High-performance Products for Smart Phone or Tablet PC

Super-Soft Conductive Gasket

Part No.: Si-5007AMS (Thickness: 0.7mm)
Si-5015AMS (Thickness: 1.5mm)

Ultra-Thin Conductive Double-sided Tape

Part No.: MST30 (Thickness: 30 μm)
MST50 (Thickness: 50 μm)
SED50 (Thickness: 50 μm)

Sound Permeable Waterproof Film NEW

(3) functions – air permeability, sound permeability and waterproofness, achieving mobile device case waterproof ratings IPX7 and IPX8.
Part No.: S3K30, S3K50, S3K80

Transparent EMI Shield Case NEW

transparent EMI shield case equipped with a successful combination of both transparency and EMI shieldability, not found in its conventional counterpart.
Conductive Double-Sided Tape

Seiren’s lineup of double-coated conductive tape products with structures originally developed by Seiren.

Structure & Features

- **Highly-Conductive Product…MST Series (PATENTED)**
  - Surface exposed conductive mesh
  - Stable contact resistivity
  - Non-conductive adhesive
  - High conductivity

- **General-Purpose Product…SED Series**
  - Conductive adhesive filler-containing nickel

- The product is designed with use of conductive mesh, which provides it with excellent grounding performance.
- The product is available in two types of thickness – MST30 (30 μm) and MST50 (50 μm).
- The product has a property of transmitting light such as UV.
- With non-conductive material (PET mesh) as its adhesive layer, the product has been successfully developed as a low-cost double-sided conductive tape with excellent punchability.

Specification

<table>
<thead>
<tr>
<th></th>
<th>Highly-Conductive</th>
<th>General-Purpose</th>
<th>Conventional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>MST30</td>
<td>MST50</td>
<td>SED50</td>
</tr>
<tr>
<td>Thickness(μm)</td>
<td>30</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Structure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Base material</td>
<td>Conductive Mesh</td>
<td>Conductive Mesh</td>
<td>PET Mesh</td>
</tr>
<tr>
<td>Adhesive</td>
<td>Non-conductive</td>
<td>Non-conductive</td>
<td>Conductive</td>
</tr>
<tr>
<td>Liner</td>
<td>PET</td>
<td>PET</td>
<td>Paper</td>
</tr>
<tr>
<td>Contact resistivity(mΩ/inch²)</td>
<td>2</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>180° peel strength(N/inch)</td>
<td>10</td>
<td>12</td>
<td>9</td>
</tr>
</tbody>
</table>

※The above data are representative values and aren’t guaranteed values.

Application

- Smart Phone, Tablet PC, e-book
Conductive Gasket

Being uniformly metallized to the inside of its PU foam, the product is soft and highly conductive.

**Structure**

![Conductive Gasket Diagram]

**Features**

- Being exceptionally soft and flexible, the product can be used in a wide range of thickness with excellent conformability to irregularities.
- Uniformly metallized to the inside of its PU foam, the product provides an excellent grounding performance. Even punched into small parts in various shapes, the product exhibits excellent conductivity in every direction.
- Even after being compressed for an extended period of time, the product can retain its original urethane foam resilience with highly reliable grounding performance.
- The product is excellent in cuttability, allowing it to be punched into small parts with no loss in its original conductivity.

**Specification**

<table>
<thead>
<tr>
<th></th>
<th>Si-5007AMS</th>
<th>Si-5015AMS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thickness (mm)</strong></td>
<td>0.75</td>
<td>1.6</td>
</tr>
<tr>
<td><strong>Range of use (mm)</strong></td>
<td>0.15~0.4</td>
<td>0.3~1.0</td>
</tr>
<tr>
<td><strong>Contact resistivity (mΩ)</strong></td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td><strong>Compression set (%)</strong></td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Peel strength (N/inch)</strong></td>
<td>11.5</td>
<td>11.5</td>
</tr>
</tbody>
</table>

*The above data are representative values and aren’t guaranteed values*

**Application**

- Smart Phone
- Tablet PC
- e-book

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Jan. 2014
Among Seiren’s newly developed EMI shield-related products is a transparent EMI shield case equipped with a successful combination of both transparency and EMI shieldability, not found in its conventional counterpart.

### Structure

The Seiren’s newly developed product is its original transparent electrically conductive fabric and transparent resin integrally molded into a transparent EMI shield case, allowing:

- Good visual recognition of characters on the case, as well as its interior; and
- Elimination of need for post-processing for EMI shield otherwise required as in its corresponding conventional one.

![Photo showing external view of the case and Conceptual cross-sectional view of the case](image)

The conventional product is a transparent resin case with a punching metal retrofitted thereto, having the disadvantages of:

- Not allowing visual recognition of characters on the case; and
- Requiring an additional process of retrofitting the punching metal to the case.

### Features

- **High EMI shieldability** [Electric field] 35.3dB (at 100MHz), 47.3dB (at 1GHz)  
  [Magnetic field] 29.3dB (at 100MHz), 28.1db (at 1GHz)  
  ※The above data are based on the measurements made on S70-4110CW using the KEC method.

- **High light transmittability**  
  Visible light transmittance 75%  
  ※For Seiren’s original conductive fabric integrally molded with polycarbonate resin 2mm in thickness into

- **Process simplification** Use of Seiren’s original electrically conductive fabric, allowed to be integrally molded with transparent resin into a transparent EMI shield case, achieving process simplification for manufacturing of such an EMI shield case.

- **Air permeability** Use of Seiren’s original electrically conductive fabric, air permeable, when integrally molded with resin into an EMI shield case, causing no interference with any countermeasure against heat generation of the case.

- **Weight reduction** Use of Seiren’s original electrically conductive fabric, light in weight, when integrally molded with resin into an EMI shield case, allowing weight reduction of the case compared to its counterpart using a punching metal or steel plate.

### Applications

- Transparent resin case requiring shielding against electromagnetic interference (EMI)
- Transparent resin case requiring protection against static electricity
Sound Permeable Waterproof Film

Among Seiren’s newly developed film products is a sound permeable waterproof film with a combination of three (3) functions – air permeability, sound permeability and waterproofness, achieving mobile device case waterproof ratings IPX7 and IPX8.

Film Structure

The film has such a soft porous structure with voids (20 to 50 μm in size) as shown in the following photo.

Features

- **Highly waterproof**: The film provides IPX7/8 waterproof protection for mobile device cases.
- **Highly sound permeable**: The film is available in three (3) types of thickness, which can be selected according to its intended application.
- **Environmentally compliant**: The film complies with RoHS and REACH.

Product lineup

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>S3K30</th>
<th>S3K50</th>
<th>S3K80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Film thickness</td>
<td>μm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water resistance</td>
<td>kPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air permeability</td>
<td>sec/100cm²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strength at break</td>
<td>N/inc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elongation at break</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100% modulus</td>
<td>N/inc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10% modulus</td>
<td>N/inc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adhesion with waterproof tape</td>
<td>N/inch</td>
<td>Film break</td>
<td>Film break</td>
<td>Film break</td>
</tr>
</tbody>
</table>

Water resistance: Pursuant to JIS L 1092 Test Method for Water Resistance of Textiles, Method B (High Water Pressure)  ※ Using mesh cover
Air permeability: Pursuant to JIS L 1092 Method B (Gurley Test Method) (equivalent to JIS P 8117 Method B)

※ The figures given for the parameters of the film in the table are their respective measured values, not their guaranteed values.

Applications

The film can be used in applications such as mobile phones, smart phones, and digital cameras as materials for their sound, internal and external pressure control filters.
Seiren's Total Support Services for Inkjet Coating From Its Development to Mass Production

Seiren provides total support services for inkjet coating from its development to mass production on a contract basis, as well as sale of equipment for such development and production.

**Inkjet Technology Development Equipment**

![Image of equipment and diagrams related to inkjet technology]

Small size (approx. 100mm square) single-function printing  
Coating equipment function  
Medium size (approx. 1000mm square) multiple-function high-accuracy printing

Note that the above is only some examples of the equipment we possess for inkjet coating, the detailed information on which is available from us upon request.

**Examples of tests provided for inkjet coating (with film thickness of 50nm – 100μm)**

<table>
<thead>
<tr>
<th>Functional materials</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulating layer, conductive layer, hydrophilic layer, hydrophobic layer, protective layer, adhesive layer, sticky layer, metal wiring, hard coat, surface fine-irregularity layer, light emitting layer, micro-lens, light reflecting layer, light transmitting layer</td>
<td>Ink preparation, ink properties evaluation (inkjet validation), accuracy requirement verification, medium/small-scale production testing</td>
</tr>
</tbody>
</table>

Note that the above is only examples of tests we provide for inkjet coating. For inquiries about any other test that you may require for inkjet coating, please contact us.

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Small-Sized Inkjet Coater
SR-TIJ-01 (Entry Model)

Inkjet coater SR-TIJ-01 designed for use in initial feasibility studies for development of an inkjet printing system and studies for development of various inkjet printing inks.

Features
The inkjet coater SR-TIJ-01 is designed to allow studies for inkjet printing with high resolution and high precision of up to 2400dpi, and is of a unit replaceable type designed for easy replacement of its ink and head, having following specific features:

- 2400 × 2400 dpi
- Ink circulation
- Ink temperature control
- Ink droplet trajectory observation
- Substrate vacuum suction
- Small size light weight desktop
- Alignment table

Various applications
- Micro-lens
- Fine line pattern
- Wiring pattern
- Color filter
- Touch panel related applications
- Insulating layer coating

Note that the above is only examples of applications of the inkjet coater. For detailed information on its applications, please contact us.

Unit replaceable type
The inkjet coater is of a unit replaceable type designed for:

- Easy replacement of the head;
- Recycling of the IU unit;
- Ink circulation and temperature control in the unit;
- Adopt the head having successful result of mass production;
- Use with a wide variety of ink types.

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Jan. 2014
Seiren’s Original Technologies
Combination of Printing & Plating

Seiren has been developing inkjet, printing and plating technologies.

We provide our customers with comprehensive proposal particularly in the field of electronics such as electrically conductive film, printed electronics and other materials.

**Printing Technology**
- Applicable to continuous printing
  - gravure printing
  - screen printing etc.

**Inkjet Technology**
- Various patterning without plate making
  - ink development
  - other inkjet application developments

**Metalizing (Plating) Technology**
- Stable plating with wet process
- Applicable to continuous plating

Electrically conductive pattern film, thin-film copper foil and micro-lens formation film and others
Thin Copper Foil

Seiren has successfully developed the original technology to form a thin copper foil (ranging in thickness from 1 to 5 μm) on carrier.

**Product Structure and Characteristics**

<table>
<thead>
<tr>
<th></th>
<th>Thin copper foil</th>
<th>Thin copper foil with nickel layer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance and Structure</strong></td>
<td><img src="image1" alt="Copper foil" /></td>
<td><img src="image2" alt="Thin copper foil with nickel layer" /></td>
</tr>
<tr>
<td>Metal film thickness</td>
<td>1 – 5 μm</td>
<td>1 – 5 μm</td>
</tr>
<tr>
<td>Peel strength</td>
<td>≤0.03 N/mm</td>
<td>≤0.03 N/mm</td>
</tr>
<tr>
<td>Surface resistivity</td>
<td>≤10 mΩ/□</td>
<td>≤10 mΩ/□</td>
</tr>
<tr>
<td>Brightness of peeled surface [L*(SCI)]</td>
<td>90</td>
<td>70</td>
</tr>
</tbody>
</table>

*The above data is representative value and not guaranteed.

**Features**

- Realizing thin film formation of copper foil or copper foil with nickel layer.
- Allowing applications in circuit formation substrate, electromagnetic interference (EMI) shield, and others.
- Improving laser workability.

**Useful for CO₂ laser drilling**

Thin copper foil with nickel layer shows a high workability for CO₂ laser drilling.

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