### Characteristics of Urethane, Rubbers and Sponges

**Features of High Performance Urethane and Rubber**

#### Urethane Properties

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Standard</th>
<th>Ceramic Urethane</th>
<th>Rubber Urethane</th>
<th>Urethane (Shore A95)</th>
<th>Urethane (Shore A85)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shore A</td>
<td>°C</td>
<td>90</td>
<td>80</td>
<td>70</td>
<td>60</td>
<td>50</td>
</tr>
<tr>
<td>Shore D</td>
<td>°C</td>
<td>90</td>
<td>80</td>
<td>70</td>
<td>60</td>
<td>50</td>
</tr>
<tr>
<td>Abrasion Resistance</td>
<td>abrasion</td>
<td>10</td>
<td>9.5</td>
<td>9</td>
<td>8.5</td>
<td>8</td>
</tr>
<tr>
<td>Impact Resistance</td>
<td>cm3</td>
<td>95</td>
<td>90</td>
<td>80</td>
<td>70</td>
<td>60</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>MPa</td>
<td>15</td>
<td>18</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Tear Strength</td>
<td>MPa</td>
<td>35</td>
<td>40</td>
<td>45</td>
<td>50</td>
<td>55</td>
</tr>
<tr>
<td>Hardness Shore A</td>
<td></td>
<td>95</td>
<td>90</td>
<td>70</td>
<td>50</td>
<td>30</td>
</tr>
<tr>
<td>Elongation %</td>
<td></td>
<td>380</td>
<td>470</td>
<td>720</td>
<td>520</td>
<td>600</td>
</tr>
</tbody>
</table>

#### Discoloration of Urethane

- Urethane may experience discoloration over time, especially under high temperatures. To mitigate this, use products with improved discoloration resistance.

#### Aging Discoloration of Artificial Urethane

- **Before Test**: 1 day
- **After Test**: 1 day

#### Features of Various Urethanes

- **Abrasion Resistant Urethane**: Suitable for use in applications requiring high abrasion resistance, such as machinery parts and conveyor belts.
- **Impact Resilience**: Ideal for protective applications requiring high impact absorption, like automotive parts.
- **Super Abrasion Resistant Urethane**: Outperforms conventional urethanes in terms of abrasion resistance, making it suitable for demanding environments.
- **Acid Resistance, Alkali Resistance**: Ensures durability in corrosive environments.

#### Features of Ceramic Urethane

- **Elasticity of Shock Absorbing Gel P410, 435**: Important for applications requiring shock absorption, like automotive and aerospace components.
- **Low Abrasion Resistant**: Serves in applications where minimal wear is critical, such as undercarriage components.
- **Low Rebound Urethane**: Suitable for human body protection, providing superior cushioning and comfort.

#### Features of Special Urethane Foam SOFRAB® 14R6

- **Environmentally Friendly**: Ideal for use in sensitive applications requiring minimal environmental impact.
- **Abrasion Resistant**: Long-lasting performance even under harsh conditions.

**Rubber Properties**

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Standard</th>
<th>Ceramic Rubber</th>
<th>Rubber (Shore A95)</th>
<th>Rubber (Shore A85)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shore A</td>
<td>°C</td>
<td>90</td>
<td>80</td>
<td>70</td>
<td>60</td>
</tr>
<tr>
<td>Shore D</td>
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<td>18</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>Tear Strength</td>
<td>MPa</td>
<td>35</td>
<td>40</td>
<td>45</td>
<td>50</td>
</tr>
<tr>
<td>Hardness Shore A</td>
<td></td>
<td>95</td>
<td>90</td>
<td>70</td>
<td>50</td>
</tr>
<tr>
<td>Elongation %</td>
<td></td>
<td>380</td>
<td>470</td>
<td>720</td>
<td>520</td>
</tr>
</tbody>
</table>

**Features of Low Rebound Urethane and Low Elasticity Rubber (Hanenanito®)**

- **Low Rebound Urethane**: Designed to maintain low resilience even under high-temperature conditions, making it ideal for applications requiring extended performance.

**Features of Rubber Absorbing Foam P435**

- **Excellent sound damping and vibration absorbing characteristics**: Ideal for use in vehicles and machinery to reduce noise and vibrations.

**Features of Special Urethane Foam SOFRAB® 14R6**

- **Environmentally friendly**: Low impact on the environment, making it a viable option for sustainable applications.

**Drop Comparison of Rubber Ball and Hanenanito® Ball**

- **Listed values are for reference, not guaranteed.**

**Rubber Characteristics**

- **Surface Hardness**: Shore A 40, 20, 10, 0, 5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100
- **Elongation %**: 380, 470, 720, 520, 600, 690, 650, 530, 650, 360, 440, 680, 490, 530, 250, 445

**Chemical Resistance**

- **Heat resistance**: °C 70, 80 (120 deg. for Short Time) 70, 70, 70, 120, 70, 80
- **Hardness Shore A**: 95, 90, 70, 50, 30, 92, 68, 90, 70, 95, 90, 70, 50, 90, 70, 15
- **Elongation %**: 380, 470, 720, 520, 600, 690, 650, 530, 650, 360, 440, 680, 490, 530, 250, 445
- **Specific Volume Resistivity**: 4.0x10⁹Ω
- **Specific Gravity**: 1.06
- **Specific Heat**: 1,060
- **Specific Volume Absorption**: 60L
- **Specific Weight**: 970
- **Specific Resistant**: 435
- **Specific Volume Resistance**: 1,060

**Drop Comparison of Rubber Ball and Hanenanito® Ball**

- **Listed values are for reference, not guaranteed.**

**Correlation of Hardness and Rebound Force of Shock Absorbing Materials**

- **Shock Absorbing Gel Low Rebound Urethane**: Best suited for human body protection. Can be pasted in multi-layers where more protection is needed.

**Drop Test**

- **Drop Test Comparison of Rubber Ball and Hanenanito® Ball**: Abrasion Resistant, Impact Resilience, Super Abrasion Resistant Urethane, Acid Resistance, Alkali Resistance, Heat Resistant.
## Rubber Properties

### Urethane Rubber
- **Features**
  - Excellent in heat, cold and weather resistance, and good in water and chemical resistance.
- **Usage**
  - ESD (Electrostatic Discharge) Protection
  - Used in Xerox photocopiers, fax machines, and other ESD-sensitive equipment.

### Chloroprene Rubber (CR)
- **Features**
  - Excellent in heat, cold, and weather resistance. Can be used in a wide range of applications due to its versatile properties.
- **Usage**
  - Used in automotive parts, such as seals and gaskets.

### Ethylene Rubber
- **Features**
  - Excellent in heat, cold, and weather resistance, and good in ozone resistance.
- **Usage**
  - Used in automotive hoses, belts, and cables.

### Fluororubber
- **Features**
  - Excellent in heat, cold, and weather resistance, and good in chemical resistance.
- **Usage**
  - Used in chemical processing equipment, such as pumps and valves.

### Nitrile Rubber
- **Features**
  - Excellent in heat, cold, and weather resistance, and good in chemical resistance.
- **Usage**
  - Used in automotive gaskets, seals, and O-rings.

### Butyl Rubber
- **Features**
  - Excellent in heat, cold, and weather resistance, and good in ozone resistance.
- **Usage**
  - Used in automotive hoses, belts, and cables.

### Low Temp. Resistance
- **Features**
  - Resists low temperatures without losing its properties.
- **Usage**
  - Used in automotive components and industrial equipment.

### Fire Resistance
- **Features**
  - Resists fire without melting or dripping.
- **Usage**
  - Used in electrical components and wiring accessories.

### Mechanical Strength
- **Features**
  - Resists mechanical stress without deforming.
- **Usage**
  - Used in automotive and industrial components.

### Abrasion Resistance
- **Features**
  - Resists wear and tear due to friction.
- **Usage**
  - Used in automotive parts and heavy-duty equipment.

### Oil Resistance
- **Features**
  - Resists penetration by oils and greases.
- **Usage**
  - Used in automotive parts and industrial equipment.

### Weather Resistance
- **Features**
  - Resists weathering without deteriorating.
- **Usage**
  - Used in automotive parts and outdoor equipment.

### Chemical Resistance
- **Features**
  - Resists penetration by various chemicals.
- **Usage**
  - Used in chemical processing equipment and industrial parts.

### Notes
- **Packaging**
  - 100 pcs. in 50 pkcs.

### Comparison of Chemical Resistance

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Urethane</th>
<th>Nitrile</th>
<th>Ethylene</th>
<th>Butyl</th>
<th>Fluorine</th>
<th>Silicon</th>
<th>Chloroprene</th>
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<tbody>
<tr>
<td>Gasoline</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<td>Light Oil</td>
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<td>O</td>
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<td>O</td>
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<tr>
<td>Plastics</td>
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<td>X</td>
<td>O</td>
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<td>Paints</td>
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<td>Greases</td>
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<td>Esters</td>
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<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

### Indication of Hardness
- **Shore A**
  - Used to measure the hardness of materials.
- **Shore B**
  - Used to measure the hardness of materials with a Shore B type durometer.
- **Shore C**
  - Used to measure the hardness of materials with a Shore C type durometer.

### Hardness Images
- **Hardness Test**
  - Standardized test method to measure the hardness of materials.

### Types of Durometers and Objects of Measurement
- **Durometer A**
  - Shore A type durometer
- **Durometer B**
  - Shore B type durometer
- **Durometer C**
  - Shore C type durometer

### Notes
- **Yellow Discoloration of Urethane**
  - May occur due to exposure to sunlight.
  - Physical properties remain unchanged.

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**Urethane Washers, Rubber Washers**

**Washer Package**

- **Material**
  - Urethane
  - Chloroprene Rubber
  - Butyl Rubber
  - Nitrile Rubber
  - Ethylene Rubber
  - Fluororubber
  - Silicon Rubber
  - Chloroprene Rubber

- **Features**
  - Excellent in heat, cold, and weather resistance.
  - Good in water and chemical resistance.

- **Usage**
  - Used in automotive parts, such as O-rings and gaskets.

- **Manufacturers**
  - SRIS 0101 C Type
  - PACK-URWH
  - PACK-WRB

**Part Number**

<table>
<thead>
<tr>
<th>Type</th>
<th>V Selection</th>
<th>T Selection</th>
<th>Tolerance</th>
<th>Pcs. per Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>PACK-URWH</td>
<td>10</td>
<td>10</td>
<td>±0.6</td>
<td>50 pcs.</td>
</tr>
<tr>
<td>PACK-URWM</td>
<td>10</td>
<td>10</td>
<td>±0.8</td>
<td>50 pcs.</td>
</tr>
<tr>
<td>PACK-WRBN</td>
<td>10</td>
<td>10</td>
<td>±0.9</td>
<td>50 pcs.</td>
</tr>
</tbody>
</table>

**Unit Price**

<table>
<thead>
<tr>
<th>Type</th>
<th>T Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>PACK-URWH</td>
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</tr>
<tr>
<td>PACK-WRBN</td>
<td>10</td>
</tr>
<tr>
<td>PACK-WRBC</td>
<td>10</td>
</tr>
</tbody>
</table>

---

**Urethane Washers**

- **Type**
  - PACK-URWH
  - PACK-URWM
  - PACK-WRBN
  - PACK-WRBC

- **Material**
  - Urethane
  - Chloroprene Rubber
  - Butyl Rubber

- **Features**
  - Excellent in heat, cold, and weather resistance.
  - Good in water and chemical resistance.

- **Color**
  - Black

---

**Notes**

- **Packaging**
  - 100 pcs. in 50 pkcs.

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**References**

- For further information, refer to Specification Sheet.

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**Contact Information**

- For inquiries, please contact your local Misumi representative.

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**Disclaimer**

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  - Siicone Rubber
  - Fluororubber
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  - Nitrile Rubber
  - Oil Resistance
  - Abrasion Resistance
  - Weather Resistance
  - Heat Resistance
  - Fire Resistance
  - Mechanical Strength
  - Chemical Resistance
  - Notes

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