Introduction

Total assembly solutions provider, ASSEMS

Adhesives have a long history and are the core material for most production processes in recent industry. ASSEMS was established in 2003 named Optim for the development of eco-friendly & human-friendly adhesives and has continuously grown in the field of adhesives.

Our environment-friendly film-adhesive is produced by eco-friendly methods without solvents and allows you to achieve low-cost and high-efficiency.

Our primary field was the shoe industry for the first time, we were registered with Nike as a supplier for hot-melt film adhesive and process of bonded fabric. Now we are extending our business field to bags, clothes, motorcars and electric products.

Our 3 major businesses are the production of hot-melt film, laminating & coating of fabrics with our film, and production of hot-melt laminating machine.

We can supply full package service to customers for bonding and laminating. We assure the environment will be one of the focusing points for quality standards. The world is trying to preserve environment of Earth through Kyoto protocol, Copenhagen climate change conference etc. but still too far to expect their real action.

With continuous efforts to save the Earth, ASSEMS is making it be possible now.

History

2003.06  OPTIM Co., Ltd. established
2003.12  Selected to new technology company from Ministry of commerce, Industry and Energy
2004.09  Selected to brilliant company from the Small & Medium Industry Promotion Corporation
2005.01  Lamination facility approved by NIKE Korea
2005.07  Designated to Venture business company from the Small & medium Industry Promotion Corporation
2006.01  Industrial technology innovation award
2006.06  Export blue chip medium and small enterprises choice
2007.03  Pusan appointment 1000 guidance corporation
2007.05  Certification NEP “Hot melt film adhesive for insole”
2007.07  Republic of Korea area reform contest prime minister Prize-winning
2008.03  Special permissions reform style smaller enterprise choice
2008.10  OPTIMA established in Guangzhou, China
2009.04  OPTIM VINA established in Hochiminh, Vietnam
2010.03  OPTIM JAYA established in Indonesia
2010.11  Green Certification
2011.01  Change Company name to ASSEMS Inc.
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Form of ASSEMS Hot-melt Film

- **Shape**: Melt adhesive by heat (Hot-melt type)
- **Form**: Dyed color, vinyl form of no-smell, No release paper
- **Width**: 44 inch (112cm) – 60 inch (152cm)
- **Thickness**: 15μm – 200μm (hair: 60μm)
- **Characters**: Environment friendly adhesives
  - No 2nd, 3rd pollution
  - SGS analysis (All products)
  - Pass in heavy metal test for Nike
  - Correct film possession in special quality
  - Able to recycle for scraps

Characters of ASSEMS Hot-melt Film

<table>
<thead>
<tr>
<th><strong>Usage</strong></th>
<th>Various &amp; specialized film adhesives for foam and material, material and material adhesion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Form</strong></td>
<td>No use release paper film adhesives</td>
</tr>
<tr>
<td><strong>Skill</strong></td>
<td>Toxic solvent adhesive &amp; Imported film adhesive change</td>
</tr>
<tr>
<td></td>
<td>Obvious quality control</td>
</tr>
<tr>
<td><strong>Performance</strong></td>
<td>Strong adhesion &amp; breathing security</td>
</tr>
<tr>
<td></td>
<td>Easy, convenient usage</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td>Non-using toxic solvent, Environment friendly process</td>
</tr>
</tbody>
</table>

Advantages of ASSEMS Hot-melt Film

- No release paper and no toxic solvent for clean environment and no environmental pollution
- Various kinds of hot-melt film bases for various materials
- Consistent & strong bonding strength and breathability
- Environment-friendly process for workers
- Possible to make width 44” to 60” (112~152cm) & thickness 15~300μm
- Various application for shoes, garments, clothes, automobile, furniture, bags, album, printing etc.
## Adhesives Comparison

### Original adhesive
- Use toxic solvent
- Liquid & block Type
- Apparent bad smell
- Direct spread working
  - No constant spread
- Poor factory environment

### ASSEMS hot-melt Film
- Non solvent type
- Film type
- No smell
- Film from product constant spread
- Clean factory environment

<table>
<thead>
<tr>
<th></th>
<th>ADHESIVE TYPE</th>
<th>MAIN SYSTEM</th>
<th>POWER</th>
<th>LAMINATION STATUS</th>
<th>HEAT</th>
<th>QUALITY</th>
<th>LOSS</th>
<th>Shrinkage</th>
<th>Small Bonding Possibility</th>
<th>Spread</th>
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</thead>
<tbody>
<tr>
<td>SOLVENT TYPE LAMINATION M/C</td>
<td>Liquid</td>
<td>Roll Press</td>
<td>Electric</td>
<td>Rotating</td>
<td>One Side</td>
<td>unequal</td>
<td>a Lot</td>
<td>Clear</td>
<td>Hard</td>
<td>unequal</td>
</tr>
<tr>
<td>WATER BASE LAMINATION M/C</td>
<td>Liquid</td>
<td>Roll Heat Press</td>
<td>Oil Pump</td>
<td>Rotating</td>
<td>One Side</td>
<td>unequal</td>
<td>a Lot</td>
<td>Frequent</td>
<td>Hard</td>
<td>unequal</td>
</tr>
<tr>
<td>ASSEMS HOT MELT LAMINATION OF PLATE TYPE</td>
<td>WAXED</td>
<td>Roll Heat Press</td>
<td>Electric</td>
<td>Plate</td>
<td>One Side</td>
<td>equal</td>
<td>Few</td>
<td>Frequent</td>
<td>Easy</td>
<td>equal</td>
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<tr>
<td>HOT MELT LAMINATION OF ROLL TYPE</td>
<td>WAXED</td>
<td>Roll Heat Press</td>
<td>Oil Pump</td>
<td>Rotating</td>
<td>One Side</td>
<td>unequal</td>
<td>a Lot</td>
<td>Frequent</td>
<td>Hard</td>
<td>unequal</td>
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<tr>
<td>HOT MELT LAMINATION OF POWDER</td>
<td>Powder</td>
<td>Net Type</td>
<td>Electric</td>
<td>Plate</td>
<td>One Side</td>
<td>unequal</td>
<td>a Lot</td>
<td>Frequent</td>
<td>Hard</td>
<td>unequal</td>
</tr>
</tbody>
</table>
Coating system that use release textile

Capacity of Hot-melt Film Adhesives

<table>
<thead>
<tr>
<th></th>
<th>FA-1000(40μm)</th>
<th>FA-2000(40μm)</th>
<th>FA-3000(35μm)</th>
<th>FA-4000(40μm)</th>
<th>FA-7000(150μm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMA Ine 1</td>
<td>2,000M/Hr</td>
<td>2,000M/Hr</td>
<td>2,000M/Hr</td>
<td>2,000M/Hr</td>
<td>2,000M/Hr</td>
</tr>
<tr>
<td>HMA Ine 2</td>
<td>2,000M/Hr</td>
<td>2,000M/Hr</td>
<td>2,000M/Hr</td>
<td>2,000M/Hr</td>
<td>2,000M/Hr</td>
</tr>
<tr>
<td>HMA Ine 3</td>
<td>2,000M/Hr</td>
<td>2,000M/Hr</td>
<td>2,000M/Hr</td>
<td>2,000M/Hr</td>
<td>2,000M/Hr</td>
</tr>
<tr>
<td>Total/Day</td>
<td>48,000M/2ton/day</td>
<td>48,000M/2ton/day</td>
<td>48,000M/2ton/day</td>
<td>48,000M/2ton/day</td>
<td>48,000M/2ton/day</td>
</tr>
<tr>
<td>Total/Month</td>
<td>1,440,000M/60ton/Month</td>
<td>1,440,000M/60ton/Month</td>
<td>1,440,000M/60ton/Month</td>
<td>1,440,000M/60ton/Month</td>
<td>1,440,000M/60ton/Month</td>
</tr>
</tbody>
</table>

Maximum Capacity: 4,320,000M/month(180ton)  HMA Ine: Working for 24hours

Capacity of Laminating & Coating

<table>
<thead>
<tr>
<th></th>
<th>Coating Process</th>
<th>Laminating Process</th>
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<tbody>
<tr>
<td>Head office &amp; Korea Factory</td>
<td>Lamination Line 1 6,000M/8hr x 20days = 120,000M/Month</td>
<td>3,000M/8hr x 20days = 60,000M/Month</td>
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<tr>
<td></td>
<td>Lamination Line 2 3,000M/8hr x 20days = 60,000M/Month</td>
<td>3,000M/8hr x 20days = 60,000M/Month</td>
</tr>
<tr>
<td></td>
<td>Lamination Line 3 3,000M/8hr x 20days = 60,000M/Month</td>
<td>3,000M/8hr x 20days = 60,000M/Month</td>
</tr>
<tr>
<td>China Factory</td>
<td></td>
<td>3,000M/8hr x 20days = 60,000M/Month</td>
</tr>
<tr>
<td>Vietnam Factory</td>
<td></td>
<td>3,000M/8hr x 20days = 60,000M/Month</td>
</tr>
<tr>
<td>Indonesia Factory</td>
<td></td>
<td>3,000M/8hr x 20days = 60,000M/Month</td>
</tr>
<tr>
<td>Total/Month</td>
<td>120,000M/Month</td>
<td>300,000M/Month</td>
</tr>
</tbody>
</table>

Coating Capacity: 240,000M/Month (2shifts)

ASSEMS Patent Right

<table>
<thead>
<tr>
<th>Title</th>
<th>Name</th>
<th>Nationality</th>
<th>Application date</th>
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</thead>
<tbody>
<tr>
<td>Laminating system &amp; temp control way to adhere to Hot-melt film textile</td>
<td>Jang J. S</td>
<td>South Korea</td>
<td>Mar, 06, 2007</td>
</tr>
<tr>
<td>Special coating release Textile &amp; making method</td>
<td>Jang J. S</td>
<td>South Korea</td>
<td>Mar, 06, 2007</td>
</tr>
</tbody>
</table>
Hot-melt Film Adhesives

**FA-1000 Series** (Acryl Base) : FA-1150

<table>
<thead>
<tr>
<th>Application</th>
<th>PU foam, tricot lamination for shoes, automobile, furniture etc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density(g/cm³)</td>
<td>M, P(T°C)</td>
</tr>
<tr>
<td>0.95~0.99</td>
<td>85~95</td>
</tr>
</tbody>
</table>

*Old machine & bad smell
Inconsistent bonding strength
Poor environment for workers

*New machine and clean environment without bad smell
Consistent bonding quality
High productivity and environment-friendly process

**FA-2000 Series** (EVA Base) : FA-2100N, FA-2010, FA-2150

<table>
<thead>
<tr>
<th>Application</th>
<th>Coating of reinforcement mat’l(6oz Canvas, Non-woven), EVA, Neoprene, Lycra, Reflective mat’l with low working temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density(g/cm³)</td>
<td>M, P(T°C)</td>
</tr>
<tr>
<td>0.95~0.99</td>
<td>60~140</td>
</tr>
</tbody>
</table>

*Material : YL-ML-005 (Photo taken with Digital Camera)

FA-1000 Low Melting Point
FA-2010 High Melting Point

Lamination done with the low melting point HMA FA-2010 shows better glossiness than the high melting point FA-2150

**FA-3000 Series** (Poly-olefin Base) : FA-3030, FA-3050

<table>
<thead>
<tr>
<th>Application</th>
<th>Coating of reinforcement mat’l(6oz Canvas, Non-woven), Hysock, sockliner for mold(insole), IP hybrid, butterfly system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density(g/cm³)</td>
<td>M, P(T°C)</td>
</tr>
<tr>
<td>0.95~0.99</td>
<td>85~95</td>
</tr>
</tbody>
</table>

Coating nonwoven cutting
Pylon Mid-sole
Molding Press
Butterfly System
Hysock Process
IP Hybrid Sockliner
**Hot-melt Film Adhesives**

**FA-4000 Series** (Poly-ester Base) : FA-4100

<table>
<thead>
<tr>
<th>Application</th>
<th>TPU lamination with reinforcement without Non-yellowing, Satin lamination for sublimation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density(g/cm³)</td>
<td>M.P(℃)</td>
</tr>
<tr>
<td>0.97~1.01</td>
<td>110~170</td>
</tr>
</tbody>
</table>

**FA-7000 Series** (Poly-urethane Base) : FA-7300, FA-7400

<table>
<thead>
<tr>
<th>Application</th>
<th>Coating of TPU, PU synthetic, PU skin layer for No-Sewing, Ortholite Foam(Virgin Foam)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density(g/cm³)</td>
<td>M.P(℃)</td>
</tr>
<tr>
<td>0.95~0.99</td>
<td>60~140</td>
</tr>
</tbody>
</table>

**Film Production**


   - Pass
   - Technical Feedback
   - Material Feedback

- Ortholite
- No-Sewing
**Industrial Applications**

- **1. Compounding**
  - 1. Mixing
  - 2. Raw material

- **2. Pelletizing**
  - Pelletizing Machine
  - 1. Raw material input
  - 2. Melting
  - 3. Cooling by water
  - 4. Drying
  - 5. Mop up
  - 6. Cutting to pellet

- **3. Blowing**

- **4. Rolling**

- **5. Packing**

- **6. Storage**
  - Storage by film

- **7. Film Recycling Process**

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**Industrial Applications**

- Footwear
- Textiles and Garments
- Automotive
- Leather
- Military Defense
- Luggage
- Household Applications
- General
- Industrial
General Information

• The length of each process line can be changed according to work place.
• Specification

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply</td>
<td>380V/3(4P)</td>
</tr>
<tr>
<td>Motor</td>
<td>½ HP - 4P - 1/40</td>
</tr>
<tr>
<td>Heater</td>
<td>62.0kw</td>
</tr>
<tr>
<td>Temperature</td>
<td>0~300°C</td>
</tr>
<tr>
<td>Speed control</td>
<td>5~25 Sec</td>
</tr>
<tr>
<td>Air</td>
<td>0~6kg/cm²</td>
</tr>
<tr>
<td>Belt Size (Width*Length)</td>
<td>Upper : 1,600 X 6,040</td>
</tr>
<tr>
<td>Bearing No.</td>
<td>2204, F205</td>
</tr>
<tr>
<td>Dimension</td>
<td>5,500 X 2,150 X 1,180</td>
</tr>
</tbody>
</table>

Characteristics

• Optimum bonding condition & exact temperature control system – Within 5 temp. deviation

• Multiple layers of materials can be laminated and coated process at one time.

• Handles adhesives & substrates up to 60” wide.

• FAM-1600 can also handle sheet feed applications.

• Constant and high pressure by air cylinder and silicon roller.

• Control Box
  - Easy to operate and visible process control.

• Unique technical skills
  - Laminating system & temp. control method.
  - The releasing textile coated by silicon manufacturing method.

Protected by patent rights
Coating process

Outline

• 1. Input rack

- Textile
- HMA Film
- Release Textile: Able to be used semi-permanently, Protected by patent rights
- Tension wheel: Prevention of material wrinkle, Multiple layers can be available.

• 2. Laminating & Coating machine (FAM-1600)

- Lid – Find the problem easily
- Emergency Switch
- Possible to measure the temp upper/ lower belt respectively.

• 3. Pressing
- One more pressing for stable bonding & surface

• 4. Cooling
- For fast binding to prevent wrinkle and curling

• 5. Tension Bar
- To prevent shrinkage & help exact rolling

• 6. 1st Rolling
- Release textile: Roll out to reuse releasing textile

• 7. Finished good rolling
- Coated material
Lamination Process

Outline

1. Input rack
2. Laminating & Coating M/C
3. Press rolling
4. Cooling
5. Tension bar
6. Rolling system

Heating Press & Cooling Press

- Pressure: 1~20kg/㎠
- Cooling Temp.: 70℃
- Pressing Roll: To strengthen bonding power
- Temperature sensor: Protected by patent rights
No-sew Process (FA-7300, 150~200um)

1. coating
2. cutting
3. Hot-press
4. Finished goods

Reinforcement Material Lamination process (FA-3050 or 2150, 40um)

- This is general process for reinforcement materials hot-melt lamination used with FA-3050.
- It is very simple & fast lamination process and clean workplace can be maintained.

1. Material preparation
2. Laminating
3. Materials roll up

FAM1600 Machine Condition

- Pressure: 3~4kg/cm²
- Temp.: 135~145°C
- Time: 3~5 M/min

Normal Lamination process

1. Textile to Textile
2. Textile to PU Synthetic leather
3. Tricot to PU Foam to Textile
4. Lycra to EVA to Lycra
5. Others, 4 layers of materials can be laminated at one time.
Sock-liner process (FA-3050, FA-2150)

I. Die cut sockliner process
- FA-3050
- EVA sheet
- Top cloth
- Size cutting
- Finish

II. Molded sockliner process
- EVA sheet
- FA-3050
- Top cloth
- Heat pressure (EVA+FA-3050+Top cloth)
- Heat pressure (EVA+FA-3050+Top cloth)

Ortholite Hotmelt coating process (FA-7400)

FA-7400
- Ortholite
- Textile
- Coated Low density EVA
- Coated EVA
- Cutting
- Laminated Ortholite
- Cutting
- Molding Press
- Cutting Press

Laminated HMA film
Coated Low density EVA form FA-2100N 40um
Coated EVA form FA-2150 40um
Laminating Ortholite form with FA-7400 50um

FA-7000 Series is PU Base copolymer
EVA sheet to PU foam(OrthoLite)
directed comolding sockliner process
Soft touch and very strong laminating strength.
Butterfly System

- Total dimension: 2m²
- Total inside dimension: 1.5m²
- Coefficient of utilization: 75%

- Strong Point
  1. Reduce production process decrease cost
  2. Cut down Textile, Hot-melt Film and EVA
  3. Environment friendly (no odor & noise)
  4. Higher bonding score
  5. Expected VOC improvement
  6. Recycle for remaining EVA (after cut)

- Comments
  Since FA-3050 is environment friendly and high productivities with higher bonding score, it needs to be applied to improve the sock liner bonding.
**General Information**

- The machine is well-suited for sample laminating and coating.
- Handles adhesives & substrates up to 45cm wide.
- Very easy to process.

- **Specification**

<table>
<thead>
<tr>
<th>Description</th>
<th>1050 x 880W x 150H</th>
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</thead>
<tbody>
<tr>
<td>Weight</td>
<td>140kg</td>
</tr>
<tr>
<td>Motor</td>
<td>2P, 220V (1/30), 0.1HP</td>
</tr>
<tr>
<td>Heater</td>
<td>220V x 3kw</td>
</tr>
<tr>
<td>Temp Range</td>
<td>0~250°C</td>
</tr>
<tr>
<td>Conveyor Speed</td>
<td>1~8m/sec</td>
</tr>
<tr>
<td>Belt size (mm)</td>
<td>upper: 500 x 1660, lower: 500 x 2090</td>
</tr>
<tr>
<td>Description</td>
<td>FA-1000 Series</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td></td>
<td>1150</td>
</tr>
<tr>
<td>Base Polymer</td>
<td>Polyacryl</td>
</tr>
<tr>
<td>Packing unit</td>
<td>Roll</td>
</tr>
<tr>
<td>Spec.</td>
<td>Thickness (µm)</td>
</tr>
<tr>
<td></td>
<td>Width (inch)</td>
</tr>
<tr>
<td></td>
<td>Length (M)</td>
</tr>
<tr>
<td>Melting Point (°C)</td>
<td>90~95</td>
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<tr>
<td>Process temperature (°C)</td>
<td>125~135</td>
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<td>Working Time ±5</td>
<td>20</td>
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<tr>
<td>Ventilation</td>
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<td>Touch</td>
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<td>Applicable material</td>
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<td>Textile</td>
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</tr>
<tr>
<td>Cotton</td>
<td>-</td>
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<td>Span (Lycra)</td>
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<td>Acetate</td>
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<td>Polyester</td>
<td>○</td>
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<tr>
<td>Glossy nylon</td>
<td>○</td>
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<td>Felt (Non Woven)</td>
<td>○</td>
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<tr>
<td>Metal</td>
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<td>Stainless</td>
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<td>Copper</td>
<td>○</td>
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<td>Copper plate</td>
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<tr>
<td>Synthetic Resin</td>
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<tr>
<td>Polypropylene (PP)</td>
<td>-</td>
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<td>PE, TPO (Thermo Plastic Olefin)</td>
<td>○</td>
</tr>
<tr>
<td>PVC</td>
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<tr>
<td>PC (Polycarbonate)</td>
<td>○</td>
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<td>PU, PET (polyethylene terephthalate)</td>
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<td>TPU (Thermo Plastic Urethan)</td>
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<td>EVA</td>
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<td>ABS (Polystyrene, styrofoam)</td>
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<td>FRP</td>
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<td>Paper</td>
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<td>Rubber with sulfur</td>
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<td>Rubber without sulfur</td>
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<tr>
<td>An inorganic compound</td>
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<td>Synthetic leather</td>
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<td>Wood(furniture)</td>
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<td>Hard wood</td>
<td>○</td>
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<tr>
<td>Soft wood</td>
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</table>
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