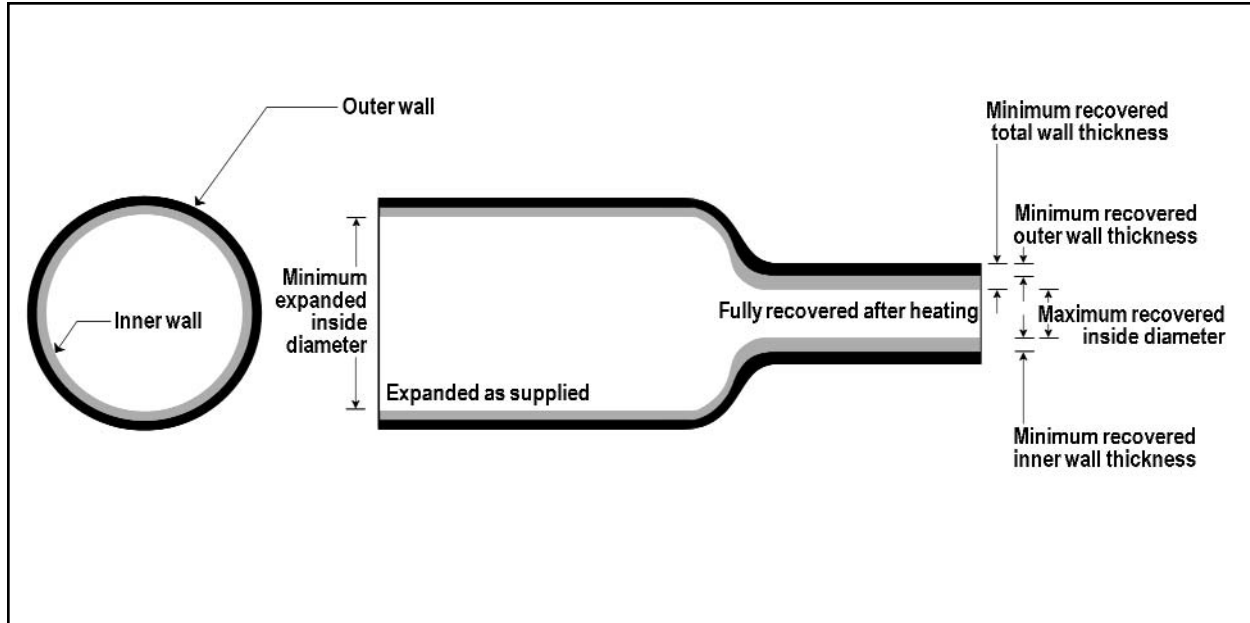


**ICOFIT**

***ProFIT***<sup>®</sup>  
**HEAT SHRINKABLE  
PRODUCTS**

**AS 9100:2004  
ISO 9001:2000  
REGISTERED**

# HEAT SHRINK TUBING DIMENSIONS



## LIST OF ABBREVIATIONS

Appl.	Applicable	Oper.	Operating
Approx.	Approximate	Pcs.	Pieces
H.S.T.	Heat shrinkable tubing	Std.	Standard
I.D.	Inside diameter	Temp.	Temperature
O.D.	Outside diameter		

### LIMITATIONS OF WARRANTY, REMEDY, AND LIABILITY

ICO RALLY warrants that products delivered are free from defects in material and workmanship and meets all specifications, which are in effect on the date of shipment. ICO RALLY makes no other warranty expressed or implied. All specifications are subject to change without notice.

Responsibility for validity in final applications or products remains the responsibility of the user. ICO RALLY encourages user testing, and will gladly provide standard product line samples for testing purposes.

All parties agree the Buyer's sale and exclusive remedy shall be for the repair or replacement of any defective part provided by the Seller. The essential purpose of this remedy shall be deemed fully satisfied as long as ICO RALLY is willing to repair or replace the defective part.

In no event shall ICO RALLY's liability under any claim exceed the price paid by the Buyer to ICO RALLY for the particular product, given rise to the claim. ICO RALLY will not be liable under any circumstances for any claim or liability based on breach of warranty or breach of contract including but not limited to loss of income, loss of profits, loss of sales, loss of use or damage to equipment, increased costs of operation, labor or facilities, or claims by third parties.

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# ProFIT® PRODUCT COMPARISON GUIDE

WALL TYPE	JACKET MATERIAL	PRODUCT	WALL STYLE			INNER WALL		FLEXIBILITY			CROSS-LINKED	OPERATING TEMPERATURE (°F)	OPERATING TEMPERATURE (°C)		
			THIN-WALL	MEDIUM-WALL	HEAVY-WALL	ADHESIVE-LINED	MELTABLE	VERY FLEXIBLE	FLEXIBLE	SEMI-RIGID					
SINGLE WALL	POLYOLEFIN	HIX	X					X		X		-67 to 275	-55 to 135		
		HIX-VW1	X					X		X		-67 to 275	-55 to 135		
		HIX3X	X						X		X		-67 to 275	-55 to 135	
		H4X	X						X		X		-67 to 275	-55 to 135	
		HIX-G/Y	X						X		X		-67 to 275	-55 to 135	
		HRX	X							X	X		-67 to 275	-55 to 135	
		HLT	X						X		X		-67 to 275	-55 to 135	
		HLT3X	X						X		X		-67 to 275	-55 to 135	
	FLUOROPOLYMER	HKX	X							X	X		-67 to 347	-55 to 175	
		HKFX	X							X	X		-67 to 302	-55 to 150	
		HVFX	X						X		X		-67 to 302	-55 to 150	
		HTX	X							X			-103 to 500	-75 to 260	
		HSX	X	X							X		-103 to 500	-75 to 260	
		HFX	X								X		-103 to 500	-75 to 260	
		HFEP1.3	X							X			-103 to 392	-75 to 200	
		HFEP1.6	X							X			-103 to 392	-75 to 200	
	PVC	HVX	X							X			-04 to 221	-20 to 105	
		HCX	X							X	X		-04 to 221	-20 to 105	
		HLF	X								X		-04 to 212	-20 to 100	
	ELASTOMER	HNTFR		X						X	X		-94 to 250	-70 to 121	
		HVT		X						X	X		-40 to 392	-40 to 200	
DUAL WALL	POLYOLEFIN	HAT	X			X			X		X		-67 to 230	-55 to 110	
		HWP		X		X			X		X		-40 to 230	-40 to 110	
		HCATV			X	X				X	X		-67 to 257	-55 to 125	
		HW3X			X	X				X	X		-67 to 194	-55 to 90	
		HW3XFR			X	X				X	X		-67 to 194	-55 to 90	
		HML		X		X				X	X		-67 to 230	-55 to 110	
		HML4X		X		X				X	X		-67 to 230	-55 to 110	
		HES1000		X		X					X	X		-40 to 266	-40 to 130
		HES2000		X		X					X	X		-40 to 266	-40 to 130
		HIM			X		X			X	X		-67 to 230	-55 to 110	
	FLUOROPOLYMER	HTIM			X		X			X			-100 to 450	-73 to 232	
SPECIALTY PRODUCTS	HSF	X						X				-40 to 257	-40 to 125		
	HSF3X	X						X				-40 to 257	-40 to 125		
	NST			X					X			0 to 240	-18 to 115		
	HSMG-A	X								X	X	-67 to 347	-55 to 175		
	HSMG-C	X							X		X	-67 to 302	-55 to 150		
	HSMG-E	X							X		X	-94 to 221	-70 to 105		
	HSLD	X							X		X	-67 to 275	-55 to 135		
	HSRT	X						X		X		-67 to 275	-55 to 135		

# ProFIT<sup>®</sup> PRODUCT COMPARISON GUIDE

PRODUCT	SHRINK TEMP (°F)		SHRINK RATIO	SUPPLIED I.D. SIZE RANGE (inches)		SUPPLIED I.D. SIZE RANGE (mm)		COLORS AVAILABLE	CLEAR AVAILABLE	FLAME-RETARDANT	UL RECOGNIZED	UL VW-1 RATED	SAE-AMS-DTL-23053	SEE CATALOG PAGE
HIX	250	121	2:1	0.046 to 5.000	1.17 to 127.00	X	X	*	*	*	/5	5		
HIX-VW1	176	80	2:1	0.046 to 2.000	1.17 to 50.80	X		X	X	X	/5	6		
HIX3X	248	120	3:1	0.118 to 1.535	3.00 to 39.00	X		X	X			6		
H4X	250	121	4:1	0.750 to 4.500	19.05 to 114.30	X		X			/5	7		
HIX-G/Y	250	121	2:1	0.125 to 1.000	3.18 to 25.40	X		X	X			20		
HRX	275	135	2:1	0.046 to 0.500	1.17 to 12.70	X	X	*	*		/6	7		
HLT	176	80	2:1	0.046 to 1.000	1.17 to 25.40	X		X	X	X	/5	8		
HLT3X	176	80	3:1	0.093 to 1.000	2.36 to 25.40	X		X	X	X		8		
HKX	347	175	2:1	0.046 to 1.500	1.17 to 38.10	X	X	X	X	X	/8	14		
HKFX	302	150	2:1	0.046 to 1.000	1.17 to 25.40		X	X	X	X	/18	14		
HVFX	302	150	2:1	0.046 to 1.000	1.17 to 25.40	X		X	X	X	/18	11		
HTX	662	350	1.5:1	0.034 to 0.470	0.86 to 11.94	X	X	X			/12	12		
HSX	662	350	1.5:1	0.050 to 0.470	1.27 to 11.94	X	X	X			/12	12		
HFX	662	350	4:1	0.078 to 1.250	1.98 to 31.75		X	X			/12	12		
HFEP1.3	430	221	1.3:1	0.031 to 1.330	0.79 to 33.78	X	X	X			/11	13		
HFEP1.6	430	221	1.6:1	0.093 to 2.000	2.36 to 50.80	X	X	X			/11	13		
HVX	212	100	2:1	0.063 to 2.000	1.60 to 50.80	X	X	X	X	X	/2	16		
HCX	212	100	2:1	0.046 to 2.000	1.19 to 50.80	X		X	X	X	/2	16		
HLF	275	135	2:1	0.748 to 6.339	19.00 to 161.00	X	X	X				15		
HNTFR	275	135	1.75:1	0.125 to 3.000	3.18 to 76.20	X		X	X		/1	17		
HVT	347	175	2:1	0.125 to 2.000	3.18 to 50.80	X		X			/13	17		
HAT	250	121	2:1	0.125 to 1.500	3.18 to 38.10	X		*	*		/4	9		
HWP	257	125	3:1	0.125 to 1.500	3.18 to 38.10	X		X	X			10		
HCATV	248	120	3:1	0.374 to 2.756	10.00 to 70.00	X		X				22		
HW3X	250	121	3:1	0.400 to 4.000	10.16 to 101.60	X		X				24		
HW3XFR	250	121	3:1	0.400 to 4.000	10.16 to 101.60	X		X			/15	24		
HML	230	110	3:1	0.118 to 1.575	3.00 to 40.00	X		X			/4	9		
HML4X	230	110	4:1	0.157 to 2.047	4.00 to 52.00	X		X			/4	9		
HES1000	275	135	4:1	0.225 to 0.700	5.72 to 17.78		X		X			10		
HES2000	275	135	4:1	0.225 to 0.700	5.72 to 17.78	X		X	X			10		
HIM	275	135	V	0.125 to 1.500	3.18 to 38.10	X		X	X		/4	11		
HTIM	680	360	V	0.036 to 0.950	0.91 to 24.13	X	X	X				15		
HSF	275	135	2:1	0.472 to 2.760	12.00 to 70.00	X		X				20		
HSF3X	275	135	3:1	0.709 to 2.362	18.00 to 60.00	X		X				20		
NST	N/A	N/A	V	V	V	X						23		
HSMG-A	347	175	2:1	0.063 to 0.500	1.60 to 25.40	X	X	X			/8	18		
HSMG-C	302	150	2:1	0.063 to 0.500	1.60 to 25.40	X		X			/18	18		
HSMG-E	230	110	2:1	0.063 to 0.500	1.60 to 25.40	X	X	*				19		
HSLD	176	80	2:1	0.187 to 1.000	4.75 to 25.40	X		X				24		
HSRT	176	80	V	V	V	X		X				21		

\* Clear not included.

V = Application specific, review catalog page for more information.

# ProFIT<sup>®</sup> PHYSICAL & ELECTRICAL PROPERTIES

PRODUCT	DIELECTRIC STRENGTH* (Volts/mil)	DIELECTRIC STRENGTH* (kVolts/mm)	TENSILE STRENGTH (psi)	TENSILE STRENGTH (MPa)	LONGITUDINAL CHANGE (%)	CATALOG PAGE
HIX	500	19.7	1500	10.3	+0, -5	5
HIX-VW1	500	19.7	1500	10.3	+3, -3	6
HIX3X	500	19.7	1500	10.3	+0, -10	6
H4X	500	19.7	1500	10.3	+0, -10	7
HIX-G/Y	500	19.7	1500	10.3	+0, -5	20
HRX	500	19.7	2000	13.8	+0, -5	7
HLT	500	19.7	1500	10.3	+1, -5	8
HLT3X	500	19.7	1500	10.3	+1, -5	8
HKX	600	23.6	5000	34.5	+0, -10	14
HKFX	400	15.7	3500	24.1	+0, -10	14
HVFX	500	19.7	4000	27.6	+0, -10	11
HTX	1400	55.1	2500	17.2	+20, -20	12
HSX	1400	55.1	2500	17.2	+20, -20	12
HFX	1400	55.1	2500	17.2	+20, -20	12
HFEP1.3	2000	78.7	2000	13.8	+15, -15	13
HFEP1.6	2000	78.7	2000	13.8	+15, -15	13
HVX	1083	42.6	3000	20.7	+0, -15	16
HCX	1083	42.6	3000	20.7	+0, -15	16
HLF	1900	74.8	3800	26.2	+0, -10	15
HNTFR	300	11.8	1500	10.3	+1, -5	17
HVT	200	7.9	1800	12.4	+0, -20	17
HAT	400	15.7	1500	10.3	+0, -10	9
HWP	500	19.7	1500	10.3	+0, -10	10
HCA TV	350	13.8	1500	10.3	+1, -10	22
HW3X	200	7.9	1200	8.3	+1, -10	24
HW3XFR	200	7.9	1200	8.3	+1, -10	24
HML	300	11.8	1300	9.0	+0, -15	9
HML4X	300	11.8	1300	9.0	+0, -15	9
HES1000	350	13.8	1500	10.3	+0, -15	10
HES2000	350	13.8	1500	10.3	+0, -15	10
HIM	500	19.7	1500	10.3	+1, -10	11
HTIM	2000	78.7	-	-	+10, -10	15
HSF	0	0	-	-	-	20
HSF3X	0	0	-	-	-	20
NST	365	14.4	1400	9.7	-	23
HSMG-A	800	31.5	5000	34.5	+0, -10	18
HSMG-C	500	19.7	4000	27.6	+0, -10	18
HSMG-E	500	19.7	1800	12.4	+0, -10	19
HSLD	500	19.7	1500	10.3	+1, -5	24
HSRT	500	19.7	1500	10.3	+1, -5	21

\* Overall dielectric strength is dependent on jacket wall thickness. Review catalog page for more information.

# HEAT SHRINKABLE POLYOLEFIN

FLEXIBLE • THIN-WALL • 2:1 • GENERAL-PURPOSE

**HIX** is the most popular general purpose heat-shrinkable tubing used for insulating, jacketing, bundling and identification. **HIX** is mechanically tough and has good abrasion and solvent resistance. Longitudinal shrinkage is less than 6%.

Applicable Specifications: SAE-AMS-DTL-23053/5, Class 1 & 2  
 UL File Number: E52612 (MW-1 except Clear)  
 Operating Temperature Range: -67°F (-55°C) to 275°F (135°C)  
 Shrink Ratio: 2 to 1  
 Shrink Temperature: 250°F (121°C)  
 Standard Colors: Type 1 (Flame-Retardant) - Black, White, Red, Blue, Yellow, Green  
 Type 2 (Non Flame-Retardant) - Clear  
 Standard Shipping Length: Spooled, 4-foot or 6-inch lengths

**PACKAGED ASSORTMENTS**

Catalog Number	Tubing Sizes	6" Pieces Per Pkg.
HIX-HA1	3/64" thru 3/16"	30
HIX-HA2	1/4" thru 3/4"	16
HIX-HA3	1" thru 4"	10

Catalog Number Size	Catalog Number Size (6" pcs.)	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		*Std. 4-ft Lengths ft / pkg	Std. Spools ft / spool	Std. 6-in Lengths pcs / pkg
		inches	mm	inches	mm	inches	mm			
HIX-3/64	HIX6-3/64	0.046	1.17	0.023	0.58	0.016	0.40	100, 200	1000	40
HIX-1/16	HIX6-1/16	0.063	1.60	0.031	0.79	0.017	0.43	100, 200	1000	36
HIX-3/32	HIX6-3/32	0.093	2.36	0.046	1.17	0.020	0.50	100, 200	500	32
HIX-1/8	HIX6-1/8	0.125	3.18	0.063	1.60	0.020	0.50	100, 200	500	28
HIX-3/16	HIX6-3/16	0.188	4.76	0.093	2.36	0.020	0.50	100, 200	500	24
HIX-1/4	HIX6-1/4	0.250	6.35	0.125	3.18	0.025	0.63	100	250	20
HIX-3/8	HIX6-3/8	0.375	9.53	0.188	4.76	0.025	0.63	100	200	16
HIX-1/2	HIX6-1/2	0.500	12.70	0.250	6.35	0.025	0.63	20, 100	150	14
HIX-3/4	HIX6-3/4	0.750	19.05	0.375	9.53	0.030	0.76	20, 100	250	12
HIX-1"	HIX6-1"	1.000	25.40	0.500	12.70	0.035	0.89	20, 48	250	8
HIX-1-1/4	HIX6-1-1/4	1.250	31.75	0.625	15.88	0.040	1.01	20, 48	100	6
HIX-1-1/2	HIX6-1-1/2	1.500	38.10	0.750	19.05	0.040	1.01	20, 48	125	5
HIX-2	HIX6-2	2.000	50.80	1.000	25.40	0.045	1.14	20	125	3
HIX-3	HIX6-3	3.000	76.20	1.500	38.10	0.050	1.27	8, 24	50	2
HIX-4	HIX6-4	4.000	101.60	2.000	50.80	0.055	1.40	8, 24	50	1
HIX-5	N/A	5.000	127.00	2.500	63.50	0.060	1.52	8	50	N/A

## MINI HEAT GUN II® & HEAT SHRINK TUBING KIT

The **MINI HEAT GUN II** is ICO RALLY's most compact and lightweight UL Recognized heat gun. Powered by standard 110V AC power, it boasts a nozzle temperature of 610°F. When not in use, you can hang the **MINI HEAT GUN II** out of your way with its convenient workbench storage loop.

The heat gun is sold as a kit with 60, six-inch pieces of our most popular **HIX** heat shrink tubing. Sizes include 1/8", 3/16", 1/4", 3/8", and 1/2" (assorted colors).

The ICO RALLY part number for the **MINI HEAT GUN II** & Heat Shrink Tubing Kit is **IR-25252**.

To reorder a refill package ask your dealer for **IR-25259**.



# HEAT SHRINKABLE POLYOLEFIN

VERY FLEXIBLE • THIN-WALL • 2:1 • VW-1 MARKED

**HIX-VW1** cross-linked heat shrinkable polyolefin tubing is a cost effective choice for commercial applications. Its excellent flexibility offers a faster, reliable replacement for molding in place, dip coating and tape wrapping. **HIX-VW1** is UL recognized and CSA certified at 125°C, 600V with UL VW-1 and CSA flame-retardance ratings. Material shrinks at a low temperature, reducing installation time and the risk of damage to heat sensitive components.

Applicable Specifications: SAE-AMS-DTL-23053/5,  
Class 1 & 3  
UL File Number: E52612 (VW-1)  
CSA File Number: 070501  
Operating Temperature Range: -67°F (-55°C) to 275°F (135°C)  
Shrink Ratio: 2 to 1  
Shrink Temperature: 176°F (80°C)  
Recommended Heat Gun: 500°F (260°C)  
Standard Colors: Black (VW-1 surface printed)  
Standard Shipping Length: Spooled or 4 Foot lengths

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. 4-ft Lengths ft / pkg	Std. Spools ft / spool
	inches	mm	inches	mm	inches	mm		
HIX-VW1-3/64	0.046	1.17	0.023	0.58	0.016	0.40	100, 200	100, 1000
HIX-VW1-1/16	0.063	1.60	0.031	0.79	0.017	0.43	100, 200	100, 1000
HIX-VW1-3/32	0.093	2.36	0.046	1.17	0.020	0.50	100, 200	100, 500
HIX-VW1-1/8	0.125	3.18	0.063	1.60	0.020	0.50	100, 200	100, 500
HIX-VW1-3/16	0.188	4.76	0.093	2.36	0.020	0.50	100, 200	100, 500
HIX-VW1-1/4	0.250	6.35	0.125	3.18	0.025	0.63	100	100, 250
HIX-VW1-3/8	0.375	9.53	0.188	4.76	0.025	0.63	100	100, 200
HIX-VW1-1/2	0.500	12.70	0.250	6.35	0.025	0.63	20, 100	100, 150
HIX-VW1-3/4	0.750	19.05	0.375	9.53	0.030	0.76	20, 100	100, 250
HIX-VW1-1"	1.000	25.40	0.500	12.70	0.035	0.89	20, 48	100, 250
HIX-VW1-1-1/2	1.500	38.10	0.750	19.05	0.040	1.01	20, 48	100, 125
HIX-VW1-2"	2.000	50.80	1.000	25.40	0.045	1.14	8	100, 125

# HEAT SHRINKABLE POLYOLEFIN

FLEXIBLE • THIN-WALL • 3:1 • GENERAL-PURPOSE

**HIX3X** is a 3 to 1, heat shrinkable, flame-retardant, general-purpose cross-linked Polyolefin tubing. Primarily used as strain relief and identification markers on wire terminations and electrical connections. **HIX3X** may also be used as a light-duty jacketing material on harnesses.

UL File Number: UL #E52612  
Operating Temperature Range: -67°F (-55°C) to 275°F (135°C)  
Shrink Ratio: 3 to 1  
Shrink Temperature: 248°F (120°C)  
Recommended Heat Gun: 500°F (260°C)  
Standard Colors: Black  
Standard Shipping Length: Spooled

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. Spools ft / spool
	inches	mm	inches	mm	inches	mm	
HIX3X-3/1	0.118	3.0	0.039	1.0	0.022	0.55	100, 492
HIX3X-6/2	0.236	6.0	0.079	2.0	0.026	0.65	100, 246
HIX3X-9/3	0.354	9.0	0.118	3.0	0.030	0.75	100, 246
HIX3X-12/4	0.472	12.0	0.157	4.0	0.030	0.75	100, 246
HIX3X-18/6	0.709	18.0	0.236	6.0	0.033	0.85	100, 246
HIX3X-24/8	0.945	24.0	0.315	8.0	0.039	1.00	50, 98
HIX3X-39/13	1.535	39.0	0.512	13.0	0.045	1.15	50, 98



# HEAT SHRINKABLE POLYOLEFIN

## SEMI-RIGID • THIN-WALL • 2:1



The semi-rigid characteristics of **HRX** make it ideal for strain relief applications and for protection of delicate components. Compared to HIX, it has enhanced gripping power and a higher tensile strength.

Longitudinal shrinkage of **HRX** is typically less than 6%.

Applicable Specifications: SAE-AMS-DTL-23053/6, Class 1 & 2  
 UL File Number: E52612 (Except Clear)  
 Operating Temperature Range: -67°F (-55°C) to 275°F (135°C)  
 Shrink Ratio: 2 to 1  
 Shrink Temperature: 275°F (135°C)  
 Recommended Heat Gun: 500°F (260°C)  
 Standard Colors: Type 1 (Flame Retardant) - Black  
 Type 2 (Non Flame-Retardant) - Clear  
 Standard Shipping Length: 4-foot or 6-inch lengths

Catalog Number Size	Catalog Number Size (6" pcs.)	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. 4-ft Lengths ft / pkg	Std. 6-in Lengths pcs / pkg
		inches	mm	inches	mm	inches	mm		
HRX-3/64	HRX6-3/64	0.046	1.17	0.023	0.58	0.020	0.50	100, 200	40
HRX-1/16	HRX6-1/16	0.063	1.60	0.031	0.79	0.020	0.50	100, 200	36
HRX-3/32	HRX6-3/32	0.093	2.36	0.046	1.17	0.020	0.50	100, 200	32
HRX-1/8	HRX6-1/8	0.125	3.18	0.063	1.60	0.020	0.50	100, 200	28
HRX-3/16	HRX6-3/16	0.188	4.76	0.093	2.36	0.025	0.63	100, 200	24
HRX-1/4	HRX6-1/4	0.250	6.35	0.125	3.18	0.025	0.63	100	20
HRX-3/8	HRX6-3/8	0.375	9.53	0.188	4.76	0.030	0.76	100	16
HRX-1/2	HRX6-1/2	0.500	12.70	0.250	6.35	0.030	0.76	20, 100	14

# HEAT SHRINKABLE POLYOLEFIN

## FLEXIBLE • THIN-WALL • 4:1



**H4X** is an overexpanded general purpose cross-linked Polyolefin tubing with a 4X expansion ratio. It was developed for a wide range of applications where larger expansions are required, such as harness repair. The high expansion of **H4X** tubing eliminates the need to remove connectors or large transitions and allows for easier harness assembly or repair. This heat-shrinkable, flexible, flame-retardant tubing is also compatible with most adhesives to provide a complete environmental seal.

Applicable Specifications: SAE-AMS-DTL-23053/5, Class 1 Overexpanded  
 UL File Number: E52612  
 Operating Temperature Range: -67°F (-55°C) to 275°F (135°C)  
 Shrink Ratio: 4 to 1  
 Shrink Temperature: 250°F (121°C)  
 Recommended Heat Gun: 500°F (260°C)  
 Standard Colors: Black  
 Standard Shipping Length: Spooled or 4-Foot lengths

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. 4-ft Lengths ft / pkg	Std. Spools ft / spool
	inches	mm	inches	mm	inches	mm		
H4X-3/4 (#11)	0.750	19.05	0.180	4.57	0.045	0.14	100, 200	100, 200
H4X-1" (#1)	1.000	25.40	0.275	6.99	0.045	0.14	100, 200	100, 200
H4X-1" (#5)	1.000	25.40	0.462	11.73	0.045	0.14	100, 200	100, 200
H4X-1-1/2 (#10)	1.500	38.10	0.375	9.53	0.045	0.14	100, 200	100, 200
H4X-2" (#2)	2.000	50.80	0.550	13.97	0.045	0.14	100, 200	100, 200
H4X-2-3/8 (#6)	2.375	60.33	0.680	17.27	0.045	0.14	100, 200	100, 200
H4X-3" (#3)	3.000	76.20	0.810	20.57	0.045	0.14	100	100
H4X-3" (#7)	3.000	76.20	0.840	21.34	0.045	0.14	100	100
H4X-3-3/4 (#8)	3.750	95.25	0.930	23.62	0.045	0.14	100	100
H4X-4" (#4)	4.000	101.60	1.050	26.67	0.045	0.14	100	100
H4X-4-1/2 (#9)	4.500	114.30	1.450	36.83	0.045	0.14	100	100

# HEAT SHRINKABLE POLYOLEFIN

**VERY FLEXIBLE • THIN-WALL • 2:1**

**HLT** is a very flexible thin-wall heat-shrinkable tubing. Made from flame-retardant polyolefin, this low-shrink temperature product is used for insulation, identification, strain relief, wire bundling, and color coding. It is a highly reliable, general-purpose tubing.

Applicable Specifications: SAE-AMS-DTL-23053/5, Class 1 & 3  
 UL/CUL File Number: E52612 (VW-1)  
 Operating Temperature Range: -67°F (-55°C) to 275°F (135°C)  
 Shrink Ratio: 2 to 1  
 Shrink Temperature: 176°F (80°C)  
 Recommended Heat Gun: 500°F (260°C)  
 Standard Colors: Black or White  
 Other colors available - consult factory  
 Standard Shipping Length: Spooled

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. Spools ft / spool
	inches	mm	inches	mm	inches	mm	
HLT-3/64	0.046	1.17	0.023	0.58	0.016	0.40	1000
HLT-1/16	0.063	1.60	0.031	0.79	0.017	0.43	1000
HLT-3/32	0.093	2.36	0.046	1.17	0.020	0.50	500
HLT-1/8	0.125	3.18	0.063	1.60	0.020	0.50	500
HLT-3/16	0.188	4.76	0.093	2.36	0.020	0.50	500
HLT-1/4	0.250	6.35	0.125	3.18	0.025	0.63	250
HLT-3/8	0.375	9.53	0.188	4.76	0.025	0.63	200
HLT-1/2	0.500	12.70	0.250	6.35	0.025	0.63	150
HLT-3/4	0.750	19.05	0.375	9.53	0.030	0.76	250
HLT-1"	1.000	25.40	0.500	12.70	0.035	0.89	250

# HEAT SHRINKABLE POLYOLEFIN

**VERY FLEXIBLE • THIN-WALL • 3:1**

**HLT3X** is a specially formulated, cross-linked polyolefin with a low recovery temperature, 3:1 shrink ratio and high flame-retardance (VW-1). Its enhanced flexibility makes it perfect for electrical insulation and strain relief of commercial wire terminations and electrical connections. In addition to light-duty harnessing and jacketing, **HLT3X** is ideal for identification wires, cables and electrical and electronic components. The soft surface of this material easily accepts the print of most hot stamping and thermal marking machines.

UL File Number: UL #E52612 (VW-1)  
 Operating Temperature Range: -67°F (-55°C) to 275°F (135°C)  
 Shrink Ratio: 3 to 1  
 Shrink Temperature: 176°F (80°C)  
 Recommended Heat Gun: 500°F (260°C)  
 Standard Colors: Black or White  
 Standard Shipping Length: Spooled

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. Spools ft / spool
	inches	mm	inches	mm	inches	mm	
HLT3X-3/32	0.093	2.36	0.031	0.79	0.023 +/- 0.003	0.58 +/- 0.08	100, 500
HLT3X-1/8	0.125	3.18	0.042	1.06	0.023 +/- 0.003	0.58 +/- 0.08	100, 500
HLT3X-1/4	0.250	6.35	0.083	2.12	0.023 +/- 0.003	0.58 +/- 0.08	100, 250
HLT3X-3/8	0.375	9.53	0.125	3.18	0.024 +/- 0.003	0.61 +/- 0.08	100, 200
HLT3X-1/2	0.500	12.70	0.166	4.23	0.024 +/- 0.003	0.61 +/- 0.08	100, 150
HLT3X-3/4	0.750	19.05	0.250	6.35	0.024 +/- 0.003	0.61 +/- 0.08	100, 250
HLT3X-1"	1.000	25.40	0.333	8.47	0.024 +/- 0.003	0.61 +/- 0.08	100, 250

# HEAT SHRINKABLE POLYOLEFIN

FLEXIBLE • THIN-WALL • 2:1 • ADHESIVE-LINED



**HAT** is a thin wall, adhesive-lined shrinkable polyolefin tubing. It is designed to insulate, seal and protect components and electrical splices from moisture and corrosion. Product is coated on the inside with special thermoplastic adhesive which adheres to a wide variety of plastic, rubber, and metal substrates. When heated, it will shrink to 50% of its supplied diameter to conform to the object it covers. Upon cooling, adhesive returns to its original state, forming a moisture-resistant bond between tubing and substrate.

Applicable Specifications: SAE-AMS-DTL-23053/4, Class 2  
 UL File Number: E52612 (excludes clear)  
 Operating Temperature Range: -67°F (-55°C) to 230°F (110°C)  
 Shrink Ratio: 2 to 1  
 Shrink Temperature: 250°F (121°C)  
 Standard Colors: Black  
 Standard Shipping Length: 4 Foot Lengths

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. 4-ft Lengths ft / pkg
	inches	mm	inches	mm	inches	mm	
HAT-1/8	0.125	3.18	0.063	1.60	0.021	0.53	100, 200
HAT-3/16	0.188	4.76	0.093	2.36	0.022	0.56	100, 200
HAT-1/4	0.250	6.35	0.125	3.18	0.030	0.76	100, 200
HAT-3/8	0.375	9.53	0.188	4.76	0.031	0.79	100, 200
HAT-1/2	0.500	12.70	0.520	6.35	0.032	0.81	100, 200
HAT-3/4	0.750	19.05	0.375	9.53	0.037	0.94	20, 100
HAT-1"	1.000	25.40	0.500	12.70	0.038	0.97	20, 100
HAT-1-1/2	1.500	38.10	0.750	19.05	0.039	0.99	20, 100

# HEAT SHRINKABLE POLYOLEFIN

SEMI-RIGID • MEDIUM-WALL • 3:1, 4:1 • ADHESIVE-LINED



**HML & HML4X** are radiation crosslinked heat-shrinkable tubings, adhesive-lined to provide environmental sealing in a wide variety of electrical applications. Their internal adhesive coating, when heated, melts and flows to form a positive seal. The coating adheres to the outer tubing and surface below, creating an excellent barrier to moisture. Because the tubing and adhesive are flexible, the moisture seal withstands bending of the substrate. Flexibility makes **HML & HML4X** tubings ideal for cable repair. The adhesive bonds to a wide variety of plastics, rubbers, and metals, including polyethylene, rubber, and aluminum.

Applicable Specifications: SAE-AMS-DTL-23053/4, Class 3  
 Operating Temperature Range: -67°F (-55°C) to 230°F (110°C)  
 Shrink Ratio: HML - 3 to 1  
 HML4X - 4 to 1  
 Shrink Temperature: 230°F (110°C)  
 Standard Colors: Black  
 Standard Shipping Length: 4 Foot Lengths

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. 4-ft Lengths ft / pkg
	inches	mm	inches	mm	inches	mm	
HML-1/8	0.118	3.00	0.039	1.00	0.039	0.99	100, 200
HML-1/4	0.236	6.00	0.079	2.00	0.039	0.99	100, 200
HML-3/8	0.354	9.00	0.118	3.00	0.055	1.40	100, 200
HML-1/2	0.472	12.00	0.157	4.00	0.070	1.78	100, 200
HML-3/4	0.748	19.00	0.236	6.00	0.088	2.24	100, 200
HML-1"	0.945	24.00	0.315	8.00	0.100	2.54	20, 100
HML-1-1/2	1.575	40.00	0.512	13.00	0.100	2.54	20, 48
HML4X-4/1	0.157	4.00	0.039	1.00	0.039	0.99	40
HML4X-8/2	0.315	8.00	0.079	2.00	0.039	0.99	40
HML4X-12/3	0.472	12.00	0.118	3.00	0.055	1.40	40
HML4X-16/4	0.630	16.00	0.157	4.00	0.070	1.78	40
HML4X-24/6	0.945	24.00	0.236	6.00	0.088	2.24	40
HML4X-32/8	1.260	32.00	0.315	8.00	0.100	2.54	40
HML4X-52/13	2.047	52.00	0.512	13.00	0.100	2.54	40

**HML & HML4X** are available with expansion ratios of 3:1 and 4:1 making it possible to repair cable without removing connectors.

# HEAT SHRINKABLE POLYOLEFIN

## FLEXIBLE · MEDIUM-WALL · 3:1 · ADHESIVE-LINED

Heat shrinkable **HWP** has a flexible, medium wall Polyolefin jacket and an adhesive liner. **HWP** is suitable for a variety of low voltage electrical and mechanical applications including wire splices, transition breakouts, and connector to cable protection.

UL File Number: UL #E52612  
 Operating Temperature Range: -40°F (-40°C) to 230°F (110°C)  
 Shrink Ratio: 3 to 1  
 Shrink Temperature: 257°F (125°C)  
 Recommended Heat Gun: 500°F (260°C)  
 Standard Colors: Black  
 Standard Shipping Length: 4 Foot Lengths

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Total Wall Thickness (Rec.)		Adhesive Wall Thickness (Rec.)		Std. 4-ft Lengths ft / pkg
	inches	mm	inches	mm	inches	mm	inches	mm	
HWP-1/8	0.125	3.18	0.040	1.02	0.040	1.00	0.010	0.25	200, 1000
HWP-3/16	0.188	4.76	0.060	1.52	0.055	1.40	0.020	0.51	200, 1000
HWP-1/4	0.250	6.35	0.080	2.03	0.057	1.45	0.022	0.56	100, 1000
HWP-3/8	0.375	9.53	0.120	3.05	0.065	1.65	0.027	0.68	100, 1000
HWP-1/2	0.500	12.70	0.157	3.99	0.070	1.78	0.030	0.76	100, 500
HWP-3/4	0.750	19.05	0.230	5.84	0.080	2.03	0.030	0.76	100, 300
HWP-1"	1.000	25.40	0.320	8.13	0.100	2.50	0.030	0.76	60, 120
HWP-1-1/2"	1.500	38.10	0.530	13.46	0.100	2.50	0.030	0.76	20, 40

**HES1000**  
**HES2000**

# HEAT SHRINKABLE POLYOLEFIN

## SEMI-RIGID · MEDIUM-WALL · 4:1 · ADHESIVE-LINED

**HES** is a semi-rigid, heat shrinkable, cross-linked Polyolefin tubing with adhesive lining suitable for environmentally sealing a wide variety of low voltage electrical and mechanical applications, including wire splices, terminations, and components. **HES** is mechanically tough, providing strain relief and abrasion protection for the material being covered.

UL File Number: E194625  
 Operating Temperature Range: -40°F (-40°C) to 266°F (130°C)  
 Shrink Ratio: 4 to 1  
 Shrink Temperature: 275°F (135°C)  
 Recommended Heat Gun: 500°F (260°C)  
 Colors: Clear - HES1000  
 Black - HES2000  
 Standard Shipping Length: 4 Foot Lengths  
 Cut piece quotes on request

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Total Wall Thickness (Rec.)		Jacket Wall Thickness (Rec.)		Adhesive Wall Thickness (Rec.)		Std. 4-ft Lengths ft / pkg
	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	
HES1000-1	0.225	5.72	0.050	1.27	0.047	1.19	0.025	0.64	0.022	0.56	100, 200
HES1000-2	0.293	7.44	0.065	1.65	0.060	1.52	0.030	0.76	0.030	0.76	100, 200
HES1000-3	0.427	10.85	0.095	2.41	0.075	1.91	0.035	0.89	0.040	1.02	40, 80
HES1000-4	0.700	17.78	0.175	4.45	0.095	2.41	0.041	1.04	0.054	1.37	20, 40
HES2000-1	0.225	5.72	0.050	1.27	0.047	1.19	0.025	0.64	0.022	0.56	100, 200
HES2000-2	0.293	7.44	0.065	1.65	0.060	1.52	0.030	0.76	0.030	0.76	100, 200
HES2000-3	0.427	10.85	0.095	2.41	0.075	1.91	0.035	0.89	0.040	1.02	40, 80
HES2000-4	0.700	17.78	0.175	4.45	0.095	2.41	0.041	1.04	0.054	1.37	20, 40

# HEAT SHRINKABLE POLYOLEFIN

## SEMI-RIGID • HEAVY-WALL • MELTABLE WALL



**HIM** dual-wall tubing utilizes a meltable inner wall and shrinkable outer wall. When heat is applied, the outer wall contracts forcing the meltable inner wall to flow in and around the object being covered. When cooled, the entire mass becomes a rigid, tough, single molding, making **HIM** an excellent encapsulation product for protecting delicate components.

Applicable Specifications: SAE-AMS-DTL-23053/4, Class 1  
 UL File Number: E194625  
 Operating Temperature Range: -67°F (-55°C) to 230°F (110°C)  
 Shrink Ratio: Varies by size  
 Shrink Temperature: 275°F (135°C)  
 Recommended Heat Gun: 500°F (260°C)  
 Standard Colors: Black, or color coded by size  
 Standard Shipping Length: 4-foot or 6-inch lengths  
 (Catalog No. HIM6-Size)

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Total Wall Thickness (Rec.)		Meltable Wall Thickness (Rec.)		Std. 4-ft Lengths ft / pkg	Additional Colors Coded by Size
	inches	mm	inches	mm	inches	mm	inches	mm		
HIM-1/8	0.125	3.18	0.023	0.58	0.035	0.89	0.020	0.50	100	Brown
HIM-3/16	0.188	4.76	0.060	1.52	0.040	1.02	0.025	0.63	100	Gray
HIM-1/4	0.250	6.35	0.080	2.03	0.042	1.07	0.027	0.69	100	White
HIM-3/8	0.375	9.53	0.135	3.43	0.045	1.14	0.030	0.76	100	Red
HIM-1/2	0.500	12.70	0.195	4.95	0.050	1.27	0.035	0.89	40	Blue
HIM-3/4	0.750	19.05	0.313	7.95	0.060	1.52	0.040	1.01	20	Yellow
HIM-1"	1.000	25.40	0.400	10.16	0.070	1.78	0.040	1.01	20	Black

# HEAT SHRINKABLE FLUOROPOLYMER

## VERY FLEXIBLE • THIN-WALL • 2:1



**HVFX** is a radiation-cross-linked, thin wall, heat shrinkable flexible fluoropolymer that can be used for jacketing and bundling wires to form light-duty harnesses. This is especially good where low profile, abrasion resistance, and flexibility are needed. This material can also be used to provide insulation and strain relief of electrical connections and wire terminations, identification of wires, and packaging of components.

Applicable Specifications: SAE-AMS-DTL-23053/18, Class 2  
 UL File Number: E194625 (VW-1)  
 Operating Temperature Range: -67°F (-55°C) to 302°F (150°C)  
 Shrink Ratio: 2 to 1  
 Shrink Temperature: 302°F (150°C)  
 Recommended Heat Gun: 500°F (260°C)  
 Standard Colors: Black  
 Standard Shipping Length: Spooled

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. Spools ft / spool
	inches	mm	inches	mm	inches	mm	
HVFX-3/64	0.046	1.17	0.023	0.58	0.010	0.25	100, 1000
HVFX-1/16	0.063	1.60	0.031	0.79	0.010	0.25	100, 1000
HVFX-3/32	0.093	2.36	0.046	1.17	0.010	0.25	100, 500
HVFX-1/8	0.125	3.18	0.063	1.60	0.010	0.25	100, 500
HVFX-3/16	0.188	4.76	0.093	2.36	0.010	0.25	100, 200
HVFX-1/4	0.250	6.35	0.125	3.18	0.012	0.30	100, 250
HVFX-3/8	0.375	9.53	0.188	4.76	0.012	0.30	100, 200
HVFX-1/2	0.500	12.70	0.250	6.35	0.012	0.30	100, 150
HVFX-3/4	0.750	19.05	0.375	9.53	0.017	0.43	100, 150
HVFX-1"	1.000	25.40	0.500	12.70	0.019	0.48	100, 125

PTFE tubing is primarily for use in high thermal and difficult environmental applications, or where a low coefficient of friction is required. PTFE provides excellent electrical insulation and has excellent chemical and solvent resistance. PTFE has the widest temperature range, best dielectric and corrosion resistant properties of all **ProFIT** tubings.

Temperatures in excess of 675°F (357°C) for any prolonged period will cause physical changes, noted by a chalky appearance on the PTFE surface. Proper shrinking can be observed as the material turns from translucent to clear or transparent. A 750°F heat gun is recommended for proper application; longitudinal shrinkage is less than 10%.

**Note:** Caution should be exercised when heat shrinking PTFE. The excessive heat required for shrinking can do damage to heat sensitive solder joints or parts being covered.

Applicable Specifications: HTX - SAE-AMS-DTL-23053/12, Class 3

HSX - SAE-AMS-DTL-23053/12, Class 2

HFX - SAE-AMS-DTL-23053/12, Class 5

Operating Temperature Range: -103°F (-75°C) to 500°F (260°C)

Shrink Ratio: HSX, HTX - 1.5 to 1

HFX - 4 to 1

Shrink Temperature: 662°F (350°C)

Recommended Heat Gun: 750°F (400°C)

Standard Colors: Natural

Standard Shipping Length: 4-Foot lengths

**STANDARD WALL**

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness	
	inches	mm	inches	mm	inches	mm
HSX-24	0.050	1.27	0.027	0.69	0.012	0.30
HSX-22	0.055	1.40	0.032	0.81	0.012	0.30
HSX-20	0.060	1.52	0.039	0.99	0.016	0.41
HSX-18	0.076	1.93	0.049	1.24	0.016	0.41
HSX-16	0.085	2.16	0.054	1.37	0.016	0.41
HSX-15	0.110	2.79	0.067	1.70	0.016	0.41
HSX-14	0.120	3.05	0.072	1.83	0.016	0.41
HSX-13	0.130	3.30	0.080	2.03	0.016	0.41
HSX-12	0.150	3.81	0.089	2.26	0.016	0.41
HSX-11	0.170	4.32	0.101	2.57	0.016	0.41
HSX-10	0.191	4.85	0.112	2.84	0.016	0.41
HSX-9	0.205	5.21	0.124	3.15	0.020	0.51
HSX-8	0.240	6.10	0.141	3.58	0.020	0.51
HSX-7	0.270	6.86	0.158	4.01	0.020	0.51
HSX-6	0.302	7.67	0.178	4.52	0.020	0.51
HSX-5	0.320	8.13	0.198	5.03	0.020	0.51
HSX-4	0.370	9.40	0.224	5.69	0.020	0.51
HSX-3	0.390	9.90	0.249	6.32	0.020	0.51
HSX-2	0.430	10.92	0.278	7.06	0.020	0.51
HSX-1	0.450	11.43	0.311	7.90	0.020	0.51
HSX-0	0.470	11.94	0.347	8.81	0.020	0.51

**THIN WALL**

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness	
	inches	mm	inches	mm	inches	mm
HTX-30	0.034	0.86	0.015	0.38	0.009	0.23
HTX-28	0.038	0.97	0.018	0.46	0.009	0.23
HTX-26	0.046	1.17	0.022	0.56	0.009	0.23
HTX-24	0.050	1.27	0.027	0.69	0.010	0.25
HTX-22	0.055	1.40	0.032	0.81	0.010	0.25
HTX-20	0.060	1.52	0.039	0.99	0.012	0.30
HTX-18	0.076	1.93	0.049	1.24	0.012	0.30
HTX-16	0.093	2.36	0.061	1.55	0.012	0.30
HTX-14	0.120	3.05	0.072	1.83	0.012	0.30
HTX-12	0.150	3.81	0.089	2.26	0.012	0.30
HTX-10	0.191	4.85	0.112	2.84	0.012	0.30
HTX-8	0.240	6.10	0.141	3.58	0.015	0.38
HTX-6	0.302	7.67	0.178	4.52	0.015	0.38
HTX-4	0.370	9.40	0.224	5.69	0.015	0.38
HTX-2	0.430	10.92	0.278	7.06	0.015	0.38
HTX-0	0.470	11.94	0.347	8.81	0.015	0.38

**4X FRACTIONAL SIZES**

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness	
	inches	mm	inches	mm	inches	mm
HFX-5/64	0.078	1.98	0.025	0.64	0.009	0.23
HFX-1/8	0.125	3.18	0.037	0.94	0.010	0.25
HFX-1/4	0.250	6.35	0.063	1.60	0.012	0.30
HFX-3/8	0.375	9.53	0.096	2.44	0.012	0.30
HFX-1/2	0.500	12.70	0.144	3.66	0.015	0.38
HFX-5/8	0.625	15.88	0.178	4.52	0.015	0.38
HFX-3/4	0.750	19.05	0.224	5.69	0.015	0.38
HFX-1"	1.000	25.40	0.278	7.06	0.015	0.38
HFX-1-1/4	1.250	31.75	0.347	8.81	0.015	0.38

**HFEP** is Fluorinated Ethylene Propylene tubing. Two shrink ratios are available, 1.3:1 (**H1.3FEP**) and 1.67:1 (**H1.6FEP**). Due to its lower shrink temperature, **HFEP** is useful in **temperature sensitive applications** where the performance characteristics of TEFLON® are desired.

Applicable Specifications: SAE-AMS-DTL-23053/11, Class 1 & 2  
 Operating Temperature Range: -103°F (-75°C) to 392°F (200°C)  
 Shrink Ratio: 1.3:1 or 1.67:1  
 Shrink Temperature: 410°F (210°C) (1" I.D. and below)  
 430°F (221°C) (Over 1" I.D.)  
 Recommended Heat Gun: 750°F (400°C)  
 Standard Colors: Translucent  
 Standard Shipping Length: 4 Foot Lengths or Coils

1.3:1 AWG HEAT SHRINK SIZES									
Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Approximate Weight		SAE-AMS-DTL-23053/11 (Class 1)
	inches	mm	inches	mm	inches	mm	lb/ft	kg/m	
H1.3FEP-24	0.031	0.787	0.027	0.686	0.008 +/- 0.002	0.203 +/- 0.051	0.0015	0.0022	-101
H1.3FEP-22	0.036	0.914	0.032	0.813	0.008 +/- 0.002	0.203 +/- 0.051	0.0016	0.0024	-102
H1.3FEP-20	0.045	1.14	0.039	0.991	0.008 +/- 0.002	0.203 +/- 0.051	0.0023	0.0034	-103
H1.3FEP-18	0.060	1.52	0.049	1.25	0.008 +/- 0.002	0.203 +/- 0.051	0.0027	0.0040	-104
H1.3FEP-16	0.075	1.91	0.061	1.55	0.009 +/- 0.002	0.229 +/- 0.051	0.0030	0.0045	-105
H1.3FEP-14	0.092	2.34	0.072	1.83	0.009 +/- 0.002	0.229 +/- 0.051	0.0031	0.0046	-106
H1.3FEP-12	0.115	2.92	0.089	2.26	0.009 +/- 0.002	0.229 +/- 0.051	0.0032	0.0048	-107
H1.3FEP-10	0.141	3.58	0.114	2.90	0.010 +/- 0.003	0.254 +/- 0.076	0.0039	0.0058	-108
H1.3FEP-9	0.158	4.01	0.124	3.15	0.010 +/- 0.003	0.254 +/- 0.076	0.0043	0.0064	-109
H1.3FEP-8	0.180	4.57	0.143	3.63	0.010 +/- 0.003	0.254 +/- 0.076	0.0048	0.0071	-110
H1.3FEP-7	0.197	5.00	0.158	4.01	0.011 +/- 0.004	0.279 +/- 0.102	0.0068	0.0101	-111
H1.3FEP-6	0.225	5.72	0.180	4.57	0.011 +/- 0.004	0.279 +/- 0.102	0.0076	0.0113	-112
H1.3FEP-5	0.248	6.30	0.198	5.03	0.011 +/- 0.004	0.279 +/- 0.102	0.0084	0.0125	-113
H1.3FEP-4	0.290	7.37	0.226	5.74	0.011 +/- 0.004	0.279 +/- 0.102	0.0094	0.0140	-114
H1.3FEP-3	0.310	7.87	0.249	6.32	0.011 +/- 0.004	0.279 +/- 0.102	0.0105	0.0156	-115
H1.3FEP-2	0.365	9.27	0.280	7.11	0.012 +/- 0.004	0.305 +/- 0.102	0.0117	0.0174	-116
H1.3FEP-1	0.400	10.20	0.311	7.90	0.012 +/- 0.004	0.305 +/- 0.102	0.0132	0.0196	-117
H1.3FEP-0	0.440	11.20	0.349	8.86	0.012 +/- 0.004	0.305 +/- 0.102	0.0180	0.0268	-118
1.3:1 FRACTIONAL HEAT SHRINK SIZES									
H1.3FEP-3/8	0.500	12.70	0.383	9.73	0.015 +/- 0.004	0.381 +/- 0.102	0.0233	0.0347	-119
H1.3FEP-7/16	0.580	14.70	0.448	11.40	0.020 +/- 0.004	0.508 +/- 0.102	0.0366	0.0545	-120
H1.3FEP-1/2	0.666	16.90	0.510	13.00	0.020 +/- 0.004	0.508 +/- 0.102	0.0400	0.0595	-121
H1.3FEP-5/8	0.830	21.10	0.637	16.20	0.025 +/- 0.004	0.635 +/- 0.102	0.0631	0.0939	-122
H1.3FEP-3/4	1.000	25.40	0.764	19.40	0.030 +/- 0.004	0.762 +/- 0.102	0.0929	0.1382	-123
H1.3FEP-7/8	1.170	29.70	0.891	22.60	0.035 +/- 0.004	0.889 +/- 0.102	0.1266	0.1884	-124
H1.3FEP-1"	1.330	33.78	1.020	25.90	0.035 +/- 0.004	0.889 +/- 0.102	0.1439	0.2141	-126
1.67:1 FRACTIONAL HEAT SHRINK SIZES (Class 2)									
H1.6FEP-3/32	0.093	2.36	0.056	1.42	0.008 +/- 0.003	0.203 +/- 0.076	0.0045	0.0066	-201
H1.6FEP-1/8	0.125	3.18	0.075	1.91	0.010 +/- 0.003	0.254 +/- 0.076	0.0046	0.0068	-202
H1.6FEP-3/16	0.188	4.76	0.115	2.92	0.010 +/- 0.002	0.254 +/- 0.076	0.0058	0.0086	-203
H1.6FEP-1/4	0.250	6.35	0.150	3.81	0.010 +/- 0.002	0.254 +/- 0.076	0.0086	0.0127	-204
H1.6FEP-3/8	0.375	9.53	0.225	5.72	0.012 +/- 0.002	0.305 +/- 0.076	0.0140	0.0207	-205
H1.6FEP-1/2	0.500	12.70	0.300	7.62	0.015 +/- 0.004	0.381 +/- 0.102	0.0283	0.0418	-206
H1.6FEP-3/4	0.750	19.05	0.450	11.43	0.020 +/- 0.004	0.508 +/- 0.102	0.0540	0.0797	-207
H1.6FEP-1"	1.000	25.40	0.600	15.24	0.025 +/- 0.005	0.635 +/- 0.127	0.0639	0.0943	-208
H1.6FEP-1-1/2	1.500	38.10	0.900	22.86	0.030 +/- 0.005	0.762 +/- 0.127	0.1260	0.1860	-209
H1.6FEP-2"	2.000	50.80	1.200	30.48	0.030 +/- 0.005	0.762 +/- 0.127	0.2200	0.3248	-210

# HEAT SHRINKABLE KYNAR

## SEMI-RIGID • THIN-WALL • 2:1

**HKX** is ideal for use where resistance to abrasion and cut-through is critical. Because it is extremely tough, it is excellent for strain relief applications. **HKX** can be flexed, twisted, and bent repeatedly without loss of mechanical or electrical strength.

**HKX** is translucent, making inspection and identification of covered objects easier. Longitudinal shrinkage is less than 5%. To keep objects being covered relatively cool, faster shrinkage at 250-350°C is suggested.

Applicable Specifications: SAE-AMS-DTL-23053/8  
 UL/CUL File Number: E52612 (VW-1)  
 Operating Temperature Range: -67°F (-55°C) to 347°F (175°C)  
 Shrink Ratio: 2 to 1  
 Shrink Temperature: 347°F (175°C)  
 Standard Colors: Translucent  
 Standard Shipping Length: 6-inch or 4-foot lengths

Catalog Number Size	Catalog Number Size (6" pcs.)	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. 4-ft Lengths ft / pkg	Std. 6-in Lengths pcs / pkg
		inches	mm	inches	mm	inches	mm		
HKX-3/64	HKX6-3/64	0.046	1.17	0.023	0.58	0.010	0.25	100, 200	32
HKX-1/16	HKX6-1/16	0.063	1.60	0.031	0.79	0.010	0.25	100, 200	28
HKX-3/32	HKX6-3/32	0.093	2.36	0.046	1.17	0.010	0.25	100, 200	24
HKX-1/8	HKX6-1/8	0.125	3.18	0.063	1.60	0.010	0.25	100, 200	20
HKX-3/16	HKX6-3/16	0.188	4.76	0.093	2.36	0.010	0.25	100	16
HKX-1/4	HKX6-1/4	0.250	6.35	0.125	3.18	0.012	0.30	100	12
HKX-3/8	HKX6-3/8	0.375	9.53	0.188	4.76	0.012	0.30	100	8
HKX-1/2	HKX6-1/2	0.500	12.70	0.250	6.35	0.012	0.30	20, 100	4
HKX-3/4	HKX6-3/4	0.750	19.05	0.375	9.53	0.017	0.43	20, 100	2
HKX-1"	HKX6-1"	1.000	25.40	0.500	12.70	0.019	0.48	20, 100	1
HKX-1-1/2	N/A	1.500	38.10	0.750	19.05	0.020	0.51	20, 100	N/A

# HEAT SHRINKABLE FLUOROPOLYMER

## SEMI-RIGID • THIN-WALL • 2:1

**HKFX** is a clear, flame-resistant, flexible fluoropolymer heat-shrinkable tubing. With approximately 40% thinner walls than most general-purpose Polyolefin tubings, it has exceptional clarity to allow easy identification and inspection. **HKFX** facilitates bundling and jacketing of wires and cables, protecting them from chemical and mechanical abuse.

Applicable Specifications: SAE-AMS-DTL-23053/18, Class 2  
 UL/CUL File Number: E52612 (VW-1)  
 Operating Temperature Range: -67°F (-55°C) to 302°F (150°C)  
 Shrink Ratio: 2 to 1  
 Shrink Temperature: 302°F (150°C)  
 Color: Clear (Flame-retardant)  
 Standard Shipping Length: Spooled

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. 4-ft Lengths ft / pkg	Std. Spools ft / spool
	inches	mm	inches	mm	inches	mm		
HKFX-3/64	0.046	1.17	0.023	0.58	0.010	0.25	100, 200	100, 1000
HKFX-1/16	0.063	1.60	0.031	0.79	0.010	0.25	100, 200	100, 1000
HKFX-3/32	0.093	2.36	0.046	1.17	0.010	0.25	100, 200	100, 500
HKFX-1/8	0.125	3.18	0.063	1.60	0.010	0.25	100, 200	100, 500
HKFX-3/16	0.188	4.76	0.093	2.36	0.010	0.25	100, 200	100, 500
HKFX-1/4	0.250	6.35	0.125	3.18	0.012	0.30	100	100, 250
HKFX-3/8	0.375	9.53	0.188	4.76	0.012	0.30	100	100, 200
HKFX-1/2	0.500	12.70	0.250	6.35	0.012	0.30	20, 100	100, 150
HKFX-3/4	0.750	19.05	0.375	9.53	0.017	0.43	20, 100	100, 250
HKFX-1"	1.000	25.40	0.500	12.70	0.019	0.48	20, 100	100, 125



# HEAT SHRINKABLE PTFE WITH MELTABLE FEP LINER



**HTIM** consists of an outer layer of PTFE heat shrink with an inner layer of FEP tubing. When properly heated, the PTFE shrinks tightly over the substrate and the FEP melts to encapsulate the product, providing a tight, moisture resistant seal.

Operating Temperature Range: -100°F (-73°C) to 450°F (232°C)  
 Shrink Ratio: See table below  
 Shrink Temperature: 680°F (360°C)  
 Recommended Heat Gun: 750°F (400°C)  
 Standard Colors: Translucent to Opaque  
 Standard Shipping Length: 4 Foot Lengths

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Expanded Wall Thickness		Approximate Weight	
	inches	mm	inches	mm	inches	mm	lb/ft	kg/m
HTIM-1/32	0.036	0.91	0.000	0.00	0.023 +/- 0.005	0.584 +/- 0.127	0.004	0.006
HTIM-1/16	0.060	1.52	0.000	0.00	0.028 +/- 0.005	0.711 +/- 0.813	0.005	0.007
HTIM-1/8	0.130	3.30	0.000	0.00	0.032 +/- 0.005	0.813 +/- 0.127	0.018	0.027
HTIM-5/32	0.160	4.06	0.000	0.00	0.032 +/- 0.005	0.813 +/- 0.127	0.021	0.031
HTIM-3/16	0.190	4.83	0.062	1.57	0.035 +/- 0.005	0.889 +/- 0.127	0.025	0.037
HTIM-1/4	0.250	6.35	0.125	3.18	0.035 +/- 0.005	0.889 +/- 0.127	0.031	0.046
HTIM-3/8	0.350	8.89	0.190	4.83	0.035 +/- 0.005	0.889 +/- 0.127	0.042	0.062
HTIM-1/2	0.450	11.43	0.312	7.92	0.055 +/- 0.005	1.400 +/- 0.127	0.091	0.135
HTIM-3/4	0.700	17.78	0.440	11.18	0.055 +/- 0.005	1.400 +/- 0.127	0.131	0.195
HTIM-1"	0.950	24.13	0.680	17.27	0.065 +/- 0.005	1.650 +/- 0.127	0.178	0.265

# HEAT SHRINKABLE LAYFLAT PVC

## SEMI-RIGID • THIN-WALL (0.004", 0.006") • 2:1



**HLF** PVC heat-shrink tubing is a thin-wall, low-cost material offering good electrical and mechanical characteristics. This specially formulated polyvinyl chloride material will shrink rapidly and uniformly, conforming to the shape of the object to be covered. Applications include wire and cable identification, insulation, and jacketing of capacitors or similar objects where protective covering is required. Widely used to hold groups of batteries together to form "battery packs."

**HLF** is available with a 0.004" (0.010 mm) or 0.006" (0.015 mm) wall thickness - please specify when ordering.

Operating Temperature Range: -4°F (-20°C) to 212°F (100°C)  
 Shrink Ratio: 2 to 1  
 Shrink Temperature: 275°F (135°C)  
 Recommended Heat Gun: 500°F (260°C)  
 Standard Colors: White, Black, or Clear  
 Standard Shipping Length: Spooled

Catalog Number Size	Minimum Expanded I.D.		Std. Spools ft / spool
	inches	mm	
HLF-19	0.748	19.00	50, 250
HLF-23	0.906	23.00	50, 250
HLF-33	1.300	33.00	50, 250
HLF-42	1.654	42.00	50, 250
HLF-48	1.890	48.00	50, 250
HLF-54	2.126	54.00	50, 250
HLF-58	2.283	58.00	50, 250
HLF-66	2.598	66.00	50, 250
HLF-72	2.835	72.00	50, 250
HLF-83	3.268	83.00	50, 250
HLF-92	3.622	92.00	50, 250
HLF-103	4.055	103.00	50, 250
HLF-112	4.409	112.00	50, 250
HLF-161	6.339	161.00	50, 250

Other sizes and colors available - subject to factory minimums.

# HEAT SHRINKABLE VINYL

FLEXIBLE • THIN-WALL • 2:1 • CROSS-LINKED

An extremely flexible general purpose tubing with high mechanical strength; ideal for jacketing and insulation. **HCX** will not cold flow, never melts, and is self-extinguishing. Maximum longitudinal shrinkage is 10%.

Compared with HVX (below), **HCX** is superior in flexibility and crack resistance and has slightly better mechanical strength.

Applicable Specifications: SAE-AMS-DTL-23053/2, Class 1  
 UL File Number: E52612 (VW-1)  
 Operating Temperature Range: -04°F (-20°C) to 221°F (105°C)  
 Shrink Ratio: 2 to 1  
 Shrink Temperature: 212°F (100°C)  
 Recommended Heat Gun: 500°F  
 Standard Colors: Black  
 Standard Shipping Length: Spooled

**PACKAGED ASSORTMENTS**

Catalog Number	Tubing Sizes	6" Pieces Per Pkg.
HCX-HA1	3/64" thru 1/4"	60
HCX-HA2	3/8" thru 1"	40
HCX-HA3	1-1/2" thru 2"	14

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. Spools ft / spool
	inches	mm	inches	mm	inches	mm	
HCX-3/64	0.046	1.19	0.023	0.58	0.020	0.51	100, 1000
HCX-1/16	0.063	1.60	0.031	0.79	0.020	0.51	100, 1000
HCX-3/32	0.093	2.36	0.046	1.17	0.020	0.51	100, 500
HCX-1/8	0.125	3.18	0.063	1.60	0.025	0.64	100, 500
HCX-3/16	0.188	4.76	0.093	2.36	0.025	0.64	100, 500
HCX-1/4	0.250	6.35	0.125	3.18	0.025	0.64	100, 250
HCX-3/8	0.375	9.53	0.188	4.76	0.030	0.76	100, 200
HCX-1/2	0.500	12.70	0.250	6.35	0.030	0.76	100, 150
HCX-3/4	0.750	19.05	0.375	9.53	0.035	0.89	100, 250
HCX-1"	1.000	25.40	0.500	12.70	0.040	1.01	100, 250
HCX-1-1/2	1.500	38.10	0.750	19.05	0.045	1.14	25, 100
HCX-2"	2.000	50.80	1.000	25.40	0.050	1.27	25, 100

# HEAT SHRINKABLE VINYL

FLEXIBLE • THIN-WALL • 2:1

**HVX** has the lowest shrink temperature of all **ProFIT** tubing and is especially applicable where higher shrinking temperature could damage enclosed or adjacent components. **HVX** is easily assembled over irregular shapes and forms a smooth, tight-fitting cover for excellent mechanical and electrical protection. When see-through insulation is required, note that **HVX** is available in clear.

Because it is more rigid than **HCX** (above), **HVX** is used for its shape retention characteristics during complex assembly or forming operations.

**Note:** **HVX** is heat-sensitive. MUST be stored at or below 70°F to avoid premature shrink back.

Applicable Specifications: SAE-AMS-DTL-23053/2, Class 2  
 UL File Number: E52612 (VW-1)  
 Operating Temperature Range: -04°F (-20°C) to 221°F (105°C)  
 Shrink Ratio: 2 to 1  
 Shrink Temperature: 212°F (100°C)  
 Recommended Heat Gun: 300°F  
 Standard Colors: Black, White, Red, Clear  
 Standard Shipping Length: Spooled

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. Spools ft / spool
	inches	mm	inches	mm	inches	mm	
HVX-1/16	0.063	1.60	0.031	0.79	0.020	0.51	100, 1000
HVX-3/32	0.093	2.36	0.046	1.17	0.025	0.64	100, 1000
HVX-1/8	0.125	3.18	0.063	1.60	0.025	0.64	100, 1000
HVX-3/16	0.188	4.76	0.093	2.36	0.025	0.64	100, 1000
HVX-1/4	0.250	6.35	0.125	3.18	0.025	0.64	100, 1000
HVX-3/8	0.375	9.53	0.188	4.76	0.025	0.64	100, 500
HVX-1/2	0.500	12.70	0.250	6.35	0.025	0.64	100, 500
HVX-3/4	0.750	19.05	0.375	9.53	0.025	0.64	100, 500
HVX-1"	1.000	25.40	0.500	12.70	0.030	0.76	100, 500
HVX-1-1/2	1.500	38.10	0.750	19.05	0.035	0.89	100, 250
HVX-2"	2.000	50.80	1.000	25.40	0.040	1.01	100, 250

# HEAT SHRINKABLE NEOPRENE ELASTOMER



**HNTFR** is a cross-linked heat-shrinkable neoprene elastomeric tubing, especially formulated for improved fluid resistance at ambient and elevated temperatures. **HNTFR** is rugged and particularly suitable for protection of cable harnesses where elevated temperature, fluid resistance and flexibility are required.

Applicable Specifications: SAE-AMS-DTL-23053/1, Class 1 & 2  
 UL File Number: E52612  
 CSA File Number: 070501  
 Operating Temperature Range: -94°F (-70°C) to 250°F (121°C)  
 Shrink Ratio: 1.75 to 1  
 Shrink Temperature: 275°F (135°C)  
 Recommended Heat Gun: 500°F (260°C)  
 Standard Colors: Black  
 Standard Shipping Length: Spools

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. Spools ft / spool
	inches	mm	inches	mm	inches	mm	
HNTFR-1/8	0.125	3.18	0.061	1.55	0.027	0.68	100
HNTFR-3/16	0.188	4.76	0.100	2.54	0.033	0.83	100
HNTFR-1/4	0.250	6.35	0.143	3.63	0.035	0.88	100
HNTFR-3/8	0.375	9.53	0.214	5.44	0.040	1.01	100
HNTFR-1/2	0.500	12.70	0.286	7.26	0.048	1.22	100
HNTFR-5/8	0.625	15.88	0.357	9.07	0.052	1.32	100
HNTFR-3/4	0.750	19.05	0.428	10.87	0.057	1.44	100
HNTFR-7/8	0.875	22.23	0.500	12.70	0.065	1.65	100
HNTFR-1"	1.000	25.40	0.570	14.48	0.070	1.77	100
HNTFR-1-1/4	1.250	31.75	0.714	18.14	0.087	2.20	100
HNTFR-1-1/2	1.500	38.10	0.857	21.77	0.095	2.41	100
HNTFR-1-3/4	1.750	44.45	1.000	25.40	0.107	2.71	75
HNTFR-2"	2.000	50.80	1.140	28.96	0.110	2.79	75
HNTFR-3"	3.000	76.20	1.710	43.43	0.125	3.17	50

# HEAT SHRINKABLE VITON FLOUROELASTOMER



**HVT** Heat-Shrinkable Viton offers outstanding performance in both high and low continuous temperature environments (-40°F to 392°F). It is unaffected by a wide variety of fuels, lubricants, acids, and solvents at elevated temperature. The tubing strength makes it especially suitable for applications demanding abrasion and high impact resistance. **HVT** may be easily marked for identification purposes.

Applicable Specifications: SAE-AMS-DTL-23053/13  
 Operating Temperature Range: -40°F (-40°C) to 392°F (200°C)  
 Shrink Ratio: 2 to 1  
 Shrink Temperature: 347°F (175°C)  
 Recommended Heat Gun: 500°F (260°C)  
 Standard Colors: Black  
 Standard Shipping Length: Spools

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. Spools ft / spool
	inches	mm	inches	mm	inches	mm	
HVT-1/8	0.125	3.18	0.063	1.60	0.030	0.76	100
HVT-3/16	0.188	4.76	0.093	2.36	0.035	0.89	100
HVT-1/4	0.250	6.35	0.125	3.18	0.035	0.89	100
HVT-3/8	0.375	9.53	0.188	4.76	0.035	0.89	100
HVT-1/2	0.500	12.70	0.250	6.35	0.035	0.89	100
HVT-5/8	0.625	15.88	0.312	7.92	0.042	1.07	100
HVT-3/4	0.750	19.05	0.375	9.53	0.042	1.07	100
HVT-7/8	0.875	22.23	0.437	11.10	0.049	1.24	100
HVT-1"	1.000	25.40	0.500	12.70	0.049	1.24	100
HVT-1-1/4	1.250	31.75	0.625	15.88	0.055	1.40	100
HVT-1-1/2	1.500	38.10	0.750	19.05	0.055	1.40	100
HVT-2"	2.000	50.80	1.000	25.40	0.065	1.65	50

# MEDICAL GRADE HEAT SHRINKABLE FLUOROPOLYMER

SEMI-RIGID • THIN-WALL • 2:1 • USP CLASS VI

**HSMG-A** is USP Class VI material designed for electrical insulation and strain relief of components that are exposed to high temperatures during use or sterilization. It has a tough, semi-rigid, thin-wall construction for applications where space between components is minimal. **HSMG-A** is compatible with gamma, ETO, steam and dry heat sterilization.

Applicable Specifications: USP Class VI  
 Operating Temperature Range: -67°F (-55°C) to 347°F (175°C)  
 Shrink Ratio: 2 to 1  
 Shrink Temperature: 347°F (175°C)  
 Recommended Heat Gun: 500°F (260°C)  
 Standard Colors: Translucent  
 Standard Shipping Length: Available in cut pieces or 4 Foot Lengths

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness	
	inches	mm	inches	mm	inches	mm
HSMG-A-1/16	0.063	1.60	0.031	0.79	0.010	0.25
HSMG-A-3/32	0.093	2.36	0.046	1.17	0.010	0.25
HSMG-A-1/8	0.125	3.18	0.063	1.60	0.010	0.25
HSMG-A-3/16	0.188	4.76	0.093	2.36	0.010	0.25
HSMG-A-1/4	0.250	6.35	0.125	3.18	0.013	0.33
HSMG-A-3/8	0.375	9.53	0.188	4.76	0.013	0.33
HSMG-A-1/2	0.500	12.70	0.250	6.35	0.013	0.33

# MEDICAL GRADE HEAT SHRINKABLE FLUOROPOLYMER

FLEXIBLE • THIN-WALL • 2:1 • USP CLASS VI

**HSMG-C** is another USP Class VI tubing product designed for electrical insulation and strain relief of components that are exposed to high temperatures during use or sterilization. It also has a tough, thin-wall construction but is more flexible than its HSMG-A counterpart. **HSMG-C** is able to withstand autoclave (limited cycles), gamma, ETO, and dry heat sterilization.

Applicable Specifications: USP Class VI  
 Operating Temperature Range: -67°F (-55°C) to 302°F (150°C)  
 Shrink Ratio: 2 to 1  
 Shrink Temperature: 302°F (150°C)  
 Recommended Heat Gun: 500°F (260°C)  
 Standard Colors: Black  
 Standard Shipping Length: Available in cut pieces, coils, or spools

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness	
	inches	mm	inches	mm	inches	mm
HSMG-C-1/16	0.063	1.60	0.031	0.80	0.010	0.25
HSMG-C-3/32	0.093	2.36	0.046	1.20	0.010	0.25
HSMG-C-1/8	0.125	3.18	0.063	1.60	0.010	0.25
HSMG-C-3/16	0.188	4.76	0.093	2.36	0.010	0.25
HSMG-C-1/4	0.250	6.35	0.125	3.18	0.012	0.30
HSMG-C-3/8	0.375	9.53	0.188	4.76	0.012	0.30
HSMG-C-1/2	0.500	12.70	0.250	6.35	0.012	0.30

# MEDICAL GRADE HEAT SHRINKABLE POLYOLEFIN

FLEXIBLE • THIN-WALL • 2:1 • USP CLASS VI

**HSMG-E**

**HSMG-E** is a USP Class VI tubing product designed for insulation of electro-surgical instruments, strain relief, color-coding and identification of medical components and devices. **HSMG-E** is highly resistant to abrasion and solvents, and is able to withstand gamma and ETO sterilization.

Additional sizes are available upon request.

Applicable Specifications: USP Class VI  
 Operating Temperature Range: -94°F (-70°C) to 221°F (105°C)  
 Shrink Ratio: 2 to 1  
 Shrink Temperature: 230°F (110°C)  
 Recommended Heat Gun: 500°F (260°C)  
 Standard Colors: Black or Clear  
 Standard Shipping Length: Available in cut pieces, coils, or spools

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness	
	inches	mm	inches	mm	inches	mm
HSMG-E-1/16	0.063	1.60	0.031	0.79	0.017	0.43
HSMG-E-3/32	0.093	2.36	0.046	1.17	0.020	0.51
HSMG-E-1/8	0.125	3.18	0.063	1.60	0.020	0.51
HSMG-E-3/16	0.188	4.76	0.093	2.36	0.020	0.51
HSMG-E-1/4	0.250	6.35	0.125	3.18	0.025	0.64
HSMG-E-3/8	0.375	9.53	0.188	4.76	0.025	0.64
HSMG-E-1/2	0.500	12.70	0.250	6.35	0.025	0.64

## AUTO HEAT™ II CONVEYER OVENS

ICO RALLY's **AUTO HEAT II** conveyor ovens offer an economical heat-process system designed and engineered to address the requirements of today's industry. These heat ovens provide a particular value in the laboratory, prototype, or low-to-medium volume production operations.

Items processed through **AUTO HEAT II** ovens are surrounded by a 360° thermal wash, exposing all surfaces to identical temperatures evenly and consistently throughout the length of the process tunnel.

**AUTO HEAT II** ovens are manufactured clean room ready. External surfaces are sealed with an easy-to-clean epoxy coating. Internal surfaces, as well as conveyor belts, rollers, gears, and blower sleeves are stainless steel. All seams are sealed with a high-temperature RTV compound.



### APPLICATIONS

- Shrinking thermally reactive polymer tubing.
- Re-flowing solder pastes during the production of printed circuit boards.
- Accelerating the curing or drying of epoxies, adhesives and coatings.
- Maximum temperature 350°C (660°F)
- Maximum belt speed 30 inches/minute

# HEAT SHRINKABLE FABRIC TUBING

**HSF** is a heat shrinkable “fabric” tubing woven from black strands of Polyester and Polyolefin. Applications include noise suppression and abrasion resistance for components such as rubber hoses, harnesses, and plastic pipes. **HSF** is highly flexible and easily installed over awkward materials such as bent hoses or pre-formed pipes. **HSF** is Halogen free.

Operating Temperature Range: -40°F (-40°C) to 257°F (125°C)  
 Shrink Ratio: 2 to 1 & 3 to 1  
 Shrink Temperature: 275°F (135°C)  
 Recommended Heat Gun: 500°F (260°C)  
 Standard Colors: Black  
 Standard Shipping Length: Spools

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. Spools ft / pkg
	inches	mm	inches	mm	inches	mm	
HSF-12/6	0.472	12.0	0.236	6.0	0.040	0.10	100, 200
HSF-20/10	0.787	20.0	0.394	10.0	0.040	0.10	100, 200
HSF-30/15	1.181	30.0	0.591	15.0	0.040	0.10	100, 200
HSF-40/20	1.575	40.0	0.787	20.0	0.040	0.10	100, 200
HSF-50/25	1.969	50.0	0.984	25.0	0.040	0.10	100, 200
HSF-60/30	2.362	60.0	1.181	30.0	0.040	0.10	50, 100
HSF-70/35	2.756	70.0	1.378	35.0	0.040	0.10	50, 100
HSF3X-18/6	0.709	18.0	0.236	6.0	0.040	0.10	100, 200
HSF3X-30/10	1.181	30.0	0.394	10.0	0.040	0.10	100, 200
HSF3X-60/20	2.362	60.0	0.787	20.0	0.040	0.10	50, 100

# HEAT SHRINKABLE POLYOLEFIN FLEXIBLE • THIN-WALL • 2:1 • GREEN/YELLOW STRIPED

**HIX-G/Y** is a longitudinal co-extrusion of green and yellow Polyolefin which produces a flexible, flame-retardant shrinkable tubing used for identifying ground wires or ground leads within a cable bundle.

UL File Number: E52612  
 Operating Temperature Range: -67°F (-55°C) to 275°F (135°C)  
 Shrink Ratio: 2 to 1  
 Shrink Temperature: 250°F (121°C)  
 Standard Colors: Green/Yellow  
 Standard Shipping Length: Spooled

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. Spools ft / spool
	inches	mm	inches	mm	inches	mm	
HIX-G/Y-1/8	0.125	3.18	0.063	1.60	0.020	0.50	100, 250
HIX-G/Y-3/16	0.188	4.76	0.093	2.36	0.020	0.50	100, 250
HIX-G/Y-1/4	0.250	6.35	0.125	3.18	0.025	0.63	100, 250
HIX-G/Y-3/8	0.375	9.53	0.188	4.76	0.025	0.63	100, 250
HIX-G/Y-1/2	0.500	12.70	0.250	6.35	0.025	0.63	100, 250
HIX-G/Y-3/4	0.750	19.05	0.375	9.53	0.030	0.76	50, 100
HIX-G/Y-1"	1.000	25.40	0.500	12.70	0.035	0.89	50, 100

**HSRT** is an all purpose heat-shrinkable tubing repair product. Its side entry design facilitates the repair or reinforcement of wire and cable insulation without removing the connector.

In addition to excellent abrasion, environmental, and electrical properties, **HSRT** is resistant to most oils, fluids, mild acids, and alkalis.

Operating Temperature Range: -67°F (-55°C) to 275°F (135°C)

Shrink Ratio: Varies by Size

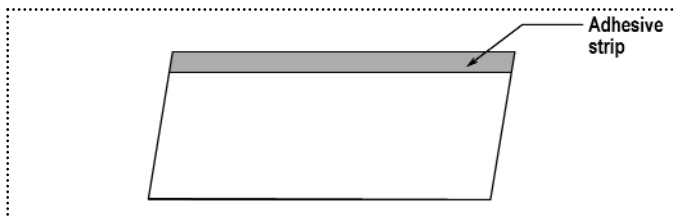
Shrink Temperature: 176°F (80°C)

Recommended Heat Gun: 500°F (260°C)

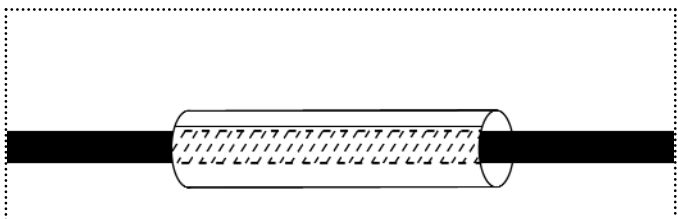
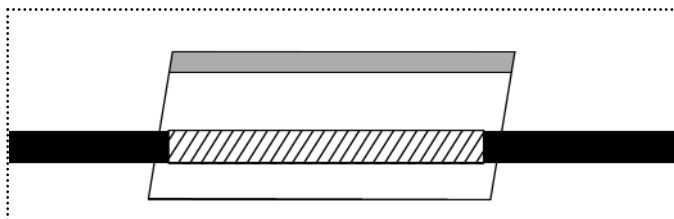
Standard Colors: Black

Standard Shipping Length: 50 ft/spool

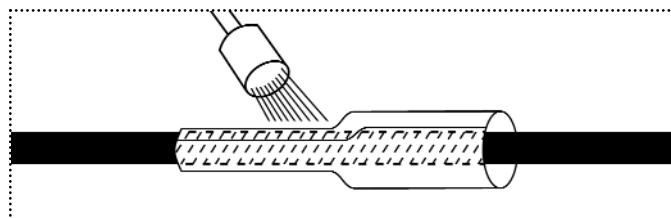
Catalog Number Size	Cable Diameter Range (Minimum - Maximum)	
	inches	mm
HSRT#1	0.125 - 0.187	3.18 - 4.75
HSRT#2	0.188 - 0.249	4.78 - 6.32
HSRT#3	0.250 - 0.370	6.35 - 9.40
HSRT#4	0.380 - 0.490	9.65 - 12.45
HSRT#5	0.500 - 0.620	12.70 - 15.75
HSRT#6	0.630 - 0.740	16.00 - 18.80
HSRT#7	0.750 - 0.870	19.05 - 22.10
HSRT#8	0.880 - 0.990	22.35 - 25.15
HSRT#9	1.000 - 1.120	25.40 - 28.45
HSRT#10	1.130 - 1.240	28.70 - 31.50
HSRT#11	1.250 - 1.370	31.75 - 34.80
HSRT#12	1.380 - 1.490	35.05 - 37.85
HSRT#13	1.500 - 1.620	38.10 - 41.15
HSRT#14	1.630 - 1.750	41.40 - 44.45



**HSRT** - Heat Shrinkable Repair Tubing as supplied. Select size based on outside diameter of wire or cable assembly which requires repair.



1. Clean surface of substrate that will be exposed to inside diameter of **HSRT** product.
2. Position **HSRT** product over area which requires repair with adhesive strip facing up as shown.
3. Remove protective liner from adhesive strip.
4. Fold adhesive strip side over non-adhesive side to create a shrinkable tube.



5. Apply heat. Tube will shrink tightly over wire or cable assembly.

# HEAT SHRINKABLE POLYOLEFIN

SEMI-RIGID • HEAVY-WALL • 3:1 • ADHESIVE-LINED

**HCATV** sleeving is designed for fast and simple installation. A specially formulated, high performance adhesive provides a durable, waterproof seal. If the **HCATV** sleeve is removed, this special adhesive leaves the connector surface clean and easily accessible for re-entry into the connector. In addition to excellent electrical properties, the heavy-wall outer jacket provides excellent mechanical properties when abrasion protection is necessary.

Operating Temperature Range: -67°F (-55°C) to 257°F (125°C)

Shrink Ratio: 3 to 1

Shrink Temperature: 248°F (120°C)

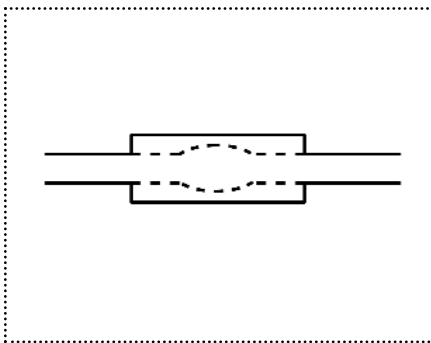
Recommended Heat Gun: 500°F (260°C)

Standard Colors: Black

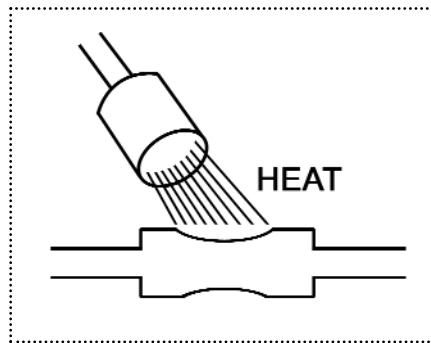
Standard Shipping Length: 4 Foot Lengths

Cut piece quotes on request

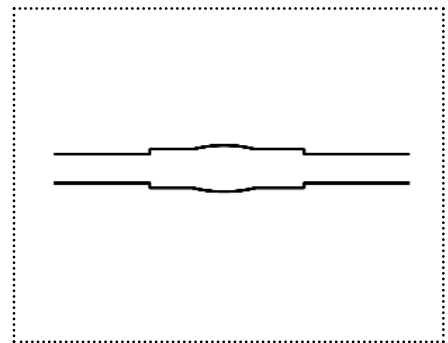
Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. 4-ft Lengths ft / pkg
	inches	mm	inches	mm	inches	mm	
HCATV-10/3	0.394	10.00	0.118	3.00	0.059	1.50	100
HCATV-19/6	0.748	19.00	0.236	6.00	0.059	1.50	100
HCATV-27/9	1.063	27.00	0.354	9.00	0.106	2.70	100
HCATV-33/9	1.299	33.00	0.354	9.00	0.106	2.70	40
HCATV-38/13	1.496	38.00	0.512	13.00	0.118	3.00	40
HCATV-43/13	1.693	43.00	0.512	13.00	0.118	3.00	40
HCATV-51/18	2.008	51.00	0.709	18.00	0.118	3.00	20
HCATV-70/25	2.756	70.00	0.984	25.00	0.154	3.90	20



1. Allow approximately 2" overlay on each end of cable or item to be covered.



2. Tubing shrinks by applying heat at 250°F/275°F with torch, heat gun, or other heat source. Shrink from center toward ends...applying heat on all sides to ensure even shrinkage.



3. Process is completed when tubing assumes outline of item being covered and sealant flows from both ends of shrink tube. Additional heating will not make tubing shrink tighter.



# NO-HEAT™ SHRINKABLE TUBING

**NO-HEAT** Shrink Tubing product requires no heat source to shrink over your connectors, wires, or cable sheaths. The tubing coverage is made possible by a spiral cut, removable support core that keeps the tubing in its expanded state. As the core is unraveled, the EPDM (Ethylene Propylene Rubber) tube conforms to the substrate and forms a water-resistant seal. In addition to being water-resistant, **NO-HEAT** Shrink Tubing resists fungus, acids and alkalis.

Operating Temperature Range: 0°F (-18°C) to 240°F (115°C)

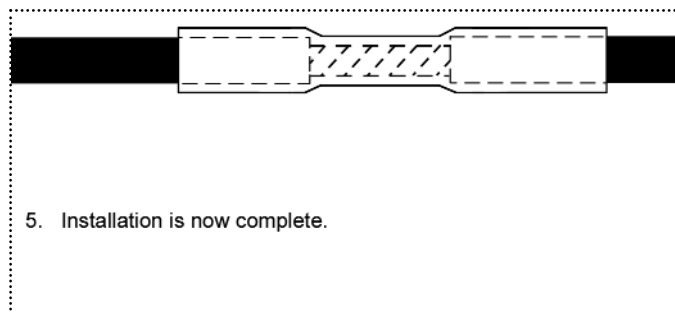
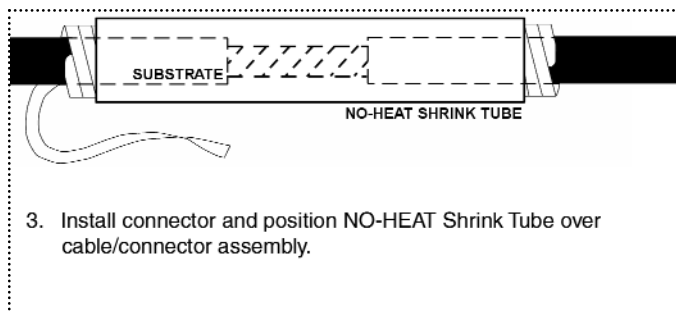
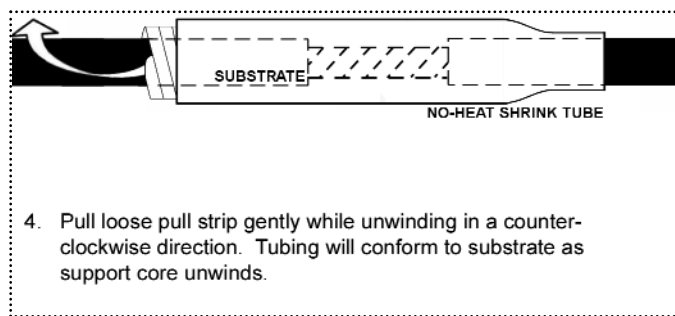
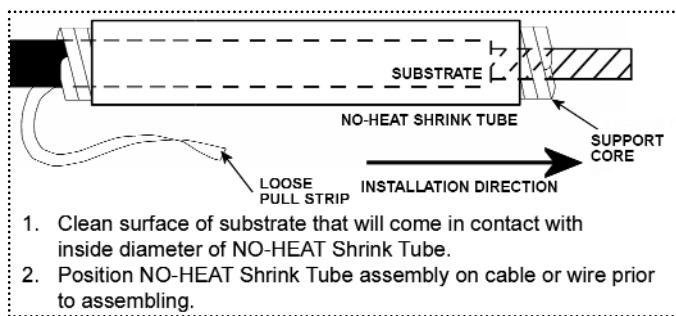
Shrink Ratio: See table below

Shrink Temperature: N/A

Standard Colors: Black

Standard Shipping Length: See table below

Catalog Number Size	Cable Diameter Range (Minimum - Maximum)		Recovered Wall Thickness		Relaxed Tube Length	
	inches	mm	inches	mm	inches	mm
NST-#2 X 6"	0.310 - 0.560	7.80 - 14.30	0.060	1.52	6.00	152
NST-#3 X 8"	0.400 - 0.820	10.10 - 20.90	0.066	1.68	8.00	203
NST-#4 X 9"	0.550 - 1.180	13.90 - 30.10	0.064	1.62	9.00	229
NST-#4 X 11"	0.550 - 1.180	13.90 - 30.10	0.064	1.62	11.00	279
NST-#5 X 6"	0.690 - 1.380	17.50 - 35.10	0.073	1.85	6.00	152
NST-#5 X 12"	0.690 - 1.380	17.50 - 35.10	0.073	1.85	12.00	305
NST-#5 X 16"	0.690 - 1.380	17.50 - 35.10	0.073	1.85	16.00	406
NST-#6 X 6"	0.930 - 1.940	23.60 - 49.30	0.070	1.78	6.00	152
NST-#6 X 12"	0.930 - 1.940	23.60 - 49.30	0.070	1.78	12.00	305
NST-#6 X 18"	0.930 - 1.940	23.60 - 49.30	0.070	1.78	18.00	457
NST-#7 X 6"	1.270 - 2.670	32.20 - 67.80	0.067	1.70	6.00	152
NST-#7 X 9"	1.270 - 2.670	32.20 - 67.80	0.067	1.70	9.00	229
NST-#7 X 12"	1.270 - 2.670	32.20 - 67.80	0.067	1.70	12.00	305
NST-#7 X 18"	1.270 - 2.670	32.20 - 67.80	0.067	1.70	18.00	457
NST-#8 X 9"	1.680 - 3.690	42.60 - 93.70	0.061	1.55	9.00	229
NST-#8 X 18"	1.680 - 3.690	42.60 - 93.70	0.061	1.55	18.00	457



# HEAT SHRINKABLE POLYOLEFIN NICKEL-COPPER PLATED POLYESTER CLOTH SHEILDING

**HSLD** makes use of HLT heat shrinkable tubing with a soft, intercloth liner of .004" nickel/copper plated, polyester cloth.

**HSLD** combines the convenience of a single step installation of heat shrinkable tubing and high performance shielding. Grounding can be accomplished through a connector, back-shell, or grounding wire.

Applicable Specifications: SAE-AMS-DTL-23053/5, Class 1 & 3  
(Jacket only)  
Typical Shielding Attenuation: 85 dB (100 MHz - 10 GHz)  
Operating Temperature Range: -67°F (-55°C) to 275°F (135°C)  
Shrink Ratio: 2 to 1  
Shrink Temperature: 176°F (80°C)  
Recommended Heat Gun: 500°F (260°C)  
Standard Colors: Black  
Standard Shipping Length: 4 Foot Lengths

Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Std. 4-ft Lengths ft / pkg
	inches	mm	inches	mm	inches	mm	
HSLD-3/16	0.188	4.76	0.093	2.36	0.020	0.50	20, 100
HSLD-1/4	0.250	6.35	0.125	3.18	0.025	0.63	20, 100
HSLD-3/8	0.375	9.53	0.188	4.76	0.025	0.63	20, 100
HSLD-1/2	0.500	12.70	0.250	6.35	0.025	0.63	20, 100
HSLD-3/4	0.750	19.05	0.375	9.53	0.030	0.76	20, 100
HSLD-1"	1.000	25.40	0.500	12.70	0.035	0.89	20, 100

# HEAT SHRINKABLE POLYOLEFIN SEMI-RIGID • HEAVY-WALL • 3:1 • ADHESIVE-LINED

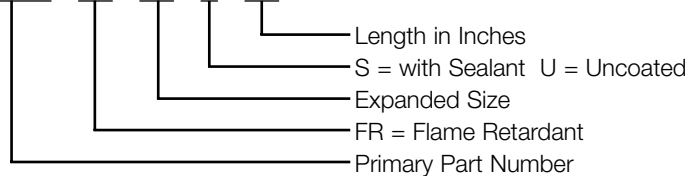
**HW3X** is a self-sealing heat-shrinkable tubing that offers greater protection under adverse environmental conditions. Standard product is supplied with sealant which provides waterproofing and protection in underwater or underground conditions. The polymer tubing has excellent insulating, abrasion-resisting, and strain-relief properties. Seals may be made over lead, steel, aluminum, copper and all standard plastic and elastomeric insulating materials. Also available without sealant (uncoated).

\*When special ordered with flame retardant (FR), tubing meets the requirements of SAE-AMS-DTL-23053/15, Class 1.

Applicable Specifications: SAE-AMS-DTL-23053/15, Class 1\*  
Operating Temperature Range: -67°F (-55°C) to 194°F (90°C)  
Shrink Ratio: 3 to 1  
Shrink Temperature: 250°F (121°C)  
Recommended Heat Gun: 500°F (260°C)  
Standard Colors: Black  
Standard Shipping Length: Cut Lengths, See Table Below

Part Number Definition:

**HW3X - XX - XX - X - XX**

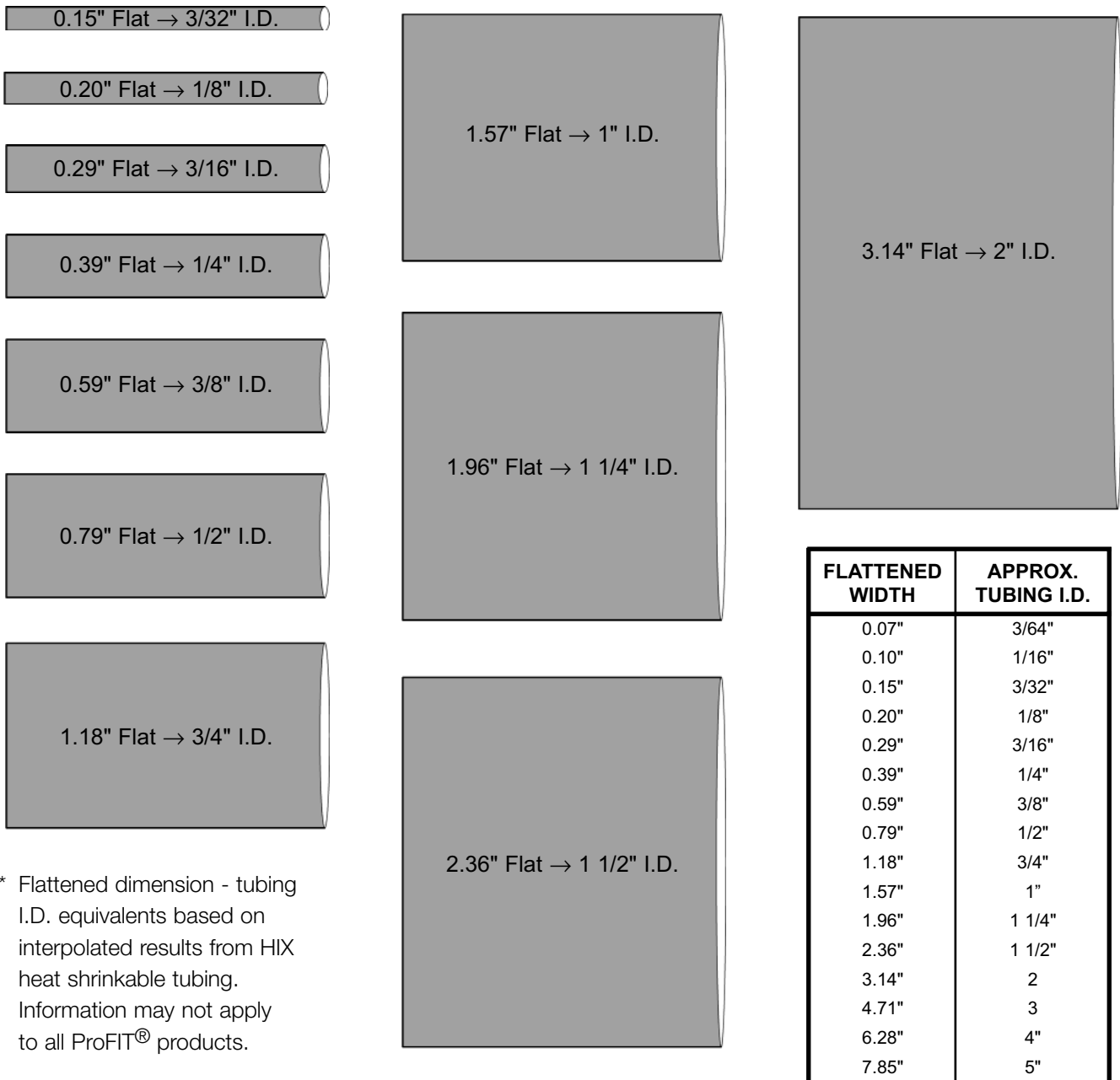


Catalog Number Size	Minimum Expanded I.D.		Maximum Recovered I.D.		Recovered Wall Thickness		Standard Cut Lengths inches
	inches	mm	inches	mm	inches	mm	
HW3X-04-	0.400	10.16	0.150	3.81	0.060	1.52	6, 9, 12, 24, 30
HW3X-07-	0.750	19.05	0.220	5.59	0.095	2.41	6, 9, 12, 24, 30, 36, 48
HW3X-11-	1.100	27.94	0.375	9.53	0.120	3.05	6, 9, 12, 24, 30, 36, 48
HW3X-15-	1.500	38.10	0.500	12.70	0.140	3.56	6, 9, 12, 24, 30, 36, 48
HW3X-20-	2.000	50.80	0.750	19.05	0.155	3.94	6, 9, 12, 24, 30, 36, 48
HW3X-30-	3.000	76.20	1.250	31.75	0.155	3.94	6, 9, 12, 24, 30, 36, 48
HW3X-40-	4.000	101.60	1.750	44.45	0.155	3.94	12, 24, 36, 48

# AWG - OUTSIDE DIAMETER CONVERSION CHART

AWG	STRANDING	APPROX. O.D.		AWG	STRANDING	APPROX. O.D.	
		inches	mm			inches	mm
30	19/42	0.012	0.305	10	37/26	0.115	2.921
28	19/40	0.016	0.406	8	133/29	0.166	4.216
26	7/34	0.019	0.483	6	133/27	0.210	5.334
24	19/36	0.024	0.610	4	133/25	0.257	6.527
22	19/34	0.031	0.787	2	133/23	0.328	8.331
20	19/32	0.037	0.940	1	133/22	0.365	9.271
18	19/30	0.049	1.245	1/0	133/21	0.464	11.786
16	19/29	0.058	1.473	2/0	133/20	0.500	12.700
14	19/27	0.073	1.854	3/0	259/22	0.509	12.928
12	19/25	0.093	2.369	4/0	259/21	0.606	15.392

## H.S.T. FLATTENED WIDTH VS. INSIDE DIAMETER\*



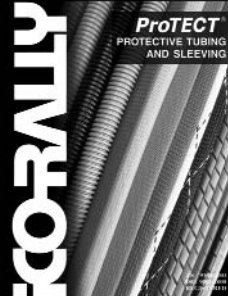
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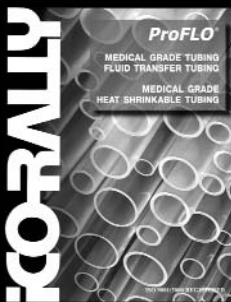
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