

# TOMBO™ BRAND

## Heat-Resistant Cloth



# Heat-Resistant Cloth

The importance of “thermal insulation” is currently being reconsidered in all industrial fields from the viewpoint of energy saving and safety.

Our various heat-resistant cloths have excellent thermal insulation and flexibility, and are optimal products for thermal insulation under high temperatures.

\*TOMBO is a registered trademark or trademark of Nichias Corporation.

\*Names with a TM symbol are trademarks of Nichias Corporation.



## ■ Lagging thermal insulation cloth

Maximum working temperature <sup>Note 1</sup>	Composition	TOMBO™ No.
550 °C	Glass fiber	8200
550 °C	Glass fiber	8400
550 °C <sup>Note 2</sup>	Glass fiber (Thermal bonding aluminum foil with heat-sealing film)	8982
	Glass fiber (Adhesive bonding with aluminum metalized film)	
700 °C	Low silica fiber	8250
1000 °C	High silica fiber	
1000 °C	High silica fiber	
800 °C <sup>Note 3</sup>	Alkaline earth silicate wool	5685
1100 °C <sup>Note 3</sup>		
1400 °C	Alumina fiber	8350

## ■ Welding spark protection cloth

Structure	TOMBO™ No.
Inorganic fiber cloth (Uncoated)	8300
Inorganic fiber cloth (Coated with surface-treatment agent)	

Product name [Classification name]	Feature	Application	Page No.
MARINETEX™ Cloth 0.5S	Thin glass fiber cloth	<ul style="list-style-type: none"> <li>For lagging applications</li> <li>For thermal insulation duvet covers</li> </ul>	P.4
MARINETEX™ Cloth 0.5A	Thin glass cloth made with ultra-fine, bulky glass fibers	<ul style="list-style-type: none"> <li>For lagging applications</li> <li>For thermal insulation duvet covers</li> </ul>	
MARINETEX™ Cloth 0.2A	A glass cloth moderately thicker than 0.5S	<ul style="list-style-type: none"> <li>For lagging applications</li> <li>For thermal insulation duvet covers</li> </ul>	
MARINETEX™ Cloth 0.7A	A glass cloth moderately thicker than 0.5A	<ul style="list-style-type: none"> <li>For thermal insulation duvet covers</li> <li>For lagging applications</li> </ul>	
INSULTEX™ Cloth	Thick glass cloth made with bulky glass fibers	<ul style="list-style-type: none"> <li>For lagging, For thermal insulation duvet covers, burn protection, heat shielding curtains, annealing</li> </ul>	P.6
INSULTEX™ Cloth-H	Thick glass cloth made with twisted bulky glass fibers	<ul style="list-style-type: none"> <li>Thermal insulation duvet covers, annealing, packing</li> </ul>	
Aluminized Cloth 100-M, 100-I	Glass cloth made by thermal bonding aluminum foil with heat-sealing film	<ul style="list-style-type: none"> <li>Covering of parts where radiant heat is intense, Thermal insulation covering</li> </ul>	P.8
Aluminized Cloth 200-M, 200-I	Glass cloth made by adhesive bonding with aluminum metalized film		
SILTEX™ Cloth 700	A silica cloth with improved heat resistance by moderate silica treatment of glass cloth	<ul style="list-style-type: none"> <li>For high temperature thermal insulation, protection for sound-absorption materials</li> </ul>	P.9
SILTEX™ Cloth 1000, 1000M	A silica cloth with a silica content of at least 96% and withstands high temperatures up to 1000°C	<ul style="list-style-type: none"> <li>For high temperature thermal insulation, rock wool duvet covers, protection for sound-absorption materials</li> </ul>	
SILTEX™ Cloth 1000S	An improved version of SILTEX Cloth 1000, with PTFE treatment on the surface of the cloth	<ul style="list-style-type: none"> <li>For high temperature thermal insulation, For alkaline earth silicate wool duvet covers, Protection for sound-absorption materials</li> </ul>	
FINEFLEX BIO™ Cloth-S	A reinforcement fiber cloth with high heat resistant alkaline earth silicate wool as its raw fiber	<ul style="list-style-type: none"> <li>For high temperature thermal insulation, Heat shielding curtains, For annealing</li> </ul>	P.12
FINEFLEX BIO™ Cloth-F	A reinforcement fiber cloth with high heat resistant alkaline earth silicate wool as its raw fiber	<ul style="list-style-type: none"> <li>Separator for heating furnace of high temperature thermal insulation furnace</li> <li>Covering materials for high temperature parts</li> </ul>	
RUBILON™ Cloth	A high heat resistant cloth of which the maximum continuous working temperature is 1400°C	<ul style="list-style-type: none"> <li>Industrial furnace curtains, Fiber lining surface coverings, Sealing of parts that penetrate through the walls of high temperature furnaces</li> </ul>	P.14

Note 1: The maximum working temperature must be restricted depending on the application and operating conditions. Use this value as a reference value only. For further details, please contact us.

Note 2: The recommended heat resistance for the aluminum processing of 100-M and 100-I is 150°C. The recommended heat resistance for the aluminum processing of 200-M and 200-I is 180°C.

Note 3: The maximum heat resistance temperature of the reinforcement wire.

Product name [Type]	Feature	Application	Page No.
Fire-Proof Cloth-S	<ul style="list-style-type: none"> <li>Offers excellent resistance to molten metal.</li> <li>Light weight and flexible.</li> <li>As it is a cloth without a resin coat, sparks and slag easily cling to it, giving it excellent scattering prevention properties.</li> </ul>	<ul style="list-style-type: none"> <li>Protection and covering of equipment and devices from sparks and slag generated during welding and cutting.</li> </ul>	P.16
Fire-Proof Cloth-SW	<ul style="list-style-type: none"> <li>Offers excellent resistance to molten metal.</li> <li>Light weight and flexible.</li> <li>The resin-coat-free surface allows sparks and slag to cling to it easily, making it suitable for preventing scattering.</li> <li>The resin-coated surface allows sparks and slag to easily bounce off.</li> <li>The resin coated surface can be affixed or bonded together with tape.</li> </ul>		

# Lagging thermal insulation cloth



**MARINETEX™**

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**INSULTEX™ Cloth**

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**Aluminized Cloth**

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**SILTEX™**

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**FINEFLEX BIO™ textile product**

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**RUBILON™**

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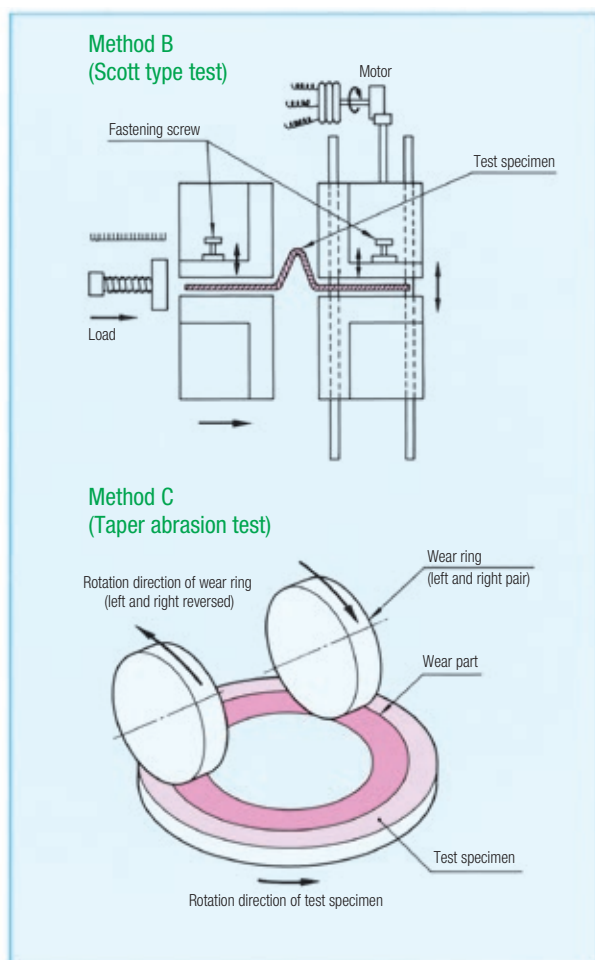
## Comparison of Overall Physical Properties

TOMBO No.	Product name		Thick-ness [mm]	Composition	Thermal conductivity (λ) [W/(m·K)]	Tensile strength <sup>Note 1</sup> [N/25 mm]		Maximum working temperature [°C]	Wear resistance <sup>Note 2</sup>								
						Vertical	Horizontal		JIS L 1096 Method B		JIS L 1096 Method C						
									Vertical direction (No. of times)	Horizontal direction (No. of times)	Wear frequency (No. of times)	Loss [g]	Appearance				
8200	MARINETEX	Cloth 0.5A	0.5	Glass fiber	$0.047 + 0.00009\theta$ ( $\rho = 0.50\text{g/cm}^2$ )	1300	800	550	7	10	500	0.03	○				
		Cloth 0.7A	0.7			700	490		22	22							
8400	INSULTEX	Cloth	1.5	Glass fiber	$0.057 + 0.00023\theta$	1250	1450	550	25	20	500	0.05	○				
		Cloth H	2.0			1200	1000		25	20							
8250	SILTEX	Cloth 700	0.55	Low silica fiber	Comparative reference for thermal conductivity	3200	2500	700	10	15	500	0.07	○				
		Cloth 1000	0.6	High silica fiber		300	200		1000	4				3	438	0.54	×
		Cloth 1000S	0.8			700	590			1000				3			

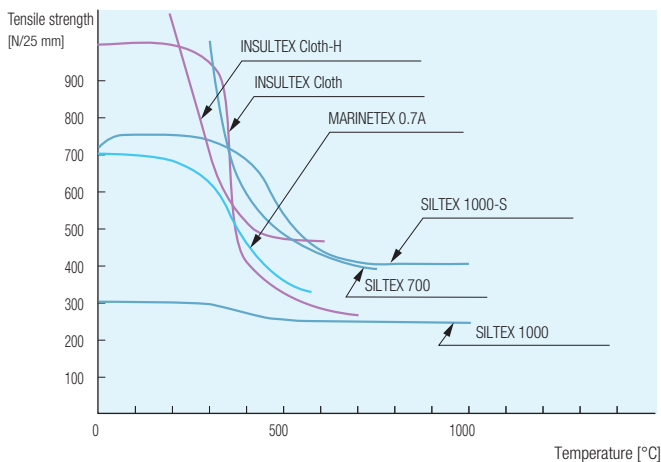
Note 1: These are reference values.

Note 2: These are our actual measurement values. They are not standard values.

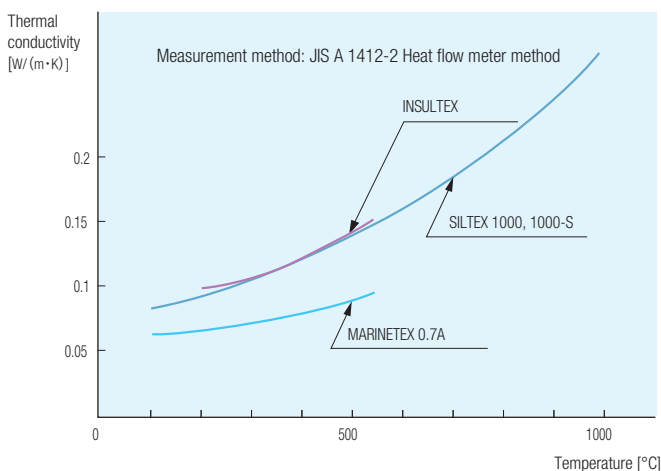
### ■ Abrasion resistance test method (JIS L 1096)



### ■ Comparison of heat resistance (reference values)



### ■ Comparison of thermal conductivity (reference values)



MARINETEX is a lagging cloth and tape for thermal insulation applications, made by weaving glass fiber with bulky yarn and subjecting it to repeated special treatment to eliminate the prickling sensation of the glass. It provides excellent thermal insulation and is flexible and stretchy, making it suitable for bonding and sewing. It can be easily installed even in the most complicated of places.



## Feature

- Its special treatment finish prevents seam slippage from occurring and the scattering of fibers is minimal.
- Unlike general glass cloth, this has flexibility.
- It absorbs paint well and gives a beautiful finish.
- It provides good adhesive properties and is ideal for sewing.
- It is completely incombustible.
- It offers excellent weather resistance.
- Its maximum working temperature is 550°C.
- MARINETEX Cloth, MARINETEX Tape, and MARINETEX Tube have passed the non-combustibility test based on the FTP Code.<sup>Note 1</sup>
- MARINETEX Cloth, MARINETEX Tape, and MARINETEX Tube are certified non-combustible products by DNV and Nippon Kaiji Kyokai (NK).

Note 1: Abbreviation of Fire Test Procedure Code

FTP Code: International Maritime Organization (IMO) "International Code for the Application of Fire Test Procedures (Marine Safety Committee Resolution MSC61 (67))" Part 1 "Non-combustibility test"

## Points to Keep in Mind for Installation

- The product can be easily cut with scissors.
- For bonding, adhesives other than those that have a strong alkaline base can be used.  
(We recommend Marine Bond KI for parts that have a low working temperature range (up to 250°C), and Marine Bond M for parts that have a high working temperature range (250 to 550°C).)
- Sewing can be done easily using glass fiber sewing thread.
- The paint finish delivers a fantastic appearance, whether brushed on or sprayed on.

\*Regular MARINETEX products change color slightly at 200 to 300°C due to special treatment.

## Precautions for handling glass filament products

### CAUTION

- Do not use a product for any other than the purpose described in the catalog and specification.
- Store products indoor at ordinary temperature and humidity, and strictly avoid to get wet.
- For disposal, follow local regulations.

Since this product contains continuous glass filament, please observe the following cautions.

Contact to continuous glass filament may cause itching and/or inflammation of skin, eyes, a throat or a nose.

- Wear respirator, protective goggles, protective gloves and work clothes with long sleeves.
- Wash hands with warm water and soap and rinse mouth every time after handling.
- Waste by cutting shall be put in a waste bag immediately in order to prevent from scattering of the dust.
- Wash the work clothes separately from other clothing.
- Get medical advice/attention, when an itch, a pain continue.

## MARINETEX™ Cloth

There are four types of MARINETEX Cloth with different thicknesses. You can select a type according to its place of use.

### Application

- Ship building or general thermal insulation material
- Heat shielding curtains ● packing ● Other



### Type & Dimensions

Type	Thickness [mm]	dimensions [mm] × roll [m]	Application
Cloth	0.2A	0.18	1050 × 100
	0.5 S	0.5	1000 × 50
	0.5A	0.5	1000 × 50
	0.7A	0.7	1000 × 50

### Performance

	Cloth			
	0.2A	0.5 S	0.5 A	0.7 A
Weave method	Plain weave	Twill	Twill	Twill
Thickness [mm]	0.18	0.5	0.5	0.7
Mass [g/m <sup>2</sup> ]	200	394	390	430
Coefficient [roll/25 mm]	Vertical	42	41	42
	Horizontal	32	29	30
Tensile strength [N/25 mm]	Vertical	200	1000	1300
	Horizontal	150	350	800
Ignition loss [625°C, 10 minutes or more] [%]	5.0 or less	2.0 or less	2.0 or less	2.0 or less

\*These are our actual measurement values. They are not standard values.

## MARINETEX™ Tape

This tape has the same performance as MARINETEX Cloth and can be used for places for which it is difficult to install insulation such as thin pipes and pipe elbows. Given that it is stretchy and has thermal insulation properties that conventional glass tape does not possess, it can provide excellent thermal insulation effects even when installed directly to pipes.

### Application

- Ship building or general burn protection ● For general thermal insulation ● For electrical insulation ● Other



### Type & Dimensions

Type	Thickness [mm]	Width [mm]	Length [m]
Tape	0.5A	0.5	50
	0.7A	0.7	
	2.5	2.5	30
Tube	2.5 T <sup>Note 1</sup>	2.5	50

Note 1: It is braided in a cylindrical shape. The width dimension is the size when the product is flattened.

### Performance

	Tape			Tube
	0.5A	0.7 A	2.5	2.5 T
Weave method	Twill	Twill	Plain weave	Braided
Thickness [mm]	0.5	0.7	2.5	2.5
Mass [g/m <sup>2</sup> ]	510 or more	460 or more	1200 or more	40 or more <sup>Note 1</sup>
Density [roll/25 mm]	Vertical	36	24	—
	Horizontal	25	18	10
Tensile strength [N/25 mm]	Vertical	1300	900	3000
Ignition loss [625°C, 10 minutes or more] [%]	3.0 or less	3.0 or less	3.0 or less	3.0 or less

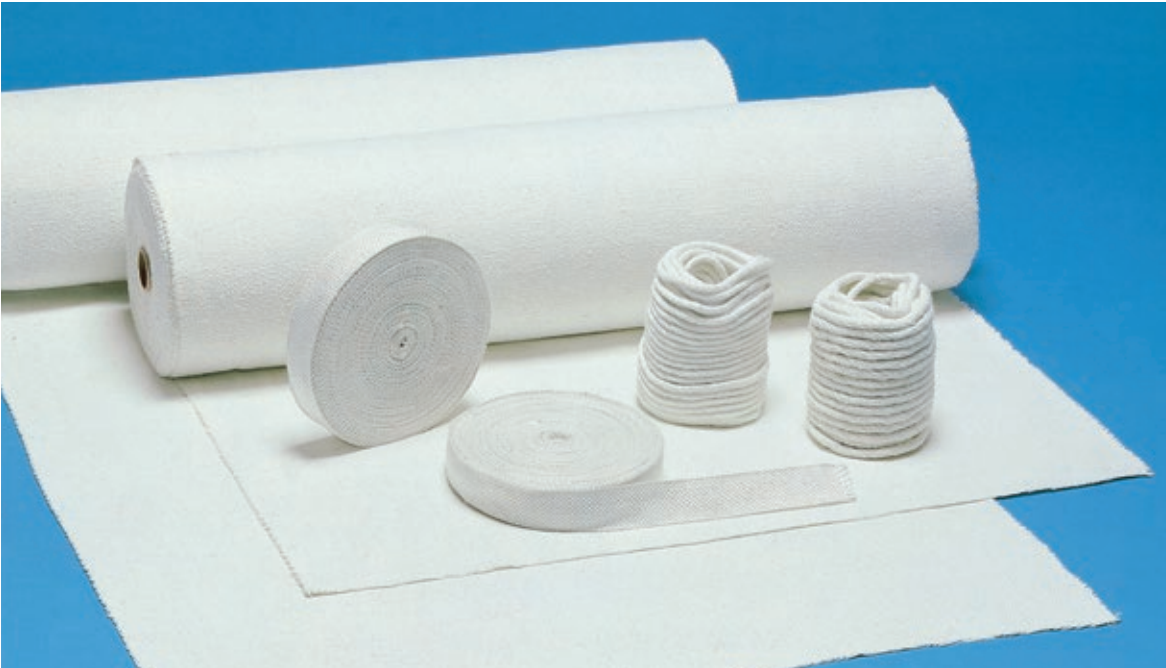
Note 1: For the tube, it is the mass of the original width.

\*These are our actual measurement values. They are not standard values.

## NU MARINETEX™

We have MARINETEX Cloth and Tape for nuclear power equipment and pipes that regulates and controls trace amounts of soluble halogen. For further details, please contact us.

Thick glass cloth and tape for thermal insulation, made by weaving bulky, treated glass yarn. A special heat treatment is applied to the product, and thus it has high strength and maintains its flexibility even at high temperatures unlike conventional glass cloth. It is suitable for applications that require a cloth that is thicker than our TOMBO No. 8200 MARINETEX.



## Feature

- It delivers excellent thermal insulation performance.
- Special heat resistance treatment enables it to keep its flexibility up to high temperatures.
- Its maximum working temperature is 550°C.
- It produces little discomfort typically associated with glass fiber.

## Application

- Thermal duvet covers
- Heat insulation lagging
- Thermal insulation materials
- Heat shielding curtains
- Packing
- Other

## Points to Keep in Mind for Installation

- The product can be easily cut with scissors.
- For bonding, adhesives other than those that have a strong alkaline base can be used.  
(We recommend Marine Bond KI for parts that have a low working temperature range (-250°C), and Marine Bond M for parts that have a high working temperature range (250 to 500°C).)
- Sewing can be done easily using glass fiber sewing thread.
- The paint finish delivers a fantastic appearance, whether brushed on or sprayed on.

\*Regular INSULTEX products change color slightly at 200 to 300°C due to special treatment, but there is no change to its performance whatsoever. If you are particularly concerned about this issue, please feel free to contact us.

## Precautions for handling glass filament products

### ⚠ CAUTION

- Do not use a product for any other than the purpose described in the catalog and specification.
- Store products indoor at ordinary temperature and humidity, and strictly avoid to get wet.
- For disposal, follow local regulations.

### Since this product contains continuous glass filament, please observe the following cautions.

Contact to continuous glass filament may cause itching and/or inflammation of skin, eyes, a throat or a nose.

- Wear respirator, protective goggles, protective gloves and work clothes with long sleeves.
- Wash hands with warm water and soap and rinse mouth every time after handling.
- Waste by cutting shall be put in a waste bag immediately in order to prevent from scattering of the dust.
- Wash the work clothes separately from other clothing.
- Get medical advice/attention, when an itch, a pain continue.



TOMBO™ No. 8400

## INSULTEX™ Cloth

INSULTEX Cloth is a thick glass cloth that retains great strength up to high temperatures, has excellent thermal insulation performance, and provides heat resistance.



### Type & Dimensions

Type	Thickness [mm]	Width [mm]	Length [m]	Remarks	
Cloth	—	1.5	1000	30	Regular product
	H	2.0			A cloth that is more flexible than INSULTEX Cloth and has excellent workability such as for sewing and cutting.
		3.0			
R	1.5	A lower cost version that has not undergone fraying prevention processing.			

### Performance

	Cloth				
	—	H		R	
Weave method	Plain weave	Plain weave		Plain weave	
Thickness [mm]	1.5	2.0	3.0	1.5	
Mass [g/m <sup>2</sup> ]	950	1010	2010	950	
Woven density [roll/100 mm]	Vertical	32	60	46	32
	Horizontal	28	25	16	25
Tensile strength [N/25 mm]	Vertical	1250	1200	2200	1250
	Horizontal	1450	1000	1350	1450
Ignition loss [%] 625°C, 10 minutes or more	5 or less	5 or less	5 or less	5 or less	
Sizing agent	Included	Included	Included	Not included	

\*These are our actual measurement values. They are not standard values.

TOMBO™ No. 8401

## INSULTEX™ Tape

INSULTEX Tape is a thick glass tape similar to the cloth version of the product. It can be easily installed on thin pipes and narrow spaces as a burning prevention material and thermal insulation material. It is thick and elastic, and therefore also exhibits excellent performance as a sealing material.



### Application

- Burning prevention
- Duct packing
- Damper sealing
- General thermal insulation
- Other

### Standard dimensions

	Width [mm]						
	25	38	50	65	75	100	
Thickness [mm]	1.5, 3.0						
Width [m]	30						
Mass [kg/roll]	Thickness 1.5	0.74	1.1	1.5	1.9	2.2	3.0
	Thickness 3.0	1.9	2.9	3.8	4.8	5.6	7.4

TOMBO™ No. 8402

## INSULTEX™ Yarn

It is a yarn made by twisting together several yarns used for INSULTEX Cloth. It is a soft and heat resistant bulky yarn.

### Application

- Packing for steam pipes and oil stove exhaust gas, etc.,
- Air conditioning duct packing
- Friction materials
- Thermal insulation materials for pipes, and raw materials for various products.

### Standard dimensions

	Nominal thickness [mm]								
	3.2	4.8	6.4	9.6	12.7	15.9	19.1	22.2	25.4
Length [m]	164	89	47	22	30				
Mass [kg/roll]	1.0				2.6	4.4	5.8	8.1	10.9

TOMBO™ No. 8403

## INSULTEX™ Tube

It is a yarn similar to the cloth version and is braided into a cylindrical shape with a braiding machine. It is a glass fiber tube that is flexible, stretchy, and provides excellent thermal insulation performance.

### Application

- Heat-resistant coating of electric wires
- Thermal insulation of automobile fuel pipes and cables
- Annealing coating
- Various thermal insulation materials
- Packing

### Standard dimensions

\*Please contact us for other available dimensions.

Nominal dimensions [mm] Thickness × inside diameter × outside diameter	Length [m/roll]	Nominal dimensions [mm] Thickness × inside diameter × outside diameter	Length [m/roll]	Nominal dimensions [mm] Thickness × inside diameter × outside diameter	Length [m/roll]
6 × 10 × 2	30	16 × 20 × 2	30	30 × 35 × 2.5	30
8 × 12 × 2		18 × 22 × 2		35 × 40 × 2.5	
10 × 14 × 2		20 × 24 × 2		40 × 45 × 2.5	
12 × 16 × 2		25 × 29 × 2		45 × 50 × 2.5	
14 × 18 × 2				50 × 55 × 2.5	
		55 × 60 × 2.5			

# Aluminized Cloth

TOMBO™ No. 8982

Aluminized Cloth is made by bonding an aluminum foil or aluminum metalized film to various base material cloths.



## Feature

- Perfect for parts that require radiant heat insulation, oil tightness, and water tightness.

## Application

- Covering of equipment used in places with radiant heat such as near a fire or high temperature furnace.
- Insulation covering for pipes and ducts.

## Points to Keep in Mind for Installation

- The product can be easily cut with scissors.
- Sewing can be done easily using a variety of sewing threads.

## Type & Dimensions

Type	Thickness [mm]	Width [mm]	Length [m]	Base material cloth	Remark
100 - M	0.5	1000	50	MARINETEX Cloth	Cloth made by thermal bonding aluminum foil with heat-sealing film on base material cloth
	0.7	1000	50		
100 - I	1.4	1000	30	INSULTEX Cloth	
200 - M	0.5	930	50	MARINETEX Cloth	Cloth made by adhesive bonding with Aluminum metalized film on base material cloth
	0.7	920	50		
200 - I	1.4	970	30	INSULTEX Cloth	

## Performance

	Aluminized Cloth						
	100 - M	100 - I	200 - M	200 - I			
Weave method	Twill		Plain weave	Twill		Plain weave	
Thickness [mm]	0.5	0.7	1.4	0.5	0.7	1.4	
Mass [kg/m <sup>2</sup> ]	0.43	0.47	1.02	0.43	0.47	1.07	
Woven density [N/25 mm]	Vertical	40	26	8	40	26	8
	Horizontal	28	18	6	28	18	6
Tensile strength [N/mm]	Vertical	980	980	980	980	980	980
	Horizontal	784	784	588	784	784	588

\*These are our actual measurement values. They are not standard values.

Due to the high purity of the SiO<sub>2</sub> fiber, there is little deterioration in the silica cloth even when used at high temperatures, making it particularly suitable for applications requiring heat resistance, acid resistance, and electrical insulation.



## Feature

- It offers excellent heat resistance.
- It offers excellent thermal shock resistance.
- It offers excellent workability.
- It offers excellent flexibility.
- It is chemically stable.
- It offers excellent thermal insulation properties.

## Points to Keep in Mind for Installation

- The product can be easily cut with scissors.
- Sewing can be done easily using silica fiber sewing thread.

## Application

### ● For high temperature thermal insulation

Furnace curtains, fireproof curtains, lagging thermal insulation materials for annealing

- Thermal insulation duvet covers made in combination with alkaline earth silicate wool

**SILTEX Cloth 1000 or 1000-S**

- Thermal insulation duvet covers made in combination with rock wool

**SILTEX Cloth 700**

### ● Lagging for sound-absorption materials

Surface coating material of fibrous sound-absorption materials for sound absorption of exhaust ducts such as gas turbines, automobile exhaust pipes, boilers, etc.

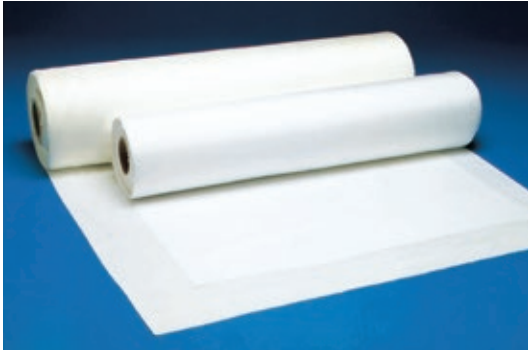
### ● For high temperature filtration materials

For excessive dust removal of high temperature gas air.

### ● Other

For protection from welding sparks in areas where acid resistance is required.

## SILTEX™ Cloth



### Type & Dimensions

Type	Thickness [mm]	Width [mm]	Length [m]
Cloth	700	0.55	1000
	1000	0.6	850
	1000S	0.8	1000
	1000M	0.65	810

### Performance

	Cloth			
	700	1000	1000S	1000M
Weave method	Twill	Twill	Sateen weave	Sateen weave
Thickness [mm]	0.55	0.6	0.8	0.65
Mass [g/m <sup>2</sup> ]	550	500	650	600
Density [roll/25 mm]	Vertical	30	38	46
	Horizontal	22	28	39
Tensile strength <sup>Note 1</sup> [N/25 mm]	Vertical	3200	300	700
	Horizontal	2500	200	590
Heat shrinkage rate [%]	5 or less <sup>Note 2</sup>	5 or less <sup>Note 3</sup>	10 or less <sup>Note 3</sup>	5 or less <sup>Note 3</sup>
SiO <sub>2</sub> amount <sup>Note 1</sup> [%]	60	99	99	99
Sizing agent	Included	Included	Included	Not included

Note 1: These are our actual measurement values. They are not standard values.

Note 2: Shrinkage after heating at 700°C for 1 hour.

Note 3: Shrinkage after heating at 1000°C for 1 hour.

### SILTEX Cloth 700

SilTEX Cloth 700 is a cloth made of silica fiber with a silica content of about 60%, and can withstand high temperatures up to 700°C. High in strength, it is an economical silica cloth ideal for combining with rock wool.

### SILTEX Cloth 1000

SILTEX Cloth 1000 is a cloth made of silica fiber with a silica content of at least 96%, and can withstand temperatures up to 1000°C. As it undergoes high temperature treatment, it hardly shrinks at high temperatures, making it the ideal silica cloth for use at extremely severe high temperatures.

### SILTEX Cloth 1000-S

SILTEX Cloth 1000-S is a significantly stronger version of SilTEX Cloth 1000, and maintains great strength even at high temperatures. Withstanding working temperatures up to 1000°C, it is the ideal silica cloth for use in extremely severe high temperatures.

The surface of cloth, which is made of silica fiber with a silica content of at least 96%, is treated with polytetrafluoroethylene (PTFE).



If PTFE is exposed to high temperatures (260°C or higher) during initial heating, harmful fine particles, fumes, and gases will be produced. Provide sufficient ventilation as a countermeasure to this.

### SILTEX Cloth 1000-M

SILTEX Cloth 1000-M is a silica cloth made of silica fiber with a silica content of at least 96%, and can withstand temperatures up to 1000°C.

## SILTEX™ Tape

SilTEX Tape is a silica tape in which the fibers, which are of the same material as SilTEX Cloth 1000 with a silica content of at least 96%, are woven into a tape form. It can be used for temperatures up to 1000°C.



### Dimensions

Thickness [mm]	Width [mm]	Length [m]
0.4	50	50
	100	

### Performance

		Tape
Weave method		Twill
Mass [g/m (50 mm width conversion)]		18
Density [roll/25 mm]	Vertical	36
	Horizontal	26
Tensile strength <sup>Note 1</sup> [N/25 mm]	Vertical	100
Heat shrinkage rate [%]		7 or less
SiO <sub>2</sub> amount <sup>Note 1</sup> [%]		99

Note 1: These are our actual measurement values. They are not standard values.

## SILTEX™ Cord

SILTEX Cord is a sewing thread mainly used for sewing SILTEX Cloth and Tape. The surface of the silica cord with a silica content of at least 96% is treated with fluororesin so as to be suitable for sewing.

**!** If PTFE is exposed to high temperatures (260°C or higher) during initial heating, harmful fine particles, fumes, and gases will be produced. Provide sufficient ventilation as a countermeasure to this.

### Dimensions

Thickness [mm]	Length [m/roll]	Mass [g/roll]
0.9	600	480

### Performance

		Cord
Mass	[g/m]	0.8
Heat shrinkage rate [%]	1000°C, 60 minutes or more	2.8
Tensile strength	<sup>Note 1</sup> [N/roll]	196
SiO <sub>2</sub> amount	<sup>Note 1</sup> [%]	99

Note 1: These are our actual measurement values. They are not standard values.

## SILTEX™ Sleeve

SILTEX Sleeve is a sleeve made by braiding silica yarn made from the same material as SILTEX Tape 1000 with a silica content of at least 96% into a cylindrical form with a braiding machine. It can withstand temperatures up to 1000°C.

It is flexible, offers excellent thermal insulation performance, and is ideal for wear resistance and fire protection of wires and cables.



### Application

- High temperature wiring covers, duct exhaust covers, high temperature sealing materials

### Performance & Dimensions

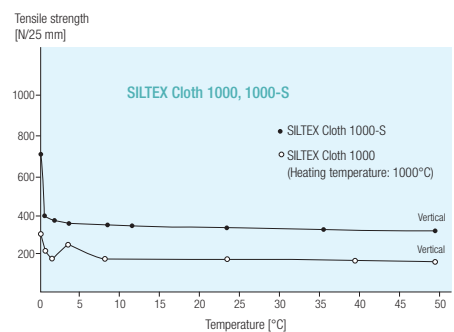
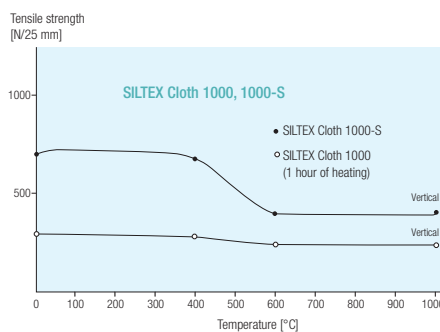
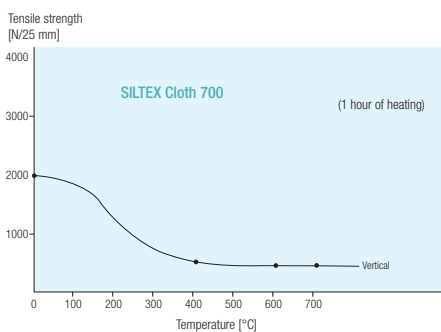
		Sleeve	
Standard inside diameter	[φmm]	8	20
Length	[m]	30	30
Standard mass	[g/m]	20	31
Tensile strength	<sup>Note 1</sup> Normal state [N/roll]	300	300
	<sup>Note 2</sup> After heating [N/roll]	90	90

Note 1: These are our actual measurement values. They are not standard values.

Note 2: Tensile strength after heating and cooling at 1000°C for 30 minutes.

## Characteristics of SILTEX™ Changes in tensile strength and temperature over time for Siltex Cloth 700 and Siltex Cloth 1000, 1000-S

\*The values above are our actual measurement values. They are not standard values.



# FINEFLEX BIO™

(textile product made of alkaline earth silicate wool)

FINEFLEX BIO textile products are cloths, tapes, cords, and ropes manufactured by mixing a small number of organic fibers with alkaline earth silicate wool and using the same method as general textile products. This organic fiber burns out in the early stages of temperature rising, causing discoloration and slight smoke generation, but this does not affect its performance as an alkaline earth silicate wool.



## Feature

- The base material is alkaline earth silicate (AES) wool, which has excellent heat resistance. Silica, magnesia, and calcia are the main components of this product.
- It delivers excellent thermal insulation performance.
- It offers excellent workability.

## Application

- Furnace heating zone separators and curtains
- Burning surface of infrared heating zone
- Cushioning material for high temperature parts
- Thermal insulation of grooves and gaps
- Expansion allowance filler within a furnace

\*FINEFLEX BIO textile products are colored green to distinguish them from refractory ceramic fiber (RCF) textile products. Only FINEFLEX BIO Braided Rope is not colored green and uses green thread as part of splicing thread.



## Precautions for handling products

### CAUTION

Please observe the following cautions in order to maintain the intrinsic functions of the products and also to ensure that these products are used safely.

- Do not use a product for any other purpose than the ones described in the catalog and specification, etc.
- Store products indoor at ambient temperature and humidity, and strictly avoid to get wet.
- Check the precautions for occupational health with the SDS.

Since this product contains alkaline earth silicate wool, please observe the following cautions.

Contents	<ul style="list-style-type: none"> <li>• Inhalation of a large amount of alkaline earth silicate wool dust for a long period of time may cause damage to respiratory systems.</li> <li>• Contact to alkaline earth silicate wool fiber may cause itching and/or inflammation of skin.</li> </ul>	
Measures to avoid	 	<ul style="list-style-type: none"> <li>• Wear respirator for handling.</li> <li>• Wear work clothing with long sleeves and protective gloves as well.</li> </ul>
Others	<ul style="list-style-type: none"> <li>• There are products containing organic binder. Hazardous gas may be generated temporarily due to organic binder contained. Use ventilation system during the initial heating-up process.</li> <li>• For disposal, follow local regulations.</li> </ul>	

AE2008A\_E

TOMBO™ No. 5685 - A

## FINEFLEX BIO™ Cloth

It is a product in which alkaline earth silicate wool is woven into a thick cloth.

Thickness [mm]	Width [mm]	Length [m]
2	1000	30



TOMBO™ No. 5685 - B

## FINEFLEX BIO™ Tape

It is a product in which alkaline earth silicate wool is woven into a thick tape.

Thickness [mm]	Width [mm]	Length [m]
2	25, 38, 50, 65, 75, 100	30



TOMBO™ No. 5685 - C

## FINEFLEX BIO™ Cord

It is a product in which multiple alkaline earth silicate wool yarns are twisted strongly.

Thickness [mm]	3.2	4.8
Packaging & packing method	1 kg/polyethylene bag	



TOMBO™ No. 5685 - D

## FINEFLEX BIO™ Twisted Rope

It is a rope-shaped product made by twisting together roving formed by twisting together the yarn of alkaline earth silicate wool.

Thickness [mm]	6.4	9.6	12.7	15.9	19.1	22.0	25.4	
Length [m]	30							



TOMBO™ No. 5685 - E

## FINEFLEX BIO™ Braided Rope

This is a rope-shaped product of which the core is made of alkaline earth silicate wool bulk fiber and the surface is roughly braided with a coating material.

Thickness [mm]	15	20	25	30	35	40	50	60	80	100	120
Length [m]	30								20	10	5



### Quality characteristics

	Cloth		Type	Cord	Twisted Rope	Braided Rope	
	5685-A-F	5685-A-S	5685-B	5685-C	5685-D	5685-E-S	5685-E-G
Reinforcement wire / covering material	Iron chrome wire	SUS wire	SUS wire	Iron chrome wire	Glass yarn	SUS wire	Glass yarn
Maximum heat resistant temperature of reinforcement wire / covering material <sup>Note 1</sup> [°C]	1100	800	800	1100	550	800	550
Mass [kg/m <sup>2</sup> ]	1.07	1.15	Depends on width and thickness				
Tensile strength [N/25mm]	Vertical	719	846	—	—	—	—
	Horizontal	461	525	—	—	—	—
Ignition loss [%]	12	14	11	11	14	—	—

Note 1: For applications where handling and shape retention after heating are not required, the product can be used at higher temperatures than this.

\*The values above are our actual measurement values. They are not standard values.



Cloths, tapes, cords, and twisted ropes contain organic matter, and therefore smoke may be generated initially when heating. Be careful not to work in an enclosed space. We also offer a range of calcinated cloths and tapes.

RUBILON is an alumina continuous fiber developed with our unique technology. It has regular heat resistance of 1400°C, excellent strength and flexibility in the ultra-high temperature range, no hygroscopicity (absorbance of moisture), and high tensile modulus of elasticity.

## Feature

- It offers excellent heat resistance and excellent strength and flexibility even after heating.
- High strength and high elastic modulus.
- It is not hygroscopic.
- It provides electrical insulation resistance.
- It offers excellent wind speed resistance under high temperatures.

## Application

- Duvet cover
- Curtain for industrial furnaces
- Surface coating of fiber lining
- Tube penetration sealing
- High temperature filters
- Insulators (heat resistant wires, etc.)
- Manhole packing for high temperature applications
- FRM reinforcement fiber

## Fiber characteristics

\*The values above are our actual measurement values. They are not standard values.

Physical characteristics		
Chemical components [%]	Al <sub>2</sub> O <sub>3</sub>	68
	SiO <sub>2</sub>	27
	B <sub>2</sub> O <sub>3</sub>	5
Color	Colorless and transparent	
Form	Continuous fiber	
Density [g/cm <sup>3</sup> ]	3.0	
Fiber diameter [μm]	11	

Mechanical characteristics		
Tensile strength [GPa]	1.8	
Normal state (after heating at 1400°C for 12 hours)	0.8	
Tensile modulus of elasticity [GPa]	196	
Elongation [%]	0.8	

Temperature characteristics	
Maximum working temperature [°C]	1400
Melting point [°C]	1800
Heat shrinkage rate [%] (after heating at 1400°C for 12 hours)	Max 1
Coefficient of linear expansion (at 25 to 300°C)	4.14 × 10 <sup>-6</sup>



## Precautions for handling products

Please observe the following cautions in order to maintain the intrinsic functions of the products and also to ensure that these products are used safely.

1. Do not use a product for any other purpose than the ones described in the catalog and specification, etc.
2. Store products indoor at ambient temperature and humidity, and strictly avoid to get wet.
3. Check the precautions for occupational health with the SDS.

Since this product contains alumina fiber, please observe the following cautions.

Caution	
Contents	① Inhalation of a large amount of alkaline earth silicate wool dust for a long period of time may cause damage to respiratory systems. ② Contact to alkaline earth silicate wool fiber may cause itching and/or inflammation of skin.
Measures to avoid	① Wear respirator for handling. ② Wear work clothing with long sleeves and protective gloves as well.
Others	① There are products containing organic binder. Hazardous gas may be generated temporarily due to organic binder contained. Use ventilation system during the initial heating-up process. ② For disposal, follow local regulations.

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TOMBO™ No. 8350

## RUBILON™ Cloth **K**

Model number	Weave method	Width [mm]	Thickness [mm]	Mass [g/m <sup>2</sup> ]	Number of threads (roll/25 mm)		Length [m/roll]
					Warp (vertical threads)	Woof (crosswise threads)	
CP20	Plain weave	1000	0.23	180	18	18	15
CS40	Sateen weave	1000	0.40	360	20	19	15
CS70	Sateen weave	1000	0.70	650	18	16	15

\*The values above are our actual measurement values. They are not standard values.

TOMBO™ No. 8350

## RUBILON™ Tape **K**

Model number	Weave method	Width [mm]	Thickness [mm]	Mass [g/m]	Length [m/roll]
T25	Twill	25	0.4	9.7	30
T50	Twill	50	0.4	18.6	30

\*The values above are our actual measurement values. They are not standard values.

TOMBO™ No. 8350

## RUBILON™ Sleeve **K**

Model number	Nominal inner diameter [mm]	Adaptive inner diameter [mm]	Weight [g/m]	Length [m/roll]
S03	3	2 to 4	5	25
S06	6	4 to 7	20	25
S15	15	10 to 20	30	25
S25	25	20 to 30	50	10
S38	38	30 to 40	80	10
S60	60	50 to 70	160	10

\*The values above are our actual measurement values. They are not standard values.

The products marked **K** may fall under controlled goods defined by "Foreign Exchange and Foreign Trade Act". If so, export admission according to the act above is required for exporting such a product.



# Welding spark protection cloth

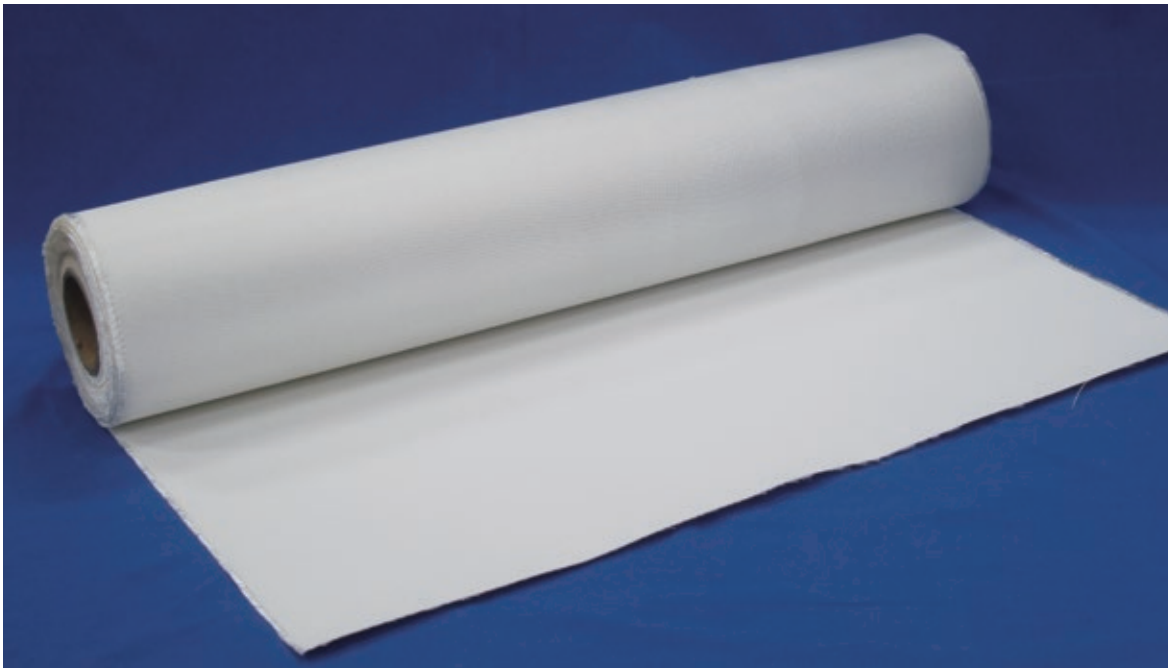


Fire-Proof Cloth

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# Fire-Proof Cloth

Shipyards and construction sites are constantly exposed to the risk of fires due to spatter and slag produced during welding and cutting. There may also be cases where expensive and vital equipment such as computers could be damaged. Our Fire-Proof Cloth is a dedicated spark-protection cloth developed to withstand such severe conditions.



## Feature

- It offers excellent resistance to molten metal.
- Light weight and flexible.
- It offers excellent workability.

\*We also offer custom designed sewed products. Please consult us if you have particular specifications in mind.

## Application

- Prevents the scattering of welding sparks
- Prevents the scattering of slag when cutting
- Equipment protection and covering

 Be aware that the slag may penetrate through the cloth depending on the size of the slag at the time of cutting.

## Dimensions

Type	Thickness [mm]	Width [mm]	Length [m]
Fire-Proof Cloth	S	0.65	810
	SW	0.70	810

TOMBO™ No. 8300 - S

## Fire-Proof Cloth-S

A thin cloth made solely of inorganic fiber. There is no need to worry about combustion thanks to the excellent heat resistance of the product's inorganic fiber. It prevents slag and spatter with almost no smoke or odor.

TOMBO™ No. 8300 - SW

## Fire-Proof Cloth-SW

With a special resin treatment that prevents slag and spatter from adhering, it is a further improved version of Fire-Proof Cloth-S. It relieves the irritation of the skin unique to the inorganic fiber of Fire-Proof Cloth-S.

## Performance

		Fire-Proof Cloth	
		S	SW
Mass	[g/m <sup>2</sup> ]	625	670
Density [roll/25 mm]	Vertical	54	54
	Horizontal	40	40
Tensile strength [N/25 mm]	Vertical	403	1519
	Horizontal	377	372

\*These are our actual measurement values. They are not standard values.

## Flame retardant testing method for spark droplets of welding and gas cutting on fabric sheets in construction works (JIS A 1323)

The JIS A 1323 class A test results are shown in the following table.

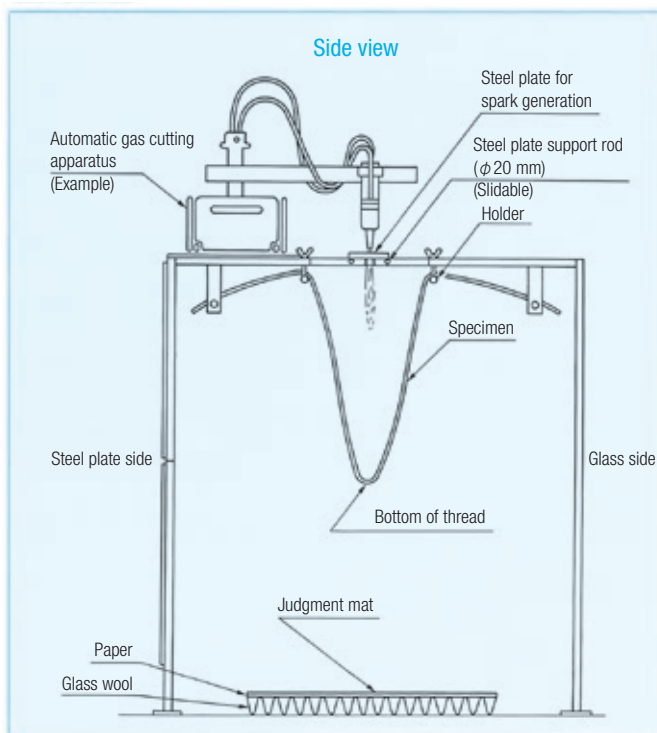
TOMBO™ No.	Product name	Certificate number	Test surface	Presence of smoke from the test specimen <sup>Note 1</sup>			Presence of through holes that are harmful in terms of fire protection flames		
				Specimen No.1	Specimen No.2	Specimen No.3	Specimen No.1	Specimen No.2	Specimen No.3
8300 - S	Fire-Proof Cloth-S	No. 11A4570	—	Not included	Not included	Not included	Not included	Not included	Not included
8300 - SW	Fire-Proof Cloth-SW	No. 13A4638	Cloth	Not included	Not included	Not included	Not included	Not included	Not included
			Resin	Not included	Not included	Not included	Not included	Not included	Not included

Note 1: From the QR code below, you can check the video of the in-house test performed under the same conditions as JIS A 1323 Class A.

### Type

Type	Flame retardant properties
Class A	When a 9 mm-thick steel plate for spark generation is cut, there must be no through holes that are harmful in terms of flame ignition and fire protection from sparks.
Class B	When a 4.5 mm-thick steel plate for spark generation is cut, there must be no through holes that are harmful in terms of flame ignition and fire protection from sparks.
Class C	When a 3.2mm-thick steel plate for spark generation is cut, there must be no through holes that are harmful in terms of flame ignition and fire protection from sparks.

### Testing equipment





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### Czech

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- Because the stated material values may vary according to actual usage environments or circumstances, please consider such figures as indications for reference.
- The content of the catalog explains the features of the products when they are used alone. When actually using the products, please start using them after testing them under the actual usage environment.
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