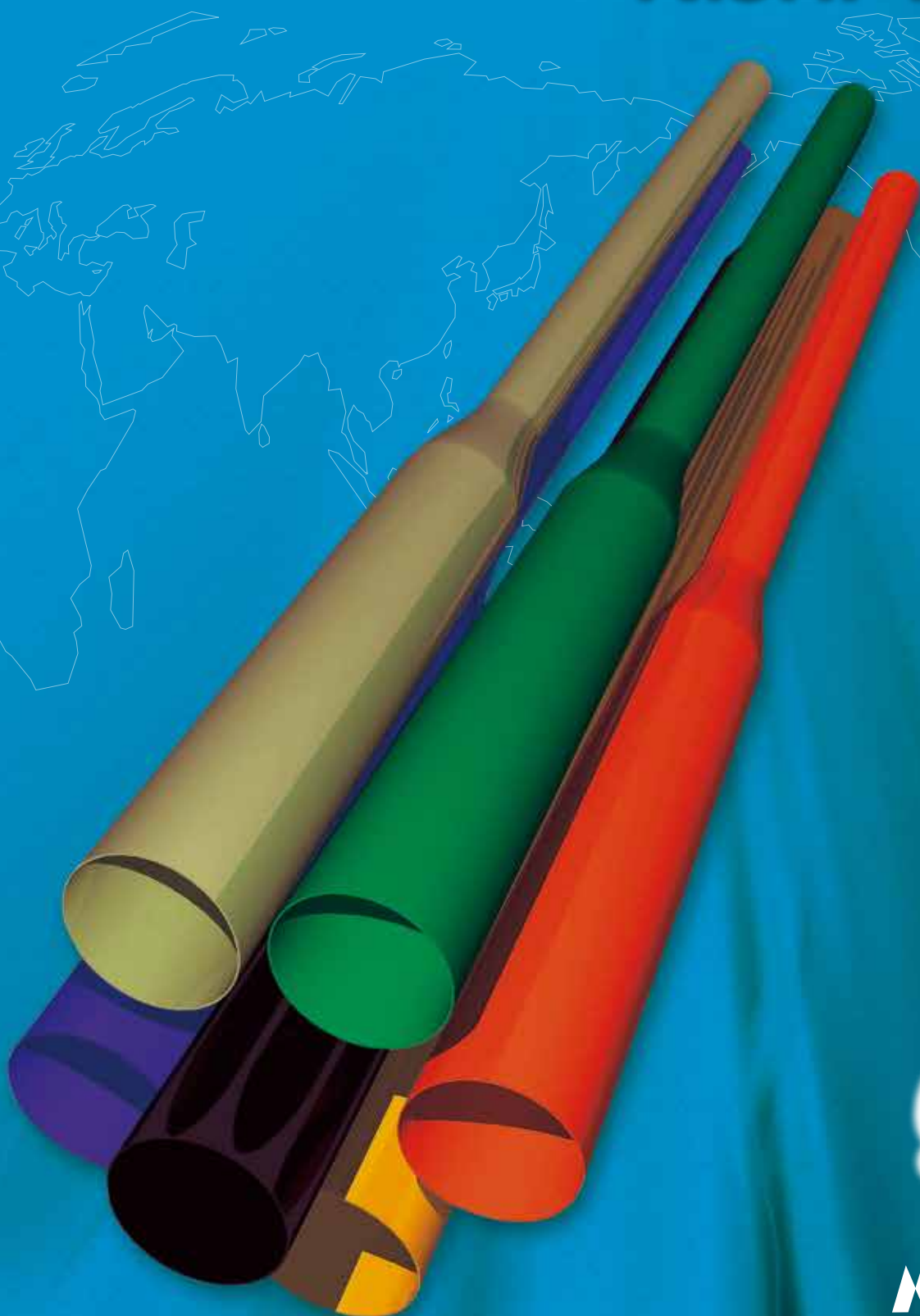


# **NISHI-TUBE**

**NISHI NIPPON ELECTRIC WIRE & CABLE CO.,LTD.**

Heat-Shrink Tubes **NISHI-TUBE**



Our Mascot Character  
**NISHIPY**



Fujikura Group

**Nishi Nippon Electric  
Wire & Cable Co., Ltd.**



## CONTENTS

Nishi-Tube Applications and Features	1
Nishi-Tube List of Products	2
Nishi-Tube Properties	3
Nishi-Tube Selection Criteria	5
Nishi-Tube Standard Sizes	5
Nishi-Tube with Internal Adhesive	6
Inner Surface Adhesive, Halogen-free Flame Resistant Heat-shrink Tube "Nishi-Tube NON-B" (Made-to-order)	6
Shielded (Anti-noise Electromagnetic Shielding) Heat-shrink Tube "Nishi-Tube NSC" (Made-to-order)	7
High Shrink Ratio Heat-shrink Tube "Nishi-Tube NOR" (Made-to-order)	7
Nishi-Tube with Buffed Surface (Made-to-order)	7
Urethane Heat-shrink Tube "Nishi-Tube NUM" (Made-to-order)	8
Anti-bacterial Heat-shrink Tube "Nishi-Tube (K)" (Made-to-order)	8
Wood-grain Pattern Nishi-Tube "MOKUME" (Made-to-order)	9
Heat-shrink Tube "Suberazu Grip" No-slip Grip	9
Nishi-Tube with Fastener Closure (Made-to-order)	10
Phosphorescent Heat-shrink Tube "Nishi-Tube Chikuko" (Made-to-order)	10
Nishi-Tube Long Product "Reel-wound Tube" (Made-to-order)	11
Tube Size Selection for Covering Bus Bars	11
Nishi-Tube Shrink Application Methods and Color Codes/Samples	12
Nishi-Tube Minimum Order Quantities and Estimates of Coverable Outer Diameters	13
Ambient-temperature Shrinkable Tube	14
Mega Solar Installation Weed Control Sheet "Weed Control Nishi Sheet" (Made-to-order)	15
Safety Indication Sheet (Made-to-order)	15
Tube for Steel Pipe Corrosion Prevention "Nishi-Tube NXL-A" (Made-to-order)	16
Nishi-Tube Application Examples	18



# NISHI-TUBE

**NISHI NIPPON ELECTRIC WIRE & CABLE CO.,LTD.**

## Limitless Applications

Nishi-Tube products are shrink tubes made of materials such as ethylene propylene rubber, polyolefin elastomer, and cross-linked polyethylene, and can be easily used to protect a wide variety of materials and objects.

Nishi-Tube products feature excellent flexibility, elasticity, resistance to cold, tracking, waterproofing, corrosion-proofing, and electrical properties, and are very easy to work with.

These features make Nishi-Tube products useful in a variety of applications, such as connecting wires and cables as well as protecting their terminals. For mechanical equipment, they can be used in automobile part covers and roller covers, and they can also be used for non-slips grips of tools and personal leisure items.

## Features

- The tubes are flexible and elastic, and can be used as coverings for moving parts.
- Tube size inner diameters before shrinking of  $\varnothing 4$  to  $\varnothing 270$  are available.
- Tubes can be made with a maximum thickness after shrinking of 7 mm. Please inquire for more details on sizes.
- The tubes have excellent durability and have an outdoor usage lifetime of 30 years or more.
- The tubes have excellent resistance to cold and heat, and can be used continuously between temperatures of  $-50^{\circ}\text{C}$  to  $105^{\circ}\text{C}$ .
- The tubes have excellent resistance to chemicals, and are notably acid- and alkaline-resistant.
- Tubes for electrical insulation applications have excellent electrical properties including insulation resistance, dielectric strength, and tracking resistance.
- Tubes with inner surfaces coated with adhesive have waterproof and corrosion-proof properties.
- Zippered tubes can be manufactured for retrofitting.
- The tubes have excellent storage stability.
- The tubes do not cause corrosion when in contact with metal parts.
- Please inquire for details on grooved tubes, special sizes, special colors, and other requests.



# NISHI-TUBE/List of Products

(Key to symbols: —: N/A ○: Good ◎: Best)

Cate-gory	Product name	Application	Insu-lation	Oil resis-tance	Flame resis-tance	Mecha-nical strength	Shrinkage ratio (Max.)	Spec. No.	Features	Size range (Inner dia before shrinkage, in mm)	Standard unit length (m)	Standard color	Continuous operating temperature	Material used
Standard products	NPR	Protection and cushioning	—	—	—	◎	1/2	T2-S0200	General-use Nishi-Tube with excellent mechanical strength	4 to 80	5 (25 m also available)	Black	105℃	Ethylene propylene rubber
	NPM		—	—	—	◎	1/2	T2-0100	Large-opening Nishi-Tube with excellent mechanical strength	90 to 100 (110 to 270 are special-order)	5	Black		
	NPE	For electrical insulation	◎	—	—	○	1/2	T2-S0400 T2-0300	Nishi-Tube with excellent electrical properties	4 to 80 90 to 100	5 (25 m also available) 5	Black		
	NPA	For bundling wires, color identification, and electrical insulation	○	—	—	○	1/2	T3-0600	Anti-corrosion for flexible water piping (colored, semitransparent, and colored semi-transparent production possible)	4 to 40	1	Red, blue, yellow, green, black, white	105℃	Cross-linked polyethylene
Special products (made-to-order)	NPN	Insulation protection / Flame resistance (Ecological tubes)	◎	—	○	○	1/2	T2-0900	Ecological tubes which have passed the Railway Rolling Stock Material Combustion Test and do not emit halogen gases	4 to 100 (110 to 270 are special-order)	5	Black / color	80℃	Ethylene propylene rubber
	NOR	Protection / cushioning / insulation	◎	—	—	◎	1/2 to 1/4	(Black) T2-1500 (Color) T2-1300	Nishi-Tube with excellent mechanical strength and abrasion resistance (See P. 7)	4 to 80	5	Black / color	105℃	Polyolefin elastomer
	NON	Insulation protection / Flame resistance (Ecological tubes)	◎	—	○	○	1/2 to 1/4	T2-3000	Ecological tubes which have passed the Railway Rolling Stock Material Combustion Test, do not emit halogen gases, and can shrink to 1/4 size	4 to 80	5	Black / color	80℃	Polyolefin elastomer
	NPE	For electrical insulation	◎	—	—	○	1/2	T2-0500	Colored Nishi-Tube with excellent electrical properties	4 to 270	5	Blue, gray, red, white, brown, green	105℃	Ethylene propylene rubber
	NPE		◎	—	—	○	1/2	T2-0300	Nishi-Tube with excellent electrical properties	120 to 270	5	Black	105℃	Ethylene propylene rubber
	NAH	Heat-resistant	—	○	—	○	1/2	T2-1000	Possesses heat resistance following fluororubber and silicone rubber and good oil resistance *Cannot be used in high-temperature/high-humidity environments	Inquire for availability	5	Black	140℃	Acrylic ethylene rubber
	NPF3	Insulation protection / Flame resistance	◎	—	○	○	1/3	T2-4000	Product has passed the Railway Rolling Stock Material Combustion Test and can shrink to 1/3 size Equivalent to UL224	20 to 100	5	Black	80℃	Ethylene propylene rubber
	Internal adhesive tube NPR-A, NPE-A, etc.	Anti-corrosion / roller cover / grips, etc.	—	—	—	◎	1/2 1/3	—	Nishi-Tube with inner surface coated with hot-melt adhesive (Softens at 80℃)	See P. 13	1	Black / color	See P. 6	—
	NPM-G NPE-G	For grips	○ (NPE-G)	—	—	○	1/2	T2-4700 T2-5400	Nishi-Tube with buffed surface (see P. 7)	255 to 50	1.6	Black / color	105℃	Ethylene propylene rubber
	SPC	Specially-made with large openings	—	—	—	○	1/2	T2-1900	NPE/NPM Nishi-Tube with enlarged pre-shrinkage inner diameter	210 to 350	450 mm or less	Black	105℃	Ethylene propylene rubber
	NXL		—	○	—	◎	1/2	—	Prevents water seepage, leakage, and corrosion at gas and water utility pipe bondings and connections as well as concrete column connection areas.	130 to 2,000 or more	450 mm	Black	120℃	Cross-linked polyethylene
	NPM-65	Product with hardness of 65	—	—	—	○	1/2	T2-1200	For protecting and reinforcing objects that required soft covers	Inquire for availability	5	Black	105℃	Ethylene propylene rubber
	NPR-LT	Low-temperature shrinking product	—	—	—	○	1/2	T2-3200	For shrinking at low temperatures (100℃) or shrinking more quickly, for protecting and reinforcing objects	Inquire for availability	5	Black	105℃	Ethylene propylene rubber
	Con Tube (QT-C) Quick Tube (QT-S)	Waterproofing / protection / insulation Ambient-temperature shrinkable tube	○	—	—	○	1/4	T6-0101 T6-0102	Ambient-temperature shrinkable tube usable for cable TV connector coverings, etc. (See P. 14-15)	11 to 63	—	Black	105℃	Ethylene propylene rubber
	Phosphorescent (NPA-H)	For identification and decorative applications	○	—	—	○	1/2	T3-0900	Nishi-Tube that uses phosphorescent material to glow in the dark	4 to 40	1	White	105℃	Cross-linked polyethylene
	NUM	Abrasion-resistant	—	—	—	◎	1/2	T2-4100	Urethane Nishi-Tube with excellent abrasive resistance and flexibility	4 to 80	5	Black	-45℃ to 80℃	Urethane rubber
	NSC	Electromagnetic shielding	—	—	—	—	1/2 to 1/4	T2-8800	Shielded tubing for shielding in a single solution	6 to 100	1	Black / color	—	Can be used with various tubes
	"Suberazu Grip" No-slip grip (NPG-SG) (NPG-SM)	For grips	○	—	—	○	1/2	T2-7800 T2-6900	Nishi-Tube for grips which can be shrunk using a home hair dryer	30, 40	200 mm 400 mm	See P.9	105℃	Ethylene propylene rubber

\*NPN (Black) is not a standard stock item, but orders are taken for standard sizes from units of 5 m × 1 pc.

\*According to the Electrical Appliances and Material Safety Act, the upper limit usage temperatures for ethylene propylene rubber, polyolefin elastomer, and cross-linked polyethylene products in electrical insulation applications is 90℃.

\*Please inquire for RoHS directive compliance of products.

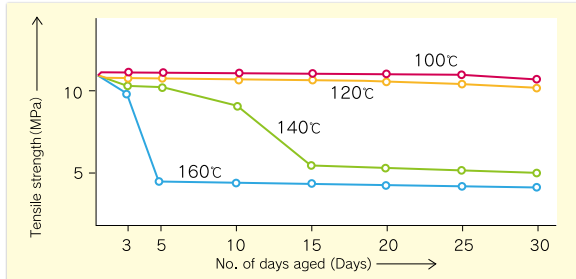
Property		Product name	NPR (Black)	NPM (Black)	NPE (Black)	NPE (Colored)	NPA (Colored)	NPF3 (Black)	NPN (Black)	NOR (Black)	NON (Black)	NPM-65 (Black)	NPR-LT (Black)	NAH (Black)	NUM (Black)	Notes
Ambient-temperature	Tensile strength MPa		12	13	14	15	20	11	9	15	11	11	13	10	21	According to JIS K 6251
	Elongation (%)		440	370	490	650	500	590	550	570	640	590	540	440	620	
Aging	Residual tensile strength (%)		97	103	97	102	100	107	101	(*)1 93	(*)1 118	118	97	(*)2 84	97	According to JIS K 6257 However, at 100°C × 48 hrs
	Residual elongation (%)		98	96	98	97	95	92	90	93	(*)1 97	98	96	(*)2 98	(*)4 97	
Oil resistance	Residual tensile strength (%)		35	36	33	27	—	—	—	44	43	—	—	(*)3 78	39	According to JIS K 6258 However, at 100°C × 72 hrs JIS No. 2 oil
	Residual elongation (%)		47	45	48	38	—	—	—	67	65	—	—	(*)3 90	77	
	Volume change (%)		149	137	142	202	—	—	—	—	—	—	—	—	—	
Tear strength N/mm			42	37	41	33	56	52	31	47	43	—	—	—	—	According to JIS K 6252
Compression set (%)			14	21	13	19	30	—	—	—	—	—	—	—	—	According to JIS K 6262 However, at 100°C × 72 hrs
Specific gravity			1.3	1.3	1.3	1.2	0.9	1.4	1.4	1.3	1.3	1.2	1.2	1.1	1.2	
Brittle temperature (°C)			-55 or less	-55 or less	-55 or less	-55 or less	-55 or less	-55 or less	-55 or less	-55 or less	-55 or less	-55 or less	-55 or less	-50 or less	-45 or less	According to JIS K 6261
Water absorption rate (%)			0.6	1.5	0.6	0.7	0.2	0.94	4.1	0.4	2.05	0.12	1.30	4.5	2.0	According to JIS K 6258 However, at 70°C × 168 hrs
Ozone resistance			No cracks	No cracks	No cracks	No cracks	No cracks	No cracks	No cracks	No cracks	No cracks	No cracks	No cracks	No cracks	No cracks	According to JIS K 6259
Dielectric constant			4.1	6.0	3.5	4.0	2.2	3.3	4.1	3.9	2.8	3.9	6	—	—	According to JIS C 2138
Dielectric tangent (%)			0.9	2.2	0.6	0.9	0.3	1.5	0.7	0.9	0.4	2.3	2.2	—	—	
Volume resistivity (Ω-cm)			8×10 <sup>14</sup>	8×10 <sup>14</sup>	2×10 <sup>16</sup>	2×10 <sup>15</sup>	6×10 <sup>14</sup>	1×10 <sup>16</sup>	1×10 <sup>15</sup>	1×10 <sup>15</sup>	6×10 <sup>15</sup>	5×10 <sup>15</sup>	7×10 <sup>14</sup>	7×10 <sup>8</sup>	1×10 <sup>5</sup>	According to JIS K 6723
Hardness (Durometer / Type A)			79	80	80	78	87	89	76	90	85	65	80	79	83	According to JIS K 6253
Oxygen index			—	—	—	—	—	31	31	—	27	—	—	—	—	According to JIS K 7201-2
Shrinkage ratio (axial direction) (-%)			0 to 6	3 to 12	3 to 12	3 to 12	3 to 12	3 to 12	3 to 15	3 to 12	3 to 12	3 to 12	0 to 6	3 to 12	0 to 6	According to JIS C 2133 However, at 140°C × 10 min

\*Note: The above property values are representative values and are not guaranteed. (\*1) 120°C × 48 hours (\*2) 175°C × 48 hours (\*3) 120°C × 22 hours (\*4) 100°C × 120 hours

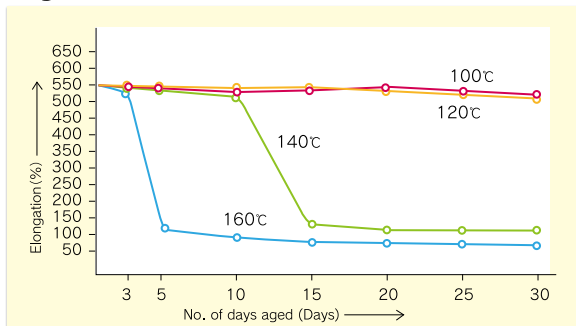
## 1 Heat resistance aging properties

Nishi-Tube (NPR) has excellent heat-resistant properties. Tensile strength and elongation changes at different temperatures are shown in Figures 1 and 2. NPE also displays similar results. Nishi-Tube (NPR) heat-resistant lifetime is shown in Figure 3.

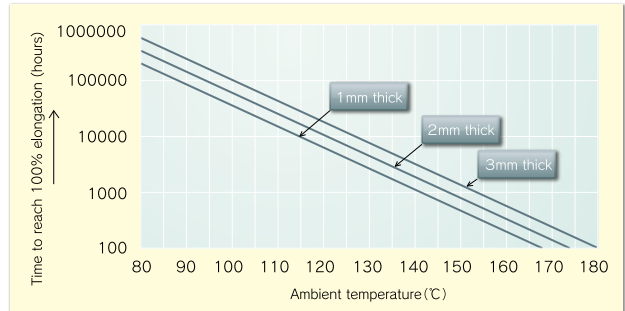
[Fig.1] Tensile strength change



[Fig.2] Elongation change



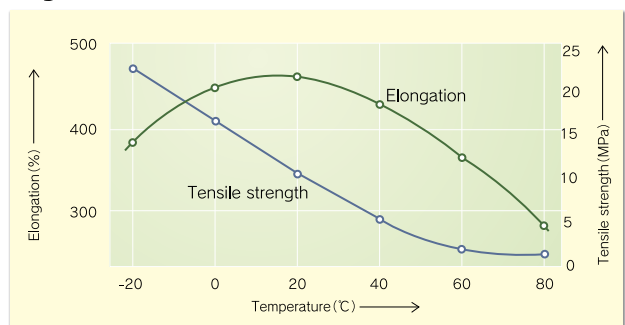
[Fig.3] Nishi-Tube heat-resistant lifetime (Time to reach 100% elongation)



## 2 Temperature-related properties of tensile strength and elongation

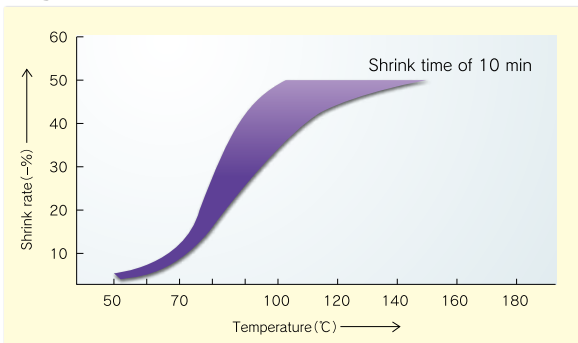
The relationship between tensile strength and elongation to temperature of Nishi-Tube (NPR) is shown in Figure 4. NPE also displays similar properties.

[Fig.4] Temperature-related properties of tensile strength and elongation

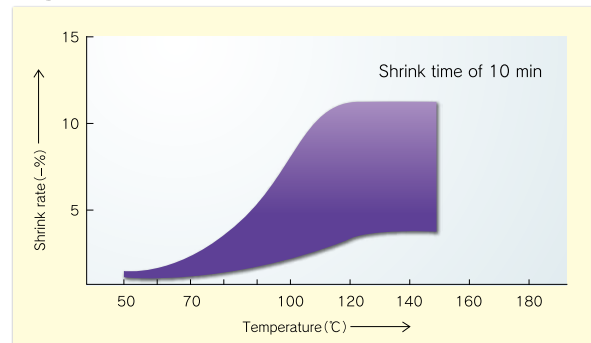


## 3 Shrinkage properties

[Fig.5] Shrinkage properties (radial direction)



[Fig.6] Shrinkage properties (axial direction)

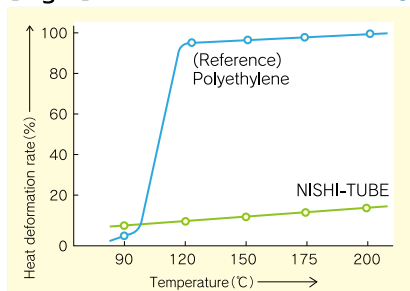


Nishi-Tube shrinkage properties (radial and axial) are shown in Figures 5 and 6.

## 4 Heating deformability

Nishi-Tube products have rubber elasticity for excellent resistance to deformation from heat. The relationship between heat deformation rates and temperature is shown in Figure 7.

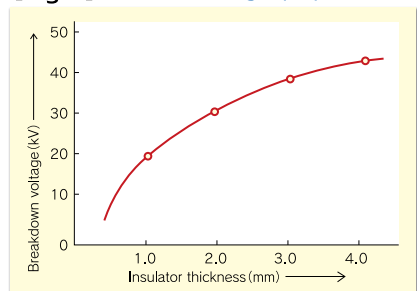
[Fig.7] Heat deformation rate (load of 10 kg)



## 5 Dielectric strength

The relationship between breakdown voltage and thickness of Nishi-Tube (NPE) is shown in Figure 8.

[Fig.8] Dielectric strength properties

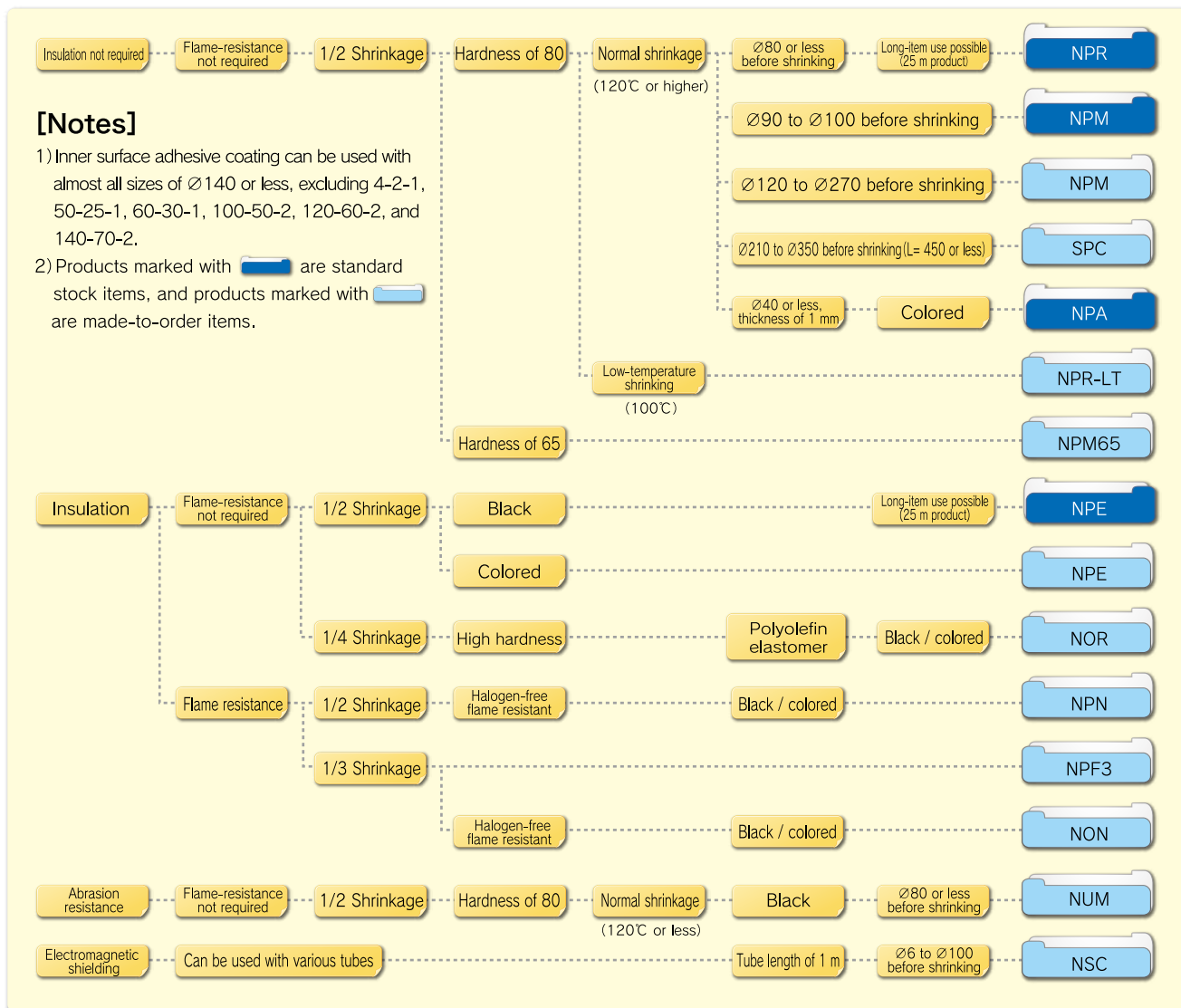


## 6 Ozone resistance

Nishi-Tube's principal component, EPR, has no unsaturated double bonds in its molecular structure, which gives it excellent ozone resistance. A sample elongated by 50% and left in an atmosphere with 50 ppm of ozone for 500 hours showed no signs of cracking.

## 7 Tracking resistance

Nishi-Tube (NPE) has excellent tracking resistance. After being sprayed with salt water over 200 times, no tracking occurred. (Compliant with JIS C 3005)



## [Nishi-Tube Standard Sizes]

**Standard Products** Ex.: 20-10-2 = Diameter before shrinking: 20 mm, diameter after shrinking: 10 mm, thickness after shrinking: 2 mm  
**NPR, NPM, NPE**



Object outer diameter (mm)	Size	Before shrinking		After shrinking				Object outer diameter (mm)	Size	Before shrinking		After shrinking			
		Inner dia (mm)	Tolerance (%)	Inner dia (mm)	Tolerance (%)	Thickness (mm)	Tolerance (%)			Inner dia (mm)	Tolerance (%)	Inner dia (mm)	Tolerance (%)	Thickness (mm)	Tolerance (%)
2.5 to 3.7	4-2-1	4	+10 -5	2	±20	1	+20 -10	21.0 to 32.0	35-17.5- $\sqrt[1]{2}$	35	+10 -5	17.5	±10	1	+20 -10
3.7 to 5.0	6-3-1	6	"	3	"	1	"	23.0 to 35.0	40-20- $\sqrt[1]{2}$	40	"	20	"	1	"
5.0 to 7.0	8-4- $\sqrt[1]{2}$	8	"	4	"	1	"	28.0 to 45.0	50-25- $\sqrt[1]{3} 2$	50	"	25	"	1	"
6.0 to 9.0	10-5- $\sqrt[1]{2}$	10	"	5	±15	1	"	35.0 to 55.0	60-30- $\sqrt[1]{3} 2$	60	"	30	"	1	"
9.0 to 13.0	15-7.5- $\sqrt[1]{2}$	15	"	7.5	±10	1	"	40.0 to 65.0	70-35- $\sqrt[2]{3}$	70	"	35	"	2	"
12.0 to 17.0	20-10- $\sqrt[1]{2}$	20	"	10	"	1	"	47.0 to 70.0	80-40- $\sqrt[2]{3}$	80	"	40	"	2	"
15.0 to 22.0	25-12.5- $\sqrt[1]{2}$	25	"	12.5	"	1	"	52.0 to 80.0	90-45- $\sqrt[2]{3}$	90	"	45	"	2	"
18.0 to 27.0	30-15- $\sqrt[1]{2}$	30	"	15	"	1	"	57.0 to 90.0	100-50- $\sqrt[2]{3}$	100	"	50	"	2	"

\*For sizes where the diameter before shrinking exceeds 100 mm, tolerance of thickness after shrinking is ±20%.

\*Please note that control for thickness before shrinking is not performed.

Note 1: Standard length = 5 m (For NPR and NPE, long-object 25 m size is also available.)

Note 2: An assortment of NPM sizes are available from an inner diameter of 90 mm.

● Please inquire for specialty tubes sizes.

● Please inquire for tubes with grooves, zippers, etc.

## NISHI-TUBE with Internal Adhesive

Made-to-order product

NISHI-TUBE



\* Testing for Nishi-Tube with internal adhesive was performed in accordance with JHS808, Standard of Method for Materials to Prevent Rust of Guardrail Post, in Section 6-2-4 "Rust Prevention for Ground-contact Parts of Guardrail Posts" of NEXCO's "Standards for the Provision of Guard Fences". After 180 days, no issues such as cracking, peeling, bulging, or rust were confirmed.

Nishi-Tube with internal adhesive has a 2-layer construction with an adhesive layer applied to the inner surface of the shrink tube. It is a hot-melt type with excellent adhesiveness.

### Applications

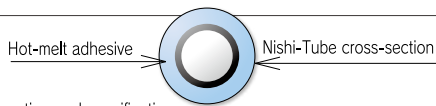
- Rust-prevention applications for ground-contact parts of steel guardrail posts
- Insulation protection for communication devices which require corrosion-proof electrical insulation and other electrical terminals
- Protection for pipes and ducts which require corrosion-proofing and waterproofing
- Covers for parts such as rollers which require abrasion resistance and adhesiveness
- For grips of farming implements, sports equipment, etc.

### Type indication

- Nishi-Tubes with internal adhesive are indicated with the suffix "-A" following the Nishi-Tube product name. For example, for NPR the product type would be NPR-A.

### Compatible product types

- NPR and NPE types can be used with internal adhesive. Please inquire for usage with other product types.
- Please refer to P. 13 for minimum order quantities.



Construction and specifications

Size (mm)	Refer to inner surface adhesive products on P.13	
Standard length (m)	1	
Ref.	Thickness of inner adhesive layer (mm)	Before shrinking: 0.1 mm or more After shrinking: 0.2 mm or more
Optimal shrink temperature (°C)		140
Adhesive melting temperature (°C)		80
Continuous maximum usage temperature (°C)		60

### Adhesive strength on different materials

To determine adhesive strength on various covered materials, Nishi-Tube 40-20-1 was shrunk onto pipes with an outer diameter of approx. 30 mm, and adhesive strength measured at 90 degrees peeling is shown below. Excellent adhesive strength was demonstrated for steel, FRP, and PVC.

Adhesive strength by material

g / 10mm width

Type	Steel	FRP	PVC	PP
Adhesive strength	1200	1600	2100	600

\*The above adhesive strength values are representative values and are not guaranteed.

Inner surface adhesive, halogen-free flame resistant heat-shrink tube

## NISHI-TUBE NON-B (NND Standard Number:T2-3300)

Made-to-order product

NISHI-TUBE NON-B



### Features

- Halogen-free flame resistant heat-shrink tube
- Tubes with halogen-free flame resistant adhesive applied to their inner surface
- Classified as "Flame Resistant" according to the Railway Rolling Stock Material Combustion Test

### Applications

- Waterproofing ends of cable ducts
- Waterproofing of connectors and connector terminal parts

### Specifications

- Tube length: 900 mm
- Thickness of adhesive: 0.7 mm (before shrinking)

Object outer diameter (mm)	Representative size	Before shrinking		After shrinking				No. in package (pcs / box)
		Inner dia (mm)	Tolerance (%)	Inner dia (mm)	Tolerance (%)	Thickness (mm)	Tolerance (%)	
11.0 to 24.0	27-10-1.7-900	27	+10 -5	10	±10	1.7	+20 -10	30
15.5 to 37.5	42-14-1.7-900	42	"	14	"	1.7	"	25
20.0 to 47.5	53-18-1.7-900	53	"	18	"	1.7	"	20
22.0 to 58.5	65-20-2.3-900	65	"	20	"	2.3	"	18
24.5 to 61.0	68-22-2.3-900	68	"	22	"	2.3	"	18
27.5 to 71.0	79-25-2.3-900	79	"	25	"	2.3	"	10
31.0 to 76.5	85-28-2.3-900	85	"	28	"	2.3	"	10
32.0 to 80.0	89-29-2.3-900	89	"	29	"	2.3	"	10

\*The minimum order quantity for the above sizes is 1 box.



## Shielded (Anti-noise Electromagnetic Shielding) Heat-shrink Tube **NISHI-TUBE NSC** (NND Standard Number: T2-8800)

Made-to-order product

NISHI-TUBE NSC

NSC tubes are heat-shrink tubes with a conductive fiber applied to its inner surface. This provides a shielding effect, making this tube suitable for anti-noise applications.



### Features

- ① A heat-shrink type compatible with a wide range of numbers of cables!
  - Shrinkable to 1/3 to 1/2 size, allowing 1 size to be used for bundling various numbers of cables.
- ② Flexible for easy application!
  - Made of EP rubber for high flexibility that can be easily bent for curved sections.
- ③ Cost-efficient!
  - Shielding tubes provide a single-product solution so that noise can be blocked without using individually-shielded wires.
  - By using NSC tubes at connectors, soldering of each shielded wire is no longer necessary.

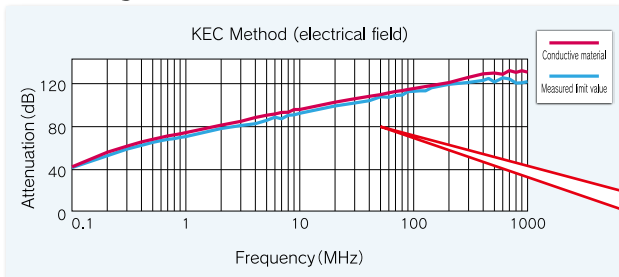
### Applications

- At connecting areas between shielded wires
- For EV and HEV harnesses
- Noise reduction for communication cables
- Protection of cables / wires when laying them out

### Sizes

- Before shrinking:  $\varnothing 6$  to  $\varnothing 100$
- Tube length: 1 m

### Shielding Effectiveness



The KEC Method is a test for measuring the effectiveness of shielding materials using an electromagnetic wave shielding effectiveness-measuring device developed by the KEC Electronic Industry Development Center.

The shield effect of the NSC tube shows high performance to follow the measurement limit value of the KEC method.

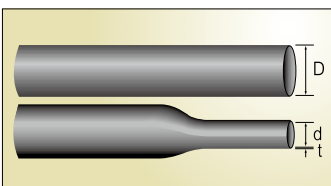
\*For standard products, the minimum order quantity is 1 m  $\times$  5 pcs. For special-order products, refer to the minimum order quantities on P. 13.

## High Shrink Ratio Heat-shrink Tube

## **NISHI-TUBE NOR** (NND Standard Number: T2-1500 (black) / T2-1300 (color))

Made-to-order product

NISHI-TUBE NOR



A single kind of heat-shrink tube can be used to cover a wide range of sizes.

### Features

- Shrink tubes with a high shrink ratio can be manufactured.
- With a hardness of 90, they are ideal for applications requiring abrasive resistance.
- These tubes also provide excellent electrical insulation.
- Colored tubes can be manufactured. (Maximum shrink ratio of 4 to 1)

### Applications

- Electrical insulation applications
- Protection and cushioning applications
- Anti-abrasion applications
- Waterproofing applications (inner surface adhesive coating type: NOR-A)

Object outer diameter (mm)	Representative size	Before shrinking		After shrinking			
		Inner diameter D (mm)	Tolerance (%)	Inner diameter D (mm)	Tolerance (%)	Thickness t (mm)	Tolerance (%)
3.5 to 11.5	12-3-2	12	$\pm 10$ $-5$	3	$\pm 10$	2	$\pm 20$ $-10$
8.5 to 34.5	35-8-2.5	35	"	8	"	2.5	"
15.5 to 64.5	65-15-3	65	"	15	"	3	"

\*Various size settings are available. Please inquire for details.

\*The minimum order amount for the above representative sizes is from 30 m (5 m  $\times$  6 pcs). For other sizes, special product minimum order quantities apply (refer to P. 13).

## **NISHI-TUBE with Buffed Surface**

Made-to-order product

NISHI-TUBE NPM-G

### Features

- This is a Nishi-Tube with a buffed finish for improved hand-held grip.
- These tubes can be used for a variety of grip applications.
- The entire outer surface of the tube is buffed.



Product types which can be buff-finished	Sizes which can be buff-finished	Length	Minimum order quantity	Product name after buffing
NPM	25-12.5-1	1.6 m per tube	Minimum order quantity 10 tubes or more	NPM-G
	25-12.5-2			
	30-15-1			
	30-15-2			
NPE (Black)	35-17.5-1			NPE (Black) -G
	35-17.5-2			
NPE (Color) *	40-20-1			NPE (Color) -G
	40-20-2			
	50-25-1			
	50-25-2			

\*For NPE (color), minimum order quantities are as shown on P.13.

# NISHI TUBE Types

Urethane Heat-Shrink Tubes

## NISHI-TUBE NUM (NND Standard Number: T2-4100)

Made-to-order product

NISHI-TUBE NUM



The urethane shrink tube "Nishi-Tube NUM" is approximately 3 times as resistant to abrasion and wear as general-grade Nishi-Tube NPR or NPM products.

### Features

- A heat-shrink tube with excellent abrasive resistance and flexibility

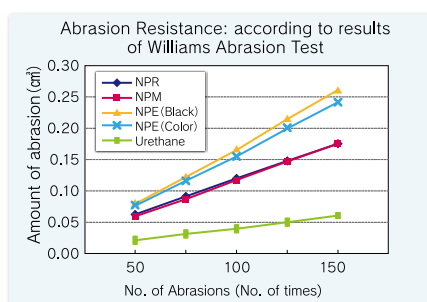
### Applications

- For rubber rollers
- For protecting construction machinery hydraulic hoses
- For various applications where abrasion and wear is a concern

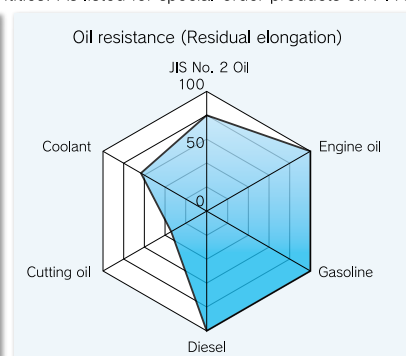
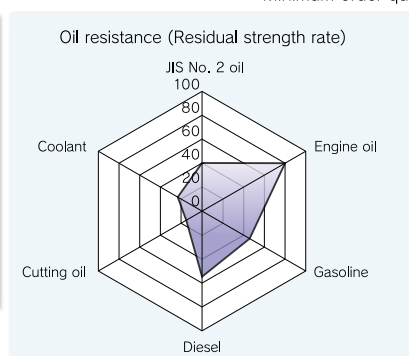
### Sizes

- 4-2-1 to 80-40-3

\*Minimum order quantities: As listed for special-order products on P.13.



©Sizes: 4-2-1 to 80-40-3  
©Length: In tubes of 5 m in length.  
\*Not a guaranteed value.



Oil resistance	Test Conditions	Property	Unit	Property Value
Gasoline	Steeped at 25°C × 72 hours	Ambient temperature	Tensile strength	MPa
Diesel	"		Tensile elongation	%
Cutting oil	Steeped at 70°C × 72 hours		Hardness (JISA)	—
Coolant	"		Heat-resistant temperature	°C
Engine oil	"		Weatherability	Residual tensile strength
JIS No. 2 Oil	Steeped at 100°C × 72 hours	1000 hrs	Residual tensile elongation	%
				108

\*For weatherability, the accelerated test value of the Sunshine Weather Meter was used.

Anti-Bacterial Heat-Shrink Tubes

## NISHI-TUBE (K)

Made-to-order product



### Features

- Prevents the growth of and reduces levels of bacteria such as E. coli and S. aureus.
- Existing Nishi-Tubes can be prepared for anti-bacterial specifications. Product names ending in (K) indicate an anti-bacterial specification. Examples: NPE(K), NPM(K), NPE-A(K)

### Sizes

- 4-2-1 to 270-140-3

\*Minimum order quantities: As listed for special-order products on P. 13

Anti-bacterial performance of Anti-bacterial Heat-shrinking Tube NPE (K)			
Sample	Sample strain	Initial bacterial count	After 24 hours
NPE(K) (Untreated product)	E. coli	$3.0 \times 10^5$	10 or less
	S. aureus	$1.0 \times 10^6$	10 or less
NPE(K) (Inundation-treated product: 60°C × 168 hours)	E. coli	$2.6 \times 10^5$	10 or less
	S. aureus	$1.1 \times 10^6$	10 or less

\*Testing method: JIS Z 2801 (Film covering method)

\*In general, an effect that reduces bacteria count by  $10^{-2}$  or more is judged as anti-bacterial.

Wood-grain Pattern Nishi-Tube

## MOKUME (NND Standard Number: T3-1100)

Made-to-order product



### Features

- MOKUME Nishi-Tube can be used to cover metal or plastic handrails to give them a warmer, more appealing wood appearance.



### Size

Unit : mm

Inner dia before shrinking	Inner dia after shrinking	Thickness after shrinking	Length
40	24	1.3	5000

\*For order quantities, please refer to the minimum order quantities for special products on P.13.

Heat-Shrink Tubes

## "Suberazu Grip" No-slip grip (NND Standard Number: T2-7800 / T2-6900)

Transform tools into professional models!!

Easily improve work efficiency!!

**For Home Improvement**

Easily improve the quality and usability of your favorite tools such as hammers and wrenches, as well as operation levers of production machines, etc., to your own specifications!

The solid grips will keep your hands from getting tired!!

No slipping means safer use and peace-of-mind!!

Fully covers even long parts!!

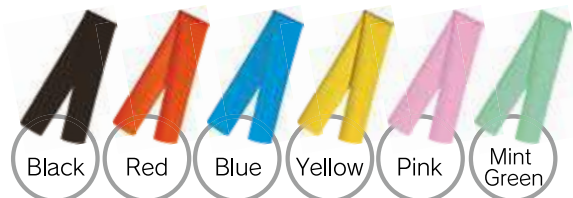
**For Gardening and Farming**

Use with a range of implements, from professional farming equipment and tools to gardening shovels!

Sizes	Inner dia (mm)	Object outer diameter (mm)
20	30	18 to 27
40	40	23 to 35

- Choose from 2 types: grooved or buffed.
- Basic lengths: 20 cm and 40 cm.
- Can be heat-shrunk using a home hair dryer.

(Color variations)



\*Actual product colors may vary slightly from color samples.

### Examples of Usage Applications

Grip is notably improved for safer usage.

**1**

Prepare the tool which "Suberazu Grip" will be applied to.

**2**

Wrap string around the area to be covered with "Suberazu Grip".

**3**

Apply the "Suberazu Grip" tube.

**5**

Heat with a hair dryer.

Finished products resemble those shown here.

It was so easy to apply!



For indoor use

## NISHI-TUBE with Fastener Closure

Made-to-order product

### Features

- Can be used with all Nishi-Tube types that are  $\varnothing 25$  or more before shrinking.
- Can be cut to length as necessary for use. (Up to tube lengths of 2.5 m)
- Can be applied to objects whose ends are blocked, preventing normal tube application.
- The fastener part is not bulky or large.
- Standard length of 1.0 m (Can be manufactured to specific lengths, from 0.3 to 2.5 m)
- When a plastic fastener (Product name: R Track) is attached to NPE Nishi-Tubes, the product name becomes NPE-F. When inner surface adhesive is also applied, the product name becomes NPE-AF.
- When a standard zipper is attached, the product name becomes NPE-Z or NPE-AZ.
- All of these products are made-to-order.

### Installation Procedure



1 Cut the tube to the required length.



2 At the cut edges, apply small amounts of instant adhesive to prevent fraying of threads of the fastener part.



3 Apply the tube and mate the fastener parts while applying instant adhesive.



4 Apply a rubber sheet along the fastener part.



5 Use a burner, etc. to perform heat-shrinking. After shrinking, the rubber covering sheet may be peeled off.



This product uses plastic zippers. Types with normal zippers can also be manufactured.

Phosphorescent Heat-Shrink Tubes

## NISHI-TUBE Chikuko (NND Standard Number: T3-0900)

Made-to-order product



### Features

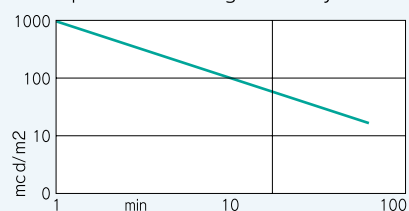
- Heat-shrink tubes that incorporate phosphorescent materials
- These materials gather light and release them over time to glow in dark places.

### Applications

- Apply to stairway handrails to provide visual assistance when going up or down at night
- For traffic safety items to indicate your presence at night when riding a bicycle, etc.

◎Sizes: 4-2-1 to 40-20-1

Graph of measured light intensity values



\*Not guaranteed values.

\*For order quantities, please refer to the minimum order quantities for special products on P. 13.



## Nishi-Tube Long Products

### Reel-wound Tubes

Made-to-order product

- Minimum order quantity: At least 1 box
- Packing configuration: The indicated number of wound paper reels are packed into a box.
- Length: The standard length for long products is 25 m.

- Compatible types: Applicable types are "Nishi-Tube NPR" and "Nishi-Tube NPE (Black)"
- Compatible sizes: Details are shown in the below table

\*Each 25 m length of product wound within a reel is held in place with tape.

Size	Long object usage	Rolled length per reel	No. of reels (Reels / box)	Qty/Box	Approx. Weight(kg)
4-2-1	×	—		—	—
6-3-1	×	—		—	—
8-4-1	○	25m×2pcs	8	400m(16pcs)	10.5
10-5-1	○	25m×2pcs	8	400m(16pcs)	12
15-7.5-1	○	25m×2pcs	8	400m(16pcs)	16.5
20-10-1	○	25m×2pcs	8	400m(16pcs)	21
25-12.5-1	○	25m×2pcs	5	250m(10pcs)	19
30-15-1	○	25m×2pcs	5	250m(10pcs)	21
35-17.5-1	○	25m×2pcs	5	250m(10pcs)	24
40-20-1	○	25m×2pcs	5	250m(10pcs)	25
50-25-1	○	25m×2pcs	4	200m( 8pcs)	26
60-30-1	○	25m×2pcs	3	150m( 6pcs)	23
8-4-2	○	25m×1pc	8	200m( 8pcs)	13
10-5-2	○	25m×1pc	6	150m( 6pcs)	14
15-7.5-2	○	25m×1pc	6	150m( 6pcs)	14

Size	Long object usage	Rolled length per reel	No. of reels (Reels / box)	Qty/Box	Approx. Weight(kg)
20-10-2	○	25m×1pc	6	150m(6pcs)	16
25-12.5-2	○	25m×1pc	6	150m(6pcs)	24
30-15-2	○	25m×1pc	5	125m(5pcs)	20.3
35-17.5-2	○	25m×1pc	5	125m(5pcs)	27
40-20-2	○	25m×1pc	5	125m(5pcs)	25
50-25-2	○	25m×1pc	4	100m(4pcs)	26
60-30-2	○	25m×1pc	3	75m(3pcs)	23
70-35-2	○	25m×1pc	3	75m(3pcs)	27
80-40-2	○	25m×1pc	2	50m(2pcs)	23
50-25-3	×	—		—	—
60-30-3	×	—		—	—
70-35-3	×	—		—	—
80-40-3	×	—		—	—
				—	—
				—	—

## Tube Size Selection for

### Covering Bus Bars

Convert the bus bar perimeter to a circular diameter using the formula ((Bus Bar Thickness + Bus Bar Width) × 2) ÷ (Pi [3.14]). Next, select a tube by its inner diameter after shrinking so that the calculation (circular diameter) ÷ (tube inner diameter after shrinking) equals 1.25 or less. Once the inner diameter after shrinking is determined, find a tube that has an inner diameter before shrinking approximately double that of the inner diameter after shrinking. Then, select the tube thickness. Please use the Nishi-Tube Size Selection Reference Chart for Bus Bars. Refer to the below chart to select the thickness.

The reason such large tubes need to be selected is because when bus bars conduct electricity, they may become hot, which can make the tubes try to shrink even further. In such cases, the shrinking action of the tubes may cause the tubes to split at the edges of the bus bar, causing installation problems.

Load voltage	Required coating thickness	Selection thickness
600 V	1.0 mm or more	2 mm
3 to 6 KV	1.5 mm or more	2 to 3 mm
8 KV	2.0 mm or more	3 mm
10 to 15 KV	3.0 mm or more	4 mm

### Nishi-Tube Size Selection Reference Chart for Bus Bars

Bus bar width (mm)	Bus bar thickness (mm)									
	2	3	4	5	6	8	10	12	15	20
10	10-5									
12	15-7.5	15-7.5								
15		20-10	20-10		20-10					
16	20-10									
18		20-10	25-12.5							
20	25-12.5	25-12.5	25-12.5	25-12.5	25-12.5					
25		30-15	30-15	30-15	35-17.5	35-17.5				
30		35-17.5	35-17.5	40-20	40-20	40-20	40-20			
32				40-20	40-20					
35			40-20		40-20	40-20				
38		40-20		40-20	50-25					
40		40-20	50-25	50-25	50-25	50-25	50-25			

Bus bar width (mm)	Bus bar thickness (mm)									
	2	3	4	5	6	8	10	12	15	20
45			50-25	50-25	50-25					
50		60-30	60-30	60-30	60-30	60-30	60-30	70-35	70-35	80-40
60					70-35	70-35	80-40			
65					80-40	80-40				
70					80-40					
75				90-45	90-45	90-45	90-45	100-50	100-50	100-50
80						90-45				
100					120-60	120-60	120-60	120-60	120-60	120-60
125					140-70	140-70	140-70			
150					160-80	170-90	170-90	170-90	170-90	170-90
175							180-100	180-100		
200					200-110	200-110	200-110	200-110	200-110	220-120

\*Depending on the size configuration, sizes may not correspond to 1.25 or less of the above calculated values.

## Nishi-Tube Shrink Application Methods

Nishi-Tubes shrink when heated to 120°C or more. However, the time required for shrinking varies depending on the capacity of the heating device and the size of the object to be covered. Use the following method to shrink Nishi-Tubes.

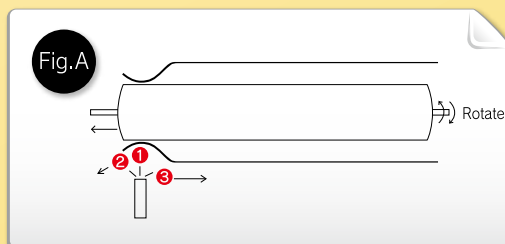
### Heat Source for Heat-shrinking

#### When electric power is available

Use an industrial dryer, infrared heater, electric heater, electric oven, etc.

#### When electric power is not available

Use a portable burner, handheld torch, gas burner, etc.



### Heat-shrinking Method

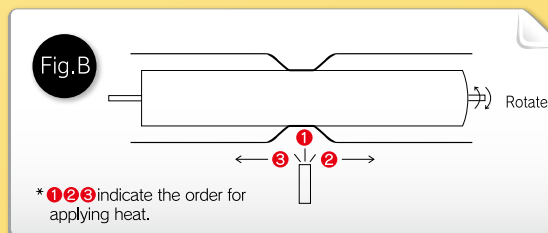
#### When using a device such as an electric oven

Set the temperature inside the electric oven to be between 120 and 160°C and evenly heated, and then place the object covered with the Nishi-Tube into the oven. The amount of heating time varies by the object being covered, but shrinking should be completed in 5 to 10 minutes.

#### When using a device such as a portable burner or industrial dryer

Apply heat to the objects with the Nishi-Tube inserted on to it, moving the heat source from end-to-end of the tube, or from the center of the tube to its edges until the tube shrinks.

(\*Refer to Figs. A and B) Apply heat evenly so that there is no localized heating. (Please consult with us for additional information regarding heating and shrinking methods)



\*123 indicate the order for applying heat.

### Nishi-Tube Cutting Length

In general, cut the Nishi-Tube about 10% longer than the object to be covered. For complex-shaped objects, cut the tube so that there is an additional margin of length.

### Cutting Nishi-Tubes

When cutting Nishi-Tubes, use a sharp implement to cut the tube straight and evenly.

### Storage

Store products away from direct sunlight in an environment of 40°C or less.

## Color Codes/Samples

Standard color							
N P E				N P A			
Color	Packing Slip Code	Munsell Code (for reference)	Color Sample	Color	Packing Slip Code	Munsell Code (for reference)	Color Sample
Blue	A	7.5PB3/8		Blue	A	10B4/8	
Black	B			Black	B		
Red	R	5R4/12		Red	R	5R4/12	
White	W	2.5Y9/2		White	W	2.5Y9N	
Green	G	7.5G4/4		Green	G	2.5G6/10	
Gray	SA	N-5		Yellow	Y	5Y8/10	
Brown	SHI	5R4/8		*Actual product colors may vary slightly from color samples. *Color matching is available for NPE products to manufacture special colors. (Minimum order quantity required)			

## Nishi-Tube Minimum Order Quantities and Estimates of Coverable Outer Diameters

Category	Outer dia (mm)	Size	Minimum order quantity								
			Standard products				Made-to-order products				
			NPE (Black)	NPR	NPM	NPA Colored Red / Yellow / Blue Green / Black / White	NPN	NPE Colored Blue / Gray / Red White / Brown / Green	Inner surface adhesive products Standard products excluding NPA	Long Products NPR/NPE (Per box)	Special Products (Other than those at left)
Standard Sizes	2.5 to 3.7	4-2-1	From 5 m	From 5 m	Not available	1m × 10pc	From 5 m	From 500 m	Not available	Not available	From 500 m
	3.7 to 5.0	6-3-1	"	"	"	"	"	"	1m × 20pc	"	"
	5.0 to 7.0	8-4-1	"	"	"	"	"	"	"	400 m or more	"
	6.0 to 9.0	10-5-1	"	"	"	"	"	"	"	"	"
	9.0 to 13.0	15-7.5-1	"	"	"	"	"	"	1m × 10pc	"	"
	12.0 to 17.0	20-10-1	"	"	"	"	"	"	"	"	"
	15.0 to 22.0	25-12.5-1	"	"	"	"	"	From 100 m	"	250 m or more	"
	18.0 to 27.0	30-15-1	"	"	"	"	"	"	"	"	From 300 m
	21.0 to 32.0	35-17.5-1	"	"	"	"	"	"	"	"	"
	23.0 to 35.0	40-20-1	"	"	"	"	"	"	Not available	"	"
	28.0 to 45.0	50-25-1	"	"	"	Not available	"	From 50 m	"	200 m or more	"
	35.0 to 55.0	60-30-1	"	"	"	"	"	"	"	150 m or more	"
	5.0 to 7.0	8-4-2	"	"	"	"	"	From 500 m	1m × 20pc	200 m or more	From 500 m
	6.0 to 9.0	10-5-2	"	"	"	"	"	"	"	150 m or more	"
	9.0 to 13.0	15-7.5-2	"	"	"	"	"	"	1m × 10pc	"	"
	12.0 to 17.0	20-10-2	"	"	"	"	"	From 100 m	"	"	"
	15.0 to 22.0	25-12.5-2	"	"	"	"	"	"	"	"	"
	18.0 to 27.0	30-15-2	"	"	"	"	"	"	"	125 m or more	From 300 m
	21.0 to 32.0	35-17.5-2	"	"	"	"	"	"	"	"	"
	23.0 to 35.0	40-20-2	"	"	"	"	"	"	"	"	"
	28.0 to 45.0	50-25-2	"	"	"	"	"	From 50 m	"	100 m or more	"
	35.0 to 55.0	60-30-2	"	"	"	"	"	"	"	75 m or more	"
	40.0 to 65.0	70-35-2	"	"	"	"	"	"	"	"	From 100 m
	47.0 to 70.0	80-40-2	"	"	"	"	"	"	"	50 m or more	"
	52.0 to 80.0	90-45-2	"	Not available	From 5 m	"	"	From 30 m	1m × 4pc	Not available	"
	57.0 to 90.0	100-50-2	"	"	"	"	"	"	"	"	From 30 m
	28.0 to 45.0	50-25-3	"	From 5 m	Not available	"	"	From 50 m	1m × 10pc	"	From 300 m
	35.0 to 55.0	60-30-3	"	"	"	"	"	"	"	"	From 100 m
	40.0 to 65.0	70-35-3	"	"	"	"	"	"	"	"	"
	47.0 to 70.0	80-40-3	"	"	"	"	"	"	"	"	"
	52.0 to 80.0	90-45-3	"	Not available	From 5 m	"	"	From 30 m	1m × 4pc	"	"
	57.0 to 90.0	100-50-3	"	"	"	"	"	"	"	"	From 30 m
Special Sizes	68 to 110	120-60-2	From 30 m	"	From 30 m	"	From 30 m	"	1m × 30pc	"	"
	80 to 125	140-70-2	"	"	"	"	"	"	"	"	"
	68 to 110	120-60-3	"	"	"	"	"	"	"	"	"
	80 to 125	140-70-3	"	"	"	"	"	"	"	"	"
	90 to 145	160-80-3	"	"	"	"	"	"	"	"	"
	102 to 155	170-90-3	"	"	"	"	"	"	"	"	"
	113 to 165	180-100-3	"	"	"	"	"	"	"	"	"
	125 to 185	200-110-3	"	"	"	"	"	"	"	"	"
	130 to 205	220-120-3	"	"	"	"	"	"	"	"	"
	160 to 230	250-140-3	"	"	"	"	"	"	"	"	"
	160 to 250	270-140-3	"	"	"	"	"	"	"	"	"

### Notes

- ①NPN (Black) is not a standard stock item, but orders are taken for standard sizes from units of 5 m × 1 pc.
- ②The NPM standard stock items are in sizes 90-45-2 to 100-50-3, and below that are NPR standard stock items.
- ③For NPE (colored), colors other than blue, gray, red, white, brown, and green have the same minimum order quantities as special products.
- ④Sizes greater than 120-60-2 are special sizes, with basic sizes shown in the above table.
- ⑤Special products may be in stock, and orders from 5 m can be shipped in such cases. However, if stock is not available, the minimum order quantities shown in the above table apply.
- ⑥Standard product minimum order quantities apply for inner surface adhesive products. For special products with inner surface adhesive, special product minimum order quantities apply. The minimum order quantity for NPA-A is 1 m × 100 pcs.
- ⑦These minimum order quantities apply for spot orders. These minimums do not necessarily apply for continuous contract orders. However, to qualify, the above minimum order quantities must be fulfilled within 6 months.
- ⑧Please inquire for requests of orders that do not fulfill these minimum order quantities.
- ⑨The minimum order quantity for SPC is 10 pieces.

# Waterproof/Protective Ambient-temperature Shrinkable Tube

Waterproof / Protective Ambient-temperature Shrinkable Tube

**CONTUBE** (QT-C) (NND Standard Number: T6-0101)

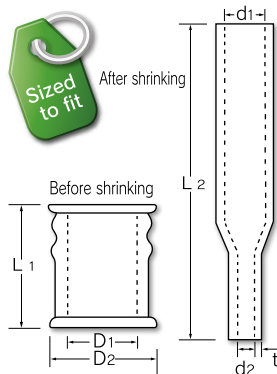
**Quicktube**  
Quick shrink tube

(QT-S) (NND Standard Number: T6-0102)

Made-to-order product

## CONTUBE

A new kind of tube for coaxial connectors that does not require a flame or heat source



Unit: mm

Object Outer dia (mm)	Size	After complete tube shrinkage			Spacer			
		Inner dia d1/d2	Thickness t	Length L2	Inner dia D1	Range outer dia D2	Length L1	Color
10 to 14	N5C-F17 (straight)	6	2.0	160	17	26	50	White
11 to 17	N7C-F20 (straight)	7	2.0	135	20	31	50	Yellow
11 to 24	N7C-F27	15/7	2.0	165	27	38	55	Brown
12 to 24	N8C-F27	15/8	2.0	165	27	38	55	White
12 to 30	N8C-F33	15/8	2.0	165	33	44	60	Purple
13.5 to 30	N12C-F33	17/9.5	2.0	175	33	44	60	Red
13.5 to 34	N12C-F37	17/9.5	2.0	175	37	48	64	Green
16 to 39	N17C-F42	20/12	2.0	185	42	53	65	Blue

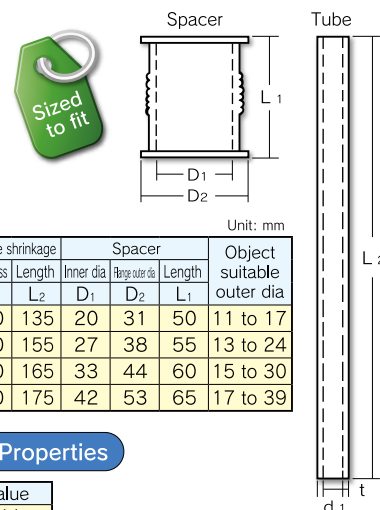
## QUICKTUBE

### Features

- Waterproof tubing can be shrunk on without using a flame or heat source.
- Removing the stopper causes the tube to come out of the spacer, and it naturally shrinks to allow for easy installation.
- Because the tube is compressed lengthwise, 3 times the length of the spacer can be covered.
- Can be easily applied to parts where tape wrapping is difficult.
- Has the elasticity and softness of rubber and is flexible.
- Suitable for electrical insulation, mechanical protection, and dust prevention usage.

### Applications

- Insulation and protection of cable terminals and connections.
- Insulation and protection of cable connections in automobiles, boats, and other vehicles.
- Insulation and protection of connections on control panels and distribution boards.



Unit: mm

Object Outer dia (mm)	Size	After complete tube shrinkage			Spacer			Object suitable outer dia
		Inner dia d1	Thickness t	Length L2	Inner dia D1	Range outer dia D2	Length L1	
11 to 17	N20S	7	2.0	135	20	31	50	11 to 17
13 to 24	N27S	9	2.0	155	27	38	55	13 to 24
15 to 30	N33S	11	2.0	165	33	44	60	15 to 30
17 to 39	N42S	13	2.0	175	42	53	65	17 to 39

### Cautions regarding use

- In cold-weather seasons when the temperature (ambient air temperature) drops below 5°C, tube shrinkage properties are impaired. In such cases, be sure to run your hands over the tube as it shrinks to ensure a close fit.
- Store away from direct sunlight in a cool place.
- Be sure to collect and dispose of all used stoppers and spacers.
- If grease causes discomfort on skin, wash with soap and water and rinse thoroughly.

Please note that usage cannot be guaranteed in the following situations.

- The object covered is more than 3 times the tube inner diameter after complete shrinkage
  - After covering, the tube part is elongated by greater than a factor of 3
  - An object with burrs or protrusions is covered
  - Usage temperatures exceed 80°C
  - The covered object comes into regular contact with other objects
  - The tube comes into contact with a liquid that causes it to swell
- Before use, confirm that tubes to be used are compliant with the expected application.  
Please contact us with any questions you may have.

### Con tube and Quick tube Properties

Characteristic	Unit	Value
Tensile strength	MPa	11
Elongation	%	690
Impact resistance	g×cm	*1 200×50
Dielectric strength	KV/mm	16
Volume resistivity	Ω-cm	5×10 <sup>14</sup>
*2 Heating, after aging	%	96
Residual elongation	%	91

- For Con tubes and Quick tubes, cold-climate specifications are available using silicone rubber which can be used in environments as cold as -60°C.

- Please note these tubes are intended for weak electrical, low voltage applications.

\*1 JIS C3005-compliant  
\*2 100°C × 120 hours

### Do not perform the following with tubes in use.

- Do not use a wrench or other tool in contact with the tube while the covered connector is tightened onto its connection.
- Do not apply additional tightening torque onto the tube's surface.
- Do not subject the surface of the tube to impacts or shocks.

Waterproofing protection of connectors for cellular transmission towers

**Ambient-temperature Shrinkable Tube (QT-M)** (NND Standard Number: T6-1200)

Made-to-order product



This tube can greatly reduce waterproofing work time for coaxial connectors at cellular transmission towers.

### Features

- Silicone grease applied to the inner surface of the tube completely blocks water from seeping in.
- The compact design in terms of the outer diameter and length results in less waste and cleanup after performing covering work.
- The tubes use ethylene propylene rubber which has excellent weatherability and strength. Silicone rubber versions are also available.



Connector size	Connector type	Compatible ambient-temperature shrinkable tube Size name*	Identification	
			Stopper	Spacer
8D	DIN-type	N8D (DIN) DAM	Green	White
	S-type	N8D (S) DAM	Brown	White
10D	DIN-type	N10D (DIN)	Yellow	White
	Flange shape (Note 1)	N10D (F)	Brown	White
20D	DIN-type	N20D	Blue	Black
	S-type			
29D	DIN-type	N29D / N39D (DIN)	White	White
	Flange shape (Note 1)			
Cannon Connector	For power supply	N-CANNON (PS)	Green	White
	For alarm	N-CANNON (AL) DAM	Green	White

Note 1) For flange connectors, the tube cannot be passed over the flange part. Also be aware that the tube cannot be applied from the flange side.

\*For tube size names including DAM, damming tape is included.



## Mega Solar Installation Weed Control Sheet

## Weed Control Nishi Sheet (NND Standard Number: T5-4100)

Made-to-order product

### Features

- **Light-blocking:** Light does not pass through this sheet, preventing light from reaching weeds under the installation, suppressing growth.
- **Weatherability:** The black polyethylene material resists deterioration caused by UV light, and is suitable for long-term use (20 years or more).
- **Non-maintenance:** Growth and spread of weeds is suppressed allowing for reduced maintenance costs for weed removal, etc.

### Applications

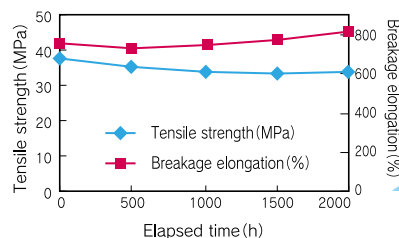
- Usable at places such as mega solar installations where growth of weeds is undesirable.
- Installing under a bed of gravel minimizes visual impact for scenery-sensitive areas such as around houses.



### Product Specifications / Sale Units / Installation Method

Sheet material	Polyethylene (Black)
Dimensions	Width: 1000 mm, Thickness: 0.5 mm
Fastener	Steel U-pin
Order quantity	Weed Control Nishi Sheet: 1 roll (50 m) units Fasteners: Sets of 10
Installation method	Apply the sheet lengthwise, overlapping by 5 cm. Fasten using U-pins at 50 cm intervals.

### Weatherability evaluation test results using a Sunshine Weather Meter



**Weatherability estimated for at least 20 years use**

## Safety Indication Sheet

Made-to-order product

Yellow reflective tape with excellent reflective brightness is applied in a stripe pattern to highly-weatherable black polyethylene sheeting. The resulting sheet can be effectively used for cautionary purposes and for accident prevention.

### Features

- **Visibility:** The surface of the yellow stripes is fully reflective, standing out more than previous products.
- **Weatherability:** The reflective properties and coloring are highly-weatherable, allowing for long-term use in outdoor applications.
- **Variety of sizes available:** Lengths of 800 mm or less can be manufactured according to customer needs.

### Usage Examples

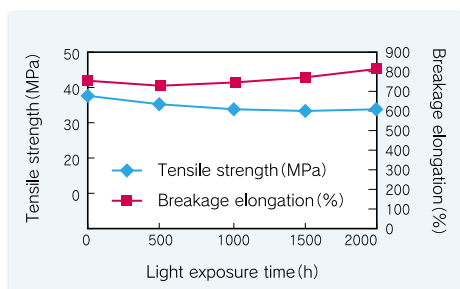


### Product Specifications / Sale Units / Application Method

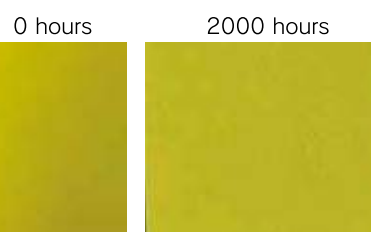
Sheet	Polyethylene (Black) / Thickness: 1.2 mm
Reflective sheet	Encapsulated-lens retroreflective sheet: 50 mm width
Sheet pattern	The reflective sheet can be applied in both diagonal or vertical patterns.
Order quantity	10 sheets per 1 size
Application method	This safety indication sheet is sold as the sheet alone. Use fixtures such as stainless bands to secure it.
Sheet dimensions (H × W) (mm)	500×700, 500×1200, 800×700, 800×1200, other sizes available

### Weatherability test results from 2000 hours of light exposure using a Sunshine Weather Meter

#### ① Weatherability of the Polyethylene Sheet



#### ② Reflective sheet color loss (Light exposure time)



Almost no color loss was found.

#### ③ Reflective sheet peeling



No peeling was found.

# NISHI-TUBE NXL/Steel Pipe Corrosion Prevention

Steel Pipe Corrosion Prevention

**Nishi-Tube NXL-A** (NND Standard Number: T5-2300)

Made-to-order product

Nishi-Tube NXL-A uses a cross-linked polyethylene base material with heat-shrinking properties, and has adhesive applied to its inner surface to maintain corrosion protection equivalent to the pipe's plastic lining. It is easy to work with, making it optimal for on-site corrosion protection for joints of steel pipes. (A zipper type (NXL-AZ) which can be applied after installation is also available for existing equipment.)

Various sizes of Nishi-Tube NXL-A are available



## Features

### 1 Excellent waterproof and corrosion-proof properties

These tubes offer excellent waterproofing, chemical resistance, stress crack resistance, and electrical properties.

### 2 Easy to work with

Work is easier compared to tape wrapping methods, with significant time savings as well.

### 3 High reliability

There is no need to rely on expertly-trained technicians, and tubes can be applied with an even finish.

### 4 Wide variety of sizes

We offer a wide variety of sizes for matching diameters of plastic-lined steel pipes.

## Applications

- Corrosion prevention for weldings and joints of pipes used for transporting gas, water, oil, etc.
- Covering for rollers
- Corrosion prevention at joints of protective steel pipes used for electrical power or communication cables, etc.

## How to Use

### Heat Source for Heat-shrinking

Hand-held gas burner

### Heat-shrinking Method

The amount of heating time varies by the size of the object being covered, but shrinking should be completed in 5 to 10 minutes.

## Work procedure for applying Nishi-Tube NXL-A to straight pipe joints

1

### Set the Nishi-Tube NXL-A into place

Insert a Nishi-Tube matching the pipe's dimensions onto the edge of the pipe in advance before welding work, and set it in place so that it won't interfere with welding work. (Note 1) When setting the Nishi-Tube, be sure it does not come into contact with any surrounding protrusions.

2

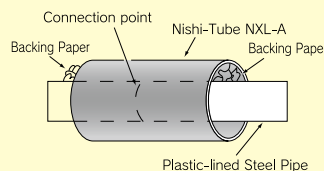
### Preparatory work

Clean the area that the Nishi-Tube will cover. Clean and remove any debris, oil, rust, or burrs.

3

### Apply the Nishi-Tube NXL-A

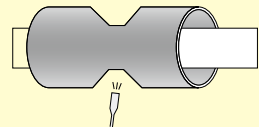
Move the previously-set Nishi-Tube into place to where it will be shrunk. Remove the backing paper from the inner surface of the Nishi-Tube, and gather it along the upper inside of the pipe so that the tube is supported.



4

### Shrink the central area of the Nishi-Tube NXL-A

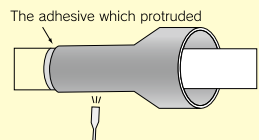
Use a hand-held gas burner to apply flame to the left and right of the center of the weld, applying heat evenly along the circumference of the tube. After this work, remove the supporting backing paper.



5

### Shrink both ends of the tube

Heat-shrink the Nishi-Tube from the center out to an edge so that any air is driven out. Move on towards the other edge when shrinking is almost complete.



6

### Completion

When heat-shrinking of the Nishi-Tube is almost complete, apply heat to the whole tube evenly and completely until a small amount of adhesive comes out from the ends of the tube.



(Note 2) The ends tend to spread out, so press down on them with your fingers.

## Standard Sizes

Nominal Size	Outer layer material (cross-linked polyethylene)								Inner layer material (adhesive layer)		Reference
	Before shrinking				After shrinking						Steel pipe
	Inner dia (mm)	Tolerance (mm)	Length (mm)	Tolerance (mm)	Inner dia (mm)	Tolerance (mm)	Length (mm)	Tolerance (mm)	Thickness before shrinking (mm)	Tolerance (mm)	outer dia (mm)
NXL-A 80 A-450	130	±10	450	±10	65	±20	2.2	±0.2	0.6	±0.15	89.1
NXL-A 100 A-450	150				75						114.3
NXL-A 125 A-450	190				100						139.8
NXL-A 150 A-450	200				120						165.3
NXL-A 200 A-450	270				135						216.3
NXL-A 250 A-450	320				160						267.3
NXL-A 300 A-450	370				185						318.5
NXL-A 350 A-450	410				205						353.6
NXL-A 400 A-450	460				230						406.4
NXL-A 450 A-450	510				255						457.2
NXL-A 500 A-450	560				280						508.0
NXL-A 550 A-450	610				305						558.8
NXL-A 600 A-450	660				330						609.6
NXL-A 650 A-450	710				355						660.4
NXL-A 700 A-450	760				380						711.2
NXL-A 750 A-450	810				405						762.0
NXL-A 800 A-450	870				435						812.0
NXL-A 850 A-450	910				455						813.6
NXL-A 900 A-450	970				485						914.4
NXL-A1000 A-450	1070				535						1016.0
NXL-A1100 A-450	1170				585						1117.6
NXL-A1200 A-450	1270				635						1219.0
NXL-A1300 A-450	1420				710						1320.0

Notes: (1) Shrink rate of approx. 50%

(2) The last 3 digits of the nominal size indicate the length.

(3) We manufacture sizes other than standard sizes upon request. (However, lengths are limited to 450 mm.)

## General Properties of Outer Layer Material

Characteristic	Measured value	Testing method
Color	Black	—
Specific gravity	0.92	—
Tensile strength - circumferential (MPa)	28.4	JIS K 6251
Tensile strength - axial (MPa)	19.6	
Circumferential elongation (%)	250	JIS K 6251
Axial elongation (%)	470	
Hardness (Durometer / Type A)	94	JIS K 6253
Brittle temperature (°C)	< -60	JIS K 6261
Volume resistivity (Ω-cm)	$1 \times 10^{16}$	JIS K 6723
Water absorption rate (%)	0.1	ASTM E570
Stress crack resistance	No cracks after 1, 000 hours	ASTM D1693

Note: The above property values are representative values and are not guaranteed.



## Application Examples



### CONTENTS

Electrical Applications	18~19
Corrosion Prevention / Waterproofing Applications	19~20
Automobile Applications / Prevention of Water Seepage/Leaking from Large Openings	20
Protective Material Applications	21
Railcar Applications / Roller Covers / Communications Applications	22
Environmental Coordination / Bundling	23
Snow Protection / Marine Applications	24

**NISHI-TUBE**  
NISHI NIPPON ELECTRIC WIRE & CABLE CO., LTD.

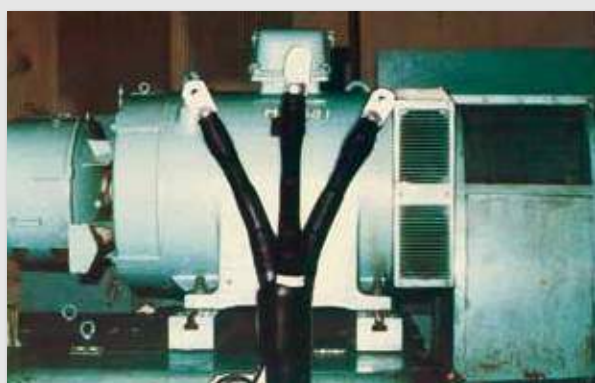
### Electrical Applications



Bus bar insulating covering (NPN)



Flexible conductor insulating covering for batteries (NPE)



High-voltage motor terminals (NS-M terminal material) (NPE)



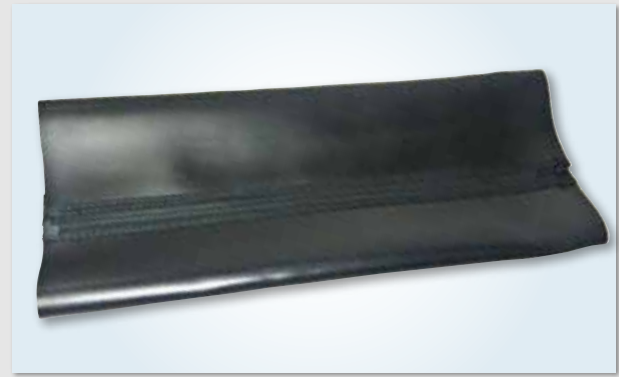
Hanging parts of cables for buildings (NPE)



## Electrical Applications



Nishi-Tube usage for terminal connector covers (NPE)



Zippered tube (NPE-Z) for bundling ends of power lines

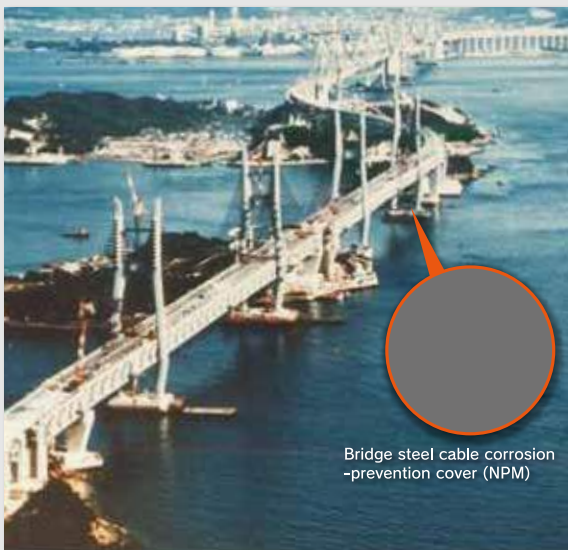
## Corrosion Prevention / Waterproofing Applications



Overall view of Ajinomoto Stadium (NPE-Z)



Great Matsukawa-ura Bridge (NPM)



Honshu-Shikoku Bridge Project (Great Seto Bridge) (NPM)



Weatherability improvements for polyethylene water pipes (NPE)

## Corrosion Prevention / Waterproofing Applications



Example of corrosion prevention of guard rail ground-contact points (NPM-A)



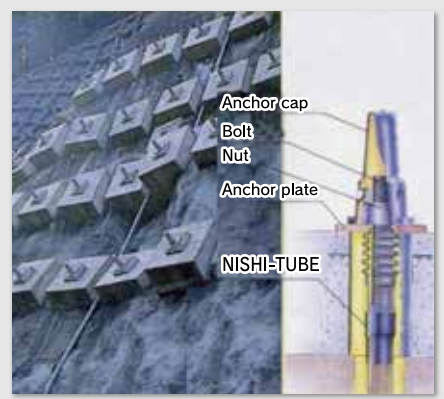
Example of corrosion prevention of lighting pole ground-contact points (NPM-A)



Corrosion prevention of coastal guard rail ground-contact points (NOR-A)



Corrosion prevention of flexible water piping (NPA)

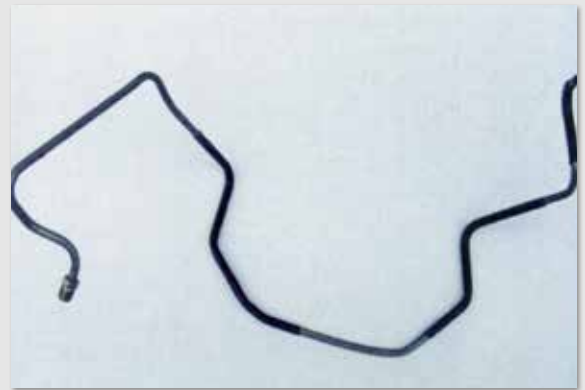


Anchor protection and corrosion prevention for cliffside protective walls (NPR-A)

## Automobile Applications



Motorbike radiator hose (NPR)



Brake oil pipe (NPR)

## Prevention of Water Seepage/Leaking from Large Openings



Waterproofing of Hume pipe joints with Nishi-Tube (NXL-A)



Corrosion prevention reinforcement for moored piles in Tamano City, Okayama (NXL-A)



## Protective Material Applications



Splinter prevention for bunker rakes (NPR)



Nishi-Tube with Buffed Surface (NPE-G)



Firefighting hose (grooved) (NPE)



Chainsaw (NPE)



School in Yufu City, Oita (Unip handrail)



Handrail cover in municipal building (NPE)



Kotobuki Park in Naie Town, Hokkaido (NPE)



Park in Usuki City, Oita (Unip handrail)

## Railcar Applications



Halogen-free flame resistant unstretched tube for railcars (NPN-S)



Halogen-free flame resistant tape for railcars (NFN-T)



Grip bar covers for trolley cars (halogen-free flame resistant specification) (NON)

## Roller Covers



Roller Covers (NPM)

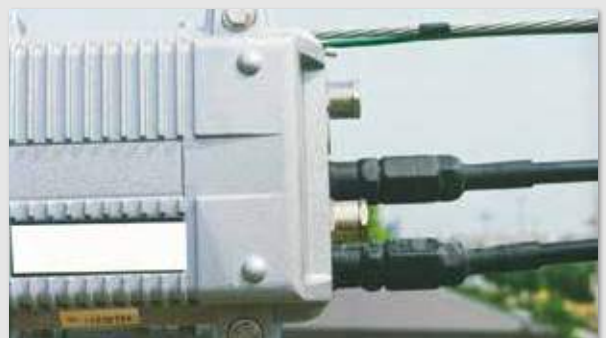


Roller Covers (NPM)

## Communications Applications



Linear communication cable connections (TN connection material)



Ambient-temperature Shrinkable Tube: Con tube



## Environmental Coordination



Nanase River in Oita (Arawasu Bridge) (NPE)



Nishi-Tube color products (NPE or NPA)



Jungle gym (NPE)



Slide (NPE)



Play structure in Taiki Town, Hokkaido

## Bundling



Steel cable bundling (NPR)



Steel cable bundling (NPR)



Interface cable connector end (NPE)



Nishi-Tube with fastener closure (NPE-F)

## Snow Protection



Vehicle shock absorber snow protection cover (SPC)



Vehicle shock absorber snow protection tube (shown applied) (SPC)

## Marine Applications



Connector covers (NOR / NON)



Connector covers (NOR / NON)



Cable port protrusion protection (NOR / NON)



Cable port protrusion protection (NOR / NON)



Control panel cable bundling (NOR / NON)



Control panel cable bundling (NOR / NON)

# Nishi-Tube Inquiry Form

Fill in this form and fax your inquiry to us.  
We will get back to you as soon as possible.



**Nishi Nippon Electric Wire & Cable Co., Ltd.**

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Cable Module/Power Cable Utility/Shrinkable Tube Division

Phone: +81-97-537-5566

Fax: **+81-97-537-1123**

## ● Customer Contact Information

Date (   /   /   )

Company Name		Phone	
Company Division		Fax	
Person in Charge		E-mail	
Address	Postal Code:		

## ● Required Specification

Product name			
Size			
Color			
Quantity			
Specific delivery date requested?	<input type="checkbox"/> Yes      /      /      / <input type="checkbox"/> No		
Object outer diameter			
Usage application			
Questions			

Thank you for your business.





Fujikura Group

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