Properties and Characteristics of High Performance Urethane/TPE (Thermoplastic Elastomer)

**Super Abrasion Resistant Urethane: Vulkollan®**

Vulkollan® is a super abrasion resistant urethane which is far superior to conventional urethanes in abrasion resistance and load bearing. It is 50 times higher in abrasion resistance and half as much again in material strength. (MISUMI's internal test)

**Abrasion Resistant Urethane**

Unique composition realized abrasion resistance 2.5 times higher than general urethanes at low cost. Color is dark brown.

**Results of Abrasion Test**

<table>
<thead>
<tr>
<th>Abrasion Test (Method)</th>
<th>General Urethane</th>
<th>1/16 in</th>
<th>TPE Vulkollan®</th>
<th>Abrasion Test (Method)</th>
<th>General Urethane</th>
<th>1/16 in</th>
<th>TPE Vulkollan®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abrasion Test (Method)</td>
<td>197.3</td>
<td>73.8</td>
<td>33.9</td>
<td>Abrasion Test (Method)</td>
<td>197.3</td>
<td>73.8</td>
<td>33.9</td>
</tr>
</tbody>
</table>

Abrasion wheels are applied to the sample using a fixed weight for a specified number of cycles. From the weight loss of the sample it is possible to rate the abrasion resistance of a material.

**Advantage**

High abrasion and material strength provide longer life and replacement intervals.

**Discoloration of Vulkollan®**

Due to its unique composition Vulkollan® has poorer color stability against ultraviolet rays than general urethanes. Pictures below show the process of change in colors of a sample exposed to outdoor sunlight.

**Abrasion Test**

- Before Test
- 1 Day
- 6 Days
- 20 Days

No change in physical property / characteristic due to discoloration.

**Heat Resistant Urethane**

The urethane has greater heat resistance up to 120°C (general urethane withstands up to 70°C).

Suitable for use in applications where high material strength in high-temperature range is required, such as work receiver for hot air dryer.

**This urethane has greater heat resistance up to 120°C (general urethane withstands up to 70°C).**

**Advantage**

- Good elongation and shock absorption
- Used as cushioning material pallet damper, conveyor machine, precision instrument etc, because of its low repulsion urethane/Low elastic rubber/Shock absorbing gel products

Shock Absorbing Gel

Shock absorbing gel is extremely soft gel which has an Askер F hardness. It has high material strength. A major characteristic is the three-dimensional slow recovery, the function to recover after compression slowly and in multiple directions.

**Characteristics of Shock Absorbing Materials**

- **Hardness of Shock Absorbing Materials**
  - **Type F**
  - **Type C/E**
  - **Aské Type A**
  - **Type D**

**Shock Absorbing Gel**

Shock absorbing gel is extremely soft gel which has an Aské F hardness. Being an urethane-based synthetic rubber, it has high material strength. A major characteristic is the three-dimensional slow recovery, the function to recover after compression slowly and in multiple directions.

**Characteristics of Shock Absorbing Materials**

- **Hardness of Shock Absorbing Materials**
  - **Type F**
  - **Type C/E**
  - **Aské Type A**
  - **Type D**

**Shock Absorbing Gel**

Shock absorbing gel is extremely soft gel which has an Aské F hardness. It is used as cushioning material pallet damper, conveyor machine, precision instrument etc, because of its low repulsion urethane/Low elastic rubber/Shock absorbing gel products

**Impact Resilience Variation by Temperature of Low Elastic Rubber - Low Repulsion Urethane**

- **Low Repulsion Urethane**
  - It has the same properties as urethane, and excels in shock absorption. With more resistance to compression than normal urethane, it is hard to deform. Not suitable for the absorption of large impact energy because its tensile strength and elongation is weaker than that of urethane of the same hardness.
  - **Low Elastic Rubber (Hanenaito®)**
  - It is used as cushioning material pallet damper, conveyor machine, precision instrument etc, because of its good elongation and shock absorption.

**Impact Resistance Variation by Temperature of Low Elastic Rubber - Low Repulsion Urethane**

- **Low Repulsion Urethane**
  - It has the same properties as urethane, and excels in shock absorption. With more resistance to compression than normal urethane, it is hard to deform. Not suitable for the absorption of large impact energy because its tensile strength and elongation is weaker than that of urethane of the same hardness.
  - **Low Elastic Rubber (Hanenaito®)**
  - It is used as cushioning material pallet damper, conveyor machine, precision instrument etc, because of its good elongation and shock absorption.