JSR EXCELINK®

High Performance Olefinic Thermoplastic Elastomer

JSR EXCELINK® is registered trademark of JSR Corporation in Canada, China, EU, Japan, Korea, Mexico, Russia, Taiwan, Thailand and USA.
About JSR

Since JSR’s success as the first Japanese producer of synthetic rubber in 1960, the company has continued to supply the world market with synthetic rubber in the key categories of EP, NBR, SBR, BR, IR, and IIR as an “Integrated manufacturer of synthetic rubber.” JSR also distills butadiene (a major raw material of synthetic rubber) in-house, and Elastomix, which is already JSR Group company, manufactures and distributes rubber compounds. A vertical business deployment that is not limited to just synthetic rubber enables JSR to provide its products in a stable manner.

About JSR EXCELINK®

JSR EXCELINK® is dynamic vulcanized type olefinic thermoplastic elastomer. Melt flow rate of EXCELINK is preferably high, therefore its injection moldability is excellent. In addition, thermal adhesion of EXCELINK with other olefinic materials (EPDM rubber, olefinic resin, olefinic TPE and so on) is excellent too. EXCELINK grade line-up includes materials with wide range of hardness from Duro A 30 to 90. EXCELINK can be used for various type of seal (automotive glass run channel, automotive door seal, electric apparatus seal and so on) as an alternative of EPDM rubber.

Comparison of Elastomers Properties

<table>
<thead>
<tr>
<th></th>
<th>Cured Rubber</th>
<th>JSR EXCELINK®</th>
<th>TPV (others)</th>
<th>TPO</th>
<th>TPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elasticity</td>
<td>Excellent</td>
<td>Good</td>
<td>Good</td>
<td>Fair</td>
<td>Good</td>
</tr>
<tr>
<td>Mechanical properties</td>
<td>Excellent</td>
<td>Fair</td>
<td>Fair</td>
<td>Fair</td>
<td>Good</td>
</tr>
<tr>
<td>Moldability</td>
<td>Fair</td>
<td>Excellent</td>
<td>Good</td>
<td>Fair</td>
<td>Good</td>
</tr>
<tr>
<td>Weatherability</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Good</td>
<td>Good</td>
<td>Fair</td>
</tr>
<tr>
<td>Heat adhesion</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Fair</td>
<td>Fair</td>
<td>Good</td>
</tr>
<tr>
<td>Surface slipperiness</td>
<td>Fair</td>
<td>Excellent</td>
<td>Fair</td>
<td>Fair</td>
<td>Fair</td>
</tr>
<tr>
<td>Density</td>
<td>Fair</td>
<td>Excellent</td>
<td>Good</td>
<td>Excellent</td>
<td>Good</td>
</tr>
</tbody>
</table>

TPV: Dynamic vulcanized type thermoplastic elastomer
TPO: Olefinic thermoplastic elastomer (simple blend type)
TPS: Styrenic thermoplastic elastomer
About JSR

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About JSR EXCELINK®

**Microstructure and feature of JSR EXCELINK®**

JSR EXCELINK® has a microstructure in which cross-linked EPDM particles disperse in olefinic resin matrix. The fine and uniform structure is obtained by using a special EPDM polymer and dynamic vulcanization technology.

By incorporating the above unique microstructure, JSR EXCELINK® provides the following superior benefits:

- **Excellent Injection Moldability**
  - High melt flow rate, Good mold reproducibility

- **Excellent thermal adhesion**
  - Excellent thermal adhesion with olefinic cured rubber and resin

- **Excellent surface slipperiness**
  - Low coefficient friction, Good scratch resistance

- **Wide range of hardness**
  - Duro 30A - 90A are available, Oil-bleed free

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**Microstructure in TPV**

**TEM photograph of JSR EXCELINK®**

**Olefinic resin (Matrix)**

**Cross-linked EPDM particle (Domain)**
JSR EXCELINK® has higher melt flow than standard TPVs, therefore it can provide excellent injection moldability. Even large size components or geometrically complicated components can be easily molded. Especially with components designed with long-flow features, JSR EXCELINK® shows remarkable results and performance every time.

Features of JSR EXCELINK®

Melt Flow

High Shear Viscosity of TPV Melt (230°C)

JSR EXCELINK® has higher melt flow than standard TPVs, therefore it can provide excellent injection moldability. Even large size components or geometrically complicated components can be easily molded. Especially with components designed with long-flow features, JSR EXCELINK® shows remarkable results and performance every time.

Thermal Adhesion

High shear viscosity of TPV melt (230°C)

Adhesion Strength with EPDM (MPa) vs. Barrel Temp. (℃)
High melt flow of JSR EXCELINK® makes its melt front reach adhesion interface in short time keeping high temperature. Therefore it can provide excellent adhesion with olefinic material (EPDM rubber, olefinic resin, olefinic TPE and so on).

Surface Slipperiness

Adhesion Strength with EPDM (MPa) vs. Injection Rate (ml/sec)
JSR EXCELINK® slippery grades have high slipperiness and good durability of slipperiness which are realized by special silicone slipping agent.
JSR EXCELINK® has higher melt flow than standard TPVs, therefore it can provide excellent injection moldability. Even large size components or geometrically complicated components can be easily molded. Especially with components designed with long-flow features, JSR EXCELINK® shows remarkable results and performance every time.

### Features of JSR EXCELINK®

<table>
<thead>
<tr>
<th>Representative Grades of JSR EXCELINK®</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Hardness Standard Grade</strong></td>
</tr>
<tr>
<td>1800B</td>
</tr>
<tr>
<td>1700B</td>
</tr>
<tr>
<td>High hardness (Duro A 70 ≦). High melt flow. Preferable for injection molding. Black spherical pellet. <strong>(Application)</strong> Automotive glass run channel, Inner belt, Outer belt, etc.</td>
</tr>
<tr>
<td><strong>Middle Hardness Standard Grade</strong></td>
</tr>
<tr>
<td>1600B</td>
</tr>
<tr>
<td>Middle hardness (Duro A 50-70). High melt flow. Preferable for injection molding. Black spherical pellet. <strong>(Application)</strong> Automotive door gap seal, Quarter window frame, Glass encapsulation, Hood seal, Back light seal, Drip seal, etc.</td>
</tr>
<tr>
<td><strong>Low Hardness Standard Grade</strong></td>
</tr>
<tr>
<td>1300B</td>
</tr>
<tr>
<td>1200B</td>
</tr>
<tr>
<td>Low hardness (Duro A 50 &gt;). Preferable for injection molding. Possible for extrusion molding. Black spherical pellet. <strong>(Application)</strong> Automotive door seal, Manhole cover seal, Olefinic resin modifier, etc.</td>
</tr>
<tr>
<td><strong>High Hardness Slippery Grade</strong></td>
</tr>
<tr>
<td>1902B</td>
</tr>
<tr>
<td>1805B, 1810B</td>
</tr>
<tr>
<td>1703B</td>
</tr>
<tr>
<td>High hardness (Duro A 70 ≦). High slipperiness. High melt flow. Preferable for injection molding. Black spherical pellet. <strong>(Application)</strong> Automotive glass run channel, Inner belt, Outer belt, Margin seal, Mirror patch gasket, Quarter window frame, etc.</td>
</tr>
<tr>
<td><strong>Middle Hardness Slippery Grade</strong></td>
</tr>
<tr>
<td>1601B</td>
</tr>
<tr>
<td>1504B</td>
</tr>
<tr>
<td>Middle hardness (Duro A 50-70). High slipperiness. High melt flow. Preferable for injection molding. Black spherical pellet. <strong>(Application)</strong> Automotive glass run channel, Mirror patch gasket, Cutline seal, Door gap seal, Hood seal, Body welt, Back light seal, Drip seal, Roof rail pad, etc.</td>
</tr>
<tr>
<td><strong>Low Hardness Slippery Grade</strong></td>
</tr>
<tr>
<td>1403B, 1404B, 1406B</td>
</tr>
<tr>
<td>1301B, 1303B, 1309B</td>
</tr>
<tr>
<td>Low hardness (Duro A 50 &gt;). High slipperiness. Preferable for injection molding. Possible for extrusion molding. Black spherical pellet. <strong>(Application)</strong> Automotive door seal, Cutline seal, Hood seal, Body welt, Pressure release valve, Steering column boot, Headlight seal, etc.</td>
</tr>
<tr>
<td><strong>Low Hardness Color Grade</strong></td>
</tr>
<tr>
<td>1301N</td>
</tr>
<tr>
<td>Low hardness (Duro A 40 &gt;). Natural color cylindrical pellet. Color and hardness are adjustable by compounding with color master batch and PP. Preferable for injection molding. Possible for extrusion molding. <strong>(Application)</strong> Electric tracking prevention seal, Color seal, Olefinic resin modifier, etc.</td>
</tr>
<tr>
<td><strong>Oil Resistance Grade</strong></td>
</tr>
<tr>
<td>47000B</td>
</tr>
</tbody>
</table>
**Legend:**

- **Standard Grade**
  - Grade Name
  - Hardness
- **Slippery Grade**
  - Grade Name
  - Hardness
- **Special Grade**
  - Grade Name
  - Hardness

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**Hardness**

- **High Hardness**
  - **1600B**
    - Duro A64
      - Short Cycle Time
      - Slipperiness Improves
    - **1601B**
      - Duro A60
  - **1700B**
    - Duro A70
      - Slipperiness Improves
    - **1703B**
      - Duro A71
  - **1800B**
    - Duro A78
      - Slipperiness Improves
    - **1805B**
      - Duro A78
    - **1810B**
      - Duro A79
  - **4700B**
    - Duro A84
  - **1902B**
    - Duro A94

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**Performance Improvement**

- **Oil Resistance Improves**
- **Adhesion Improves**
- **Slipperiness Improves**
  - Short Cycle Time
  - Slipperiness Improves

## JSR EXCELINK® Property Data

### 【Injection molding condition】
- **Oil Resistance**
- **Color Grade**

### JSR EXCELINK® Grade Naming System
- **Hardness (Duro A 15sec delay)**
- **Type of TPO**
- **Color**
  - B = Black
  - N = Natural
- **Product numbers**
- **Grade**

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<table>
<thead>
<tr>
<th>Grade</th>
<th>Hardness (Duro A 15sec delay)</th>
<th>Density (g/cm³)</th>
<th>Melt Flow Rate (230℃, 21N g/10min.)</th>
<th>Modulus at 100% Elongation (MPa)</th>
<th>Tensile Strength at Break (MPa)</th>
<th>Elongation at Break (%)</th>
<th>Tear Strength un nicked (kN/m)</th>
<th>Compression Set (22hrs at 70℃, %)</th>
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</thead>
<tbody>
<tr>
<td>1800B</td>
<td>1800B</td>
<td>78</td>
<td>0.89</td>
<td>24</td>
<td>3.2</td>
<td>8.5</td>
<td>640</td>
<td>38</td>
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<td>1700B</td>
<td>1700B</td>
<td>70</td>
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<td>8</td>
<td>2.4</td>
<td>6.9</td>
<td>630</td>
<td>31</td>
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<td>1600B</td>
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<td>2.0</td>
<td>5.5</td>
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<td>1200B</td>
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<td>9</td>
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<td>64</td>
<td>3.1</td>
<td>7.4</td>
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<td>0.89</td>
<td>5</td>
<td>2.4</td>
<td>6.3</td>
<td>650</td>
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<td>1601B</td>
<td>60</td>
<td>0.88</td>
<td>8</td>
<td>1.7</td>
<td>4.3</td>
<td>600</td>
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<td>1504B</td>
<td>1504B</td>
<td>53</td>
<td>0.89</td>
<td>1</td>
<td>1.5</td>
<td>4.1</td>
<td>550</td>
<td>20</td>
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<td>1406B</td>
<td>1406B</td>
<td>43</td>
<td>0.88</td>
<td>10</td>
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<td>530</td>
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<tr>
<td>1404B</td>
<td>1404B</td>
<td>46</td>
<td>0.89</td>
<td>4</td>
<td>1.2</td>
<td>3.2</td>
<td>520</td>
<td>16</td>
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<tr>
<td>1309B</td>
<td>1309B</td>
<td>36</td>
<td>0.88</td>
<td>15</td>
<td>0.9</td>
<td>3.3</td>
<td>510</td>
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<tr>
<td>1303B</td>
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<td>38</td>
<td>0.88</td>
<td>2</td>
<td>0.9</td>
<td>2.9</td>
<td>570</td>
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<tr>
<td>1301B</td>
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<td>37</td>
<td>0.89</td>
<td>4</td>
<td>0.9</td>
<td>2.7</td>
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<td>32</td>
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<td>14</td>
<td>0.9</td>
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<td>580</td>
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<tr>
<td>4700B</td>
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<td>&lt;1</td>
<td>5.9</td>
<td>8.0</td>
<td>190</td>
<td>30</td>
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### Remarks
- Oil Resistance TPO (TPV)
- Dynamic Vulcanized TPO (TPV)
- Slippery Grade
- Color Grade
- Natural Color
- Good Oil Resistance
- Good Adhesion
- Low Compression Set
- Short Cycle Time
- Slippriness
### Oil Resistance

**JSR EXCELINK® Property Data**

<table>
<thead>
<tr>
<th>Grade Name</th>
<th>Type of TPO</th>
<th>70~79A</th>
<th>80~89A</th>
<th>90~99A</th>
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<tbody>
<tr>
<td>JSR 4700B</td>
<td>TPO(TPV)</td>
<td>1</td>
<td>1</td>
<td>2</td>
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</tbody>
</table>

**Slipperiness**

<table>
<thead>
<tr>
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<th>Slipperiness</th>
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<tbody>
<tr>
<td>JSR 4700B</td>
<td>8</td>
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</table>

<table>
<thead>
<tr>
<th>Grade Name</th>
<th>Oil Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>JSR 4700B</td>
<td>16</td>
</tr>
</tbody>
</table>

**Oil Resistance TPO(TPV)**

<table>
<thead>
<tr>
<th>Grade Name</th>
<th>Oil Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>JSR 4700B</td>
<td>16</td>
</tr>
</tbody>
</table>

**Oil Resistance of JSR EXCELINK® 4700B**

Test Condition: IRM903 Oil, 120°C×70hours

<table>
<thead>
<tr>
<th>ΔV(%)</th>
<th>CH(Point)</th>
<th>Sc(TB)(%)</th>
<th>Sc(EB)(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4</td>
<td>-1</td>
<td>-29</td>
<td>-45</td>
</tr>
</tbody>
</table>

**Remarks**

- This data indicates representative physical properties, and does not signify product specifications.
**Product Pellet**

Spherical pellet is processed by under water cut. It prevents to form pellet bridge in hopper. All of standard grades and slippery grades are spherical pellet.

Cylindrical pellet is processed by strand cut. Special grades, such as 1301N and 4700B, are cylindrical pellet.

**Product Package**

Steel Box
The steel box contains 25kg paper bags (Max. 25 bags per box, Cover is made of carton). Since the steel box can be stored with the sides removed, this contributes to a saving space after the product is used.

Paper Bag
25kg product is packed into the thick paper bag with a polyethylene inner.

Octagon Box
500kg product is packed into the thick carton box with a polyethylene inner.
**Product Pellet**

Spherical pellet is processed by underwater cut. It prevents the formation of a pellet bridge in the hopper.

All standard grades and slippery grades are spherical pellets.

**Cylindrical Pellet**

Cylindrical pellet is processed by strand cut. Special grades, such as 1301N and 4700B, are cylindrical pellets.

**Product Package**

The steel box contains 25kg paper bags (Max. 25 bags per box; cover is made of carton). Since the steel box can be stored with the sides removed, this contributes to saving space after the product is used.

- **Steel Box**: 25kg product is packed into the thick paper bag with a polyethylene inner.
- **Paper Bag**: 500kg product is packed into the thick carton box with a polyethylene inner.
- **Octagon Box**:
JSR Corporation
Specialty Elastomer Dept.
Elastomer Division
Shiodome Sumitomo bldg.,
1-9-2 Higashi-Shinbashi, Minato-ku,
Tokyo 105-8640, Japan
TEL: (03) -6218-3624
FAX: (03) -6218-3697
http://www.jsr.co.jp

USA, Canada
JSR Trading Inc.
Cincinnati, OH USA
TEL:+1-513-421-6166

Mexico, Central and South America
JSRT Mexico, S.A. de C.V.
Irapuato, Gto, Mexico
TEL:+52-462-607-4929

Europe
Nagase (Europe) GmbH
Budapest, Hungary
TEL:+36-1-268-1705

China
JSR (Shanghai) Co.,Ltd.
Shanghai, China
TEL:+86-21-6278-7600

India
Bombay Chemical & Rubber Products
Mumbai, India
TEL:+91-98-2004-2806

Thailand
JSR Trading Bangkok Co.,Ltd.
Bangkok, Thailand
TEL:+66-(0)-2236-7291-3

Korea
Il Kwang Polymer Co.,Ltd.
Hwaseong-si
TEL:+82-31-8059-2325

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