

## Basic Properties

- (1) Materials : Irradiated cross-linked flexible flame-retardant polyolefin
- (2) Shrink temperature : min. 90°C
- (3) Shrink Ratio : Radial change: min. 50%  
: Longitudinal change: min. -15%
- (4) Continuous Operating Temperature : -55 to 105°C

## Features

- (1) UL224 approved
- (2) Flexible
- (3) Flame-retardant

## Specification/Approvals

UL224

File No. E48762

Catalog No. Sumitube™ F(Z) or 939

Rating temperature: 105°C

Rating voltage: 600V

Flammability: VW-1

Electrical Appliance and Material Safety Law (Japan)

Flammability rating (-F-) test registration No.: F-STS3-009 - F-STS3-012

## Marking on the surface

VW-1-F-◆SUMITOMO-K SUMITUBE F(Z) CAT 939 105°C

## Application

- (1) Insulation, protection and reinforcement for termination and joints of electric wire
- (2) Colour identification and bundling for electric wires
- (3) Insulation and protection for resistor and condenser

## Colours

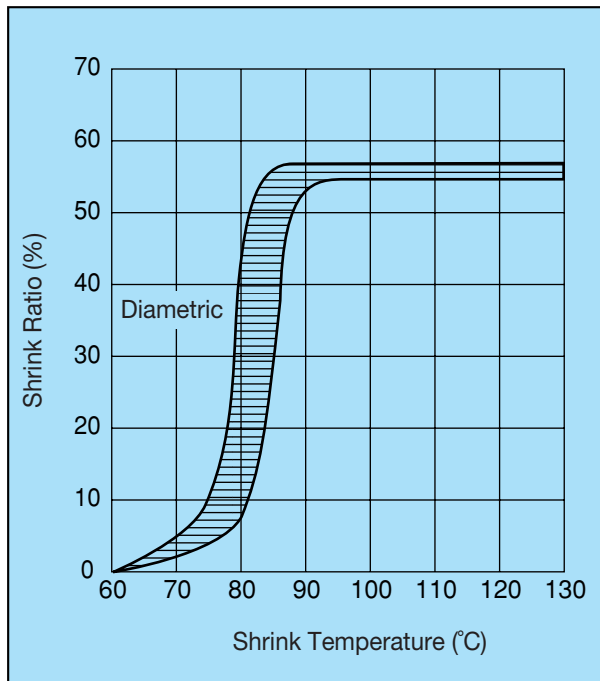
Black, Brown, Red, Orange, Yellow, Green, Blue, Purple, Grey, White

## Properties [UL224]

Properties	Items	Requirements	Typical values*1
Mechanical	Tensile strength (before aging)	min. 10.4MPa	12.6MPa
	Tensile strength (after aging)	136°C x 7 days, min. 7.3MPa	14.8MPa
	Elongation (before aging)	min. 200%	333%
	Elongation (after aging)	136°C x 7 days, min. 100%	358%
	Heat shock	250°C x 4 hours, no crack	pass
	Cold bend	-30°C x 1 hour, no crack	pass
Electrical	Voltage resistance (before aging)	AC2.5kV x 60 sec. no breakdown	pass
	Voltage resistance (after aging)	136°C x 7 days, AC2.5kV x 60 sec., no breakdown	pass
	Dielectric breakdown (before aging)	min. AC2.5kV	21.0kV
	Dielectric breakdown (after aging)	136°C x 7 days, min. 50% of original and min. AC2.5kV	pass
	Volume resistivity	min. 1.0 x 10 <sup>16</sup> Ω·cm	2.7 x 10 <sup>16</sup> Ω·cm
Chemical	Corrosion against bare copper	136°C x 7 days, no corrosion after leaving under humidity 95%, 23°C x 24 hours	pass
	Stability against copper	136°C x 7 days, elongation min. 100% after leaving under humidity 95%, 23°C x 24 hours	358%
	Flammability	Flame-retardant, pass VW-1	pass

\*1: For reference use only

## Shrink Property



## Sizes

Nominal size (mm)	Supplied ID (mm)		Recovered ID (mm)		Unit length (min.) (m)	
	Inside diameter	Wall thickness (nom.)	Inside diameter (max.)	Wall thickness (min.)	Cut	Spool
1 x 0.2	1.30 ± 0.30	0.20	0.50	0.33	1	200
1.5 x 0.2	2.00 ± 0.30	0.20	0.75	0.36	1	200
2 x 0.2	2.50 ± 0.30	0.20	1.00	0.44	1	200
2.5 x 0.25	3.00 ± 0.30	0.25	1.25	0.44	1	200
3 x 0.25	3.50 ± 0.30	0.25	1.50	0.44	1	200
3.5 x 0.25	4.00 ± 0.30	0.25	1.75	0.44	1	200
4 x 0.25	4.50 ± 0.30	0.25	2.00	0.44	1	200
5 x 0.25	5.40 ± 0.30	0.25	2.50	0.56	1	100
6 x 0.25	6.4 ± 0.4	0.25	3.00	0.56	1	100
7 x 0.25	7.4 ± 0.4	0.25	3.50	0.56	1	50
8 x 0.25	8.4 ± 0.4	0.25	4.00	0.56	1	50
9 x 0.25	9.4 ± 0.4	0.25	4.50	0.56	1	50
10 x 0.25	10.4 ± 0.4	0.25	5.00	0.56	1	50
11 x 0.25	11.4 ± 0.4	0.25	5.50	0.56	1	50
12 x 0.25	12.4 ± 0.4	0.25	6.0	0.56	1	50
13 x 0.3	13.4 ± 0.4	0.30	6.5	0.69	1	50
14 x 0.3	14.5 ± 0.4	0.30	7.0	0.69	1	50
15 x 0.3	15.5 ± 0.4	0.30	7.5	0.69	1	50
16 x 0.3	16.8 ± 0.5	0.30	8.0	0.69	1	50
18 x 0.35	18.7 ± 0.5	0.35	9.0	0.77	1	50
20 x 0.35	21.2 ± 0.6	0.35	10.0	0.77	1	50
22 x 0.4	23.2 ± 0.6	0.40	11.0	0.77	1	50
25 x 0.4	26.1 ± 0.8	0.40	12.5	0.87	1	50
30 x 0.5	32.0 ± 1.0	0.50	15.0	0.87	1	50
40 x 0.5	43.0 ± 1.5	0.50	20.0	0.97	1	50
50 x 0.5	53.0 ± 2.0	0.50	25.0	0.97	1	50