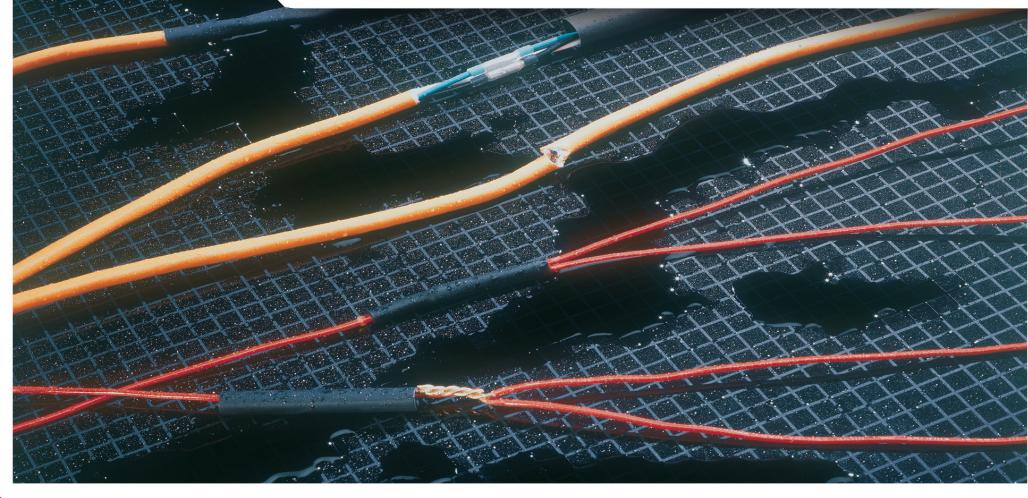
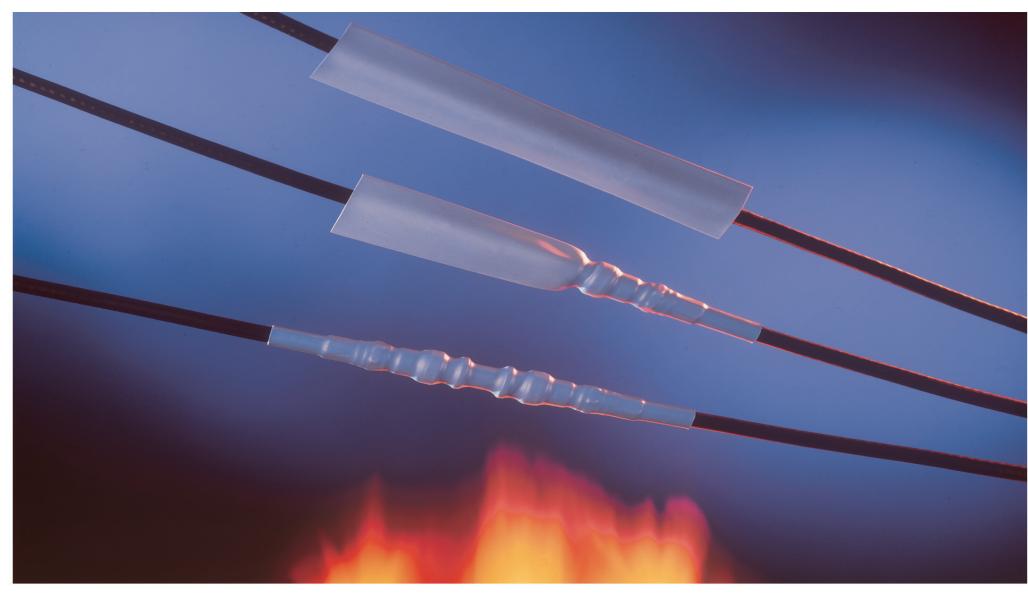




# INSULATION PRODUCTS CORPORATION

Materials For The Electrical & Electronic Industry

- Heat Shrink Tubing
- Non-Shrink Tubing
- Specialty Products & Services
- Printing, Marking & Cutting
- Commercial Grade Polyolefin
- Industrial Adhesives



# INSULATION PRODUCTS CORPORATION



Since 1974, Insulation Products Corporation has been committed to providing our customers with superior electrical insulating tubing. As a major supplier of heat-shrinkable tubing, extruded tubing, and sleeving, we pride ourselves on quick, courteous service.

At Insulation Products Corporation the customer is number one, our staff is dedicated to processing all customer requests quickly. We are happy to answer your questions, and respond to your concerns. We strive to develop strong working relationships with our customers.

Orders from our large inventory are normally shipped within forty-eight hours with custom markers, cutting, and other value added items available in a week or less. Insulation Products' fabricating processes for cutting and marking are maintained to close tolerances, in a clean environment, for a quality finished product. Our recently remodeled, 120,000sf computerized facilities and updated manufacturing equipment enable us to maintain a competitive edge in the industry. Our extensive product line includes all types of RoHS compliant products, heat-shrink tubing, extruded tubing, sleeving, cable ties, tape, insulating materials, and special services.

Our interest at this time is to find out if we can be of any assistance to you. Please contact us with any questions, sample requests or further literature and specification requests you may have.

Sincerely

The IPC Team

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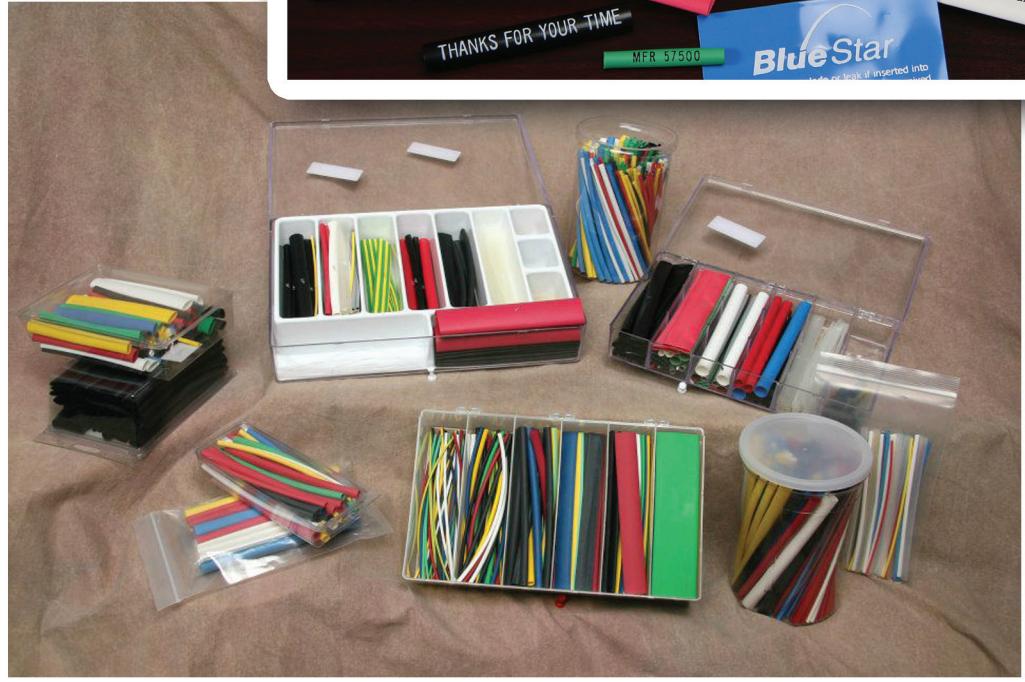
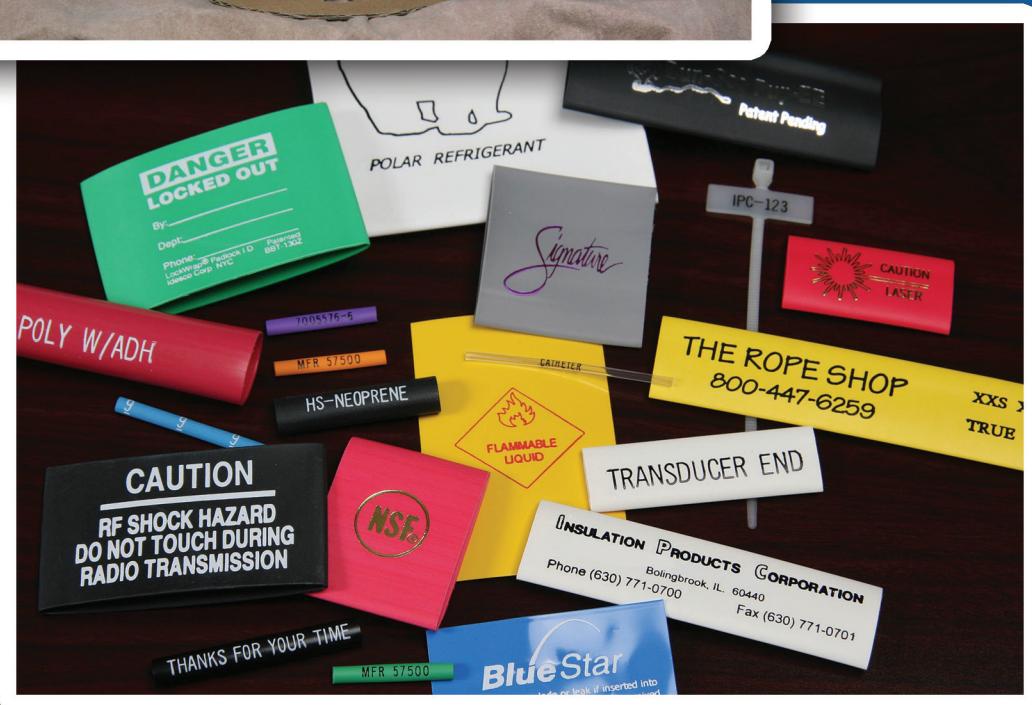
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- Hot stamped on shrinkable or non-shrinkable tubing and cable ties
- Large stock of tubing and cable ties for immediate delivery
- Custom made to your specifications
- No minimum quantity

Insulation Products Corporation's hot stamp markers are a low cost, simple, attractive and completely dry process for marking or coding cable, wire and other parts for identification.

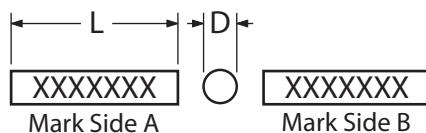
Hot stamp markers identify or finish products to improve profits by increasing production, efficiency and appearance. Parts can be customized with manufacturers logo, part number, date code and serial number on all types of sleeveings, heat shrinkable tubing and cable ties. A wide selection of type sizes, tubing colors and imprint colors give that finished look to your product.

Insulation Products Corporation will mark on U/L, CSA and military approved materials with a quality permanent imprint, cut to length and package to the customer's needs. No minimum quantity is required per order.

With new, high speed, automated, cutting and stamping equipment, orders are normally shipped in one to two weeks.

## Ordering Data & Specifications:

- Type is standard Gothic unless otherwise specified
- Standard print color is black or white (other colors available)
- Tubing sizes from 3/64" up to 5" diameter
- Standard character sizes from 1/16" to 1/2"
- Custom sizes available
- Markings on both sides available
- Serialization available
- On the chart, "D" is the inside diameter "L" is the length to cut the tubing



- Maximum 6 lines of type using 1/8" characters
- We will mark to these Military Specifications
  - MIL-STD-130: Identification marking of U.S. Military property
  - MIL-M-81531: Marking of electrical insulating materials
  - MIL-M-60903: Marking of electrical wires and cables (#7444)

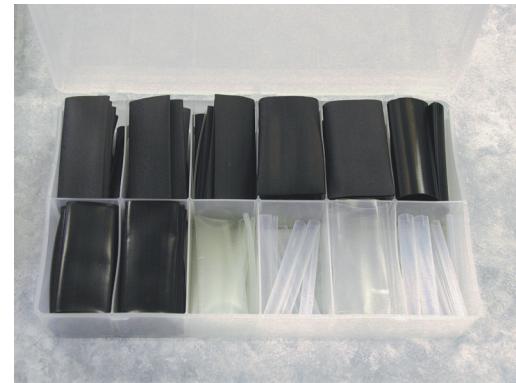


**Custom upon request**  
**Any type of tubing**  
**Divided boxes and single tubs**

Insulation Products Corporation can make up kits to your specifications in single tubs, multiple slot boxes or zipper bags. Let us know what your needs are and we will help you with the layout, sizing and types of tubing that will work for your application.

Kits can include our tubing, your tubing or a combination of both. Tubing can be marked with the corresponding size and type or even show your name and logo.

Please contact a salesperson for details.





Inexpensive low shrink temperature tubing

**Low shrink temperature**

**2:1 shrink low cost U/L**

**CSA MIL-Spec.**

Heat Shrinkable PVC Tubing provides excellent electrical insulation along with the lowest shrink temperature of any of our tubings. When high shrink temperatures can damage enclosed or adjacent components this tubing is the best choice. PVC tubing shrinks a full 50% quickly at 200°F.

Approximately 20% longitudinal shrinkage allows ripple free conformance around sharp bends to form a tight fitting insulation for most general applications with a high degree of flexibility.

Resists most chemicals and oils as well as sunlight, moisture and fungus.

Also available in Irradiated (product #IP32IP) and 1/32" heavy wall.

| Specifications:                |  |
|--------------------------------|--|
| U/L Subject 224                | VW-1   |
| Rated for 600V                 |  |
| U/L File #E28044               |  |
| CSA, OFT                       |  |
| CSA File #41513                |  |
| ASTM D 3150                    |  |
| M23053/2 Class 2               |  |
| <b>Longitudinal Shrinkage:</b> | 20%  |
| <b>Storage:</b>                | extremely heat sensitive; store at 70°F or below, or use in 30 days.                 |
| <b>Temperature Rating:</b>     | continuous operation from -20°C to 105°C.  |
| <b>Electrical:</b>             | 1083 volts per mil.  |
| <b>Colors:</b>                 | black, white, clear, red and yellow (other colors available with special quotation). |

| Order Size | Expanded Diameter | Recovered |       |
|------------|-------------------|-----------|-------|
|            |                   | Diameter  | Wall  |
| 3/64"      | .046"             | .023"     | .020" |
| 1/16"      | .063"             | .031"     | .020" |
| 3/32"      | .093"             | .046"     | .020" |
| 1/8"       | .125"             | .062"     | .020" |
| 3/16"      | .187"             | .093"     | .020" |
| 1/4"       | .250"             | .125"     | .025" |
| 5/16"      | .313"             | .187"     | .025" |
| 3/8"       | .375"             | .187"     | .025" |
| 1/2"       | .500"             | .250"     | .025" |
| 5/8"       | .625"             | .313"     | .025" |
| 3/4"       | .750"             | .375"     | .030" |
| 1"         | 1.000"            | .500"     | .035" |
| 1-1/4"     | 1.250"            | .625"     | .041" |
| 1-1/2"     | 1.500"            | .750"     | .043" |
| 2"         | 2.000"            | 1.000"    | .048" |
| 3"         | 3.000"            | 1.500"    | .068" |
| 4"         | 4.000"            | 2.000"    | .073" |



### low shrink temperature tubing UV resistant

- Highly UV resistant
- Low shrink temperature
- 2:1 shrink low cost

Heat Shrinkable UV PVC Tubing provides excellent electrical insulation along with the lowest shrink temperature of any of our tubings. PVC tubing shrinks a full 50% quickly at 200°F.

### UV Certification

This is to certify that clear Heat Shrink Tubing supplied: After 5,000 kilojoules of exposure, the compound used to make heat shrink clear appears to retain aesthetic and structural integrity comparable to 8-10 years exposure in South Florida. The evaluation of this Vinyl compound has been derived utilizing a Xenon weatherometer. Xenon data is used to evaluate resistance to solar and other UV exposure sources. The brittleness of the material is - 30°C.

### Specifications:

**Longitudinal Shrinkage:** 20%

**Storage:** extremely heat sensitive; store at 70°F or below, or use in 30 days.

**Temperature Rating:** continuous operation from -20°C to 105°C.

**Colors:** black, white, clear, red and yellow (other colors available with special quotation).

### Other Standards used:

SAE J 1960 tests the accelerated exposure of automotive exterior materials using a controlled irradiance water-cooled xenon arc apparatus. This test method is designed to accelerate the extreme environmental conditions encountered outside a vehicle due to sunlight, heat, and moisture (in the form of humidity, condensation or rain) for the purpose of predicting the performance of automotive materials.

SAE J2527 standard for exterior testing

SAE J 1885 standard for interior testing

SAE J1976 standard for South Florida Weathering, Direct Sunlight

| Order Size | Expanded Diameter | Recovered |       |
|------------|-------------------|-----------|-------|
|            |                   | Diameter  | Wall  |
| 3/64"      | .046"             | .023"     | .020" |
| 1/16"      | .063"             | .031"     | .020" |
| 3/32"      | .093"             | .046"     | .020" |
| 1/8"       | .125"             | .062"     | .020" |
| 3/16"      | .187"             | .093"     | .020" |
| 1/4"       | .250"             | .125"     | .025" |
| 5/16"      | .313"             | .187"     | .025" |
| 3/8"       | .375"             | .187"     | .025" |
| 1/2"       | .500"             | .250"     | .025" |
| 5/8"       | .625"             | .313"     | .025" |
| 3/4"       | .750"             | .375"     | .030" |
| 1"         | 1.000"            | .500"     | .035" |
| 1-1/4"     | 1.250"            | .625"     | .041" |
| 1-1/2"     | 1.500"            | .750"     | .043" |
| 2"         | 2.000"            | 1.000"    | .048" |
| 3"         | 3.000"            | 1.500"    | .068" |
| 4"         | 4.000"            | 2.000"    | .073" |



**Ultra thin wall for battery and pharmaceutical applications**

### Ultra thin wall

**Semi-rigid - Low shrink temp.**

**U/L VW-1**

Layflat PVC Heat Shrink Tubing is a thin-wall, low cost material offering good electrical and mechanical characteristics. When exposed to heat in excess of 275°F for a few seconds, the specially formulated polyvinyl chloride material will shrink rapidly and uniformly conforming to the shape of the object to be covered.

Layflat PVC is available in diameters from .250" to 6" and larger. The standard wall thickness is .004" and .006" but is also available as thin as .0015" and as thick as .012" (for thicker walls use product #IP30HS). Standard colors are white, black and clear but can be special ordered in almost any color.

Applications include insulation and jacketing of batteries, capacitors and similar objects - a vast range of applications in the production of industrial equipment, toys, sporting goods, electronics, medical and consumer products.

A portable heat gun can be used for shrinking in most applications.

| Specifications:   |
|---|
| U/L VW-1  |
| U/L file #E129478   |
| <b>Electrical:</b> dielectric strength (.004) 2400 volts/mil  |
| <b>Thermal:</b> operating temperature +100°C to -20°C, cold brittleness 20°C heat shock 121°C, ihr. on flowing, dripping or cracking<br>high temperature resistance 200hrs at 100°C |
| <b>Electrical:</b> 2400 volts/mill (.004" sample)   |
| <b>Shrink Ratio:</b> up to 50%  |
| <b>Standard Color:</b> black, white and clear (most any color available on special order)   |

Layflat is measured in millimeters flat width, in the range from 5mm up to 250mm and larger. Common sizes are shown below but many others are available.

| Battery Size | Diameter | Flat Width   |
|--------------|----------|--------------|
| 3A           | 7/16"    | 17.5 to 19mm |
| 2A           | 9/16"    | 23 to 24.5mm |
| N            | 1/2"     | 19 to 21.5mm |
| sub C        | 7/8"     | 36 to 40mm   |
| C            | 1-1/8"   | 42 to 48mm   |
| D            | 1-3/8"   | 56 to 60mm   |
| 9V           | 1-1/8"   | 56 to 60mm   |



**Shrink over terminals for insulation and strain relief.**

**Flexible, General purpose polyolefin  
Low shrink temperature  
Excellent substitute for HS-PVC**

Commercial Grade Polyolefin Tubing is an irradiated, economical and mechanically tough heat shrinkable tubing used for insulating, jacketing and identification.

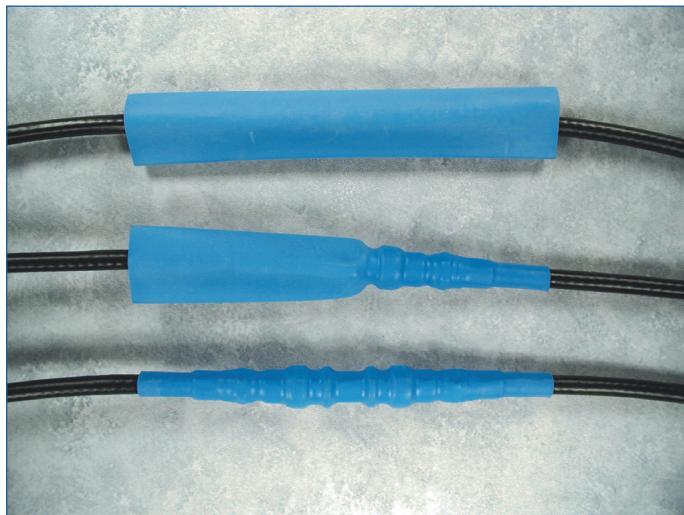
IP29CG has excellent electrical, chemical and physical properties representing a good all purpose heat shrinkable tubing.

Application of heat above 100°C will shrink this tubing quickly to 50% of its supplied diameter or snug down on the object it is to cover.

When comparing this product to heat shrinkable PVC, IP29CG offers reduced longitudinal shrinkage, better shelf-life, vivid colors and superior temperature characteristics.

| <b>Specifications:</b>                      |   |
|---|---|
| ROHS Compliant                              |   |
| Corrosion Resistant                         |   |
| Solvent Resistant                           |   |
| High Gloss Finish                           |   |
| Colors are vivid - Clear is "crystal" clear |   |
| <b>Longitudinal Shrinkage:</b>              | less than 5%  |
| <b>Storage:</b>                             | very stable; can be stored over extended intervals without change.                              |
| <b>Temperature Rating:</b>                  | continuous operation from -55°C to 105°C.   |
| <b>Electrical:</b>                          | 550 volts per mil.  |
| <b>Standard Colors:</b>                     | black, white, clear, red, blue, green and yellow (most sizes in brown, orange, violet and gray) |
| <b>Low Temp Flexibility:</b>                | (4 hrs @ -55°C) No cracking   |

| Order Size | Expanded Diameter | Recovered |       |
|------------|-------------------|-----------|-------|
|            |                   | Diameter  | Wall  |
| 3/64"      | .046"             | .023"     | .018" |
| 1/16"      | .063"             | .031"     | .018" |
| 3/32"      | .093"             | .046"     | .020" |
| 1/8"       | .125"             | .062"     | .020" |
| 3/16"      | .187"             | .093"     | .020" |
| 1/4"       | .250"             | .125"     | .025" |
| 3/8"       | .375"             | .187"     | .025" |
| 1/2"       | .500"             | .250"     | .025" |
| 5/8"       | .625"             | .313"     | .025" |
| 3/4"       | .750"             | .375"     | .030" |
| 1"         | 1.000"            | .500"     | .035" |
| 1-1/4"     | 1.250"            | .625"     | .040" |
| 1-1/2"     | 1.500"            | .750"     | .040" |
| 2"         | 2.000"            | 1.000"    | .045" |
| 3"         | 3.000"            | 1.500"    | .050" |
| 4"         | 4.000"            | 2.000"    | .055  |



**Shrink over terminals for insulation and strain relief.**

**General purpose flexible polyolefin  
Flame retardant  
U/L, CSA, MIL-Spec.**

Heat Shrinkable Polyolefin Tubing is a highly flexible, radiation cross-linked tubing used for insulating, jacketing and identification. It will not melt, is mechanically tough and will not split when shrunk.

Made from flame-retardant polyolefin, it has excellent electrical, chemical and physical properties representing a good all purpose heat shrinkable tubing.

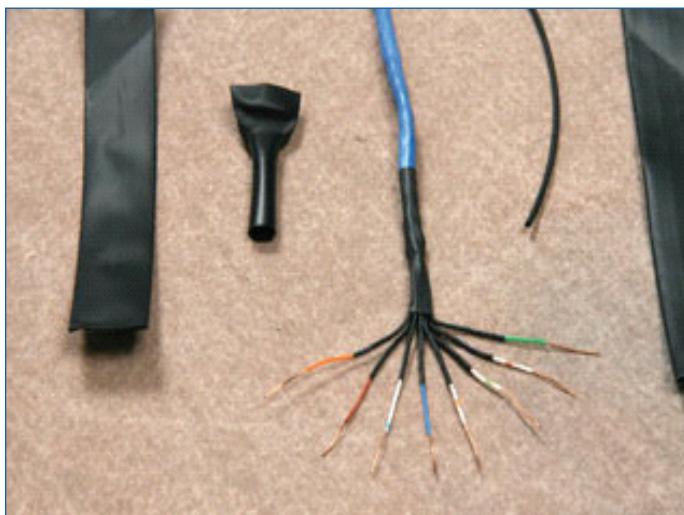
Application of heat above 121°C will shrink this tubing quickly to 50% of its supplied diameter or snug down on the object it is to cover.

Resists a wide range of chemicals and oils, as well as sunlight, moisture and fungus.

Also available in 3:1 and 4:1 shrink ratio and Medical Grade UPS class VI.

| <b>Specifications:</b>         |   |
|--------------------------------|---|
| U/L Subject 224                | VW-1  |
| CSA, OFT                       |   |
| AMS 3636                       |   |
| ASTM 3637                      |   |
| M23053/5                       |   |
| <b>Longitudinal Shrinkage:</b> | less than 5%  |
| <b>Storage:</b>                | very stable; can be stored over extended intervals without change.                              |
| <b>Temperature Rating:</b>     | continuous operation from -55°C to 135°C.   |
| <b>Electrical:</b>             | 1300 volts per mil.   |
| <b>Standard Colors:</b>        | black, white, clear, red, blue and yellow (most sizes in brown, orange, green, violet and gray) |

| Order Size | Expanded Diameter | Recovered |       |
|------------|-------------------|-----------|-------|
|            |                   | Diameter  | Wall  |
| 3/64"      | .046"             | .023"     | .018" |
| 1/16"      | .063"             | .031"     | .018" |
| 3/32"      | .093"             | .046"     | .020" |
| 1/8"       | .125"             | .062"     | .020" |
| 3/16"      | .187"             | .093"     | .020" |
| 1/4"       | .250"             | .125"     | .025" |
| 3/8"       | .375"             | .187"     | .025" |
| 1/2"       | .500"             | .250"     | .025" |
| 5/8"       | .625"             | .313"     | .025" |
| 3/4"       | .750"             | .375"     | .030" |
| 1"         | 1.000"            | .500"     | .035" |
| 1-1/4"     | 1.250"            | .625"     | .040" |
| 1-1/2"     | 1.500"            | .750"     | .040" |
| 2"         | 2.000"            | 1.000"    | .045" |
| 3"         | 3.000"            | 1.500"    | .050" |
| 4"         | 4.000"            | 2.000"    | .055" |

**Low shrink temperature and space saving**

**Very thin wall**  
**Flexible and Flame Retardant**  
**U/L and CSA**

IP33TW is a very thin wall heat shrinkable polyolefin tubing with a highly flexible, radiation cross-linked tubing used for insulating, jacketing and identification where saving space is important.

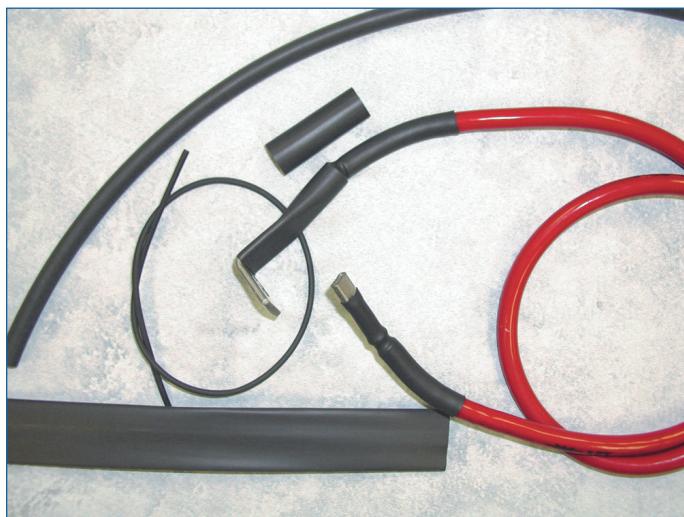
Made from flame-retardant polyolefin, it has excellent electrical, chemical and physical properties representing a good all purpose heat shrinkable tubing.

Low shrink temperature reduces install time. Application of heat above 90°C will shrink this tubing quickly to 50% of its supplied diameter or snug down on the object it is to cover.

Resists a wide range of chemicals and oils as well as sunlight, moisture and fungus.

| Specifications:  |  |  |  |
|--|--|--|--|
| U/L Subject 224 VW-1   |  |  |  |
| CSA  |  |  |  |
| <b>Longitudinal Shrinkage:</b> less than 5%  |  |  |  |
| <b>Storage:</b> very stable; can be stored over extended intervals without change. |  |  |  |
| <b>Temperature Rating:</b> continuous operation from -30°C to +125°C.              |  |  |  |
| <b>Electrical:</b> 500 volts per mil.  |  |  |  |
| <b>Standard Colors:</b> black (others special order, available upon request)       |  |  |  |

| Order Size | Expanded Diameter | Recovered |       |
|------------|-------------------|-----------|-------|
|            |                   | Diameter  | Wall  |
| 3/64"      | .046"             | .023"     | .012" |
| 1/16"      | .063"             | .031"     | .012" |
| 3/32"      | .093"             | .046"     | .012" |
| 1/8"       | .125"             | .062"     | .013" |
| 3/16"      | .187"             | .093"     | .013" |
| 1/4"       | .250"             | .125"     | .014" |
| 3/8"       | .375"             | .187"     | .014" |
| 1/2"       | .500"             | .250"     | .014" |
| 3/4"       | .750"             | .375"     | .017" |
| 1"         | 1.000"            | .500"     | .020" |



Works great as a strain relief

**Very flexible polyolefin**  
**Low shrink temperature**  
**Highly flame retardant**

Very Flexible Heat Shrinkable Polyolefin Tubing is the most flexible tubing we offer. Its high degree of flexibility along with low shrink temperature and high flame retardancy, allow a wide range of applications with a single tubing.

Rated at 135°C this tubing has been engineered to offer a low shrink temperature of 100°C. This allows the tubing to shrink rapidly, thereby minimizing heat exposure and possible damage to sensitive sub-strate materials or components.

This tubing is ideal for aircraft / aerospace assemblies where flexible wire bundling and fire-resistant covering of components is needed.

| Specifications:            |                |
|----------------------------|----------------|
| U/L 224                    |                |
| CSA                        |                |
| AMS-3587                   |                |
| <b>Temperature Rating:</b> | -55°C to 135°C |
| <b>Shrink Temperature:</b> | 100°C          |
| <b>Shrink Ratio:</b>       | 2:1            |
| <b>Electrical:</b>         | 800 V/mil      |
| <b>Tensile Strength:</b>   | +/- 5%         |
| <b>Standard Color:</b>     | black          |

| Order Size | Expanded Diameter | Recovered |       |
|------------|-------------------|-----------|-------|
|            |                   | Diameter  | Wall  |
| .036"      | .046"             | .023"     | .016" |
| .043"      | .063"             | .031"     | .017" |
| .054"      | .093"             | .046"     | .020" |
| .063"      | .125"             | .062"     | .020" |
| .076"      | .187"             | .093"     | .020" |
| .093"      | .250"             | .125"     | .025" |
| .114"      | .375"             | .187"     | .025" |
| .143"      | .500"             | .250"     | .025" |
| .188"      | .750"             | .375"     | .030" |
| .250"      | 1.000"            | .500"     | .035" |
| .375"      | 1.500"            | .750"     | .040" |
| .500"      | 2.000"            | 1.000"    | .045" |



Meltable inner liner for encapsulating

**Semi-rigid  
Encapsulating  
High shrink ratio**

Melt Wall Polyolefin Tubing is a semi-rigid heat shrinkable tubing that is coextruded and selectively cross-linked to provide a tough protective outer shrinkable jacket with a meltable inner wall.

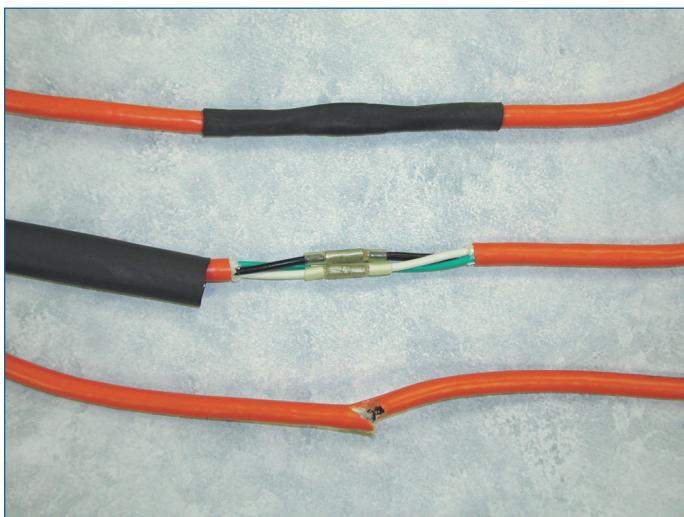
With the application of heat in excess of 135°C the inner wall melts and is forced by the outer wall to flow in and around all underlying surfaces and small voids. When cool, the tubing becomes one solid mass excellent for encapsulating delicate components from moisture and the attack of chemicals and solvents.

Melt Wall Polyolefin Tubing is recommended for a wide variety of electronic, electrical and mechanical applications...wherever a highly reliable one-step approach to jacketing, encapsulation and environmental sealing is required.

| Specifications:                                  |  |
|--|--|
| M23053/4 Class 1                                 |  |
| U/L Approved                                     |  |
| <b>Shrink Ratio:</b> 2.5:1                       |  |
| <b>Longitudinal Shrinkage:</b> +1/-10%           |  |
| <b>Continuous Operating Temp:</b> -55°C to 110°C |  |
| <b>Shrink Temperature:</b> 135°C                 |  |
| <b>Colors:</b> Black standard - others on quote  |  |

| Order Size | Expanded Diameter | Recovered |       |
|------------|-------------------|-----------|-------|
|            |                   | Diameter  | Wall  |
| 1/8"       | .125"             | .023"     | .038" |
| 3/16"      | .187"             | .060"     | .043" |
| 1/4"       | .250"             | .080"     | .047" |
| 3/8"       | .375"             | .135"     | .050" |
| 1/2"       | .500"             | .195"     | .055" |
| 3/4"       | .750"             | .313"     | .065" |
| 1"         | 1.000"            | .400"     | .075" |

# ADHESIVE LINED POLYOLEFIN HEAT SHRINK TUBING IP44A2 & IP45A3



Adhesive liner seals out moisture

Flexible, thin wall

2:1 & 3:1 shrink ratio

Flame retardant outer jacket

Adhesive Lined Heat Shrink Tubing is a flexible polyolefin lined with a thin layer of special thermoplastic adhesive for excellent moisture protection and strain relief.

This tubing offers convenient protection of electrical components, wire splices or bundling of wires. Automotive, truck and marine wiring splices and connections are quickly and easily protected from harsh environments.

With the application of heat Adhesive Lined Heat Shrink Tubing shrinks to a tight fit, forcing the adhesive lining to flow and cover the substrate. When cooled the adhesive forms a permanent, flexible and waterproof barrier.

The tubing is available in a standard 2 to 1 shrink (product #IP44A2), and also as a 3 to 1 shrink (product #IP45A3) for hard to fit applications.

For larger diameters see product #IP47HV Heavy Wall Polyolefin Tubing.

| Specifications:   |              |  |  |
|---|--------------|--|--|
| Product #IP44A2 only:   |              |  |  |
| M23053/4 Class 2 (upon request)   | U/L Approved |  |  |
| Product #IP45A3 only:   |              |  |  |
| M23053/4 Class 3 (upon request)   | U/L Approved |  |  |
| <b>Shrink Temperature:</b> 121°C  |              |  |  |
| <b>Electrical:</b> 500 Volts/Mil  |              |  |  |
| <b>Standard Lengths 4'</b> (spool lengths available on request)   |              |  |  |
| <b>Markers and Cut Pieces:</b> Cutting and printing on this tubing is available - call for a quotation. |              |  |  |

| Order Size        | Expanded Diameter | Recovered |       |
|-------------------|-------------------|-----------|-------|
|                   |                   | Diameter  | Wall  |
| <b>2:1 Shrink</b> |                   |           |       |
| 1/8"              | .125"             | .062"     | .026" |
| 3/16"             | .187"             | .093"     | .026" |
| 1/4"              | .250"             | .125"     | .029" |
| 3/8"              | .375"             | .187"     | .029" |
| 1/2"              | .500"             | .250"     | .030" |
| 3/4"              | .750"             | .375"     | .029" |
| 1"                | 1.000"            | .500"     | .042" |
| <b>3:1 Shrink</b> |                   |           |       |
| 1/8"              | .125"             | .023"     | .038" |
| 3/16"             | .187"             | .060"     | .043" |
| 1/4"              | .250"             | .080"     | .047" |
| 3/8"              | .375"             | .120"     | .050" |
| 1/2"              | .500"             | .157"     | .055" |
| 3/4"              | .750"             | .313"     | .065" |





Heavy duty jacketing with adhesive liner

**3:1 Shrink Polyolefin**  
**Environmental protection**  
**Tough heavy wall**

Heavy Wall heat shrink tubing is a thermally stabilized, modified polyolefin, heat shrinkable tubing. It provides a simpler, more positive splice sealing method that offers greater protection under the most adverse environmental conditions. A relatively small number of sizes covers a large number of cable sizes because of the high shrink ratio.

Seals may be made over lead, steel, aluminum, copper, and all standard plastic and elastomeric insulating materials. The standard tubing is supplied with an adhesive to provide optimum water-proofing and environmental protection in submersible or direct buried applications.

This tubing can also be supplied in medium wall (product #IP46) where wall constraint is a factor. Both tubings are rated for continuous operating temperature up to 90°C for non-pressurized cable systems.

| Specifications:                                      |  |
|--|--|
| U/L Approved   |  |
| M23053/15 Class 1 & 2                                |  |
| <b>Dielectric Strength:</b> @ 150 mils 250 volts/mil |  |
| <b>Tensile Strength:</b> 2400 psi                    |  |
| <b>Water Absorption:</b> 0.05%                       |  |
| <b>Solvent Resistance:</b> Excellent                 |  |
| <b>Standard Length:</b> 48"                          |  |

| Order Size | Expanded Diameter | Recovered Diameter | Recovered Wall |        |
|------------|-------------------|--------------------|----------------|--------|
|            |                   |                    | Heavy          | Medium |
| 3/8"       | .400"             | .150"              | .080"          | .080"  |
| 3/4"       | .750"             | .220"              | .105"          | .080"  |
| 1"         | 1.100"            | .375"              | .120"          | .080"  |
| 1-1/2"     | 1.500"            | .500"              | .140"          | .080"  |
| 2"         | 2.000"            | .750"              | .155"          | .080"  |
| 3"         | 3.000"            | 1.250"             | .155"          | .080"  |
| 4-1/2"     | 4.500"            | 1.500"             | .170"          | -      |
| 6"         | 6.000"            | 1.800"             | .170"          | -      |
| 7"         | 7.000"            | 2.000"             | .170"          | -      |



**seal cable and conduit ends / terminate electrical connections**

#### Seal wire and pipe ends

#### Adhesive lined

#### High shrink ratio

Heat Shrinkable End Caps offer a simple, yet effective method for sealing crimped electrical connections, cable ends, pipe and conduit. The adhesive lined caps allow an operator to seal and insulate connections much faster than conventional methods requiring tape wrapping.

When heated, the end cap's outer jacket shrinks while the inner wall flows into voids to create an environmentally sealed and electrically insulated connection.

End caps are manufactured from crosslinked polyolefin and exhibit a dielectric strength of 600 -1000 volts/mil. They are designed to remain tightly in place for the life of the substrate.

| Specifications:   |  |  |  |
|---|--|--|--|
| <b>Tensile Strength:</b> 2100 psi                           |  |  |  |
| <b>Elongation:</b> 350%                                     |  |  |  |
| <b>Longitudinal change:</b> 10%                             |  |  |  |
| <b>Specific Gravity:</b> 1.1                                |  |  |  |
| <b>Heat Shock:</b> No Cracking (4 hrs at 225oC)             |  |  |  |
| <b>Low Temp. Flexibility</b> (4 hrs. at -55oC): No Cracking |  |  |  |
| <b>Dielectric Strength:</b> 500 V/Mil min.                  |  |  |  |
| Noncorrosive  |  |  |  |

| Expanded Diameter | Recovered Diameter | Nominal Length | Recovered Wall Thickness |
|-------------------|--------------------|----------------|--------------------------|
| .125"             | .023"              | .87"           | .048"                    |
| .187"             | .060"              | 1"             | .062"                    |
| .250"             | .080"              | 1.12"          | .078"                    |
| .375"             | .090"              | 1.25"          | .082"                    |
| .500"             | .100"              | 1.5"           | .090"                    |
| .400"             | .150"              | 3.0"           | .080"                    |
| .750"             | .220"              | 3.5"           | .080"                    |
| 1.10"             | .400"              | 4.0"           | .080"                    |
| 1.30"             | .400"              | 4.0"           | .080"                    |
| 1.50"             | .500"              | 4.5"           | .080"                    |
| 1.70"             | .500"              | 4.5"           | .080"                    |
| 2.05"             | .750"              | 4.5"           | .080"                    |
| 2.75"             | 1.00"              | 5.0"           | .080"                    |
| 3.50"             | 1.18"              | 5.0"           | .095"                    |
| 4.70"             | 1.57"              | 6.5"           | .105"                    |

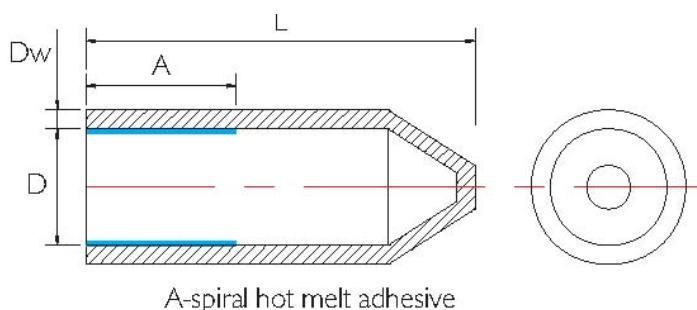


### Heat Shrinkable Cable End Caps with Spiral Adhesive Coating

EC offers an economical means of sealing the end of power cable with a completely watertight seal. The internal surface of the end cap has a layer of spiral coated hot melt adhesive, which retains its flexible properties after recovery. EC is recommended for application both in open air and on underground power distribution cables with PVC, lead or XLPE sheaths.

- Effectively offering protection against oxidation, Ozone, UV-radiation etc.
- Coated with hot melt adhesive to ensure environment seal
- Easily to fit into the cable end
- Minimum fully shrink temperature: 120°C for permanent wire and terminal identification.

| Specifications:                 |              |                         |
|---------------------------------|--------------|-------------------------|
| Property                        | Test Method  | Typical Data            |
| Operating temperature           | IEC 216      | -55 to +110             |
| Tensile strength                | ASTM D 638   | >14MPa                  |
| Elongation at break             | ASTM D 638   | >400%                   |
| Density                         | ASTM D 792   | 1.05                    |
| Elongation at break after aging | 150 /168hrs. | >300%                   |
| Dielectric strength             | IEC 243      | >15kV/mm                |
| Volume resistance               | IEC 93       | >10 <sup>14</sup> Ω. cm |



| Order Size | Expanded Diameter | Recovered Diameter | Length |
|------------|-------------------|--------------------|--------|
| 12/4       | .47"              | .16"               | 1.5"   |
| 14/5       | .55"              | .20"               | 1.75"  |
| 20/6       | .79"              | .24"               | 2.0"   |
| 25/8.5     | .98"              | .33"               | 2.5"   |
| 35/16      | 1.38"             | .63"               | 3.25"  |
| 40/15      | 1.57"             | .59"               | 3.25"  |
| 55/26      | 2.17"             | 1.02"              | 4.0"   |
| 75/36      | 2.95"             | 1.42"              | 4.75"  |
| 100/52     | 3.94"             | 2.05"              | 5.5"   |
| 120/60     | 4.72"             | 2.36"              | 6.0"   |
| 145/60     | 5.71"             | 2.36"              | 6.0"   |
| 160/82     | 6.30"             | 3.23"              | 6.0"   |
| 200/90     | 7.87"             | 3.54"              | 6.0"   |



Flexible, abrasion resistant covering for wires

**Highly abrasion resistant****Unaffected by common fluids and solvents**

Heat Shrinkable Neoprene Tubing is a modified polychloroprene recommended for applications requiring a tough, highly flexible covering. Neoprene remains flexible at low temperatures which makes it ideal for cables and harness applications that operate in severe environmental conditions.

This tubing has a thick-wall construction to provide superior cut-through and abrasion resistance. It is unaffected by most fluids and solvents along with excellent resistance to oils.

Heat Shrinkable Viton Tubing offers the outstanding low temperature and chemical resistance properties found in Neoprene with the addition of high temperature performance up to 200°C.

The tubings are easily marked by hot-stamping for permanent wire and terminal identification.

**Specifications:****Chlorinated Polyolefin (Neoprene)**

M23053/1 Class 1 &amp; 2

MIL-R-46846 Type 1 Class 1 (upon request)

**Temperature Ratings:** -70°C to +121°C**Shrink Temperature:** 135°C minimum**Standard Color:** Black**Markers and Cut Pieces Available****Fluoroelastomer (Viton)**

M23053/13

MIL-R-46846 Type 3 Class 1 (upon request)

**Temp. Ratings:** -55°C to 200°C / 175°C Shrink**Dielectric Strength:** 500 Volts/ Mil**Tensile Strength:** 2400 psi

| Order Size | Expanded Diameter | Recovered |       |
|------------|-------------------|-----------|-------|
|            |                   | Diameter  | Wall  |
| 1/8"       | .125"             | .062"     | .030" |
| 3/16"      | .187"             | .093"     | .035" |
| 1/4"       | .250"             | .125"     | .035" |
| 3/8"       | .375"             | .187"     | .035" |
| 1/2"       | .500"             | .250"     | .035" |
| 5/8"       | .625"             | .312"     | .042" |
| 3/4"       | .750"             | .375"     | .042" |
| 1"         | 1.000"            | .500"     | .049" |
| 1-1/4"     | 1.250"            | .625"     | .055" |
| 1-1/2"     | 1.500"            | .750"     | .055" |
| 2"         | 2.000"            | 1.000"    | .065" |



A very thin wall high dielectric tubing

**Semrigid  
High Dielectric  
U/L CSA**

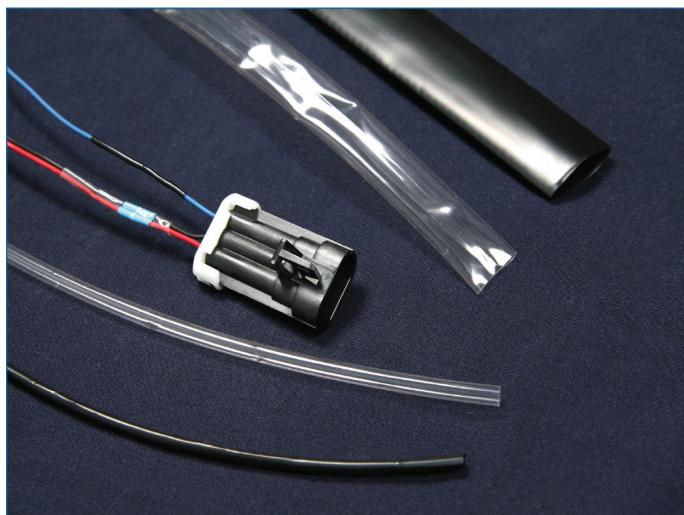
Heat Shrinkable Kynar Tubing is an irradiated, thin-wall tubing offering a high degree of mechanical strength and high temperature resistance. Kynar tubings are fabricated from polyvinylidene fluoride which gives outstanding abrasion resistance and cut-through properties in combination with high dielectric strength. Kynar is inherently flame-retardant and semi-rigid. It is highly resistant to most industrial fuels, chemicals and solvents.

Kynar tubings shrink at 350°F on applications such as jacketing for components, fuse coverings and capacitor protection. Because the tubing is transparent, it offers see-thru inspection and identification.

Heat Shrinkable Kynar is excellent for strain relief applications. It can be flexed, twisted and bent repeatedly without loss of mechanical or electrical strength. Because of its thin wall, Kynar can be used in areas where space is limited.

| Specifications:   |  |  |  |
|---|--|--|--|
| U/L Subject 224 VW-1  |  |  |  |
| CSA OFT   |  |  |  |
| M23053/8  |  |  |  |
| *meets functional requirements of M23053/18   |  |  |  |
| Class 1 (upon request)  |  |  |  |
| <b>Temperature Ratings:</b> Continuous operation from -55°C to 175°C                      |  |  |  |
| <b>Electrical:</b> 800-1000 Volts per mil (withstands 2000 volts for 1 min.)              |  |  |  |
| <b>Heat Shock:</b> 4 hours @ 300°C no cracks, flowing or dripping                         |  |  |  |
| <b>Colors:</b> Clear (transparant) and Black  |  |  |  |
| <b>Markers and Cut Pieces:</b> Cutting and printing on this tubing available upon request |  |  |  |

| Order Size | Expanded Diameter | Recovered |       |
|------------|-------------------|-----------|-------|
|            |                   | Diameter  | Wall  |
| .3/64"     | .046"             | .023"     | .010" |
| .1/16"     | .063"             | .032"     | .010" |
| .3/32"     | .093"             | .046"     | .010" |
| .1/8"      | .125"             | .062"     | .010" |
| .3/16"     | .187"             | .093"     | .010" |
| .1/4"      | .250"             | .125"     | .012" |
| .3/8"      | .375"             | .187"     | .012" |
| .1/2"      | .500"             | .250"     | .012" |
| .3/4"      | .750"             | .375"     | .017" |
| 1"         | 1.000"            | .500"     | .018" |
| 1-1/2"     | 1.500"            | .750"     | .020" |



Flexible and abrasion resistant tubing

**Great Clarity****High Flame Resistance and  
high Temperature Performance**

IP55FL is a flame retardant, flexible tubing offering a high degree of mechanical strength and high temperature resistance. Fluoropolymer is made from polyvinylidene fluoride which gives outstanding abrasion resistance and cut-through properties. IP55FL is inherently flame-retardant and flexible. It is highly resistant to most industrial fuels, chemicals and solvents.

Fluoropolymer tubings shrink at 125°C on applications such as jacketing for components, fuse coverings and capacitor protection. Because the tubing is transparent, it offers excellent see-thru inspection and identification.

| Specifications:   |  |  |  |
|---|--|--|--|
| U/L Subject 224 VW-1  |  |  |  |
| M23053/18 Class 2   |  |  |  |
| <b>Temperature Ratings:</b> Continuous operation from -55°C to 150°C                      |  |  |  |
| <b>Electrical:</b> 2500 volts, no breakdown   |  |  |  |
| <b>Heat Shock:</b> 4 hours @ 275°C no cracks, flowing or dripping                         |  |  |  |
| <b>Colors:</b> Clear (transparant) and Black  |  |  |  |
| <b>Markers and Cut Pieces:</b> Cutting and printing on this tubing available upon request |  |  |  |

| Order Size | Expanded Diameter | Recovered |       |
|------------|-------------------|-----------|-------|
|            |                   | Diameter  | Wall  |
| 3/64"      | .046"             | .023"     | .010" |
| 1/16"      | .063"             | .031"     | .010" |
| 3/32"      | .093"             | .046"     | .010" |
| 1/8"       | .125"             | .062"     | .010" |
| 3/16"      | .187"             | .093"     | .010" |
| 1/4"       | .250"             | .125"     | .012" |
| 3/8"       | .375"             | .187"     | .012" |
| 1/2"       | .500"             | .250"     | .012" |
| 3/4"       | .750"             | .375"     | .017" |
| 1"         | 1.000"            | .500"     | .019" |
| 1-1/2"     | 1.500"            | .750"     | .020" |
| 2"         | 2.000"            | 1.000"    | .023" |



Thin wall, high dielectric, for tight spaces

**High Dielectric  
Very thin wall  
High longitudinal shrinkage**

Mylar Heat Shrink Tubing is a superior, high dielectric insulation material that provides a tight, smooth protective covering. It is extremely easy to use and is suitable for hand or machine application, with no special or costly shrinking equipment necessary. Mylar tubing may be shrunk by heat guns, electrical coil heaters or ovens. It is shrinkable by as much as 50% of its diameter in order to provide an immovable, tight fit. Temperature requirements are as low as 90°C for shrinking purposes with a heat cycle as short as one second.

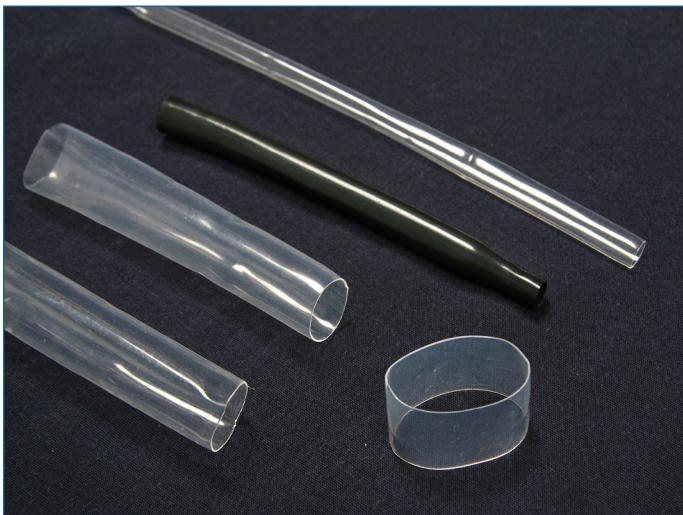
Mylar Heat Shrink is spiral wound to practically any diameter and length. It is an excellent choice for both high temperature and electrical insulation; for protection of coils and components; or as a replacement for tape.

Physical property values are published by DuPont and are typical for 65 gauge Mylar polyester film. Further information on Mylar film is available from the DuPont Co. Our Engineering Dept. will be glad to work with you on individual requests.

| Specifications:                 |                |
|---------------------------------|----------------|
| M23053/7 Class 2 (upon request) |                |
| Dielectric Strength (VPM min.)  | 1,500          |
| Tensile Strength (PSI)          | 20,000         |
| Elongation                      | 75%            |
| Shrinkage (@100°C)              |                |
| Machine Direction-Min.          | 35%            |
| Machine Direction-Max.          | 55%            |
| Transverse Direction-Min.       | 45%            |
| Transverse Direction-Max.       | 60%            |
| Melting Point (C)               | 245+           |
| Density (Average)               | 1.348          |
| Thickness-Min. Mils             | .55            |
| Thickness-Max. Mils             | .78            |
| Water Absorption                | 0.8%           |
| Dielectric Constant             | 3.9-3.9        |
| Temperature Range               | -60 to + 150°C |

| Order Size | Expanded Diameter | Recovered |          |
|------------|-------------------|-----------|----------|
|            |                   | Diameter  | Wall     |
| 1/16"      | .062"             | .037"     | 2-4 mil. |
| 3/32"      | .093"             | .055"     | 2-4 mil. |
| 1/8"       | .125"             | .075"     | 2-4 mil. |
| 3/16"      | .187"             | .112"     | 2-4 mil. |
| 1/4"       | .250"             | .150"     | 2-4 mil. |
| 5/16"      | .313"             | .187"     | 2-4 mil. |
| 3/8"       | .375"             | .225"     | 2-4 mil. |
| 1/2"       | .500"             | .300"     | 2-4 mil. |

This material is a custom run product. The sizes above are stock items at this time but are not guaranteed in the future. Please contact sales for any size not shown above



**Low shrink temperature, extra clear Teflon**

#### High Temperature

**Excellent Chemical Resistance**

**Ultra Clear**

FEP Heat Shrink Tubing is a semi-rigid fluorinated ethylene propylene tubing rated for continuous service temperature from -55°C to 200°C.

The excellent electrical and mechanical properties of FEP make it ideal for chafe guards on braided metal hoses where fittings must be cleared and as terminal and splice insulation. Outstanding chemical inertness allows FEP to be used as a cover over pressure and temperature probes in corrosive chemicals where different diameters are encountered.

FEP is normally used where many of the properties inherent in PTFE are desired but the shrink temperature must be lower.

#### Specifications:

M23053/11 FDA Title 21 #177.1550

**Temperature Ratings:** -55°C to 200°C shrink  
290°C

**Electrical:** Dielectric strength 2000 volts/mil.

| Order Size             | Expanded Diameter | Recovered |       |
|------------------------|-------------------|-----------|-------|
|                        |                   | Diameter  | Wall  |
| <b>1.3 to 1 Shrink</b> |                   |           |       |
| 24                     | .031"             | .027"     | .008" |
| 22                     | .036"             | .032"     | .008" |
| 20                     | .045"             | .039"     | .008" |
| 18                     | .060"             | .049"     | .008" |
| 16                     | .075"             | .061"     | .009" |
| 14                     | .092"             | .072"     | .009" |
| 12                     | .115"             | .089"     | .009" |
| 10                     | .141"             | .114"     | .010" |
| 9                      | .158"             | .124"     | .010" |
| 8                      | .180"             | .143"     | .010" |
| 7                      | .197"             | .158"     | .011" |
| 6                      | .225"             | .180"     | .011" |
| 5                      | .248"             | .198"     | .011" |
| 4                      | .290"             | .226"     | .011" |
| 3                      | .310"             | .249"     | .011" |
| 2                      | .365"             | .280"     | .012" |
| 1                      | .400"             | .311"     | .012" |
| 0                      | .440"             | .349"     | .012" |
| 3/8"                   | .500"             | .383"     | .015" |
| 7/16"                  | .580"             | .448"     | .020" |
| 1/2"                   | .666"             | .510"     | .020" |
| 5/8"                   | .830"             | .637"     | .025" |
| 3/4"                   | 1.000"            | .764"     | .030" |
| 7/8"                   | 1.170"            | .891"     | .035" |
| 1"                     | 1.330"            | 1.020"    | .035" |

| Order Size              | Expanded Diameter | Recovered |       |
|-------------------------|-------------------|-----------|-------|
|                         |                   | Diameter  | Wall  |
| <b>1.67 to 1 Shrink</b> |                   |           |       |
| 3/32"                   | .093"             | .056"     | .008" |
| 1/8"                    | .125"             | .075"     | .010" |
| 3/16"                   | .188"             | .115"     | .010" |
| 1/4"                    | .250"             | .150"     | .010" |
| 3/8"                    | .375"             | .225"     | .012" |
| 1/2"                    | .500"             | .300"     | .015" |
| 3/4"                    | .750"             | .450"     | .020" |
| 1"                      | 1.000"            | .600"     | .025" |
| 1-1/2"                  | 1.500"            | .900"     | .030" |



### A very high temperature, chemical resistant tubing

#### 2:1 Shrink High Temperature Excellent Chemical Resistance

PTFE Heat Shrink Tubing is a unique Thermoplastic that possesses excellent characteristics for tubing used in high temperature applications, corrosive atmospheres, electrical insulation and as a lubricant. PTFE possesses the lowest coefficient of friction of any known solid, and is used widely because of its anti-stick properties. It is non-wetting and self-lubricating.

PTFE heat shrink tubing has excellent chemical resistant qualities and is unaffected by all known chemicals except alkali metals, Fluorine under certain conditions and some Fluorine compounds at elevated temperatures. It is unaffected by weathering and has excellent resistance to outdoor exposure.

PTFE has the widest working range of any plastics material (-250°C to 260°C), does not support combustion and is an excellent insulator for electrical applications.

#### Specifications:

M23053/12

FDA Approved C.F.R. 21 121.255

**Shrink Ratio:** 2:1 as shown above/  
4:1 (call for information)

**Shrink Temperature:** 621°F

**Continuous Operating Temperature:**  
-100°F to 500°F

| Order Size | Expanded ID/<br>Recovered ID | Recovered Wall Thickness |       |       |
|------------|------------------------------|--------------------------|-------|-------|
|            |                              | Standard                 | Thin  | Light |
| 30         | .034/.015"                   | -                        | .009" | -     |
| 28         | .038/.018"                   | -                        | .009" | -     |
| 26         | .046/.022"                   | -                        | .009" | -     |
| 24         | .050/.027"                   | .012"                    | .010" | .006" |
| 22         | .055/.032"                   | .012"                    | .010" | .006" |
| 20         | .060/.039"                   | .016"                    | .012" | .006" |
| 19         | .065/.043"                   | .016"                    | .012" | .006" |
| 18         | .076/.049"                   | .016"                    | .012" | .006" |
| 17         | .085/.054"                   | .016"                    | .012" | .006" |
| 16         | .093/.061"                   | .016"                    | .012" | .006" |
| 15         | .110/.067"                   | .016"                    | .012" | .006" |
| 14         | .120/.072"                   | .016"                    | .012" | .008" |
| 13         | .140/.080"                   | .016"                    | .012" | .008" |
| 12         | .150/.089"                   | .016"                    | .012" | .008" |
| 11         | .170/.101"                   | .016"                    | .012" | .008" |
| 10         | .191/.112"                   | .016"                    | .012" | .008" |
| 9          | .205/.124"                   | .020"                    | .015" | .008" |
| 1/8        | .215/.130"                   | .020"                    | .015" | .008" |
| 8          | .240/.141"                   | .020"                    | .015" | .008" |
| 7          | .270/.158"                   | .020"                    | .015" | .008" |
| 6          | .302/.178"                   | .020"                    | .015" | .010" |
| 5          | .320/.198"                   | .020"                    | .015" | .010" |
| 4          | .370/.224"                   | .020"                    | .015" | .010" |
| 3          | .390/.249"                   | .020"                    | .015" | .010" |
| 1/4"       | .410/.260"                   | .020"                    | .015" | .010" |
| 2          | .430/.278"                   | .020"                    | .015" | .010" |
| 1          | .450/.311"                   | .020"                    | .015" | .010" |
| 5/16"      | .470/.329"                   | .020"                    | .015" | .012" |
| 0          | .470/.347"                   | .020"                    | .015" | .012" |
| 3/8"       | .560/.399"                   | .025"                    | .020" | -     |
| 7/16"      | .655/.462"                   | .025"                    | .020" | -     |
| 1/2"       | .750/.524"                   | .025"                    | .020" | -     |
| 5/8"       | .930/.655"                   | .030"                    | .025" | -     |
| 3/4"       | 1.125/.786"                  | .035"                    | .030" | -     |
| 7/8"       | 1.310/.911"                  | .035"                    | -     | -     |
| 1"         | 1.500/1.036"                 | .035"                    | -     | -     |



**USP Class VI, ISO 10993-5**

**USP Class VI Compliant  
ISO 10993-5 Certified  
USFDA Compliant  
RoHS Compliant**

Medical -Grade USP Class VI heat shrink tubing that sets the standard for high-performance, safety and reliability, meeting the most stringent biocompatible criteria. Tubing is alcohol wiped, packaged in coils or on plastic spools, and double plastic bagged in a clean room environment. 100%

| Specifications:   |  |  |  |
|---|--|--|--|
| <b>Acrylated Polyolefin</b>                               |  |  |  |
| Shrink Ratio: 2:1   |  |  |  |
| Operating Temperature: -55°C to 121°C<br>(-67°F to 250°F) |  |  |  |
| Longitudinal Shrink: ±5%                                  |  |  |  |
| Tensile Strength: 3200 / 3600 psi                         |  |  |  |
| Dielectric Strength: 1,800 / 2,000 vpm                    |  |  |  |
| Standard Colors: Black, White, Blue, Clear                |  |  |  |
| <b>Radiation Cross-Linked Polyvinylidene Fluoride</b>     |  |  |  |
| Shrink Ratio: 2:1   |  |  |  |
| Operating Temperature: -55°C to 175°C<br>(-67°F to 347°F) |  |  |  |
| Longitudinal Shrink: ±10%                                 |  |  |  |
| Tensile Strength: 5740 psi                                |  |  |  |
| Dielectric Strength: 1,300 vpm                            |  |  |  |
| Standard Colors: Black, White                             |  |  |  |
| <b>High-Performance, Non-Phthalate Polyvinylchloride</b>  |  |  |  |
| Shrink Ratio: 2:1   |  |  |  |
| Operating Temperature: -20°C to 60°C<br>(-4°F to 140°F)   |  |  |  |
| Longitudinal Shrink: 20% at maximum full recovery         |  |  |  |
| Tensile Strength: 2900 psi                                |  |  |  |
| Dielectric Strength: 650 vpm                              |  |  |  |
| Standard Color: Crystal Clear                             |  |  |  |

factory tested for superior insulation integrity, reliability and safety.

#### **Radiation Cross-Linked Acrylated Polyolefin**

For insulating electro-surgical instruments and for biocompatible jacketing for temporary implantation devices. Features high dielectric strength, superior cut-through, puncture and abrasion resistance, unique heat sealable and adhesion properties without adhesives, numerous sterilization options.

#### **Radiation Cross-Linked Polyvinylidene Fluoride**

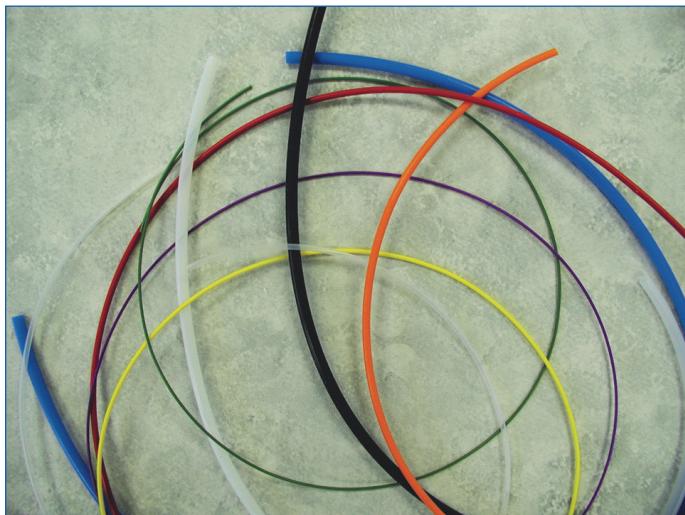
High heat resistant, thin wall fluoropolymer best for electrical insulation, stiffening, strain relief, and as a manufacturing aid in demanding environments. Features exceptional mechanical strength, low cost substitute for PTFE in many applications, lower shrink temperature than PTFE.

#### **High-Performance, Non-Phthalate Polyvinylchloride**

Ultra-flexible, crystal clear, low shrink temperature, non-phthalate Polyvinylchloride is ideal for tube joining, transitioning and providing transparent protection. Features outstanding flexibility, exceptional clarity, low shrink temperature.

| Order Size                     | Expanded Diameter | Recovered |       |
|--------------------------------|-------------------|-----------|-------|
|                                |                   | Diameter  | Wall  |
| <b>Acrylated Polyolefin</b>    |                   |           |       |
| 3/32"                          | .093"             | .046"     | .020" |
| 1/8"                           | .125"             | .063"     | .020" |
| 3/16"                          | .187"             | .093"     | .020" |
| 1/4"                           | .250"             | .125"     | .025" |
| 3/8"                           | .375"             | .187"     | .025" |
| 1/2"                           | .500"             | .250"     | .025" |
| <b>Polyvinylidene Fluoride</b> |                   |           |       |
| 3/32"                          | .093"             | .046"     | .010" |
| 1/8"                           | .125"             | .063"     | .010" |
| 3/16"                          | .187"             | .093"     | .010" |
| 1/4"                           | .250"             | .125"     | .013" |
| 3/8"                           | .375"             | .187"     | .013" |
| 1/2"                           | .500"             | .250"     | .013" |
| <b>Polyvinylchloride</b>       |                   |           |       |
| 3/32"                          | .093"             | .046"     | .020" |
| 1/8"                           | .125"             | .063"     | .020" |
| 3/16"                          | .187"             | .093"     | .020" |
| 1/4"                           | .250"             | .125"     | .025" |
| 3/8"                           | .375"             | .187"     | .025" |
| 1/2"                           | .500"             | .250"     | .025" |





**A superior high dielectric strength 105°C PVC tubing**

**High Temperature**

**U/L recognized CSA certified**

**Low cost**

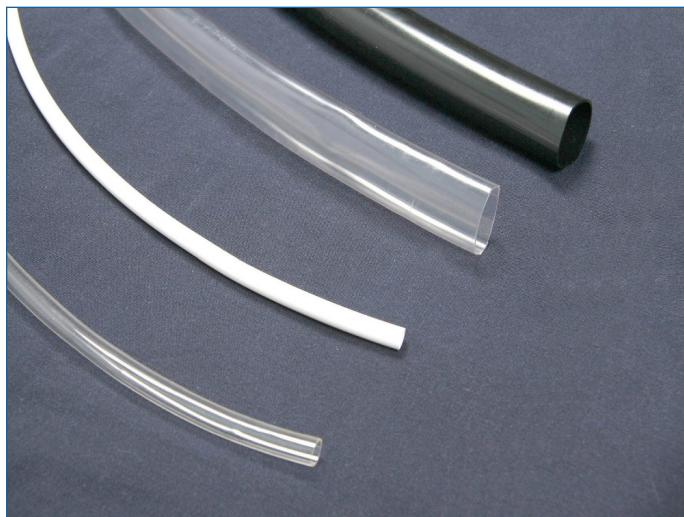
A high temperature extruded PVC tubing designed for electrical applications, general purpose bundling, and many other uses.

105°C vinyl tubing is a low cost, flexible vinyl with excellent electrical, mechanical and thermal properties for applications up to 105°C. It carries Underwriters Laboratories recognition and is rated VW-1 along with Canadian Standards Association certification.

This tubing is available with standard wall thickness shown below along with a .032" wall thickness in sizes #24 thru 1/2" on special order where 600V rating is needed.

| <b>Specifications:</b>   |      |  |
|--|------|--|
| U/L Subject 224  | VW-1 |  |
| CSA OFT  |      |  |
| 1000 Volts/ mil dielectric   |      |  |
| MIL-I-631D Grade C   |      |  |
| ASTM D 922   |      |  |
| AMS 3631   |      |  |
| QPL Approved   |      |  |
| <b>Colors:</b> black, white, red, yellow, green and clear are standard.  |      |  |
| <b>Continuous operating temperature:</b>                                 |      |  |
| -20 to 105°C   |      |  |
| <b>Dielectric Strength:</b> 750vpm - .021" sample                        |      |  |
| Cut pieces and markers are available, please contact us for a quotation. |      |  |

| Order Size | Nominal I.D. | Wall  | Order Size | Nominal I.D. | Wall  |
|------------|--------------|-------|------------|--------------|-------|
| #24        | .022"        | .012" | 1/4"       | .250"        | .020" |
| #22        | .027"        | .012" | #2         | .263"        | .020" |
| #20        | .034"        | .016" | #1         | .294"        | .020" |
| #19        | .038"        | .016" | #0         | .330"        | .020" |
| #18        | .042"        | .016" | 5/16"      | .313"        | .025" |
| #17        | .047"        | .016" | 3/8"       | .375"        | .025" |
| #16        | .053"        | .016" | 7/16"      | .437"        | .025" |
| #15        | .059"        | .016" | 1/2"       | .500"        | .025" |
| #14        | .066"        | .016" | 9/16"      | .563"        | .030" |
| #13        | .076"        | .016" | 5/8"       | .625"        | .030" |
| #12        | .085"        | .016" | 3/4"       | .750"        | .035" |
| #11        | .095"        | .016" | 7/8"       | .875"        | .035" |
| #10        | .106"        | .016" | 1"         | 1.000"       | .035" |
| #9         | .118"        | .020" | 1-1/8"     | 1.125"       | .035" |
| #8         | .133"        | .020" | 1-1/4"     | 1.250"       | .040" |
| #7         | .148"        | .020" | 1-3/8"     | 1.375"       | .045" |
| #6         | .166"        | .020" | 1-1/2"     | 1.500"       | .045" |
| #5 (3/16") | .186"        | .020" | 1-3/4"     | 1.750"       | .055" |
| #4         | .208"        | .020" | 2"         | 2.000"       | .060  |
| #3         | .234"        | .020" |            |              |       |



A superior general purpose PVC tubing

#### Exceptional Temperature Range

**Flame Retardant**

**Flexible**

IP12GA maintains high dielectric strength, excellent flexibility, non-corrosiveness and fungus resistance over a wide temperature range. It is recommended for appliances, electric motors, automotive components, motorcycles and a host of other installations.

IP1274 is manufactured to withstand temperatures as low as -70°C. This produces unusually high flexibility and cut-through resistance while maintaining high dielectric strength. Recommended uses include harnessing, cable or conduit installations in airborne devices, aircraft, missiles and snow machines.

#### Specifications:

##### IP12GA

MIL-I-631 Grade A & B, Form U, Subform Ua, Class I and II, Category 1

ASTM D922

**Operating Temperature:** -55°C to 90°C

**Dielectric Strength:** 1000 VPM

##### IP1274

MIL-I-7444 Types I and III

MIL-I-22076

**Operating Temperature:** -70°C to 85°C

**Dielectric Strength:** 545 VPM

**Colors:** Black, Clear

| Order Size | Norm. ID | Wall |
|------------|----------|------|
| 24         | .022     | .012 |
| 22         | .027     | .012 |
| 20         | .034     | .016 |
| 19         | .038     | .016 |
| 18         | .042     | .016 |
| 17         | .047     | .016 |
| 16         | .053     | .016 |
| 15         | .059     | .016 |
| 14         | .066     | .016 |
| 13         | .076     | .016 |
| 12         | .085     | .016 |
| 11         | .095     | .016 |
| 10         | .106     | .016 |
| 9          | .118     | .020 |
| 8          | .133     | .020 |
| 7          | .148     | .020 |
| 6          | .166     | .020 |
| 5 (3/16")  | .186     | .020 |
| 4          | .208     | .020 |
| 3          | .234     | .020 |
| 1/4"       | .250     | .020 |
| 2          | .263     | .020 |
| 1          | .294     | .020 |
| 0          | .330     | .020 |
| 5/16"      | .313     | .025 |
| 3/8"       | .375     | .025 |
| 7/16"      | .437     | .025 |
| 1/2"       | .500     | .025 |
| 9/16"      | .563     | .030 |
| 5/8"       | .625     | .030 |
| 3/4"       | .750     | .035 |
| 7/8"       | .875     | .035 |
| 1"         | 1.000    | .035 |
| 1-1/8"     | 1.125    | .035 |
| 1-1/4"     | 1.250    | .040 |
| 1-3/8"     | 1.375    | .045 |
| 1-1/2"     | 1.500    | .045 |
| 1-3/4"     | 1.750    | .055 |
| 2"         | 2.000    | .060 |



**Great for low pressure FDA applications**

**Food Grade Vinyl  
Heavy wall  
Kink resistant**

Virgin materials are used for this Food and Drug Administration approved Vinyl tubing.

Vinyl tubing is clear, smooth, flexible, corrosion-resistant, non-aging and non-oxidizing. Meets tests such as U.S. Pharmacopoeia Classes I through VI and the criteria set forth by Federal Specification L-T-790B for laboratory and medical tubing (including oxygen handling).

Sold from stock in 100 ft. coils up to 11/16" x 15/16" x 1/8" wall and in 50' lengths 11/16"

x 1" x 5/32" wall and larger tubings. Cut pieces or special lengths on quotation.

| Sizes |       |       |
|-------|-------|-------|
| I.D.  | O.D.  | Wall  |
| 1/16" | 3/16" | 1/16" |
| 1/8"  | 1/4"  | 1/16" |
| 3/16" | 1/4"  | 1/32" |
| 3/16" | 5/16" | 1/16" |
| 3/16" | 3/8"  | 3/32" |
| 3/16" | 7/16" | 1/8"  |
| 1/4"  | 5/16" | 1/32" |
| 1/4"  | 3/8"  | 1/16" |
| 1/4"  | 7/16" | 3/32" |
| 1/4"  | 1/2"  | 1/8"  |
| 5/16" | 7/16" | 1/16" |
| 5/16" | 1/2"  | 3/32" |
| 5/16" | 9/16" | 1/8"  |
| 3/8"  | 1/2"  | 1/16" |
| 3/8"  | 9/16" | 3/32" |
| 3/8"  | 5/8"  | 1/8"  |

| Sizes  |        |       |
|--------|--------|-------|
| I.D.   | O.D.   | Wall  |
| 7/16"  | 9/16"  | 1/16" |
| 7/16"  | 5/8"   | 3/32" |
| 1/2"   | 5/8"   | 1/16" |
| 1/2"   | 11/16" | 3/32" |
| 1/2"   | 3/4"   | 1/8"  |
| 1/2"   | 13/16" | 5/32" |
| 9/16"  | 3/4"   | 3/32" |
| 9/16"  | 13/16" | 1/8"  |
| 9/16"  | 7/8"   | 5/32" |
| 5/8"   | 3/4"   | 1/16" |
| 5/8"   | 13/16" | 3/32" |
| 5/8"   | 7/8"   | 1/8"  |
| 5/8"   | 15/16" | 5/32" |
| 11/16" | 7/8"   | 3/32" |
| 11/16" | 15/16" | 1/8"  |



### Polyurethane

#### Ether 75A & Ester 85A

Our Polyurethane tubing is available in polyether and polyester, both with optimum abrasion resistance, high tensile strength and low-temperature flexibility. Neither contain plasticizers, so migration is not a problem. Polyether types give maximum abrasion resistance and good oil, solvent and grease resistance. Both materials meet FDA requirements.

Stocked in 100' coils up to 5/8" x 7/8" x 1/8" wall and 50' coils from 3/4" x 1" x 1/8" wall and larger. Cut pieces, special lengths, durometers and colors on quotation.

For best results, use sleeved compression fittings with all thermoplastic tubing.

| Specifications:    |             |            |
|--------------------|-------------|------------|
| Ether Polyurethane | Test Method |            |
| Specific Gravity   | 1.12        | D1505/D792 |
| Tensile Strength   | 5500        | D882/D638  |
| Elongation %       | 550         | D882/D638  |
| Hardness           | 80-97       | D786       |
| Ester Polyurethane | Test Method |            |
| Specific Gravity   | 1.20        | D1505/D792 |
| Tensile Strength   | 6500        | D882/D638  |
| Elongation %       | 550         | D882/D638  |
| Hardness           | 77-97       | D786       |

| Sizes |        |       | Approx.<br>lbs. / C | Ether/Ester<br>psi @ 73° |
|-------|--------|-------|---------------------|--------------------------|
| I.D.  | O.D.   | Wall  |                     |                          |
| 1/16" | 1/8"   | 1/32" | .5                  | 80 / 105                 |
| 1/8"  | 3/16"  | 1/32" | .8                  | 50 / 70                  |
|       | 1/4"   | 1/16" | 1.9                 | 80 / 110                 |
| 3/16" | 1/4"   | 1/32" | 1.1                 | 40 / 55                  |
|       | 5/16"  | 1/16" | 2.6                 | 65 / 85                  |
| 1/4"  | 5/16"  | 1/32" | 1.4                 | 30 / 50                  |
|       | 3/8"   | 1/16" | 3.2                 | 55 / 75                  |
|       | 7/16"  | 3/32" | 5.3                 | 70 / 95                  |
|       | 1/2"   | 1/8"  | 7.7                 | 85 / 110                 |
| 5/16" | 7/16"  | 1/16" | 3.9                 | 50 / 65                  |
|       | 9/16"  | 1/8"  | 9.0                 | 75 / 100                 |
| 3/8"  | 1/2"   | 1/16" | 4.5                 | 40 / 55                  |
|       | 9/16"  | 3/32" | 7.2                 | 55 / 75                  |
|       | 5/8"   | 1/8"  | 10.3                | 70 / 90                  |
| 7/16" | 5/8"   | 3/32" | 8.2                 | 50 / 65                  |
| 1/2"  | 5/8"   | 1/16" | 5.8                 | 30 / 40                  |
|       | 3/4"   | 1/8"  | 12.9                | 55 / 75                  |
| 5/8"  | 13/16" | 3/32" | 11.1                | 35 / 50                  |
|       | 7/8"   | 1/8"  | 15.4                | 45 / 60                  |
| 3/4"  | 1"     | 1/8"  | 18.0                | 40 / 55                  |
| 7/8"  | 1-1/8" | 1/8"  | 20.6                | 35 / 45                  |
| 1"    | 1-1/4" | 1/8"  | 23.2                | 30 / 40                  |



**Very high temperature chemical resistant tubing**

**Excellent thermal, electrical  
and chemical resistance**

**Many colors available**

PTFE Tubing is the most versatile insulating material, offering highly stable electrical properties at virtually all electronic frequencies throughout an operating range of -70°C to 260°C. PTFE tubing is nontoxic and will not burn in normal atmosphere at any temperature, and is inert to practically all lubricants, solvents, and reagents. Electrical performance is excellent, offering extremely high dielectric strength even in the thinnest cross sections, with hot soldering irons and sub-zero environmental conditions having no effect. PTFE tubing possesses the lowest coefficient of friction of any known solid. It is also resistant to wicking, moisture absorption, or contamination from objectionable sources.

PTFE tubing is the material to specify when the reliability and dependability of an application at environmental, electrical, mechanical, and chemical extremes is paramount.

| <b>Specifications:</b>      |  |  |  |  |  |
|-----------------------------|--|--|--|--|--|
| Standard Wall               | AMS 3653B<br>MIL-I-22129<br>U/L 600 V                |  |  |  |  |
| Thin Wall                   | AMS 3655   |  |  |  |  |
| Light Wall                  | AMS 3654   |  |  |  |  |
| <b>Temperature Ratings:</b> | Melt Point 620°F<br>Continuous usage -275°F to 500°F |  |  |  |  |
| <b>FDA Recognition:</b>     | GFR 21.121.2555                                      |  |  |  |  |
| U/L Recognized              |  |  |  |  |  |

| Order Size | Inside Dia. | Wall Thickness (mim/max) |            |            |
|------------|-------------|--------------------------|------------|------------|
|            |             | Standard                 | Thin       | Light      |
| 30         | .012"       | -                        | .007/.011" | .004/.008" |
| 28         | .015"       | -                        | .007/.011" | .004/.008" |
| 26         | .018"       | -                        | .007/.011" | .004/.008" |
| 24         | .022"       | .010/.014"               | .008/.012" | .004/.008" |
| 22         | .028"       | .010/.014"               | .008/.012" | .004/.008" |
| 20         | .034"       | .013/.019"               | .009/.015" | .004/.008" |
| 19         | .038"       | .013/.019"               | .009/.015" | .004/.008" |
| 18         | .042"       | .013/.019"               | .009/.015" | .004/.008" |
| 17         | .047"       | .013/.019"               | .009/.015" | .004/.008" |
| 16         | .053"       | .013/.019v               | .009/.015" | .004/.008" |
| 15         | .059"       | .013/.019"               | .009/.015" | .004/.008" |
| 14         | .066"       | .013/.019"               | .009/.015" | .006/.010" |
| 13         | .076"       | .013/.019"               | .009/.015" | .006/.010" |
| 12         | .085"       | .013/.019"               | .009/.015" | .006/.010" |
| 11         | .095"       | .013/.019"               | .009/.015" | .006/.010" |
| 10         | .106"       | .013/.019"               | .009/.015" | .006/.010" |
| 9          | .118"       | .016/.024"               | .011/.019" | .006/.010" |
| 1/8"       | .125"       | .016/.024"               | .011/.019" | .006/.010" |
| 8          | .133"       | .016/.024"               | .011/.019" | .006/.010" |
| 7          | .148"       | .016/.024"               | .011/.019" | .006/.010" |
| 6          | .166"       | .016/.024"               | .011/.019" | .007/.013" |
| 5          | .186"       | .016/.024"               | .011/.019" | .007/.013" |
| 4          | .208"       | .016/.024"               | .011/.019" | .007/.013" |
| 3          | .234"       | .016/.024"               | .011/.019" | .007/.013" |
| 1/4"       | .255"       | .016/.024"               | .011/.019" | .007/.013" |
| 2          | .263"       | .016/.024"               | .011/.019" | .007/.013" |
| 1          | .294"       | .016/.024"               | .011/.019" | .007/.013" |
| 5/16"      | .321"       | .016/.024"               | .011/.019" | .009/.015" |
| 0          | .330"       | .016/.024"               | .011/.019" | .009/.015" |
| 3/8"       | .387"       | .019/.031"               | .015/.025" | .010/.020" |
| 7/16"      | .451"       | .019/.031"               | .015/.025" | .013/.023" |
| 1/2"       | .515"       | .019/.031"               | .015/.025" | .013/.023" |
| 5/8"       | .643"       | .024/.036"               | .020/.030" | .015/.025" |
| 3/4"       | .772"       | .027/.043"               | .024/.036" | .015/.025" |
| 7/8"       | .875"       | .027/.043"               | -          | -          |
| 1"         | 1.000"      | .027/.043"               | -          | -          |
| 1-1/4"     | 1.250"      | .032/.048"               | -          | -          |
| 1-1/2"     | 1.500"      | .032/.048"               | -          | -          |



Very flexible / conforms to irregular shapes

**Self-fitting over many shapes and sizes**

**Rated to 125°C**

Expandable Polyester Sleeving is a light-weight, encapsulating sleeving designed to expand and adjust to irregular surfaces to protect cable bundles and wire assemblies. It is braided from polyethylene terephthalate monofilament which offers cut-through, chemical and fungus resistance in addition to abrasion resistance.

Push the sleeving over large fittings to expand its size. Once over, expandable sleeving becomes a snug, form-fitting cover that adjusts to irregular shapes and contours providing abrasion resistance and protection with a minimum of bulk and weight.

Polyester expandable sleeving is available as a standard U/L recognized product rated for 125°C. It can also be supplied with the added feature of flame retardance. Also U/L recognized for 125°C, the flame retardant version carries U/L's highest VW-1 rating.

| Specifications:  |  |  |
|--|--|--|
| U/L Recognized   |  |  |
| CSA Certified  |  |  |
| Rated for 125°C  |  |  |
| Flame Retardant Version U/L VW-1                                 |  |  |
| .010" Filament Diameter  |  |  |
| Available in a heavy wall version for twice the wear resistance. |  |  |
| Expandable sleeving comes in nine colors.                        |  |  |
| Rot-free   |  |  |
| Does not trap heat or humidity                                   |  |  |

| Order Size | Usage Range  |              |
|------------|--------------|--------------|
|            | Minimum Size | Maximum Size |
| 1/8"       | 3/32"        | 1/4"         |
| 1/4"       | 1/8"         | 5/16"        |
| 3/8"       | 1/4"         | 1/2"         |
| 1/2"       | 3/8"         | 5/8"         |
| 3/4"       | 5/8"         | 1"           |
| 1"         | 5/8"         | 1-3/8"       |
| 1-1/4"     | 1-1/8"       | 1-1/2"       |
| 1-1/2"     | 1-3/8"       | 1-3/4"       |
| 1-3/4"     | 1-1/2"       | 2-1/4"       |
| 2"         | 1-1/2"       | 3"           |
| 2-1/2"     | 2"           | 3-1/2"       |



For very high temperature applications

| Specifications:        |
|------------------------|
| <b>Vinyl Coated</b>    |
| U/L Recognized         |
| MIL-I-3190             |
| MIL-I-21557            |
| ASTM D-372             |
| NEMA VS-1              |
| 130°C                  |
| <b>Acrylic Coated</b>  |
| MIL-I-3190             |
| 155°C                  |
| <b>Silicone Coated</b> |
| U/L Recognized         |
| MIL-I-3190             |
| ASTM D-372             |
| NEMA VS-1              |
| 200°C                  |

| Order Size | Nominal I.D. |
|------------|--------------|
| #24        | .022"        |
| #22        | .027"        |
| #20        | .034"        |
| #18        | .042"        |
| #16        | .053"        |
| #15        | .059"        |
| #14        | .066"        |
| #13        | .076"        |
| #12        | .085"        |
| #11        | .095"        |
| #10        | .106"        |
| #9         | .118"        |
| #8         | .133"        |
| #7         | .148"        |
| #6         | .166"        |
| #5         | .186"        |
| #4         | .208"        |
| #3         | .234"        |
| #2         | .263"        |
| #1         | .294"        |
| #0         | .330"        |
| 3/8"       | .375"        |
| 7/16"      | .438"        |
| 1/2"       | .500"        |
| 5/8"       | .625"        |
| 3/4"       | .750"        |

### High Temperature

#### Heat Treated / Vinyl Coating / Acrylic Coated / Silicone Coated

Fiberglass sleeving is designed for heat resistance along with a variety of coatings to meet specific thermal and dielectric requirements.

**Heat treated** (IP64FS) fiberglass is designed for applications up to 1200°F. It is annealed to remove any organic impurities and to improve its fray resistance. It is often used where air gap electrical insulation is sufficient, particularly where high temperatures are encountered.

**Vinyl coated** (IP65VC) fiberglass is coated with a specifically formulated vinyl designed to provide high dielectric strength and good heat resistance.

Rated for continuous operation at 130°C its excellent flexibility and toughness makes it ideal for many applications. The vinyl coating is flame retardant and is U/L recognized VW-1.

**Acrylic coated** (IP66AC) fiberglass is a flexible fully cured acrylic coating applied to a tightly braided fiberglass sleeving. This coating offers excellent cut-through resistance and compatibility with most varnishes, resins and wire enamels. Rated for continuous use at 155°C it is ideal for insulating motor leads and a variety of instruments.

**Silicone coated** (IP67SC) fiberglass is a highly flexible sleeving designed for use at temperatures up to 200°C. It also retains its flexibility at temperatures as low as -70°C. This sleeving is compatible with most high temperature insulation systems, exhibits excellent corona resistance and is self-extinguishing leaving only a non-conductive ash. Its applications are widespread because of its large operating band and includes insulation of leads and connections in transformers.



Bundles wires and hoses firmly but allows flexibility

U/L recognized

Mil-Spec.

Standard and reverse cuts

Spiral Wrap Tubing is an expandable spirally cut tubing designed to hold wire bundles firmly yet allows complete flexibility. Individual wires can enter or exit at any point on a long harness where many leads may be required.

Spiral Wrap allows removal for changes or repair and is easily reinstalled. This material offers more versatility than tape and is quicker to use than lacing tape or cable ties.

It is available in a wide variety of materials and colors to satisfy high temperature (up to 260°C), fire resistant (U/L 94V-0 & 94V-2) and U/V applications, plus color coding and identification.

| Specifications:  |  |
|--|--|
| Also available in polyethylene, U/V resistant polyethylene, fire retardant polyethylene, nylon and PTFE for special applications.            |  |
| <b>Polyethylene</b><br>Operating temperature: -60°C to 88°C<br>Ford Spec. LP390<br>Mil-I-631D<br>Mil-P-21922B                                |  |
| <b>Nylon</b><br>Operating temperature: -40°C to 121°C<br>Mil-I-20693B Type 1<br>Mil-M-22096A<br>Mil-M-19098                                  |  |
| <b>PTFE</b><br>Operating temperature: -268°C to 260°C<br>AMS 3651C, 3653C, 3654 & 3655<br>ASTM-D-3295<br>Mil-I-22129C<br>Mil-T-47287A Type 1 |  |

| Order Size | Nominal O.D. | Wall  | Pitch |
|------------|--------------|-------|-------|
| 1/8"       | .125"        | .032" | 3/16" |
| 3/16"      | .187"        | .030" | 1/4"  |
| 1/4"       | .250"        | .045" | 3/8"  |
| 3/8"       | .375"        | .052" | 7/16" |
| 1/2"       | .500"        | .062" | 9/16" |
| 5/8"       | .625"        | .062" | 5/8"  |
| 3/4"       | .750"        | .065" | 3/4"  |
| 1"         | 1.00"        | .080" | 1.00" |
| 1-1/4"     | 1.25"        | .090" | 1.25" |



Bundling for easy insertion and break-out

**General Purpose Polyethylene**  
**High Temperature Nylon**  
**Extra Flexible Polypropylene**

Slit Guard Conduit is an easy to use protection for wire, cable and hoses. Its full length slit down the side allows quick installation of your assembly but because of its unique corrugated design also closes for a permanent covering.

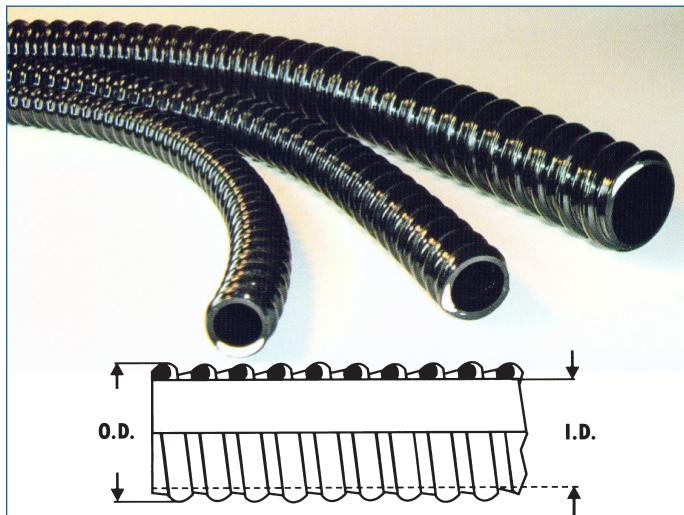
**General purpose polyethylene** is used for bundling applications where temperatures are not a concern. It is also available in a gray flame retardant version.

**Nylon** Slit Guard Conduit is a copolymer nylon type 6, providing good impact strength, elongation and flexibility. It is best suited for under hood, near brakes and other hot spots up to 300°F.

**Polypropylene** Slit Guard Conduit gives the added flexibility to allow sharp bends in tight areas and is available in a UL-94 V2 rated material.

| Specifications:                |                   |                    |
|--------------------------------|-------------------|--------------------|
| <b>Colors:</b>                 | standard black    | - others available |
| <b>Put-up:</b>                 | Boxes or Gaylord  |                    |
| Available with or without slit |                   |                    |
| <b>Polyethylene</b>            |                   |                    |
| Operating temperature:         | -40°F - +200°F    |                    |
| <b>Nylon</b>                   |                   |                    |
| Operating temperature:         | -40°F - +300°F    |                    |
| Tensile Strength:              | 5100psi ASTM D638 |                    |
| Ultimate Elongation:           | 225% ASTM D638    |                    |
| <b>Polypropylene</b>           |                   |                    |
| Operating temperature:         | -40°F - +275°F    |                    |
| Tensile Strength:              | 3000psi ASTM D638 |                    |
| Ultimate Elongation:           | 700% ASTM D638    |                    |

| Order Size | Nominal I.D. | Nominal O.D. |
|------------|--------------|--------------|
| 1/4"       | .250"        | .400"        |
| 3/8"       | .350"        | .510"        |
| 7/16"      | .415"        | .580"        |
| 1/2"       | .500"        | .695"        |
| 5/8"       | .615"        | .820"        |
| 3/4"       | .740"        | .980"        |
| 7/8"       | .855"        | 1.130"       |
| 1"         | 1.000"       | 1.270"       |
| 1-1/8"     | 1.110"       | 1.350"       |
| 1-1/4"     | 1.220"       | 1.460"       |
| 1-1/2"     | 1.560"       | 1.880"       |



### Flexible, nonmetallic Electrical Tubing

- 1/4" thru 2" trade size
- Use with straight or right angle connectors
- Resists corrosion, oil & water
- Maximum flexibility, can be used in extremely tight quarters
- Resists abuse, pulling & crushing
- Smooth inside for easier wire pulling
- Light weight, lower installed cost
- Outdoor, sunlight resistant
- Quick installation, cuts with utility knife or PVC cutter
- Integral rigid & flexible PVC construction
- Suitable for use in high vibration or flexing applications

#### Specifications:

Recognized under the Components program of Underwriters' Laboratories File No. E129972



CSA Certified by Canadian Standards Association File No. LL-84707, except where noted by in specifications table.



| Order Size | O. D.<br>Min.-Max | I. D.<br>Min.-Max | Std. Pkg. |
|------------|-------------------|-------------------|-----------|
| 1/4"       | .560" - .575"     | .385" - .405"     | 100'      |
| 3/8"       | .690" - .710"     | .484" - .504"     | 100'      |
| 1/2"       | .820" - .840"     | .622" - .642"     | 100'      |
| 3/4"       | 1.030"-1.050"     | .820" - .840"     | 100'      |
| 1"         | 1.290"-1.315"     | 1.041"-1.066"     | 100'      |
| 1-1/4"     | 1.630"-1.660"     | 1.380"-1.410"     | 100'      |
| 1-1/2"     | 1.865"-1.900"     | 1.575"-1.600"     | 50'       |
| 2"         | 2.340"-2.375"     | 2.020"-2.045"     | 50'       |



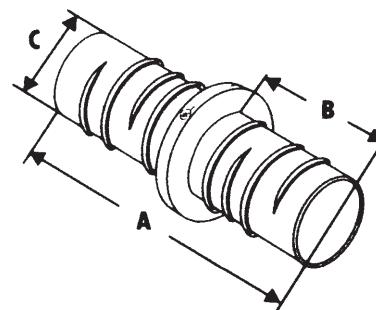
Couplings for long length runs

### Nonmetallic Liquid-tight Conduit Coupling

- UL & CUL listed
- Produced from UV rated material for long outdoor life
- Attractive one-piece design
- Less waste! No need to throw away those odd length pieces
- Simply screw the coupling unto two pieces simultaneously to make one continuous piece
- Snake long lengths of conduit with ease by cutting the conduit, placing wire & reconnecting
- Design allows superior liquid-tight seal & optimum pull strength

| Specifications:   |  |
|---|--|
| Listed under the Underwriters' Laboratories File Number E197675 |  |
| <b>Applications:</b> Outdoor Lighting Assemblies                |  |
| Applications for long conduit runs                              |  |
| Wire Protection   |  |
| Locations where type B conduit is used                          |  |

| Order Size | Part Dimensions (inches) |        |        |
|------------|--------------------------|--------|--------|
|            | A                        | B      | C      |
| 3/8"       | 1.725"                   | 0.800" | 0.520" |
| 1/2"       | 1.725"                   | 0.800" | 0.625" |
| 3/4"       | 1.725"                   | 0.800" | 0.825" |
| 1"         | 1.730"                   | 0.810" | 1.105" |
| 2"         | 4.225"                   | 2.075" | 2.100" |





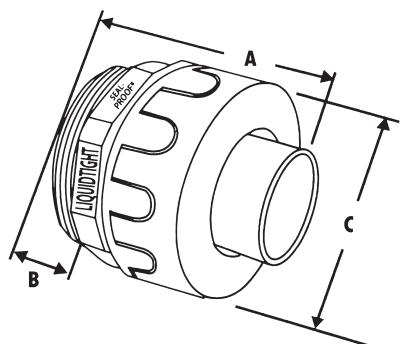
**Easy to install for a secure connection**

### Flexible, Nonmetallic, Electrical Tubing Connectors

- Available 3/8" through 2"
- All nylon construction resists salt water, weak acids, gasoline, alcohol, grease & other common solvents.
- Standard Color: Black or Gray
- Complete conduit/connector system is reusable. Conduit will not wind tight onto the connector during assembly & can be easily removed by pulling while turning in a clockwise direction.
- Suitable for indoor/outdoor use; for original equipment manufacturers of field installers.
- Molded of type nylon 6. Flammability classification 94V-2; temperature index 125°C
- "O" ring & steel locknut included. applications

#### Specifications:

Listed under the Underwriters Laboratories File No. E197675



| Order Size | K.O. Size | Part Dimensions (inches) |       |       |
|------------|-----------|--------------------------|-------|-------|
|            |           | A                        | B     | C     |
| 1/4"       | PG7       | 1.750                    | 0.440 | 1.062 |
| 3/8"       | 1/2"      | 2.000                    | 0.540 | 1.400 |
| 1/2"       | 1/2"      | 2.000                    | 0.540 | 1.400 |
| 3/4"       | 3/4"      | 2.200                    | 0.635 | 1.700 |
| 1"         | 1"        | 2.280                    | 0.740 | 2.000 |
| 1-1/4"     | 1-1/4"    | 2.440                    | 0.760 | 2.400 |
| 1-1/2"     | 1-1/2"    | 2.700                    | 0.800 | 2.670 |
| 2"         | 2"        | 2.990                    | 0.850 | 3.280 |



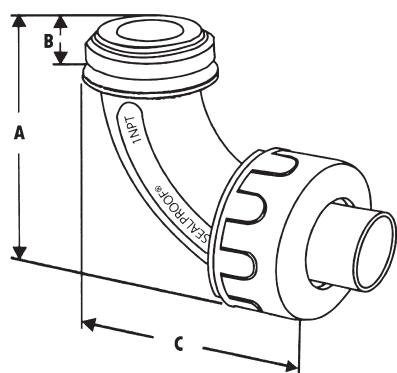
**Smooth internal surfaces for easier wire installation**

### Flexible, Nonmetallic, Electrical Tubing Connectors

- Available 3/8" through 2"
- All nylon construction resists salt water, weak acids, gasoline, alcohol, grease & other common solvents.
- Standard Color: Black or Gray
- Complete conduit/connector system is reusable. Conduit will not wind tight onto the connector during assembly & can be easily removed by pulling while turning in a clockwise direction.
- Suitable for indoor/outdoor use; for original equipment manufacturers of field installers.
- Molded of type nylon 6. Flammability classification 94V-2; temperature index 125°C
- "O" ring & steel locknut included.

#### Specifications:

Listed under the Underwriters' Laboratories File No. E197675



| Order Size | K.O. Size | Part Dimensions (inches) |       |       |
|------------|-----------|--------------------------|-------|-------|
|            |           | A                        | B     | C     |
| 3/8"       | 1/2"      | 2.120                    | 0.500 | 3.120 |
| 1/2"       | 1/2"      | 2.120                    | 0.500 | 3.120 |
| 3/4"       | 3/4"      | 2.500                    | 0.520 | 3.600 |
| 1"         | 1"        | 3.125                    | 0.700 | 4.125 |
| 1-1/4"     | 1-1/4"    | 4.450                    | 0.760 | 5.200 |
| 1-1/2"     | 1-1/2"    | 4.750                    | 0.800 | 5.200 |
| 2"         | 2"        | 5.420                    | 0.860 | 5.800 |



**Domestically made adhesives offer fresher product**

**Premium Quality, Consistency and Reliability  
Custom Engineered Products Available  
ALL products made domestically**

Insulation Products Corporation offers a complete line of Adhesive Products. From Instant Adhesives (Cyanoacrylates), Threadlockers and Sealers (Anaerobic), Structural Adhesives (Methacrylates) and Dispensing Equipment.

### **Instant Adhesives (Cyanoacrylates)**

No other adhesives offer a better combination of convenience, ease of use, dependability and strength. Whether bonding rubber, plastic, metal, wood or other surfaces, this adhesive will give you the ultimate in performance. Cyanoacrylates are used where an extremely fast fixture speed and where minimal spacing is required.

### **Threadlockers, Sealing, Retaining and Gasketing (Anaerobics)**

Whether you are looking for a locking/sealing solution on threaded fasteners, non-threaded assemblies (cylindrical, bearings, gears, shafts or pulleys), or form-in-place gaskets; we will have a product for you.

This family of adhesives are engineered to provide the most consistent fixture and cure times in the industry. Domestic production means you get fresher and therefore faster performing materials.

### **Structural Adhesives (1 and 2 part epoxies, UV Cure, Acrylics and Methacrylates)**

We offer a complete line of epoxies, 1-part and 2-part, for bonding, encapsulating and potting applications for all types of industries. Our 2-part

methacrylates are designed for structural bonding of most metals, thermoplastics and composites. There are great solutions for marine, automotive and industrial applications. We even offer UV-curing adhesives, which are used in a wide range of situations for electronics, medical devices, automotive and packaging

### **Sealants**

These products are designed to meet a variety of bonding and sealing applications. Extremely versatile and designed to provide good adhesion and sealing properties for many different applications. These can be used on glass, ceramics, masonry, wood, painted surfaces, metal and plastics.

### **Application Systems**

Our dispensing equipment is reliable, consistent and dependable. We offer solutions from hand held applicators to fully automated systems, microprocessor controllers, precision dispensing valves and a complete family of accessories.

With engineers on site, we will be able to create a solution to your adhesive requirements. We are here for all your adhesive requirements.



**Tough, abrasion-resistant polyethylene with thick aggressive adhesive for areas where tubing can not be applied.**

Heat shrinkable polyolefin tape is a primerless, heat shrinkable tape designed to insulate and seal areas, where tubing can not be used, for protection against moisture and corrosion. This unique tape permits quick and reliable installation without error by installers who have little experience working with heat shrink products. The shrinking action achieves exceptional conformation to contours, squeezing the adhesive into all surface irregularities, forming an effective seal.

Using a propane torch or heat gun, pre-heat the object to remove any moisture. This will assist flow-out and bonding of the adhesive. Spirally wrap tape, keeping snug at all times, with about a 20% overlap. Warm the ends first and press down firmly to secure. Start shrinking from the center, moving in a circular direction around the pipe at all times. As the tape shrinks, work towards the ends of the tape.

| Specifications:             |                                       | Standard Size |
|-----------------------------|---------------------------------------|---------------|
| Temperature Rating          | -25°C to 60°C                         | 3/4"          |
| Tape Tensile Strength       | ASTM D-638 2,600 P.S.I.               | 1"            |
| Tape Elongation             | ASTM D-638 600 P.S.I.                 | 1-1/2"        |
| Adhesive Softening Point    | ASTM E-28 76°C                        | 2"            |
| Adhesive Peel Strength      | 10 P.S.I.                             | 3"            |
| Adhesive Lap Shear Strength | 25 P.S.I.                             | 4"            |
| Low Temperature Flexibility | ASTM D-2671 -25°C                     | 6"            |
| Water Absorption            | ASTM D-570 0.15% after 24 hrs at 23°C | 50' lengths   |
| Volume Resistivity          | ASTM D-257 1015 OHM-CM                |               |
| Dielectric Breakdown        | ASTM D-149 650 volts/mil              |               |
| Tape Backing Thickness      | .016"                                 |               |
| Adhesive Thickness          | .035"                                 |               |



**Shrinks any tubing with variable temperature**

### Variable Temperature

### Two Speed Motor

### Solid State

Our VT-1100 variable temperature heat gun allows the user to dial in the correct shrink temperature for whatever tubing is being used, from low temperature, sensitive PVCs, to high temperature, hard to shrink Teflon. Lightweight yet rugged, this gun can be used for every application from production lines to the occasional user.

Attachments are available for shrinking small diameter or large diameter tubing along with a pin-point attachment to control heat to a selected point.

A larger bench top heat gun is available for production lines where continuous operation for extended periods is needed.

### Specifications:

UL & CSA Approved

1200 Watts

120 VAC/10 Amp

Weighs only 1.6 lbs

Variable Temperature Control Dial

Temperature from 250°F – 1100°F

Solid State Construction

Two Speed Motor

High Quality Heat Element

Built in Safety Stand



# PRODUCT SPECIFICATIONS

## HEAT SHRINK TUBING

### Polyolefin

|                           |                                      |                    |
|---------------------------|--------------------------------------|--------------------|
| Standard Wall             | M23053/5 Class 1,2 & 3               | U/L VW-1 & CSA OFT |
| Very Flexible             |                                      | U/L & CSA          |
| Thin Wall                 | U/L & CSA                            |                    |
| Semi-Rigid                | M23053/6 Class 1 & 2                 | U/L                |
| Melt Wall                 | M23053/4 Class1                      | U/L                |
| Adhesive lined            | M23053/4 Class 2 & 3 (upon request)  | U/L                |
| Heavy Wall Adhesive lined | M23053/15 Class 1 & 2 (upon request) |                    |
| Medical Grade             | USP Class VI, ISO 10993-5            |                    |

### PVC

|               |                  |                    |
|---------------|------------------|--------------------|
| Standard Wall | M23053/2 Class 2 | U/L VW-1 & CSA OFT |
| 1/32" Wall    |                  | U/L VW-1 & CSA OFT |
| Irradiated    | M23053/2 Class 1 | U/L VW-1 & CSA OFT |
| Layflat       |                  |                    |

### High-Temperature Fluoropolymer

|               |   |                    |
|---------------|---|--------------------|
| PTFE          | M23053/12 Class 1,2,3,4 & 5   |                    |
| FEP           | M23053/11 Class 1 & 2   |                    |
| Kynar         | M23053/8  | U/L VW-1 & CSA OFT |
| Mylar         | M23053/7 Class 1 & 2  |                    |
| Neoprene      | M23053/1 Class 1 & 2<br>MIL-R-46846 Type 1, Class 1 (upon request)<br>M23053/16 |                    |
| Viton         | M23053/13<br>MIL-R-46846 Type 3, Class 1 (upon request)                         |                    |
| Fluoropolymer | M23053/18 Class 1,2 & 3   | U/L VW-1           |

### Misc.

|                        |  |
|------------------------|--|
| End Caps               |  |
| Large Dia. Pipe Tubing |  |

## NON-SHRINK TUBING

### High-Temperature Fluoropolymer

|      |         |
|------|---------|
| PTFE | M22129C |
| FEP  |         |
| PFA  |         |

### PVC

|                 |                                       |                    |
|-----------------|---------------------------------------|--------------------|
| Standard Wall   | M631D Grade C                         | U/L VW-1 & CSA OFT |
| 1/32" Wall      |                                       | U/L VW-1 & CSA OFT |
| Fractional Wall |                                       | FDA Grade          |
| Low Temperature | M7444 Type 1 & 3<br>M631D Grade A & B |                    |

### Sleeving

|                            |       |     |
|----------------------------|-------|-----|
| Heat Treated Fiberglass    |       | U/L |
| Vinyl Coated Fiberglass    | M3190 | U/L |
| Acrylic Coated Fiberglass  | M3190 | U/L |
| Silicone Coated Fiberglass | M3190 | U/L |
| Expandable Polyester       |       |     |
| Roundit                    |       | U/L |

### Slit Corrugated Conduit

### Spiral Wrap

### Non-Metallic Electrical Tubing

### Misc.

|                                    |  |
|------------------------------------|--|
| Tape - Electrical & Industrial     |  |
| Cable Ties - Flat locking & Beaded |  |

## SPECIAL SERVICES

**Hot Stamp Marking / Printing**  
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**ROHS Compliant Products**  
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