

Tubing & Sleeving

LAPP products are available from
MARYLAND METRICS

P.O. Box 261 Owings Mills, MD 21117 USA
ph:(410)358-3130 (800)638-1830
fx:(410)358-3142 (800)872-9329
RFQ form: <http://mdmetric.com/rfq.htm>

Lapp Index Page: <http://mdmetric.com/elect/contents.htm>

OLFLEX[®]



Tubing & Sleeving

SELECTION GUIDES

OLFLEX® Tubing & Sleeving Selection Guide 546

OLFLEX® Tubing & Sleeving Environmental Chart 548

GENERAL PURPOSE HEAT SHRINKABLE TUBING

2 to 1 OLFLEX® TWPVC **UL/CSA/ROHS** 550
Multi-Purpose Irradiated PVC Tubing, High Strength, Extra Durable

2 to 1 OLFLEX® TWPV **UL/CSA/ROHS** 551
Multi-Purpose, Irradiated Polyolefin, Low Recovery Temperature, Flame Retardant

2 to 1 OLFLEX® TWPG **UL/CSA/ROHS** 552
Multi-Purpose, Irradiated Polyolefin, Green/Yellow Ground Identification

3 to 1 OLFLEX® TWP3:1 **UL/CSA/ROHS** 553
High Shrink Ratio, Irradiated Polyolefin, Low Recovery Temperature, Flame Retardant

4 to 1 OLFLEX® TWP4:1 **UL/ROHS** 554
Extra High Shrink Ratio, Irradiated Polyolefin, Low Recovery Temperature, Flame Retardant

LIQUID TIGHT ADHESIVE LINED HEAT SHRINKABLE TUBING

2 to 1 OLFLEX® ALP **UL/CSA/ROHS** 555
Dual Wall, Adhesive Lined, Irradiated Polyolefin, High Durability, Liquid Tight Sealing

3 to 1 OLFLEX® MWA3:1 **UL/CSA/ROHS** 556
Dual Wall, High Shrink Ratio, Adhesive Lined, Irradiated Polyolefin
High Durability, Liquid Tight Sealing




4 to 1 OLFLEX® MWA4:1 **UL/ROHS** 557
Dual Wall, Extra High Shrink Ratio, Adhesive Lined, Irradiated Polyolefin
High Durability, Liquid Tight Sealing

HIGH PERFORMANCE HEAT SHRINKABLE TUBING

2 to 1 OLFLEX® SRP **UL/CSA/ROHS** 558
Semi-Rigid, Irradiated Polyolefin, Superior Mechanical Strength

2 to 1 OLFLEX® HF **ROHS** 559
Highly Flexible Irradiated Elastomer, Flexible Rugged Protection

Tubing & Sleeving

2 	OLFLEX® CRE Chemical and Temperature Resistant Irradiated Fluoroelastomer, Extreme Hazard Protection	ROHS	560
2 	OLFLEX® ZH Halogen-Free, Reduced Smoke Emission Irradiated Polyolefin, Environmentally Safe Tubing	ROHS	561
2 	OLFLEX® WOVEN Heat Shrinkable Woven Fabric Tubing, High Abrasion Resistance	UL/ROHS	562

WIRE & CABLE MANAGEMENT ACCESSORIES

	OLFLEX® HG1 Multi-Purpose, Versatile, Economical Heat Gun	UL/cUL	563
	OLFLEX® HG3 LCD Ultimate Precision, Industrial Performance Heat Gun, High Heat, High Airflow	UL/cUL	564
	OLFLEX® ZT Flexible Vinyl Zipper Style Tubing, Protective, High Strength, Cable Management Wireway	ROHS	565
	OLFLEX® PVC Sleeving Multi-Purpose PVC Sleeving in Multiple Colors	UL/CSA/ROHS	566
	OLFLEX® O WRAP Polyester Protective Split Wrap, Flexible & Tough for Bundling	UL/CSA/ROHS	567
	OLFLEX® CC/ CC FR Non-Fraying PET Sleeving, Expandable	UL/CSA/ROHS	568
	OLFLEX® PET/ PET FR General Purpose PET Sleeving, Economical	UL/CSA/ROHS	569
	OLFLEX® WRAP/ WRAP FR PET Sleeve with Velcro, Easy Access and Installation	UL/CSA/ROHS	570
	OLFLEX® SW/ SW FR Semi-Rigid PET Sleeve with Split Wrap for Easy Installation	UL/CSA/ROHS	571

TECHNICAL DATA

	Tubing Installation Guide	572
	Considerations in Applying & Choosing Heat Shrinkable Tubing	573

OLFLEX® PVC Sleeving

Multi-Purpose PVC Sleeving in Multiple Colors



OLFLEX® PVC is a multi-purpose sleeving for abrasion protection and exposure to chemicals and oils in industrial plant applications.





Performance Characteristics:

- Exhibits high dielectric strength
- Provides protection against chafing and most chemicals, oils and acids
- Flexible for handling and installation

Performance Advantages:

- Provides a secondary layer of insulation for safety purposes
- Increased cable performance life and decreased equipment downtime

Technical Data:

 Material:	PVC
 Temperature Range:	-20°C to +105°C -4°F to +221°F
 Rated Voltage:	
"24" - "4":	300V
"5/16" - "2-1/2":	600V
 Approvals:	UL Standard 224 CSA Standard 198 ASTM D 922 AMS 3631



Color:

Black, white, red, yellow, & clear

Testing Information:

Property	Test Method	Typical Value
• Specific Gravity	ASTM D 792	1.32
• Tensile Strength	ASTM D 876	2800 psi
• Elongation	ASTM D 876	288%
• Brittleness Temperature	ASTM D 746	-20°C
• Flammability	UL VW-1, CSA OFT	Pass
• Volume Resistivity	ASTM D 257	5.4X10 ²
• Dielectric Strength- 0.021" specimen	ASTM D 149	750 vpm

Part Number	Nominal Outer Diameter inches	Nominal Wall inches	Put-up Lengths		Part Number	Nominal Outer Diameter inches	Nominal Wall inches	Put-up Lengths	
			Spool	Box				Spool	Box
4900-24-X	.022	.012	1000	4000	4900-2-X	.263	.020	1000	2000
4900-22-X	.027	.012	1000	4000	4900-1-X	.294	.020	1000	2000
4900-20-X	.034	.016	1000	4000	4900-5/16-X	.313	.025	500	1000
4900-19-X	.038	.016	1000	4000	4900-0-X	.330	.025	500	1000
4900-18-X	.042	.016	1000	4000	4900-3/8-X	.375	.025	500	1000
4900-17-X	.047	.016	1000	4000	4900-7/16-X	.438	.025	500	1000
4900-16-X	.053	.016	1000	4000	4900-1/2-X	.500	.025	500	1000
4900-15-X	.059	.016	1000	4000	4900-9/16-X	.563	.030	250	500
4900-14-X	.066	.016	1000	4000	4900-5/8-X	.625	.030	250	500
4900-13-X	.076	.016	1000	4000	4900-3/4-X	.750	.035	250	500
4900-12-X	.085	.016	1000	4000	4900-7/8-X	.875	.035	100	400
4900-11-X	.095	.016	1000	4000	4900-11N-X	1.000	.035	100	400
4900-10-X	.106	.016	1000	4000	4900-1-1/8-X	1.125	.035	100	400
4900-9-X	.118	.020	1000	4000	4900-1-1/4-X	1.250	.040	100	400
4900-8-X	.133	.020	1000	4000	4900-1/3-8-X	1.375	.045	50	200
4900-7-X	.148	.020	1000	4000	4900-1-1/2-X	1.500	.045	50	200
4900-6-X	.166	.020	1000	2000	4900-1-3/4-X	1.750	.055	50	200
4900-5-X	.186	.020	1000	2000	4900-21N-X	2.000	.060	50	200
4900-4-X	.208	.020	1000	2000	4900-2-1/4-X	2.250	.065	50	200
4900-3-X	.234	.020	1000	2000	4900-2-1/2-X	2.500	.070	50	200
4900-1/4-X	.250	.020	1000	2000					

Enter the digit of the color where the "X" is in the P/N when ordering: 0= Black, 9= White, 2= Red, 4= Yellow, C= Clear

OLFLEX® O WRAP

Polyester Protective Split Wrap
Flexible & Tough for Bundling



OLFLEX® O WRAP is a tough, flexible, lightweight split wrap used to bundle and protect wire harnesses and cable assemblies. It is used in industrial machinery, robotics and factory automation systems.

Performance Characteristics:

- Easily applied with a self-wrapping overlap
- Self-wrapping design with 45° to 135° overlap
- Outstanding protection from chaffing, cutting and abrasion
- Unaffected by exposure to fuels, oils, lubricants and salt water
- Rugged yet smooth fabric texture and appearance

Performance Advantages:

- Easy installation and removal for assembly and maintenance
- Organizes and bundles wires on plant site to improve work safety
- Resists mechanical damage in industrial environments ensuring no machine or systems downtime
- Superior protection for use in harsh environments, resistant against oils, lubricants, moisture, dirt and abrasion



Technical Data:

Material:	Polyethylene Terephthalate (PET) filaments
Operating Temperature:	-75°C to +125°C -103°F to +257°F
Melt Temperature:	250°C/ 482°F
Approvals:	UL CSA

Performance Properties:

- Low Temperature Flexibility: -70°C/-94°F
- Corrosion Resistance: Non-Corrosive
- Flammability Rating: UL 224

Color: Black

Part Number	Reference	Diameter Inches	Standard Put-up Spools (FT)
61U80086	O WRAP 1/2 BK S	1/2	164
61U80087	O WRAP 3/4 BK S	3/4	82
61U80088	O WRAP 1 BK S	1	82
61U80089	O WRAP 1-1/2 BK S	1-1/2	49

Additional sizes and colors available upon request.

OLFLEX® CC/ CC FR

Non-Fraying PET Sleaving
Expandable



OLFLEX® CC is a high density braid that is used in industrial wire and harness applications and is excellent in bundling and routing wires where durability is crucial. OLFLEX® CC FR is a flame retardant version, designed to quickly self-extinguish and minimize the spread of flame.

Performance Characteristics:

- High density braid does not fray when cut and expands without unraveling
- Resistant to oil, chemicals, and abrasion
- Increased braid density for fuller coverage

Performance Advantages:

- Hot knife is not required for cutting, improving safety
- Virtually frayless when cut with a hot knife
- Denser coverage provides for increased protection of substrates for increased product life



Technical Data:

Material:	Polyethylene Terephthalate (PET) filaments	Colors:	- OLFLEX® CC - OLFLEX® CC FR	Black, Gray Black, White
Temperature Range: operating	-75°C to +125°C -103°F to +257°F	Approvals:	- OLFLEX® CC - OLFLEX® CC FR	UL/CSA UL/CSA, Mil-202, FAR 25, VW-1
Melt Temperature:	- OLFLEX® CC - OLFLEX® CC FR			
	230°C/446°F 250°C/482°F			

OLFLEX® CC

Part Number	Nominal Size	Expansion Range		Standard Put-Ups		lbs./100 ft
		Min.	Max.	Bulk Spool	Mini Spool	
CC-1/8-XX	1/8"	1/8"	1/4"	1000	100	0.396
CC-1/4-XX	1/4"	5/32"	7/16"	1000	100	0.464
CC-3/8-XX	3/8"	3/16"	5/8"	500	100	0.744
CC-1/2-XX	1/2"	1/4"	3/4"	500	100	0.822
CC-3/4-XX	3/4"	5/8"	1"	250	75	1.113
CC-1-XX	1"	3/4"	1-3/16"	250	50	1.236
CC-1-1/4-XX	1-1/4"	1"	1-1/2"	250	50	1.555
CC-1-1/2-XX	1-1/2"	1-1/4"	2"	250	50	1.850

Available in black or gray. Enter BK for black or GY for gray in place of the "XX".

OLFLEX® CC FR: Flame Retardant Version

Part Number	Nominal Size	Expansion Range		Standard Put-Ups		lbs./100 ft
		Min.	Max.	Bulk Spool	Mini Spool	
CCFR-1/8-XX	1/8"	1/8"	1/4"	1000	100	0.396
CCFR-1/4-XX	1/4"	5/32"	7/16"	1000	100	0.464
CCFR-3/8-XX	3/8"	3/16"	5/8"	500	100	0.744
CCFR-1/2-XX	1/2"	1/4"	3/4"	500	100	0.822
CCFR-3/4-XX	3/4"	5/8"	1"	250	75	1.113
CCFR-1-XX	1"	3/4"	1-3/16"	250	50	1.236
CCFR-1-1/4-XX	1-1/4"	1"	1-1/2"	250	50	1.555
CCFR-1-1/2-XX	1-1/2"	1-1/4"	2"	250	50	1.850

Available in black with white tracers or white with black tracers. Enter BW for black or WB for white in place of the "XX".

OLFLEX® PET/ PET FR

General Purpose PET Sleaving
Economical



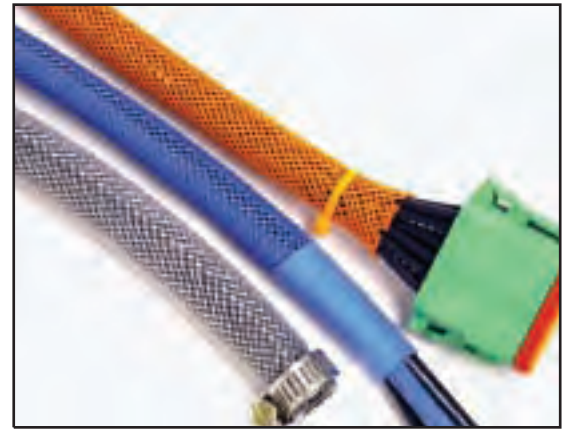
OLFLEX® PET is an economical solution that provides bundling and protection of wires, cables and hoses. OLFLEX® PET FR is a flame retardant version, designed to quickly self-extinguish and minimize the spread of flame.

Performance Characteristics:

- High resistance to gasoline, chemicals and cleaning solvents
- Increased braid density for fuller coverage
- Expands up to 150%
- Halogen-free
- Cuts cleanly when a hot knife is used

Performance Advantages:

- Denser coverage provides for increased protection of substrates for increased product life
- Economical alternative for low budget installations
- Increased product life in industrial applications where gasolines, chemicals and cleaning solvents are present
- Available in a wide variety of colors for color coding installations



Technical Data:

Material:	Polyethylene Terephthalate (PET) filaments	Colors:	- OLFLEX® PET - OLFLEX® PET FR	Various Black, White
Operating Temperature:	-75°C to +125°C -103°F to +257°F	Approvals:	- OLFLEX® PET - OLFLEX® PET FR	UL/CSA FAR 25, FMVSS 302 UL/CSA Mil-202, FAR 25, FMVSS 302, VW-1
Melt Temperature:	- OLFLEX® PET: 230°C/446°F - OLFLEX® PET FR: 250°C/482°F			

OLFLEX® PET

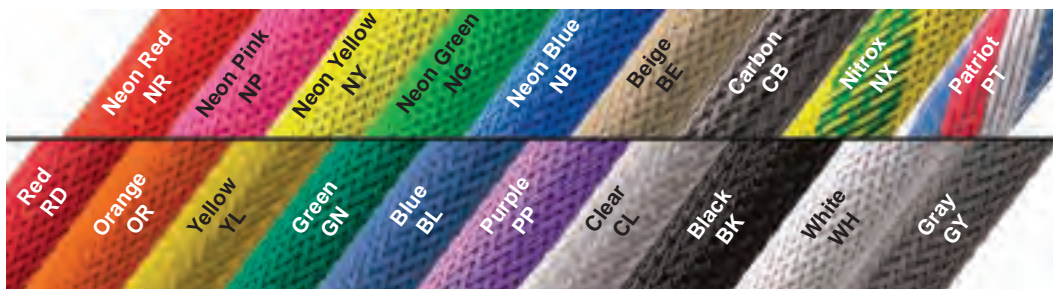
Part Number	Nominal Size	Expansion Range Min.	Expansion Range Max.	Standard Bulk Spool	Put-Ups Mini Spool	lbs./100 ft	Part Number	Nominal Size	Expansion Range Min.	Expansion Range Max.	Standard Bulk Spool	Put-Ups Mini Spool	lbs./100 ft
PET-1/8-XX	1/8"	3/32"	1/4"	1000	225	0.16	PET-1-1/4-XX	1-1/4"	3/4"	1-3/4"	250	50	1.60
PET-1/4-XX	1/4"	1/8"	7/16"	1000	200	0.24	PET-1-1/2-XX	1-1/2"	1"	2-1/2"	200	40	1.96
PET-3/8-XX	3/8"	3/16"	5/8"	500	125	0.57	PET-1-3/4-XX	1-3/4"	1-1/4"	2-3/4"	200	30	2.70
PET-1/2-XX	1/2"	1/4"	3/4"	500	100	0.77	PET-2-XX	2"	1-1/2"	3-1/2"	200	50	3.30
PET-5/8-XX	5/8"	3/8"	1"	500	100	0.95	PET-2-1/2-XX	2-1/2"	1-3/4"	4-1/2"	200	50	3.80
PET-3/4-XX	3/4"	1/2"	1-1/4"	250	75	1.20	PET-3-XX	3"	2-1/2"	4-3/4"	100	50	4.00
PET-1-XX	1"	5/8"	1-5/8"	250	65	1.34							

Available in many colors: see below chart. Enter the 2 digit letters where the XX is when ordering.

OLFLEX® PET FR: Flame Retardant Version

Part Number	Nominal Size	Expansion Range Min.	Expansion Range Max.	Standard Bulk Spool	Put-Ups Mini Spool	lbs./100 ft	Part Number	Nominal Size	Expansion Range Min.	Expansion Range Max.	Standard Bulk Spool	Put-Ups Mini Spool	lbs./100 ft
PETFR-1/8-XX	1/8"	3/32"	1/4"	1000	225	0.16	PETFR-1-1/2-XX	1-1/2"	1"	2-1/2"	200	40	1.96
PETFR-1/4-XX	1/4"	1/8"	7/16"	1000	200	0.24	PETFR-1-3/4-XX	1-3/4"	1-1/4"	2-3/4"	200	30	2.70
PETFR-3/8-XX	3/8"	3/16"	5/8"	500	125	0.57	PETFR-2-XX	2"	1-1/2"	3-1/2"	200	50	3.30
PETFR-1/2-XX	1/2"	1/4"	3/4"	500	100	0.77	PETFR-2-1/2-XX	2-1/2"	1-3/4"	4-1/2"	200	50	3.80
PETFR-3/4-XX	3/4"	1/2"	1-1/4"	250	75	1.20	PETFR-3-XX	3"	2-1/2"	4-3/4"	100	50	4.00
PETFR-1-1/4-XX	1-1/4"	3/4"	1-3/4"	250	50	1.60							

Available in black with white tracers or white with black tracers. Enter BW for black or WB for white in place of the "XX".



OLFLEX® WRAP/ WRAP FR

PET Sleeve with Velcro

Easy Access and Installation



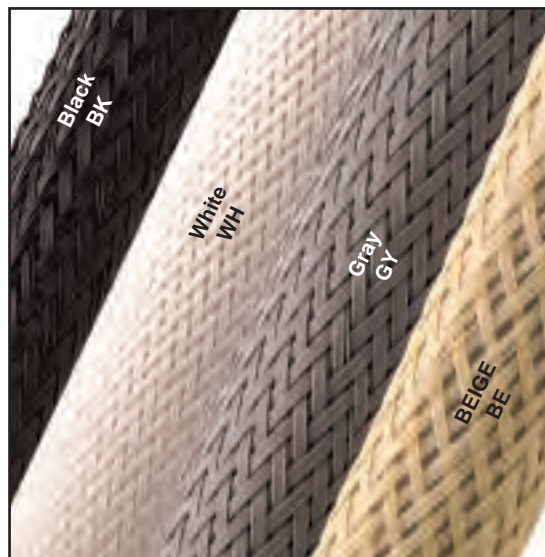
OLFLEX® WRAP is a PET sleeving that allows for breaking out cables or hoses from bundles for connection and retrofit applications. OLFLEX® WRAP FR is a flame retardant version, designed to quickly self-extinguish and minimize the spread of flame.

Performance Characteristics:

- Easily opened and closed by velcro edges
- Flexible material expands over various shapes
- Cut with a hot knife to avoid fraying

Performance Advantages:

- Varied access provides easy connections and rework
- Time savings solutions for varied applications
- Halogen-free



Technical Data:

Material:	Polyethylene Terephthalate (PET) filaments	Colors:	- OLFLEX® WRAP Black, White, Gray, Beige - OLFLEX® WRAP FR Black
Temperature Range: operating	-75°C to +125°C -103°F to +257°F	Approvals:	- OLFLEX® WRAP UL/CSA - OLFLEX® WRAP FR UL/CSA Mil-202, VW-1
Melt Temperature:	- OLFLEX® WRAP 230°C/446°F - OLFLEX® WRAP FR 250°C/482°F		

OLFLEX® WRAP

Part Number	Nominal Size	Hook & Loop Width	Standard Put-Ups		lbs./100 ft
			Bulk Spool	Mini Spool	
FW-1/2-XX	1/2"	1/4"	100	20	1.3
FW-3/4-XX	3/4"	5/8"	100	15	1.8
FW-1-1/4-XX	1-1/4"	5/8"	100	12	2.3
FW-2-XX	2"	5/8"	100	10	3.2

Available in black, white, gray or beige. Enter BK for black, WH for white, GY for gray or BE for beige in place of "XX".

OLFLEX® WRAP FR: Flame Retardant Version

Part Number	Nominal Size	Hook & Loop Width	Standard Put-Ups		lbs./100 ft
			Bulk Spool	Mini Spool	
FWFR-1/2	1/2"	1/4"	100	20	1.3
FWFR-3/4	3/4"	5/8"	100	15	1.8
FWFR-1-1/4	1-1/4"	5/8"	100	12	2.3
FWFR-2	2"	5/8"	100	10	3.2

Available in black with white tracers only.

OLFLEX® SW/ SW FR

Semi-Rigid PET Sleeve with Split Wrap for Easy Installation



OLFLEX® SW is a preformed PET sleeve provided with a built-in split. Simply pull the wrap apart, install your wire and hoses and release. OLFLEX® SW FR is a flame retardant version, designed to quickly self-extinguish and minimize the spread of flame.

Performance Characteristics:




- Preformed split allows for easy installation of wire and hoses
- More flexible than spiral wrap
- Tight bend radius without splitting open
- Quiet in installations with high vibrations
- 25% edge overlap
- SW FR is packed in an easy access box to protect its cylindrical shape

Performance Advantages:

- Provides a large overlap for full coverage over splices and in-line connections
- Ease of installation provides for labor and costs savings
- Halogen-free



Technical Data:

 Material:	Polyethylene Terephthalate (PET) filaments
 Temperature Range: operating	-75°C to +125°C -103°F to +257°F
 Melt Temperature:	
- OLFLEX® SW	230°C/446°F
- OLFLEX® SW FR	250°C/482°F

 Color:	Black
 Approvals:	
- OLFLEX® SW	UL/CSA
- OLFLEX® SW FR	UL/CSA, VW-1

OLFLEX® SW/SWFR

OLFLEX® SW Part Number	OLFLEX® SW-FR Part Number	Nominal Size	Expansion Range Min/Max	Bulk Spool	Standard Put-Ups Mini Spool	lbs./100 ft
SW-1/8	SWFR-1/8	1/8"	NA	400	100	0.2
SW-1/4	SWFR-1/4	1/4"	NA	200	100	0.6
SW-1/2	SWFR-1/2	1/2"	NA	150	75	1.4
SW-3/4	SWFR-3/4	3/4"	NA	100	50	1.6
SW-1	SWFR-1	1"	NA	100	50	2.0
SW-1-1/2	SWFR-1-1/2	1-1/2"	NA	75	25	2.7
SW-2	SWFR-2	2"	NA	50	25	3.6

Available in black only.

CUTTING TOOLS:



Serrated Edge Scissors:

These scissors have a serrated blade on an angle for easy cutting of sleeving.

Part Number
812056

* Other cutting tools available upon request.



Bench Mount Hot Knife:

The bench mount hot knife has a 2-1/2" cutting blade and heats to 600°C in 30 seconds. 110 volts for operation. Replacement blades available.

Part Number
Bench mount Hot Knife: 812057
Replacement blades: 812058

OLFLEX® TUBING INSTALLATION GUIDE

Warning:

- 1) Follow installation instructions carefully.
- 2) Use caution and proper safety procedures when working with an open flame and high temperatures.
- 3) Maintain a well ventilated workplace and avoid charring or burning product to prevent fumes that may cause eye, nose and throat irritation.
- 4) Consult M.S.D.S prior to handling or use for complete details.



Installation Instructions:




- 1) Position heat shrink tubing over object to be covered.
- 2) Using a heat gun, infrared heat source, soft yellow flame torch or oven, heat the tubing uniformly until it fully recovers and conforms to the object. Please consult the Lapp catalog or www.lappusa.com for the appropriate shrink temperatures.
- 3) If working with a long piece of tubing, start at one end and rotate while applying heat.
- 4) Avoid overheating the shrink tubing.
- 5) Remove the heat source and allow the shrink tubing to cool completely.



CONSIDERATIONS IN APPLYING & CHOOSING HEAT SHRINKABLE TUBING

Heat shrinkable tubing is sold in its Expanded I.D. state. The application of heat activates the tubing's memory, causing the expanded tubing to “recover” or shrink down. When fully recovered, the tubing will shrink down to the Recovered I.D. When shrinking tubing, it is highly recommended to adhere to the estimated shrink temperature.

OLFLEX® TUBING is available in three heat shrink ratio varieties.

-  **Tubing will shrink down approximately 50%.**
-  **Tubing will shrink down approximately 67%.**
-  **Tubing will shrink down approximately 75%.**

As the tubing recovers, the tubing wall thickens. A small reduction in the tubing length known as longitudinal shrinkage will also occur during the shrinking process. Longitudinal shrinkage will typically range from 5-15% depending on the product.

When covering multiple substrates, you must consider the larger sized substrate that needs to be covered (i.e. connector) as well as the smaller cable diameter.

2:1 Shrink Ratio Example:

OLFLEX® 190, PN 601612 - Nominal O.D. 0.524 inch

*Note the cable O.D. is a nominal value that can vary roughly 5%

Rule of thumb: The Recovered I.D. should not be larger than the substrate O.D.

Choose tubing with a Recovered I.D. that is approximately 20-25% smaller than the substrate's O.D.

For example, Cable O.D.- .524” X .80 = .419, Cable O.D.- .524” X .75 = .393



**Tubing will shrink down approximately 50%.
.75” tubing size x .5 = .375**

Choice: The 3/4” size will adequately meet the shrink tube requirements



SHRINK RATIO EXAMPLE

For an O.D. of .524 inches and 2:1 Shrink Ratio, the recommended tubing size would be 3/4”

SIZE	INSIDE DIAMETER AS SUPPLIED (MIN)		INSIDE DIAMETER AFTER RECOVERY (MAX)		WALL THICKNESS AFTER RECOVERY (NOM)	
	INCH	(MM)	INCH	(MM)	INCH	(MM)
1/16	0.063	1.60	0.032	0.82	0.020	0.51
1/8	0.125	3.18	0.063	1.60	0.025	0.64
3/16	0.187	4.75	0.093	2.36	0.025	0.64
1/4	0.250	6.35	0.125	3.18	0.025	0.64
3/8	0.375	9.53	0.187	4.75	0.028	0.71
1/2	0.500	12.70	0.250	6.35	0.028	0.71
3/4	0.750	19.05	0.375	9.53	0.033	0.84
1	1.000	25.40	0.500	12.70	0.038	0.97
1 1/2	1.500	38.10	0.750	19.05	0.043	1.09
2	2.000	50.80	1.000	25.40	0.048	1.22

INSULATE



BEAUTIFY



HARNESS



IDENTIFY



SEAL



SHIELD



BUNDLE



PROTECT

