

# Hanenaito® / Low Rebound / Low Strain Sponge Sheets

# Heat Insulation Polyimide Sheets, Heat Insulation Polyimide Washers

No Adhesive	Adhesive	Material	Hardness	Color
SUNSET	SUNSETA	Low Elasticity Rubber Sponge (Hanenaito® Sponge)	Asker C25	Black
SPTA	-	Low Rebound Sponge	Asker C27	White
SNPG	-	Low Strain Sponge (Silicone Foam)	Asker C15	Green (T 3mm) White (T 6mm)

Adhesive thickness is 0.14 ~ 0.2mm.  
 Hanenaito® is a registered trademark of Naigai Rubber Industry Co., Ltd.  
 The values of hardness are reference values.

**Accuracy Standards**

T Dimension Tolerance	A, B Dimension Tolerance
T	A, B
3, 5	190 or Less
±0.5	±1.5
6~20	200~390
±1.0	±2.0
	400 or More
	±3.0

Part Number	10mm Increment		T Selection
	A	B	
SUNSET SUNSETA	20~500	20~350	3
			5
			8
			10
SPTA	20~500	20~500	5
			10
			15
			20
SNPG	20~500	20~300	3
			6

Ordering Example: Part Number - A - B - T  
 SUNSET - 500 - 350 - 10

A ≥ B  
 The price of SUNSETA is the price of SUNSET shown in the table multiplied by material multiplier.  
 (Ex.) Part Number - A - B - T >> (Unit Price) x (Material Multiplier) = Standard Type Unit Price  
 SUNSETA - 100 - 50 - 3

Part Number	T	A	Unit Price			
			20~100	110~200	210~300	310~350
No Adhesive SUNSET (x1.0)	3	20~100	-	-	-	-
		110~200	-	-	-	-
		210~300	-	-	-	-
		310~400	-	-	-	-
		410~500	-	-	-	-
Adhesive SUNSETA (x1.2)	5	20~100	-	-	-	-
		110~200	-	-	-	-
		210~300	-	-	-	-
		310~400	-	-	-	-
		410~500	-	-	-	-
Material Multiplier	8	20~100	-	-	-	-
		110~200	-	-	-	-
		210~300	-	-	-	-
		310~400	-	-	-	-
		410~500	-	-	-	-
	10	20~100	-	-	-	-
		110~200	-	-	-	-
		210~300	-	-	-	-
		310~400	-	-	-	-
		410~500	-	-	-	-

- Features**
- Low Elasticity Rubber Sponge (Hanenaito® Sponge)**
    - It is low elasticity rubber (Hanenaito®) foam.
    - Excels in shock absorption.
    - Lightweight with specific gravity at 0.3.
  - Low Rebound Sponge**
    - It is bridge foam of styrene-type elastomer.
    - Excellent shock absorption.
  - Low Strain Sponge (Silicone Foam)**
    - It is a silicone foam.
    - The material resists crushing, even after repetitive impact absorption.
    - Usable in a very wide temperature range of -40°C ~ 150°C.
- Peel off the protective film on the surface before use.

**Characteristics of Sponges**

Item	Unit	Low Elasticity Rubber Sponge	Low Rebound Sponge	Low Strain Sponge
Apparent Density	g/cm <sup>3</sup>	0.3	0.097	0.26
Air Bubble	-	Independent Cell	Independent Cell	Independent Cell
Tensile Strength	MPa (kgf/cm <sup>2</sup> )	0.9 (9)	0.9 (9)	0.32 (3.2)
Elongation	%	480	210	73
25% Compression Set	%	62	5.1	0.2
Temperature of Continuous Use	°C	20~60	10~50	-40~150
Chemical Resistance				
Oil (Gasoline)		X	X	X
Acid		X	O	O
Alkali		X	O	O
Organic Solvent		X	X	X

**Heat Insulation Polyimide Sheets Polyimide Foam**

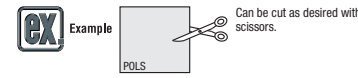
Type	Material	Color	Hardness	Allowable Temperature
No Adhesive	POLS	Aromatic Polyimide Foam	Light Beige	Asker C62
Adhesive	POLSA			Main Body: 400°C Adhesive Material: 200°C

The temperature of continuous use is 300°C.  
 This product is regulated under Foreign Exchange and Foreign Trade Act. Export permit from the Minister of Economy, Trade and Industry is needed for exporting.

Part Number	Type	T	1mm Increment	
			A	B
No Adhesive	POLS	2	10~500	10~500
Adhesive	POLSA	2	10~500	10~500

Ordering Example: Part Number - A - B  
 POLS2 - 200 - 100

Part Number	Type	T	A	Unit Price			
				10~100	101~200	201~300	301~400
No Adhesive POLS	2		10~100	-	-	-	-
			101~200	-	-	-	-
			201~300	-	-	-	-
			301~400	-	-	-	-
			401~500	-	-	-	-
Adhesive POLSA	2		10~100	-	-	-	-
			101~200	-	-	-	-
			201~300	-	-	-	-
			301~400	-	-	-	-
			401~500	-	-	-	-



**Heat Insulation Polyimide Washers Polyimide Foam**

Standard	Configurable Type	Material	Hardness	Color
No Adhesive	WSPOL	Polyimide Foam	Asker C62	Light Beige
Adhesive	WSPOLA, WSPOLF, WSPOLFA			

The temperature of continuous use is 300°C.  
 Adhesive Seal (Thickness 0.14 ~ 0.2mm)

**Standard**

Part Number	Type	D	V Selection	T Selection	Unit Price
WSPOL WSPOLA	2	6	2	2	WSPOL, WSPOLA
			3		
			4		
			5		
			6		
			8		
			10		
			12		
			15		
			20		
			25		
			30		
			35		
			40		
			50		
			60		

Ordering Example: Part Number - V - T  
 WSPOL15 - 6 - 2

**Configurable Type**

Part Number	Type	T	D	V	Unit Price
WSPOLF WSPOLFA	2	±0.5	10~100	5~80 (No Hole: V=0)	WSPOLF, WSPOLFA
				When D ≤ 40, D-V ≤ 5.	

**Configurable Type**

Part Number	Type	T	D	V	Unit Price
WSPOLF WSPOLFA	2	±0.5	10~100	5~80 (No Hole: V=0)	WSPOLF, WSPOLFA
				When D ≤ 40, D-V ≤ 5.	

**Mechanical Characteristics**

Item	Unit	Characteristic Values	Testing Method
Tensile Strength	MPa	0.05 (HPRIS), 1.3 (POLS)	ASTM D 3574 (TestE)
Modulus of Elongation	MPa	0.17 (HPRIS), 11.5 (POLS)	ASTM D 3574 (TestE)
Elongation	%	28 (HPRIS), 23 (POLS)	ASTM D 3574 (TestE)
Flexural Modulus	MPa	-	18.6

**Chemical Resistance**

Chemical	HPRIS	POLS	Testing Method
10% Sulfuric Acid	○	○	Room temperature, soaked for 24 hours
10% Hydrochloric Acid	○	○	
Acetone	○	○	
Methylene Chloride	○	○	
NMP	○	○	
DMA	○	○	

○: No appearance change or swelling

**Thermal and Electrical Characteristics**

Item	Unit	Characteristic Values	Testing Method
Expansion Ratio	Times	330~270 (HPRIS), 10 (POLS)	
Apparent Density	kg/m <sup>3</sup>	4~5 (HPRIS), 135 (POLS)	ASTM D 3574 (TestA)
Tg	°C	400 (HPRIS), 401 (POLS)	DSC Analysis
Thermal Decomposition Temp. (5%)	°C	540 (HPRIS), 569 (POLS)	TGA Analysis
Brittle Temperature	°C	<-150 (HPRIS), <-150 (POLS)	
Thermal Conductivity	W/m·K	0.045 (HPRIS), 0.044 (POLS)	ASTM C 518
Combustibility	-	-	V-0 Equivalent
Limited Oxygen Index	%	50 (HPRIS), 49 (POLS)	ASTM D 2863
Outgas	TML	1.01 (HPRIS), 0.94 (POLS)	ASTM E 595
	CVCM	0.04 (HPRIS), 0.01 (POLS)	
	WVR	0.72 (HPRIS), 0.81 (POLS)	
Dielectric Constant (1MHz)	-	1 (HPRIS), 1.25 (POLS)	Impedance Analyzer
Dissipation Factor (1MHz)	-	0.0001 (HPRIS), 0.0025 (POLS)	

**Overview**

- Made of polyimide foam, best in heat resistance among engineering plastic.
- Excels in heat resistance, fire retardancy, environment resistance and is of low outgassing. Provides high performance as a thermal insulator or a soundproof material under high temperature.
- Polyimide sheets and washers are made by using heat insulation sponge compressed to 2mm.

**Main Features**

- High heat resistance with glass transition temperature of 400°C.
- Flexible workability: easily cut by utility knives.
- Self-extinguishable and flame-resistant.
- Extremely low gas discharge.
- Possesses superior properties of aromatic polyimide, such as resistance to radiation and ultraviolet, electrical isolation and chemical resistance.

**Cautions**

- As a characteristic of polyimide, rebound from compression is inferior. Avoid usage in compressed state to maintain heat insulating property.
- Allowable temperature limit for adhesive is 200°C. When using at operating temperature of 200°C or higher, use the adhesive as a temporary measure. (Apply supplementary attachment method such as nipping.)