TSUBAKI
PLASTIC TOP CHAIN
TTUPM-H / WT2515G-M

NEW
A New Solution from Tsubaki – Plastic Top

“Bevedolphin” – Beverage + Dolphin
“Bevedolphin” is the name of Tsubaki’s new plastic chain series for the beverage industry. Bevedolphin quickly and smoothly conveys your beverage containers, just like a dolphin quickly and smoothly swims through the sea. Our Bevedolphin Series is our solution for the beverage industry.

Prevents chain floating on curved sections when used in combination with magnet-embedded rails

TTUPM-H Type

Plug-less structure prevents plug drop-out

WT2515G-M Type

TTUPM-H Type

TTUPM-H Type uses the world’s first special double layer D-type plastic pin combining both plastic and metal. It possesses all the features of plastic while preventing floating through magnetism.
Chains Ideal for Beverage Container Conveyance

All-metal pins wear when exposed to water, causing significant wear elongation. However, special double layer D-type plastic pins use special engineering plastic where they slide against the links to further minimize wear elongation in contact with water and prolong the life of the chain.

Feature 2

Special double layer D-type plastic pins are much lighter than conventional pins. They are 15% lighter than all-metal pins, and thus can reduce chain attraction to magnet-embedded rails in curved sections to optimum levels and reduce capacitance.

Feature 3

WT2515G-M Type

WT2515G-M Type uses special stepped plastic connecting pins. While plugged types (with plugs to prevent pin drop-out) have a risk of foreign matter entering when plugs drop out, there is no risk with special stepped plastic pins, which combine pins and a pin drop-out prevention structure. The simple structure of only links and pins also makes handling easy.

Combining TTUPM-H and WT2515G-M Types

The curved TTUPM838H type and straight WT2515G-M type can both be installed on the same structural frame, so multi-row conveyor design is a snap. An example of installation can be seen on the right.
Plastic Top Chain  TTUPM-H Type

Plastic Chain

Combination of magnet-embedded plastic rail and chain

- Curved rail (Carry way wearstrip)
- Chain
- Special double layer D-type plastic pin
- Magnet embedded in curved rail

Connecting pin

- Special double layer D-type plastic pin
  - (Outside: Special engineering plastic (orange))
  - (Core: metal)
  - Model no.: TTUPM-H-PLA-TK-JPD

- Special double layer D-type plastic pin
  * When connecting or disconnecting the chain, use punches with a 6 to 7.5mm diameter. Smaller punch diameters may knock out the core metal pins.

Chain (plastic pins)

<table>
<thead>
<tr>
<th>Product code</th>
<th>Model no.</th>
<th>Top plate</th>
<th>Pin</th>
<th>Max. allowable load kN(kgf)</th>
<th>Approx. mass kgf/m</th>
<th>Back bend radius mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>K11</td>
<td>TTUPM838H-CB</td>
<td>Low-friction polyacetal (carbon black filled)</td>
<td>Special double layer D-type plastic pin</td>
<td>1.9(190)</td>
<td>1.5</td>
<td>70</td>
</tr>
</tbody>
</table>

Notes)
1. A chain consists of the required number of units of links and a fraction less than one unit. 1 unit = 120 links
2. Made-to-order product.
3. The chain material is low friction polyacetal with carbon black (CB).
4. Only connecting pins are orange. Base chain pins are white.
5. Operating temperature range is -20°C to (80) 80°C. (80)°C is for wet conditions.
6. Allowable chain speed: 100 m/min (with lubrication) and 50 m/min (without lubrication)

Other Chain Materials

ULF: Ultra Low Friction (Color: Blue)
HG: Low Friction & abrasion resistance (Color: Navy Blue)

For chain materials other than the above, please contact us.

Chain model numbering

<table>
<thead>
<tr>
<th>Model no.</th>
<th>Plate width</th>
<th>Model</th>
<th>Series code</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTUPM</td>
<td>838 H</td>
<td>CB</td>
<td></td>
</tr>
<tr>
<td>(838 = 83.8 mm)</td>
<td></td>
<td></td>
<td>CB: Low-friction, wear-resistant type (Blue)</td>
</tr>
</tbody>
</table>

* No space is required between characters and codes.
Sprocket

<table>
<thead>
<tr>
<th>Product code</th>
<th>Model no.</th>
<th>Teeth</th>
<th>Pitch diameter (mm)</th>
<th>Outer diameter (mm)</th>
<th>Bore diameter (mm)</th>
<th>Keyway number</th>
<th>Approx. mass (kg)</th>
<th>Type</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>K151111</td>
<td>WT-SW2500-16T25</td>
<td>16</td>
<td>130.2</td>
<td>131.9</td>
<td>ø25</td>
<td>8</td>
<td>28.3</td>
<td>0.26</td>
<td>Reinforced polynamide (Exterior color: Black)</td>
</tr>
<tr>
<td>K151112</td>
<td>WT-SW2500-16T30</td>
<td>16</td>
<td>130.2</td>
<td>131.9</td>
<td>ø30</td>
<td>8</td>
<td>33.3</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>K151113</td>
<td>WT-SW2500-16T35</td>
<td>16</td>
<td>130.2</td>
<td>131.9</td>
<td>ø35</td>
<td>10</td>
<td>38.3</td>
<td>0.24</td>
<td></td>
</tr>
<tr>
<td>K151114</td>
<td>WT-SW2500-16T40</td>
<td>16</td>
<td>130.2</td>
<td>131.9</td>
<td>ø40</td>
<td>12</td>
<td>43.3</td>
<td>0.24</td>
<td></td>
</tr>
<tr>
<td>K151115</td>
<td>WT-SW2500-18T25</td>
<td>16</td>
<td>146.3</td>
<td>148.3</td>
<td>ø25</td>
<td>8</td>
<td>28.3</td>
<td>0.29</td>
<td></td>
</tr>
<tr>
<td>K151116</td>
<td>WT-SW2500-18T30</td>
<td>16</td>
<td>146.3</td>
<td>148.3</td>
<td>ø30</td>
<td>8</td>
<td>33.3</td>
<td>0.28</td>
<td></td>
</tr>
<tr>
<td>K151117</td>
<td>WT-SW2500-18T35</td>
<td>16</td>
<td>146.3</td>
<td>148.3</td>
<td>ø35</td>
<td>10</td>
<td>38.3</td>
<td>0.28</td>
<td></td>
</tr>
<tr>
<td>K151118</td>
<td>WT-SW2500-18T40</td>
<td>16</td>
<td>146.3</td>
<td>148.3</td>
<td>ø40</td>
<td>12</td>
<td>43.3</td>
<td>0.28</td>
<td></td>
</tr>
<tr>
<td>K151119</td>
<td>WT-SW2500-21T25</td>
<td>16</td>
<td>170.4</td>
<td>172.7</td>
<td>ø25</td>
<td>8</td>
<td>28.3</td>
<td>0.36</td>
<td></td>
</tr>
<tr>
<td>K151120</td>
<td>WT-SW2500-21T30</td>
<td>16</td>
<td>170.4</td>
<td>172.7</td>
<td>ø30</td>
<td>8</td>
<td>33.3</td>
<td>0.35</td>
<td></td>
</tr>
<tr>
<td>K151121</td>
<td>WT-SW2500-21T35</td>
<td>16</td>
<td>170.4</td>
<td>172.7</td>
<td>ø35</td>
<td>10</td>
<td>38.3</td>
<td>0.34</td>
<td></td>
</tr>
<tr>
<td>K151122</td>
<td>WT-SW2500-21T40</td>
<td>16</td>
<td>170.4</td>
<td>172.7</td>
<td>ø40</td>
<td>12</td>
<td>43.3</td>
<td>0.33</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Models in boldface are stock items (standard products) while models in normal face are made-to-order products.
2. Bolt tightening torque: 5.7 N·m (0.58 kgf·m)
3. Any half of a split sprocket pair should not be paired with a half of a different pair.
4. Operating temperature range is -20°C to 80°C.
5. Machined solid sprockets (steel & engineering plastic) are also available upon request.

Idler Wheel

<table>
<thead>
<tr>
<th>Product code</th>
<th>Model no.</th>
<th>Dimensions</th>
<th>Approx. mass (kg)</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>K151167</td>
<td>TP-IW1221-25</td>
<td>A: 130.0 B: 100 C: 45 d: 25.3</td>
<td>0.4</td>
<td>Polyacetal (Exterior color: Green)</td>
</tr>
<tr>
<td>K151168</td>
<td>TP-IW1221-30</td>
<td>A: 142.5 B: 109 C: 43.5 d: 30.3</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>K151169</td>
<td>TP-IW1221-40</td>
<td>A: 154.8 B: 125 C: 48.3 d: 40.3</td>
<td>0.5</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Standard product.
2. Operating temperature range is -20°C to 80°C.
3. Bolt tightening torque: 9.8 N·m (1 kgf·m)
4. Any half of a split idler wheel should not be combined with a half of a different idler wheel.
5. Idler wheels rotate on the shaft; do not use an unfinished shaft.
6. Only use a finished shaft.

Magnet-embedded Plastic Rail

<table>
<thead>
<tr>
<th>Model no.</th>
<th>Installation location</th>
<th>Chain side-flex radius</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR.TTUPMH-K500P1R1</td>
<td>Carry way wearstrip</td>
<td>500</td>
<td>UHMW-PE (white)</td>
</tr>
<tr>
<td>PR.TTUPMH-K500P1R2</td>
<td>Return way wearstrip</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PR.TTUPMH-K500P1B</td>
<td>Return way base</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Made-to-order product. Please contact a Tsubaki representative for further information.
2. Other plastic rails (with different shapes, bend radius, and materials) are also available upon request. Please contact a Tsubaki representative for further information.
**Plastic Modular Chain**  
**WT2515G-M Type**

### Plastic Chain

#### Plan view
![Plan view diagram](image)

#### Connecting pin

Special stepped plastic pins / Orange  
(Material: Special engineering plastic)  
Model no.: WT2515G-PLA-JPD

![Connecting pin diagram](image)

### Chain (plastic pins)

<table>
<thead>
<tr>
<th>Product code (WT)</th>
<th>Model no. (K13)</th>
<th>Top plate</th>
<th>Pin</th>
<th>Max. allowable load (kN(kg))</th>
<th>Approx. mass (kg/m)</th>
<th>Back bend radius (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WT2515G-M330-CB</td>
<td>Low-friction polyacetal (carbon black filled)</td>
<td>Blue</td>
<td>Special stepped plastic pin</td>
<td>1.9(190)</td>
<td>0.8</td>
</tr>
</tbody>
</table>

**Notes**
1. A chain consists of the required number of units of links and a fraction less than one unit. 1 unit = 120 links.  
2. Made-to-order product.  
3. The chain material is low friction polyacetal with carbon black (CB).  
4. Only connecting pins are orange. Base chain pins are white.  
5. Operating temperature range is -20°C to 60°C.  
6. Allowable chain speed: 100 m/min. (with lubrication) and 50 m/min (without lubrication).

### Chain model numbering

<table>
<thead>
<tr>
<th>Model code</th>
<th>Chain pitch</th>
<th>Meandering prevention guide</th>
<th>Fixed width</th>
<th>Plate width</th>
<th>Series code</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT</td>
<td>25</td>
<td>G: With meandering prevention guide</td>
<td>M: 330</td>
<td>83.8 mm</td>
<td>CB: Low-friction, wear-resistant type (Blue)</td>
</tr>
</tbody>
</table>

* No space is required between characters and codes.

### Other Chain Materials

- **ULF:** Ultra Low Friction  
  (Color: Blue)  
- **HG:** Low Friction & abrasion resistance  
  (Color: Navy Blue)

For chain materials other than the above, please contact us.
### Sprocket

**WT-SW2250-16T (Round hole)**

- Teeth: 16
- Pitch diameter: $D_p = 130.2$
- Outer diameter: $D_o = 130$
- Bore diameter: $d = 8$
- Keyway: Round hole
- Bore shape: Round 30 polished steel bar
- Shaft: Reinforced polyamide (Black)

**WT-SW2250-18T (Round hole)**

- Teeth: 18
- Pitch diameter: $D_p = 146.3$
- Outer diameter: $D_o = 146$
- Bore diameter: $d = 12$
- Keyway: Round hole
- Bore shape: Round 40 polished steel bar
- Shaft: Split

**WT-SW2250-16T (Square hole)**

- Teeth: 16
- Pitch diameter: $D_p = 130.2$
- Outer diameter: $D_o = 130$
- Bore diameter: $d = 8$
- Keyway: Round hole
- Bore shape: Square 40 polished steel bar
- Shaft: Reinforced polyamide (Black)

**WT-SW2250-18T (Square hole)**

- Teeth: 18
- Pitch diameter: $D_p = 146.3$
- Outer diameter: $D_o = 146$
- Bore diameter: $d = 12$
- Keyway: Round hole
- Bore shape: Square 40 polished steel bar
- Shaft: Split

**Notes:***
1. Operating temperature range is -20°C to 80°C.
2. Square-hole sprockets are loosely fitted to the shaft to accommodate the thermal expansion between the chain and conveyor, as well as chain-sprocket installation errors.
3. Use round-hole sprockets only when the chain width is 680 mm or shorter and temperature variations are within 30°C.
4. Models in boldface are stock items (standard products) while models in normal face are made-to-order products.

### Idler Wheel

**WT-SW2250-16T-IW-M**

- Teeth: 16
- Pitch diameter: $D_p = 130.2$
- Outer diameter: $D_o = 130$
- Bore diameter: $d = 8$
- Shaft: Round 30 polished steel bar
- Material: Polyamide (White)

**WT-SW2250-18T-IW-M**

- Teeth: 18
- Pitch diameter: $D_p = 146.3$
- Outer diameter: $D_o = 146$
- Bore diameter: $d = 12$
- Shaft: Round 40 polished steel bar
- Material: Polyamide (White)

**Notes:***
1. Operating temperature range is -20°C to 80°C.
2. Use only as an idler wheel.
Corrosion Resistance against Different Liquids

When selecting a chain, refer to Table 1 to check whether the material is appropriate for the intended application. You can also use this corrosion resistance data to check the material of the rail used with the Top Chain. The table shows results obtained in a laboratory at 20°C and does not guarantee usability in all conditions. Consider the overall operating conditions (including humidity) with actual use. The table shows the material of the components used in the top plates and chain individually, so be sure to check them in the material in combination. Reagents with no concentration indicated are saturated or a 100% solution. Use caution when mixing solutions as their conditions differ.

Table 1. Corrosion resistance against different liquids

<table>
<thead>
<tr>
<th>Liquid</th>
<th>TITIAN-H Top</th>
<th>TITIAN-W Top</th>
<th>WSSA-R Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic acid (10%)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Acetone</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>Ammonium solution</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beer</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>Benzene</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citric acid</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Drinking water / Coffee</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formic acid (50%)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Fruit juice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gasoline</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>Hydrochloric acid (2%)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrogen peroxide solution (5%)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Iodine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lactic acid</td>
<td>X</td>
<td>X</td>
<td>O</td>
</tr>
</tbody>
</table>

- Sufficient corrosion resistance
- Corrosion resistance under certain operating conditions
- No corrosion resistance

Step 1. Check Conveyance Conditions

1. Conveyed material
   A. Material used in container or conveyed material
   B. Weight per unit
   C. Shape/dimensions
2. Conveyance route
   A. Linear or curved conveyance
   B. Conveyor length/width
   C. Layout
   D. Space
3. Conveyance conditions
   A. Conveyance amount
   B. Conveyor speed
   C. Conveyor belt
   D. Lubrication
   E. Item stacking (accumulation, ratio)
4. Conveyance atmosphere
   A. Temperature
   B. Corrosive gases
   C. Humidity
   D. Emissions
   E. Other environmental factors

Step 2. Selection of Rail Material

Select the appropriate rail material.

Table 2. Rail material selection chart

<table>
<thead>
<tr>
<th>Chain type</th>
<th>Rail material</th>
<th>Abrasive material</th>
<th>B</th>
<th>A</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic top chain,</td>
<td>Stainless steel</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Plastic block chain,</td>
<td>Steel</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Plastic modular chain,</td>
<td>Solid (P rail)</td>
<td>Yes</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>• For straight conveyor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• For curved conveyor</td>
<td>M rail</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>M rail SJ-CN0</td>
<td>×</td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>

Table 3. Calculating Chain Load and Required Power

1) Description of symbols
   \[ P = \frac{F \cdot V}{60 \eta} \]
   \[ F = 9.80665 \times 10^{-3} \times \left( (2.1 \cdot m_1 + m_3) \cdot L_1 \cdot \mu_1 \right) \]
   \[ (2.1 \cdot m_1 + m_3) \cdot L' \cdot \mu_1 , m_3 \cdot \mu_2 \]

- \( F \): Chain load (kN)
- \( m_1 \): Chain weight (kg/m)
- \( L_1 \): Length of conveyance (m)
- \( \mu_1 \): Coefficient of friction (See Table 3)
- \( \mu_2 \): Coefficient of friction (See Table 4)
- \( V \): Chain speed (m/min)
- \( \eta \): Power transmission device efficiency in drive section

Step 3. Calculating Chain Load and Required Power

3-1. Calculating F in linear conveyance

\[ F = 9.80665 \times 10^{-3} \times \left( (2.1 \cdot m_1 + m_3) \cdot L_1 \cdot \mu_1 \right) \]

3-2. Calculating F in curved conveyance (with one curved section)

\[ F = 9.80665 \times 10^{-3} \cdot F_{01} \]

Return-way load

\[ F_{01} = F_{01} \times \left( \frac{m_3 + m_1 \cdot L_1}{m_3 + m_2} \cdot \mu_1 \right) \]

Carry-way load

\[ F_{01} = F_{01} \times \left( \frac{m_3 + m_1 \cdot L_1}{m_3 + m_2} \cdot \mu_1 \right) \]

\[ L_1 = L_1 \times \mu_1 \]

\[ L_3 = L_3 \times \mu_1 \]

\[ \beta = \beta \times \mu_1 \]

\[ \lambda = \lambda \times \mu_1 \]
Step 4. Selecting a Chain Size

Select a Top Chain with a maximum allowable load greater than the maximum load (F) applied to the chain. Also, take the conveyor speed and ambient temperature into consideration, referencing the allowable load graphs in Tables 7 and 8.

\[ F \leq \text{Max. allowable chain load (depending on speed and temperature)} \]

### Table 3. Dynamic coefficient of friction of chain/rail $\mu_1$

<table>
<thead>
<tr>
<th>Top plate material</th>
<th>Condition</th>
<th>UHMW-PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB</td>
<td>No lubrication or water-lubricated</td>
<td>0.2</td>
</tr>
</tbody>
</table>

### Table 4. Dynamic coefficient of friction of chain/conveyed items $\mu_2$

<table>
<thead>
<tr>
<th>Top plate material</th>
<th>Condition</th>
<th>Material of carried item</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB</td>
<td>No lubrication or water-lubricated</td>
<td>Aluminum can</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Steel can</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Glass bottle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plastic container</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carton</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Material of carried item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum can</td>
<td>0.19</td>
</tr>
<tr>
<td>Steel can</td>
<td>0.12</td>
</tr>
<tr>
<td>Glass bottle</td>
<td>0.16</td>
</tr>
<tr>
<td>Plastic container</td>
<td>0.29</td>
</tr>
</tbody>
</table>

### Table 5. Magnet factor $\mu_3$

<table>
<thead>
<tr>
<th>Top plate material</th>
<th>Condition</th>
<th>Magnet factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB</td>
<td>No lubrication or water-lubricated</td>
<td>0.47</td>
</tr>
</tbody>
</table>

### Table 6. Angle and length factors when using curved rails $\alpha_L$, $\alpha_S$

<table>
<thead>
<tr>
<th>Top plate material</th>
<th>Condition</th>
<th>Horizontal bend angle $\alpha_L$</th>
<th>Length factor $\alpha_S$</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB</td>
<td>No lubrication or water-lubricated</td>
<td>30°, 60°, 90°</td>
<td>0.5, 1.0, 1.6</td>
</tr>
</tbody>
</table>

### Table 7. Allowable load graph for WT2515G-M330-CB

\[ \text{Allowable chain speed} \]
\[ \text{With lubrication: 100 m/min. Without lubrication: 50 m/min.} \]

### Table 8. Allowable load graph for TTUPM838H-CB

\[ \text{Allowable chain speed} \]
\[ \text{With lubrication: 100 m/min. Without lubrication: 50 m/min.} \]

2. Conveyor Design

1. Conveyor Parts Arrangement

Guide rail arrangement depends on the installation space and other factors. An example is shown in the figure below.

- Chain slack
  - The first return roller should be placed 500 to 900 mm from the drive. The amount of slack in the chain between return rollers should be 50 to 100 mm. Using different intervals or amounts of slack may result in chain skipping.

- Return roller intervals
  - Place the return rollers at even intervals after the first return roller just after the drive. (Recommended roller interval is about 400 to 600)

- Engagement angle
  - The engagement angle between the drive sprocket and the chain must be greater than 150°.

- Height of wearstrip on carry way (H)
  - See figure below.

5. Return rollers

Return rollers receive the top side of the chain on the return way. Use return rollers taking into consideration the chain back bend radius. As a general rule, the chain back bend radius should not be greater than the radius of the return rollers.

### Table 9. Allowable load graph

<table>
<thead>
<tr>
<th>Chain back bend radius (unit: mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT2515G-M</td>
</tr>
<tr>
<td>TTUPM838H</td>
</tr>
</tbody>
</table>

6. Wearstrip ends

Keep the length of one pitch of the chain between the shaft center and the wearstrip end on the drive and driven sides. Also the wearstrip end of the driven unit must be rounded or chamfered to prevent the wearstrip from catching or snagging the chain.
2. Installing Wearstrips

See below for guide clearances for the chain, as well as chain alignment pitch when using multiple lanes.

**Single lane**

WT2515G-M

45 mm

TTUPM838H

45 mm

**Multi-lane**

For multi-lane applications, the lateral pitch should be 85 mm. An example is shown in the figure below, but note that it depends on the installation space.

---

3. Assembly and Disassembly of the Chain

**Assembly and Disassembly of TTUPM838H**

The D-pin type connecting pins can be inserted/removed from either side. Use a punch with an outer diameter of 6 to 7.5 mm. Ensure that the pins are fully but not excessively inserted.

---

**Assembly and Disassembly of WT2515G-M330**

**Disassembly**

Apply the punch (with max. diameter of 4.5 mm) to the side of the pin without a cutout, and punch out the pin by tapping the punch with a hammer.

---

**Assembly**

Use the dedicated connecting pins (special stepped plastic pin (orange)). Insert the pin from the side without cutout into the link. Connect the chain by applying a punch to the side with cutout and tapping the pin into the link. Pins can be inserted from either side of the link.

---

**Re-assembly**

Do not reuse a previously inserted connecting pin (special stepped plastic pin (orange)) to connect chains.

- **Connecting pin (special stepped plastic pin)**
  Use the dedicated connecting pin (special stepped plastic pin) to assemble the chain. The special stepped plastic pins are colored orange so they can be distinguished from the base chain pins (white). One connecting pin is provided for each chain.

---

* Do not use a punch with an outer diameter smaller than 6 mm or greater than 7.5 mm as they may damage the chain and/or pin.
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 alkalis, 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 fi ying 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 of 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 the 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 fi ying 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 specifi c cations 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 series contains silicone-based lubricant. Therefore, do not use this chain for printing processes, or in cases where silicone will have a harmful effect.
- The TP-IR18/IR60/RR55 (return rollers), PR520-M (M plastic rail), and SJ-CNO are dry conveyor parts (lube-free, no water adhesion). DIA, MPD, MF, HS, and KV150 chains are specifi cally for dry environments. Do not use these on a conveyor under wet conditions (environments where they will come into contact with water, soap 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 60°C. Also, do not use in environments where such components will be exposed to steam.
- Toxic gases may be generated if the Chemical Resistant series (including Super Chemical Resistant) is exposed directly to open flame, or to temperatures above 150°C. Do not expose to excessive heat or to open fi ame.
- Plastic chain is fl ammable. Do not use at temperatures above the maximum allowable temperature or use near open fl ame. Combustion may generate dangerous toxic gases.

Warranty

1. LIMITED WARRANTY
Products manufactured by Seller: (a) conform to the design and specifi cations, 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.

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Buyer is solely responsible for the design and specifi cations of the products, including without limitation, the determination of suitability for Buyer’s application of the products.

3. CLAIMS
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(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.
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(d) Repair, alteration, neglect or misuse of the products shall void all applicable warranties.

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