Surface Protective Materials

E-MASK®•SPV®•ELEP Masking Tape

Cautions for surface protective materials

<table>
<thead>
<tr>
<th>Cautions</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage</td>
<td>Avoid exposing the product to direct sunlight. Store it in locations with normal temperature.</td>
</tr>
<tr>
<td></td>
<td>Ensure the surface protective materials within 50°C remain after delivery.</td>
</tr>
<tr>
<td>Indoor use</td>
<td>When using impregnated substrates or for use outdoors, choose weather-resistant surface protective materials.</td>
</tr>
<tr>
<td></td>
<td>You may feel a sense of heaviness while peeling off the surface protective material of a coated substrate in accordance with the baking conditions of the protective material, or you may peel off coated layers. Furthermore, uneven color may occur depending on the type of painting materials employed when vinyl chloride surface protective materials are used.</td>
</tr>
<tr>
<td></td>
<td>Surface protective materials that are surface-treated such as alumite treated substrates may exhibit different peeling properties depending on the treatment conditions of the substrates.</td>
</tr>
<tr>
<td></td>
<td>The laminated film or surface protective film, especially on material containing halogenates (e.g., vinyl chloride and acetate), when surface protective material is peeled off from substrates, a minute amount of it may be transferred to the surface of the substrate. This transfer can cause failure to occur when the substrates are painted, plated, etched, or bonded. Before using the substrate, adequately remove conditions such as surface cleaning, surface preparation, and peeling.</td>
</tr>
<tr>
<td>Substrate</td>
<td>The surface protective film on a substrate may float from the substrate at its ends over time if the film is laminated with excessive tension throughout.</td>
</tr>
<tr>
<td></td>
<td>Some surface protective materials that are surface-treated, such as alumite treated substrates, may exhibit different peeling properties depending on the treatment conditions of the substrates.</td>
</tr>
<tr>
<td></td>
<td>Carefully consider the applicability of the surface protective materials, especially on material containing halogenates (e.g., vinyl chloride and acetate), when surface protective material is peeled off from substrates. Any matter that attaches to the surface of the substrate, such as machining oil or dirt, may adversely affect the properties of its surface protective material.</td>
</tr>
</tbody>
</table>

Product warranty

• The product warranty period is six months after delivery of the product.
• The warranty covers product properties and quality, but does not cover all uses and processes.
• If any abnormality occurs or the defective product can be replaced with a new one or refunded to the extent of the money paid at the time of delivery.
• Before use, be sure to perform adequate verification and review before making a final judgment on whether the product is conformable or not.

Nitto Denko Corporation

26th Fl., Shinagawa Season Terrace, 1-2-70, Konan, Minato-ku, Tokyo 108-0075, Japan

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Nitto’s SPV features our proprietary laminated structure created using highly sophisticated technologies that enable it to be used in a wide assortment of applications and environments.

Nitto’s products boast a wide scope of applications, ranging from surface protection of stainless steel, aluminum, decorative metal plates and other metal products to housing products, curing materials used in the automotive industry as well as for applications in the optoelectronics sector.

Selection Guidelines  How to Select the Most Suitable Surface Protective Materials

Nitto offers a wide variety of surface protective materials to meet your needs and demands. To select the surface protective material most suitable for the application and environment in which it is going to be used, detailed information corresponding to a particular function is required. Please refer to the “Basic functional requirements for surface protective materials” and “Criteria for selecting a surface protective material” below. Along with the information you obtain from these charts, please consult our staff at the nearest sales office for additional assistance and information.

Criteria for selecting a surface protective materials

1. Confirm what is to be protected
   - Type of substrate
     - Metal
     - Plastic
2. Film application conditions
   - Application method
     - Mechanical
   - Manual
3. Processing conditions
   - Mechanical processing method and conditions
4. Storage conditions
   - Indoors or outdoors
5. Peel conditions
   - Peel speed/angle
   - Peel environment
   - After peeling off the film, will surface be given coating, vapor-deposition, chemical treatment, etc.?
### General Properties

**Surface Protective Materials for Electronics and Optical Products**

Surface protective materials for electronics and optical products must be clean and must possess an antistatic function and easy peeling ability.

#### General Properties

**E-MASK® RP Series**

- Optical grade protective film with an antistatic property produced in a class 1000 clean environment
- E-MASK® RP Series for the surface protective of optical grade protective film with an antistatic property uses a polyester film as a base material and was produced in a class 1000 clean environment.

#### Structure

**RP207**
- Easy removal of dust on the backing, printable backing
- Release liner
- Acrylic adhesive
- Polyester film
- Antistatic layer
- Printable dustproof layer

**RP301**
- Stable antistatic function, printable backing
- Release liner
- Acrylic adhesive
- Polyester film
- Antistatic layer

#### Features

- Superior transparency enables inspection of outer appearance of optical film without removing the tape.
- Offers good wettability for optical films and outstanding reapplication properties.
- Easy peeling. Suitable for large-size optical films (RP207).
- High resistance to dust on the backing and ease of wiping dust off (RP207).
- Backing printable with stamp or inkjet printer (RP207/ RP301).

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness*1 (mm)</th>
<th>Adhesive strength (N/25mm)</th>
<th>Color</th>
<th>Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>P207</td>
<td>0.11</td>
<td>0.059</td>
<td>Clear Plastic</td>
<td>Polyester film</td>
</tr>
<tr>
<td>P301</td>
<td>0.25</td>
<td>0.048</td>
<td>Clear Plastic</td>
<td>Polyester film</td>
</tr>
</tbody>
</table>

*1 Release liner thickness is not included.

#### E-MASK® AW Series

- Surface protective material with good wettability and easier re-applicability
- E-MASK® AW-Series is made of polyether film-based surface protective materials and uses urethane adhesive with good wettability.

#### Structure

**AW303EB/AW343EB**
- Excels in static electricity suppression when peeled, protects sensors from damage, and prevents particle catching
- Polyether film Acrylic adhesive
- Polyester film Antistatic layer
- Urethane adhesive

**AW5003**
- Protection of smart phones and mobile phones during shipment
- Protection of touch panels during the manufacturing process
- Protection of touch panels during shipment

#### Features

- Good wettability and easier re-applicability
- Stable adhesion over time
- Good low-contamination performance
- Excels in static electricity suppression when peeled, protects sensors from damage, and prevents particle catching
- Protection of smart phones and mobile phones during shipment
- Protection of touch panels during the manufacturing process
- Protection of touch panels during shipment

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness*1 (mm)</th>
<th>Adhesive strength (N/25mm)</th>
<th>Adhesion to HC face*2 (N/25mm)</th>
<th>Static electricity voltage when peeled from glass*3 (kV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AW303EB</td>
<td>0.048</td>
<td>0.010</td>
<td>0.02</td>
<td>0</td>
</tr>
<tr>
<td>AW343EB</td>
<td>0.089</td>
<td>0.015</td>
<td>0.02</td>
<td>0</td>
</tr>
<tr>
<td>AW5003</td>
<td>0.150</td>
<td>0.075</td>
<td>0.02</td>
<td>0</td>
</tr>
</tbody>
</table>

*1 Release liner thickness is not included.
*2 Measured at a peeling speed of 300 mm/min and a peeling angle of 180°. 20-40 minutes after application.
*3 Measured at a temperature of 23°C, a humidity of 50%, a peeling speed of 10 m/min, and a measuring distance of 100 mm with a sliding-type surface potential sensor.
Surface Protective Materials for Electronics and Optical Products

E-MASK® R Series
Low contamination type developed for surface protection of optical parts

E-MASK R Series consists of polyethylene-based surface protective tapes developed utilizing proprietary adhesive synthesis technologies. This series is especially suitable for surface protection of LCD polarization films, hard-coat or non-glare treated acrylic plates and polyester films during processing and transportation.

Structure
- Acrylic adhesive
- Polyethylene film

Features
- Minimal change in adhesive strength following application ensures easy peeling.
- Superior transparency enables inspection of the substrate surface condition without removing the tape.

Applications
- Surface protection for optical films such as polarization films (during LCD shipment) and screen protection for mobile phones.
- Suitable for use in applications that do not permit attraction of dust and dirt due to static electricity produced when applying or peeling the tape.
- Good lamination for uneven surface such as anti-glare treatment.

General Properties

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness* (mm)</th>
<th>Adhesive strength (N/20mm)</th>
<th>Color</th>
<th>Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-50EP</td>
<td>0.050</td>
<td>0.90</td>
<td>Clear</td>
<td>Plastic</td>
</tr>
<tr>
<td>R-100</td>
<td>0.065</td>
<td>0.30</td>
<td>Clear</td>
<td>Paper</td>
</tr>
<tr>
<td>R-200</td>
<td>0.070</td>
<td>0.80</td>
<td>Clear</td>
<td>Plastic</td>
</tr>
</tbody>
</table>

*Measured on acrylic plate

E-MASK® RB-S Series
Surface protective tapes with an antistatic property that are ideal for applications that do not tolerate static electricity such as LCD panels

E-MASK RB-S Series is a surface protective tapes developed for optical films such as LCD polarization film. Prevents static electricity produced and offers stable adhesion and easy peeling.

Structure
- Acrylic adhesive
- Antistatic layer
- Polyolefin film

Features
- Has good initial lamination level and light peeling force.
- Minimal change in adhesive strength following application ensures easy peeling.
- Offers superior dustproofness when unwinding.

Applications
- Surface protective for optical films such as polarization films (during LCD shipping)
- Applications that do not permit attraction of dust and dirt due to static electricity produced when applying or peeling the tape.

General Properties

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness* (mm)</th>
<th>Adhesive strength (N/20mm)</th>
<th>Color</th>
<th>Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB-100S</td>
<td>0.045</td>
<td>0.10</td>
<td>Clear</td>
<td>Plastic</td>
</tr>
<tr>
<td>RB-200S</td>
<td>0.050</td>
<td>0.15</td>
<td>Clear</td>
<td>Plastic</td>
</tr>
<tr>
<td>RB-300S</td>
<td>0.050</td>
<td>0.05</td>
<td>Clear</td>
<td>Plastic</td>
</tr>
</tbody>
</table>

*Measured on acrylic plate

E-MASK® HR Series
Low contamination type developed for surface protection of optical parts

E-MASK HR Series consists of polyethylene-based surface protective tapes developed utilizing proprietary adhesive synthesis technologies. This series is especially suitable for surface protection of LCD polarization films, hard-coat or non-glare treated acrylic plates and polyester films during processing and transportation.

Structure
- Acrylic adhesive
- Polyethylene film

Features
- Minimal change in adhesive strength following application ensures easy peeling.
- Superior transparency enables inspection of the substrate surface condition without removing the tape.
- Good lamination for uneven surface such as anti-glare treatment.

Applications
- Surface protection for optical films such as polarization films (during LCD shipment) and lenses for mobile phones.
- Suitable for use in applications that do not permit attraction of dust and dirt due to static electricity produced when applying or peeling the tape.
- Good lamination for uneven surface such as anti-glare treatment.

General Properties

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness* (mm)</th>
<th>Adhesive strength (N/20mm)</th>
<th>Color</th>
<th>Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-50EP</td>
<td>0.063</td>
<td>0.60</td>
<td>Clear</td>
<td>Plastic</td>
</tr>
<tr>
<td>R-100</td>
<td>0.070</td>
<td>0.30</td>
<td>Clear</td>
<td>Plastic</td>
</tr>
<tr>
<td>R-200</td>
<td>0.070</td>
<td>0.20</td>
<td>Clear</td>
<td>Plastic</td>
</tr>
</tbody>
</table>

*Measured on acrylic plate

E-MASK® LS Series
Single-sided optical grade anti-scattering protection tape

E-MASK LS Series is a single-sided constantly adhering sheet developed utilizing proprietary adhesive synthesis technology. Our product lineup uses a TAC/PET base material for each optical property.

Structure
- Release liner
- Acrylic adhesive
- TAC film
- Surface treatment layer
- Protection film
- Protection film

Features
- Offers superior transparency.
- Suitable for application to glass or plastic plates such as polycarbonate plates.
- It has high lamination level.
- Produced in clean rooms.

Applications
- Window glass scattering preventive film
- Lens scattering preventive film
- Suitable for use in applications that do not permit attraction of dust and dirt due to static electricity produced when applying or peeling the tape.

General Properties

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness* (mm)</th>
<th>Adhesive strength (N/20mm)</th>
<th>Color</th>
<th>Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS63T6H1</td>
<td>0.160</td>
<td>30.00</td>
<td>Clear</td>
<td>Plastic</td>
</tr>
<tr>
<td>LS5005</td>
<td>0.100</td>
<td>18.50</td>
<td>Clear</td>
<td>Plastic</td>
</tr>
</tbody>
</table>

*1 Does not include thickness of the release liner.
*2 LS63T6H1 and LS5005 have 90° and 180° peeling adhesion (to acrylic plates), respectively.

Release liner
Acrylic adhesive
Polyethylene film
Antistatic layer
Protection film
Masking Tapes for Printed Circuit Boards

ELEP Masking N-300
Tapes for masking terminals during plating of printed circuit boards
ELEP Masking N-300 is a masking tape with a polyester film as a base material. Offering excellent chemical resistance and tight adhesion properties, ELEP Masking N-300 is used for masking terminals during the plating of printed circuit boards, mainly for preventing ingress of the painting solution.

General Properties

<table>
<thead>
<tr>
<th>Thickness (mm)</th>
<th>Adhesive strength (N/25mm)</th>
<th>Tensile strength (N/25mm)</th>
<th>Elongation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.100</td>
<td>5.48</td>
<td>83</td>
<td>90</td>
</tr>
</tbody>
</table>

Structure
- Acrylic adhesive
- Polyester film

Features
- Light unwinding and easy application.
- Special adhesive enables tight adhesion to the printed circuit board and tape does not peel or become misaligned during work processes.
- Utilizes even higher degree of tight adhesiveness when applied using heat and roller pressure.
- Excellent chemical resistance.
- Can withstand harsh usage conditions and leaves no adhesive residue.
- Minimal change in adhesive strength following application ensures easy peeling.

Applications
Prevents ingress of plating solution during plating of printed circuit boards.

ELEP Masking N-380R
Tapes for protective during soldering for mounting printed circuit board components
ELEP Masking N-380R is a surface protective masking tape with a polyvinyl chloride film carrier developed for masking during the plating of printed circuit boards. Offering excellent chemical resistance and very tight adhesion, this masking tape is suitable for preventing contamination from the spray or hot vapor of plating solution.

General Properties

<table>
<thead>
<tr>
<th>Thickness (mm)</th>
<th>Adhesive strength (N/25mm)</th>
<th>Tensile strength (N/25mm)</th>
<th>Elongation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.08</td>
<td>0.60</td>
<td>55</td>
<td>230</td>
</tr>
</tbody>
</table>

Structure
- Acrylic adhesive
- Polyvinyl chloride film

Features
- Light unwinding and easy application.
- Special adhesive enables tight adhesion to the printed circuit board, and tape does not peel or become misaligned during work processes.
- Utilizes even higher degree of tight adhesiveness when applied using heat and roller pressure.
- Offers excellent chemical resistance.
- Uses no silicon-based release coating, resulting in no slippage when layering.
- Minimal change in adhesive strength following application ensures easy peeling.

Applications
Prevents ingress of flux or soldering solution during solder leveling process on printed circuit boards.

ELEP Masking N-700S
Tapes for masking terminals on printed circuit boards during solder leveling process
ELEP Masking N-700S is a tape for masking terminals during the solder leveling process on printed circuit boards.

General Properties

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness (mm)</th>
<th>Standard length (m)</th>
<th>Adhesive strength (N/25mm)</th>
<th>Tensile strength (N/25mm)</th>
<th>Elongation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-300</td>
<td>0.100</td>
<td>6/9/12/15/18</td>
<td>5.48</td>
<td>83</td>
<td>90</td>
</tr>
<tr>
<td>N-380R</td>
<td>0.080</td>
<td>20/300</td>
<td>0.60</td>
<td>55</td>
<td>7</td>
</tr>
<tr>
<td>N-700S</td>
<td>0.28</td>
<td>12/15/18</td>
<td>7.00</td>
<td>80</td>
<td>15</td>
</tr>
<tr>
<td>N-800R</td>
<td>0.14</td>
<td>4/6/8/12/15/18</td>
<td>4.50</td>
<td>80</td>
<td>80</td>
</tr>
</tbody>
</table>

Structure
- Natural rubber adhesive
- Crepe paper
- Polyolefin film

Features
- Light unwinding and easy application.
- Special adhesive enables tight adhesion to the printed circuit board, and tape does not peel or become misaligned during work processes.
- Utilizes even higher degree of tight adhesiveness when applied using heat and roller pressure.
- Excellent soldering and reflex resistance and prevents ingress of solder.
- Can withstand harsh usage conditions and leaves no adhesive residue.
- Minimal change in adhesive strength following application ensures easy peeling.

Applications
Prevents ingress of flux or soldering solution during solder leveling process on printed circuit boards.

ELEP Masking N-800R
Tapes for protective during soldering for mounting printed circuit board components
ELEP Masking N-800R is a crepe paper masking tape developed for use in the soldering process when mounting components onto printed circuit boards. This tape provides excellent solder and flux resistance in addition to strong adhesiveness, while permitting easy peeling after the soldering process and leaving almost no adhesive residue.

General Properties

<table>
<thead>
<tr>
<th>Thickness (mm)</th>
<th>Adhesive strength (N/25mm)</th>
<th>Tensile strength (N/25mm)</th>
<th>Elongation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.14</td>
<td>4.50</td>
<td>80</td>
<td>15</td>
</tr>
</tbody>
</table>

Structure
- Natural rubber adhesive
- Crepe paper

Features
- Light unwinding and easy application.
- Special adhesive enables tight adhesion to the printed circuit board, and tape does not peel or become misaligned during work processes.
- Utilizes even higher degree of tight adhesiveness when applied using heat and roller pressure.
- Excellent soldering and reflex resistance and prevents ingress of solder.
- Can withstand harsh usage conditions and leaves no adhesive residue.
- Minimal change in adhesive strength following application ensures easy peeling.

Applications
For use during the soldering process when mounting components onto printed circuit boards, mainly preventing ingress of flux or soldering solution.

Application Examples
Surface Protective Materials for Plastic Plates

Controlling adhesive strength in accordance with surface roughness while achieving well-balanced adhesion on substrates with partially different surface conditions are key requirements.

For embossed surfaces of plastic plates
SPV-J Series
SPV-V Series

For flat plastic plates
SPV-P Series

SPV-J Series

Offers outstanding surface protective for printing, punching and transportation of plastic nameplates
SPV-J Series of polyolefin surface protective tapes was developed to provide effective surface protective for printing, punching and transportation of plastic nameplates.

Structure
Natural rubber adhesive
Polyolefin film
Release coating

Features
- Minimal change in adhesive strength following application ensures easy peeling.
- J Series has variety adhesive strength level. The product can adjust various surface roughness and process levels.
- Offers excellent initial adhesion and easy application. Film can be easily peeled and re-applied (manual application) when inspecting printed surfaces.
- Suitable for nameplate punching and molding processes.

Applications
Surface protective for printing, punching and transportation of plastic nameplates.

General Properties

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness (mm)</th>
<th>Adhesive strength (N/20mm)</th>
<th>Tensile strength (N/20mm)</th>
<th>Elongation (%)</th>
<th>Weatherability (S-W-M(h))</th>
</tr>
</thead>
<tbody>
<tr>
<td>J-200</td>
<td>0.045</td>
<td>0.25</td>
<td>35</td>
<td>500</td>
<td>20</td>
</tr>
<tr>
<td>J-500</td>
<td>0.90</td>
<td>1.20</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Stainless steel plate as the substrate.

*Measured on acrylic plates.

SPV-P Series

Low-adhesive material with superior transparency that do not contaminate surface of substrates
SPV-P Series was developed using Nitto’s proprietary multilayer film forming technology. Offers stable surface protective for cutting, punching, in-process transport and shipment for such substrates as PMMA (acrylic) plates, PC (polycarbonate) plates and LCD polarizing films.

Structure
Ethylene/polyvinyl acetate adhesive
Polyethylene film

Features
- Superior transparency enables inspection of the surface condition of the substrate without removing the tape.
- Low adhesion SPV-P Series is suitable for smooth surfaces.

Applications
Surface protective of plastic plates during transportation.

General Properties

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness (mm)</th>
<th>Adhesive strength (N/20mm)</th>
<th>Tensile strength (N/20mm)</th>
<th>Elongation (%)</th>
<th>Weatherability (S-W-M(h))</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-367K</td>
<td>0.060</td>
<td>0.05</td>
<td>20</td>
<td>200</td>
<td>50</td>
</tr>
<tr>
<td>P-368K</td>
<td>0.80</td>
<td>0.80</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Measured on acrylic plates.

Application Examples

SPV Application by Substrate

<table>
<thead>
<tr>
<th>Substrate</th>
<th>Polyolefin based SPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic</td>
<td>362 J, P Series</td>
</tr>
<tr>
<td>Acrylic resin, ABS</td>
<td>364 J, V Series</td>
</tr>
<tr>
<td>Polycarbonate</td>
<td>P Series</td>
</tr>
<tr>
<td>Polyvinyl chloride</td>
<td></td>
</tr>
</tbody>
</table>
Several thousand types of decorative metal plates are used for household electronic appliances and construction materials. Controlling the strength of the adhesive according to the coating material and the surface grade is key to protecting the surface of decorative metal plates.

**SPV®-C Series**

Colored metal plate surface protective tapes

SPV-C Series of surface protective tapes uses a polyethylene film as a base material, which is developed by utilizing Nitto's proprietary technology. This Series offers superior protective for colored metal plates during transportation and processing.

**Structure**

Acrylic adhesive

Polyethylene film

**Features**

- Minimal change in adhesive strength following application ensures easy peeling.
- Superior transparency enables inspection of the surface condition of the substrate without removing the tape.
- Depending on the surface roughness and degree of processing, the most suitable product among a wide range of adhesive strength products can be used.
- SPV-C-6010 is particularly focus on environmental friendly since the product don’t use organic solvent in adhesive.

**Applications**

Surface protective of colored metal plates during transportation and processing.

**General Properties**

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness (mm)</th>
<th>Adhesive strength (N/20mm)</th>
<th>Tensile strength (N/20mm)</th>
<th>Elongation (%)</th>
<th>Weatherability (S-W-M(h))</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-600</td>
<td>0.060</td>
<td>0.70</td>
<td>25</td>
<td>250</td>
<td>150</td>
</tr>
<tr>
<td>C-100</td>
<td>0.70</td>
<td>1.40</td>
<td>25</td>
<td>250</td>
<td>100</td>
</tr>
<tr>
<td>C-300</td>
<td>2.10</td>
<td>2.50</td>
<td>25</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>C-500</td>
<td>0.050</td>
<td>2.00</td>
<td>30</td>
<td>220</td>
<td></td>
</tr>
</tbody>
</table>

**SPV®-364 Series**

Polyolefin-based surface protective tapes suitable for decorative metal plates and nameplates

SPV-364 Series of surface protective tapes uses a polyolefin film as a base material. This series is highly effective in protecting the surfaces of pre-coated steel plates and nameplates.

**Structure**

Polyolefin film

Release coating

**Features**

- Minimal change in adhesive strength following application ensures easy peeling.
- Outstanding re-application properties.
- Light unwinding and easy application.

**Applications**

Surface protective of pre-coated steel plates and nameplates during transportation and processing.

**General Properties**

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness (mm)</th>
<th>Adhesive strength (N/25mm)</th>
<th>Tensile strength (N/25mm)</th>
<th>Elongation (%)</th>
<th>Weatherability (S-W-M(h))</th>
</tr>
</thead>
<tbody>
<tr>
<td>364CCK2</td>
<td>0.050</td>
<td>2.60</td>
<td>0.40</td>
<td>50</td>
<td>700</td>
</tr>
<tr>
<td>364MK2</td>
<td>0.055</td>
<td>2.70</td>
<td>0.64</td>
<td>50</td>
<td>800</td>
</tr>
<tr>
<td>364FJ2</td>
<td>0.043</td>
<td>1.20</td>
<td>800</td>
<td>50</td>
<td>600</td>
</tr>
<tr>
<td>364F1J2</td>
<td>0.095</td>
<td>2.15</td>
<td>800</td>
<td>50</td>
<td>800</td>
</tr>
<tr>
<td>364F2J2</td>
<td>0.055</td>
<td>6.80</td>
<td>0.055</td>
<td>76+</td>
<td>800</td>
</tr>
</tbody>
</table>

*1 Colored metal board 40 N/25mm

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Surface Protective Materials for Laser Processing

Transportation and processing of stainless steel and aluminum plates

Manufacturer

Coil

Coil Center

SPV application

Processing

Laser processing (top-end surface protective film application)

Laser processing (rear surface protective film application)

- Strong adhesive type so that the occurrence of film peeling caused by assist gas is minimal.
- Almost no emission of chlorine type of gas during laser processing.
- Eliminates the trouble of peeling film before processing, enabling reduced operation time.
- Moreover, cutting pierced and cut sections twice allows better finish.

Matters requiring attention during laser cutting

- When using these products with laser processing, unpeeling can occur depending on the cutting conditions. However, processability can be enhanced by reviewing the following conditions.
  1) Please sufficiently secure necessary adhesive strength. (Do only after leaving product in place for several days after application.)
  2) Perform cutting at fast speeds. (Perform cutting at 0.2 mm/min per minute or faster.)
  3) Lower assist gas pressure.
  4) Set a large gas nozzle diameter.
  5) Shorten time from piercing to the start of cutting.
  6) Lengthen distance from the piercing to the areas to be cut.
  7) Using oxygen or flammable gases causes fire risk during laser cutting together with tape. Please consult with machine supplier about the conditions.

SPV®-AM-500/FG-3500

Surface protective tapes for metal plates. These products show excellent performance during the metal fabrication processes both in punching and bending. And good for bottom side protection during laser cutting.

These products are protective tapes consisting of special carrier film and unique adhesive. They can also be used for punch press (NCT) process as well as laser-cutting process.

Structure

- Acrylic adhesive
- Special film
- Release coating

Features

- Prevents entrainment of metal chips which often occurs with thick-type surface protective tapes.
- Almost no emission of chlorine type of gas during incineration, such as gas from incineration of polyvinyl chloride films.
- Excellent film strength and bending processability during processing of metal plates.
- Minimize dross during laser cutting as bottom side protection.

Applications

Surface protective for stainless steel and aluminum plates during transportation and processing.

General Properties

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness (mm)</th>
<th>Adhesive strength (N/20mm)</th>
<th>Tensile strength (N/20mm)</th>
<th>Elongation (%)</th>
<th>Weatherbility (S-W-M (h))</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM-500</td>
<td>0.050</td>
<td>1.50</td>
<td>150</td>
<td>170</td>
<td>100</td>
<td>for CO₂</td>
</tr>
<tr>
<td>FG-3500</td>
<td>0.035</td>
<td>2.50</td>
<td>80</td>
<td>130</td>
<td>500</td>
<td>for fiber</td>
</tr>
</tbody>
</table>

LASERGUARD (SPV®-LG-4000/LG-4002/LG-5000/310GH3/310GH5)

Metal Surface Protective Materials with Excellent Laser Processability

Nitto’s wide lineup offers total solutions for surface protective materials for laser cutting.

Structure

- Natural rubber adhesive
- White polyethylene film (blue print)
- Special release coating

Features

- No need for film peeling-off work that was previously required before processing; this can lead to shortened working hours.
- SPV-LG-4002 (for CO₂) and SPV-310GH5 (for both CO₂ and fiber) are designed with an emphasis on high-strength adhesive types designed with an emphasis on film peel-off prevention with assist gas.
- SPV-LG-4000 (for CO₂) and SPV-LG-5000 (for both CO₂ and fiber) are added to our product lineup as medium-strength adhesive types designed with an emphasis on light releaseability.
- No chlorine-based gas emissions during laser processing.
- Finer finishing by twice cutting pierced parts or cut sections.

Applications

- Surface protective for stainless steel and aluminum plates during transportation and processing.
- Suitable for bender work.

General Properties

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Adhesive strength (N/20mm)</th>
<th>Tensile strength (N/20mm)</th>
<th>Elongation (%)</th>
<th>Weatherbility (S-W-M (h))</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>LG-4000</td>
<td>0.100</td>
<td>2.7</td>
<td>30</td>
<td>250</td>
<td>NO</td>
</tr>
<tr>
<td>LG-4010</td>
<td>0.090</td>
<td>4.5</td>
<td>30</td>
<td>250</td>
<td>YES</td>
</tr>
<tr>
<td>LG-5000</td>
<td>0.090</td>
<td>4.0</td>
<td>40</td>
<td>320</td>
<td>YES</td>
</tr>
<tr>
<td>310GH3</td>
<td>0.100</td>
<td>1.7</td>
<td>30</td>
<td>150</td>
<td>YES</td>
</tr>
<tr>
<td>310GH4</td>
<td>0.100</td>
<td>4.0</td>
<td>40</td>
<td>320</td>
<td>YES</td>
</tr>
</tbody>
</table>
Surface Protective Materials for Metal Plates

For Stainless Steel
We offer surface protective materials suitable for use when processing substrates such as mirror-finished stainless steel, which cannot be repaired when marked with scratches.

For Aluminum and Aluminum Sashes
Exterior surface protective materials for various long and heavy building construction materials; durable and tough enough to prevent scratching caused by large shocks and feature weather-ability enabling use during long construction periods.

SPV®-ME-4001
Environment-friendly surface protective tapes suitable for bending
SPV-ME-4001 is environment-friendly surface protective tapes developed for stainless steel and other plates that do not use polyvinyl chloride as a base material. The bending processability of this product is superior to that of existing polyvinyl chloride surface protective tapes by using special polyethylene film as a base material.

SPV®-M-6020/M-6030
Environment-friendly and water-based adhesive product for use with stainless steel and other metal plates
SPV-M-6020/M-6030 are water-based adhesive films developed for surface protective of stainless steel and other metal plates. Unlike conventional products, these environment-friendly films use no organic solvents during the adhesive manufacturing stage and also use polyethylene film as a base material.

SPV Application by Substrate

<table>
<thead>
<tr>
<th>Substrate</th>
<th>Polyvinyl chloride based SPV</th>
<th>Polyethylene based SPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>BA plate 202, 205, 224 Series</td>
<td>301, 363, M, S, AM Series</td>
</tr>
<tr>
<td></td>
<td>201, 202, 205, 224 Series</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mirror finish 205 Series</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Colored stainless plate</td>
<td></td>
</tr>
<tr>
<td>Aluminum</td>
<td>Rear plate 201, 202, 205, 224, AL Series</td>
<td>301, 363, C, M Series</td>
</tr>
<tr>
<td></td>
<td>Alumite (sealed) 201, 202, 205, AL Series</td>
<td></td>
</tr>
<tr>
<td>Aluminum sashes</td>
<td>Paint Lacquered -</td>
<td>A Series</td>
</tr>
<tr>
<td></td>
<td>Electric coating 202, 224, AL Series</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Binding, Holding 202 Series</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Please consult us regarding titanium and copper plates.
This catalog contains examples of measured values, not guaranteed values. Moreover, Nitto does not guarantee suitability for the applications contained in this catalog. Before use, consideration should be given to proper usage upon ascertaining whether the product is suitable for the substrate (material to which SPV will be applied).
Surface Protective Materials for Metal Plates

**SPV®-A-6050/A-8050**

Environment-friendly product for aluminum sashes
SPV-A-6050/A-8050 are surface protective tapes that use a water-based adhesive. These environment-friendly products use a polyethylene film as a base material.

**Features**
- Offers superior adhesiveness to aluminum sashes.
- Easily peeled off after use.
- Does not depend largely on surface roughness of substrates.
- Offers outstanding weatherability.

**Applications**
Surface protective of aluminum sashes, etc.

**General Properties**

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness (mm)</th>
<th>Adhesive strength (N/20mm)</th>
<th>Tensile strength (N/20mm)</th>
<th>Elongation (%)</th>
<th>Weatherability (S-W-M(h))</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-6050</td>
<td>0.065</td>
<td>2.75</td>
<td>30</td>
<td>250</td>
<td>500</td>
</tr>
<tr>
<td>A-8050</td>
<td>0.085</td>
<td>3.00</td>
<td>35</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Stainless steel BA plate as the substrate.

**SPV®-2001SR/2001SR**

Standard surface protective tapes for metal plates that use a polyvinyl chloride film as a base material (Comply with RoHS2 regulations)
SPV-201SR/2001SR are surface protective tapes that use a polyvinyl chloride film as a base material. These products are suitable for protecting the surfaces of stainless steel aluminum plates during transportation and light processing.

**Structure**
- Natural rubber adhesive
- Polyvinyl chloride film

**Features**
- Light unwinding and easy application.

**Applications**
Surface protective of stainless steel aluminum plates during transportation and light processing.

**General Properties**

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness (mm)</th>
<th>Adhesive strength (N/20mm)</th>
<th>Tensile strength (N/20mm)</th>
<th>Elongation (%)</th>
<th>Weatherability (S-W-M(h))</th>
</tr>
</thead>
<tbody>
<tr>
<td>201SR</td>
<td>0.12</td>
<td>0.80</td>
<td>80</td>
<td>250</td>
<td>25</td>
</tr>
<tr>
<td>2001SR</td>
<td>0.100</td>
<td>0.90</td>
<td>70</td>
<td>250</td>
<td>25</td>
</tr>
</tbody>
</table>

Stainless steel BA plate as the substrate.

**SPV®-363**

Surface protective tape for metal plates that provides easy peeling and excellent processability
SPV-363 is a surface protective tape for metal plates that has a polyethylene film. Featuring excellent processability, SPV-363 is ideally suited for surface protective during the processing of stainless steel and aluminum plates.

**Structure**
- Acrylic adhesive
- Polyethylene film

**Features**
- Light unwinding and easy application.
- Easy peeling.
- Usable during drawing and bending as well as roll processing.

**Applications**
Surface protective of stainless steel plates and aluminum plates during transportation and processing.

**General Properties**

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness (mm)</th>
<th>Adhesive strength (N/20mm)</th>
<th>Tensile strength (N/20mm)</th>
<th>Elongation (%)</th>
<th>Weatherability (S-W-M(h))</th>
</tr>
</thead>
<tbody>
<tr>
<td>363</td>
<td>0.070</td>
<td>1.40</td>
<td>30</td>
<td>350</td>
<td>150</td>
</tr>
</tbody>
</table>

Stainless steel BA plate as the substrate.

**Surface protective tapes feature excellent processability and weather resistance**
SPV-301/302 are surface protective tapes for metal plates that use a polyethylene film as a base material. Providing excellent processability and weather resistance, these products prevent scratching of metal plate surfaces during processing and transportation.

**Structure**
- Acrylic adhesive
- Polyethylene film

**Features**
- Minimal change in adhesive strength following application ensures easy peeling.
- Excellent weatherability with little adhesive residue on the substrates.
- Capable of tracking during drawing and bending processes, thus preventing damage to metal surfaces.

**Applications**
Surface protective of stainless steel and aluminum plates during transportation and processing.

**General Properties**

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness (mm)</th>
<th>Adhesive strength (N/20mm)</th>
<th>Tensile strength (N/20mm)</th>
<th>Elongation (%)</th>
<th>Weatherability (S-W-M(h))</th>
</tr>
</thead>
<tbody>
<tr>
<td>301</td>
<td>0.11</td>
<td>2.50</td>
<td>0.70</td>
<td>40</td>
<td>500</td>
</tr>
<tr>
<td>302</td>
<td>0.12</td>
<td>2.20</td>
<td>2.20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*SPV-302 has stronger lamination than SPV-301 for rough surface, such as DF.
Surface Protective Materials for Metal Plates

**SPV®-224R/214R**
SPV-224R/214R are PVC base surface protective tapes for metal plates that complies with RoHS2 regulations. Offers outstanding weatherability through the utilization of special acrylic adhesive.

**Features**
- Surface protective tape that uses RoHS2 compliant PVC.
- Utilizes acrylic adhesive that enables outdoor use.
- Suitable to use during processing of stainless steel plates, aluminum plates and nameplates.

**Applications**
- Surface protection for stainless steel, aluminum and nameplates to prevent damage during processing.
- Storage of glass, aluminum sashes, etc.

**General Properties**

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness (mm)</th>
<th>Adhesive strength (N/20mm)</th>
<th>Tensile strength (N/20mm)</th>
<th>Elongation (%)</th>
<th>Weatherability (S-W-M(h))</th>
</tr>
</thead>
<tbody>
<tr>
<td>224R</td>
<td>0.080</td>
<td>1.00</td>
<td>50</td>
<td>200</td>
<td>500</td>
</tr>
<tr>
<td>214R</td>
<td>0.120</td>
<td>1.20</td>
<td>70</td>
<td>200</td>
<td>400</td>
</tr>
</tbody>
</table>

*Stainless steel BA plate used as the substrate.

**SPV®-202R**
SPV-202R is a PVC base surface protective tape for metal plates that complies with RoHS2 regulations.

**Features**
- Strong adhesive type, suitable for harsh processing.
- Sufficient oil resistance, applicable for milling operation of aluminum.

**Applications**
- Surface protection for stainless steel plates, aluminum and polished steel plates during deep drawing and roll forming.

**General Properties**

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness (mm)</th>
<th>Adhesive strength (N/20mm)</th>
<th>Tensile strength (N/20mm)</th>
<th>Elongation (%)</th>
<th>Weatherability (S-W-M(h))</th>
</tr>
</thead>
<tbody>
<tr>
<td>202R</td>
<td>0.12</td>
<td>2.70</td>
<td>66</td>
<td>200</td>
<td>25/250</td>
</tr>
</tbody>
</table>

*Stainless steel BA plate used as the substrate.

**SPV®-S-400X**
Surface protective tapes for deep drawing of stainless steel
SPV-S-400X of surface protective tapes was developed for surface protective during stainless steel processing. Products can be selected in accordance with the shape from simple processing to complex processing.

**Features**
- Minimal film floating during drawing; multistep drawing is possible.

**Applications**
- Surface protective during stainless steel deep drawing.

**General Properties**

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Thickness (mm)</th>
<th>Adhesive strength (N/20mm)</th>
<th>Tensile strength (N/20mm)</th>
<th>Elongation (%)</th>
<th>Weatherability (S-W-M(h))</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-400X</td>
<td>0.040</td>
<td>2.70</td>
<td>60</td>
<td>45</td>
<td>600</td>
<td>50</td>
</tr>
</tbody>
</table>

*Stainless steel BA plate used as the substrate.

**Easy metal dust cleaning of metal coil leveler line**
LCS-100 is a cleaning sheet for removing metal dust attached to metal leveler roll.

**Performance**
- Before leveler cleaning
- After leveler cleaning

**Leveler Cleaning Sheet LCS-100**

Metal coil leveler line
- Uncoiler
- Three-Roll leveler
- Leveler
- Feeder
- Shearing machine
- Metal sheets
- Cleaning sheet
- Cleaning sheets catch metal dust
- Metal dust causes damage on plates
### General Properties

#### Polyethylene Film

<table>
<thead>
<tr>
<th>Number</th>
<th>Thickness</th>
<th>Adhesive strength (N/20mm)</th>
<th>Tensile strength (N/20mm)</th>
<th>Elongation (%)</th>
<th>Weathervability</th>
<th>Size</th>
<th>Color</th>
<th>Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>201</td>
<td>0.060</td>
<td>2.50</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Polyolefin film Synthetic rubber</td>
</tr>
<tr>
<td>205</td>
<td>0.060</td>
<td>2.50</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Polyolefin film Synthetic rubber</td>
</tr>
</tbody>
</table>

#### Polyurethane Film

<table>
<thead>
<tr>
<th>Number</th>
<th>Thickness</th>
<th>Adhesive strength (N/20mm)</th>
<th>Tensile strength (N/20mm)</th>
<th>Elongation (%)</th>
<th>Weathervability</th>
<th>Size</th>
<th>Color</th>
<th>Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>201</td>
<td>0.060</td>
<td>2.50</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Polyurethane film Acrylic</td>
</tr>
</tbody>
</table>

#### PVC Type SPV for Metal Plates

<table>
<thead>
<tr>
<th>Product type</th>
<th>Number</th>
<th>Thickness</th>
<th>Adhesive strength (N/20mm)</th>
<th>Tensile strength (N/20mm)</th>
<th>Elongation (%)</th>
<th>Weathervability</th>
<th>Size</th>
<th>Color</th>
<th>Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>201 Series</td>
<td>201SR</td>
<td>0.060</td>
<td>2.50</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Polyvinyl chloride film Natural rubber</td>
</tr>
<tr>
<td>201SR</td>
<td>0.12</td>
<td>2.50</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Polyvinyl chloride film Natural rubber</td>
<td></td>
</tr>
<tr>
<td>205R</td>
<td>0.060</td>
<td>2.50</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Polyvinyl chloride film Natural rubber</td>
<td></td>
</tr>
</tbody>
</table>

#### PO Type SPV for Multipurpose Applications

<table>
<thead>
<tr>
<th>Product type</th>
<th>Number</th>
<th>Thickness</th>
<th>Adhesive strength (N/20mm)</th>
<th>Tensile strength (N/20mm)</th>
<th>Elongation (%)</th>
<th>Weathervability</th>
<th>Size</th>
<th>Color</th>
<th>Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>301 Series</td>
<td>301</td>
<td>0.11</td>
<td>2.50</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Polyvinyl chloride film Natural rubber</td>
</tr>
<tr>
<td>302</td>
<td>0.12</td>
<td>1.90</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Polyvinyl chloride film Natural rubber</td>
<td></td>
</tr>
<tr>
<td>363 Series</td>
<td>363</td>
<td>0.070</td>
<td>1.90</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Polyvinyl chloride film Natural rubber</td>
</tr>
<tr>
<td>364 Series</td>
<td>364</td>
<td>0.070</td>
<td>1.90</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Polyvinyl chloride film Natural rubber</td>
</tr>
</tbody>
</table>

#### SPV Log Roll Diameter

<table>
<thead>
<tr>
<th>Base material</th>
<th>Number</th>
<th>Thickness</th>
<th>100m</th>
<th>200m</th>
<th>500m</th>
<th>1,000m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyvinyl chloride</td>
<td>SPV-2001SR</td>
<td>0.100</td>
<td>141</td>
<td>181</td>
<td>297</td>
<td>376</td>
</tr>
<tr>
<td>Polyvinyl chloride</td>
<td>SPV-2011SR</td>
<td>0.085</td>
<td>129</td>
<td>172</td>
<td>345</td>
<td>433</td>
</tr>
<tr>
<td>Polyvinyl chloride</td>
<td>SPV-302</td>
<td>0.12</td>
<td>150</td>
<td>186</td>
<td>385</td>
<td>469</td>
</tr>
<tr>
<td>Polyvinyl chloride</td>
<td>SPV-C-300</td>
<td>0.065</td>
<td>127</td>
<td>160</td>
<td>221</td>
<td>303</td>
</tr>
</tbody>
</table>

Note: The above chart shows examples of measured values, not guaranteed values.