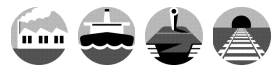


**Halogen-Free,
Flame-Retardant,
Heat-Shrinkable Tubing**

Product Facts

- Emits minimal amounts of toxic or acid gases during combustion
- Meets performance requirements of MIL-C-24640 and MIL-C-24643 cable jackets
- Resists moisture, fungus, and weathering
- Available in expansion ratios as high as 3:1
- XFFR has the following approvals:
 - ABS (American Bureau of Shipping)
 - DNV (Det Norske Veritas)
 - Lloyd's (Lloyd's Register of Shipping)

XFFR



Applications

XFFR halogen-free tubing can be used for re-jacketing and repairing halogen-free cables in any enclosed area where a flame-retardant, halogen-free environment is required. These environments include tunnels, buildings, mass transit vehicles, and ships. When installed with SFTS-FR1 tape, the tubing can also be used in applications requiring water sealing and protection from abrasion and corrosion.

Installation

Minimum shrink temperature: 70°C [158°F]
Minimum full recovery temperature: 121°C [250°F]

Operating Temperature Range

-55°C to 105°C
[-67°F to 221°F]

Specifications/Approvals

Series	Military	Industry	Raychem
XFFR	MIL-C-24643	NES 713 NES 711	RW-2016

Available in:	Americas	Europe	Asia Pacific
	■	■	■

Product Dimensions

XFFR (Continued)

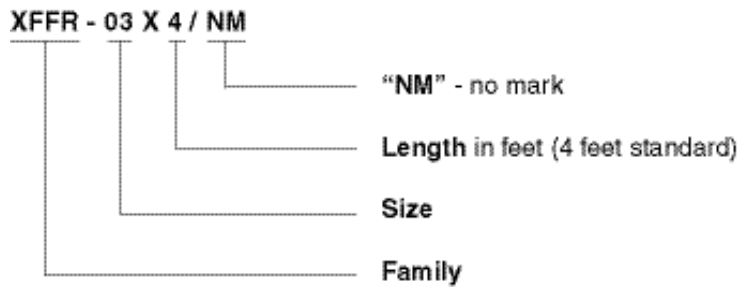
Size	Inside Diameter		Recovered Wall Thickness* After Heating (Nominal)
	Minimum Expanded as Supplied	Maximum Recovered After Heating	
XFFR-03	7.62 [0.300]	2.54 [0.100]	1.52 [0.060]
XFFR-04	10.16 [0.400]	3.81 [0.150]	1.52 [0.060]
XFFR-07	19.05 [0.750]	5.59 [0.220]	2.03 [0.080]
XFFR-11	27.94 [1.100]	9.52 [0.375]	2.67 [0.105]
XFFR-15	38.10 [1.500]	12.70 [0.500]	3.05 [0.120]
XFFR-20	50.80 [2.000]	19.05 [0.750]	3.05 [0.120]
XFFR-30	76.20 [3.000]	31.75 [1.250]	3.94 [0.155]

*Wall thickness will be less if tubing recovery is restricted during shrinkage.

Ordering Information

Color	Standard	Black (-0)
Size selection	Always order the largest size that will shrink snugly over the component to be covered.	
Standard packaging	1.2-meter [4-foot] or 7.5-meter [25-foot] lengths.	

Part Numbering System



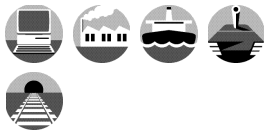
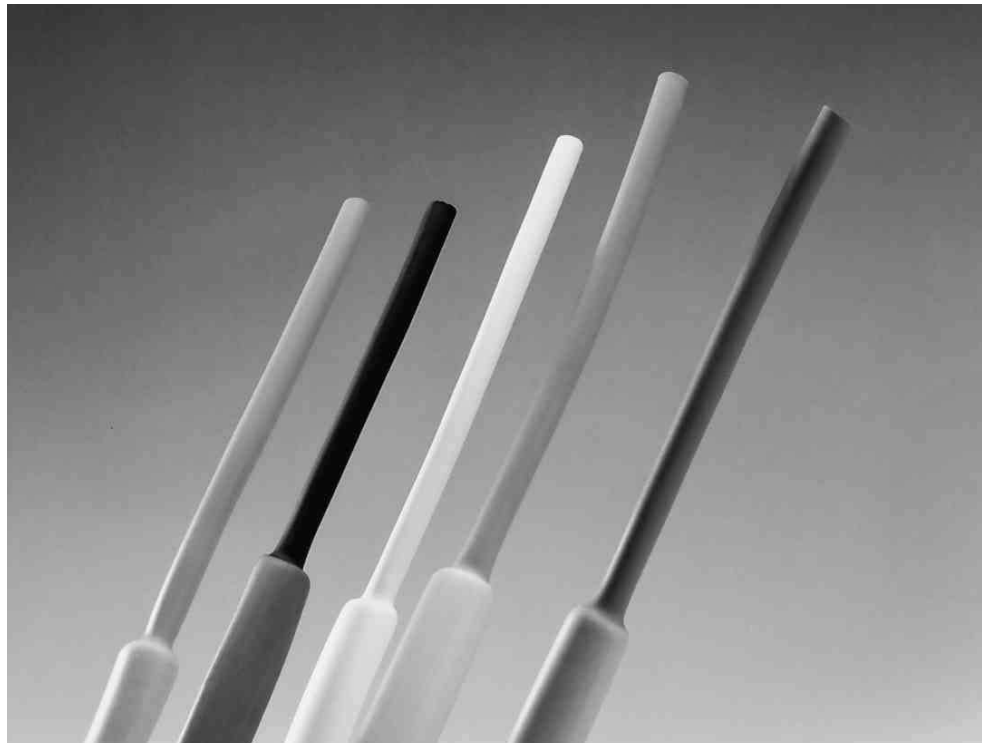
No adhesive.

Flexible, Thin-Wall, Low-Fire-Hazard Tubing

Product Facts

- 2:1 shrink ratio
- Low smoke emissions
- Flexible, flame-retardant
- No added halogens
- Low evolution of acid gases

ZH-100



Applications

ZH-100 is a flexible, thin-wall, heat-shrinkable tubing designed for low-fire-hazard applications. ZH-100 contains no added halogens, and exhibits excellent fire safety characteristics combined with low evolution of acid gases, while retaining good mechanical and fluid resistance properties.

Installation

Minimum shrink temperature: 80°C [176°F]
 Minimum full recovery temperature: 120°C [248°F]

Operating Temperature Range

-30°C to 105°C
 [-22°F to 221°F]

Specifications/Approvals

Series	Military	Agency	Raychem
ZH-100	Def. Stan. 59-97 Issue 3 Type 8	BR 1326A BS 3G-198 Part 3 Type 15	RW-2031

Available in:	Americas	Europe	Asia Pacific
	■	■	■

Product Dimensions

ZH-100 (Continued)

Size	Inside Diameter		Recovered Wall Thickness* After Heating
	Minimum Expanded as Supplied	Maximum Recovered After Heating	
1/8	3.2 [0.125]	1.6 [0.062]	0.50 ± 0.10 [0.019 ± 0.004]
3/16	4.8 [0.187]	2.4 [0.093]	0.50 ± .0.10 [0.019 ± 0.004]
1/4	6.4 [0.250]	3.2 [0.125]	0.65 ± 0.15 [0.026 ± 0.006]
3/8	9.5 [0.375]	4.8 [0.187]	0.65 ± 0.15 [0.026 ± 0.006]
1/2	12.7 [0.500]	6.4 [0.250]	0.65 ± 0.15 [0.026 ± 0.006]
3/4	19.0 [0.750]	9.5 [0.375]	0.75 ± 0.15 [0.030 ± 0.006]
1	25.4 [1.000]	12.7 [0.500]	0.90 ± 0.15 [0.035 ± 0.006]
1 1/2	38.0 [1.500]	19.0 [0.750]	1.00 ± 0.20 [0.039 ± 0.008]
2	51.0 [2.000]	25.4 [1.000]	1.15 ± 0.25 [0.045 ± 0.010]

*Wall thickness will be less if tubing recovery is restricted during shrinkage.

Ordering Information

Color	Standard	Black (-0)
	Nonstandard	White (-9), red (-2), blue (-6), yellow (-4), green (-5)
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request.	
Standard packaging	On spools.	
Ordering description**	Specify product name, size and color (for example, ZH-100 1/8-0).	

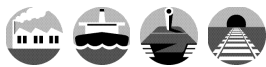
**Europe only. For supply to MIL, Def Stan and BS add -MS, -DS or -BS to ordering description.

Heat-Shrinkable, Flexible Tubing with Low Toxicity for Fire Safety Applications

Product Facts

- 2:1 shrink ratio
- Low smoke emission
- System 100 tubing

ZHTM



Applications

A flexible, thick-wall, heat-shrinkable tubing to be used in conjunction with -100 molded parts and Zerohal cable to form Raychem System 100. This material exhibits excellent fire safety characteristics combined with low smoke emission and low evolution of acid gases while retaining good mechanical and fluid-resistance

properties. Used for insulation and protection of cables, harnesses, and electrical and electronic components in enclosed spaces, such as in marine applications, mass transit systems, and offshore installations, to reduce toxicity risks, or where equipment would be irreparably damaged by corrosive products of combustion.

Installation

Minimum shrink temperature: 80°C [176°F]
 Minimum full recovery temperature: 121°C [250°F]

Operating Temperature Range

-30°C to 105°C
 [-22°F to 221°F]

Specifications/Approvals

Series	Military	Agency	Industry	Raychem
ZHTM	Def. Stan. 59-97 Issue 3 Type 8	BS 4G-198 Part 3 Type 15 VG 95343 Part 5 Type L VDE 0341/Pt 9005	BR 1326A	RW-2058

Available in:	Americas	Europe	Asia Pacific
	■	■	■

Product Dimensions

ZHTM (Continued)

Size	Inside Diameter		Recovered Wall Thickness* After Heating
	Minimum Expanded as Supplied	Maximum Recovered After Heating	
3/1.5	3.0 [0.118]	1.5 [0.059]	0.70 ± 0.10 [0.028 ± 0.004]
5/2.5	5.0 [0.197]	2.5 [0.098]	0.75 ± 0.12 [0.030 ± 0.005]
8/4	8.0 [0.315]	4.0 [0.157]	0.80 ± 0.15 [0.031 ± 0.006]
12/6	12.0 [0.472]	6.0 [0.236]	0.90 ± 0.15 [0.035 ± 0.006]
18/9	18.0 [0.709]	9.0 [0.354]	1.00 ± 0.18 [0.039 ± 0.007]
24/12	24.0 [0.945]	12.0 [0.472]	1.10 ± 0.20 [0.043 ± 0.008]
40/20	40.0 [1.575]	20.0 [0.789]	1.30 ± 0.23 [0.051 ± 0.009]
50/30	50.0 [1.969]	30.0 [1.181]	1.50 ± 0.28 [0.059 ± 0.011]

*Wall thickness will be less if tubing recovery is restricted during shrinkage.

Ordering Information

Color	Standard	Black (-0)
Size selection	Always order the largest size that will shrink snugly over the component to be covered. Special order sizes are available upon request.	
Standard packaging	On spools.	
Ordering description**	Specify product name, size and color (for example, ZHTM 8/4-0).	

**Europe only. For supply to Def Stan and BS add -DS or -BS to ordering description.