Tsubakimoto Chain Co., a leading manufacturer of power transmission and conveyor components, has redesigned its Plastic Block Chain to provide even greater user-friendliness and safer conveyance. And by expanding its innovative line-up of Tsubaki Plastic Block Chain products to include the new RSP40 chain with top plates, Tsubakimoto can better satisfy customer needs for a variety of applications in food processing, packaging, solar modules, rechargeable batteries, automotive parts, containers and pharmaceuticals.

**New Advanced Features**

- **New Chain Link Design Enhances Safety**
  Redesigned chain links result in less toppling and tipping of goods from snagging during transfer from one conveyor to another. They also reduce the potential for broken chain fragments to become intermixed with conveyed goods.

- **D-Pin Technology Prevents Stress Cracking**
  The use of D-pins for all connecting pins reduces the risk of damage to connecting areas, such as stress cracking of pin holes, brought on by cleaning solutions or other means.

- **Smaller Back-Flex Radius Helps in Layout Design**
  The back-flex radius on the RSP60 single-strand chain has been reduced from 450 mm to 180 mm, making it easier to design return-way layouts.

**Basic Features**

The following basic features have been proven in various conveyor applications.

- **Minimal Damage During Conveyance**
  Proprietary soft plastic top surfaces are ideal for transporting products and materials that could be easily scratched.

- **Smooth Conveyance**
  Plastic Block Chain allows smaller ANSI standard sprockets to be used, reducing the dead space between conveyors and ensuring smooth transfer from one conveyor to another.

- **Easy Maintenance**
  The simple construction of Plastic Block Chain makes it easy to wash and clean. Parts replacement is faster and simpler than with flat conveyor belts.

- **Lightweight Chain / Lower Running Costs**
  Because Plastic Block Chain is one third the weight of conventional steel chain, there’s less chain tension. This significantly reduces the amount of power required to run the conveyor.

- **Lube-Free Operation**
  The self-lubricating engineering plastic used in the chain components allows dry, “lube-free” operation.

- **Quiet Operation**
  Plastic Block Chain is 5 to 7 dB quieter than conventional steel chain and reduces ear-jarring noises.
Features of Tsubaki Plastic D-Pin Chain

**Long Life**
A combination of proprietary Tsubaki materials allows the chain to exhibit outstanding wear resistance between the pin and hinges—under dry, soapy or wet conditions. The chain works particularly well when using water as a lubricant.

**Less Noise & Vibration**
With a chain weight 26% to 29% lighter than that of stainless steel knurled pin top chains, there is less dynamic energy involved and thus less noise and vibration.

**Lower Running Costs**
Lighter chain weight means less tension on the chain, significantly reducing the amount of energy needed to run the chain.

### PRODUCT LINE-UP
A full line-up of Plastic Block Chain for a wide range of conveyor applications.

#### STRAIGHT RUNNING
- **RSP35/40/50/60 --- Page 5**
  - Pitch: 9.525 to 19.05 mm
  - Single strand
  - Stainless steel D-pin
- **RSP40P/60P --- Page 6**
  - Pitch: 12.7/19.05 mm
  - Single strand
  - Plastic D-pin
- **RSP40-SL300 --- Page 7**
  - Pitch: 12.7 mm
  - Plate width: 30 mm
  - Single strand
  - Stainless steel D-pin
- **RSP60-2 --- Page 8**
  - Pitch: 19.05 mm
  - Double strand
  - 40% stronger than RSP60
  - Stainless steel D-pin

#### SIDE FLEXING
- **RSP60-CU --- Page 9**
  - Pitch: 19.05 mm
  - Single strand
  - Stainless steel D-pin or plastic D-pin
- **RSP60-CU-2 --- Page 10**
  - Pitch: 19.05 mm
  - Double strand
  - 30% stronger than RSP60-CU
  - New float-preventive tabs (reinforced design)
  - Stainless steel D-pin

#### HEAVY DUTY
- **Snap Cover Chain --- Page 11**
  - Pitch: 9.525 to 31.75 mm
  - Single strand
  - 6 to 8 times stronger than RSP chains

---

**Wear Resistance Test of TOP Chain with Water Lubrication**

<table>
<thead>
<tr>
<th>Wear Elongation (%)</th>
<th>Operating Time</th>
</tr>
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<tbody>
<tr>
<td>1.2</td>
<td>0.1</td>
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<td>1.0</td>
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<tr>
<td>0.8</td>
<td>0.4</td>
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<tr>
<td>0.6</td>
<td>0.6</td>
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<tr>
<td>0.4</td>
<td>0.8</td>
</tr>
<tr>
<td>0.2</td>
<td>1.0</td>
</tr>
<tr>
<td>0.1</td>
<td>1.2</td>
</tr>
</tbody>
</table>

**Features of Tsubaki Plastic D-Pin Chain**

- Stainless Steel Pin
- Plastic D-Pin
Innovative Tsubaki Plastic Series

Plastic Block Chain can be selected in accordance with your requirements and application from among a variety of plastic materials other than a standard-grade polyacetal resin.

**LF**

**Low Friction/Wear Resistant Series**

1. **Protects Conveyed Items**
   - Coefficient of friction is 15% to 45% lower than Standard Series, resulting in reduced line pressure during accumulation and minimizing potential scratching or other damage to conveyed items.

2. **Long Service Life (compared to Standard Series)**
   - Chain life is 1.2 to 2 times longer than Standard Series because of lower chain load.

3. **Smooth Transfer and Accumulation of Conveyed Items**

4. **Reduced Drive Power Requirements**

5. **Diverse Color Options**
   - Available colors include white (LFW), brown (LFB) and green (LFG).

**ULF**

**Ultra Low Friction Series**

1. **Protects Conveyed Items**
   - A special polyacetal material incorporating a silicone-based lubricant significantly lowers the coefficient of friction by 15% to 30% compared to that of LF Series (under dry conditions). Line pressure is reduced during accumulation, minimizing potential scratching or other damage to conveyed items.

2. **Smooth Transfer and Accumulation of Conveyed Items**

3. **Reduced Drive Power Requirements**

**DIA**

**Impact Resistant Series for Dry Environments**

1. **Impact Resistant**
   - Outstanding durability, plus, even in the unlikely event that the chain breaks, the broken resin fragments tend not to chip or shatter.

2. **High Friction**
   - Coefficient of friction is 20% higher than Standard Series. Can be used on slight inclines in dry environments.

3. **Conforms to Japan Food Sanitation Act**
   - Resin material satisfies requirements under the Japan Food Sanitation Act (Notification No. 20 of the Ministry of Health, Labour and Welfare).

4. **Light Weight**
   - About 20% lighter than Standard Series polyacetal top chain. Easy to handle, and can reduce drive power requirements.

**Applications**

- Conveyors of trays in bakeries
- Dry environments where food items will be placed directly on conveyor
- Additional countermeasure for protecting foods from contamination
- Slightly inclined conveyors
**KV**

**Heat Resistant/High Speed Series**

1. **Heat Resistant Up to 250°C**
   KV Series withstands temperatures up to 250°C (KV250) or 180°C (KV180). Can be used inside furnaces and heaters.

2. **Minimal Expansion and Contraction Resulting from Temperature Changes**
   (1/2 to 1/3 of the Standard Series)

3. **Fire Resistant**
   Conforms to UL standard V-0 classification (UL's highest classification).

4. **High Chemical Resistance**
   Possesses outstanding tolerance against chemicals used in washing and sterilization.

5. **Electroconductivity**
   Volume specific resistance is low \(1 \times 10^6 \Omega\) with no generation of static electricity.

   **Applications**
   - Heat-shrink packaging lines for bottles
   - Conveyors of solar modules after laminator
   - Conveyors of printed circuit boards after dryer
   - Conveyors of injection needles in sterilizing process and gluing process
   - Conveyors regularly sterilized with hot water or chemicals
   - High-speed conveyors of beverage cans in filler rooms

---

**Y**

**Chemical Resistant Series**

1. **High Chemical Resistance**
   Possesses outstanding tolerance against chemicals such as organic solvents, inorganic salts, acids, alkalis and oxidants.
   (Refer to page 13 for details.)

   **Applications**
   - Conveyors of printed circuit boards or silicon wafers in cleaning process
   - Conveyors of rechargeable batteries
   - Conveyors in cleaning process with chloride chemicals

---

**SY**

**Super Chemical Resistant Series**

1. **Enhanced Chemical Resistance**
   Pin made of titanium instead of 304 stainless steel provides enhanced chemical resistance compared to Chemical Resistant Series (Y).
   (Refer to page 13 for details.)

   **Applications**
   - Conveyors of rechargeable batteries
   - Conveyors in acid or alkaline environments
   - Ideal when wanting to improve chemical resistance over Y Series

---

In addition, various other types are also available, including Antibacterial/Mold Resistant (MWS), Impact Resistant Series for Wet Environments (DIY), Acid Resistant (AR), Ultraviolet Resistant (UVR), High Friction (HF) and Electrostatic Preventive (SE).

Please refer to the Tsubaki Top Chain catalog for more details.
Plastic Block Chain

Single Strand, Straight Running, Stainless Steel Pins

<table>
<thead>
<tr>
<th>Tsubaki Chain No.</th>
<th>P</th>
<th>R</th>
<th>W</th>
<th>L</th>
<th>H1</th>
<th>H2</th>
<th>H</th>
<th>Approx. Mass kg/m</th>
<th>No. of Links per Standard Length (3,048 mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSP35</td>
<td>9.525</td>
<td>5.08</td>
<td>4.78</td>
<td>13</td>
<td>4</td>
<td>5</td>
<td>9</td>
<td>0.15 (0.13/0.18)</td>
<td>320</td>
</tr>
<tr>
<td>RSP40</td>
<td>12.7</td>
<td>7.92</td>
<td>7.95</td>
<td>20</td>
<td>6</td>
<td>6.7</td>
<td>12.7</td>
<td>0.36 (0.30/0.45)</td>
<td>240</td>
</tr>
<tr>
<td>RSP50</td>
<td>15.875</td>
<td>10.16</td>
<td>9.53</td>
<td>22.5</td>
<td>7</td>
<td>8</td>
<td>15</td>
<td>0.46 (0.40/0.55)</td>
<td>192</td>
</tr>
<tr>
<td>RSP60</td>
<td>19.05</td>
<td>11.91</td>
<td>12.7</td>
<td>30</td>
<td>8.5</td>
<td>8.8</td>
<td>17.3</td>
<td>0.72 (0.68/0.90)</td>
<td>160</td>
</tr>
</tbody>
</table>

Note: Mass shown in { / } is for DIA/DIY.

Chain Material Availability / Technical Data

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
<td>LFW</td>
<td>LFH</td>
<td>Blue</td>
<td>KV180</td>
<td>KV250</td>
<td>Blue</td>
<td>Mat White</td>
<td>Cream</td>
<td>Green</td>
</tr>
<tr>
<td>RSP35</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>RSP40</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
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<td>RSP50</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>RSP60</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>●</td>
<td>○</td>
<td>●</td>
</tr>
</tbody>
</table>

Max. Allowable Load (kN (kgf))
- RSP35: 0.18 (18) | 0.18 (18) | 0.13 (13) | 0.10 (10) | 0.14 (14)
- RSP40: 0.44 (45) | 0.44 (45) | 0.34 (35) | 0.25 (25) | 0.34 (35)
- RSP50: 0.69 (70) | 0.69 (70) | 0.49 (50) | 0.39 (40) | 0.54 (55)
- RSP60: 0.88 (90) | 0.88 (90) | 0.64 (65) | 0.49 (50) | 0.69 (70)

Operating Temperature Range °C
-20 to 80 | -20 to 180 (250) | -20 to 80

Max. Allowable Speed m/min
- With Lube: 60 | 60 | 60 | 50 | 60
- No Lube: 60 | 60 | 60 | 50 | 60

Available: ● Design stock —: Not available

Notes:
1. Operating temperature of (250) is for KV250.
2. Standard chain length is 3,048 mm (10 feet).
3. Please contact Tsubaki for other plastic materials.
4. Only connecting pins for Super Chemical Resistant (SY) Series are diamond-knurled titanium pins.
5. Design/shape of Heat Resistant/High Speed (KV) Series has not changed.
6. Products with updated design cannot be connected to older designs. The entire chain must be replaced as a unit.

Sprockets

Standard ANSI sprockets can be used (minimum number of teeth is 14).

Model Identification

RSP40-LFB

Model | Chain Size | Chain Material
--- | --- | ---
--- | --- | ---
No designation (standard)
Plastic Block Chain

Single Strand, Straight Running, Plastic Pins

<table>
<thead>
<tr>
<th>Tsubaki Chain No.</th>
<th>P</th>
<th>R</th>
<th>W</th>
<th>L</th>
<th>H1</th>
<th>H2</th>
<th>H</th>
<th>Approx. Mass kg/m</th>
<th>No. of Links per Standard Length (3,048 mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSP40P</td>
<td>12.7</td>
<td>7.92</td>
<td>7.95</td>
<td>20</td>
<td>6</td>
<td>6.7</td>
<td>12.7</td>
<td>0.26 (0.30)</td>
<td>240</td>
</tr>
<tr>
<td>RSP60P</td>
<td>19.05</td>
<td>11.91</td>
<td>12.7</td>
<td>30</td>
<td>8.5</td>
<td>8.8</td>
<td>17.3</td>
<td>0.53 (0.62)</td>
<td>160</td>
</tr>
</tbody>
</table>

Note: Mass shown in ( ) is for DIY.

Chain Material Availability / Technical Data

<table>
<thead>
<tr>
<th>Tsubaki Chain No.</th>
<th>Standard</th>
<th>LF Series</th>
<th>MWS Series</th>
<th>E Series</th>
<th>DIY Series</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
<td>Yellow</td>
<td>White</td>
<td>Beige</td>
<td>Green</td>
</tr>
<tr>
<td>Tsubaki Chain No.</td>
<td>White</td>
<td>Yellow</td>
<td>White</td>
<td>Beige</td>
<td>Green</td>
</tr>
<tr>
<td>RSP40P</td>
<td>RSP40P</td>
<td>0.25 (25)</td>
<td>RSP40P</td>
<td>0.18 (18)</td>
<td>0.20 (20)</td>
</tr>
<tr>
<td>RSP60P</td>
<td>RSP60P</td>
<td>0.59 (60)</td>
<td>RSP60P</td>
<td>0.41 (42)</td>
<td>0.44 (45)</td>
</tr>
</tbody>
</table>

Max. Allowable Load kN (lbf)

Operating Temperature Range °C
-20 to 60 (80)

Max. Allowable Speed m/min

With Lube 60
No Lube 60

Notes:
1. Operating temperature of (80) is for dry conditions (no lubrication).
2. Standard chain length is 3,048 mm (10 feet).
3. Plastic connecting pins (for linking chain units) only will be orange-colored. Plastic main body pins are white.

Sprockets

Standard ANSI sprockets can be used (minimum number of teeth is 14).

Model Identification

RSP40P-LFB

Model | Chain Size | Chain Material | Plastic Pin
No designation (standard)
**Features**
- Plastic Block Chain with top plates; ideal for conveying small goods.
- Suitable for suspended conveyance of goods between paralleled strands of chains.

---

### Chain Material Availability / Technical Data

<table>
<thead>
<tr>
<th>Tsubaki Chain No.</th>
<th>Approx. Mass kg/m</th>
<th>Standard LF Series</th>
<th>MWS Series</th>
<th>ULF Series</th>
<th>E Series</th>
<th>Y Series</th>
<th>DIA Series</th>
<th>DIY Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSP40-SL</td>
<td>0.36 (0.3/0.45)</td>
<td>White</td>
<td>White</td>
<td>Green</td>
<td>Brown</td>
<td>Cream</td>
<td>Blue</td>
<td>Black</td>
</tr>
<tr>
<td>Max. Allowable Load kN (kgf)</td>
<td>0.44 (45)</td>
<td>0.26 (27)</td>
<td>0.19 (19)</td>
<td>0.34 (35)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Operating Temperature Range °C</td>
<td>-20 to 80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Allowable Speed m/min</td>
<td>With Lube 60</td>
<td>50</td>
<td>-</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No Lube 60</td>
<td>50</td>
<td>60</td>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>

Notes:
1. Mass shown in ( / ) is for DIA/DIY.
2. Standard chain length is 3,048 mm (10 feet).
3. Number of links per standard length is 240.
4. Plastic pins are not available.

---

### Sprockets

Standard ANSI sprockets can be used (minimum number of teeth is 14).

### Allowable Load Graphs

Same as RSP40 stainless steel pin chain. See page 17.

### Model Identification

**RSP40-SL300-LFB**

- **Model**: RSP40-SL
- **Chain Size**: 300
- **Chain Material**: LFB
- **Top Plate Width**: (300~30mm)
**Double Strand, Straight Running, Stainless Steel Pins**

### Features
- Link width is double that of RSP60 chain. Suitable for conveying wider goods.
- Approx. 40% higher maximum allowable load than RSP60 plastic chain. Ideal for higher applied load conditions.

### Chain Material Availability / Technical Data

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>RSP60-2</td>
<td>1.50 (1.20/1.65)</td>
<td>Gray</td>
<td>White</td>
<td>Green</td>
<td>Brown</td>
<td>Cream</td>
<td>Blue</td>
<td>Black</td>
<td>Mat White</td>
<td>Mat White</td>
<td>Cream</td>
</tr>
<tr>
<td>Max. Allowable Load kN (kgf)</td>
<td>1.27 (130)</td>
<td>0.89 (91)</td>
<td>0.64 (65)</td>
<td>0.98 (100)</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Operating Temperature Range °C:** -20 to 80

<table>
<thead>
<tr>
<th>Max. Allowable Speed m/min</th>
<th>With Lube</th>
<th>No Lube</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>60</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. Mass shown in ( / ) is for DIA/DIY.
2. Standard chain length is 3,048 mm (10 feet).
3. Number of links per standard length is 160.
4. Plastic pins are not available.

### Sprockets (RSP60-2 and RSP60-CU-2)

1. Two standard ANSI type B (machined) sprockets are combined for use with RSP60-2 and RSP60-CU-2 chains.
2. Adjust the width between the two sprockets by inserting a distance piece.

**Notes:**
1. Standard ANSI double-strand sprockets cannot be used.
2. Teeth on the two sprockets must be aligned with one another.
3. No. of sprocket teeth is at least 12 teeth.

### Model Identification

**RSP60-LFB-2**

Model | Chain Size | Chain Material | Double Strand
---|---|---|---
RSP60-2 | Double Strand | LFB | No designation (standard)


**Plastic Block Chain**

**RSP60-CU, RSP60P-CU**

**Single Strand, Side Flexing**

![Image of Plastic Block Chain]

**Features**
- RSP60-CU and RSP60P-CU chain designed for use in side-flexing conveyors.
- Beveled chain links keep the chain securely in position at curved sections.

**Chain Material Availability / Technical Data**

<table>
<thead>
<tr>
<th>Tsubaki Chain No.</th>
<th>Approx. Mass kg/m</th>
<th>Standard</th>
<th>LF Series</th>
<th>MWS Series</th>
<th>ULF Series</th>
<th>E Series</th>
<th>Y Series</th>
<th>DIA Series</th>
<th>DIY Series</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>White</td>
<td>White</td>
<td>Green</td>
<td>Brown</td>
<td>Cream</td>
<td>Blue</td>
<td>Black</td>
<td>Mat White</td>
</tr>
<tr>
<td>RSP60-CU</td>
<td>0.7 (0.60/0.88)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>RSP60P-CU</td>
<td>0.5(-/0.68)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Max. Allowable Load (N)</td>
<td>RSP60-CU</td>
<td>0.83 (85)</td>
<td>0.59 (60)</td>
<td>0.42 (43)</td>
<td>0.64 (65)</td>
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<tr>
<td>RSP60P-CU</td>
<td>0.44 (45)</td>
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<td>0.31 (32)</td>
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<td>0.33 (34)</td>
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</tr>
<tr>
<td>Operating Temperature Range °C</td>
<td>-20 to 80</td>
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<td></td>
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<tr>
<td>Max. Allowable Speed m/min</td>
<td>With Lube</td>
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<td>50</td>
<td>60</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>No Lube</td>
<td>60</td>
<td>50</td>
<td>60</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Available ● Design stock ○ Not available

Notes:
1. Mass shown in ( ) is for DIA/DIY.
2. Standard chain length is 3,048 mm (10 feet).

**Sprockets**

Standard ANSI sprockets can be used (minimum number of teeth is 14).

**Model Identification**

**RSP60P-CU-LFB**

- **Model**
- **Chain Size**
- **Side Flexing**
- **Chain Material**

![Diagram of Model Identification]

- **Pin Material**
  - No designation (standard)
  - No designation: Stainless steel pin
  - P: Plastic pin
Plastic Block Chain
RSP60-CU-2
Double Strand, Side Flexing, Stainless Steel Pins

Features
- RSP60-CU-2 chain designed for use in side-fLEXing conveyors. Suitable for conveying wider goods.
- Approx. 30% higher maximum allowable load than RSP60-CU chain. Ideal for higher applied load conditions.
- Equipped with float-preventive tabs. Keeps the chain securely in position.

Chain Material Availability / Technical Data

<table>
<thead>
<tr>
<th>Tsubaki Chain No.</th>
<th>Approx. Mass kg/m</th>
<th>Standard</th>
<th>LF Series</th>
<th>MWS Series</th>
<th>ULF Series</th>
<th>E Series</th>
<th>Y Series</th>
<th>DIA Series</th>
<th>DIY Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSP60-CU-2</td>
<td>1.50 (1.28/1.88)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Max. Allowable Load kN (kgf)</td>
<td>1.08 (110)</td>
<td>0.78 (77)</td>
<td>0.54 (55)</td>
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<td>Operating Temperature Range °C</td>
<td>-20 to 80</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Max. Allowable Speed m/min</td>
<td>100 With Lube</td>
<td>60 50 -</td>
<td>100</td>
<td></td>
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<td></td>
<td></td>
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</tr>
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<td></td>
<td>No Lube</td>
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<td>100</td>
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</tbody>
</table>

● Available ○: Design stock
Notes: 1. Mass shown in ( / ) is for DIA/DIY.
2. Standard chain length is 3,048 mm (10 feet).
3. Plastic pins are not available.

Sprockets
Sprockets are the same as for RSP60-2 chain (see page 8).

Model Identification

RSP60-CU-LFB-2

Model Chain Size Side Flexing Double Strand

Chain Material
No designation (standard)
Tsubaki line-up also features Snap Cover Chain, a standard roller chain with a plastic cover attached to each link of a steel base chain. Snap Cover Chain is designed to be used when Plastic Block Chain has insufficient tensile strength or when a longer conveyor length is desired.

**Tsubaki Chain No.**

<table>
<thead>
<tr>
<th>Chain Type</th>
<th>Standard</th>
<th>NP (nickel-plated)</th>
<th>Lambda (lube-free)</th>
<th>SS (304SS)</th>
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</thead>
<tbody>
<tr>
<td>RF06B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS40</td>
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<tr>
<td>RS50</td>
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</tr>
<tr>
<td>RS100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Plastic Cover**

- **Standard**
  - Material: Polyacetal (white)
  - Used for general applications
- **Electroconductive**
  - Material: Electroconductive polyacetal (black)
  - Used in applications where dust build-up from static, electrical noise and sparks must be avoided (volume specific resistance $1 \times 10^{12} \Omega \cdot \text{cm}$)
- Various surface-treated covers are also available. Consult Tsubaki for details.
- Cannot be used with electroconductive plastic covers as it will impede electroconductivity.

<table>
<thead>
<tr>
<th>Tsubaki Chain No.</th>
<th>Pitch P (mm)</th>
<th>Roller Diameter D (mm)</th>
<th>Width between Links (W) (mm)</th>
<th>Pin Diameter D (mm)</th>
<th>Plate Thickness t (mm)</th>
<th>Width F (mm)</th>
<th>Width F' (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF06B-SC</td>
<td>9.525</td>
<td>6.35</td>
<td>5.72</td>
<td>3.28</td>
<td>1.0</td>
<td>1.27</td>
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<td>12.70</td>
<td>7.92</td>
<td>7.95</td>
<td>3.97</td>
<td>1.5</td>
<td>1.5</td>
<td>12.0</td>
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<td>15.875</td>
<td>10.16</td>
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<td>2.0</td>
<td>15.0</td>
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<td>RS60-SC</td>
<td>19.05</td>
<td>11.91</td>
<td>12.70</td>
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<td>2.4</td>
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<td>15.88</td>
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<td>19.05</td>
<td>9.54</td>
<td>4.0</td>
<td>4.0</td>
<td>30.1</td>
</tr>
</tbody>
</table>

**Sprockets**

- Sprockets must have at least 13 teeth.
- RF06B chains are BS/DIN (ISO B) standard chains, which require 06B sprockets.
- Standard ANSI sprockets can be used for chains RS40 to RS100. However, note that the maximum diameter of the sprocket hub for a given number of teeth must be kept to prevent interference between the bottom plate of the engineering plastic cover and the sprocket hub. Please consult Tsubaki for details.

- Operating temperature range: -10°C to 80°C
- Maximum allowable speed: 60 m/min.
Plastic Chains

<table>
<thead>
<tr>
<th>Chain Type</th>
<th>Series</th>
<th>Standard</th>
<th>LF Low Friction/ Anti-Wear</th>
<th>MWS Antibacterial/ Mold Resistant</th>
<th>ULF Ultra Low Friction</th>
<th>KV Heat Resistant/ High Speed</th>
<th>E Electro-conductive</th>
<th>Y Chemical Resistant</th>
<th>SY Super Chemical Resistant</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>KV180</td>
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<td>Plastic Block Chain</td>
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</tr>
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</tr>
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<table>
<thead>
<tr>
<th>Chain Type</th>
<th>Series</th>
<th>DIA Impact Resistant</th>
<th>DIY Impact Resistant</th>
<th>SE Electrostatic Preventive</th>
<th>AR Acid Resistant</th>
<th>HF High Friction</th>
<th>UVR Ultraviolet Resistant</th>
<th>Pin Material (for series other than SY; SY is titanium)</th>
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</tbody>
</table>

- Refer to pages 5 to 11 for details on each type.
- ●: Items shown in catalog
- ○: Design stock available
- ▲: Design stock may be available; contact Tsubaki for conditions of use, etc.
- —: Not Available
- Plastic pin types
- Plastic pin types cannot be used in environments that are exposed to water temperatures greater than 60°C.
Important Selection Considerations

- Because of the risk of damage and/or breakage, Plastic Block Chain (with the exception of the Impact Resistant Series) is not recommended for use under conditions in which the chain may be subject to impact, or in which foreign materials or objects might become jammed in the conveyor. Please consider the use of a metal chain under these conditions.
- The presence of abrasives during operation will cause the Plastic Block Chain to wear prematurely. Please consider the use of a metal chain in this case.
- When conveying food products, the Impact Resistant Series (DIa or DIy) is recommended if in case a chance impact were to damage the Plastic Block Chain and there would be a possibility that broken chain pieces or fragments might become intermixed with the product or item being conveyed.
- Consult with a Tsubaki representative before using the chain in cases where it will be in contact with special liquids (for example, solvents or chemicals such as acids or alkalis) or used under special environments (for example, exposure to ultraviolet radiation).
- Using stainless steel pin chain in a wet environment will decrease the resin's self-lubricating ability and thus shorten the life of the chain. The use of plastic pin chain is recommended in environments where the chain will be exposed to water.
- The operating temperature range for accessories, sprockets and idler wheels made of UHMW-PE (ultra-high molecular weight polyethylene) is -20°C to 60°C. Also, do not use in environments where such components will be exposed to steam.
- The Chemical Resistant and Super Chemical Resistant chains may produce toxic fumes when exposed directly to flame or to temperatures exceeding 150°C. Never expose to flame or excessively high temperatures.
- Plastic Block Chain is combustible. Never use this product near open flame or fire, or at temperatures above the allowable operating range. It may ignite and burn, producing dangerous fumes.

Caution: Corrosion Resistance to Various Fluids

When selecting a chain, refer to Table 1 to determine the suitability of the chain material for specific applications. In addition, Table 1 can be used to check the corrosion resistance of the wearstrip material to be used together with the top chain. The overall usage environment, including humidity and other conditions, must also be thoroughly evaluated in the selection process. This table lists materials separately for the top plate and for other chain components. These must be considered together for optimum selection. The table shows the results of lab tests conducted at 20°C (68°F) and is provided for reference only. No warranty conditions whatsoever are stated or implied by the data in this table.

Follow procedures 1 to 6 to select the chain most suitable for the application.

Step 1: Establish Operating Conditions

A) Conveyed Goods

1. Container material
2. Mass
3. Dimensions

B) Conveyer Arrangement

1. Straight or side flexing
2. Conveyer length
3. Conveyer layout
4. Space limitations

C) Conveying Conditions

1. Conveying capacity
2. Intervals spacing between conveyed goods
3. Conveying speed
4. Lubrication

D) Environment

1. Temperature
2. Corrosive conditions including the presence of chemicals, water, and high humidity (see Table 1)
3. Abrasive conditions including the presence of glass fragments, paint chips, metal powder, sand, etc.

Step 2: Select Chain Link Material

Select the appropriate series (on pages 3 and 4) according to the application and your requirements.

Table 2 below shows the applicability of the Standard and LF Series under various usage conditions.

<table>
<thead>
<tr>
<th>Chain Type</th>
<th>Wearstrip Material</th>
<th>No Lube</th>
<th>With Lube</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless Steel</td>
<td>B D A A</td>
<td>C B B</td>
<td>Listed as Plastic Block Chain</td>
<td>A: Most recommended B: Highly recommended C: Recommended D: Acceptable, x: Inappropriate</td>
</tr>
<tr>
<td>Steel</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>P Plastic Rail</td>
<td>A D</td>
<td>D</td>
<td>Listed as Plastic Block Chain</td>
<td>A: Most recommended B: Highly recommended C: Recommended D: Acceptable, x: Inappropriate</td>
</tr>
<tr>
<td>PMW Plastic Rail</td>
<td>A D</td>
<td>D</td>
<td>Listed as Plastic Block Chain</td>
<td>A: Most recommended B: Highly recommended C: Recommended D: Acceptable, x: Inappropriate</td>
</tr>
<tr>
<td>M Plastic Rail</td>
<td>A D</td>
<td>D</td>
<td>Listed as Plastic Block Chain</td>
<td>A: Most recommended B: Highly recommended C: Recommended D: Acceptable, x: Inappropriate</td>
</tr>
</tbody>
</table>

Step 3: Select Wearstrip Material

Choose a suitable wearstrip material in the same way as in Step 2.

Table 3: Wearstrip Material Selection Guide

<table>
<thead>
<tr>
<th>Chain Type</th>
<th>Wearstrip Material</th>
<th>No Lube</th>
<th>With Lube</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>P Plastic Rail</td>
<td>Ultra high molecular weight polyethylene</td>
<td>D</td>
<td>B</td>
<td>Listed as Plastic Block Chain</td>
</tr>
<tr>
<td>PMW Plastic Rail</td>
<td>Low friction, wear resistant ultra high molecular weight polyethylene</td>
<td>D</td>
<td>B</td>
<td>Listed as Plastic Block Chain</td>
</tr>
<tr>
<td>M Plastic Rail</td>
<td>Special polyamide</td>
<td></td>
<td></td>
<td>Listed as Plastic Block Chain</td>
</tr>
</tbody>
</table>

Note: Operating temperature range: P/PMW plastic rail = -20°C to 60°C M plastic rail = -20°C to 80°C
Step 4: Determine Factors and Coefficients

The coefficients of dynamic friction shown in Tables 4 and 5 below are based on experimental data gathered by Tsubaki. Values may be different depending on usage conditions, environment, properties of the items being transported, level of cleanliness of the chain, and other factors.

Table 4: Coefficient of Dynamic Friction (μ₁) between Link Plate and Wearstrip

<table>
<thead>
<tr>
<th>Link Plate Material</th>
<th>Lubrication</th>
<th>Wearstrip Material</th>
<th>Stainless Steel</th>
<th>Steel</th>
<th>P/M (Plastic Rails)</th>
<th>PMK (Plastic Rail)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>No Lube</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
<td>0.20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soapy Water</td>
<td>0.15</td>
<td>0.15</td>
<td>0.12</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>DPC</td>
<td>No Lube</td>
<td>0.17</td>
<td>0.17</td>
<td>0.18</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soapy Water</td>
<td>0.12</td>
<td>0.12</td>
<td>0.12</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>ULF</td>
<td>No Lube</td>
<td>0.14</td>
<td>0.14</td>
<td>0.15</td>
<td>0.13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soapy Water</td>
<td>0.11</td>
<td>0.11</td>
<td>0.11</td>
<td>0.11</td>
<td></td>
</tr>
<tr>
<td>KV180</td>
<td>No Lube</td>
<td>0.20</td>
<td>0.20</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soapy Water</td>
<td>0.12</td>
<td>0.12</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>DIA</td>
<td>No Lube</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soapy Water</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>DIY</td>
<td>No Lube</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
<td>0.20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soapy Water</td>
<td>0.15</td>
<td>0.15</td>
<td>0.12</td>
<td>0.12</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. For KV series, coefficient of dynamic friction listed is for room temperature; for high temperatures, use 0.35.
2. M plastic rail is specifically designed for dry applications.

Table 5: Coefficient of Dynamic Friction (μ₂) between Conveyed Goods and Link Plate

<table>
<thead>
<tr>
<th>Conveyed Material</th>
<th>Lubrication</th>
<th>Polyocetal</th>
<th>Stainless Steel</th>
<th>Steel</th>
<th>P/M (Plastic Rails)</th>
<th>PMK (Plastic Rail)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel Cans</td>
<td>No Lube</td>
<td>0.25</td>
<td>0.17</td>
<td>0.14</td>
<td>0.20</td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td>Soapy Water</td>
<td>0.12</td>
<td>0.12</td>
<td>0.11</td>
<td>0.12</td>
<td>--</td>
</tr>
<tr>
<td>Aluminum Cans</td>
<td>No Lube</td>
<td>0.30</td>
<td>0.25</td>
<td>0.18</td>
<td>0.35</td>
<td>0.38</td>
</tr>
<tr>
<td></td>
<td>Soapy Water</td>
<td>0.20</td>
<td>0.20</td>
<td>0.12</td>
<td>0.20</td>
<td>--</td>
</tr>
<tr>
<td>Paper Packages</td>
<td>No Lube</td>
<td>0.22</td>
<td>0.12</td>
<td>0.10</td>
<td>0.12</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>Soapy Water</td>
<td>0.12</td>
<td>0.12</td>
<td>0.10</td>
<td>0.12</td>
<td>--</td>
</tr>
<tr>
<td>Glass Bottles</td>
<td>No Lube</td>
<td>0.25</td>
<td>0.16</td>
<td>0.13</td>
<td>0.20</td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td>Soapy Water</td>
<td>0.15</td>
<td>0.15</td>
<td>0.11</td>
<td>0.15</td>
<td>--</td>
</tr>
<tr>
<td>Plastic Containers</td>
<td>No Lube</td>
<td>0.25</td>
<td>0.17</td>
<td>0.14</td>
<td>0.20</td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td>Soapy Water</td>
<td>0.12</td>
<td>0.12</td>
<td>0.11</td>
<td>0.12</td>
<td>--</td>
</tr>
<tr>
<td>Industrial Parts (metal)</td>
<td>No Lube</td>
<td>0.25</td>
<td>0.17</td>
<td>0.14</td>
<td>0.20</td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td>Soapy Water</td>
<td>0.12</td>
<td>0.12</td>
<td>0.11</td>
<td>0.12</td>
<td>--</td>
</tr>
</tbody>
</table>

Note: For KV series, coefficient of dynamic friction listed is for room temperature; for high temperatures, use 0.35.

Step 5: Calculate Chain Tension and Power Required

Note: Formulas are given for both SI units and gravimetric units. When calculating the chain tension (F), gravimetric weight units (kgf) have the same value as SI mass units (kg).

Explanation of Symbols

- \( F \) = Chain tension (kN) or (kgf)
- \( m_1 \) = Chain mass (kg/m) or (kgf/m)
- \( L \) = Length of conveyance section (m)
- \( m_2 \) = Mass of conveyed goods (kg/m) or (kgf/m)
- \( L' \) = Length of accumulation section (m)
- \( m_3 \) = Mass of accumulated goods (kg/m) or (kgf/m)
- \( \mu_1 \) = Coefficient of dynamic friction between chain and wearstrip (See Table 4)
- \( \mu_2 \) = Coefficient of dynamic friction between conveyed goods and chain in accumulation section (See Table 5)
- \( P \) = Power required (kW)
- \( V \) = Chain speed (m/min)
- \( \eta \) = Mechanical transmission efficiency for drive unit

SI Units (kN)

Chain Tension

\[
F = 9.80665 \times 10^4 \frac{(2.1m_1 + m_2) L \cdot \mu_1 + (2.1m_1 + m_2) L' \cdot \mu_2}{60 \eta}
\]

Power Required

\[
P = \frac{F \cdot V}{60 \eta}
\]

Gravimetric Units (kgf)

Chain Tension

\[
F = \frac{(2.1m_1 + m_2) L \cdot \mu_1 + (2.1m_1 + m_2) L' \cdot \mu_2}{180 \eta}
\]

Power Required

\[
P = \frac{F \cdot V}{6120 \eta}
\]

Step 6: Determine Chain Size

Select a plastic block chain having a maximum allowable load larger than the maximum tension \( F \) to be applied to the chain. Consult the maximum allowable load graphs on pages 17 and 18 and consider conveyor speed and ambient temperature in the selection process.

\[ F \leq \text{Maximum allowable load (coupled with speed and temperature)} \]

When the maximum allowable load is insufficient, it can be corrected by increasing the number of chain strands or by splitting it into many short conveyors.
The layout of the supports for chains will vary according to the installation space available and other parameters. A typical layout is shown below.

1) Chain Slack
Return rollers should be spaced at intervals of 500 to 600 mm to support the return way of the chain. The amount of slack in the chain between return rollers should be 50 to 100 mm.

2) Engagement Angle
The engagement angle between the drive sprocket and the chain must be greater than 150°. When working tension is greater than 50% of maximum allowable load, the engagement angle must be greater than 180°.

3) Wearstrip Ends
A distance equivalent to the pitch spacing of the chain must be established between the end of the wearstrip and the respective shaft centers on both the drive and driven ends. Also, the tail end of the return wearstrip on the driven side must be rounded or chamfered (slipped) to prevent catching or snagging of the chain.

4) Height of Wearstrip on Carry Way
Refer to the above diagram or dimension A from the equation to the right.

\[ A = \frac{\text{Sprocket Pitch Diameter}}{2} + \beta \]

---

**Carry-Way Chain Guides**

1) Chain Guide for Straight Running Chains

![Diagram of Chain Guide for Straight Running Chains]

**Table 6: Dimensions of Chain Guide**

<table>
<thead>
<tr>
<th>Type</th>
<th>RSP35</th>
<th>RSP40</th>
<th>RSP50</th>
<th>RSP60</th>
<th>RSP60-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>16</td>
<td>23</td>
<td>25.5</td>
<td>33</td>
<td>63</td>
</tr>
<tr>
<td>H</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

Notes:
Do not support the chain by the bush.
There is a risk of uneven wear due to sliding friction between the wearstrip and the bush.
Installing a wearstrip between the guide and the chain is recommended.
See Table 3 on page 13 for wearstrip selection information.

2) Chain Guide for Side Flexing Chains

- RSP60-CU, RSP60P-CU

![Straight Section and Curved Section Diagrams]

- RSP60-CU-2

![Straight and Curved Sections Diagrams]
1) Supported by Return Rollers

This is the most common and recommended layout.

- Angle of chain wrap on the drive sprocket must be at least 150°.
- Make sure the return rollers rotate freely. If they do not rotate smoothly, localized sliding will occur, possibly generating wear dust or causing the top plate to wear unevenly.

| A: 50 to 100 mm (during operation) | B: 500 to 600 mm | C: Less than half the outer diameter of sprocket |

May vary depending on chain type and conveying conditions. To be used only as a basic guide.

- When using return rollers, check the back-flex radius of chains in Table 7. The radius of the return roller must be greater than the back-flex radius of the chain. However, as long as the back-flex radius is less than around 300 mm, return rollers can be used by keeping the chain slack low.

- The ratio of the inner diameter to the outside diameter of the return rollers should be at least 1:4 to ensure smooth rotation of rollers. This is particularly beneficial for return rollers that use a soft material on the periphery of the rollers, such as TP-IR18 and TP-IR60 (specifically for dry environments).

Table 7: Back-Flex Radius of Chains

<table>
<thead>
<tr>
<th>Chain Type</th>
<th>Back-Flex Radius</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSPF35-KV180</td>
<td>110 (150)</td>
</tr>
<tr>
<td>RSPF40 (including plastic pins)</td>
<td>125</td>
</tr>
<tr>
<td>RSP50</td>
<td>200</td>
</tr>
<tr>
<td>RSP60 (including plastic pins)</td>
<td>180</td>
</tr>
<tr>
<td>RSP60-2</td>
<td>450</td>
</tr>
<tr>
<td>RSP60-CU (including plastic pins)</td>
<td>250</td>
</tr>
<tr>
<td>RSP60-CU-2</td>
<td>150</td>
</tr>
</tbody>
</table>

* Back-flex radius is 450 mm before design update.

2) Supported by Wearstrip

Although this is an economical option for layouts, it has a disadvantage in that the upper surface of the link plates is susceptible to damage from sliding. Suitable for when working tension is less than 50% of maximum allowable chain load.

- Angle of chain wrap on the drive sprocket must be at least 150°.
- The radius of curvature (R) on both ends of the return-way wearstrip must be greater than the back-flex radius of the chain in Table 7 so that the chain does not get caught.

| A: 50 to 100 mm (during operation) | B: 500 to 600 mm |

May vary depending on chain type and conveying conditions. To be used only as a basic guide.

3) No Support

This conveyor layout is normally not recommended because the tension of the return way from the weight of the chain causes chain vibration and prevents smooth operation. If this method is unavoidable in the case of short conveyor lengths (less than 1.5 m), provide a take-up mechanism on the driven side or splice the chain in case the chain is elongated. The wrap angle on the drive sprocket must be at least 150° (when working tension is less than 50% of maximum allowable chain load).

- The amount of chain slack A should be approximately 10% of the conveyor length B.

4) Chain Guide for Side Flexing Chains in Curved Sections

- RSP60-CU, RSP60P-CU

- RSP60-CU-2

Curved Section
Outer Wearstrip
Wearstrip
Wearstrip
Frame
Allowable Load Graphs for Plastic Block Chain

Max. allowable load for DIA/DIY series is 80% of graph values.

Max. allowable load for DIY series is 80% of graph values.

Max. temperature under wet conditions: 60°C

Values are identical for SY (super chemical resistant) series.
Follow procedures 1 to 4 to select the chain most suitable for the application.

Step 1: Check Maximum Allowable Load of Snap Cover
Make certain that the load applied per link is within the maximum allowable load indicated in Table 8.

Step 2: Calculate Chain Tension

Explanation of Symbols

- $F$ = Maximum chain tension (kN (kgf))
- $m_1$ = Mass of conveyed goods (kg/m)
- $m_2$ = Chain mass (kg/m)
- $S$ = Length of conveyance (sprocket center distance) (m)
- $S'$ = Length of accumulation section (m)
- $\mu_1$ = Coefficient of friction between chain and guide rail (carry way) (See Table 9)
- $\mu_2$ = Coefficient of friction between chain and guide rail (return way) (See Table 10)
- $\mu_3$ = Coefficient of dynamic friction between conveyed goods and chain (See Table 11)
- $P$ = Power required (kW)
- $V$ = Chain speed (m/min)
- $K$ = Coefficient of speed (See Table 12)
- $\eta$ = Mechanical transmission efficiency for drive unit
- $G$ = Gravitational acceleration $9.80665 \text{m/s}^2$

Table 8: Maximum Allowable Load of Snap Cover

<table>
<thead>
<tr>
<th>Guide Rail Material</th>
<th>Polyacetal (electroconductive type)</th>
<th>Stainless Steel</th>
<th>Ultra-High Molecular Weight Polyethylene</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF06B-SC</td>
<td>0.03 (3)</td>
<td>0.05 (5)</td>
<td>0.07 (7)</td>
</tr>
<tr>
<td>RS40-SC</td>
<td>0.10 (10)</td>
<td>0.15 (15)</td>
<td>0.25 (25)</td>
</tr>
</tbody>
</table>

Table 10: Coefficient of Sliding Friction ($\mu_2$) between Chain (Plastic Cover) and Guide Rail

<table>
<thead>
<tr>
<th>Polyacetal (electroconductive type)</th>
<th>Stainless Steel</th>
<th>Ultra-High Molecular Weight Polyethylene</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.25</td>
<td>0.25</td>
<td></td>
</tr>
</tbody>
</table>

Note: Without lubrication

Table 11: Coefficient of Dynamic Friction ($\mu_3$) between Conveyed Goods and Chain (Plastic Cover)

<table>
<thead>
<tr>
<th>Plastic Cover Material</th>
<th>Steel Cans</th>
<th>Aluminum Cans</th>
<th>Paper Packages</th>
<th>Glass Bottles</th>
<th>Plastic Containers</th>
<th>Industrial Parts (metal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Type</td>
<td>0.25</td>
<td>0.30</td>
<td>0.22</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>Electroconductive Type</td>
<td>0.03</td>
<td>0.05</td>
<td>0.07</td>
<td>0.10</td>
<td>0.15</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Note: Without lubrication

The maximum chain tension is calculated using the following formula.

- SI Units (kN)

$$F = \left( m_1 + m_2 \right) S \cdot \mu_3 + 1.1 m_3 \cdot S \cdot \mu_1 + m_1 \cdot S' \cdot \mu_2 \cdot G / 1000$$

- Gravimetric Units (kgf)

$$F = \left( m_1 + m_2 \right) S \cdot \mu_3 + 1.1 m_3 \cdot S \cdot \mu_1 + m_1 \cdot S' \cdot \mu_2 \cdot G / 1000$$

Step 3: Determine Chain Size

Using the maximum tension ($F$) and the coefficient of speed ($K$) shown in Table 12, check whether or not the following formulas are satisfied. See the maximum allowable load of each chain size on page 11.

One strand of chains: $F \times K \leq \text{Maximum allowable load}$

Two strands of chains in a pair: $0.6 \times F \times K \leq \text{Maximum allowable load}$

Step 4: Calculate Power Required

The power required is calculated using the following formula.

- SI Units (kW)

$$P = \frac{F \times V}{54.5 \times \eta}$$

- Gravimetric Units (kgf)

$$P = \frac{F \times V}{556.5 \times \eta}$$
1) Basics of Wearstrip
Conveyance should be effectuated on the tension side and the conveyor on the slack side should be supported by the wearstrip, both ends of which should be slightly curved to prevent vibrations and pulsation of the chain.

2) Chain Slack
The necessary slack in the chain during conveyor operation is 90 to 140 mm below the drive sprocket as shown in the above figure.

3) Sprocket and Wearstrip Location

4) Curve at End of Wearstrip
The curve radius of the wearstrip should be larger than the back-flex radius of the chain (see table on the right).

5) Ways to Support Chain
- Carry way: Make sure the chain is supported by the rollers. If supported by the plastic cover, the cover will quickly wear down.
- Return way: The whole surface of the plastic cover should be supported.

**Chain Length Adjustment**

Chain length adjustment should be properly carried out in accordance with the procedure described below.

1) Detaching Plastic Covers
The plastic cover can be detached by hand, but a screwdriver makes the work easier.

2) Disassembling Base Chain
For riveted roller chain, use a hand grinder to remove the riveted ends of the two pins (on the same side) of the outer link to be cut. Be careful not to overheat the chain when performing the grinding operation. For Lambda chain, work especially slowly so as not to heat the oil-impregnated bushes.

3) Attaching Special Connecting Link and Plastic Covers
Join both ends of the chain with special connecting link. Be sure to install the detachable plate before attaching plastic covers.
When attaching the plastic cover, attach the cover in the base chain firmly.
For Your Safety When Using the Chain

Warning
To avoid danger, observe the following rules.

[General]
● Do not use chain or chain accessories for any purpose other than their originally intended use.
● Never perform additional work on chain (including machining, grinding, annealing, cleaning with acids or alkalies, electroplating, or welding or cutting with a torch which will cause heat effects). These processes may cause the chain to break during operation, leading to a risk of severe injury.
● When replacing a worn or damaged part, do not replace just the worn or damaged part. Replace all parts with new parts. The chain may break during operation, leading to a risk of severe injury.
● When using chain in a lifting device, set up a safety barrier and do not allow anyone to go under the equipment. Also, when jigs or tools are connected to the edges of the chain, be sure to adequately lubricate the connecting parts. Detachment of the chain or unexpected chain breakage may lead to severe injury from flying or falling parts.
● Strictly observe the general guidelines listed in Section 1, Chapter 1, 2nd Edition of the Japanese Occupational Safety and Health Regulations as well as rules and regulations concerning occupational safety and health in your region/country. Always install safety equipment (safety covers, etc.) on chain and sprockets. There is a risk of severe injury from conveyed items or the chain as a result of becoming caught in the chain or from unexpected chain breakage.
● Chain and sprockets must be inspected on a regular basis. Damaged parts, or parts that have reached the end or their service life, should be replaced with new parts. There is a risk not only of the chain not functioning properly, but also of severe injury from chain breakage or abnormal operation. Perform work as instructed in the manual, catalog or other documentation that was provided with the product.

[During installation]
● Before starting work, turn off the power switch and take measures to prevent it from being turned on accidentally. There is a risk of severe injury from becoming caught in the chain.
● Always wear safety goggles when using hammers while working to connect chains. There is a risk of severe injury from flying metal fragments or splinters.
● Secure the chain and parts to prevent them from moving freely. There is a risk of severe injury from chain components moving under their own weight, or from falling and body parts becoming pinched in the chain.

Caution
To prevent accidents, observe the following rules.

● Understand the structure and specifications of the chain that you are handling.
● Before installing chain, inspect it to make sure no damage occurred during delivery.
● Inspect and maintain chain and sprockets at regular intervals.
● Chain strength varies by manufacturer. Only Tsubaki products should be used when chain is selected using Tsubaki catalogs.
● Start and stop the chain gradually, and do not subject it to sudden impact.
● Do not apply initial tension to the chain.
● Consult with a Tsubaki representative before using the chain in cases where it will be in contact with special liquids or used under special environments.
● When disconnecting chains that have engineering plastic pins, do not reuse a pin once removed since it may not engage properly or it may even come loose.
● When using chains with engineering plastic pins under wet conditions, make sure that the temperature does not exceed 60°C.
● The link material for ULF ultra-low friction chains contains silicone-based lubricant. Therefore, do not use this chain for printing processes, or in cases where silicone will have a harmful effect.
● The TRR18/60 return rollers and PRB20-M (M plastic rail) are dry conveyor parts (lube-free, no water adhesion). The DIA series are specifically for dry environments. Do not use these on a conveyor under wet conditions (environments where they will come into contact with water, soapy water or other liquids), since this may cause the chain to malfunction. Bearing corner discs are also designed for use in dry environments.
● Using a plastic top chain in a wet environment will decrease the resin's self-lubricating ability and thus shorten the life of the chain. Since this is especially true with stainless steel pins, we recommend using plastic pins or KV series chain.
● The operating temperature range for accessories, sprockets and idler wheels made of UHMW-PE (ultra-high molecular weight polyethylene) is -20°C to 80°C. Also, do not use in environments where such components will be exposed to steam.

Warranty

1. LIMITED WARRANTY
Products manufactured by Seller; (a) conform to the design and specifications, if any, expressly agreed to in writing by Seller; and (b) are free of defects in workmanship and materials at the time of shipment. The warranties set forth in the preceding sentence are exclusive of all other warranties, express or implied, and extend only to Buyer and to no other person. ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY EXCLUDED.

2. NON-RELIANCE
Buyer is not relying upon any advice, representations or warranties (except the warranties expressly set forth above) of Seller, or upon Seller's skill or judgment regarding the Seller's products.
Buyer is solely responsible for the design and specifications of the products, including without limitation, the determination of suitability for Buyer's application of the products.

3. CLAIMS
(a) Any claim relating to quantity or type shall be made to Seller in writing within 7 days after receipt of the products; any such claim made thereafter shall be barred.
(b) Any claim under the above-stated Limited Warranty shall be made to Seller in writing within three (3) months after receipt of the products; any such claim made thereafter shall be barred.
(c) Seller's liability for breach of warranty otherwise is limited to repair or replacement, at Seller's option, of non-conforming or defective products. Buyer waives all other remedies, including, but not limited to, all rights to consequential, special or incidental damages, including, but not limited to, damages resulting from personal injury, death or damage to or loss of use of property.
(d) Repair, alteration, neglect or misuse of the products shall void all applicable warranties.

4. INDEMNIFICATION
Buyer will indemnify, defend and hold Seller harmless from all loss, liability, damage and expense, including attorneys' fees, arising out of any claim (a) for infringement of any patent, trademark, copyright, misappropriation of trade secrets, unfair competition or similar charge by any products supplied by Seller in accordance with the design or specifications furnished by Buyer, or (b) arising out of or connected with the products or any items into which the products are incorporated, including, but not limited to, any claim for product liability (whether or not based on negligence or strict liability of Seller), breach of warranty, breach of contract or otherwise.

5. ENTIRE AGREEMENT
These terms and conditions constitute the entire agreement between Buyer and Seller and supersede any inconsistent terms and conditions, whether contained in Buyer's purchase order or otherwise, and whether made heretofore or hereafter. No statement or writing subsequent to the date hereof which purports to modify or add to the terms and conditions hereof shall be binding unless consented to in writing, which makes specific reference hereto, and which has been signed by the party against which enforcement thereof is sought. Seller reserves the right to change these terms and conditions without prior notice.

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