11 Coated Ties

- 316 base material provides added corrosion protection
- Coating provides additional protection to the bundle
- Provides improved isolation between dissimilar metals

COATED 316 STAINLESS STEEL						
MLTC2H-LP316	2.00 (50)	7.9 (201)	.31 (8)	120 (534)	50	250
MLTC4H-LP316	4.00 (102)	14.3 (362)			50	250
MLTC6H-LP316	6.00 (152)	20.5 (521)			50	250
MLTC8H-LP316	8.00 (203)	26.8 (679)			50	250
MLTC10H-LP316	10.00 (254)	33.0 (838)			50	250

*Order number of reels required. Std. Pkg. -TLR = 76M reel and Bulk Pkg. - MR = 305M reel.
Premier products are shown in **BOLD** print.