Rubber Properties

**Features**

- **Urethane**: Excels in mechanical strength. Weak in heat and chemical resistance. Wide range of hardness variations.
- **Nitrile (NBR)**: Excels in abrasion resistance and oil resistance, and economical. Inferior in weather resistance. Avoid using in areas where it may be exposed to direct sunlight or around ozone-generating electrical devices.
- **Chloroprene (CR)**: Well-balanced in properties and economical.
- **Butyl (IIR)**: Excels in weather resistance and air tightness. Suits for inner tube of air tire. Inferior in all oil resistance and fire resistance.
- **Fluorine (FPM)**: Excels in heat resistance. Inferior in mechanical strength.
- **Low Elastic (Hanenaito®)**: Excels in shock absorption and oil resistance. Inferior in heat resistance and low temperature resistance.

**Property Order**

<table>
<thead>
<tr>
<th>Item</th>
<th>Urethane</th>
<th>Nitrile</th>
<th>Chloroprene</th>
<th>Ethylene</th>
<th>Fluorine</th>
<th>Low Elastic</th>
<th>Silicon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Strength</td>
<td>Silicon Low Elastic Butyl Ethylene Nitrile Fluorine Chloroprene Urethane</td>
<td>Butyl Ethylene Chloroprene Urethane Nitrile Fluorine</td>
<td>Butyl Ethylene Silicon Fluorine Chloroprene Urethane Nitrile</td>
<td>Butyl Ethylene Silicon Fluorine Chloroprene Urethane Nitrile</td>
<td>Butyl Ethylene Silicon Fluorine Chloroprene Urethane Nitrile</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Property Comparison Chart**

<table>
<thead>
<tr>
<th>Item</th>
<th>Urethane</th>
<th>Nitrile</th>
<th>Chloroprene</th>
<th>Ethylene</th>
<th>Fluorine</th>
<th>Low Elastic</th>
<th>Silicon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Strength</td>
<td>Silicon Low Elastic Butyl Ethylene Nitrile Fluorine Chloroprene Urethane</td>
<td>Butyl Ethylene Chloroprene Urethane Nitrile Fluorine</td>
<td>Butyl Ethylene Silicon Fluorine Chloroprene Urethane Nitrile</td>
<td>Butyl Ethylene Silicon Fluorine Chloroprene Urethane Nitrile</td>
<td>Butyl Ethylene Silicon Fluorine Chloroprene Urethane Nitrile</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comparison of Allowable Temperature**

![Temperature Characteristics](chart)

**Comparison of Chemical Resistance**

![Chemical Resistance](chart)

**Indication of Hardness**

Three hardness categories are used for MISUMI’s Urethane / Rubbers / Sponges.

1. **Shore A**: Used for Urethane and Rubbers. “Shore A 70” means a hardness measured by using type-A Durometer in accordance with New JIS Standard K6253.
2. **ASKER C**: Used to describe the hardness of Sponges. “ASKER C 25” means a hardness measured by using a spring type hardness tester Ask C in accordance with SRS 0101 (Standard by the Society of Rubber Industry, Japan). For those two above, larger value indicates harder material.
3. **Penetration**: Used to describe the hardness of gel materials. Penetration is standardized by JIS K2207. It indicates hardness by the penetrated length that a pin of specified weight penetrates in a sample perpendicularly. The value is one penetration for 1/10mm length. (Larger value indicates softer material.)