

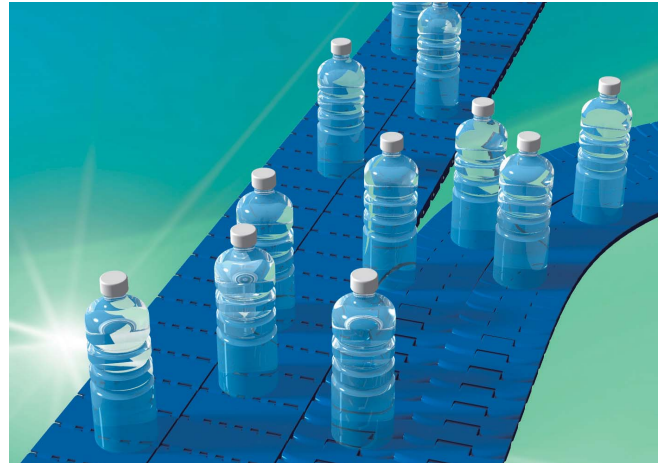
TSUBAKI PLASTIC TOP CHAIN TTUPM-H / WT2515G-M



A New Solution from Tsubaki – Plastic Top

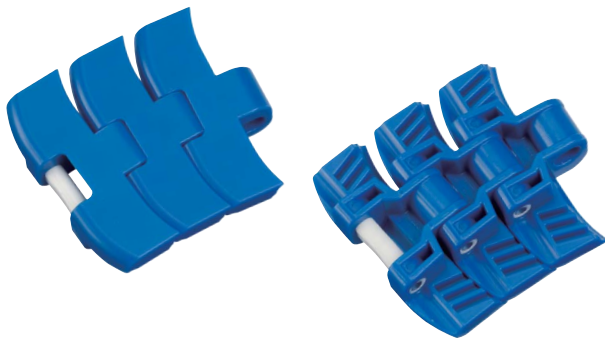


“Bevedolphin” – Beverage + Dolphin
 “Bevedolphin” is the name of Tsubaki’s new plastic chain series for the beverage industry. Bevedolphin quickly and smoothly conveys your beverage containers, just like a dolphin quickly and smoothly swims through the sea. Our Bevedolphin Series is our solution for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



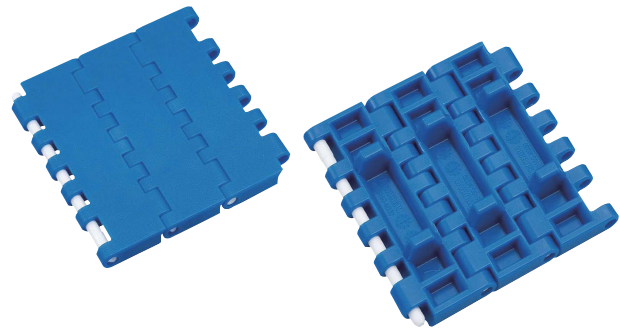
Prevents chain floating on curved sections when used in combination with magnet-embedded rails

TTUPM-H Type



Plug-less structure prevents plug drop-out

WT2515G-M Type

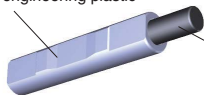


TTUPM-H Type

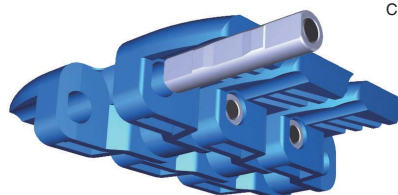
Feature 1

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.

Special engineering plastic



Metal

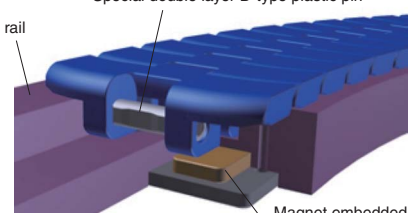


Special double layer D-type plastic pin

Combination of links and pins

Curved rail

Special double layer D-type plastic pin



Magnet embedded in curved rail

Combination of rail and chain

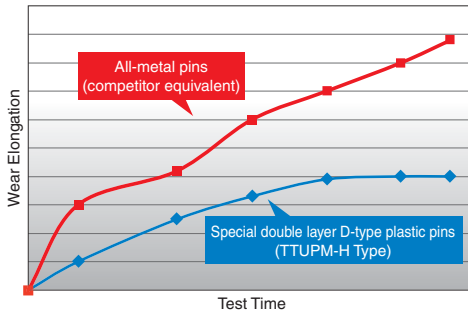
Chains Ideal for Beverage Container Conveyance



Feature 2

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.

Wear Elongation Comparison Graph



Test Conditions

The graph on the left shows our in-house test results.

Comparison

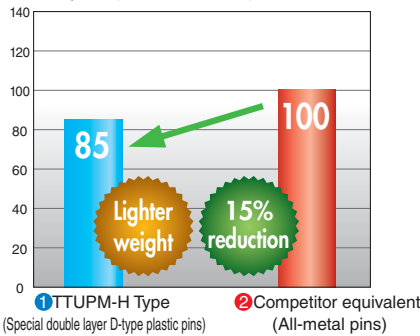
- ① Special double layer D-type plastic pins (New Tsubaki TTUPM-H Type)
 - ② All-metal pins (Competitor equivalent)
- Chain speed: 60 m/min
Ambient temperature, 5 kg weight load
Contact with water (water drip)

Feature 3

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.

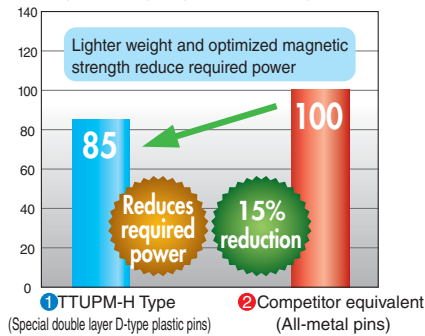
Reduces Chain Weight

*Weight comparison with all-metal pin chains as 100.



Required Power Reduction Graph

*Comparison of required power with all-metal pins as 100.



Test Conditions

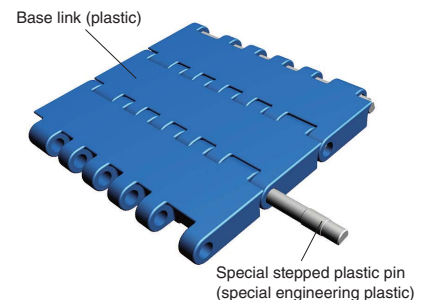
Comparison

- ① Special double layer D-type plastic pins (New Tsubaki TTUPM-H Type)
 - ② All-metal pins (Competitor equivalent)
- Chain speed: 60 m/min
Ambient temperature, 5 kg weight load
Test conveyor: Approx. 2,600 mm
One curved section

WT2515G-M Type

Feature 4

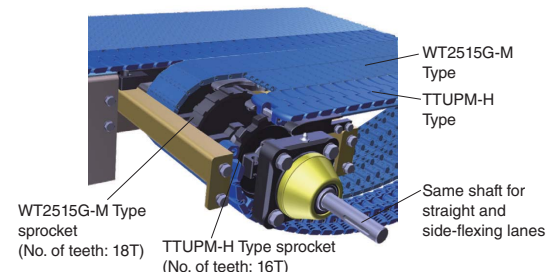
WT2515G-M Type uses special stepped plastic connecting pins. While plugged types (with plugs to prevent pin drop-out) have a risk of foreign matter entering when plugs drop out, there is no risk with special stepped plastic pins, which combine pins and a pin drop-out prevention structure. The simple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



Combining TTUPM-H and WT2515G-M Types

Feature 5

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.



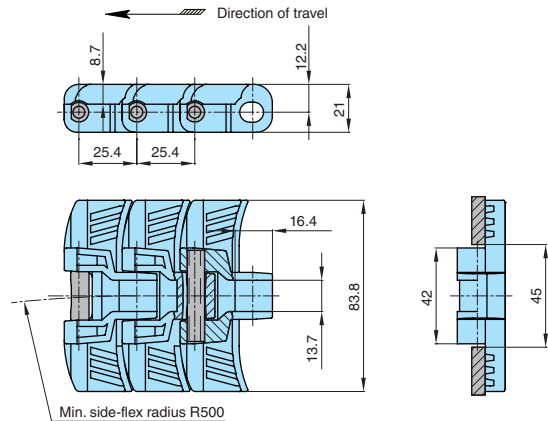
Plastic Top Chain TTUPM-H Type

Side-flexing

Plastic Chain

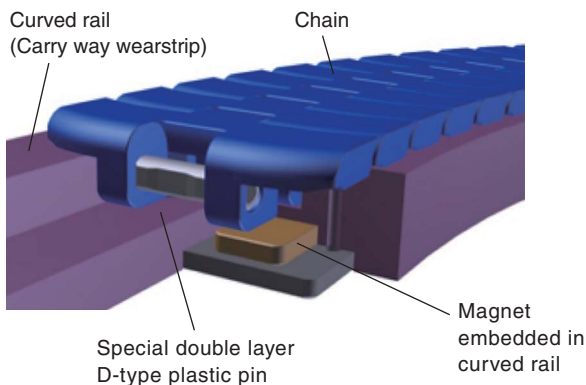


Plan view



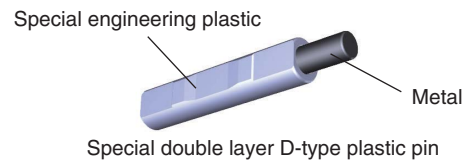
Bevedolphin™

Combination of magnet-embedded plastic rail and chain



Connecting pin

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



* 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)

Product code	Model no.	Top plate		Pin	Max. allowable load kN{kgf}	Approx. mass kgf/m	Back bend radius mm
		Material	Color				
K11	TTUPM838H-CB	Low-friction polyacetal (carbon black filled)	Blue	Special double layer D-type plastic pin	1.9{190}	1.5	70

- 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) 80°C. (60)°C is for wet conditions.
6. Allowable chain speed: 100 m/min (with lubrication) and 50 m/min (without lubrication)

Chain model numbering

Model no.	Plate width	Model	Series code
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TTUPM 838 H — CB
(838 = 83.8 mm) CB: Low-friction, wear-resistant type (Blue)

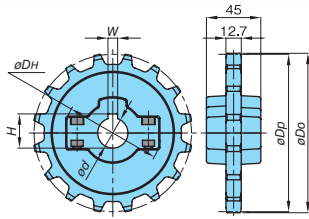
* No space is required between characters and codes.

Other Chain Materials

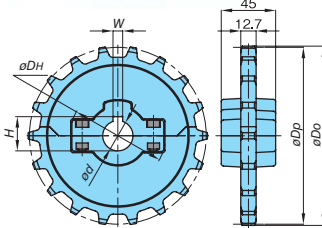
- ULF: Ultra Low Friction (Color: Blue)
HG: Low Friction & abrasion resistance (Color: Navy Blue)
For chain materials other than the above, please contact us.

Sprocket

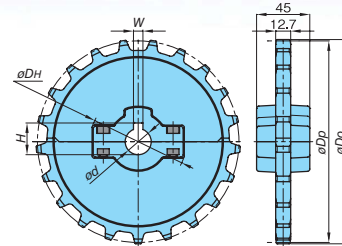
WT-SW2500-16T



WT-SW2500-18T



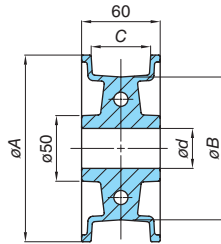
WT-SW2500-21T



Product code	Model no.	Teeth	Pitch diameter D_p	Outer diameter D_o	Bore shape	Bore diameter d	Keyway		Hub diameter D_h	Approx. mass k_g	Type	Material	
							W	H				Body	Bolts/ Nuts
K151111	WT-SW2500-16T25	16	130.2	131.9	Round	ø25	8	28.3	82	0.26	Split	Reinforced polyamide (Exterior color: Black)	Stainless steel
K151112	WT-SW2500-16T30					ø30	8	33.3		0.25			
K151113	WT-SW2500-16T35					ø35	10	38.3		0.24			
K151114	WT-SW2500-16T40					ø40	12	43.3		0.24			
K151115	WT-SW2500-18T25	18	146.3	148.3	Round	ø25	8	28.3	82	0.30	Split	Reinforced polyamide (Exterior color: Black)	Stainless steel
K151116	WT-SW2500-18T30					ø30	8	33.3		0.29			
K151117	WT-SW2500-18T35					ø35	10	38.3		0.28			
K151118	WT-SW2500-18T40					ø40	12	43.3		0.28			
K15	WTSW2500-21T25	21	170.4	172.7	Round	ø25	8	28.3	82	0.36	Split	Reinforced polyamide (Exterior color: Black)	Stainless steel
K15	WTSW2500-21T30					ø30	8	33.3		0.35			
K15	WTSW2500-21T35					ø35	10	38.3		0.34			
K15	WTSW2500-21T40					ø40	12	43.3		0.33			

- 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.

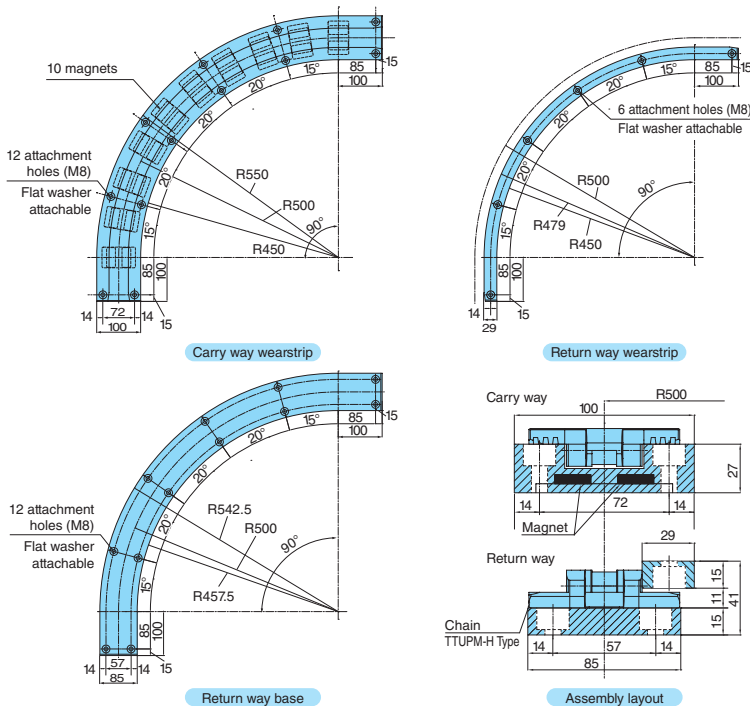
Idler Wheel



Product code	Model no.	Dimensions				Approx. mass k_g	Material	
		A	B	C	d		Body	Bolts/ Nuts
K151167	TP-IW1221-25	130.0	100	45	25.3	0.4	Polyacetal (Exterior color: Green)	Stainless
K151168	TP-IW1221-30				30.3			
K151169	TP-IW1221-40				40.3			
K151170	TP-IW1223-30	142.5	109	43.5	30.3	0.4	Polyacetal (Exterior color: Green)	Stainless
K151171	TP-IW1223-40				40.3			
K151172	TP-IW1225-30	154.8	125	45	30.3	0.5	Polyacetal (Exterior color: Green)	Stainless
K151173	TP-IW1225-40				40.3			

- 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. A 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



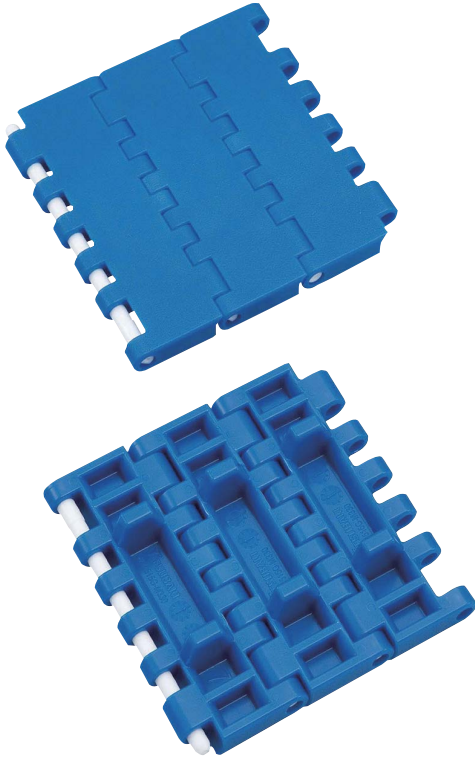
Model no.	Installation location	Chain side-flex radius	Material
PR-TTUPMHR500P1R1	Carry way wearstrip	500	UHMW-PE (white)
PR-TTUPMHR500P1R2	Return way wearstrip		
PR-TTUPMHR500P1B	Return way base		

- 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.

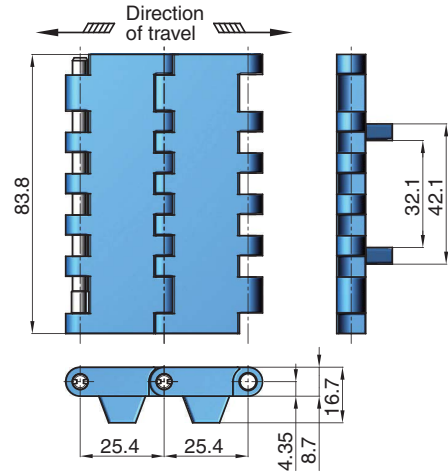
Plastic Modular Chain WT2515G-M Type

Straight

Plastic Chain

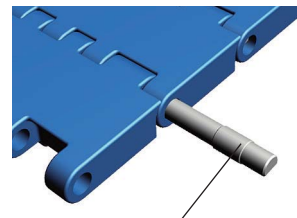


Plan view



Connecting pin

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



Special stepped plastic pins (special engineering plastic)

* Note that pins are to be removed from a certain direction. (See page 9)

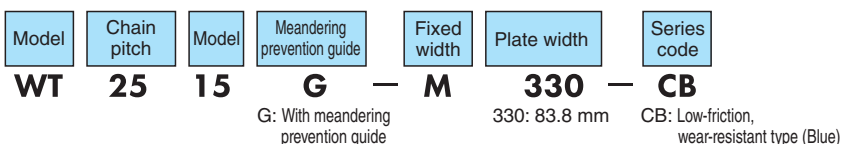


Chain (plastic pins)

Product code	Model no.	Top plate		Pin	Max. allowable load kN{kgf}	Approx. mass kgf/m	Back bend radius mm
		Material	Color				
K13	WT2515G-M330-CB	Low-friction polyacetal (carbon black filled)	Blue	Special stepped plastic pin	1.9{190}	0.8	25

- 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) 80°C. (60)°C is for wet conditions.
 6. Allowable chain speed: 100 m/min. (with lubrication) and 50 m/min (without lubrication)

Chain model numbering



* No space is required between characters and codes.

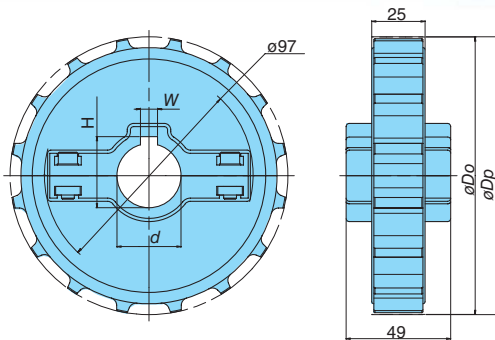
Other Chain Materials

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

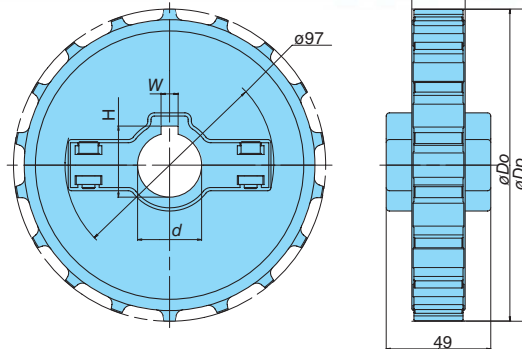
For chain materials other than the above, please contact us.

Sprocket

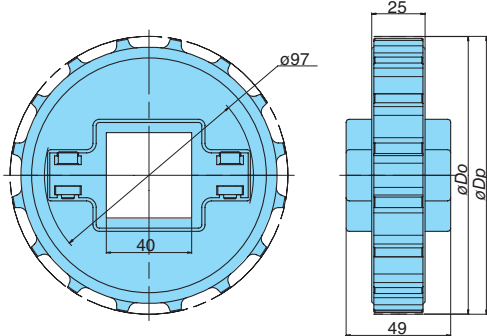
WT-SW2250-16T (Round hole)



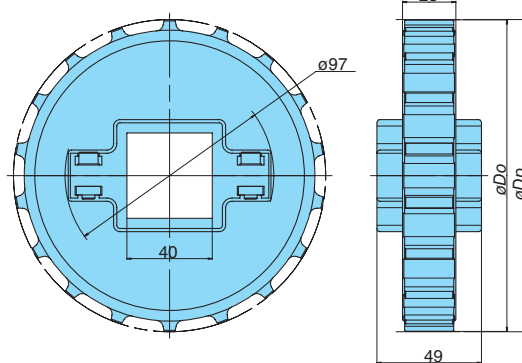
WT-SW2250-18T (Round hole)



WT-SW2250-16T (Square hole)



WT-SW2250-18T (Square hole)

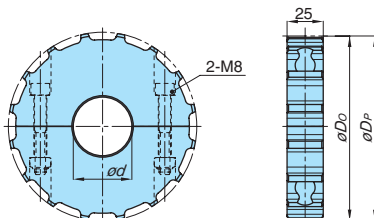


Product code	Model no.	Teeth	Pitch diameter D_p	Outer diameter D_o	Bore diameter d	Keyway		Bore shape	Shaft	Material	Type
						W	H				
K151202	WT-SW2250-16T30	16	130.2	130	$\varnothing 30$	8	33.3	Round hole	Round 30 polished steel bar	Reinforced polyamide (Black)	Split
K151203	WT-SW2250-16T40				$\varnothing 40$	12	43.3		Round 40 polished steel bar		
K15	WT-SW2250-16T40S				40	—	—	Square hole	Square 40 polished steel bar		
K151204	WT-SW2250-18T30	18	146.3	146	$\varnothing 30$	8	33.3	Round hole	Round 30 polished steel bar		
K151205	WT-SW2250-18T40				$\varnothing 40$	12	43.3		Round 40 polished steel bar		
K15	WT-SW2250-18T40S				40	—	—	Square hole	Square 40 polished steel bar		

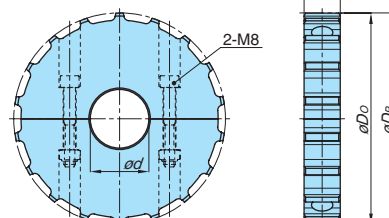
- Notes) 1. Operating temperature range is -20°C to 80°C .
 2. Square-hole sprockets are loosely fitted to the shaft to accommodate the thermal expansion between the chain and conveyor, as well as chain-sprocket installation errors.
 3. Use round-hole sprockets only when the chain width is 680 mm or 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



WT-SW2250-18T-IW-M



Product code	Model no.	Teeth	Pitch diameter D_p	Outer diameter D_o	Bore diameter d	Shaft	Material	Type
K151206	WT-SW2250-16T30IW-M	16	130.2	130	$\varnothing 30$	Round 30 polished steel bar	Polyamide (White)	Split
K151207	WT-SW2250-16T40IW-M				$\varnothing 40$	Round 40 polished steel bar		
K151208	WT-SW2250-18T30IW-M	18	146.3	146	$\varnothing 30$	Round 30 polished steel bar		
K151209	WT-SW2250-18T40IW-M				$\varnothing 40$	Round 40 polished steel bar		

- Notes) 1. Operating temperature range is -20°C to 80°C .
 2. Use only as an idler wheel.
 3. Standard product.

1. Selection

Precautions for Selection

- Plastic Top Chains are not recommended for use in operating conditions where they may be subject to impact or catch foreign material as this may damage or break the chains. Consider using a metal chain. Also, use inverter control, etc. to slowly start and stop the conveyor.
- Plastic Top Chains may suffer premature wear when used in operating conditions where they may contact abrasive material. Consider using a metal chain.
- Contact a Tsubaki representative before using Plastic Top Chains in contact with special liquids (acidic or alkaline chemicals or solutions) or in special environments (UV rays, etc.).
- 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 contact with steam.
- Toxic gases may be generated if Chemical Resistant Series (including Super Chemical Resistant Series) chains are exposed directly to open flame or temperatures above 150°C. Do not expose these series to excessive heat or open flame.
- Plastic chains are flammable. Do not use above the maximum allowable temperature or near open flame, as they may catch fire and generate dangerous toxic gases.

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 constituent components used in the top plates and chain individually, so be sure to check them 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

Liquid	TTUPM-H Type		Liquid	WT2515G-M Type	
	WT2515G-M Type	WT2515G-M Type		WT2515G-M Type	WT2515G-M Type
Acetic acid (10%)	×	×	Milk / Butter	○	○
Acetone	×	○	Nitric acid (5%)	×	×
Alcohol	○	○	Oil (vegetable, mineral)	○	○
Ammonia solution	△	△	Paraffin	○	○
Beer	○	○	Phosphoric acid (10%)	×	×
Benzene	○	○	Potassium hydroxide	×	×
Carbon tetrachloride	△	○	Seawater	×	△
Chromic acid (5%)	×	×	Soap water	○	○
Citric acid	×	×	Sodium chloride	×	○
Drinking water / Coffee	○	○	Sodium hydroxide (25% caustic soda)	×	×
Formic acid (50%)	×	×	Sodium hypochlorite	×	×
Fruit juice	○	○	Sulfuric acid (5%)	×	×
Gasoline	○	○	Vegetable juice	○	○
Hydrochloric acid (2%)	×	×	Vinegar	×	△
Hydrogen peroxide solution (3%)	×	×	Water	○	○
Iodine	×	×	Whiskey	○	○
Lactic acid	×	△	Wine	○	○

○: Sufficient corrosion resistance △: Corrosion resistance under certain operating conditions ×: No corrosion resistance

Step 1. Check Conveyance Conditions

- | | | |
|--|--|--|
| 1) Conveyed material | 3) Conveyance conditions | 4) Conveyance atmosphere |
| A. Material used in container or conveyed material | A. Conveyance amount | A. Temperature |
| B. Weight per unit | B. Conveyance interval | B. Chemicals, water, humidity, and other corrosive conditions (See Table 1) |
| C. Shape/dimensions | C. Conveyor speed | C. Glass shards, paint chips, metal chips, sand, and other abrasive material |
| | D. Lubrication | D. Exposure to ultraviolet light |
| | E. Item stacking (accumulation, ratio) | |
- 2) Conveyance route
- Linear or curved conveyance
 - Conveyor length/width
 - Layout
 - Space

Step 2. Selection of Rail Material

Select the appropriate rail material.

Table 2. Rail material selection chart

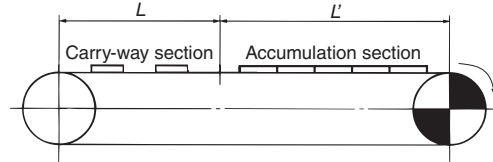
Chain type	Rail material	Abrasive material				A: Strongly recommended B: Recommended C: Very usable D: Usable ×: Not appropriate
		Without lubrication		With lubrication		
		No	Yes	No	Yes	
Plastic top chain, Plastic block chain, Plastic modular chain • For straight conveyor • For curved conveyor	Stainless steel	B	D	A	A	
	Steel	A	C	D	D	
	Solidur (P rail)	D	×	A	×	
	PMW rail PLF rail	B	×	A	×	
	M rail SJ-CNO	A	×	×	×	

	Material/Color	Feature
Solidur (P rail)	<ul style="list-style-type: none"> Ultra-high molecular weight polyethylene White or green 	<ul style="list-style-type: none"> Most common rail Machine-cut or extruded product When using a plastic chain, this rail is recommended for wet conditions Low water absorption; chemical-resistant and shock-proof.
PMW rail PLF rail	<ul style="list-style-type: none"> Low-friction, wear-resistant ultra-high molecular weight polyethylene White 	<ul style="list-style-type: none"> Lower friction compared to P rail; wear-resistant rail Machine-cut product
M rail SJ-CNO	<ul style="list-style-type: none"> Special polyamide Blue (M rail) Purple (SJ-CNO) 	<ul style="list-style-type: none"> Dry-only rail Wear-resistant rail Machine-cut product

Note: Operating temperature range: Solidur (P rail) : -20°C to 60°C M rail / SJ-CNO : -20°C to 80°C
PMW rail / PLF rail

Step 3. Calculating Chain Load and Required Power

3-1. Calculating F in linear conveyance



1) Description of symbols

- F = Chain load ————— kN
- m_1 = Chain weight ————— kg/m
- L = Length of carry-way section — m
- m_2 = Conveyed item weight in carry-way section — kg/m
- L' = Length of accumulation part — m
- m_3 = Weight of carried item in accumulation part — kg/m
- μ_1 = Dynamic coefficient of friction of chain/rail — (See Table 3)
- μ_2 = Dynamic coefficient of friction of the chain and conveyed item in accumulation section — (See Table 4)
- μ_3 = Coefficient of magnetism — (See Table 5)
- α_L = Coefficient of angle when using a side-flex rail — (See Table 6)
- α_s = Coefficient of length — (See Table 6)
- r = Side-flex radius — m
- P = Required power — kW
- V = Chain speed — m/min
- η = Power transmission device efficiency in drive section

SI units (kN)

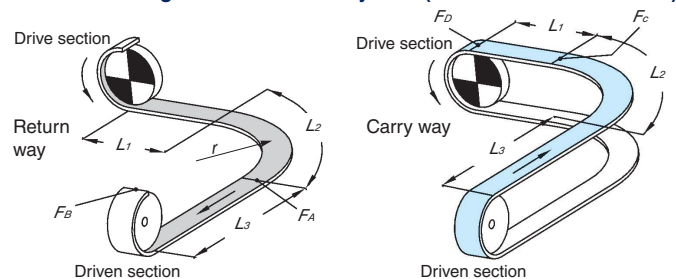
Chain load

$$F = 9.80665 \times 10^{-3} \{ (2.1 m_1 + m_2) L \cdot \mu_1 + (2.1 m_1 + m_3) L' \cdot \mu_1 + m_3 \cdot L' \cdot \mu_2 \}$$

Required power

$$P = \frac{F \cdot V}{60 \eta}$$

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



$$F = 9.80665 \times 10^{-3} \cdot F_D \text{ (kN)}$$

Return-way load

[Load of A part : F_A]
 $F_A = m_1 (L_1 + L_2) \mu_1 \cdot \alpha_L 90^\circ$
 $L_2 = r \times \alpha_s 90^\circ$

[Load of B part : F_B]
 $F_B = 1.1 \times (F_A + m_1 \cdot L_3 \cdot \mu_1)$

Carry-way load

[Load of C part : F_C]
 $F_C = [F_B + (m_1 + m_2) L_2 \cdot (\mu_1 + \mu_3) + (m_1 + m_2) \cdot L_3 \cdot \mu_1 + m_3 \cdot (L_2 + L_3) \cdot \mu_2] \times \alpha_L 90^\circ$
 $L_2 = r \times \alpha_s 90^\circ$

[Load of D part : F_D]
 $F_D = F_C + \{ (m_1 + m_2) L_1 \cdot \mu_1 + m_3 \cdot L_1 \cdot \mu_2 \}$

The coefficients shown in Tables 3 through 6 are based on in-house test data. Actual coefficients may differ depending on the operation conditions, atmosphere, shape of the conveyed items, chain grime, and other conditions. Use the coefficients given to calculate chain load.

Table 3. Dynamic coefficient of friction of chain/rail μ_1

Top plate material	Condition	UHMW-PE
CB	No lubrication or water-lubricated	0.2

Table 4. Dynamic coefficient of friction of chain/conveyed items μ_2

Top plate material	Condition	Material of carried item			
		Aluminum can Steel can	Glass bottle	Plastic container	Carton
CB	No lubrication or water-lubricated	0.19	0.12	0.16	0.29

Table 5. Magnet factor μ_3

Top plate material	Condition	Magnet factor
CB	No lubrication or water-lubricated	0.47

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

Top plate material	Condition	Horizontal bend angle α_L		
		30°	60°	90°
CB	No lubrication or water-lubricated	1.1	1.25	1.35
Length factor α_S		0.5	1.0	1.6

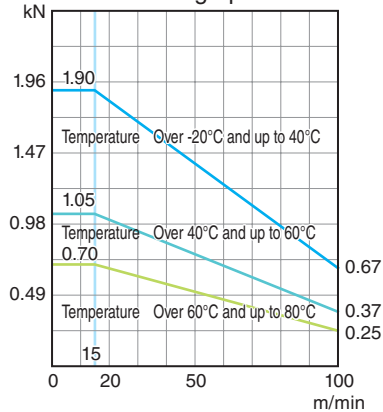
Top plate material	Condition	Horizontal bend angle α_L		
		120°	150°	180°
CB	No lubrication or water-lubricated	1.50	1.70	1.85
Length factor α_S		2.1	2.6	3.1

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.

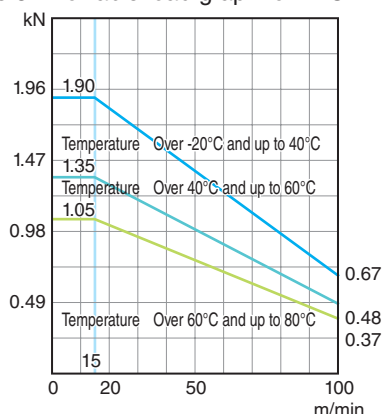
$$F \leq \text{Max. allowable chain load (depending on speed and temperature)}$$

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



Allowable chain speed
With lubrication: 100 m/min.
Without lubrication: 50 m/min.

Table 8. Allowable load graph for TTUPM838H-CB

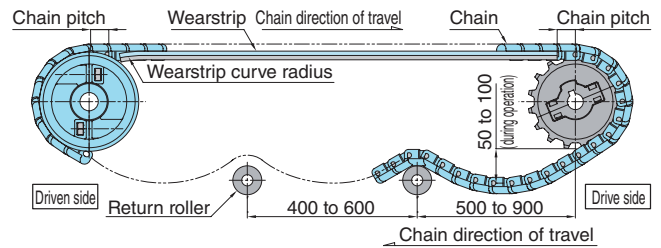


Allowable chain speed
With lubrication: 100 m/min.
Without lubrication: 50 m/min.

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.



1) 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.

2) 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)

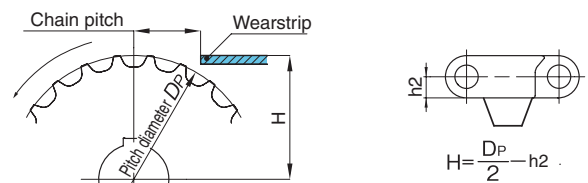
3) Engagement angle

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

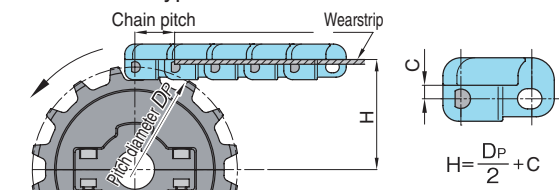
4) Height of wearstrip on carry way (H)

See figure below.

① WT2515G-M Type



② TTUPM-H Type



* Keep the length of one pitch on both the drive and driven sides.

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.

Chain back bend radius (unit: mm)

Chain	Back bend radius R
WT2515G-M	25
TTUPM838H	70

6) Wearstrip ends

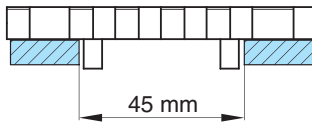
Keep the length of one pitch of the chain between the shaft center and the wearstrip end on the drive and driven sides. Also the wearstrip end of the driven unit must be rounded or chamfered to prevent the wearstrip from catching or snagging the chain.

2. Installing Wearstrips

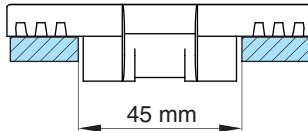
See below for guide clearances for the chain, as well as chain alignment pitch when using multiple lanes.

Single lane

WT2515G-M

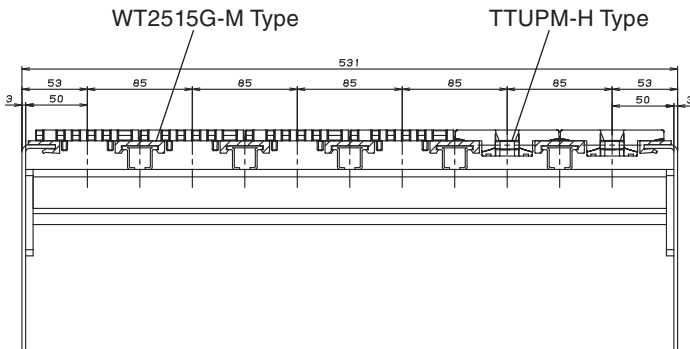


TTUPM838H



Multi-lane

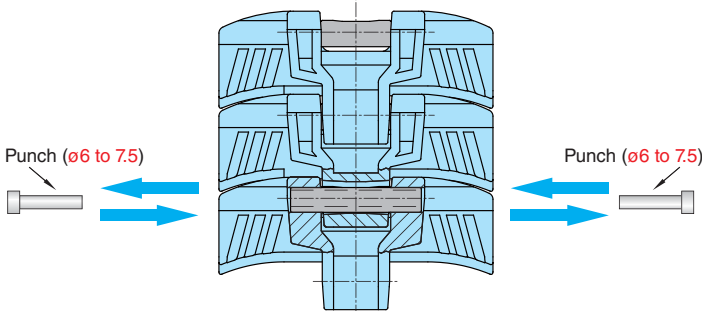
For multi-lane applications, the lateral pitch should be 85 mm. An example is shown in the figure below, but note that it depends on the installation space.



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.

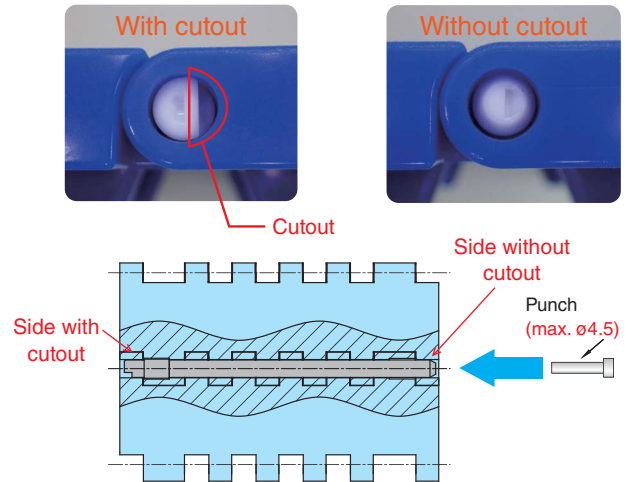


* Do not use a punch with an outer diameter **smaller than 6 mm or greater than 7.5 mm** as they may damage the chain and/or pin.

Assembly and Disassembly of WT2515G-M330

Disassembly

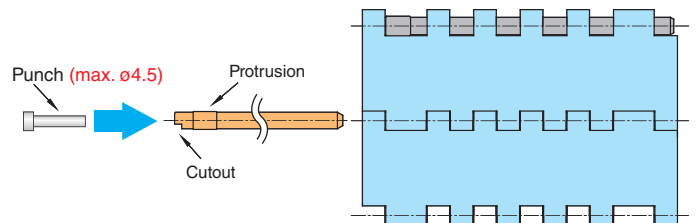
Apply the punch (with max. diameter of 4.5 mm) to the side of the pin without a cutout, and punch out the pin by tapping the punch with a hammer.



* Note that pins need to be removed from the correct direction.

Assembly

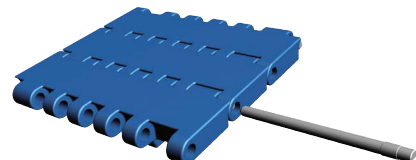
Use the dedicated connecting pins (special stepped plastic pin (orange)). Insert the pin from the side without cutout into the link. Connect the chain by applying a punch to the side with cutout and tapping the pin into the link. Pins can be inserted from either side of the link.



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.



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 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 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 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 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 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 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 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 flame.
- Plastic chain is flammable. Do not use at temperatures above the maximum allowable temperature or use near open flame. Combustion may generate dangerous toxic gases.

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 or 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.

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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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