TOMBO™ BRAND

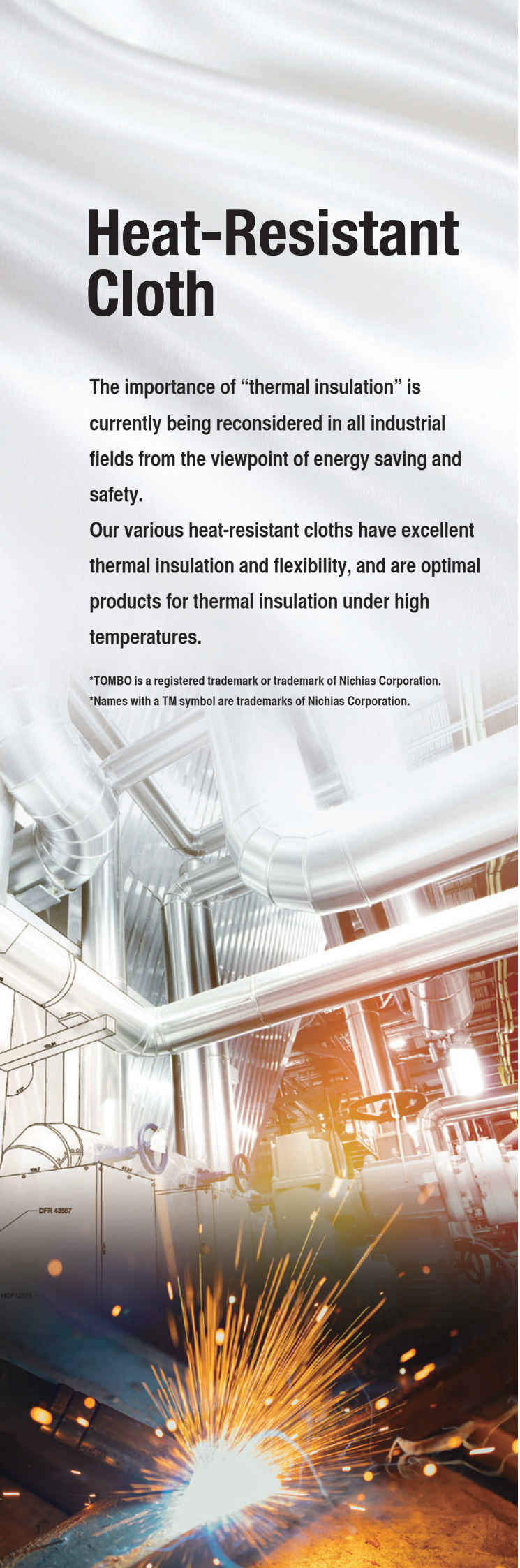
Jan. 2023

Heat-Resistant Cloth

NICHIAS

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.



Lagging thermal insulation cloth

Maximum working temperature Note 1	Composition	TOMBO™ No.
550 °C	Glass fiber	8200
550 °C	Glass fiber	8400
550 °C Note 2	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 Note 3	Alkaline earth silicate wool	5685
1100 °C Note 3		
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)	

*Check the precautions for occupational health using the SDS (safety data sheet).

Product name [Classification name]	Feature	Application	Page No.
MARINETEX™ Cloth 0.5S	Thin glass fiber cloth	●For lagging applications ●For thermal insulation duvet covers	P.6
MARINETEX™ Cloth 0.5A	Thin glass cloth made with ultra-fine, bulky glass fibers	●For lagging applications ●For thermal insulation duvet covers	
MARINETEX™ Cloth 0.2A	A glass cloth moderately thicker than 0.5S	●For lagging applications ●For thermal insulation duvet covers	
MARINETEX™ Cloth 0.7A	A glass cloth moderately thicker than 0.5A	●For thermal insulation duvet covers ●For lagging applications	
INSULTEX™ Cloth	Thick glass cloth made with bulky glass fibers	●For lagging, For thermal insulation duvet covers, burn protection, heat shielding curtains, annealing	P.8
INSULTEX™ Cloth-H	Thick glass cloth made with twisted bulky glass fibers	●Thermal insulation duvet covers, annealing, packing	
Aluminized Cloth 100-M, 100-I	Glass cloth made by thermal bonding aluminum foil with heat-sealing film	●Covering of parts where radiant heat is intense, Thermal insulation covering	P.9
Aluminized Cloth 200-M, 200-I	Glass cloth made by adhesive bonding with aluminum metalized film		
Silica Cloth 700	A silica cloth with improved heat resistance by moderate silica treatment of glass cloth	●For high temperature thermal insulation, protection for sound-absorption materials	P.11
Silica Cloth 1000, 1000M	A silica cloth with a silica content of at least 96% and withstands high temperatures up to 1000°C	●For high temperature thermal insulation, rock wool duvet covers, protection for sound-absorption materials	
Silica Cloth 1000S	An improved version of Silica Cloth 1000, with PTFE treatment on the surface of the cloth	●For high temperature thermal insulation, For alkaline earth silicate wool duvet covers, Protection for sound-absorption materials	
FINEFLEX BIO™ Cloth-S	A reinforcement fiber cloth with high heat resistant alkaline earth silicate wool as its raw fiber	●For high temperature thermal insulation, Heat shielding curtains, For annealing	P.13
FINEFLEX BIO™ Cloth-F	A reinforcement fiber cloth with high heat resistant alkaline earth silicate wool as its raw fiber	●Separator for heating furnace of high temperature thermal insulation furnace ●Covering materials for high temperature parts	
RUBILON™ Cloth	A high heat resistant cloth of which the maximum continuous working temperature is 1400°C	●Industrial furnace curtains, Fiber lining surface coverings, Sealing of parts that penetrate through the walls of high temperature furnaces	P.16

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	●Offers excellent resistance to molten metal. ●Light weight and flexible. ●As it is a cloth without a resin coat, sparks and slag easily cling to it, giving it excellent scattering prevention properties.	●Protection and covering of equipment and devices from sparks and slag generated during welding and cutting.	P.18
Fire-Proof Cloth-SW	●Offers excellent resistance to molten metal. ●Light weight and flexible. ●The resin-coat-free surface allows sparks and slag to cling to it easily, making it suitable for preventing scattering. ●The resin-coated surface allows sparks and slag to easily bounce off. ●The resin coated surface can be affixed or bonded together with tape.		

Lagging thermal insulation cloth

MARINETEX™

INSULTEX™

Aluminized Cloth

Silica textile

FINEFLEX BIO™

RUBILON™

Comparison of Overall Physical Properties

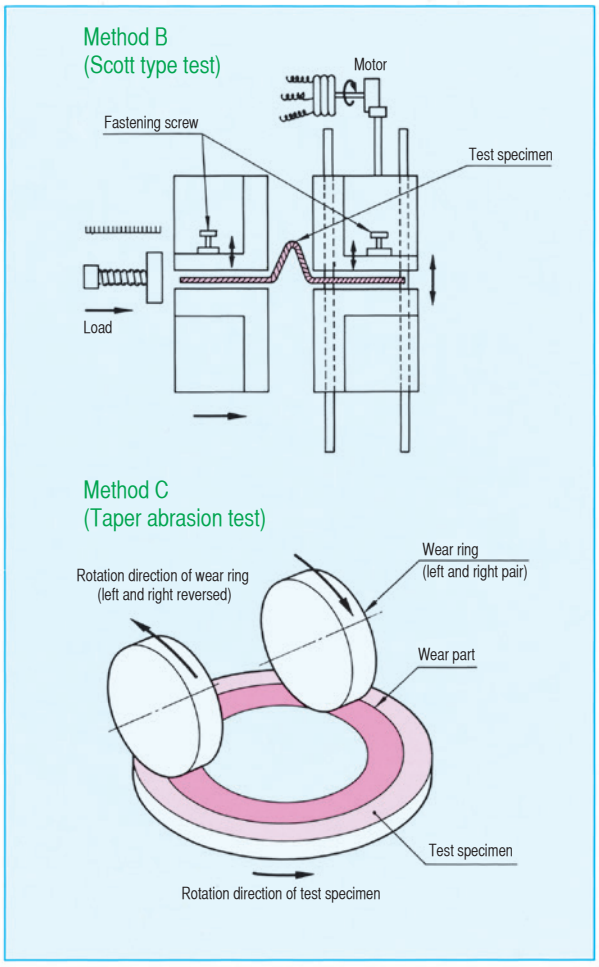
TOMBO No.	Product name		Thick-ness [mm]	Composition	Thermal conductivity Note 1 (λ) [W/(m·K)]	Tensile strength Note 1 [N/25 mm]		Maximum working temperature Note 3 [°C]	Wear resistance Note 2				
									JIS L 1096 Method B			JIS L 1096 Method C	
						Vertical	Horizontal		Vertical direction [No. of 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 + 0.00009θ (ρ = 0.50g/cm²)	1300	800	550	7	10	500	0.03	○
		Cloth 0.7A	0.7			700	490	550	22	22	500	0.15	○
8400	INSULTEX	Cloth	1.5	Glass fiber	0.057 + 0.00023θ	1250	1450	550	25	20	500	0.05	○
		Cloth H	2.0			1200	1000	550	25	20	500	0.09	○
8250	Silica	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	2	419	1.01	×

Note 1: These are reference values.

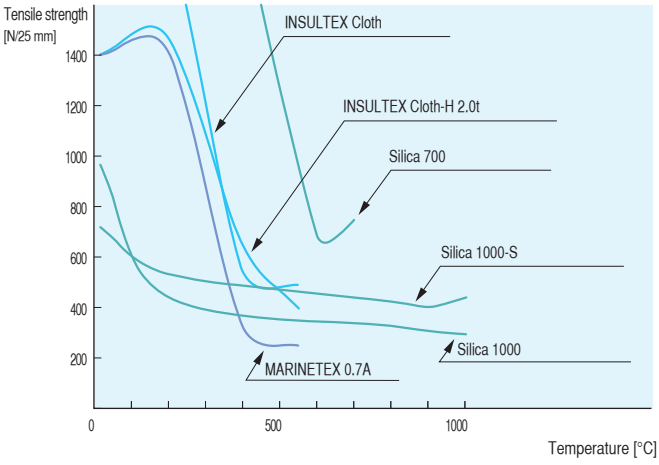
Note 2: These are our actual measurement values. They are not standard values.

Note 3: 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.

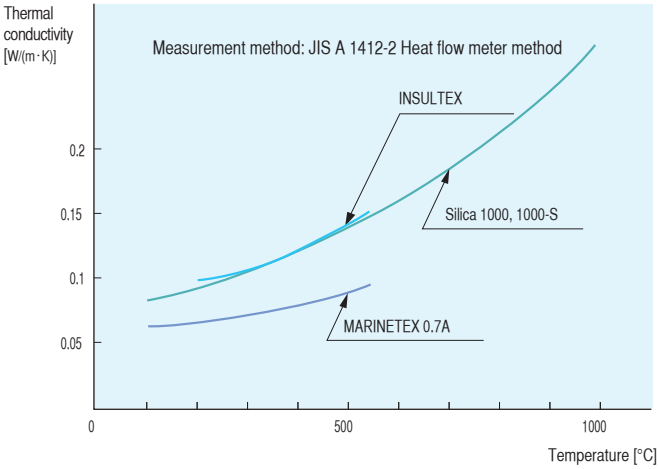
Abrasion resistance test method (JIS L 1096)



Comparison of heat resistance (reference values)



Comparison of thermal conductivity (reference values)



Lagging thermal insulation cloth

MARINETEX™

(textile product made of thin glass fiber)

Maximum working temperature: 550°C

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. Note 1
- MARINETEX Cloth, MARINETEX Tape, and MARINETEX Tube are certified non-combustible products by 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.
- 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 continuas 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.

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TOMBO™ No. 8200

MARINETEX™ Cloth

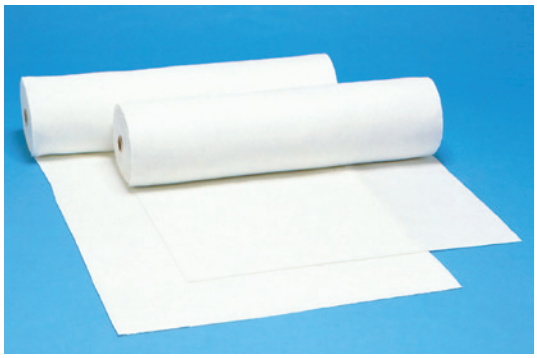
There are four types of MARINETEX Cloth with different thicknesses. You can select a type according to its place of use.

Type & Dimensions

Type		Thickness [mm]	dimensions [mm] × roll [m]			Application
Cloth	0.2 A	0.18	1050	×	100	For lagging applications For thermal insulation duvet covers
	0.5 S	0.5	1000	×	50	
	0.5 A	0.5	1000	×	50	
	0.7 A	0.7	1000	×	50	

Application

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



Performance

		Cloth			
		0.2 A	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/m²]	200	394	390	430
Coefficient [roll/25 mm]	Vertical	42	41	42	28
	Horizontal	32	29	30	20
Tensile strength [N/25 mm]	Vertical	200	1000	1300	700
	Horizontal	150	350	800	490
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.

TOMBO™ No. 8200

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.

Type & Dimensions

Type		Thickness [mm]	Width [mm]	Length [m]
Tape	0.5 A	0.5	50 100	50
	0.7 A	0.7		
	2.5	2.5		30
Tube	2.5 T Note1	2.5	50	50

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

Application

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

Performance

		Tape			Tube
		0.5 A	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/m²]	510 or more	460 or more	1200 or more	40 or more Note 1
Density [roll/25 mm]	Vertical	36	24	22	—
	Horizontal	25	18	10	—
Tensile strength [N/25 mm]	Vertical	1300	900	3000	4000 or more
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.

TOMBO™ No. NU8200

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.

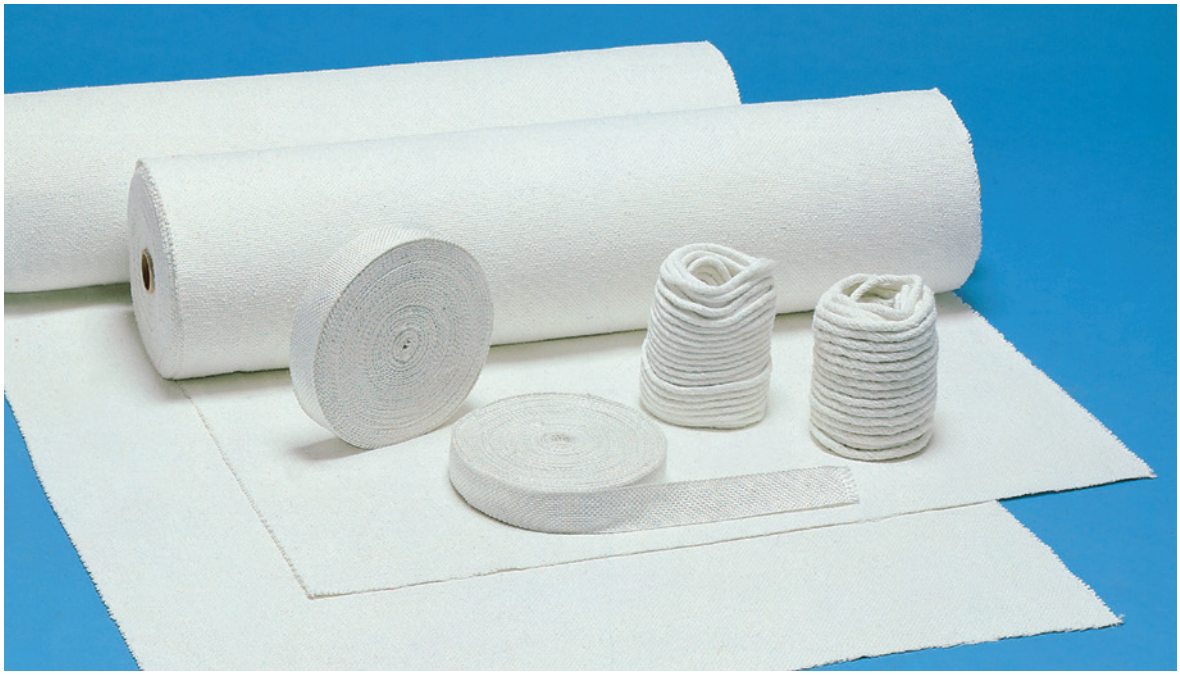
Lagging thermal insulation cloth

INSULTEX™

(textile product made of thick glass fiber)

Maximum working temperature: 550°C

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.
- 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 continuas 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.

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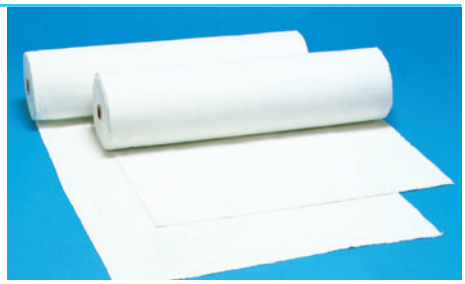
TOMBO™ No. 8400

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/m²]	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.

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

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.

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.

Standard dimensions

*Please contact us for other available dimensions.

Nominal dimensions [mm] Thickness × inside diameter × outside diameter	Length [m/roll]
6 × 10 × 2	30
8 × 12 × 2	
10 × 14 × 2	
12 × 16 × 2	
14 × 18 × 2	

Nominal dimensions [mm] Thickness × inside diameter × outside diameter	Length [m/roll]
16 × 20 × 2	30
18 × 22 × 2	
20 × 24 × 2	
25 × 29 × 2	

Nominal dimensions [mm] Thickness × inside diameter × outside diameter	Length [m/roll]
30 × 35 × 2.5	30
35 × 40 × 2.5	
40 × 45 × 2.5	
45 × 50 × 2.5	
50 × 55 × 2.5	
55 × 60 × 2.5	

Application

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

Lagging thermal insulation cloth

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/m²]	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.

Lagging thermal insulation cloth

Silica textile

Maximum working temperature: 700°C [Cloth 700] / Maximum working temperature: 1000°C [Cloth 1000]

Due to the high purity of the SiO_2 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.

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

Silica Cloth 1000 or 1000-S

•Thermal insulation duvet covers made in combination with rock wool

Silica 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.

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.

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 continuas 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.

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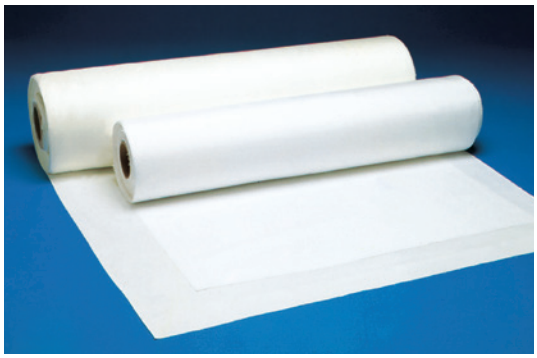
TOMBO™ No. 8250

Silica Cloth



Type & Dimensions

Type		Thickness [mm]	Width [mm]	Length [m]
Cloth	700	0.55	1000	50
	1000	0.6	850	25
	1000S	0.8	1000	25
	1000M	0.65	810	25

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/m²]	550	500	650	600
Density [roll/25 mm]	Vertical	30	38	46	52
	Horizontal	22	28	39	40
Tensile strength Note 1 [N/25 mm]	Vertical	3200	300	700	390
	Horizontal	2500	200	590	190
Heat shrinkage rate	[%]	5 or less Note 2	5 or less Note 3	10 or less Note 3	5 or less Note 3
SiO_2 amount Note 1	[%]	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.

Silica Cloth 700

Silica 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.

Silica Cloth 1000

Silica 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.

Silica Cloth 1000-S

Silica Cloth 1000-S is a significantly stronger version of Silica 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.

Silica Cloth 1000-M

Silica 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.

TOMBO™ No. 8250

Silica Tape

Silica Tape is a silica tape in which the fibers, which are of the same material as 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 Note 1 [N/25 mm]	Vertical	100
Heat shrinkage rate	[%]	7 or less
SiO_2 amount Note 1	[%]	99

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

TOMBO™ No. 8250

Silica Cord

Silica Cord is a sewing thread mainly used for sewing 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 Note 1 [N/roll]	196
SiO_2 amount Note 1 [%]	99

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

TOMBO™ No. 8250

Silica Sleeve

Silica Sleeve is a sleeve made by braiding silica yarn made from the same material as 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

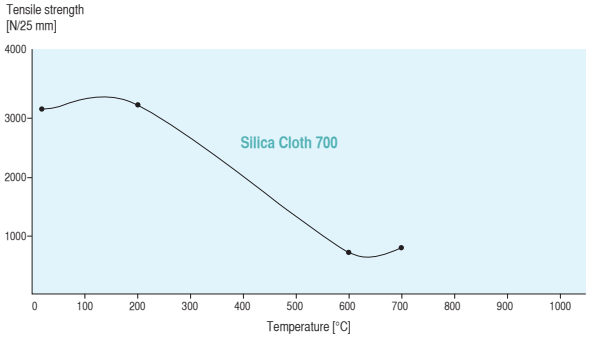
		Sleeve	
Standard inside diameter [φmm]		8	20
Length [m]		30	30
Standard mass [g/m]		20	31
Tensile strength Note 1	Normal state [N/roll]	300	300
	After heating Note 2 [N/roll]	90	90

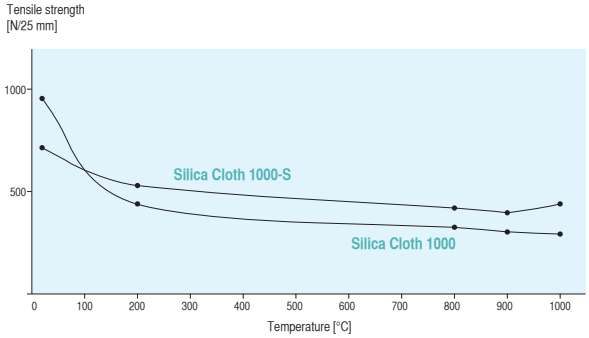
Note 1: These are our actual measurement values. They are not standard values.
Note 2: Tensile strength after heating and cooling at 1000°C for 30 minutes.

Characteristics of Silica cloth

Changes in tensile strength and temperature over time for Silica Cloth 700 and Silica Cloth 1000, 1000-S

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





Lagging thermal insulation cloth

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 thead.

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 safety.

- 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	・Inhalation of a large amount of alkaline earth silicate wool dust for a long period of time may cause damage to respiratory systems. ・Contact to alkaline earth silicate wool fiber may cause itching and/or inflammation of skin.	
Measures to avoid		・Wear respirator for handling. ・Wear work clothing with long sleeves and protective gloves as well.
Others	・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. ・For disposal, follow local regulations.	

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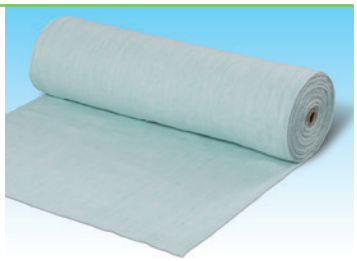
TOMBO™ No. 5685 - A

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 Note 1 [°C]		1100	800	800	1100	550	800	550
Mass	[kg/m²]	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.

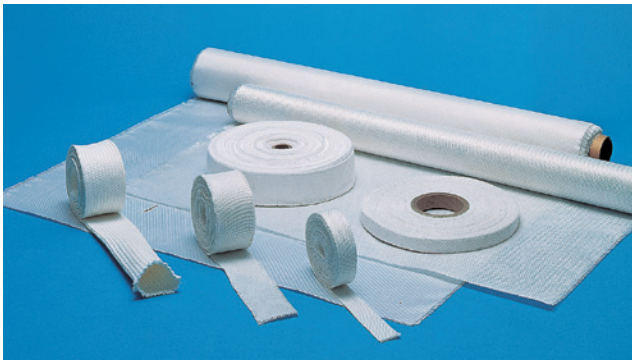
Lagging thermal insulation cloth

RUBILON™

(textile product made of alumina long fiber)

Maximum working temperature: 1400°C

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

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	・Inhalation of a large amount of alkaline earth silicate wool dust for a long period of time may cause damage to respiratory systems. ・Contact to alkaline earth silicate wool fiber may cause itching and/or inflammation of skin.
Measures to avoid	 ・Wear respirator for handling. ・Wear work clothing with long sleeves and protective gloves as well.
Others	・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. ・For disposal, follow local regulations.

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Fiber characteristics

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

Physical characteristics		
Chemical components [%]	Al_2O_3	68
	SiO_2	27
	B_2O_3	5
Color	Colorless and transparent	
Form	Continuous fiber	
Density [g/cm³]	3.0	
Fiber diameter [μm]	11	

Mechanical characteristics	
Tensile strength [GPa] Normal state	1.8
(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^{-6}

TOMBO™ No. 8350

RUBILON™ Cloth K

Model number	Weave method	Width [mm]	Thickness [mm] Japanese Industrial Standards (JIS)	Mass [g/m²]	Number of threads [roll/25 mm] Warp (vertical threads)	Number of threads [roll/25 mm] Woof (crosswise threads)	Length [m/roll]
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.

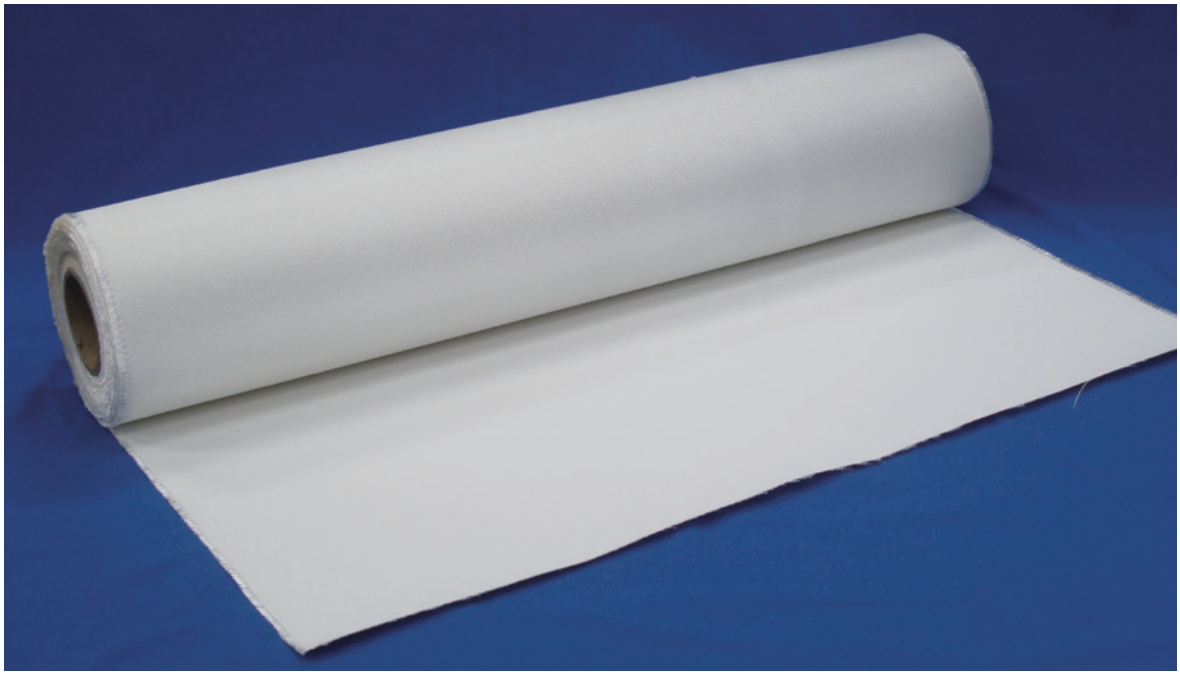
Welding spark protection cloth

Fire-Proof Cloth

Welding spark protection cloth

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.

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.

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 continuas 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.

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Dimensions

Type		Thickness [mm]	Width [mm]	Length [m]
Fire-Proof Cloth	S	0.65	810	25
	SW	0.70	810	25

Performance

		Fire-Proof Cloth	
		S	SW
Mass	[g/m²]	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 1323-2008)

The JIS A 1323-2008 class A test results are shown in the following table.

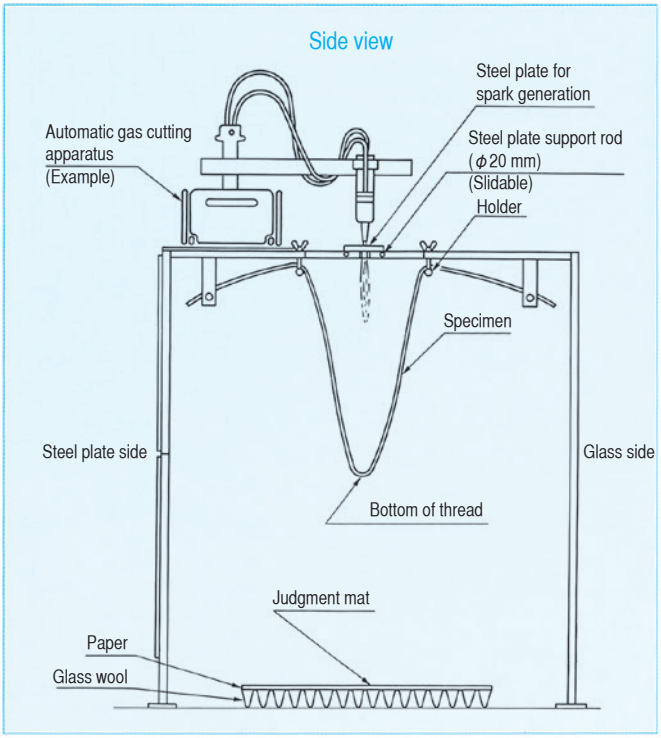
TOMBO™ No.	Product name	Certificate number	Test surface	Presence of smoke from the test specimen Note 1			Presence of through holes that are harmful in terms of fire protection flames		
				Specimen No.1	Specimen No.2	Specimen No.3	Specimen No.1	Specimen No.2	Specimen No.3
8300 - S	Fire-Proof Cloth-S	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

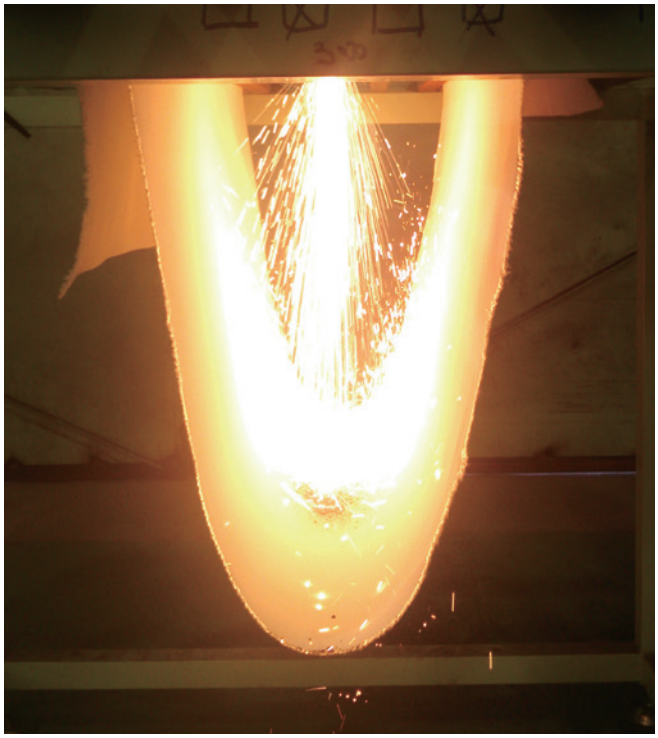
*The results in the table above are examples, and not guarantees that all products will have similar test results.Testing agency: Japan Testing Center for Construction Materials.

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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