

# TSUBAKI SMALL SIZE CONVEYOR CHAINS & SPROCKETS



# In Markets Around the World. Only from TSUBAKI. TSUBAKI Small Size Conveyor

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#### **TSUBAKI Group Environmental Policy**

#### Philosophy

The Tsubaki Group understands that the preservation of the Earth's environment is one of the highest priorities for humankind.

Our aim is to consider the environment in all of our activities to contribute to the creation of a healthy and wealthy tomorrow.

#### **Basic Policy**

- We strive to understand the environmental aspect of our business activities, products, and services, and implement measures to reduce the environmental burden for the conservation of the Earth's environment.
- We have established an organization to ensure environmental conservation and continually strive to improve our environmental management system.
- We abide by all environmental laws, regulations, and agreements.
- We aim to raise employee awareness of environmental conservation and ensure an understanding of our Basic Environmental Policy among all employees through environmental education, corporate publications, and other means.

# Chains



**Kyotanabe Plant Concept** 

Kind consideration towards the global environment

Harmony and coexistence with the global environment

Pursuit of high efficiency and high quality

Courage to look to the future

Tsubakimoto Chain's Kyotanabe Plant is a state-of-the-art facility outfitted with the latest environmental systems to produce environmentally friendly products that meet the needs of the times and our customers.

#### **Internationally Accredited Plant**

Tsubakimoto Chain aims to make products that are people-friendly, environmentally friendly, and reliable. Its Chain Division acquired ISO 9001 accreditation in 1995 and ISO 14001 accreditation in 2003.

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# Tsubaki World-Class Quality and an Extensive Line-Up to Satisfy Ever-Changing Needs

Tsubakimoto Chain conducts its business activities with the aim of providing the best value to our customers. We strive to be the world's leading manufacturer of chain and power transmission components.

Tsubaki Small Size Conveyor Chain is indispensable in supporting production lines of every kind around the world.



Tsubaki incorporates Life Cycle Assessment (LCA) in its activities, and develops and manufactures environmentally friendly chain products that have a significant impact on reducing greenhouse gas emissions.



Tsubaki contributes to protecting the environment by eliminating surface treatments that incorporate harmful chemicals.

#### Special Small Size Conveyor Chain

Ease of use and new features further broaden selection options.

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#### Lube Free Small Size Conveyor Chain

Special oil-impregnated bushes deliver long life with no lubrication. The result is reduced labor maintenance, better operating environments, and greater productivity.



#### Standard Small Size Conveyor Chain

Tsubaki's chain with the widest range of applications. All parts are heat treated, resulting in increased tensile and fatigue strength.



#### Double Pitch Chain

Tsubaki Double Pitch Chains are indicated with this symbol in this catalog.

In contrast to the RS Attachment Chain, the chain pitch is doubled, and the shape of the link plates is flat. Ideal for applications where the conveying distance is relatively long or the speed is low.



#### DICESSION Construction Const

#### Corrosion Resistant Small Size Conveyor Chain

Stainless steel, engineering plastic, or special surface-treated chain. The ideal choice of chain in corrosive environments.



#### High Precision Conveyor Chain

Needle bearings between the pins and bushes almost eliminate pitch elongation. Ideal for applications requiring accurate positioning.

#### Plus a Attachment Chain

Tsubaki offers a wide range of customized attachment chains for conveyors to match the application, equipment, environment, and conveying conditions.



#### Free Flow Chain

Free Flow Chain is ideal for accumulating conveyors. It allows the product to be stopped at any location using an external stopper while the chain continues to run. When an operation or function is complete, the stopper is removed and conveyance continues.





Tsubaki RS type conveyor chains are indicated with this symbol in this catalog.

RS Attachment Chain is an RS Roller Chain with attachments on the plates. Ideal for high-speed, smooth, quiet conveyance.



# I | N | D | E | X

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TSUBAKI ECO LINK The TSUBAKI Eco Link logo is used only on products that satisfy the standards for environmental friendliness set by the Tsubaki Group.





# **Small Size Conveyor Chain**

### **△** Precautions Before Use

Be sure to read this entire Small Size Conveyor Chain catalog to make the proper chain selection for your application. In addition, be sure to indicate the relevant section to the persons who will actually be maintaining the conveyor chain.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

Small Size Conveyor Chain is a convenient, compact mechanical device that can transport goods and materials while taking up a minimal amount of space. However, it does not have an unlimited service life.

 Conveyor chain must be inspected on a regular basis and replaced as necessary. It is subject to wear and should be regarded as an expendable item.



5. Environmental conditions, such as the presence of corrosive liquids or gases, may cause chain breakage. This can be avoided by selecting a chain material appropriate to the usage conditions.



Caution

 Elongation resulting from wear may cause conveyor chain to ride up on a sprocket or break.
 Proper lubrication or the use of a lube free chain such as the Lambda Series can minimize chain elongation and extend service life.



- 3. Wear between the bushes and the rollers will cause interference between the link plates and guide rails, increasing tension on the chain. This may lead to an increase in motor power consumption, or may cause chain breakage. This situation can be avoided with proper lubrication or by using Lambda Chain or plastic roller chain.
- 4. Excessive tension may cause chain breakage. This can be avoided through proper selection that anticipates the inertial force the chain will be subject to.

- 6. Improper centering, or problems with layout or design, can shorten chain life or cause chain breakage. This can be avoided by proper positioning and alignment.
- 7. Wear on chain parts will generate debris (wear debris).
- 8. When restrictions by law or guidelines exist in selecting chain, select the chain based on those laws and guidelines, and on allowable tension. Choose a chain with an ample margin.



9. When link plate holes are enlarged or pin diameters made smaller to make it easier to insert and remove the pin, chain performance may decrease and cause accidents.



#### **Features and Important Points of Conveyor Chains**

#### **Features**

- 1. Can move conveyed goods or materials with almost any shape or form.
- 2. Wide operational range, including conveyor length, transport direction, usage environment, etc.
- 3. Can reliably convey goods or materials with no slippage.
- 4. Highly durable, highly efficient.

#### **Important Points**

- 1. No slippage is a strong advantage of conveyor chain, but consideration must be given in selection when impact resistance is considered.
- 2. The mechanical nature of the chain engaging the sprocket will cause speed variations.



#### **Handling Precautions**

- 1. Mishandling the chain may cause a loss of accuracy. Never handle the chain as shown in the photographs to the right.
- 2. Rough handling such as throwing or dropping the chain will cause twisting deformation and/or a loss of accuracy.
- 3. Stainless steel chain, in particular, must be handled with care.

#### Chain Handling







Hold the chain so that it does not become tangled or twisted.

Handling the chain in such a way that it becomes tangled or looped around itself will cause it to become twisted and lead to a loss of accuracy.

Applying excessive load in the direction that the chain is twisted will cause torsion and lead to a loss of accuracy.

# **Small Size Conveyor Chain**

#### Construction

#### **Double Pitch Chain Construction**

- Double Pitch Roller Chain has the same basic construction as standard roller chain, but chain pitch is twice as long, and the chain has flat-shaped link plates with longer attachments.
- · R rollers and S rollers are available, with usage depending on application. (See "Roller Type" on page 11.)
- · Can be used with double pitch sprockets or RS Roller Chain sprockets (with S rollers, when the number of sprocket teeth is 30 or more).
- · Ideal for applications where the conveying distance is relatively long or the speed is low.





1. Plate

The plate bears the tension placed on the chain. Because the accuracy of the holes into which pins or bushes are fit affects chain quality, plates are manufactured with particular precision and finished into tough plates with high fatigue strength and impact resistance.

#### 2. Pin



The two ends of the pin are inserted into holes in the outer plates and riveted in place. For Hollow Pin Chain and Poly Steel Chain, they are inserted only. Because the pins are subject to shearing and bending forces via the plates, and because the bushes rotate and slide along the pins as the chain articulates, they are manufactured with an emphasis on strength and wear resistance.



#### 3. Bush

The two ends of the bushes are inserted into the inner plate and function as bearings for the pins and rollers. They are subject to complex forces through the various parts, and are finished to specifications having high wear resistance.

#### 4. Roller

Rollers are slip fit onto the bushes, and lighten mechanical shock when the chain engages the sprocket. In addition, they serve to reduce running resistance by turning while the chain is in motion, making the chain run smoothly. Wear resistance is important.

#### 5. Attachment



Bolt holes are drilled for attachments. (For details, see page 12: "Standard Attachments".)

### RS

#### **RS Attachment Chain Construction**

- This chain is a standard RS Roller Chain with added attachments.
- Because the chain pitch is smaller, it can transport small objects using a small pitch, and is ideal for general applications where conveying distance is short.
- · Runs quietly, smoothly and can travel at high speeds.
- · RS Roller Chain sprockets can be used in almost all cases.





#### 6. Spring Clip/Cotter Pin

Spring clips and cotter pins prevent the connecting plates from detaching and are important components to maintain the intrinsic strength of the chain. Always install these parts.



#### 7. Inner Link

The ends of the two bushes are inserted into the inner plate to form the inner link. Rollers are slip fit over the outside of the bushes.

#### 8. Outer Link



The ends of the two pins are inserted into the outer plate. The ends of the pins other than those on the connecting links are riveted in place to prevent detachment. For Hollow Pin Chain and Poly Steel Chain, they are inserted only. The pitch, roller diameter, and inner width of the inner link are considered the basic three dimensions of a roller chain. When these dimensions are identical, a roller chain and sprocket are dimensionally compatible.

#### Note:

#### Slip Fit

When the shafts and holes are fitted together, there is a continuous loose fit. This is a fit where the range of tolerance for the hole is larger than the range of tolerance for the shaft (pin or bush).

#### Press Fit

When the shafts and holes are fitted together, there is a continuous interferential fit. This is a fit where the range of tolerance for the hole is smaller than the range of tolerance for the shaft (pin or bush).

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

# **Small Size Conveyor Chain**

#### **Connecting Parts**

#### 1. Connecting Links (symbol: CL)

- A chain normally consists of multiple interconnected links and so requires a connecting link.
- 2) Connecting links are available with attachments or without attachments.
- Connecting links are available with either spring clips or cotter pins to prevent the connecting plate from detaching. See chart at right.

#### 2. Offset Links (symbol: OL)

- 1) An offset link is used when a strand of chain has an odd number of links.
- 2) Attachment offset links are not available.





For RS Attachment Chain

Connecting Link Application Table					
Form		СІір Туре	Cotter Pin Type		
Chain Size		RF2060 or Smaller R60 or Smaller	RF2080 or Larger R80 or Larger		
e Pitch	Plain CL	Spring Clip Connecting Plate	Connecting Plate		
Doubl	Attachment CL	Spring Clip	Cotter Pin		
S	Plain CL	Spring Clip	Cotter Pin		
Ϋ́	Attachment CL	Spring Clip	Cotter Pin		

Note: NS specifications use a cotter pin on the connecting link regardless of size. Please contact a Tsubaki representative if a clip is needed.

#### **Roller Type**

#### 1. R Roller

The roller diameter is larger than the plate width, and the roller is used in Double Pitch Chain. R rollers are the most basic and feature high load carrying capacity and low frictional resistance.





#### 2. S Roller

The roller diameter is smaller than the plate width. Effectively reduces shock and wear when the chain engages the sprocket.



#### **Standard Attachments**

#### 1. A1, A2 Attachments

An A attachment has a bent link plate that extends out on one side of the chain, forming an L-shape. The attachment comes with one or two bolt holes and is designated as A1 or A2, respectively (A1 only for RS type).



#### 2. K1, K2 Attachments

A K attachment has a bent link plate that extends out on both sides of the chain. The attachment comes with one or two bolt holes and is designated as K1 or K2, respectively (K1 only for RS type).



#### 3. SA1, SA2 Attachments

With an SA attachment, the link plate is extended vertically on one side of the chain. The attachment comes with one or two bolt holes and is designated as SA1 or SA2, respectively (SA1 only for RS type).



#### 4. SK1, SK2 Attachments

With an SK attachment, the link plate is extended vertically on both sides of the chain. The attachment comes with one or two bolt holes and is designated as SK1 or SK2, respectively (SK1 only for RS type).



#### 5. GNK1 Attachment

The GNK1 attachment indicates a chain with a bolt hole drilled into the center of the link plates on both sides of the chain. (Available only for S rollers on Double Pitch Chains.)



#### 6. EP Attachment (Extended Pin)

One end of the pins is extended on one side of the chain.



#### 7. Hollow Pin Chain

In Hollow Pin Chain, the pins have a hole, allowing for installation of various attachments.



**Chain Formation** 

Chains can be assembled with an attachment on every link plate or at intervals of two or more links. However, placing an attachment on an outside link at an interval of an even number of links is convenient for maintenance purposes.



#### **Plus** *a* **Attachments**

#### Speedy Delivery

Tsubakimoto maintains a stock of parts with special dimensions and a proven track record of performance, and can handle stock orders and quick deliveries.

- Speedy delivery service is ideal for situations in which standard dimension products do not fit exactly.
- Lube Free Lambda Chain is also available. (See pages 57 to 62.)
- Please contact a Tsubaki representative for details on delivery.

#### **Stock Designs**

Tsubakimoto has a portfolio of reliable designs with a track record of success. Selecting from among these designs will lead to better design efficiency for your application as a whole. (See pages 63 to 75.)

# **Small Size Conveyor Chain**

#### **Selection Guide**

Series	Product Name		Features, Applications	Features	Operating Temperature Range (°C) *6	
	Double Pitch Chain		General uses	Carbon steel	_	
Standard Small	RS Attachment Chain					
Size Convevor	Additional RS Attachment Chai	ns				
Chain	RF Roller Chain		Direct placement of materials on chain	Plates are flat in shape		
Chain	BS Attachment Chain		General uses	Carbon steel	-10 to 150	
Special Small	Hollow Pin Double Pitch Chain					
Size Conveyor	Hollow Pin RS Chain		Conveyance by hollow attachment pin	Ideal for wire mesh conveyors		
Chain	Curved RS Attachment Chain		Curved conveyance	Guide rails required		
	Lambda Double Pitch Chain			Dimensionally interchangeable with		
Lube Free Small Size Conveyor	Lambda RS Attachment Chain		_	Standard Small Size Conveyor Chain	10 to 150	
	BS Lambda Attachment Chain			Lube-free British Standard chain (ISO 606)		
	X-Lambda Double Pitch Chain		Special oil-impregnated bushes provide	Felt seal improves wear	10 to 60	
	X-Lambda RS Attachment Chain		long service life	resistance	10 10 00	
	Surface-Treated Lambda Double Pitch Chain			Nickel-plated (NP)		
	Surface-Treated Lambda RS Attachment Chain		Use NSF-H1 food grade oil in It's special	Special surface treatment (NEP)		
Griain	Lambda RF Roller Chain		sintered busnes.	Lube-free chain with flat plates	-10 to 150	
	Lambda Hollow Pin Double Pite	ch Chain		Uses special oil-impregnated	1	
	Lambda Hollow Pin RS Chain			bushes for hollow pin bushes		
	Lambda KF Series Double Pitc	h Chain		Uses heat-resistant lubrication	10 to 220 *1	
	Lambda KF Series RS Attachm	ent Chain		for bushes	-10 10 230	
	Stainless Steel	SS	Water immersion, acids/alkalis and low-/high- temperature environments	All components use 304 stainless steel		
		AS	Applications requiring higher allowable load than SS chain, as well as corrosion and heat resistance	Uses heat-treated stainless steel in pins and rollers	1 –20 to 400	
		NS	Higher corrosion resistance than SS chain	Components use 316 stainless steel		
		LSC	Water immersion; dry, non-lubricated conditions	Engineering plastic sleeve between pin and bush	-20 to 100 *7	
	Stainless Steel RS Attachment Chain	SS	Water immersion, acids/alkalis and low-/high- temperature environments	All components use 304 stainless steel		
		AS	Applications requiring higher allowable load than SS chain, as well as corrosion and heat resistance	Uses heat-treated stainless steel in pins and rollers	I –20 to 400	
		NS	Higher corrosion resistance than SS chain	Components use 316 stainless steel		
<b>.</b> .		LSC	Water immersion; dry, non-lubricated conditions	Engineering plastic sleeve between pin and bush	-20 to 100 *7	
Corrosion	Surface-Treated	NP	Environments requiring mild corrosion resistance	Nickel-plated		
Resistant Small	Double Pitch Chain	NEP	Exposed outdoor environments, exposure to seawater	Special surface treatment	-10 to 150	
Size Conveyor	Surface-Treated	NP	Environments requiring mild corrosion resistance	Nickel-plated		
Chain	RS Attachment Chain	NEP	Exposed outdoor environments, exposure to seawater	Special surface treatment		
	Poly Steel Attachment Chain (P	C)	Environments requiring corrosion resistance and no lubrication	Uses engineering plastic inner links	-20 to 80	
		Standard			-10 to 80 *2	
	Plastic Boller Double Pitch Chain	NP	Environments requiring lightweight and low-	Uses engineering plastic rollers		
		SS	noise applications			
		Standard				
	Plastic Roller Double Pitch Chain	NP	Even lower noise levels than engineering	Uses special engineering plastic rollers	-10 to 80 *3	
	RP-SNP Low-Noise Series	SS	plastic rollers			
	Heat-Resistant Plastic Roller Double Pitch Ch	ain (RPKV-SS)	Environments requiring chemical resistance	Uses super engineering plastic rollers	-10 to 180	
	Stainless Steel Hollow Pin		Water immersion, acids/alkalis and low-/high- temperature environments; conveyance by hollow attachment pin	All componente une 201 eteinlage	-20 to 400	
	Double Pitch Chain (SS)			steel; ideal for wire mesh conveyors		
	Stainless Steel Hollow Pin RS	Chain (SS)		,		
		Standard	n Zero wear elongation*5 (other than initial wear)	r) Needles between pin and bush control wear elongation in conveyance	-10 to 150 *4	
	Bearing Bush Chain	High precision				
High Precision	SS					
Convevor	Bearing Cage Chain		Low-cost alternative to Bearing Bush Chain	Needle cage between pin and bush	h	
Chain	Indexing Table Chain		For high-precision positioning	Needle bearings used in bearing area, side rollers, and guide rollers	-10 to 60	
	Mini Tact Chain		For high-precision positioning of small work	Needle bearings used in bearing area	10 to 40	

\*1: Depending on your usage environment, you may need to multiply the allowable load by one of the factors listed on page 94, table 9 when selecting your chain.
\*2: Operating temperature range of Plastic Roller Double Pitch Chain (SS) is -20°C to 80°C.
\*3: Operating temperature range of Plastic Roller Double Pitch Chain, RP-SNP Low-Noise Series (SS) is -20°C to 80°C.

\*4: Operating temperature range of Bearing Bush Chain (SS) is -10°C to 60°C.

\*6: Use a lubricant suited to the operating temperature. (See page 101, table 14.)

\*7: LSC stainless steel chains have a -20°C to 100°C operating temperature range when using plastic rollers.

<sup>\*5:</sup> Wear elongation of Bearing Bush Chain (SS) is extremely small.

			Daubla D	tab Chair		Chain	Size					Heeks		2h e i e			
	2040	2050	2060	2080	2100	2120	2160	25	35	40	50			100	120	140	160
	2040	2030	2000	2000	2100	2120	2100	25	55	40	50	00	00	100	120	140	100
			•	-		•											
										•				•			
										08B	10B	12B	16B				
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										08B	10B	12B	16B				
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 BC50S45	BC50D45	BC75S60	BC75D60	BC100S70	BC100D70	BC150S90	BC150D90										
BCM12.5-9	BCM15.0-9																
	-		•												I		

# **Small Size Conveyor Chain**

#### **How to Order**

When ordering small size conveyor chain, specify chain size and material as well as chain length and the installation position and configuration of attachments.

#### 1. Chain Numbering

To prevent errors, specify the product code and model number for chain, connecting links, and offset links. For product codes and chain numbering, see the chain numbering examples on page 16 and dimension tables. Also, use only the model number for ordering products that have no product code.

#### 2. Specific Ordering Procedure for Chain

#### 1) Units (stock items) [1 unit = 10 ft/3,048 mm]

- (1) Small size conveyor chain with attachments is stocked in units (standard length). Each unit consists of an even number of links (the number of links is per the dimension table.)
- (2) A connecting link is supplied on one end of each chain unit and an inner link is supplied on the other end. In general, these terminating links can be joined together to make a longer chain.
- (3) When splitting a single unit for use, order the required number of connecting links separately.

Example: RF2040R-4LA2 ..... n units RF2040-A2-CL ..... n pieces

Note: For RS25, 1 unit = 1,000 mm

#### 2) Special Assembly for Made-to-Order Product

A chain assembled to your specifications based on chain length, termination on both ends, attachment spacing, etc., is called a "special assembly." How to specify the formation is described below.

#### (1) When Total Length Is an Even Number of Links

- (1) A connecting link is supplied on one end of each chain unit and an inner link is supplied on the other end.
- (2) Specify the adding position and spacing for attachments according to "4. Attachment Spacingand Description" on page 17.
- (3) Please contact a Tsubaki representative for special chain lengths.

#### (2) When Total Length Is an Odd Number of Links (please refer to the pictures below)

- (1) Specify how both ends will be terminated:
- a) Inner links on both ends
- b) Connecting links on both ends
- c)Outer links on both ends (shipped with the outer links disassembled; after assembling the outer links on both ends, the end surfaces of the pins must be properly secured by riveting)
- d) Connecting link on one end and offset link on other end
- (2) Specify the adding position and spacing for attachments according to "4. Attachment Spacing and Description" on page 17.
- (3) Please contact a Tsubaki representative for special chain lengths.



#### (3) When Chains Are to Be Used as Strands (1) Mirror-Image Strands in Pairs

Attachments on a set of chains to be used as strands are manufactured to be symmetrical (see illustration below). [1 unit = 10 ft/3,048 mm] Specification example:

RF2040S-6LA1-5L EP ..... 6 units Strand specs: 120 links by 6 strands (120 links x 2 strands x 3 sets)



Mirror-Image Strands in Pairs Attachments are mirror images on opposite strands

For EP, AA1, KK1, SAA1, SKK1, and GNK1 attachments, instructions for half-assembly in mirror image are unnecessary when using chains in parallel (symmetrical on right and left sides).

#### (2) Matched and Tagged in Pairs

Chain lengths will vary within standard tolerance. When it is desirable to minimize the relative difference in total chain length in a set of chains to be used as strands, the chain is matched and tagged in pairs. [1 unit = 10 ft/3,048 mm] Specification example:

RF2040R-2LA2 ..... 6 units Strand specs: 2 strands x 3 sets Matched and tagged in pairs

Note: There is an extra charge for chains matched and tagged in pairs. Please contact a Tsubaki representative for an estimate.

#### (4) Long Chain Lengths (long configurations)

Chains consisting of more than one unit are called "long chains." There are limitations on total chain length depending on chain size and conveyor type. Please contact a Tsubaki representative for details.

#### 3. Configurations When Ordering by Total Number of Links

#### 1) For Long Configurations, Be Sure to Specify [see 2-(4) above]

#### 2) When Unspecified:

(1) We will ship n units, plus one unit having a fractional number of links. However, when the fractional number of links is less than one-fourth of a unit, we will ship only one long configuration chain consisting of one unit plus a fractional number of links. Example:

RF2040R-2LA2 ..... 380 links

Shipping form: 120 links (length of one unit) ..... 2 strands 140 links ..... 1 strand

(2) When a single unit cannot be split at an interval between attachments, we will determine a configuration (length) using a number of links that enable the chain to be split in the range of (1 unit – 1/4 unit). The fractional number of links will be treated in the same way as above.



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#### 4. Attachment Spacing and Description

Chain Numbering Example	Base Attachment Description	Connecting Link (CL) Type	Attachment Formation
RS40 - 1LA1 ○ = 1	<u></u> LA1	A1-CL	$A1-CL \xrightarrow{A1-CL} 1L 1L 1L 1L 1L A1 repeat$
RS40 - 2LA1	<u></u> LA1	A1-CL	A1-CL
<i>RS40 – 2LA1RL</i> () = 2	<u>O</u> LA 1 RL	Plain <i>CL</i>	$CL \qquad \qquad$
R540 - 3LA1	<u></u> _LA1	Plain <i>CL</i>	See note $O$
$RS40 - 1L2LA1$ $\bigcirc = 1, \bigtriangleup = 2$	<u>O</u> L <u></u> [][]	A1-CL	A1-CL 11 2L 11 2L 1L, 2L A1 repeat
RS40-1L3LA1 ○=1,△ =3	<u>_l</u> _lA1	Plain <i>CL</i>	See note



# **Double Pitch Chain**

Double Pitch Chain has the same basic construction as standard roller chain, but chain pitch is twice as long, and the chain has flat-shaped link plates. This series is regulated by ISO 1275-A, ASME B29.100, and JIS B 1803. Features:

- 1. Accurate tolerances for overall length.
- 1. Accurate tolerances for overall length.
- 2. Both R rollers and S rollers are available and can be selected to match the application.

#### Base Chain



• Connecting links: RF2040 to RF2060 use spring clips. RF2080 and larger as well as chains with GNK1 attachments (all sizes) use cotter pins. Base chain pins are riveted.

#### Attachments



Note: RS sprockets can be used with S rollers if the sprocket has more than 30 teeth. A Double Pitch chain sprocket will be needed if the sprocket has fewer than 30 teeth. Please refer to separate Tsubaki Drive Chain catalog for more information on RS sprockets.

Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

**Conveyor Chain** 

No. of

Links per Unit

120

96

80

60

48

40

30

Plate

Thickness

Τ

1.5

2.0

3.2

4.0

4.8

5.6

7.15

Width

Н

12.0

15.0

17.2

23.0

28.6

34.4

48.2

Approx. Mass kg/m

Steel

R Roller

0.87

1.30

2.19

3.52

5.80

8.13

13.70

S Roller

0.51

0.84

1.51

2.41

3.54

5.08

8.96

bouble Pitch

Size Conveyo

Special

Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain **Corrosion Resistant** 

Small Size Conveyor Chain

High Precision Conveyor Chain

Engineering Manual

Plus a

Lube Free

#### Roller Dia. Width Pin Type Offset Pin Between Tsubaki Pitch Inner Link Length Roller 7 Chain Р S Roller R Roller Dia. Plates Lı L2 No. R1 R2 D W

7.95

9.53

12.70

15.88

19.05

25.40

31.75

3.97

5.09

5.96

7.94

9.54

11.11

14.29

8.25

10.30

14.55

18.30

21.80

26.95

33.95

9.95

12.0

16.55

20.90

24.50

30.55

38.45

18.2

22.6

31.5

39.9

47.5

59.0

74.1

101.60 Chain strength: Please see pages 91 and 92.

Base Chain Dimensions

25.40

31.75

38.10

50.80

63.50

76.20

7.92

10.16

11.91

15.88

19.05

22.23

28.58

15.88

19.05

22.23

28.58

39.69

44.45

57.15

RF2040

RF2050

RF2060

RF2080

RF2100

RF2120

RF2160

S

R

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Attachment Dimensions

Tsubaki Chain No.	Roller Type	Pitch <i>P</i> '	С	Сı	C2	К	N	0	Oı	S
RF2040			12.7	11.1	13.6	9.5	19.1	3.6	5.2	9.1
RF2050			15.9	14.3	15.9	11.9	23.8	5.2	6.8	11.1
RF2060	c c	Contact a	21.45	17.5	19.1	14.3	28.6	5.2	8.7	14.7
RF2080	· ·	Tsubaki representative	27.8	22.2	25.4	19.1	38.1	6.8	10.3	19.1
RF2100	к	for details.	33.35	28.6	31.8	23.8	47.6	8.7	14.3	23.4
RF2120			39.7	33.3	37.3	28.6	57.2	14	16	27.8
RF2160			52.4	44.5	50.8	38.1	76.2	18	22	36.5

Tsubaki	x	X2	XS	D	13	И	G	Additiona	l Weight per A kg	.ttachment
Chain No.	~	712	Xo	U	20		Ũ	A, SA	K, SK	EP
RF2040	19.3	17.6	19.8	3.97	9.5	16.75	4.1	0.003	0.006	0.001
RF2050	24.2	22.0	24.6	5.09	11.9	21.0	5.1	0.006	0.012	0.002
RF2060	31.5	28.2	30.6	5.96	14.3	27.45	6.1	0.017	0.034	0.003
RF2080	40.7	36.6	40.5	7.94	19.1	35.5	8.1	0.032	0.064	0.007
RF2100	49.9	44.9	50.4	9.54	23.8	43.4	10.1	0.060	0.120	0.012
RF2120	60.7	54.4	59.9	_	_	_	_	0.100	0.200	_
RF2160	77.8	70.0	78.6	-	-	-	-	0.203	0.400	-

#### ■ Operating Temperature Range: -10°C to 150°C

Use a lubricant suited to the operating temperature. (See page 101, table 14.)





# **RS Attachment Chain**

RS Attachment Chain is used for short conveyors (usually less than 10 m) of small products. This chain is also suitable for low-noise environments.

#### Base Chain

auble Pitc

Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

Corrosion Resistant Small Size Conveyor Chain

Plus a

Small Size Conveyor Chain

High Precision Conveyor Chain

Lube Free

Special

Standard



#### Attachments



• The drawings above show attachments added on every link.

Note: RS sprockets can be used. Please refer to separate Tsubaki Drive Chain catalog for information on RS sprockets.



#### Base Chain Dimensions

Tsubaki	Pitch	DI	Roller Dia.	Width Between		Plate			P	in		Approx. Mass	No. of Links
Chain No.	Р	1	R	W	Thickness T	Width H	Width h	Dia. D	Lı	L2	L	kg/m	per Unit
RS25	6.35		( 3.30)	3.18	0.75	5.84	5.05	2.31	3.80	4.8	-	0.14	160
RS35	9.525		( 5.08)	4.78	1.25	9.0	7.8	3.59	5.85	6.85	13.5	0.33	320
RS40	12.70		7.92	7.95	1.5	12.0	10.4	3.97	8.25	9.95	18.2	0.64	240
RS50	15.875	Contact a	10.16	9.53	2.0	15.0	13.0	5.09	10.3	12.0	22.6	1.04	192
RS60	19.05	Tsubaki	11.91	12.70	2.4	18.1	15.6	5.96	12.85	14.75	28.2	1.53	160
RS80	25.40	for details.	15.88	15.88	3.2	24.1	20.8	7.94	16.25	19.25	36.6	2.66	120
RS100	31.75		19.05	19.05	4.0	30.1	26.0	9.54	19.75	22.85	43.7	3.99	96
RS120	38.10		22.23	25.40	4.8	36.2	31.2	11.11	24.90	28.90	55.0	5.93	80
RS140	44.45		25.40	25.40	5.6	42.2	36.4	12.71	26.90	31.70	59.5	7.49	68
RS160	50.80		28.58	31.75	6.4	48.2	41.6	14.29	31.85	36.85	70.2	10.10	60

Chain strength: Please see pages 91 and 92. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Attachment Dimensions

Trubaki				_									Additional \	Weight per At	tachment kg
Chain No.	С	C1	N	0	S	Т	X	X2	XS	D	L3	L4	A, SA	K, SK	EP
RS25	7.15	7.95	5.6	3.4	4.75	0.75	10.7	10.7	11.65	2.31	6.0	9.3	0.0003	0.0006	-
RS35	9.5	9.5	7.9	3.4	6.35	1.25	14.3	14.3	14.55	3.59	9.5	14.6	0.0008	0.0016	0.001
RS40	12.7	12.7	9.5	3.6	8.0	1.5	17.8	17.8	17.40	3.97	9.5	16.75	0.002	0.004	0.001
RS50	15.9	15.9	12.7	5.2	10.3	2.0	23.4	23.4	23.05	5.09	11.9	21.0	0.003	0.006	0.002
RS60	19.05	18.3	15.9	5.2	11.9	2.4	28.2	28.2	26.85	5.96	14.3	25.75	0.007	0.014	0.003
RS80	25.4	24.6	19.1	6.8	15.9	3.2	36.6	36.6	35.45	7.94	19.1	33.85	0.013	0.026	0.007
RS100	31.75	31.8	25.4	8.7	19.8	4.0	44.9	44.9	44.0	9.54	23.8	41.75	0.026	0.052	0.012
RS120	38.1	36.5	28.6	10.3	23.0	4.8	55.8	50.8	52.9	11.11	28.6	51.4	0.044	0.088	0.020
RS140	44.5	44.5	34.9	11.9	28.6	5.6	63.1	57.2	63.5	12.71	33.3	57.9	0.071	0.142	0.030
RS160	50.8	50.8	38.1	14.3	31.8	6.4	71.8	65.1	70.1	14.29	38.1	67.45	0.097	0.194	0.045

Note: Pin diameters for RS35 and RS35-LMC (Lambda) chain are different. The two cannot be combined.

#### **Operating Temperature Range:** –10°C to 150°C

Use a lubricant suited to the operating temperature. (See page 101, table 14.)

#### Chain Numbering



Il Size Conveyor Chain

# **Additional RS Attachment Chains**

Attachments

**Small Size Conveyor Chain** 

tandard

Special

Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain **Corrosion Resistant** 

Plus a

Small Size Conveyor Chain

High Precision Conveyor Chain

Lube Free



#### Attachment Dimensions

Tsubaki Clurin Ni Pitch		C	CI	N	0	s	т	Y	YS		NW Index on inner links	KM	Additio	nal Weight	per Attach	ment kg
Chain No.	FIICH	C	CI		U	5	'	^	73	1477	see Note 5 below)	1.00	AA, SAA	KK, SKK	WA, WSA	WK, WSK
RS40	12.70	12.7	12.7	9.5	4.5	8.0	1.5	17.8	17.4	23.0	24.7	9.5	0.003	0.006	0.003	0.006
RS50	15.875	15.9	15.9	12.7	5.5	10.3	2.0	23.4	23.05	28.8	30.9	11.9	0.006	0.012	0.007	0.014
RS60	19.05	19.05	18.3	15.9	6.6	11.9	2.4	28.2	26.85	34.6	37.2	14.3	0.011	0.022	0.012	0.024
RS80	25.40	25.4	24.6	19.1	9.0	15.9	3.2	36.6	35.45	46.1	49.5	19.1	0.023	0.046	0.028	0.056
RS100	31.75	31.75	31.8	25.4	11.0	19.8	4.0	44.9	44.0	57.7	61.9	23.8	0.048	0.096	0.055	0.110

1. Base chain dimensions are the same as those of RS Attachment Chain. Note:

Connecting links: RS40 to RS40 to RS60 use spring clips. RS80 and RS100 use cotter pins.
 Check sprocket hub dimensions to ensure that attachments AA, KK, SAA, and SKK will not make contact with the hub.
 Check clearances between AA and KK attachments to ensure that no contact occurs on curved sections of the conveyor path.
 In the table above, NW (when on inner link) refers to the case when attachments are provided on inner links.

6. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Operating Temperature Range: –10°C to 150°C

Use a lubricant suited to the operating temperature. (See page 101, table 14.)

#### Chain Numbering

#### RS80-1LAA1

Chain size

Attachment type

Attachment spacing

**Engineering Manual** 

# **RF Roller Chain**

RF Roller Chain is identical to RS Attachment Chain except that the link plates have flattened sides to allow conveyed materials to be placed directly on the chain.

#### Base Chain



• Connecting links: RF35 to RF60 use spring clips. RF80 and larger use cotter pins. • Offset links are not available.

#### Base Chain Dimensions

Tsubaki	Pitch	Roller	Width Between Inner	Plo	ate		Pin		Max. Allowable	Approx. Mass	No. of
Chain No.	Р	Dia. R	Link Plates W	Thickness T	Width H	Dia. D	Lı	L2	Load kN {kgf}	kg/m	per Unit
RF35	9.525	( 5.08)	4.78	1.25	9.0	3.59	5.85	6.85	1.52{ 155}	0.41	320
RF40	12.70	7.92	7.95	1.5	12.0	3.97	8.25	9.95	2.65{ 270}	0.74	240
RF50	15.875	10.16	9.53	2.0	15.0	5.09	10.3	12.0	4.31{ 440}	1.22	192
RF60	19.05	11.91	12.70	2.4	18.1	5.96	12.85	14.75	6.28{ 640}	1.78	160
RF80	25.40	15.88	15.88	3.2	24.1	7.94	16.25	19.25	10.7 {1090}	3.09	120
RF100	31.75	19.05	19.05	4.0	28.6	9.54	19.75	22.85	17.1 {1740}	4.43	96
RF120	38.10	22.23	25.40	4.8	34.4	11.11	24.9	28.9	23.9 {2440}	6.49	80

Note: Roller diameter R (in parentheses) for RF35 is the bush diameter.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### ■ Operating Temperature Range: –10°C to 150°C

Use a lubricant suited to the operating temperature. (See page 101, table 14.)

#### **Chain Numbering**

#### <u>RF60</u>

Chain size

Stainless steel and Lambda chains are also available. Please consult a Tsubaki representative for more information.

RS sprockets can be used. Please refer to separate Tsubaki Drive Chain catalog for information on RS sprockets.

Small Size Conveyor Chain

Small Size Conveyor Chain

Corrosion Resistant Small Size Conveyor Chain

Small Size Conveyor Chain

Plus a

Lube Free

Special

# **BS Attachment Chain**

BS Attachment Chain conforms to ISO 606 "B" series standards. The dimensions are fully interchangeable with existing BS chains used in equipment manufactured in Europe, without the need to replace sprockets.

#### Base Chain

R S

Small Size Conveyor Chain

Small Size Conveyor Chain

Special

Standard



#### Attachments



Small Size Conveyor Chain

Small Size Conveyor Chain

Corrosion Resistant Small Size Conveyor Chain

Small Size Conveyor Chain

High Precision Conveyor Chain

**Engineering Manual** 

Plus a

Lube

Free

Special

#### Base Chain Dimensions

Tsubaki Charin Na		Pitch	Roller Dia.	Width Between		Plo	ate	
Chain No.	150 110.	Р	R	W	Thickness T2	Thickness T1	Width H	Width h
RS08B	O8B	12.70	8.51	7.75	1.6	1.6	12.0	10.4
RS10B	10B	15.875	10.16	9.65	1.5	1.5	14.7	13.7
RS12B	12B	19.05	12.07	11.68	1.8	1.8	16.1	16.1
RS16B	16B	25.40	15.88	17.02	4.0	3.2	21.0	21.0
RS20B	20B	31.75	19.05	19.56	4.4	3.4	26.0	26.0
RS24B	24B	38.10	25.40	25.40	6.0	5.6	33.40	31.20

Tsubaki		Р	in		Min. Tensile	Approx. Mass	No. of Links
Chain No.	Dia. D	Lı	L2	L	kN {kgf}	kg/m	per Unit
RS08B	4.45	8.4	10.0	18.6	12.9{ 1320}	0.70	240
RS10B	5.08	9.55	11.25	20.8	15.7{ 1600}	0.95	192
RS12B	5.72	11.1	13.0	24.4	22.1{ 2250}	1.25	160
RS16B	8.28	17.75	19.95	39.3	60.0{ 6120}	2.70	120
RS20B	10.19	19.9	23.1	46.6	95.0{ 9680}	3.85	96
RS24B	14.63	26.65	31.85	61.7	160 {16300}	7.45	80

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Attachment Dimensions

Tsubaki			A1,	, SA1, K1, S	iK1 Attachm	ients			Additional Attach	Weight per ment kg			
Chain No.	С	C1	N	0	S	x	X2	XS	A, SA	K, SK			
RS08B	11.9	12.7	11.4	4.2	8.9	19.05	17.15	19.3	0.002	0.004			
RS10B	15.9	15.9	12.7	5.0	10.2	22.25	20.6	22.9	0.003	0.006			
RS12B	19.05	22.2	16.5	7.1	13.5	29.85	27.8	32.05	0.006	0.012			
RS16B	23.8	23.9	24.3	6.7	15.2	37.35	34.4	34.1	0.014	0.028			
RS20B	31.75         31.8         25.4         8.7         19.8         44.85         41.6         34.1         0.024												
RS24B	Contact a Tsubaki representative for details.												

Tsubaki		WA WA	2, WSA 1, WSA	2, WK2 1, WK1	, WSK2 , WSK1	Attachn Attachn	nents nents			EP Atta	chment		Addit A	ional Weig ttachment k	nt per
Chain No.	С	C1	NW	0	S	X	XS	KW	<i>P</i> '	D	L3	L4	WA, WSA	WK, WSK	EP
RS08B	12.7	13.1	24.6	4.9	8.9	20.3	20.7	12.7	ev .	4.45	9.5	17.0	0.005	0.010	0.001
RS10B	15.9	16.6	30.0	5.0	10.2	22.85	23.6	15.9	act a paki	5.08	11.9	20.25	0.006	0.012	0.002
RS12B	17.45	17.6	34.8	5.5	11.4	25.65	25.75	19.1	Tsuk	5.72	14.3	24.1	0.009	0.018	0.003
RS16B	28.6	26.0	46.0	8.1	15.9	39.25	36.7	25.4		8.28	19.1	35.25	0.030	0.060	0.008
RS20B	Contact a Tsubaki representative for details. 10.19 23.8 42.0 Contact a Tsubaki representative for details.														
RS24B						C	ontact a T	subaki re	presentati	ve for det	ails.				

#### ■ Operating Temperature Range: –10°C to 150°C

Use a lubricant suited to the operating temperature. (See page 101, table 14.)

#### Pin Shape

Single-strand chains in sizes RS08B through RS16B use easy disassembly pins (with center sink riveting). All other sizes, including multi-strand chains, use double stake riveting.

#### Sprockets

Use BS Roller Chain (ISO B Series) sprockets (made-to-order item).

#### Chain Selection

Please contact a Tsubaki representative regarding chain selection.

#### Special Orders

Tsubaki can manufacture special attachments and special extended pins, as well as RF06B, RS20B, and RS24B Attachment Chain having dimensions other than those given above. Please inquire for details.

#### Chain Numbering

Chain size

#### RS08B-1LA1

Attachment type

# **Hollow Pin Chain**

In Hollow Pin Chain, the pin is made with a hole, enabling various attachments to be installed simply and easily. This type of chain is used for general-purpose conveyance.

#### Features:

- 1. Regardless of whether the chain is straight or wrapped around a sprocket, the center distance between attachments is always the same. 2. The load from the attachments is distributed equally to both sides of the link plates. This provides advantages in terms of strength, and
- the chain has less tendency to wind while running.

3. It is easy to replace attachments, do maintenance, or adjust attachment spacing even while the chain is installed on equipment.

#### Hollow Pin Double Pitch Chain

#### Base Chain



#### Base Chain Dimensions

Tsubaki	ype	Pitch	Bush Roller		Width Between	Plate			Pi	n		Offset Pin	Approx. Mass kg/m		No. of
Chain No.	Soller 7	P	Dia. B	Dia. <i>R</i>	Inner Link Plates	Thickness T	Width H	Outer Dia. F	Inner Dia. E (min )	Lı	L2	Length	Bush Type	R Roller	Links per Unit
RF2040-HP		25.40	7.92	15.88	7.95	1.5	12.0	5.68	4.00	8.00	9.50	19.1	0.46	0.82	120
RF2050-HP	S	31.75	10.16	19.05	9.53	2.0	15.0	7.22	5.12	10.05	11.65	23.4	0.75	1.21	96
RF2060-HP	R	38.10	11.91	22.23	12.70	2.4	17.2	8.38	5.99	12.55	14.25	28.7	1.38	2.06	80
RF2080-HP		50.80	15.88	28.58	15.88	3.2	23.0	11.375	8.02	16.25	17.80	35.7	1.80	2.81	60

Chain strength: Please see page 92.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### **Hollow Pin RS Chain**

#### Base Chain

High Precision Conveyor Chain

#### Base Chain Dimensions

Tsubaki Chain No.	Pitch	tch P Dia. B	Width Between	Plc	ite Width	Outor Dia	Pi Innor Dig	'n		Offset Pin Length	Approx. Mass	No. of Links per
	P		W	T	H	E	F (min.)	Lı	L2	Ľ	kg/m	Unit
RS40-HP	12.70	7.92	7.95	1.5	12.0	5.68	4.00	8.00	9.50	19.1	0.53	240
RS50-HP	15.875	10.16	9.53	2.0	15.0	7.22	5.12	10.05	11.65	23.4	0.86	192
RS60-HP	19.05	11.91	12.70	2.4	18.1	8.38	5.99	12.55	14.25	28.7	1.27	160
RS80-HP	25.40	15.88	15.88	3.2	24.1	11.375	8.02	16.25	17.80	35.7	2.15	120

 $\bigcirc$ 

 $\bigcirc$ 

Chain strength: Please see page 92.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### ■ Operating Temperature Range: –10°C to 150°C

Use a lubricant suited to the operating temperature. (See page 101, table 14.)

Connecting Link

#### Chain Numbering

#### **RF2040S-HP-NP**

Chain size \_\_\_\_\_\_ Roller type (S: S roller, R: R roller) \_\_\_\_ Chain type: Hollow pin \_\_\_\_\_

Chain specification Standard: No symbol Nickel-plated: NP

#### <u>RS40-HP-NP</u>

Offset Link

Chain specification Standard: No symbol Nickel-plated: NP

**Engineering Manual** 

Small Size Conveyor Chain

Corrosion Resistant Small Size Conveyor Chain

Lube Free

# **Curved Attachment Chain**

Curved Attachment Chain has additional clearance between the pins and bushes to permit extra flexibility. Guide rails to control the chain enable it to be used for curved conveyance. This chain can be used for power transmission purposes, as well as for conveyance when attachments are installed. (Contact a Tsubaki representative for details.)



#### Base Chain Dimensions

Tsubaki Chain No. Pitch	Pitch	Width Between	Roller Dia. R		Plate			Pin		Min.	Max. Allowable	Approx. Mass kg/m		No. of
	Inner Link Plates W	S Roller	R Roller	Thickness T	Width H	Dia. D	Lı	L2	Radius r	kN {kgf}	S Roller	R Roller	Links per Unit	
RF2040-CU	25.40	7.95	7.92	15.88	1.5	12.0	3.97	8.45	9.75	700	1.86{190}	0.51	0.87	120
RF2050-CU	31.75	9.53	10.16	19.05	2.0	15.0	5.09	10.6	12.4	800	2.84{290}	0.84	1.30	96
RF2060-CU	38.10	12.70	11.91	22.23	2.4	17.2	5.96	13.25	15.05	1000	4.02{410}	1.22	1.90	80
RF2080-CU	50.80	15.88	15.88	28.58	3.2	23.0	7.94	16.75	20.05	1200	6.96{710}	2.02	3.13	60
Chain strongth														

Chain strength: Please see page 92. The dimensions shown in this catalog are n

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Attachment Dimensions

Tsubaki Chain No.			A1, K1	I, A2, K2 Attac	A1, K1, A2, K2 Attachments											
	С	К	N	0	S	Х	Х2	А	К							
RF2040-CU	12.7	9.5	19.1	3.6	9.1	19.5	17.6	0.03	0.06							
RF2050-CU	15.9	11.9	23.8	5.2	11.1	24.4	22.0	0.06	0.12							
RF2060-CU	21.45	14.3	28.6	5.2	14.7	29.9	27.0	0.013	0.026							
RF2080-CU	27.8	19.1	38.1	6.8	19.1	39.1	35.25	0.026	0.052							



#### **Curved RS Attachment Chain**

otherwise specified.

Chain size ——— Chain type: Curved

Chain Numbering

• When attachments are to be installed on each even-numbered

**RS80-CU-1LA1** 

Attachment type

Attachment spacing

link, attachments will be provided on inner links unless

#### Base Chain and Attachments



#### Base Chain Dimensions

Tsubaki	Pitch	Width Between Inner Link Plates W	Roller Dia.		Plate			Pin		Min.	Max. Allowable	No. of	
Chain No.	Chain No. P		R	Thickness T	Width H	Width h	Dia. D	Lı	L2	Radius r	Load kN {kgf}	Mass kg/m	Links per Unit
RS40-CU	12.70	7.95	7.92	1.5	12.0	10.4	3.97	8.45	9.75	350	1.86{190}	0.61	240
RS50-CU	15.875	9.53	10.16	2.0	15.0	13.0	5.09	10.6	12.4	400	2.84{290}	1.01	192
RS60-CU	19.05	12.70	11.91	2.4	18.1	15.6	5.96	13.25	15.05	500	4.02{410}	1.40	160
RS80-CU	25.40	15.88	15.88	3.2	24.1	20.8	7.94	16.75	20.05	600	6.96{710}	2.47	120

Chain strength: Please see page 92.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Attachment Dimensions

Tsubaki Chain No.			A1, K1 A	tachments			Additional Weight per Attachment ${\rm kg}$			
	С	N	0	S	Х	Х2	А	К		
RS40-CU	12.7	9.5	3.6	8.0	18.0	17.8	0.002	0.004		
RS50-CU	15.9	12.7	5.2	10.3	23.7	23.4	0.003	0.006		
RS60-CU	19.05	15.9	5.2	11.9	28.5	28.2	0.007	0.014		
RS80-CU	25.4	19.1	6.8	15.9	37.1	36.6	0.013	0.026		

#### **Operating Temperature Range:** –10°C to 150°C

Use a lubricant suited to the operating temperature. (See page 101, table 14.)





**Engineering Manual** 

### **Lube Free Small Size Conveyor Chain**

#### Tsubaki Lambda® Chain

Tsubaki is a pioneer in the industry, being the first to develop a chain that uses special oil-impregnated bushes. Since first being introduced in 1988, Lambda Chain has gained an outstanding reputation in a variety of industries and applications. It is capable of meeting a wide range of customer needs for long life in a lubrication-free environment, resulting in a reduction in overall long-term costs.

- Long life without additional lubrication... Special oil-impregnated bushes provide long service life.
- Interchangeability... Compatible with Standard Small Size Conveyor Chain.
- Operating temperature range... –10°C to 150°C
- More than 14 times the wear elongation life of RS Roller Chain.
- (RS80-LMC and RS100-LMC have seven times and RS35-LMC has five times the life of RS Roller Chain.)
- Use NSF-H1 food grade oil in It's special sintered bushes.

#### Performance in Normal Temperatures (-10°C to 60°C)



#### Lambda Double Pitch Chain, Lambda RS Attachment Chain

Inner and outer link plates are blackened. This treatment provides better corrosion resistance, as well as improving the overall appearance of the chain.

#### Surface-Treated Lambda Double Pitch Chain, Surface-Treated Lambda RS Attachment Chain

Standard Lambda Chain with anti-corrosion surface treatments. NP: Nickel-plated plates and rollers provide mild corrosion resistance. NEP: A special anti-corrosion surface treatment is applied to the plates and rollers to improve corrosion resistance.

#### BS Lambda Attachment Chain

Lambda Chain that conforms to ISO 606 B series standards. The dimensions are fully interchangeable with existing BS chains. Specially shaped pins are used on single-strand 08B to 16B sizes to enable easy chain disassembly using a standard chain breaker.

#### Lambda Hollow Pin Double Pitch Chain, Lambda Hollow Pin RS Chain

Hollow Pin Chain with all the features of Lambda Chain. (Special oil-impregnated sintered bushes are used for hollow pin bushes.)

#### Lambda RF Roller Chain

RF Roller Chain with all the features of Lambda Chain. Designed for lubrication-free applications where conveyed objects are placed directly on the chain.









High Precision Conveyor Chain

### **Lube Free Small Size Conveyor Chain**

#### Long Life Lambda<sup>®</sup> Chain (X- $\Lambda$ [X-Lambda])

The inclusion of an oil-impregnated felt seal in the construction of X- $\Lambda$  (X-Lambda) Chain significantly improves the anti-wear performance of standard Lambda Chain. Ideal for environments where extended replacement intervals are required when using lube-free chain.

- Ultra long life... The inclusion of an oil-impregnated felt seal in the construction of X-Lambda Chain provides more than five times the anti-wear performance of standard Lambda Chain (Tsubakimoto comparison at –10°C to 60°C).
- Ultra long life in a lube-free chain... The combination of a special oil-impregnated bush and felt seal further extends service life.
- Interchangeability... Fully interchangeable with Lambda Chain. However, as the overall pin length is longer than Lambda Chain, please check attachment dimensions and that there will be no interference with machinery or other equipment.
- Operating temperature range... –10°C to 60°C
- Please contact a Tsubaki representative regarding use above 60°C.





X-Lambda Double Pitch Chain, X-Lambda RS Attachment Chain

#### Tsubaki Incorporates LCA (Life Cycle Assessment) in Its Activities

Tsubaki Lambda<sup>®</sup> Chain is an eco-friendly chain that requires no lubrication and has a long wear life. It is extremely effective in reducing greenhouse gas emissions.

\* CO2 emissions comparing RS80-LMD-1 Lambda Chain and RS80-1 Roller Chain

89.4% reduction in CO<sub>2</sub> emissions\*

LCA (Life Cycle Assessment)

Life Cycle Assessment (LCA) is a tool for the systematic evaluation of the environmental aspects of a product through all stages of its life cycle, from raw materials to waste management including recycling and final disposal.

CONARIO

### **Lube Free Small Size Conveyor Chain**

#### Lambda<sup>®</sup> Chain KF Series

Lambda Chain KF Series uses special bushes impregnated with a lubricant that does not deteriorate or disperse at high temperatures to deliver "lube-free" operation and long service life in high-temperature environments where maintenance is difficult.

- Outstanding performance at high temperatures.
- Stable lubrication and anti-wear properties at high temperatures.
- Uses NSF-H1 food grade certified lubricating oil and is environmentally friendly.
- Operating temperature range: 150°C to 230°C

Chain size: RS40-LMC-KF to RS80-LMC-KF, RF2040-LMC-KF to RF2080-LMC-KF Please contact a Tsubaki representative when you need other sizes and specifications.



#### $\triangle$ Safety Precautions for Lambda Chains

- Do not use Lambda Chain if the chain will come in direct contact with food or where coating flakes or wear dust can contaminate food. Also, in non-food applications, appropriately cover the chain or contact a Tsubaki representative about chain selection if using in environments where coating flakes or wear dust present problems. Though nickel is not subject to the Japan Food Sanitation Law or the Industrial Safety and Health Law, plating on sliding parts can peel.
- 2. Do not use Lambda Chain where there is the possibility of exposure to chemicals, water, or cleaning/degreasing vapors.

Corrosion Resistant Small Size Conveyor Chain

Plus a

Small Size Conveyor Chain

# Tsubaki Lube-Free Lambda® Chain

#### Keeps your application running clean No product contamination Reduces downtime and maintenance costs

Applications

Food and Beverage, Packaging, Printing, Personal Care, Electronic Appliances, Automotive, Lumber, Textile, Lighting ... and More!



# Lambda® Double Pitch Chain, Surface-Treated



Note: RS sprockets can be used with S rollers if the sprocket has more than 30 teeth. A Double Pitch chain sprocket will be needed if the sprocket has fewer than 30 teeth. Please refer to separate Tsubaki Drive Chain catalog for more information on RS sprockets.

# Lambda<sup>®</sup> Double Pitch Chain

#### Base Chain Dimensions

		D's L	Width Roller Dia.		r Dia.		Pin		Offset	Plate		
Tsubaki Chain No.	Roller Type	Pitch P	Ρ'	Inner Link Plates W	S Roller <i>R</i> 1	R Roller <i>R</i> 2	Dia. D	Lı	L2	Pin Length L	Thickness T	Width <i>H</i>
RF2040-LMC		25.40	tails.	7.95	7.92	15.88	3.97	8.25	9.95	18.2	1.5	12.0
RF2050-LMC	S	31.75	subak or de	9.53	10.16	19.05	5.09	10.30	12.0	22.6	2.0	15.0
RF2060-LMC	•	38.10	ct a T	12.70	11.91	22.23	5.96	14.55	16.55	31.5	3.2	17.2
RF2080-LMC	R	50.80	Conta	15.88	15.88	28.58	7.94	18.30	20.90	39.9	4.0	23.0
RF2100-LMC		63.50	repre	19.05	19.05	39.69	9.54	21.80	24.50	47.5	4.8	28.6

#### Attachment Dimensions

		Attachment														
Tsubaki Chain No.	С	Cı	C2	к	N	0	01	S	Т	x	<b>X</b> 2	Xs	D	Lз	L4	G
RF2040-LMC	12.7	11.1	13.6	9.5	19.1	3.6	5.2	9.1	1.5	19.3	17.6	19.8	3.97	9.5	16.75	4.1
RF2050-LMC	15.9	14.3	15.9	11.9	23.8	5.2	6.8	11.1	2.0	24.2	22.0	24.6	5.09	11.9	21.0	5.1
RF2060-LMC	21.45	17.5	19.1	14.3	28.6	5.2	8.7	14.7	3.2	31.5	28.2	30.6	5.96	14.3	27.45	6.1
RF2080-LMC	27.8	22.2	25.4	19.1	38.1	6.8	10.3	19.1	4.0	40.7	36.6	40.5	7.94	19.1	35.5	8.1
RF2100-LMC	33.35	28.6	31.8	23.8	47.6	8.7	14.3	23.4	4.8	49.9	44.9	50.4	9.54	23.8	43.4	10.1

		Approx. N	∕ass kg/m	Additional	No. of		
Tsubaki Chain No.	Max. Allowable Load kN {kgf}	S Roller	R Roller	A, SA	K, SK	EP	Links per Unit
RF2040-LMC	2.65{ 270}	0.51	0.87	0.003	0.006	0.001	120
RF2050-LMC	4.31{ 440}	0.84	1.30	0.006	0.012	0.002	96
RF2060-LMC	6.28{ 640}	1.51	2.19	0.017	0.034	0.003	80
RF2080-LMC	10.7 {1090}	2.41	3.52	0.032	0.064	0.007	60
RF2100-LMC	17.1 {1740}	3.54	5.80	0.06	0.12	0.012	48

Note: Dimensions O and O1 are slightly smaller on NEP chains.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Operating Temperature Range: –10°C to 150°C

Note: -10°C to 230°C for KF Series Chain. (Be sure to factor in temperature when selecting.)

#### Chain Numbering

#### RF2040S-LMC-NP-1LK2



LMC-KF: Lambda KF Series Attachment Chain

Note: The link plates on Lambda KF Series Chain are blackened.

Offset links for Lambda KF Series Chain are made-to-order. Please contact a Tsubaki representative for more information.

Standard Small Size Conveyor Chain

Plus a

# Long Life Lambda<sup>®</sup> Double Pitch Chain (X- $\Lambda$ [X-Lambda])

#### Base Chain

Double Pitch

Standard Small Size Conveyor Chain

**Small Size Conveyor Chain** 

Small Size Conveyor Chain



• Connecting links: RF2040-LMCX to RF2060-LMCX use spring clips. RF2080-LMCX and RF2100-LMCX use cotter pins. Base chain pins are riveted.

#### Attachments



Note: RS sprockets can be used with S rollers if the sprocket has more than 30 teeth Please refer to separate Tsubaki Drive Chain catalog for more information on RS sprockets.
Tsubaki	Dellar	Dital	Width	Roller	· Dia.		Pin		Plo	ate	
Chain No.	Туре	P	Link Plates	S Roller <i>R</i> 1	S Roller <i>R</i> 2	Dia. D	Lı	L2	Thickness T	Width H	Load kN {kgf}
RF2040-LMCX		25.40	7.95	7.92	15.88	3.97	8.90	10.6	1.5	12.0	2.65 { 270}
RF2050-LMCX	s	31.75	9.53	10.16	19.05	5.09	11.0	12.7	2.0	15.0	4.31 { 440}
RF2060-LMCX	.	38.10	12.70	11.91	22.23	5.96	15.25	17.15	3.2	17.2	6.28 { 640}
RF2080-LMCX	R	50.80	15.88	15.88	28.58	7.94	19.15	21.75	4.0	23.0	10.7 {1090}
RF2100-LMCX		63.50	19.05	19.05	39.69	9.54	22.6	25.3	4.8	28.6	17.1 {1740}

#### Base Chain Dimensions

#### Attachment Dimensions

Tsubak Chain No						Attac	hment						Appro: kg	x. Mass /m	Additional Weight per Attachment kg		No. of Links
chuir rio.	С	Cı	C2	K	N	0	<i>O</i> 1	S	Т	X	X2	XS	S Roller	R Roller	A, SA	K, SK	per Unit
RF2040-LMCX	12.7	11.1	13.6	9.5	19.1	3.6	5.2	9.1	1.5	19.9	17.6	19.8	0.51	0.87	0.003	0.006	120
RF2050-LMCX	15.9	14.3	15.9	11.9	23.8	5.2	6.8	11.1	2.0	24.85	22.0	24.6	0.84	1.30	0.006	0.012	96
RF2060-LMCX	21.45	17.5	19.1	14.3	28.6	5.2	8.7	14.7	3.2	32.4	28.2	30.6	1.51	2.19	0.017	0.034	80
RF2080-LMCX	27.8	22.2	25.4	19.1	38.1	6.8	10.3	19.1	4.0	41.6	36.6	40.5	2.43	3.54	0.032	0.064	60
RF2100-LMCX	33.35	28.6	31.8	23.8	47.6	8.7	14.3	23.4	4.8	50.8	44.9	50.4	3.56	5.82	0.06	0.12	48

Note: Please inquire regarding OL (outer links).

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### **Operating Temperature Range:** –10°C to 60°C

Due to the felt seals, X-Lambda chain pin length is slightly longer than that on standard attachment chain. The X dimension is longer on X-Lambda chain attachments than on standard attachments. Please check that there will be no interference with equipment.

Uses an oil-impregnated felt seal, causing more oil to stick to the surface of the chain when compared to Lambda Chain.

See page 40 for instructions on handling connecting links. Note that the shape of the felt seal is round and differs from the felt seals on RS Chain. Four felt seals are installed on each connecting link.

No offset links are available. Please use an even number of links.

#### Chain Numbering RF2040S-LMCX-1LK2 Chain size Roller type

S: S roller R: R roller

Attachment type
Attachment spacing
Chain type LMCX: X-Lambda Attachment Chain

Small Size Conveyor Chain

Standard Small Size Conveyor Chain

Special Small Size Conveyor Chain

Lube Free Small Size Conveyor Chain

**Corrosion Resistant** Small Size Conveyor Chain

### Lambda® RS Attachment Chain, Surface-Treated

Base Chain

louble Pitte

Standard Small Size Conveyor Chain

Special



#### Attachments



Note: RS sprockets can be used. Please refer to separate Tsubaki Drive Chain catalog for information on RS sprockets.

### Lambda<sup>®</sup> RS Attachment Chain

#### Base Chain Dimensions

Taula alci	D'i I		Width Between	Roller Dia.		P	in			Plate		Max. Allowable	Approx.	No. of
Chain No.	Pitch P	P'	Inner Link Plates W	(Bush Dia.) <i>R</i>	Dia. D	Lı	L2	L	Thickness T	Wid <del>t</del> h <i>H</i>	Width h	Load kN {kgf}	Mass kg/m	Links per Unit
RS35-LMC	9.525	ils.	4.78	(5.08)	3.00	5.85	6.85	13.5	1.25	9.0	7.8	1.52{ 155}	0.33	320
RS40-LMC	12.70	deta	7.95	7.92	3.97	8.25	9.95	18.2	1.5	12.0	10.4	2.65{ 270}	0.64	240
RS50-LMC	15.875	a Tsuk ve for	9.53	10.16	5.09	10.3	12.0	22.6	2.0	15.0	13.0	4.31{ 440}	1.04	192
RS60-LMC	19.05	itact o	12.70	11.91	5.96	12.85	14.75	28.2	2.4	18.1	15.6	6.28{ 640}	1.53	160
RS80-LMC	25.40	Cor	15.88	15.88	7.94	16.25	19.25	36.6	3.2	24.1	20.8	10.7 {1090}	2.66	120
RS100-LMC	31.75	9	19.05	19.05	9.54	19.75	22.85	43.7	4.0	30.1	26.0	17.1 {1740}	3.99	96

#### Attachment Dimensions

<b>T</b>					Attac	nment					Additional Weight per Attachment kg			
Isubaki Chain No.	С	Cı	N	0	S	X	<b>X</b> 2	Xs	Lз	La	A, SA	K, SK	EP	
RS35-LMC	9.5	9.5	7.9	3.4	6.35	14.3	14.3	14.55	9.5	14.6	0.0008	0.0016	0.0008	
RS40-LMC	12.7	12.7	9.5	3.6	8.0	17.8	17.8	17.40	9.5	16.75	0.002	0.004	0.001	
RS50-LMC	15.9	15.9	12.7	5.2	10.3	23.4	23.4	23.05	11.9	21.0	0.003	0.006	0.002	
RS60-LMC	19.05	18.3	15.9	5.2	11.9	28.2	28.2	26.85	14.3	25.75	0.007	0.014	0.003	
RS80-LMC	25.4	24.6	19.1	6.8	15.9	36.6	36.6	35.45	19.1	33.85	0.013	0.026	0.007	
RS100-LMC	31.75	31.8	25.4	8.7	19.8	44.9	44.9	44.0	23.8	41.75	0.026	0.052	0.012	

Note: 1. Pin diameters for Lambda RS35-LMC and Standard RS35 are different and therefore they cannot be connected together.

2. RS35-LMC has no rollers.

3. Dimension D of RS35-LMC EP attachment is 3.0 mm diameter and is smaller than that of Standard RS35.

4. Dimension O is slightly smaller on NEP chains.

5. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### ■ Operating Temperature Range: –10°C to 150°C

Note: -10°C to 230°C for KF Series Chain. (Be sure to factor in temperature when selecting.)

#### **Chain Numbering**



Note: The link plates on Lambda KF Series Chain are blackened.

Offset links for Lambda KF Series Chain are made-to-order. Please contact a Tsubaki representative for more information.



### Long Life Lambda<sup>®</sup> RS Attachment Chain (X-A [X-Lambda])

#### Base Chain



• Connecting links: RS40-LMCX to RS60-LMCX use spring clips. RS80-LMCX and RS100-LMCX use cotter pins. Base chain pins are riveted.

• Offset links are not available.

#### Attachments



• Pins other than those on connecting links are riveted regardless of whether attachments are present.

• Drawings show attachments added on every link.

• When attachments are to be installed on each even-numbered link, they will be installed on the inner link. Please specify when they must be installed on the outer link.

Note: RS sprockets can be used. Please refer to separate Tsubaki Drive Chain catalog for information on RS sprockets.

High Precision Conveyor Chain

**Engineering Manual** 

ouble Pito

Standard Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

Lube Free

Special



#### Base Chain Dimensions

#### Attachment Dimensions

Tsubaki				Attach	ment				Additional Weight per Attachment kg		
Chain No.	С	Cı	N	0	S	X	<b>X</b> 2	Xs	A, SA	K, SK	
RS40-LMCX	12.7	12.7	9.5	3.6	8.0	18.40	17.8	17.40	0.002	0.004	
RS50-LMCX	15.9	15.9	12.7	5.2	10.3	24.10	23.4	23.05	0.003	0.006	
RS60-LMCX	19.05	18.3	15.9	5.2	11.9	29.05	28.2	26.85	0.007	0.014	
RS80-LMCX	25.4	24.6	19.1	6.8	15.9	37.5	36.6	35.45	0.013	0.026	
RS100-LMCX	31.75	31.8	25.4	8.7	19.8	45.6	44.9	44.0	0.026	0.052	

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### ■ Operating Temperature Range: -10°C to 60°C

- Due to the felt seals, X-Lambda chain pin length is slightly longer than that on standard attachment chain. The X dimension is longer on X-Lambda chain attachments than on standard attachments. Please check that there will be no interference with equipment.
  - When assembling chain, use connecting links designed for X-Lambda Chain (with felt seals). As shown in the diagram at the right, insert felt seals between the outer plates and connecting plates, and attach the link. The felt seals are impregnated with oil. Be careful to ensure that oil is not squeezed out.
  - Uses an oil-impregnated felt seal, causing more oil to stick to the surface of the chain when compared to Lambda Chain.
- No offset links are available. Please use an even number of links.





Small Size Conveyor Chain

Plus a

**Engineering Manual** 

### **BS Lambda® Attachment Chain**

Base Chain



Small Size Conveyor Chain Small Size Conveyor Chain

#### Base Chain Dimensions

				Width		Plo	ate				
Tsubaki Chain No.	Pitch P	P'	Roller Dia. <i>R</i>	Between Inner Link Plates W	Thickness T2	Thickness T1	Width <i>H</i>	Width h	Pin Dia. D		
RS08B-LM	12.70	Contact a	8.51	7.75	1.6	1.6	12.0	10.4	4.45		
RS10B-LM	15.875	Tsubaki	10.16	9.65	1.5	1.5	14.7	13.7	5.08		
RS12B-LM	19.05	representative for details.	representative for details.	representative	12.07	11.68	1.8	1.8	16.1	16.1	5.72
RS16B-LM	25.40			15.88	17.02	4.0	3.2	21.0	21.0	8.28	

Tsubaki		Pin Length		Offset Pin Length	Min. Tensile	Approx.	No. of
Chain No.	L1+L2	Lı	L2	L	kN {kgf}	Mass kg/m	Links per Unit
RSO8B-LM	18.4	8.4	10.0	18.6	13.7{1400}	0.70	240
RS10B-LM	20.8	9.55	11.25	20.8	16.1{1640}	0.95	192
RS12B-LM	24.1	11.1	13.0	24.4	19.5{1990}	1.25	160
RS16B-LM	37.7	17.75	19.95	39.3	54.1{5520}	2.70	120

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Attachment Dimensions

Tsubaki Chain No.			A1,	SA1, K1, Sk	<1 Attachme	ents			Addition per Attac	al Weight hment kg
Chuin No.	С	Cı	A, SA	K, SK						
RS08B-LM	11.9	12.7	11.4	4.2	8.9	19.05	17.15	19.3	0.002	0.004
RS10B-LM	15.9	15.9	12.7	5.0	10.2	22.25	20.6	22.9	0.003	0.006
RS12B-LM	19.05	22.2	16.5	7.1	13.5	29.85	27.8	32.05	0.006	0.012
RS16B-LM	23.8	23.9	24.3	6.7	15.2	37.35	34.4	34.1	0.014	0.028

Tsubaki Chain No.		W. W	42, WSA A1, WSA	42, WK2 41, WK1	, WSK2 , WSK1	Attachm Attachm	ents ients		EP	Attachm	ent	Additional Weight per Attachment kg			
Chain No.	С	Cı	NW	0	S	X	Xs	KW	D	Lз	L4	WA, WSA	WK, WSK	EP	
RS08B-LM	12.7	13.1	24.6	4.9	8.9	20.3	20.7	12.7	4.45	9.5	17.0	0.005	0.010	0.001	
RS10B-LM	15.9	16.6	30.0	5.0	10.2	22.85	23.6	15.9	5.08	11.9	20.25	0.006	0.012	0.002	
RS12B-LM	17.45	17.6	34.8	5.5	11.4	25.65	25.75	19.1	5.72	14.3	24.1	0.009	0.018	0.003	
RS16B-LM	28.6	26.0	46.0	8.1	15.9	39.25	36.7	25.4	8.28	19.1	35.25	0.030	0.060	0.008	

#### ■ Operating Temperature Range: -10°C to 150°C

#### Sprockets

BS Roller Chain sprockets (conforming to ISO B Series standards) must be used.

#### Pin Shape

Single-strand chains in sizes RS08B through RS16B use easy disassembly pins (with center sink riveting). All other sizes, including multi-strand chains, use double stake riveting.

**Chain Selection:** Please inquire for chain selection.

#### Chain Numbering



#### Made-to-Order Items

Special attachment shapes with dimensions different than above, as well as special extended pins, Lambda KF/NP Chain, and RF06B, RS20B, and RS24B attachment chain are also available. Please contact a Tsubaki representative for more information.

#### Note

When replacing European standard attachment chain with Lambda Chain, note that dimensions may be different than Tsubaki standard dimensions. Be sure to check attachment dimensions before ordering.

# Double Pitch

Standard Small Size Conveyor Chain

### Lambda<sup>®</sup> RF Roller Chain

#### Base Chain



Connecting links: RF35-LMC to RF60-LMC use spring clips. RS80-LMC and larger use cotter pins. Base chain pins are riveted.
Offset links are not available.

#### Base Chain Dimensions

Tsubaki Chain No	Pitch	Roller	Width Between Inner	Plo	ate		Pin		Max. Allowable	Approx.	No. of
Chain No.	Р	Dia. R	Link Plates	Thickness T	Width H	Dia. D	Lı	L2	kN {kgf}	Mass kg/m	Unit
RF35-LMC	9.525	( 5.08)	4.78	1.25	9.0	3.0	5.85	6.85	1.52{ 155}	0.41	320
RF40-LMC	12.70	7.92	7.95	1.5	12.0	3.97	8.25	9.95	2.65{ 270}	0.74	240
RF50-LMC	15.875	10.16	9.53	2.0	15.0	5.09	10.3	12.0	4.31{ 440}	1.22	192
RF60-LMC	19.05	11.91	12.70	2.4	18.1	5.96	12.85	14.75	6.28{ 640}	1.78	160
RF80-LMC	25.40	15.88	15.88	3.2	24.1	7.94	16.25	19.25	10.7 {1090}	3.09	120
RF100-LMC	31.75	19.05	19.05	4.0	28.6	9.54	19.75	22.85	17.1 {1740}	4.43	96

Note: 1. Pin diameters for RS35 and RS35-LMC are different. The two cannot be connected.

2. Roller diameter R (in parentheses) for RF35-LMC is the bush diameter.

3. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### ■ Operating Temperature Range: –10°C to 150°C

Sprockets: Standard RS sprockets can be used.Please refer to separate Tsubaki Drive Chain catalog for information on RS sprockets.

#### Chain Numbering

#### RF40-LMC



Chain type LMC: Lambda Chain

Double Pite

**Engineering Manual** 

## Lambda<sup>®</sup> Hollow Pin Chain



#### Lambda Hollow Pin Double Pitch Chain

Base Chain



Tsubaki Chain No.	· Type	Pitch P	Bush	Roller	Width Between	Plo	ate		Pi	in		Offset Pin	Approx kg	c. Mass /m	No. of
	Р	P B	R	Plates W	Thickness T	Width H	Outer Dia. <i>E</i>	Inner Dia. F (min.)	Lı	L 2	Lengin	Bush Type	R Roller	per Unit	
RF2040-LMC-HP		25.40	7.92	15.88	7.95	1.5	12.0	5.68	4.00	8.00	9.50	19.1	0.46	0.82	120
RF2050-LMC-HP	S	31.75	10.16	19.05	9.53	2.0	15.0	7.22	5.12	10.05	11.65	23.4	0.75	1.21	96
RF2060-LMC-HP	• R	38.10	11.91	22.23	12.70	2.4	17.2	8.38	5.99	12.55	14.25	28.7	1.38	2.06	80
RF2080-LMC-HP		50.80	15.88	28.58	15.88	3.2	23.0	11.375	8.02	16.25	17.80	35.7	1.80	2.81	60

Note: The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.



Base Chain



Tsubaki	Pitch	Bush	Width Between	Plo	ate		Pi	in		Offset	Approx	No. of Links per Unit 240 192 160
Chain No.	P	Dia. B	Inner Link Plates	Thickness T	Width H	Outer Dia. E	Inner Dia. F (min.)	Lı	L 2	Pin Length L	Mass kg/m	
RS40-LMC-HP	12.70	7.92	7.95	1.5	12.0	5.68	4.00	8.00	9.50	19.1	0.53	240
RS50-LMC-HP	15.875	10.16	9.53	2.0	15.0	7.22	5.12	10.05	11.65	23.4	0.86	192
RS60-LMC-HP	19.05	11.91	12.70	2.4	18.1	8.38	5.99	12.55	14.25	28.7	1.27	160
RS80-LMC-HP	25.40	15.88	15.88	3.2	24.1	11.375	8.02	16.25	17.80	35.7	2.15	120

#### Operating Temperature Range: -10°C to 150°C

#### Sprockets

Double Pitch... Double Pitch sprockets can be used. RS Roller Chain sprockets can be used provided that the sprockets are of the S roller type and have 30 or more teeth.

RS Chain...... RS Roller Chain sprockets can be used. Please refer to separate Tsubaki Drive Chain catalog for information on RS sprockets.

#### **Chain Numbering**

#### RF2040S-LMC-HP

Chain size Roller type: Chain type Lambda Hollow Pin Chain S: S roller R: R roller

RS	40	-	LMC	:-HP

Chain size

Chain type Lambda Hollow Pin Chain



Special

Standard

Small Size Conveyor Chain

### Lambda<sup>®</sup> Chain Specialty Attachments

Tsubaki Specialty Attachments take up a wide range of conveying assignments. If your operations move long, narrow items and stoves, convey items on chains, use slats, or have other unique requirements, consider these benefits.

- Custom engineering at a reasonable cost
- Proven reliability

- High strength
- Easy selection

Quick delivery

- Outstanding performance
- Press Nut and Threaded Hole Chain

Press nuts can be inserted into holes on chain attachments, or holes can be tapped to provide a threaded hole in chain attachments. This special attachment allows slats or jigs to be attached using only machine screws or bolts, significantly improving work efficiency.

### **Free Flow Chain**

This chain consists of a Lambda base chain with freely rotating rollers. Although the base chain does not require lubrication, steel top rollers and steel outboard rollers must be lubricated. (Plastic top rollers and plastic outboard rollers do not require lubrication.)



Chain with K2 attachment and press nut



Chain with bent-over A2 attachment and threaded hole



Chain with K1 and SA1 attachments and press nut



**Double Plus Chain** 



Top Roller Chain



Outboard Roller Chain

### **Direct Loading Top Chain**

This chain is designed to allow various types of machine parts and container products (such as bottles, cans, and paper packs) to be placed directly on the chain for conveyance. The base chain is Lambda Chain.



TS Top Chain



TN Top Chain



**RT Roller Table** 

### **Direct Loading Chain with Special Attachments**

This is Lambda Chain with special attachments to match the shape of the workpiece, such as round bars, pipes, small boxes, etc.



Chain with triangle attachments for conveying bar-type objects



Chain with tray attachments for conveying small boxes



Chain with V-shaped attachments for conveying pipes

Special



45

#### **Direct Loading Bent Attachment Chain**

This chain is designed to allow pallets, cardboard boxes, plastic containers, etc., to be placed directly on the chain for conveyance. Stainless steel attachments, bracket-type attachments, and rubber attachments can be custom made according to the application.



Chain with bracket-type attachments (stainless steel)



Double Pitch Chain with bracket-type attachments



Double-strand chain with rubber attachments

### **Extended Pin with Thread Chain**

This chain features extended pins, threaded extended pins, or extended pins with spring clips to enable installation of various attachments. The attachments can be secured by nuts, inserted into tubing, or attached to spring clips.



Chain with threaded extended pins



Extended pin chain



Extended pin chain with spring clips

### Bar, Slat, and Wire Mesh Conveyor Chain

Special attachment chain to match the shape of attached tools or jigs such as slats with holes, stepped bars, square bars, round bars, etc.



Chain for conveyor with slats with holes (Chain center and slats are at the same level)



Stepped bar chain (Ends are inserted into holes in attachments)



Hollow Pin Chain for wire mesh conveyor with guide rollers



Square bar chain



Round bar attachment bush chain

### **Chains That Convey by Sandwiching Workpieces Between Chains**

These chains form two conveyors that sandwich an object between them using the stay pins of the chain, or a bent-over open-boxshaped attachment.



Stay-pin chain (with blocks attached to the stay pins)



Chain with bent-over attachments

Standard Small Size Conveyor Chain

Small Size Conveyor Chain

Special

Plus a

**Small Size Conveyor Chain** 

High Precision Conveyor Chain

**Engineering Manual** 

### **Corrosion Resistant Small Size Conveyor Chain**



Small Size Conveyor Chain

Standard

NS Seri

#### **Stainless Steel Attachment Chain**

Combinations of various materials allow these chains to be used in water and in corrosive atmospheres that are acidic or alkaline, as well as in special environments such as low and high temperatures. Double Pitch and RS Attachment Chains are available. For further details, see page 96: "Corrosion Resistance Guide for Corrosion Resistant Chains and Sprockets."

SS Series"	304 stainless steel

1. Standard corrosion-resistant chain.

2. Can be used in water and special atmospheres that are acidic or alkaline, and at low and high temperatures (-20°C to 400°C).

3. Marginally magnetic due only to the cold-forming process.

es	316 stainless steel (spring clips are 301 stainless stee	el and cotter pins are 304 stainless steel)
----	--	---

- 1. Used for applications that require higher corrosion resistance than SS chains.
- 2. Can be used in water and special atmospheres that are acidic or alkaline, and at low and high temperatures (-20°C to 400°C).
- 3. Non-magnetic except for spring clips.

**AS Series** Combination of heat-treated stainless steel and 304 stainless steel

- 1. Maximum allowable tension 1.5 times greater than SS chains.
- 2. Corrosion resistance is slightly less than that of SS chains.
- 3. AS chains are suitable for applications that require corrosion resistance and heat resistance (-20°C to 400°C) and smaller sizes and/or higher load capacity than SS chains. Chain is magnetic.

LSC Series 304 stainless steel + special engineering plastic sleeve between pin and bush

- 1. Ideal for when a longer-life stainless steel chain is need (longer than with SS chain). Has 4 times the wear life of SS chain (in-house testing comparison).
- 2. Operating temperature range: -20°C to 100°C (-20°C to 80°C when using plastic rollers).
- 3. Marginally magnetic due only to the cold-forming process.

▲ Caution \*1: Certain chemicals at some concentrations will cause corrosion even though these chains are made of stainless steel.



#### **Surface-Treated Attachment Chain**

A surface treatment has been applied to standard small size conveyor chain for improved corrosion resistance. Double Pitch and RS Attachment Chains are available.

Н	NP Series*2	Nickel plating on steel (all components heat-treated steel)
	1. Nickel plating n	ot only improves appearance but also adds a small degree of corrosion resistance.

- Therefore, can be used in applications where there is exposure to water.
- 2. Operating temperature range: -10°C to 150°C.

#### NEP Series\*2 Special surface treatment on steel (all components heat-treated steel)

- 1. Highest level of corrosion resistance among various plated and surface-treated chains. Can be used outdoors or in environments involving exposure to seawater.
- 2. Next-generation chain that uses no toxic substances such as hexavalent chromium, reducing the impact on the environment.
- 3. Operating temperature range: -10°C to 150°C.

Caution \*2: Do not use Corrosion Resistant Chain if the chain will come in direct contact with food or where coating flakes or wear dust can contaminate food. Also, in non-food applications, appropriately cover the chain or contact a Tsubaki representative about chain selection if using in environments where coating flakes or wear dust present problems. Though nickel is not subject to the Japan Food Sanitation Law or the Industrial Safety and Health Law, plating on sliding parts can peel.

Engineering Manual

Lube Free

**Small Size Conveyor Chain Corrosion Resistant** 

Small Size Conveyor Chain

**Conveyor Chain High Precision** 

Plus a

Special

Standard

Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

Lube Free

COTTOSION RESISTANT Small Size Conveyor Chai

Plus a

Small Size Conveyor Chain

High Precision Conveyor Chain

Specia



#### **Poly Steel Attachment Chain**

The combination of polyacetal inner links and 304 stainless steel pins and outer link plates effectively incorporates the advantages of materials into one chain.

- 1. Lube-free and corrosion resistant.
- 2. Low noise (approximately 5 dB less than standard steel chain).
- 3. Lightweight (approximately 50% less than standard steel chain).
- 4. Operating temperature range: –20°C to 80°C.
- 5. Engineering plastic color: White.
- 6. ANSI and BIS/DN chains are available.







#### **Plastic Roller Double Pitch Chain**

- 1. Lightweight (approximately 30% less than standard steel chain).
- 2. Low noise (approximately 5 to 7 dB less than standard steel chain).
- 3. Low running resistance (approximately 30% less than standard steel chain).
- 4. Engineering plastic roller color: White (P).

Standard Series Engineering	g plastic rollers (polyacetal) on steel base chain (heat-treated)	
1. Engineering plastic rollers.		
2. Operating temperature range	e: -10°C to 80°C.	
NP Series Parts are n	ickel-plated except for plastic rollers	
1. Mild corrosion resistance.		
2. Operating temperature range	e: -10°C to 80°C.	
SS Series Engineering	g plastic rollers (polyacetal) on 304 stainless steel base chain	
1. Corrosion resistant.	2. Operating temperature range: -20°C to 80°C.	556 6
LCC Carrian Spanial and	vincering plastic cleave used between hin and buch on SS chain	200
LSC Series Special eng	trainless steel shelp is seed (langer than with SS shelp)	

- 1. Ideal for when a longer-life stainless steel chain is need (longer than with SS chain).
- 2. Operating temperature range: -20°C to 80°C (-20°C to 80°C when using plastic rollers).
- 3. Marginally magnetic due only to the cold-forming process.

#### **Heat-Resistant Plastic Roller Double Pitch Chain**

- 1. Excellent heat, chemical, and fire resistance. Conforms to the Japan Food Sanitation Law.
- 2. Operating temperature range: -20°C to 180°C.
- 3. Super engineering plastic roller color: Black.
- 4. Base chain is only available in SS series.



#### **Low-Noise Plastic Roller Double Pitch Chain**

1. Special engineering plastic rollers emit even less noise (-7 dB quieter) than standard engineering plastic rollers.

- 2. Operating temperature range: -10°C to 80°C (standard and NP series), -20°C to 80°C (SS series).
- 3. Special engineering plastic roller color: Light cream.
- 4. Base chain is available in standard, NP, and SS series.





### **Stainless Steel/Surface-Treated/Plastic Roller**



• Connecting links: RF2040 to RF2060 use spring clips. RF2080 and larger as well as chains with GNK1 attachments (all sizes) use cotter pins. Base chain pins are riveted.

- Offset links for Stainless Steel Double Pitch Chain and Plastic Roller Double Pitch Chain (SS specification) are secured by cotter pins on both sides.
- NS chains use a cotter pin on the connecting link regardless of size. Please contact a Tsubaki representative if a clip is needed.
  Cotter pins are used on both sides of the offset link for stainless steel Double Pitch chain and plastic roller Double Pitch chain (SS specifications).

#### Attachments

Double Pitch

Standard Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

**Corrosion Resistant** 

Plus a

Small Size Conveyor Chain

High Precision Conveyor Chain

**Engineering Manual** 

Lube Free

Special



Drawings show attachments added on every link.

Note: RS sprockets can be used with S rollers if the sprocket has more than 30 teeth. A Double Pitch chain sprocket will be needed if the sprocket has fewer than 30 teeth. Please refer to separate Tsubaki Drive Chain catalog for more information on RS sprockets. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

R S

Standard

Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

Lube Free

Corrosion Resistant Size Conveyor Chain

Plus a

Small Size Conveyor Chain

High Precision Conveyor Chain

**Engineering Manual** 

Special

### **Double Pitch Chain**

#### Base Chain Dimensions

Tsubaki 占			Roller Dia.		ween ates W	Pin				Plate		Арр	g/m	No. of	
Tsubaki Chain No.	koller Ty	Pitch P	S Roller	R Roller	idth Beh r Link Pl	Dia.	Lı	L2	Offset Pin Length	Thickness	Width	Ste	eel	Plastic Roller	Links per Unit
	4		R1	R2	lnne W	D			-	1	Н	S Roller	R Roller	R Roller	Unin
RF2040		25.40	7.92	15.88	7.95	3.97	8.25	9.95	18.2(18.6)	1.5	12.0	0.51	0.87	0.52	120
RF2050		31.75	10.16	19.05	9.53	5.09	10.30	12.0	22.6(23.9)	2.0	15.0	0.84	1.30	0.83	96
RF2060	ç	38.10	11.91	22.23	12.70	5.96	14.55	16.55	31.5(32.8)	3.2	17.2	1.51	2.19	1.48	80
RF2080	• •	50.80	15.88	28.58	15.88	7.94	18.30	20.90	$39.9\langle42.1 angle$	4.0	23.0	2.41	3.52	2.64	60
RF2100	ĸ	63.50	19.05	39.69	19.05	9.54	21.80(22.30)	24.50(24.90)	$47.5 \langle 50.0 \rangle$	4.8 〈5.0〉	28.6	3.54(3.66)	5.80 ( 5.92)	3.63(3.75)	48
RF2120		76.20	22.23	44.45	25.40	11.11	26.95 (28.05)	30.55(31.75)	$59.0\langle 63.5\rangle$	5.6 (6.0)	34.4	$5.08\langle 5.37  angle$	8.13 (8.42)	_	40
RF2160		101.60	28.58	57.15	31.75	14.29	33.95(35.70)	38.45(41.10)	74.1 (81.3)	7.15(8.0)	48.2	8.96(9.84)	13.70(14.58)	_	30

Note: Figures inside < > are for stainless steel chain. Chain strength: Please see pages 91 and 92.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### A, K, SA, SK, EP, GNK1 Attachment Dimensions

Tsubaki Chain No.	Roller Type	Pitch <i>P</i> '	С	СІ	C2	К	N	0	01	S												
RF2040			12.7	11.1	13.6	9.5	19.1	3.6	5.2	9.1												
RF2050			15.9	14.3	15.9	11.9	23.8	5.2	6.8	11.1												
RF2060		Contact a Tsubaki representative for details.	Contact a Tsubaki representative for details.	Contact a Tsubaki representative for details.	21.45	17.5	19.1	14.3	28.6	5.2	8.7	14.7										
RF2080					representative for details.	27.8	22.2	25.4	19.1	38.1	6.8	10.3	19.1									
RF2100	ĸ																					
RF2120				39.7	33.3	37.3	28.6	57.2	14.0	16.0	27.8											
RF2160			52.4	44.5	50.8	38.1	76.2	18.0	22.0	36.5												

Tsubaki	v	X2	XS	D	L3	14	6	Additional Weight per Attachment kg			
Chain No.		72	73			L4	6	A, SA	K, SK	EP	
RF2040	19.3	17.6	19.8	3.97	9.5	16.75	4.1	0.003	0.006	0.001	
RF2050	24.2	22.0	24.6	5.09	11.9	21.0	5.1	0.006	0.012	0.002	
RF2060	31.5	28.2	30.6	5.96	14.3	27.45	6.1	0.017	0.034	0.003	
RF2080	40.7	36.6	40.5	7.94	19.1	35.5	8.1	0.032	0.064	0.007	
RF2100	49.9(50.8 )	44.9(45.3 )	50.4	9.54	23.8	43.4(43.9)	10.1	0.060(0.063)	0.120(0.126)	0.012	
RF2120	60.7(61.8 )	54.4(55.2 )	59.9	_	_	_	_	0.100(0.107)	0.200(0.214)	-	
RF2160	77.8 (80.35)	70.0(71.65)	78.6	_	_	-	_	0.203(0.227)	0.400(0.454)	_	

Note:

Dimensions O and O1 are slightly smaller on NEP chains.
 Figures inside < > are for stainless steel chain.
 SS and NS chains are not pre-lubricated before shipping. Always lubricate the chain before use, except when using underwater or when the chain will contact water. Using a chain without lubrication may result in premature articulation problems. Maximum allowable loads are based on lubricated (including water lubricated) conditions.

#### Chain Numbering

#### **RF2040S-SS-1LK2**



#### Operating Temperature Range: –10°C to 150°C

Note: Operating temperature range is -10°C to 80°C for plastic rollers, but -20°C to 180°C for KV Series Chain. Use a lubricant suited to the operating temperature. (See page 101, table 14.)

Note: For sizes of Stainless Steel Double Pitch Chain, Surface-Treated Double Pitch Chain, and Plastic Roller Double Pitch Chain, refer to "Selection Guide" on pages 13 and 14.

### **Stainless Steel RS Attachment Chain, Surface-**

#### Base Chain

Standard Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

Special



• The offset link for RS25 is double pitch.

#### Attachments



Note: RS sprockets can be used. Please refer to separate Tsubaki Drive Chain catalog for information on RS sprockets.

Standard

Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

Lube Free

**Corrosion Resistant** 

Plus a

Small Size Conveyor Chain

Small Size Conveyor Chain

Special

### **Treated RS Attachment Chain**

Note: For sizes of Stainless Steel RS Attachment Chain and Surface-Treated RS Attachment Chain, refer to "Selection Guide" on pages 13 and 14.

Tsubaki	Pitch	Roller Dia.	Width Between		Plate			Р	in		Approx.	No. of	
Chain No.	Р	(Bush) R	Inner Link Plates W	Thickness T	Width <i>H</i>	Width h	Dia. D	Lı	L2	L	Mass kg/m	Links per Unit	
RS25	6.35	(3.30)	3.18	0.75	5.84	5.05	2.31	3.80	4.8	_	0.14	160	
RS35	9.525	(5.08)	4.78	1.25	9.0	7.8	3.59	5.85	6.85	13.5 〈14.7〉	0.33	320	
RS40	12.70	7.92	7.95	1.5	12.0	10.4	3.97	8.25	9.95	18.2 〈18.6〉	0.64	240	
RS50	15.875	10.16	9.53	2.0	15.0	13.0	5.09	10.3	12.0	22.6 (23.9)	1.04	192	
RS60	19.05	11.91	12.70	2.4	18.1	15.6	5.96	12.85	14.75	28.2 〈29.4〉	1.53	160	
RS80	25.40	15.88	15.88	3.2	24.1	20.8	7.94	16.25	19.25	36.6 (39.0)	2.66	120	
RS100	31.75	19.05	19.05	4.0	30.1	26.0	9.54	19.75	22.85	43.7 〈45.7〉	3.99	96	
RS120	38.10	22.23	25.40	4.8 (5.0)	36.2	31.2	11.11	24.90 〈25.75〉	28.90 〈29.8〉	55.0 〈59.7〉	5.93 〈6.13〉	80	
RS140	44.45	25.40	25.40	5.6 (6.0)	42.2	36.4	12.71	26.90 〈28.15〉	31.70 〈32.95〉	59.5 〈66.2〉	7.49 〈7.91〉	68	
RS160	50.80	28.58	31.75	6.4 (7.0)	48.2	41.6	14.29	31.85 〈33.55〉	36.85 〈38.55〉	70.2 〈77.3〉	10.10 〈10.86〉	60	

#### Base Chain Dimensions

Note: Figures inside < > are for stainless steel chain. Chain strength: Please see pages 91 and 92. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Attachment Dimensions

Tsubaki	C	CI	N	0	S	т	x	X2	xs	D	13	и	Additional Weight per Attachment kg		
Chain No.	C			U	U	,		~~~	7.0	D	20	24	A, SA	K, SK	EP
RS25	7.15	7.95	5.6	3.4	4.75	0.75	10.7	10.7	11.65	2.31	6.0	9.3	0.0003	0.0006	_
RS35	9.5	9.5	7.9	3.4	6.35	1.25	14.3	14.3	14.55	3.59	9.5	14.6	0.0008	0.0016	0.001
RS40	12.7	12.7	9.5	3.6	8.0	1.5	17.8	17.8	17.40	3.97	9.5	16.75	0.002	0.004	0.001
RS50	15.9	15.9	12.7	5.2	10.3	2.0	23.4	23.4	23.05	5.09	11.9	21.0	0.003	0.006	0.002
RS60	19.05	18.3	15.9	5.2	11.9	2.4	28.2	28.2	26.85	5.96	14.3	25.75	0.007	0.014	0.003
RS80	25.4	24.6	19.1	6.8	15.9	3.2	36.6	36.6	35.45	7.94	19.1	33.85	0.013	0.026	0.007
RS100	31.75	31.8	25.4	8.7	19.8	4.0	44.9	44.9	44.0	9.54	23.8	41.75	0.026	0.052	0.012
RS120	38.1	36.5	28.6	10.3	23.0	4.8 〈5.0〉	55.8 (56.7)	50.8 (51.5)	52.9	11.11	28.6	51.4	0.044 <0.046>	0.088 (0.092)	0.020
RS140	44.5	44.5	34.9	11.9	28.6	5.6 〈6.0〉	63.1 (64.6)	57.2 (58.0)	63.5	12.71	33.3	57.9	0.071 <0.076>	0.142 (0.152)	0.030
RS160	50.8	50.8	38.1	14.3	31.8	6.4 〈7.0〉	71.8 (73.7)	65.1 (66.0)	70.1	14.29	38.1	67.45	0.097 <0.106>	0.194 (0.212)	0.045

Note: 1. Dimension O is slightly smaller on NEP chains. 2. Figures inside < > are for stainless steel chain.

3. SS and NS chains are not pre-lubricated before shipping. Always lubricate the chain before use, except when using underwater or when the chain will contact water. Using a chain without lubrication may result in premature articulation problems. Maximum allowable loads are based on lubricated (including water lubricated) conditions.



■ Operating Temperature Range: -10°C to 150°C (-10°C to 80°C for plastic rollers) Use a lubricant suited to the operating temperature. (See page 101, table 14.) High Precision Conveyor Chain

### **Poly Steel Attachment Chain**

Base Chain



Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

Tsubaki	Pitch	Bush	Width Between		Plo	ate			Pin		Max. Allowable	Approx. Mass	No. of
Chain No.	Р	Dia. R	Inner Link Plates W	Thickness Ti	Thickness T2	Width H	Width h	Dia. D	Lı	L2	Load kN {kgf}	kg/m	Unit
RS25-PC	6.35	3.30	3.18	0.75	1.3	6.0	5.05	2.31	4.5	5.5	0.08{ 8}	0.095	160
RS35-PC	9.525	5.08	4.78	1.25	2.2	9.0	7.8	3.59	6.85	7.85	0.18{18}	0.22	320
RS40-PC	12.70	7.92	7.95	1.5	1.5	12.0	10.4	3.97	8.25	9.95	0.44{45}	0.39	240
RS50-PC	15.875	10.16	9.53	2.0	2.0	15.0	13.0	5.09	10.3	12.0	0.69{70}	0.58	192
RS60-PC	19.05	11.91	12.70	2.4	2.4	18.1	15.6	5.96	12.85	14.75	0.88{90}	0.82	160

#### Base Chain Dimensions

#### Attachment Dimensions

Tsubaki	C	<i>C</i> 1	N	0	c	v	vs	12	14	Additional	Weight per At	tachment kg
Chain No.	C	CI			5	~	7.5	15	L4	A, SA	K, SK	EP
RS25-PC	7.95	7.95	5.6	3.4	4.75	11.45	11.65	-	—	0.0003	0.0006	-
RS35-PC	10.5	9.5	7.9	3.4	6.35	15.35	14.55	-	-	0.0008	0.0016	-
RS40-PC	12.75	12.7	9.5	3.6	8.0	17.8	17.4	9.4	16.75	0.002	0.004	0.001
RS50-PC	16.0	15.9	12.7	5.2	10.3	23.55	23.05	11.9	21.0	0.003	0.006	0.002
RS60-PC	19.15	18.3	15.9	5.2	11.9	28.35	26.85	14.2	25.75	0.007	0.014	0.003

Note: Poly Steel Chain in BS specifications is made-to-order. Please contact a Tsubaki representative for more information. Available sizes: RS08B-PC, RS10B-PC, RS12B-PC

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

Offset links are not available for Poly Steel Attachment Chain. Chains should be designed with an even number of links.

- RS Roller Chain sprockets can be used.
- RS40-PC to RS60-PC use the same connecting links as Stainless Steel Drive Chain (SS specification). RS25-PC and RS35-PC use special connecting links.
- When replacing Stainless Steel RS Attachment Chain with Poly Steel Attachment Chain, please check the chain tension. Poly Steel Attachment Chain tension should be less than the maximum allowable tension.
- Guide rails should support the bottom side of the inner links.
- Attachments other than EP attachments cannot be installed on inner links and will be attached to even-numbered links.
- The ends of the pins on the base chain are not riveted.

#### **Chain Numbering**



Standard

Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

Lube Free

Special

### **Stainless Steel Hollow Pin Chain**

In Hollow Pin Chain, the pin is made with a hole, enabling various attachments to be installed simply and easily. This type of chain is used for general-purpose conveyance.

Features: 1. Regardless of whether the chain is straight or wrapped around a sprocket, the center distance between attachments is always the same. 2. The load from the attachments is distributed equally to both sides of the link plates. This provides advantages in terms of strength,

- and the chain has less of a tendency to wind while running.
- 3. It is easy to replace attachments, do maintenance, or adjust attachment spacing even while the chain is installed on equipment.

#### Stainless Steel Hollow Pin Double Pitch Chain

#### Base Chain



#### Base Chain Dimensions

Tsubaki	Type	Pitch	Bush	Roller	Width Between	Plo	ate		Pi	'n		Offset Pin	Appro: kg	k. Mass /m	No. of
Chain No.	Roller	Р	Dia. B	Dia. R	Plates W	Thickness T	Width <i>H</i>	Outer Dia. E	Inner Dia. F (Min.)	Lı	L2	Length L	Bush Type	R Roller	Links per Unit
RF2040-HP-SS		25.40	7.92	15.88	7.95	1.5	12.0	5.68	4.00	8.00	9.50	19.1	0.46	0.82	120
RF2050-HP-SS	S	31.75	10.16	19.05	9.53	2.0	15.0	7.22	5.12	10.05	11.65	23.4	0.75	1.21	96
RF2060-HP-SS	R	38.10	11.91	22.23	12.70	2.4	17.2	8.38	5.99	12.55	14.25	28.7	1.38	2.06	80
RF2080-HP-SS		50.80	15.88	28.58	15.88	3.2	23.0	11.375	8.02	16.25	17.80	35.7	1.80	2.81	60

Note: The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

Chain strength: Please see pages 91 and 92.

#### **Stainless Steel Hollow Pin RS Chain**

#### Base Chain



#### Base Chain Dimensions

Tsubaki	Pitch	Bush	Width	Plo	ate		Pi	n		Offset Pin	Approx.	No. of
Chain No.	P	Dia. B	Inner Link Plates W	Thickness T	Width H	Outer Dia. <i>E</i>	Inner Dia. F (Min.)	Lı	L2	Length <i>L</i>	Mass kg/m	Links per Unit
RS40-HP-SS	12.70	7.92	7.95	1.5	12.0	5.68	4.00	8.00	9.50	19.1	0.53	240
RS50-HP-SS	15.875	10.16	9.53	2.0	15.0	7.22	5.12	10.05	11.65	23.4	0.86	192
RS60-HP-SS	19.05	11.91	12.70	2.4	18.1	8.38	5.99	12.55	14.25	28.7	1.27	160
RS80-HP-SS	25.40	15.88	15.88	3.2	24.1	11.375	8.02	16.25	17.80	35.7	2.15	120

Chain strength: Please see pages 91 and 92.

Note: SS and NS chains are not pre-lubricated before shipping. Always lubricate the chain before use, except when using underwater or when the chain will contact water. Using a chain without lubrication may result in premature articulation problems. Maximum allowable loads are based on lubricated (including water lubricated) conditions.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Chain Numbering

#### RF20<u>405</u>-HP-<u>SS</u>

Chain size \_\_\_\_\_\_ Roller type (S: S roller, R: R roller) — Chain type: Hollow pin \_\_\_\_\_

```
Chain specification
Stainless steel: SS
```

#### <u>RS40-HP-SS</u>

Chain size ——\_\_\_\_ Chain type: Hollow pin

Chain specification Stainless steel: SS

**Engineering Manual** 



Standard Small Size Conveyor Chain

Special

Small Size Conveyor Chain

High Precision Conveyor Chain

Plus a

## Plus $\alpha$ Attachment Chain

	Specification	Description	Page	
	Special Hole Diameter Attachment (Attachment Types: A, K)	Attachment with special hole diameters.	57, 58	
	Press Nut Attachment (Attachment Types: A-NM, K-NM)	Nuts are added on the attachment to enable slats to be installed simply and easily.	59, 60	Standar Small Siz
	Special Extended Pin (Attachment Type: EPL)	Chain with extended pins projecting to a customer-specified length can be manufactured with a short leadtime for perfect compatibility with your attachments or parts.	61, 62	d e Conveyor Cha
	Ground Attachment (Attachment Type: PG)	The upper surface of the link plate is ground to provide a smooth conveying surface and to protect the conveyed material from damage.	63	in Sp
	Large Size Chain with Attachment	Attachment for chain sizes RS180 and larger.	64	ecial all Siz
	Double Pitch Deep Link (Attachment Type: DL)	Height of the link plates (dimension H1) is higher than the top of the roller on double pitch base chain. Allows materials to be placed directly on the chain even with R rollers.	65	e Conveyor Cha
nts	Bent-Over Attachment (Attachment Type: UM)	The top edges of the bent-over attachment are chamfered to protect conveyed materials from scratches. Allows conveyed materials to be placed directly on the chain, or be conveyed by sandwiching between chains.	65	in Small S
hme	Guide Roller (Attachment Type: GR)	Guide rollers prevent meandering and can be used as running rollers. (Not for curved chain.)	66	F <b>ree</b> Size Convey
Attac	Extended Pin with Thread (Attachment Type: EN)	Extended pins (high-strength/hardened steel) are threaded to enable tools, jigs, etc. to be attached.	67	or Chain
lus α /	Extended Pin with Spring Clip (Attachment Type: EC)	The spring clip allows the attachment of tools, etc. A tool attachment for two pins can only be placed on the pin link.	68	<b>Corrosion</b> Small Size C
₽.	Stay Pin (Attachment Type: ST)	Pins are made longer to form parallel strands. Conveyed materials can be placed directly on the pins. Installing wire mesh is one example of use.	69, 70	Resistant onveyor Chain
	Triangle Attachment (Attachment Type: RE)	For conveying various types of bar-like objects.	71	Plus Small
	Sticker Attachment (Attachment Type: FS)	The attachment is topped with a sharp barb-like spike to grip flat objects such as film.	71	<b>a</b> Size Conve
	Gripper Attachment (Attachment Types: KU, KUM)	Gripper attachment for conveying film, etc., held by a friction clip.	72	syor Chain
	Magnetic Attachment (Attachment Type: MG)	A magnet mounted on the attachment holds conveyed objects. Can be used for conveyance on a slope.	73	Hig Cor
	Rubber Attachment (Attachment Type: RSG)	A layer of rubber is bonded to the attachment. The elasticity of the rubber allows objects to be conveyed between chains.	73	h Precisi Iveyor Cl
	Crescent Top Plate (Attachment Type: CL)	For circulating-loop conveyors operating on a horizontal plane.	74	ion 1ain
	Slat (Attachment Type: SLT [Riveted])	Slats are installed on tough RF Double Pitch Chains. Ideal for conveying relatively heavy material.	74	Engin
	Slat (Attachment Type: SLW [Welded])	Slats are installed on RF Double Pitch Chains. Ideal for conveying relatively heavy material.	75	eering M
	RS Slat (Attachment Type: SLT [Riveted])	This single pitch chain with a short internally set slat is suitable for smooth conveyance of small objects.	75	lanual

### Plus $\alpha$ Attachments



Standard Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

Corrosion Resistant Small Size Conveyor Chain

Plus a

Small Size Conveyor Chain

High Precision Conveyor Chain

**Engineering Manual** 

Lube Free

Special

Attachments with special hole diameters.

Special Hole Diameter Attachment (Attachment Types: A, K)

Standard Chain
 Lambda Chain (lube free)



- Connecting links: RF2040 to RF2060 use spring clips. RF2080 and larger use cotter pins. Base chain pins are riveted.
  Attachments shown are S roller type. However, the dimensions for attachments are the same when R rollers are used. Also, the drawings show attachments added on every link.
- Pins other than those on connecting links are riveted regardless of whether attachments are present.
- X and X2 are the width of the attachments installed on the outer (pin) link and inner (roller) link, respectively.
- The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Attachment Dimensions

Tsubaki C	hain No.	D'I I	Width	Roller	Dia. R		Pin		Plo	ate				Attac	nment		
Standard	Lambda	Pitch P	Between Inner Link Plates W	S Roller	R Roller	Dia. D	Lı	L2	Width <i>H</i>	Thickness T	С	К	N	S	x	<b>X</b> 2	0
RF2040	RF2040-LMC	25.40	7.95	7.92	15.88	3.97	8.25	9.95	12.0	1.5	12.7	9.5	19.1	9.1	19.3	17.6	4.5.5.5
RF2050	RF2050-LMC	31.75	9.53	10.16	19.05	5.09	10.30	12.0	15.0	2.0	15.9	11.9	23.8	11.1	24.2	22.0	4.5.5.5
RF2060	RF2060-LMC	38.10	12.70	11.91	22.23	5.96	14.55	16.55	17.2	3.2	21.45	14.3	28.6	14.7	31.5	28.2	5.5.6.5
RF2080	RF2080-LMC	50.80	15.88	15.88	28.58	7.94	18.30	20.90	23.0	4.0	27.8	19.1	38.1	19.1	40.7	36.6	9.0
RF2100	RF2100-LMC	63.50	19.05	19.05	39.69	9.54	21.80	24.50	28.6	4.8	33.35	23.8	47.6	23.4	49.9	44.9	11.0

#### Chain Numbering







Connecting Link (CL)

RF2040-LMC-K1-5.5-CL

Same as at left

Connecting link (CL)

Attachment type (enter only when attachment is installed)

### **Plus α Attachments**

#### Speedy delivery available (2)

Special Hole Diameter Attachment (Attachment Types: A, K)





Standard

Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

Corrosion Resistant Small Size Conveyor Chain

Lube Free

Special



• Connecting links: RS35 to RS60 use spring clips. RS80 and larger use cotter pins. Base chain pins are riveted.

- X and X2 are the width of the attachments installed on the outer (pin) link and inner (roller) link, respectively.
- Drawings show attachments added on every link.
- Pins other than those on connecting links are riveted regardless of whether attachments are present.
- The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Attachment Dimensions

Tsubaki C	hain No.	D'i I	Width	Roller		Pin		Plc	ate			A	ttachme	nt	
Standard	Lambda	Pitch P	Between Inner Link Plates W	(Bush) Dia. <i>R</i>	Dia. D	Lı	L2	Width H	Thickness T	С	N	S	x	<b>X</b> 2	0
RS35	RS35-LMC	9.525	4.78	(5.08)	3.59 <3.00>	5.85	6.85	9.0	1.25	9.5	7.9	6.35	14.3	14.3	2.6
RS40	RS40-LMC	12.70	7.95	7.92	3.97	8.25	9.95	12.0	1.5	12.7	9.5	8.0	17.8	17.8	4.5.5.5
R\$50	RS50-LMC	15.875	9.53	10.16	5.09	10.3	12.0	15.0	2.0	15.9	12.7	10.3	23.4	23.4	4.5.5.5
RS60	RS60-LMC	19.05	12.70	11.91	5.96	12.85	14.75	18.1	2.4	19.05	15.9	11.9	28.2	28.2	5.5.6.5
RS80	RS80-LMC	25.40	15.88	15.88	7.94	16.25	19.25	24.1	3.2	25.4	19.1	15.9	36.6	36.6	9.0
RS100	RS100-LMC	31.75	19.05	19.05	9.54	19.75	22.85	30.1	4.0	31.75	25.4	19.8	44.9	44.9	11.0

Note: The figure inside < > is for Lambda Chain.

#### **Chain Numbering**





Chain size

Special hole diameter (Dimension O in mm) Attachment spacing and type Chain type

LMC: Lambda Attachment Chain No symbol: Standard



(enter only when attachment is installed)

ius a

all Size

#### **Plus α Attachments** Speedy delivery available (3)

Nuts are added on the attachment to enable slats to be installed simply and easily. Both the attachment and nut are heat-treated for ample strength.



- Connecting links: RF2040 to RF2060 use spring clips. Base chain pins are riveted.
- Attachments shown are S roller type. However, the dimensions for attachments are the same when R rollers are used. Also, the drawings show attachments added on every link.
- Pins other than those on connecting links are riveted regardless of whether attachments are present.
- X and X2 are the width of the attachments installed on the outer (pin) link and inner (roller) link, respectively.
- The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Attachment Dimensions

Tsubaki (	Chain No.	D'1	Width	Roller	Dia. R		Pin		Plc	ite				A	ttachm	ent			
Standard	Lambda	Pitch	Between Inner Link Plates W	S Roller	R Roller	Dia. D	Lı	L2	Width H	Thickness T	С	К	N	В	S	X	<b>X</b> 2	Τı	0
RF2040-NM3	RF2040-LMC-NM3	25.40	7.95	7.92	15.88	3.97	8.25	9.95	12.0	1.5	12.7	9.5	19.1	5.5	9.1	19.3	17.6	3.6	M3
RF2040-NM4	RF2040-LMC-NM4	25.40	7.95	7.92	15.88	3.97	8.25	9.95	12.0	1.5	12.7	9.5	19.1	7.0	9.1	19.3	17.6	3.8	M4
RF2050-NM4	RF2050-LMC-NM4	31.75	9.53	10.16	19.05	5.09	10.3	12.0	15.0	2.0	15.9	11.9	23.8	7.0	11.1	24.2	22.0	4.3	M4
RF2050-NM5	RF2050-LMC-NM5	31.75	9.53	10.16	19.05	5.09	10.3	12.0	15.0	2.0	15.9	11.9	23.8	8.0	11.1	24.2	22.0	5.1	M5
RF2060-NM5	RF2060-LMC-NM5	38.10	12.70	11.91	22.23	5.96	14.55	16.55	17.2	3.2	21.45	14.3	28.6	8.0	14.7	31.5	28.0	6.3	M5
RF2060-NM6	RF2060-LMC-NM6	38.10	12.70	11.91	22.23	5.96	14.55	16.55	17.2	3.2	21.45	14.3	28.6	10.0	14.7	31.5	28.0	7.3	M6

Dimension B is the width when nuts are installed on upper and lower surfaces.

#### **Chain Numbering**





Connecting Link (CL)

#### RF2040-LMC-K1-NM4-CL Connecting link (CL) Same as at left Attachment type

(enter only when attachment is installed)

High Precision Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain **Corrosion Resistant** 

Plus a

**Small Size Conveyor Chain** 

Lube Free

Standard

Special

Small Size Conveyor Chain

Small Size Conveyor Chain **Corrosion Resistant** 

ius a

Conveyor Chain

Lube Free

### Plus $\alpha$ Attachments

#### Speedy delivery available (4)



- Drawings show attachments added on every link.
- Pins other than those on connecting links are riveted regardless of whether attachments are present.
- X and X2 are the width of the attachments installed on the outer (pin) link and inner (roller) link, respectively.
- The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Attachment Dimensions

Tsubaki (	Chain No.	D'I I	Width	Roller		Pin			Plate					Attac	nment			
Standard	Lambda	Pitch P	Between Inner Link Plates W	Dia. <i>R</i>	Dia. D	Lı	L2	Width h	Wid <del>t</del> h <i>H</i>	Thickness T	С	N	В	S	x	<b>X</b> 2	Τı	0
RS40-NM3	RS40-LMC-NM3	12.70	7.95	7.92	3.97	8.25	9.95	10.4	12.0	1.5	12.7	9.5	5.5	8.0	17.8	17.8	3.6	M3
RS40-NM4	RS40-LMC-NM4	12.70	7.95	7.92	3.97	8.25	9.95	10.4	12.0	1.5	12.7	9.5	7.0	8.0	17.8	17.8	3.8	M4
RS50-NM4	RS50-LMC-NM4	15.875	9.53	10.16	5.09	10.3	12.0	13.0	15.0	2.0	15.9	12.7	7.0	10.3	23.4	23.4	4.3	M4
R\$50-NM5	RS50-LMC-NM5	15.875	9.53	10.16	5.09	10.3	12.0	13.0	15.0	2.0	15.9	12.7	8.0	10.3	23.4	23.4	5.1	M5
R\$60-NM5	RS60-LMC-NM5	19.05	12.70	11.91	5.96	12.85	14.75	15.6	18.1	2.4	19.05	15.9	8.0	11.9	28.2	28.2	5.5	M5
RS60-NM6	RS60-LMC-NM6	19.05	12.70	11.91	5.96	12.85	14.75	15.6	18.1	2.4	19.05	15.9	10.0	11.9	28.2	28.2	6.5	M6

Dimension B is the width when nuts are installed on upper and lower surfaces.

#### Chain Numbering

#### Press Nut (RS)





#### Connecting Link (CL)

#### RS40-LMC-K1-NM4-CL

Same as at left

Connecting link (CL) Attachment type

(enter only when attachment is installed)

### Plus $\alpha$ Attachments



Standard Small Size Conveyor Chain

Small Size Conveyor Chain

Special

Chain with extended pins projecting to a customer-specified length can be manufactured with a short leadtime for perfect compatibility with your attachments or parts.

Speedy delivery available (5)

#### Special Extended Pin (Attachment Type: EPL)





- Extended pins on standard Lambda Chain are nickel-plated. Consequently, pin end diameter will be slightly larger.
- Connecting links: RF2040 to RF2060 use spring clips. RF2080 and larger use cotter pins. Base chain pins are riveted.
- Attachments shown are S roller type. However, the dimensions for attachments are the same when R rollers are used. Also, the drawings show attachments added on every link.
- Pins other than those on connecting links are riveted regardless of whether attachments are present.
- The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Attachment Dimensions

			Mr. Id	D	<u> </u>			D			
Tsubaki C	Chain No.	Pitch	Width	Koller	Dia. R	Pi	n	Ple	ate	P	in
Standard	Lambda	P	Inner Link Plates W	S Roller	R Roller	Dia. D	L2	Width <i>H</i>	Thickness T	Lз	L4
RF2040-EPL15.4	RF2040-LMC-EPL15.4	25.40	7.95	7.92	15.88	3.97	9.95	12.0	1.5	15.4	22.65
RF2040-EPL20.3	RF2040-LMC-EPL20.3	25.40	7.95	7.92	15.88	3.97	9.95	12.0	1.5	20.3	27.55
RF2040-EPL29.8	RF2040-LMC-EPL29.8	25.40	7.95	7.92	15.88	3.97	9.95	12.0	1.5	29.8	37.05
RF2050-EPL19.3	RF2050-LMC-EPL19.3	31.75	9.53	10.16	19.05	5.09	12.0	15.0	2.0	19.3	28.4
RF2050-EPL23.8	RF2050-LMC-EPL23.8	31.75	9.53	10.16	19.05	5.09	12.0	15.0	2.0	23.8	32.9
RF2050-EPL31.2	RF2050-LMC-EPL31.2	31.75	9.53	10.16	19.05	5.09	12.0	15.0	2.0	31.2	40.3
RF2060-EPL16.5	RF2060-LMC-EPL16.5	38.10	12.70	11.91	22.23	5.96	16.55	17.2	3.2	16.5	29.65
RF2060-EPL20.8	RF2060-LMC-EPL20.8	38.10	12.70	11.91	22.23	5.96	16.55	17.2	3.2	20.8	33.95
RF2060-EPL28.2	RF2060-LMC-EPL28.2	38.10	12.70	11.91	22.23	5.96	16.55	17.2	3.2	28.2	41.35
RF2080-EPL27.1	RF2080-LMC-EPL27.1	50.80	15.88	15.88	28.58	7.94	20.90	23.0	4.0	27.1	43.5
RF2080-EPL35.4	RF2080-LMC-EPL35.4	50.80	15.88	15.88	28.58	7.94	20.90	23.0	4.0	35.4	51.8
RF2080-EPL56.5	RF2080-LMC-EPL56.5	50.80	15.88	15.88	28.58	7.94	20.90	23.0	4.0	56.5	72.9
RF2100-EPL34.0	RF2100-LMC-EPL34.0	63.50	19.05	19.05	39.69	9.54	24.50	28.6	4.8	34.0	53.6
RF2100-EPL43.7	RF2100-LMC-EPL43.7	63.50	19.05	19.05	39.69	9.54	24.50	28.6	4.8	43.7	63.3
RF2100-EPL69.9	RF2100-LMC-EPL69.9	63.50	19.05	19.05	39.69	9.54	24.50	28.6	4.8	69.9	89.5

#### **Chain Numbering**



#### RF2040S-LMC-2LEPL15.4





LMC: Lambda Attachment Chain No symbol: Standard

#### Connecting Link (CL)

RF2040-LMC-E	1-L15.4-CL
	Same as at left
Same as at left	Connecting link (CL)
E1	: One extended pin
E2	: Two extended pins

**Engineering Manual** 

RS80-FPI30.8

RS80-FPI39 1

RS80-EPL42.3

RS100-EPL37.7

RS100-FPI45 0

RS100-EPL50.7

RS80-IMC-FPI30.8

RS80-IMC-FPI39 1

RS80-LMC-EPL42.3

RS100-LMC-EPL37.7

RS100-LMC-EPL45.0

RS100-LMC-EPL50.7

25 40

25 40

25.40

31.75

31.75

31.75

15.88

15.88

15.88

19.05

19.05

19.05

15.88

15.88

15.88

19.05

19.05

19.05

7.94

7.94

7.94

9.54

9.54

9.54

16.25

16.25

16.25

19.75

19.75

19.75

19.25

19.25

19.25

22.85

22.85

22.85

20.8

20.8

20.8

26.0

26.0

26.0

24.1

24.1

24.1

30.1

30.1

30.1

3.2

3.2

3.2

4.0

4.0

4.0

30.8

39.1

42.3

37.7

45.0

50.7

45.55

53.9

57.1

55.65

62.95

68.65

### Plus $\alpha$ Attachments

#### Speedy delivery available (6)





### **Plus α Attachments**

#### Selecting from among these designs will improve overall design efficiency for your application.

The upper surface of the link plate is ground to provide a smooth conveying surface and to protect the conveyed material from damage.



Small Size Conveyor Chain

Small Size Conveyor Chain

#### Ground Attachment (Attachment Type: PG)



#### **Attachment Dimensions**

Tsubaki	Pitch	Width Between	Roller	Dia. R		Pin		Plo	ate			A	ttachme	ent			Connecting
Chain No.	Р	Inner Link Plates W	S Roller	R Roller	Dia. D	Lı	L2	Width H	Thickness T	С	К	N	0	S	X	<b>X</b> 2	Link Type
RF2040-PG	25.40	7.95	7.90	15.80	3.97	8.25	9.95	12.0	1.5	12.7	9.5	19.1	3.6	8.9	19.3	17.6	Spring clip
RF2050-PG	31.75	9.53	10.12	18.97	5.09	10.30	12.0	15.0	2.0	15.9	11.9	23.8	5.2	10.9	24.2	22.0	Spring clip
RF2060-PG	38.10	12.70	11.88	22.15	5.96	14.55	16.55	17.2	3.2	21.45	14.3	28.6	5.2	14.4	31.5	28.2	Spring clip
RF2080-PG	50.80	15.88	15.71	28.50	7.94	18.30	20.9	23.0	4.0	27.8	19.1	38.1	6.8	18.8	40.7	36.6	Cotter pin
		1			1 11	c II											

Note: 1. Chains without attachments are available only with S rollers.

2. On chains without attachments, the outer surface of rollers is not ground. In this case, the roller diameter will differ from the dimensions given above. Roller diameter (R) for RF2040S is 7.92, RF2050S is 10.16, RF2060S is 11.91, and RF2080S is 15.88.

The top surface of link plates is ground on chains without attachments. In this case, the plate width H will differ from the dimensions given above. Width (H) for RF2040S is 11.9, RF2050S is 14.9, RF2060S is 17.1, and RF2080S is 22.7. 3.

4. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Ground Attachment (Attachment Type: PG)



• X and X2 are the width of the attachments installed on the outer (pin) link and inner (roller) link, respectively.

• Drawings show attachments added on every link.

• Pins other than those on connecting links are riveted regardless of whether attachments are present.

#### Attachment Dimensions

Tsubaki	Pitch	Width Between	Roller		Pin			Plate			A	Attachmer	nt		Connecting
Chain No.	Р	Inner Link Plates W	Dia. R	Dia. D	Lı	L2	Width h	Width <i>H</i>	Thickness T	С	N	0	S	X	Link Type
RS40-PG	12.70	7.95	7.90	3.97	8.25	9.95	10.4	12.0	1.5	12.7	9.5	3.6	7.8	17.8	Spring clip
RS50-PG	15.875	9.53	10.12	5.09	10.3	12.0	13.0	15.0	2.0	15.9	12.7	5.2	10.1	23.4	Spring clip
RS60-PG	19.05	12.70	11.88	5.96	12.85	14.75	15.6	18.1	2.4	19.05	15.9	5.2	11.6	28.2	Spring clip
RS80-PG	25.40	15.88	15.71	7.94	16.25	19.25	20.8	24.1	3.2	25.4	19.1	6.8	15.6	36.6	Cotter pin
RS100-PG	31.75	19.05	18.83	9.54	19.75	22.85	26.0	30.1	4.0	31.75	25.4	8.7	19.4	44.9	Cotter pin
RS120-PG	38.10	25.40	22.01	11.11	24.9	28.9	31.2	36.2	4.8	38.1	28.6	10.3	22.6	55.8	Cotter pin
RS140-PG	44.45	25.40	25.18	12.71	26.9	31.7	36.4	42.2	5.6	44.5	34.9	11.9	28.2	63.1	Cotter pin
RS160-PG	50.80	31.75	28.36	14.29	31.85	36.85	41.6	48.2	6.4	50.8	38.1	14.3	31.4	73.7	Cotter pin

Note: X and X2 are the width of the attachments installed on the outer (pin) link and inner (roller) link, respectively. (For RS40 to RS100, X = X2; for RS120, X2 = 51.2; for RS140, X2 = 58.0; and for RS160, X2 = 66.0) The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

Lube Free

**Conveyor Chain High Precision** 

### Plus $\alpha$ Attachments

#### Selecting from among these designs will improve overall design efficiency for your application.



#### Large Size Chain with Attachment

Attachment for chain sizes RS180 and larger.



#### Attachment Dimensions

Tsubaki	Pitch	Roller	Width Between		Pin			Plate		20	<i>C</i> 1	N	0	c	22	Ve	NL	Ku
Chain No.	Р	Dia. R	Inner Link Plates W	Dia. D	Lı	L2	h	Н	Т	20	CI	IN	0	3	27	AS	INW	κw
RS180	57.15	35.71	35.72	17.46	35.65	42.45	46.8	54.2	7.15	114.3	-	42.0	15.0	35.8	160.3	_	-	-
RS200	63.50	39.68	38.10	19.85	39.0	44.8	52.0	60.3	8.0	127.0	63.5	48.0	17.5	42.9	167.0	85.5	115.4	63.5
RS240	76.20	47.63	47.63	23.81	47.9	55.5	62.4	72.4	9.5	152.4	76.2	57.2	21.0	47.7	195.8	106.7	138.5	57.0
RF320-T	101.6	63.5	63.65	31.75	63.8	77.6	—	92	12.7	203.2	-	76.2	25.4	85.5	281.3	—	-	—
RF400-T	127.0	79.38	79.3	39.68	79.65	92.65	_	120	16.0	254.0	120	101.6	38.0	79.4	356.0	180	245	127



**Engineering Manual** 

### **Plus α Attachments**

Selecting from among these designs will improve overall design efficiency for your application.

#### **Double Pitch Deep Link** (Attachment Type: DL)

Height of the link plates (dimension H<sub>1</sub>) is higher than the top of the roller on double pitch base chain. Allows materials to be placed directly on the chain, even with R rollers.



#### Attachment Dimensions

Tsubaki	Pitch	Width Between	Roller	Chain		Pin		Plo	ate	Connecting
Chain No.	Р	Inner Link Plates W	Dia. R	Height	Dia. D	Lı	L2	Width H1	Thickness T	Link Type
RF2040R-DL	25.40	7.95	15.88	(17.9)	3.97	8.25	9.95	10.0	1.5	Spring clip
RF2050R-DL	31.75	9.53	19.05	(21.5)	5.09	10.3	12.0	12.0	2.0	Spring clip
RF2060R-DL	38.10	12.70	22.23	(25.1)	5.96	14.55	16.55	14.0	3.2	Spring clip
RF2080R-DL	50.80	15.88	28.58	(32.2)	7.94	18.3	20.9	18.0	4.0	Cotter pin

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.



#### Bent-Over Attachment (Attachment Type: UM)

The top edges of the bent-over attachment are chamfered to protect conveyed materials from scratches. Allows conveyed materials to be placed directly on the chain, or be conveyed by sandwiching between chains.



#### Attachment Dimensions

Tsubaki	Pitch	Width Between	Roller		Pin					Plate			
Chain No.	Р	Inner Link Plates W	Dia. R	Dia. D	Lı	L2	Hı	H2	N	X	Т	t	То
RS40-UM	12.70	7.95	7.92	3.97	8.25	9.95	7.0	5.7	24.4	11.3	1.5	1.5	1.25
RS50-UM	15.875	9.53	10.16	5.09	10.3	12.0	8.5	7.1	30.5	13.1	2.0	2.0	1.5

• When used as a replacement chain, carefully check dimension H2 to avoid possible interference.

• Max. allowable load is not the same as RS Áttachment Chain.

• The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

Small Size Conveyor Chain

Lube Free

**Engineering Manual** 

## Plus $\alpha$ Attachments

## Selecting from among these designs will improve overall design efficiency for your application.

Guide rollers prevent meandering and can be used as running rollers. (Not for curved chain.)



#### Guide Roller (Attachment Type: GR)



• Connecting links: RF2040 to RF2060 use spring clips. RF2080 and RF2100 use cotter pins.

• Attachments shown are R roller type. However, the dimensions for attachments are the same when S rollers are used.

#### Attachment Dimensions

Tsubaki	Pitch	Width Between	Roller	Dia. R		Pin		Ple	ate		А	ttachme	nt		Guide	Roller
Chain No.	Р	Inner Link Plates W	S Roller	R Roller	Dia. D	Lı	L2	Width <i>H</i>	Thickness T	С	X	N	Y	d	DF	l
RF2040-GR	25.40	7.95	7.92	15.88	3.97	8.25	9.95	12.0	1.5	17.45	22.2	9.5	13.2	3.97	15.88	7.8
RF2050-GR	31.75	9.53	10.16	19.05	5.09	10.3	12.00	15.0	2.0	21.15	27.5	12.7	16.2	5.09	19.05	9.4
RF2060-GR	38.10	12.70	11.91	22.23	5.96	14.55	16.55	17.2	3.2	27.0	34.95	15.9	22.2	5.96	22.23	12.6
RF2080-GR	50.80	15.88	15.88	28.58	7.94	18.3	20.90	23.0	4.0	33.35	42.9	19.1	27.4	7.94	28.58	15.8
RF2100-GR	63.50	19.05	19.05	39.69	9.54	21.8	24.50	28.6	4.8	42.85	55.55	25.4	32.7	9.54	39.69	19.0

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.





• Connecting links: RS40 to RS60 use spring clips. RS80 and RS100 use cotter pins.

• The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Attachment Dimensions

Tsubaki	Pitch	Width Between	Roller		Pin		Plo	ate		A	ttachmer	nt		Guide	Roller
Chain No.	P	Inner Link Plates W	Dia. R	Dia. D	Lı	L2	Width <i>H</i>	Thickness T	С	X	N	Y	d	DF	l
RS40-GR	12.70	7.95	7.92	3.97	8.25	9.95	12.0	1.5	17.45	22.2	9.5	16.5	3.97	15.88	11.05
RS50-GR	15.875	9.53	10.16	5.09	10.3	12.0	15.0	2.0	21.15	27.5	12.7	20.6	5.09	19.05	13.75
RS60-GR	19.05	12.70	11.91	5.96	12.85	14.75	18.1	2.4	25.4	33.35	15.9	25.7	5.96	22.23	17.65
RS80-GR	25.40	15.88	15.88	7.94	16.25	19.25	24.1	3.2	31.75	41.3	19.1	32.5	7.94	28.58	22.5
RS100-GR	31.75	19.05	19.05	9.54	19.75	22.85	30.1	4.0	41.3	54.0	25.4	39.5	9.54	39.69	27.4

Double Pitch

Standard

Small Size Conveyor Chain

 Special
 Lube Free

 Small Size Conveyor Chain
 Small Size Conveyor Chain

### **Plus α Attachments**

Selecting from among these designs will improve overall design efficiency for your application.

Extended pins (high-strength/hardened steel) are threaded to enable tools, jigs, etc. to be attached. Mounting a tool or jig that straddles two pins is constrained by P', the distance between pin centerlines. Please contact a Tsubaki representative about dimension P'.

#### Extended Pin with Thread (Attachment Type: EN)



Attachments shown are S roller type. However, the dimensions for attachments are the same when R rollers are used.

• The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Attachment Dimensions

Tsuk	paki	Pitch	Width Between	Roller	Dia. R			Pin			Pla	te	Connecting
Chai	n No.	Р	Inner Link Plates W	S Roller	R Roller	Dia. D	D۱	d	<b>T</b> 1	L2	Width H	Thickness T	Link Type
RF2040S-EN	RF2040R-EN	25.40	7.95	7.92	15.88	3.97	5.00	M4	1.5	9.95	12.0	1.5	Spring clip
RF2050S-EN	RF2050R-EN	31.75	9.53	10.16	19.05	5.09	6.35	M5	2.0	12.0	15.0	2.0	Spring clip
RF2060S-EN	RF2060R-EN	38.10	12.70	11.91	22.23	5.96	8.35	M6	2.4	16.55	17.2	3.2	Spring clip
RF2080S-EN	RF2080R-EN	50.80	15.88	15.88	28.58	7.94	9.88	M8	3.2	20.90	23.0	4.0	Cotter pin
RF2100S-EN	RF2100R-EN	63.50	19.05	19.05	39.69	9.54	11.46	M10	4.0	24.50	28.6	4.8	Cotter pin





• The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### L3 and L5, or L4 and L5.

#### **Attachment Dimensions**

Tsubaki	Pitch	Width Between	Roller			Pin				Plate		Connecting
Chain No.	Р	Inner Link Plates W	Dia. R	Dia. D	Dı	d	T۱	L 2	Width h	Wid <del>t</del> h H	Thickness <i>T</i>	Link Type
RS40-EN	12.70	7.95	7.92	3.97	5.00	M4	1.5	9.95	10.4	12.0	1.5	Spring clip
RS50-EN	15.875	9.53	10.16	5.09	6.35	M5	2.0	12.0	13.0	15.0	2.0	Spring clip
RS60-EN	19.05	12.70	11.91	5.96	8.35	M6	2.4	14.75	15.6	18.1	2.4	Spring clip
RS80-EN	25.40	15.88	15.88	7.94	9.88	M8	3.2	19.25	20.8	24.1	3.2	Cotter pin
RS100-EN	31.75	19.05	19.05	9.54	11.46	M10	4.0	22.85	26.0	30.1	4.0	Cotter pin
RS120-EN	38.10	25.40	22.23	11.11	13.07	M12	4.8	28.90	31.2	36.2	4.8	Cotter pin

Small Size Conveyor Chain Small Size Conveyor Chain **Corrosion Resistant** 

Lube Free

**Engineering Manual** 

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#### Selecting from among these designs will improve overall design efficiency for your application.

The spring clip allows the attachment of tools, etc.

**Plus α Attachments** 

Mounting a tool or jig that straddles two pins is constrained by P', the distance between pin centerlines. Please contact a Tsubaki representative about dimension P'.



• Attachments shown are S roller type. However, the dimensions for attachments are the same when R rollers are used.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Attachment Dimensions

Tsuk	paki	Pitch	Width Between	Roller [	Dia. R		Р	in	_	Plo	ate	Connecting
Chain No.		Р	Inner Link Plates W	S Roller	R Roller	Dia. D	Lı	L2	Lo	Width H	Thickness T	Link Type
RF2040S-EC	RF2040R-EC	25.40	7.95	7.92	15.88	3.97	8.25	9.95	(2.8)	12.0	1.5	Spring clip
RF2050S-EC	RF2050R-EC	31.75	9.53	10.16	19.05	5.09	10.3	12.0	(3.0)	15.0	2.0	Spring clip
RF2060S-EC	RF2060R-EC	38.10	12.70	11.91	22.23	5.96	14.55	16.55	(3.4)	17.2	3.2	Spring clip





#### Attachment Dimensions

Tsubaki	Pitch	Width Between	Roller		Pi	n			Plate		Connecting
Chain No.	Р	Inner Link Plates W	Dia. R	Dia. D	Lı	L 2	Lo	Width h	Width H	Thickness T	Link Type
RS40-EC	12.70	7.95	7.92	3.97	8.25	9.95	(2.8)	10.4	12.0	1.5	Spring clip
RS50-EC	15.875	9.53	10.16	5.09	10.3	12.0	(3.0)	13.0	15.0	2.0	Spring clip
RS60-EC	19.05	12.70	11.91	5.96	12.85	14.75	(3.4)	15.6	18.1	2.4	Spring clip

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

Standard Small Size Conveyor Chain

Small Size Conveyor Chains

The Best Solution 🔘

Ø

Small Size Conveyor Chain

Special

### **Plus α Attachments**

Selecting from among these designs will improve overall design efficiency for your application.

Pins are made longer to form parallel strands. Conveyed materials can be placed directly on the pins. Installing wire mesh is one example of use.





#### Attachment Dimensions

Tsuk	paki	Pitch	Width Between	Roller	Dia. R		Pi	in		Plo	ate	Connecting
Chai	n No.	Р	Inner Link Plates W	S Roller	R Roller	Dia. D	Dı	L2	C1, C2	Width H	Thickness T	Link Type
RF2040S-ST	RF2040R-ST	25.40	7.95	7.92	15.88	3.97	5.84(5.2)	9.95		12.0	1.5	Spring clip
RF2050S-ST	RF2050R-ST	31.75	9.53	10.16	19.05	5.09	6.35(6.1)	12.0	Please	15.0	2.0	Spring clip
RF2060S-ST	RF2060R-ST	38.10	12.70	11.91	22.23	5.96	8.35 (8.07)	16.55	specify	17.2	3.2	Spring clip
RF2080S-ST	RF2080R-ST	50.80	15.88	15.88	28.58	7.94	9.88	20.90	dimension	23.0	4.0	Cotter pin
RF2100S-ST	RF2100R-ST	63.50	19.05	19.05	39.69	9.54	11.46	24.50	C1 or C2.	28.6	4.8	Cotter pin
RF2120S-ST	RF2120R-ST	76.20	25.40	22.23	44.45	11.11	13.07	30.55		34.4	5.6	Cotter pin
RF2160S-ST	RF2160R-ST	101.60	31.75	28.58	57.15	14.29	17.90	38.45		48.2	7.15	Cotter pin

Note: Figures inside < > are for stainless steel chain.

High Precision Conveyor Chain

### **Plus α Attachments**

#### Selecting from among these designs will improve overall design efficiency for your application.



Standard

Special

Lube Free



Stay Pin (Attachment Type: ST)

- 4. This chain is provided with connecting links on both ends.
- 5. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Attachment Dimensions

Tsubaki	Pitch	Width Between	Roller		Pi	n			Plate		Connecting
Chain No.	Р	Inner Link Plates W	Dia. R	Dia. D	Dı	L2	C1, C2	Width h	Width H	Thickness T	Link Type
RS35-ST	9.525	4.78	(5.08)	3.59	5.0	6.85		7.8	9.0	1.25	Spring clip
RS40-ST	12.70	7.95	7.92	3.97	5.84(5.2)	9.95		10.4	12.0	1.5	Spring clip
RS50-ST	15.875	9.53	10.16	5.09	6.35(6.1)	12.0	Please	13.0	15.0	2.0	Spring clip
RS60-ST	19.05	12.70	11.91	5.96	8.35 (8.07)	14.75	specify	15.6	18.1	2.4	Spring clip
RS80-ST	25.40	15.88	15.88	7.94	9.88	19.25	dimension	20.8	24.1	3.2	Cotter pin
RS100-ST	31.75	19.05	19.05	9.54	11.46	22.85	C1 or C2.	26.0	30.1	4.0	Cotter pin
RS120-ST	38.10	25.40	22.23	11.11	13.07	28.9		31.2	36.2	4.8	Cotter pin
RS140-ST	44.45	25.40	25.40	12.71	14.67	31.7		36.4	42.2	5.6	Cotter pin
RS160-ST	50.80	31.75	28.58	14.29	17.90	36.85		41.6	48.2	6.4	Cotter pin

Note: Roller diameter R (in parentheses) for RS35-ST is the bush diameter. Figures inside < > are for stainless steel chain.

### **Plus α Attachm<u>ents</u>**

Selecting from among these designs will improve overall design efficiency for your application.

Chain Numbering

RS40-RE



Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

Corrosion Resistant Small Size Conveyor Chain

Plus a

**Small Size Conveyor Chain** 

Lube Free

Special

Standard

#### Triangle Attachment (Attachment Type: RE)

For conveying various types of bar-like objects.



• Other types of attachments are available. Please inquire for details.

- Connecting links: RS40 to RS60 use spring clips. Other sizes use cotter pins.
- The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Attachment Dimensions

Tsubaki	Pitch	Width Between	Roller		Pin			Plate	
Chain No.	Р	Inner Link Plates W	Dia. R	Dia. D	Lı	L2	Width H	Thickness T	Height Xs
RS40-RE	12.70	7.95	7.92	3.97	8.25	9.95	12.0	1.5	17.9
RS50-RE	15.875	9.53	10.16	5.09	10.3	12.0	15.0	2.0	23.5
RS60-RE	19.05	12.70	11.91	5.96	12.85	14.75	18.1	2.4	20.8
RS80-RE	25.40	15.88	15.88	7.94	16.25	19.25	24.1	3.2	29.0
RS100-RE	31.75	19.05	19.05	9.54	19.75	22.85	30.1	4.0	34.6

0

#### Sticker Attachment (Attachment Type: FS)

The attachment is topped with a sharp barb-like spike to grip flat objects such as film. Please specify the shape of the attachment and the form to which the tip is to be machined (shape left as punched, chamfered edges, ground edges, etc.)


# Plus $\alpha$ Attachments

# Selecting from among these designs will improve overall design efficiency for your application.

Gripper attachment for conveying film, etc., held by a friction clip.



# Gripper Attachment (Attachment Types: KU, KUM)





# Attachment Dimensions

Tsubaki	Pitch	Roller	Width Between		Pin		Plo	ate	C	ір
Chain No.	Р	Dia. R	Inner Link Plates W	Dia. D	Lı	L2	Width H	Thickness T	l	N
RS08B-KU	12.70	8.51	7.75	4.45	8.53	10.05	11.8	1.5	20.15	18.0
RS50-KU	15.875	10.16	9.53	5.09	12.0	15.0	15.0	2.0	26.7	18.0

Note: Available in steel, nickel-plated steel, or stainless steel.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.



# Attachment Dimensions

Tsubaki	Pitch	Roller	Width Between	Vidth Pin Plate X N1		N <sub>2</sub>	H <sub>2</sub>	Ha		B	Spring					
Chain No.	Р	Dia. R	Inner Link Plates W	Dia. D	Lı	L2	Width H1	Thickness T	~		142	112	115	Ŭ	D	N
RS08B-KUM	12.70	8.51	7.75	4.45	8.4	10.0	12.0	1.6	20.3	16.8	22.8	10.5	10.8	(4.2)	(3.7)	50
RS10B-KUM	15.875	10.16	9.65	5.08	9.55	11.25	14.7	1.5	23.9	20.0	26.6	11.3	12.4	(6.0)	(5.0)	70

Note: 1. Steel, nickel-plated steel, and stainless steel types are available.

2. Spring load values are for when the spring is closed.

3. Lambda chain is also available. Please contact a Tsubaki representative for more information.

4. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.



# **Plus α Attachments**

# Selecting from among these designs will improve overall design efficiency for your application.



Small Size Conveyor Chain

Small Size Conveyor Chain

Corrosion Resistant Small Size Conveyor Chain

**Small Size Conveyor Chain** 

**Conveyor Chain High Precision** 

Plus a

# Magnetic Attachment (Attachment Type: MG)

A magnet mounted on the attachment holds conveyed objects. Can be used for conveyance on a slope.



# Rubber Attachment (Attachment Type: RSG)

A layer of rubber is bonded to the attachment. The elasticity of the rubber allows objects to be conveyed between chains.



# Attachment Dimensions

<b>T</b> 1 1.	No.	D'i I		Width	Transverse	Р	in	Ple	ate		1	Attachmen	it	
Isubaki Chain No.	of Strands	Pitch P	Roller Dia.ØR	Between Inner Link Plates W	Pitch C	Dia. ØD	Length L	Width H	Thickness T	N	S	А	В	α
RS40	1	12.70	7.92	7.95	—	3.97	20.0	12.0	1.5	24.4	9.0	4.0	13.0	30
RS40-2	2	12.70	7.92	7.95	14.4	3.97	34.6	12.0	1.5	24.4	9.0	4.0	13.0	30
RS40-3	3	12.70	7.92	7.95	14.4	3.97	48.8	12.0	1.5	24.4	9.0	6.0	15.0	0
RS50-2	2	15.875	10.16	9.53	18.1	5.09	42.0	15.0	2.0	28.8	13.0	10.0	23.0	20
RS60	1	19.05	11.91	12.7	_	5.96	29.5	18.1	2.4	34.6	13.0	10.0	23.0	0
RS60-2	2	19.05	11.91	12.7	22.8	5.96	52.4	18.1	2.4	34.6	13.0	10.0	23.0	20

Note: Dimensions L are all calculated as both ends of the pin being CL secured.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

**Engineering Manual** 

# **Plus α Attachments**

# Selecting from among these designs will improve overall design efficiency for your application.



# Crescent Top Plate (Attachment Type: CL)

For circulating-loop conveyors operating on a horizontal plane.



# Attachment Dimensions

Tsubaki	Pitch	Roller	Width Between		Pin		Plo	ate	Тор	Plate
Chain No.	Р	Dia. R	Inner Link Plates W	Dia. D	Lı	L2	Width H	Thickness T	Width XW	Thickness To
RF2050R-CL	31.75	19.05	9.53	5.09	15.05	11.9	15.0	2.0	32	6.0
RF2060R-CL	38.10	22.23	12.70	5.96	19.5	16.95	17.2	3.2	38.1	6.35
RF2080R-CL	50.80	28.58	15.88	7.94	24.2	21.1	23.0	4.0	50	8.0
RF2100R-CL	63.50	39.69	19.05	9.54	25.9	24.3	28.6	4.8	63.5	6.35

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

# Slat (Attachment Type: SLT [Riveted])

Slats are installed on tough RF Double Pitch Chains. Ideal for conveying relatively heavy material.



• Attachments shown are S roller type.

• The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

# Attachment Dimensions

Tubaki (	hain No	Pitch	Width Between	Roller	Dia. R	Pi	in	Plo	ate
ISODUKI C	indin NO.	Р	Inner Link Plates W	S Roller	R Roller	L	Dia. D	Width H	Thickness T
RF2040S-SLT	RF2040R-SLT	25.40	7.95	7.92	15.88	19.3	3.97	12.0	1.5
RF2050S-SLT	RF2050R-SLT	31.75	9.53	10.16	19.05	23.8	5.09	15.0	2.0
RF2060S-SLT	RF2060R-SLT	38.10	12.70	11.91	22.23	33.9	5.96	17.2	3.2
RF2080S-SLT	RF2080R-SLT	50.80	15.88	15.88	28.58	41.8	7.94	23.0	4.0
Tsubaki C	Chain No.	2C	2X	К	N	S	St	SL	Sw
RF2040S-SLT	RF2040R-SLT	25.4	38.6	9.5	19.1	9.1	3.2	50.8	24.0
RF2050S-SLT	RF2050R-SLT	31.8	48.4	11.9	23.8	11.1	4.0	63.5	30.0
RF2060S-SLT	RF2060R-SLT	42.9	63.0	14.3	28.6	14.7	4.8	76.2	36.0
RF2080S-SLT	RF2080R-SLT	55.6	81.4	19.1	38.1	19.1	5.6	101.6	48.0

Standard

Small Size Conveyor Chain



# Plus $\alpha$ Attachments

Selecting from among these designs will improve overall design efficiency for your application.



Standard Small Size Conveyor Chain

Special Small Size Conveyor Chain

# Slat (Attachment Type: SLW [Welded])

Slats are installed on RF Double Pitch Chains. Ideal for conveying relatively heavy material.



• Attachments shown are S roller type.

• The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

# Attachment Dimensions

Tsubaki Chain No.		Width Pitch Between		Roller	Dia. R	Pi	n	Plc	ıte	S <sub>T</sub>	S,	Sw	¥۶
ISODUKI C	alulii 190.	Р	Inner Link Plates W	S Roller	R Roller	L	Dia. D	Width H	Thickness T	01	51	500	7.5
RF2060S-SLW	RF2060R-SLW	38.10	12.70	11.91	22.23	31.5	5.96	17.2	3.2	3.2	76.2	36.0	14.7
RF2080S-SLW	RF2080R-SLW	50.80	15.88	15.88	28.58	39.9	7.94	23.0	4.0	4.5	101.6	48.0	19.1

# RS Slat (Attachment Type: SLT [Riveted])

This single pitch chain with a short internally set slat is suitable for smooth conveyance of small objects.



# Attachment Dimensions

Tsubaki	Pitch	Width Between	Roller	Pi	n	Plo	ate	20	28	N	s	S <sub>T</sub>	S,	Sw
Chain No.	Р	Inner Link Plates W	Dia. R	Dia. D	L	Width H	Thickness T	20	27			51	51	377
RS40-SLT	12.70	7.95	7.92	3.97	19.3	12.0	1.5	25.4	35.6	9.5	8.0	3.2	50.8	12.0
RS50-SLT	15.875	19.53	10.16	5.09	23.8	15.0	2.0	31.8	46.8	12.7	10.3	3.2	63.5	15.0
RS60-SLT	19.05	12.70	11.91	5.96	30.5	18.1	2.4	38.1	56.4	15.9	11.9	4.0	76.2	18.0
RS80-SLT	25.40	15.88	15.88	7.94	38.5	24.1	3.2	50.8	73.2	19.1	15.9	4.8	101.6	24.0

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

**Engineering Manual** 

# **Special Specification Attachments**

Examples of Special Specification Attachments





# **Special Specification Attachments**









# **High Precision Conveyor Chain**

# **Bearing Bush Chain**

Tsubaki Bearing Bush Chain enables chains to be used in conveyance systems considered impossible up to now. Ideal for automated, laborsaving, or high-speed applications for improved productivity.



Plus Q

Small Size Conveyor Chain

Standard

Special

Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain **Corrosion Resistant** 

Lube Free

Small Size Conveyor Chain

(0.02%) following start of operation.

# Wear Elongation Diagram



# Application Examples

Process	Material/Object Conveyed
Assembly	Condensers, cassettes, batteries, stoves, automotive parts, limit switches, watches, solenoid valves
Inspection	ICs, cables, automotive parts
Processing	Medical products, cables, building material boards
Packaging	Brushes, batteries, confections
Filling	Detergent
Printing	Beverage containers, drinking glasses, printed materials

extremely low value.

# Wear Elongation Diagram



# [Test Conditions]

Standard/High-Precision/Stainless Steel Specifications

- Chain size: RF2040R
- Chain tension: Standard/High-Precision = 0.78 kN {80 kgf} Stainless Steel = 0.44 kN {45 kgf}
- Chain speed: 70 m/min (acceleration test)
- Sprocket teeth: 12T × 12T
- Number of links: 44
- Continuous operation
- Selection Example:

# Calculating Number of Cycles from Actual Conditions

Chain: RF2040R

- Number of links: 232 links = 5,892.8 mm
- Feed length per takt time = 101.6 mm/1.1 second
- Sprocket teeth: 12T × 12T
- Assuming 4 flexing cycles per chain revolution: Therefore, the number of cycles in two years (8 hours/day x 300 days/year) under the above conditions yields: 5,892.8 mm ÷ 101.6 mm × 1.1 seconds = 63.8 seconds/revolution 60 seconds  $\div$  63.8 seconds  $\times$  60 minutes  $\times$  8 hours  $\times$  300 days  $\times$  2 years  $\times$  4 cycles  $= 1.08 \times 106$  cvcles

## **Bearing Cage Chain** Uses a needle bearing cage (of engineering plastic) between the pin and bush; RF-NC steel base chain (outer plates are blackened; inner plates are nickel-plated) Small Size Conveyor Chain 1. Virtually no chain wear elongation after initial elongation (0.03%) following start of operation (see graph below). 2. Operating temperature range: -10°C to 60°C Wear Elongation Diagram [Test Conditions] Elongation (%) Chain model: RF2040R-NC Chain tension: 0.44 kN {45 kgf} 0.10 Small Size Conveyor Chain 0.08 Chain speed: 70 m/min (acceleration test) 0.06 Sprocket teeth: 12T × 12T Chain Wear 0.04 Number of links: 44 0.02 Continuous operation 0 Space between pin and bush is filled with grease 10<sup>6</sup> Number of Articulations 10

# **Mini Tact Chain**

Custom designs and manufacturing are available to match your application needs. Please contact a Tsubaki representative for more information.

BCM Uses steel needle bearings; aluminum inner blocks and steel base chain	
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- 1. Virtually no chain wear elongation after initial elongation (0.01%) following start of operation.
- 2. Chain pitch accuracy is  $\pm$  0.05 mm. Plus, small pitch makes this chain ideal for accurate positioning of small work.
- 3. Aluminum inner blocks mean lighter weight, enabling a compact design that includes drive components.
- 4. Operating temperature range: -10°C to 40°C

# **Indexing Table Chain**



Uses needle bearings; outboard rollers and guide rollers use steel bearings; steel base chain (links are blackened)

- 1. Virtually no chain wear elongation after initial elongation (0.01%) following start of operation.
- 2. Chain pitch accuracy is  $\,\pm\,0.05$  mm, enabling high positioning accuracy.
- 3. Operating temperature range: -10°C to 60°C
- Two types of outboard rollers are available: single (S) and double (D).
- Double outboard rollers (D type) draw the guide rail up to the sides of the sprockets, enabling smooth conveyance. This type is for general applications.
- Single outboard rollers (S type) are used as replacements when this type is currently in use.



e e e

Small Size Conveyor Chain

Lube Free

**Plus** *a* Small Size Conveyor Chain

Standard

Special



# **Bearing Bush Chain**

# Base Chain



• Connecting links: RF2050 and RF2080 use cotter pins. Base chain pins are riveted on all sizes.

# Attachments



# Base Chain/Attachment Dimensions

Tsubaki C	Chain No.	Pitch	Roller	Width Between		Plate			Pin		Max. Allowable	Approx.
Standard	High- Precision	Р	Dia. R	Inner Link Plates W	Thickness T	Width <i>h</i>	Width H	Dia. D	Lı	L2	Load kN {kgf}	kg/m
RF2040R-NB	RF2040R-NBH	25.40	15.88	7.95	1.5	12.0	17.5	3.97	8.25	9.95	0.78{ 80}	0.99
RF2050R-NB	RF2050R-NBH	31.75	19.05	9.53	2.0	15.0	21.0	4.97	10.30	12.00	1.27{130}	1.72
RF2060R-NB	RF2060R-NBH	38.10	22.23	12.70	3.2	17.2	26.0	5.96	14.55	16.55	1.77{180}	2.57
RF2080R-NB	RF2080R-NBH	50.80	28.58	15.88	4.0	23.0	35.0	7.94	18.30	20.90	2.94{300}	3.88

Tsubaki C	Chain No.				Attachment				Additiona per Attac	al Weight chment kg
Standard	High- Precision	S	С	X • X2	N	К	Т	0	A2	K2
RF2040R-NB	RF2040R-NBH	9.1(8.9)	12.70	19.3	19.1	9.5	1.5	3.6	0.003	0.006
RF2050R-NB	RF2050R-NBH	11.1(10.9)	15.90	24.2	23.8	11.9	2.0	5.2	0.006	0.012
RF2060R-NB	RF2060R-NBH	14.7(14.4)	21.45	31.5	28.6	14.3	3.2	5.2	0.017	0.034
RF2080R-NB	RF2080R-NBH	19.1(18.8)	27.80	40.7	38.1	19.1	4.0	6.8	0.032	0.064

Note: Dimension S differs for High-Precision chain, and is given inside parentheses. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

Tsubaki Chain No.	Pitch	Roller Dia.	Width Between		Plate			Pin		Max. Allowable	Approx.
Stainless Steel	Р	R	Inner Link Plates W	Thickness T	Width h	Width H	Dia. D	Lı	L2	Load kN {kgf}	kg/m
RF2040R-NB-SS	25.40	15.88	7.95	1.5	12.0	17.5	3.97	10.45	12.15	0.44{ 45}	1.06
RF2050R-NB-SS	31.75	19.05	9.53	2.0	15.0	21.0	4.97	12.60	14.30	0.69{ 70}	1.82
RF2060R-NB-SS	38.10	22.23	12.70	3.2	17.2	26.0	5.96	16.80	18.70	1.03{105}	2.68
RF2080R-NB-SS	50.80	28.58	15.88	4.0	23.0	35.0	7.94	21.50	24.40	1.77{180}	4.07

Tsubaki Chain No.		Additional Weight per Attachment kg								
Stainless Steel	S	С	Х	Х2	N	К	Т	0	A2	К2
RF2040R-NB-SS	9.1	14.9	21.5	19.3	19.1	9.5	1.5	3.6	0.003	0.006
RF2050R-NB-SS	11.1	18.2	26.5	24.2	23.8	11.9	2.0	5.2	0.006	0.012
RF2060R-NB-SS	14.7	23.7	33.95	31.5	28.6	14.3	3.2	5.2	0.017	0.034
RF2080R-NB-SS	19.1	31.0	43.9	40.7	38.1	19.1	4.0	6.8	0.032	0.064

Small Size Conveyor Chain Standard

# **Bearing Cage Chain**

# Base Chain



# Attachments



# Base Chain Dimensions

Tauhali Chain Na	Pitch	Roller Dia. <i>R</i>	Width Between		Plate			Pin	Max. Allowable	Approx.	
TSUDAKI Chain INO.	Р		Inner Link Plates W	Thickness T	Width h	Width H	Dia. D	Lı	L2	Load kN {kgf}	kg/m
RF2040R-NC	25.40	15.88	7.95	1.5	12.0	17.5	3.97	8.25	9.95	0.44{ 45}	0.99
RF2050R-NC	31.75	19.05	9.53	2.0	15.0	21.0	5.09	10.30	12.00	0.69{ 70}	1.72
RF2060R-NC	38.10	22.23	12.70	3.2	17.2	26.0	5.96	14.55	16.55	1.03{105}	2.57
RF2080R-NC	50.80	28.58	15.88	4.0	23.0	35.0	7.94	18.30	20.90	1.77{180}	3.88

# Attachment Dimensions

Taubaki Chain Na			Additional Weight per Attachment kg						
TSUBURI CHUIIT NO.	S	С	$X \cdot X2$	N	К	Т	0	A2	K2
RF2040R-NC	9.1	12.70	19.3	19.1	9.5	1.5	3.6	0.003	0.006
RF2050R-NC	11.1	15.90	24.2	23.8	11.9	2.0	5.2	0.006	0.012
RF2060R-NC	14.7	21.45	31.5	28.6	14.3	3.2	5.2	0.017	0.034
RF2080R-NC	19.1	27.80	40.7	38.1	19.1	4.0	6.8	0.032	0.064

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

Small Size Conveyor Chain

Plus a

Small Size Conveyor Chain

Corrosion Resistant Small Size Conveyor Chain

Lube Free

# **Bearing Bush Chain, Bearing Cage Chain**

# Sprockets

RF Double Pitch sprockets for R rollers can be used.

# Max. Allowable Loads for Bearing Bush Chain (NB) and Bearing Cage Chain (NC)

(Unit: kN {kgf} per attachment or per roller)										
Tsubaki Chain No.	Allowable A2 A	stachment Load	Allowable Roller Load							
	Outer Plate	Inner Plate	NC/NB/NBH Specification	NB-SS Specification						
RF2040R	0.12{12}	0.03{ 3}	0.15{15}	0.05{ 5}						
RF2050R	0.18{18}	0.05{ 5}	0.20{20}	0.06{ 6}						
RF2060R	0.47{48}	0.13{13}	0.29{30}	0.09{ 9}						
RF2080R	0.72{73}	0.21{21}	0.54{55}	0.15{15}						

# Precautions for Use

1. Chain speed must be less than 30 m/minute.

2. Operating temperatures: Bearing Cage Chain: -10°C to 60°C

Bearing Bush Chain (Standard/High-Precision): -10°C to 150°C

Bearing Bush Chain (Stainless Steel): -10°C to 60°C

3. Chain must be handled carefully when the pins have been removed, for example, while connecting the chain,

as the needles in the bearings (or in the needle cage) may fall out.

# Lubrication

The space between the pin and bush is filled with grease, but the sprocket teeth and the gap between the bush and roller should be lubricated with ISO VG100 to VG150 (SAE30 to SAE40) machine oil.

# Chain Numbering

# Bearing Bush Chain (Standard)

# RF2040R-NB-1LA2

Chain size			Attachment type
Roller type (R only) —			
Chain type			
NB: Standard	SS: Stainle	ess Steel	
NBH: High-Precision	NC: Bearin	g Cage	

Bearing Bush Chain Custom Shape Examples





Standard Small Size Conveyor Chain

Plus a

Small Size Conveyor Chain

**Conveyor Chain** 

**High Precision** 

**Engineering Manual** 

# **Mini Tact Chain**



■ Operating Temperature Range: 10°C to 40°C **Chain Speed:** Less than 30 m/min (recommended range) Tsubaki can design and manufacture these chains to match your application and requirements. Please contact a Tsubaki representative when considering indexing conveyor chain.





# Sprockets (for BCM Chain)



Note: Drawings show 12-tooth sprockets, but 16-tooth sprockets are also available. All dimensions are the same as above.

Tsubaki Chain No.	Sprocket											
	Sprocket No.	Туре	No. of Teeth	Pitch Dia. Dp	Outside Dia. Do	Root Circle Dia. <i>D</i> B	Facewidth T	Approx. Mass kg	Material			
	BCM12.5-9 D 12T	Drive	1.0T	48.296	48	44.296	3	0.090	Plastic + steel			
PCM12.5.0	BCM12.5-9 A 12T	Driven	121	48.296	48	44.296	3	0.025	Plastic			
DC/V(12.3-7	BCM12.5-9 D 16T	Drive	16T	64.073	63.5	60.073	3	0.130	Plastic + steel			
	BCM12.5-9 A 16T	Driven		64.073	63.5	60.073	3	0.062	Plastic			
	BCM15-9 D 12T	Drive	1.0T	57.956	57.5	53.956	3	0.110	Plastic + steel			
PCM15 0	BCM15-9 A 12T	Driven	121	57.956	57.5	53.956	3	0.050	Plastic			
DCIVIT J-9	BCM15-9 D 16T	Drive	14T	76.888	76.5	72.888	3	0.170	Plastic + steel			
	BCM15-9 A 16T	Driven		76.888	76.5	72.888	3	0.100	Plastic			

**Conveyor Chain High Precision** 

Small Size Conveyor Chain

Small Size Conveyor Chain **Corrosion Resistant** 

Small Size Conveyor Chain

Plus a

Lube Free

# **Indexing Table Chain**

# Specifications

- Link plate material: Carbon steel
- Link surface treatment: Blackened
- Outboard rollers: Two types of outboard rollers are available: single (S) and double (D).
  - Double outboard rollers draw the guide rail up to the sides of the sprockets, enabling smooth conveyance. This type is for general applications.
  - Single outboard rollers are used as replacements when this type is currently in use.

		 200
D).	22	
	R.	
	9	

Tsubaki Chain No.	Pitch mm	Mass/Link kg	Max. Allowable Load per Link kN/link {kg/link}	Allowable Load kN {kgf}	Allowable Speed mm/s
BC050 <sup>S</sup> <sub>D</sub> 45	50	0.14	0.05 { 5}	0.49 { 50}	500
BC075 <sup>S</sup> <sub>D</sub> 60	75	0.32	0.08 { 8}	0.69 { 70}	500
BC100 <sup>S</sup> <sub>D</sub> 70	100	0.44	0.08 { 8}	0.69 { 70}	500
BC150 <sup>S</sup> <sub>D</sub> 90	150	1.16	0.12 {12}	1.27 {130}	500

Note: Allowable speed is index pitch (mm) ÷index time (seconds)



# Chain Outside Dimensions (Single Roller)



Small Size Conveyor Chain

Lube Free

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**Engineering Manual** 

# Chain Outside Dimensions (Double Roller)



Note: Made-to-order product.

# Sprockets (for BC Chain)

# Specifications

Tooth profile: Special round tooth profile Material: Carbon steel for machine structural use Surface treatment: Blackened

# Available Types

Sizes: 50, 75, 100, and 150 mm widths Number of teeth: 8T or 12T

Note: Same sprockets are used for Single Roller and Double Roller types.





	Sprocket													
Tsubaki Chain No	Sumalist Ma	No. of		Dimensions									Moment of Inertia	
Chain 140.	эргоскегтчо.	Teeth	Dp	Do	Dı	D2	Dз	W	Т	Н	М	kg	$I(kg \cdot m^2) \{GD^2(kgf \cdot m^2)\}$	
PCOED S 45	BC050-45-08T	8T	130.66	131	64	80	110	60	5	10	25	2.4	0.005{0.02}	
BC050 D45	BC050-45-12T	12T	193.19	194	130	146	170	60	5	10	25	4.7	0.02 {0.08}	
PC075 \$40	BC075-60-08T	8T	195.98	196	116	134	170	77	6	11	33	6.5	0.025{0.1}	
BC075 D60	BC075-60-12T	12T	289.78	290	214	232	265	77	6	11	33	12.6	0.13 {0.5}	
PC100 \$70	BC100-70-08T	8T	261.31	262	172	192	230	87	6	13	37	11	0.085{0.34}	
BCTOU DVO	BC100-70-12T	12T	386.37	387	305	325	360	87	6	13	37	21	0.4 {1.6}	
RC150 \$ 90	BC150-90-08T	8T	391.97	392	280	305	338	111	8	15	48	28	0.52 {2.1}	
BC120 DA0	BC150-90-12T	12T	579.56	580	480	505	536	111	8	15	48	52	2.4 {9.6}	

Note: The size and shape of bore diameter (d) and hub diameter (DH) are determined by conveyor layout. Please indicate.

Lube Free Small Size Conveyor Chain

Small Size Conveyor Chain **Corrosion Resistant** 



Special Small Size Conveyor Chain

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Lube Free Small Size Conveyor Chain



Small Size Conveyor Chain Engineering Manual

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# **Chain Selection**

An appropriate chain size and type can be selected based upon the type and capacity of the conveyor. In some cases, it may be difficult to determine the most appropriate chain size and type, since there are a variety of operating conditions for the conveyor. The general procedure for chain selection is as follows:

Step 1: Check Conveyance Conditions  $\rightarrow$  Step 2: Tentatively Determine Chain Type  $\rightarrow$  Step 3: Check Allowable Load  $\rightarrow$ Step 4: Calculate Max. Chain Load → Step 5: Determine Chain Size → Step 6: How to Select Indexing Chain

# Step 1: Check Conveyance Conditions

- 1) Type of conveyor (slat conveyor, bucket elevator, etc.)
- 2) Method of chain travel (horizontal, inclined, or vertical conveyor)
- 3) Type, mass, and size of materials to be conveyed
- 4) Conveyor capacity, interval between conveyed objects
- 5) Conveying speed
- 6) Conveyor length
- 7) Lubrication status
- 8) Considerations for special environments (high/low temperature, presence of corrosive substances)

# Step 3: Check Allowable Load

Table 1: Base Chain Allowable Boller Load

# Step 2: Tentatively Determine Chain Type

Use the following formula to determine maximum static chain load (F) for tentative selection of chain type.

G

1000

SI Units: F(kN)=W×f1×Kv×

G=9.80665 m/s<sup>2</sup>

Gravimetric Units: F{kgf}=W×f1×Kv

W: Total mass {weight} of conveyed objects on conveyor kg {kgf} f1: Coefficient of friction (Table 3) Kv : Speed coefficient (Table 4)

Tentatively select a chain that has maximum allowable load of F (for two parallel strands, use F X 0.6) or more.

Unit: kN {kgf}/roller

Poly Steel

Chain

The load applied to rollers or attachments should not exceed the allowable loads shown in Table 1 and Table 2.

					0.1		
Tsubaki Chain No.	Double Pitch RS Attachment (Standard) Lambda/X-Lambda		Stainless S (SS,	Steel Roller AS)	Plastic Roller	Heat-Resistant Plastic Roller	Low-Noise Plastic Roller
	R Roller	S Roller	R Roller	S Roller	R Roller	R Roller	R Roller
RS25	-	-	-	-	-	-	-
R\$35	_	_	_	_	_	_	_

0.101111101								1 CHOIN	
	R Roller	S Roller	R Roller	S Roller	R Roller	R Roller	R Roller		Base Chain
RS25	-	-	-	-	-	-	-	0.005{0.5}	Allowable Boller Load
RS35	-	-	-	-	-	-	-	0.015{1.5}	Load
RF2040.RS40	0.64{ 65}	0.15{ 15}	0.20{ 20}	0.05{ 5}	0.20{ 20}	0.20{ 20}	0.14{14}	0.02 {2.0}	
RF2050.RS50	0.98{100}	0.20{ 20}	0.29{ 30}	0.06{ 6}	0.29{ 30}	0.29{ 30}	0.21{21}	0.04 {4.0}	
RF2060.RS60	1.57{160}	0.29{ 30}	0.49{ 50}	0.09{ 9}	0.49{ 50}	0.49{ 50}	0.34{35}	0.06 {6.0}	
RF2080.RS80	2.65{270}	0.54{ 55}	0.79{ 80}	0.15{15}	0.88{ 90}	-	0.62{63}	-	
RF2100.RS100	3.92{400}	0.79{ 80}	1.17{120}	0.25{25}	1.27{130}	-	-	-	Roller Load
RF2120.RS120	5.88{600}	1.18{120}	-	-	-	-	-	-	(per roller
- •RS140	-	1.32{135}	-	-	-	-	-	-	
RF2160.RS160	9.61{980}	1.91{195}	_	_	_	_	_	_	

1. Values are for lubricated chain. Values for Double Pitch and RS Attachment Chain include corrosion-resistant chains (NP/NEP series). Note:

Values for Poly Steel Chain are for the case in which the roller supports the bottom surface of the inner link

3. The material used for standard R roller guide rail should be a high tensile strength material at least S45C (JIS), 1045 (AISI) or better.

4. See page 83 for details on Bearing Cage Chain and Bearing Bush Chain.

## Table 2: A Attachment Allowable Load Double Pitch Chain Unit: kN {kgf}/attachment

Soupro i non onani one ar (kgi)/ataoninone							
Tsubaki Chain No.	Double Pitch Chain*	Stainless Steel Chain					
RF2040	0.262{ 26.7}	0.108{11.0}					
RF2050	0.455{ 46.4}	0.189{19.3}					
RF2060	1.06 {108 }	0.419{42.7}					
RF2080	1.67 {170 }	0.646{65.9}					
RF2100	2.51 {256 }	1.15{117 }					
RF2120	3.68 {375 }	1.79{183 }					
RF2160	5.84 {596 }	3.13{319 }					
Note: * In	cludes corrosion	-resistant chain					

(NP/NEP series). See page 83 for details on Bearing Cage

Chain and Bearing Bush Chain.

**RS** Chain Unit: kN {kgf}/attachment Tsubaki **RS** Attachment Stainless Chain No Chain\* Steel Chain 0.012{ RS25 0.028{ 2.9} 1.2} RS35 0.094{ 9.6} 0.036{ 3.7} 0.054{ **RS40** 0.130{ 13.3} 5.5} RS50 0.243{ 24.8} 0.101{ 10.3} RS60 0.376{ 38.3} 0.148{ 15.1} RS80 0.591{ 60.3} 0.233{ 23.8} RS100 0.933{ 95.1} 0.361{ 36.8} RS120 1.39 {142 } 0.629{ 64.1} RS140 1.82 {186 } 0.869{ 88.6} 2.36 {241 } 1.19 {121 RS160 }

Note: \* Includes corrosion-resistant chain (NP/NEP series).

- 1) The mounting hole of an A attachment is regarded as the point where the allowable vertical load acts on the attachment.
- 2) For K attachments, double the values shown for A attachments.
- 3) Load should not exceed maximum allowable roller load.



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# Step 4: Calculate Max. Chain Load (F)

In this catalog, values are indicated in both SI and gravimetric units. The weight (kgf) used to calculate the max. load in the gravimetric units is the same value as the mass (kg).

- F : Max. static load applied to chain : kN {kgf}
- V : Conveying speed (chain speed) : m/min
- H : Center distance between sprockets (vertical direction) : m
- L : Center distance between sprockets (horizontal direction) : m
- C : Center distance between sprockets : m
- M : Mass {weight} of moving parts (chain, bucket, apron, etc.) : kg/m {kgf/m}
- W: Total mass {weight} of conveyed objects on conveyor (max. value) : kg {kgf}
  - For countable items:  $W = \frac{C}{\text{Loading interval}} \times \text{Mass {weight} of conveyed items}$
- kW: Power required
- f1 : Coefficient of friction between chain and guide rail (Table 3)
- n: Transmission efficiency of drive unit
- G : Gravitational acceleration: 9.80665 m/s<sup>2</sup>



Roller Type	Roller Steel R Type		Lambda Chain	Plastic Roller*	Low-Noise Plastic Roller	Bearing Bush Chain
	Dry	Lubricated		D	ry	Dry
R roller	0.12	0.08	0.08	0.08	0.1	0.21
S roller	0.21	0.14	0.14	-	-	-

\* Includes heat-resistant plastic rollers.

# Table 3-2: f1: Coefficient of Rolling Friction of Chain Plates on Rail

Steel	Poly Steel Chain	
Dry	Foly Sleer Chain	
0.3	0.2	0.25



# Engineering Manual Small Size Conveyor Chain



\* When calculating the value for F, if L · f1–H<0, make L · f1–H=0. Also when calculating the value for kW, if H–L · f1<0, make H–L · f1=0.

# Step 5: Determine Chain Size

Multiply the maximum load (F) applied to a chain by the speed coefficient (Kv) given in Table 4 for a chain that satisfies the following formula:

F×Kv≦Max. Allowable Load
--------------------------

## Table 4: Speed Coefficient (Kv)

Chain Speed (m/min)	Speed Coefficient (Kv)	Chain Speed (m/min)	Speed Coefficient (Kv)
15 or less	1.0	70 to 90	2.2
15 to 30	1.2	90 to 110	2.8
30 to 50	1.4	110 to 120	3.2
50 to 70	1.6		

 $\langle$  The recommended speed of the following chains is as follows:  $\rangle$ 

Bearing Cage Chain	]
Bearing Bush Chain	: 30 m/min or less
Indexing Table Chain, Mini Tact Chain	J
Plastic Roller Chain	: 70 m/min or less
Poly Steel Chain	: 70 m/min or less

# Table 5: Small Size Conveyor Chain Strength

# Double Pitch Unit: kN {kgf}

Double Pitch Chain, Lambda Chain (Including NP/NEP Series), X-Lambda Chain (Maximum Allowable Load)

Tsubaki Chain No.	Standard Chain	Lambda Chain, X-Lambda Chain
RF2040 (S,R)	2.65{ 270}	2.65{ 270}
RF2050 (S,R)	4.31{ 440}	4.31{ 440}
RF2060 (S,R)	6.28{ 640}	6.28{ 640}
RF2080 (S,R)	10.7 {1090}	10.7 {1090}
RF2100 (S,R)	17.1 {1740}	17.1 {1740}
RF2120 (S,R)	23.9 {2440}	—
RF2160 (S,R)	40.9 {4170}	_

Tsubaki Chain No.	Stainle	ess Steel Double Pitch	Surface-Treated Double Pitch Chain			
	SS	AS	NS	LSC	NP	NEP
RF2040 (S,R)	0.44{ 45}	0.69{ 70}	0.44{ 45}	0.44{ 45}	2.65{ 270}	2.65{ 270}
RF2050 (S,R)	0.69{ 70}	1.03{105}	0.69{ 70}	0.69{ 70}	4.31{ 440}	4.31{ 440}
RF2060 (S,R)	1.03{105}	1.57{160}	1.03{105}	1.03{105}	6.28{ 640}	6.28{ 640}
RF2080 (S,R)	1.77{180}	2.65{270}	1.77{180}	1.77{180}	10.7 {1090}	10.7 {1090}
RF2100 (S,R)	2.55{260}	_	_	_	17.1 {1740}	17.1 {1740}
RF2120 (S,R)	3.82{390}	_	_	_	23.9 {2440}	_
RF2160 (S,R)	6.37{650}	_	_	_	40.9 {4170}	_

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Standard

## Plastic Roller Chain (Maximum Allowable Load)

Turbaki Chain Na		Standard Series			Heat-Resistant		
ISUDUKI CHUIN INO.	Standard	NP	SS	Standard	NP	SS	Series
RF2040 (R)	0.44{ 45}	0.44{ 45}	0.44{ 45}	0.44{ 45}	0.44{ 45}	0.44{ 45}	0.44{ 45}
RF2050 (R)	0.69{ 70}	0.69{ 70}	0.69{ 70}	0.69{ 70}	0.69{ 70}	0.69{ 70}	0.69{ 70}
RF2060 (R)	1.03{105}	1.03{105}	1.03{105}	1.03{105}	1.03{105}	1.03{105}	1.03{105}
RF2080 (R)	1.77{180}	1.77{180}	1.77{180}	1.77{180}	1.77{180}	1.77{180}	_
RF2100 (R)	2.55{260}	2.55{260}	2.55{260}	_	_	_	_

## Hollow Pin Chain (Maximum Allowable Load)

Tsubaki Chain No.	Standard	Lambda	NP	SS
RF2040 (S,R)	1.77{180}	1.47{150}	1.77{180}	0.44{ 45}
RF2050 (S,R)	3.14{320}	2.55{260}	3.14{320}	0.69{ 70}
RF2060 (S,R)	4.22{430}	3.43{350}	4.22{430}	1.03{105}
RF2080 (S,R)	7.65{780}	6.18{630}	7.65{780}	1.77{180}

# High Precision Conveyor Chain

Searing Bush Chain (Maximum Allowable Load)									
Tsubaki Chain No.	Standard	NBH	NB-SS						
RF2040	0.78{ 80}	0.78{ 80}	0.49{ 45}						
RF2050	1.27{130}	1.27{130}	0.69{ 70}						
RF2060	1.77{180}	1.77{180}	1.03{105}						
RF2080	2.94{300}	2.94{300}	1.77{180}						

Standard Chain

0.64{ 65}

1.52{ 155}

2.65{ 270}

4.31{ 440}

6.28{ 640}

10.7 {1090}

17.1 {1740}

23.9 {2440}

32.4 {3300}

40.9 {4170}

Stainless Steel RS Attachment Chain

AS

0.69{ 70}

1.03{105}

1.57{160}

2.65{270}

Corrosion Resistant Small Size Conveyor Chain (Maximum Allowable Load)

## Mini Tact Chain

Tsubaki Chain No.	Max. Allowable Load
BCM12.5-9	0.3{30}
BCM12-9	0.3{30}

RS Chain Unit: kN {kgf}

Tsubaki Chain No.

RS25

**RS35** 

RS40

RS50

RS60

RS80

RS100

RS120 RS140

RS160

Tsubaki Chain No.

RS25 (RS25PC)

RS35 (RS35PC)

RS40 (RS40PC)

RS50 (RS50PC)

RS60 (RS60PC)

RS80

RS140

RS160

## **Indexing Table Chain**

RS Attachment Chain, Lambda Chain (Including NP/NEP Series), X-Lambda Chain (Maximum Allowable Load)

-	
Tsubaki Chain No.	Max. Allowable Load
BC050 (S,D) 45	0.49{ 50}
BC075 (S,D) 60	0.69{ 70}
BC100 (S,D) 70	0.69{ 70}
BC150 (S.D) 90	1.27{130}

Lambda Chain

1.52{ 155}

2.65{ 270}

4.31{ 440}

6.28{ 640}

10.7 {1090}

17.1 {1740}

NS

0.12{ 12}

0.26{ 27}

0.44 { 45}

0.69{ 70}

1.03{105}

1.77{180}

\_

LSC

0.44{ 45}

0.69{ 70}

1.03{105}

1.77{180}

\_

Tsubaki Chain No.	Standard
RF2040 (S,R)	1.86{190}
RF2050 (S,R)	2.84{290}
RF2060 (S,R)	4.02{410}
RF2080 (S,R)	6.96{710}

Curved Chain (Maximum Allowable Load)

## **Bearing Cage Chain**

X-Lambda Chain

2.65{ 270}

4.31{ 440}

6.28{ 640}

10.7 {1090}

17.1 {1740}

NP

0.64 65

1.52{ 155}

2.65{ 270}

4.31{ 440}

6.28 640

10.7 {1090}

17.1 {1740}

23.9 {2440}

32.4 {3300}

40.9 {4170}

Surface-Treated RS Attachment Chain

Tsubaki Chain No.	Max. Allowable Load
RF2040 (S,R)	0.45{ 45}
RF2050 (S,R)	0.69{ 70}
RF2060 (S,R)	1.03{105}
RF2080 (S,R)	1.77{180}

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Small Size Conveyor Chain

Small Size Conveyor Chain

Standard

# Small Size Conveyor Chain Lube Free

Poly Steel

Chain

0.08{ 8}

0.18{18}

0.44{45}

0.69{70} 0.88{90}

# **Conveyor Chain High Precision**

92

## RS100 2.55{260} RS120 3.82{390} 4.61{470}

SS

0.12{ 12}

0.26{ 27}

0.44 { 45 }

0.69{ 70}

1.03{105}

1.77{180}

6.37{650}

## Hollow Pin Chain (Maximum Allowable Load)

	•	-				
Tsubaki Chain No.	Standard	Lambda	NP	SS	Tsubaki Chain No.	
RS40	1.77{180}	1.47{150}	1.77{180}	0.44{ 45}	RS40	Γ
RS50	3.14{320}	2.55{260}	3.14{320}	0.69{ 70}	RS50	Γ
RS60	4.22{430}	3.43{350}	4.22{430}	1.03{105}	RS60	Γ
RS80	7.65{780}	6.18{630}	7.65{780}	1.77{180}	RS80	
RS50 RS60 RS80	3.14{320} 4.22{430} 7.65{780}	2.55{260} 3.43{350} 6.18{630}	3.14{320} 4.22{430} 7.65{780}	0.69{ 70} 1.03{105} 1.77{180}	RS50 RS60 RS80	

Note: SS and NS chains are not pre-lubricated before shipping. Always lubricate the chain before use, except when using underwater or when the chain will contact water. Using a chain without lubrication may result in premature articulation problems. Maximum allowable loads are based on lubricated (including water lubricated) conditions.

# Curved Chain (Max. Allowable Load)

NEP

2.65{ 270}

4.31{ 440}

6.28 640

10.7 {1090}

17.1 {1740}

Tsubaki Chain No.	Standard
RS40	1.86{190}
RS50	2.84{290}
RS60	4.02{410}
RS80	6.96{710}

# Engineering Manual Small Size Conveyor Chain

# Step 6: How to Select Indexing Chain

When selecting chain for indexing operations using indexing equipment, in addition to the normal load based on F (load from frictional force), the added load from inertia (F1) must be taken into account when calculating the total load acting on the chain. In general, this additional load F1 is found from the formula F1 =  $m\alpha$ . The steps to calculate chain load based on this formula are explained below.

Stand Small 3	on the chain. In general, this additional load F1 is found the based on this formula are explained below.	from the formula F1 = m $\alpha$ . The steps to ca	alculate chain load
lard Size (	m. Total mass on driven side $(k\sigma)$		
Conveyo	$\alpha$ : Maximum acceleration (m/s <sup>2</sup> )		
or Chain	SI Units	{Gravimetric Unit	s}
us IS		Mass {weight} of conveyed object W_kg {kg}	
)ecia 1all Sij		Driven-side sprocket mass {weight} M	2 kg {kgf}
re Conveyor Cha			
5	lotal ma	ass {weight} of moving parts of chain (jigs, etc.) M1 kg {kgt}	
Lube Small S	1) Find total mass "m" on driven side.	1) Find total mass "m" on driven side.	
F <b>ree</b> Size Conv	$m = W + M1 + \frac{1}{2}M2$	$m = \frac{1}{\underline{G}} (W + M1 + \frac{1}{2} M2)$	
reyor		$\underline{G}$ : Acceleration of gravity = 9.	80665 (m/s²)
Chain	Note: $\frac{1}{2}$ M2 is an approximate calcu converted to the mass (weight)	lated value for the inertial force of the sprocke ) of the chain.	t
ion Resis ize Conveyor	and the formula in 1) above. For example, when using a cam indexing system,	Table 6: Relationship Between Cam Cu	ves and Am
tant Chaii	maximum acceleration $lpha$ can be found by using	Name	Am
<u> </u>	the following formula:	Modified sine curve (MS)	±5.53
Plu Sma	$\alpha = \operatorname{Am} \frac{L}{t^2} (m/s^2)$	Modified trapezoidal curve (MT)	±4.89
II S Q	L: Indexing length of 1 takt (m)	Modified sine constant velocity (MSC)	±8.01
ie Co	t: Indexing time of 1 takt (s)	For details, check with the manufacturer of the in	dexing equipment.
iveyor C	Am: Dimensionless maximum acceleration (Table 6) Use the value for Am corresponding to the cam curve.		
hain	3) Find $F_{\Sigma}$ the total working load taking the additional	$_{1}$ 3) Find E <sub>5</sub> , the total working load taking t	he additional
οт	tension due to inertia into consideration	tension due to inertia into consideratio	n
ligh	$F_{\Sigma}=F+F1/1000$	$F_{\Sigma}=F+F1/G$	
Prec eyor	F: Chain load based on frictional force (kN)	F: Chain load based on frictiona	l force (kgf)
ision Chain	(Maximum static tension)	(Maximum	static tension)
		· ·	
Engi	4) Determine cha	iin size	
	FΣKv≦Ma>	anum allowable load	

Kv: Speed coefficient (Table 4)

5) Check the allowable roller load of the chain.

		Conveyor D	esign Guidelines
1. Conveyor	System an	d Roller Type (Table 7)	3. Use of Standard Small
Conveyor System	Roller Type	Comments	at High/Low Temperatu
Chain Rolling (horizontal, inclined)	R Roller Type Heavy in chain weight Greater allowable roller load	<ul> <li>Smooth operation and vibrations are small.</li> <li>Power required is low since frictional resistance is small.</li> <li>Center distance between sprockets should be generally over 10 meters.</li> </ul>	As a general rule, standard small operated in clean air enviro temperatures between –10°C an operated in environments outsio points should be taken into consi
Double Pitch Chain		<ul> <li>Applicable for speeds over 20 m/min.</li> </ul>	1. Operation at very low or high to Chain must be selected or used i
Chain Rolling	S Roller Type	<ul> <li>Center distance between sprockets should be generally less than 10 m.</li> <li>Applicable for speeds under 20 m/min.</li> </ul>	is operated in freezing chambers through dryers or heat-treatme affected by heat from the mater below provides guidelines for allowable load and temperature for
Chain Sliding			
	Lower allowable Loller load	<ul> <li>Resistant to loading shocks and bad environments:</li> </ul>	Temperature Range
Double Pitch Chain		<ul><li>however, the rail is damaged quickly.</li><li>Construction is simple.</li><li>Power required is large.</li></ul>	-30°C to -20°C (Max. allor -20°C to -10°C (Max. allor -10°C to 150°C (Max. allor 150°C to 200°C (Max. allor

# 2. Conveyor Arrangement (Table 8)



Both the conveying and return sides are supported by rails. The most recommended and streamlined layout. A sag is produced on the take-off side of the sprocket.

The return side is supported by guides, rollers, or idlers. Since the chain bends when it comes into contact with the rollers or guides, friction increases, allowing for easy wear. Also, chain vibration exerts a negative effect on overall running. Consequently, it is not desirable to have a long center distance between sprockets.

The return side is not supported. The tension due to the mass of the chain on the return side produces vibrations causing rough conveyance.

Examples showing slat conveyors and a cross rod conveyor that are most commonly used:



Slats are installed using A attachments, and the rollers roll over the rails on both the conveying and return sides.

Slats are installed using K attachments. Compared to the above example, this type of arrangement is suitable for wide slat conveyors where the mass of the conveyed goods is heavy. However, on the return side the slats slide on the rail.

This is a cross rod conveyor where a pipe is installed by means of an EP attachment, GNK attachment, or Hollow Pin Chain. The rollers roll on the rails on both the conveying and return sides.

# Size Conveyor Chain ires

size conveyor chain can be nments and in ambient d 60°C. When the chain is le this range, the following deration.

emperatures:

n a different manner when it cold areas, when it passes nt furnaces, or when it is al being conveyed. Table 9 the relationship between or standard chains.

# Working Load

Temperature Range	Allowable Tension
–30°C to –20°C	(Max. allowable load in catalog) x 0.25
–20°C to –10°C	(Max. allowable load in catalog) x 0.33
–10°C to 150°C	(Max. allowable load in catalog) x 1.0
150°C to 200°C	(Max. allowable load in catalog) x 0.75
200°C to 250°C	(Max. allowable load in catalog) x 0.5

# Table 10: Temperature Environment and Points of Concern

Temperature Range	Usage Conditions	Potential Problems
–50°C to –30°C	Under -30°C or lower conditions, consider corrosion-resistant SS and AS stainless steel chains. Standard steel chains cannot be used.	<ol> <li>Low-temperature embrittlement may occur with standard steel chain, reducing impact resistance.</li> <li>Consecting of lubricent</li> </ol>
–30°C to –10°C	Standard steel chain should be selected on the basis of the corrected working load above (Table 9).	<ul> <li>(2) Congeaning on tubicant.</li> <li>(3) Rust due to condensation.</li> <li>(4) Seizure due to frost formation.</li> </ul>
60°C to 150°C	Different lubricant is required.	
150°C to 250°C	Because wear resistance is reduced in this temperature range, consider selecting the next larger pitch chain size over the one originally selected to reduce bearing pressures. When standard chain is to be used, evaluate whether or not the chain can be used at a reduced allowable load (see Table 9 above).	<ol> <li>Excessive wear due to decreased pin and bush hardness.</li> <li>Excessive elongation due to softening.</li> <li>Insufficient lubrication and chain seizure due to deterioration of lubricant</li> </ol>
250°C to 400°C	Consider corrosion-resistant SS and AS stainless steel chains.	(4) Excessive wear and chain seizure due to formation of scale.

# 4. Lubricants and High/Low Temperatures

Special low-temperature or high-temperature lubricants are required if a chain will be exposed to temperatures outside the range of -10°C to 60°C. See page 101 for details on recommended lubricants.

# Engineering Manual Small Size Conveyor Chain

# 5. Cautions on Use in Special Environments

As a general rule, conveyor chain should be used in clean air environments. When used in a special environment, reference should be made to the following items.

# 1. Use in Wet Conditions

If the chain is splashed with water or goes through heated vapor, the following problems may occur.

- 1) Increase in wear elongation due to improper or insufficient lubrication.
- 2) Decrease in fatigue strength from rust and corrosion (pitting) of the chain.

# Countermeasures

- Reduce bearing pressure using a larger sized chain to improve wear resistance.
- Use corrosion-resistant small size conveyor chain for rust prevention.

## 2. Use in Acidic or Alkaline Conditions

If the chain is exposed to acids or alkaline conditions, such as battery acid and liquid used in plating processes, the following problems may occur.

- 1) Embrittlement fracture of link plates and pins.
- 2)Fatigue breakage of link plates and pins due to rust and pitting corrosion.
- 3) Wear from usual mechanical wear and corrosion.
- 4) Reduction in volume of the whole chain from corrosion.
- 5) In special cases where the chain is underwater (immersed in liquid), electrochemical corrosion may occur.
- 6) There are also circumstances where even stainless steel chain will corrode. The photograph below shows an example of chain that was used in a plating apparatus. The chain fell to pieces within one month due to the effects of acid.



Corrosion of Stainless Steel Drive Chain

# Countermeasures for Embrittlement Fractures (stress corrosion cracking)

- Adopt a brittleness countermeasure that lowers crack susceptibility.
- Install a cover or casing to prevent acids or alkalis from contacting the chain.
- Adopt a high-grade material with anti-corrosive properties.

# **Countermeasures for Corrosion**

- Use surface-treated attachment chain.
- Install a cover or casing to prevent acids or alkalis from contacting the chain.
- Adopt a high-grade material with anti-corrosive properties.

In general, embrittlement fractures (stress corrosion cracking) occur around the link plate holes. This is the area where the pin and bush are press-fitted to the link plate having the highest concentration of stress. Cracks occur even when there is no tension on the chain. Conveyor chain in general is more susceptible to acids than alkalis, and in special cases, embrittlement fractures (stress corrosion cracking) are generated by seawater or pit water.



Hydrogen Embrittlement Cracking

# 3. Use Under Conditions Where Wear Is a Problem

If the chain is exposed to strong abrasive materials that promote wear such as sand, coke, and metal particles, the following problems may occur.

- 1) When abrasive materials penetrate between the pins and bushes, chain wear is promoted and poor articulation occurs.
- 2) When abrasive materials penetrate between the bushes and rollers, chain wear is promoted and poor roller rotation occurs.
- 3) When abrasive materials penetrate between the link plates, poor articulation occurs.

# Countermeasures

- · Apply a dust-proof casing.
- Remove foreign particles by regularly washing the chain.
- Reduce bearing pressure using a larger sized chain to improve wear resistance.
- Adopt a chain that has specially processed parts where wear is a problem.

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# 6. Other Precautions

1) To keep long conveyors consistently operating in top condition, use take-up devices to eliminate chain slack.

Take-up stroke = (center distance between sprockets X 0.02) + catenary sag allowance

The "0.02" factor represents a 2% allowable wear elongation of chain.

- 2) Chain must always be engaged with at least three sprocket teeth.
- 3) When operating with multiple strands of conveyor chain, sprockets should be mounted on the same shaft and all sprocket teeth should be properly aligned.
- 4) When operating a long conveyor with two or more strands of

chain, and when especially high pitch accuracy is required, Tsubaki can provide specially configured chain to minimize the relative difference in length. Also, special sprockets can be manufactured to ensure that sprocket teeth are properly aligned.

# 7. Corrosion Resistance Guide for Corrosion Resistant Chains and Sprockets (Table 11)

Corrosion resistance varies accordingly depending on application conditions. This table should not be considered a guarantee. Using this table as a reference, be sure to check the corrosion resistance of the chain in advance according to actual operating conditions in determining chain type.

Table 11	able 11																		
-1 1	C	orro Ro	sion	n Res Cha	sista in	nt	Spro	ocket		Co	orro Rol	sion	Res	ista n	nt	Spro	cket		d ain)
Chemical, Food Product	SS	AS	NS	TI	PC	PC- SY	Engineering Plastic	ss	Chemical, Food Product	SS	AS	NS	TI	PC	PC- SY	Engineering Plastic	SS	Chemical, Food Product	Standar (Steel Cho
Acetic acid 10% 20°C	А	А	А	А	А	А	В	А	Malic acid 50% 50°C	А	А	А	А	А	А	А	А	Acetic acid (5%)	×
Acetone 20°C	А	А	А	А	А	×	А	А	Mayonnaise 20°C	А	В	А	А	А	А	А	А	Acetone	×
Alcohol (methyl, ethyl, propyl, butyl)	Α	А	А	А	А	А	А	А	Milk 20°C	А	А	А	А	А	А	А	А	Alcohol	А
Aluminum sulfate Saturated 20°C	Α	×	Α	А	-	-	-	А	Nitric acid 5% 20°C	А	В	А	А	×	А	×	А	Aqueous ammonia	В
Ammonium chloride 50% Boiling point	В	×	Α	А	-	-	-	В	Oleic acid 20°C	Α	А	Α	А	А	-	Α	Α	Beer	А
Ammonium nitrate Saturated boiling	Α	Α	Α	А	В	А	Α	Α	Oils (vegetable, mineral) 20°C	Α	А	А	А	А	Α	А	Α	Benzene	А
Ammonium sulfate // 20°C	Α	В	Α	А	-	-	-	Α	Oxalic acid 10% 20°C	Α	В	А	А	-	Α	А	Α	Carbon tetrachloride	В
Aqueous ammonia 20°C	Α	А	Α	А	А	А	А	А	Paraffin 20°C	А	Α	А	А	А	Α	А	Α	Caustic soda (25%)	×
Beer 20°C	Α	А	Α	А	А	А	Α	А	Petroleum 20°C	Α	Α	Α	А	А	-	А	Α	Chromic acid (10%)	×
Benzene 20°C	Α	Α	Α	А	А	А	Α	Α	Phosphoric acid 5% 20°C	Α	В	Α	А	Х	Α	×	Α	Citric acid	×
Boric acid 50% 100°C	Α	А	Α	А	-	-	-	Α	// 10% 20°C	в	В	В	А	×	Α	×	В	Formic acid	×
Butyric acid 20°C	Α	А	Α	А	А	-	А	А	Picric acid Saturated 20°C	Α	Α	А	А	-	-	-	Α	Formic acid aldehyde	А
Calcium chloride Saturated 20°C	В	×	Α	А	В	А	Α	В	Potassium chloride // 20°C	Α	В	Α	А	-	-	Α	А	Fruit juice	×
Calcium hydroxide (hydrated lime) 20% Boiling	Α	Α	Α	Α	А	А	-	А	Potassium dichromate 10% 20°C	Α	Α	Α	А	А	-	Α	Α	Gasoline	A
Calcium hypochlorite (bleaching powder) Available chlorine 11 to 14% 20°C	Α	×	Α	А	×	А	В	Α	Potassium hydroxide (caustic potash) 20% 20°C	Α	Α	Α	А	А	Α	А	Α	Hydrochloric acid (2%)	×
Carbolic acid 20°C	Α	Α	Α	А	×	А	×	Α	Potassium nitrate 25% 20°C	Α	Α	Α	А	А	-	А	Α	Hydrogen peroxide	×
Carbonated water	Α	Α	Α	А	-	-	-	А	// 25% Boiling point	Α	×	Α	А	_	-	-	Α	Hypochlorite soda	×
Carbon tetrachloride (dry) 20°C	A	Α	Α	А	А	А	Α	Α	Potassium permanganate Saturated 20°C	Α	Α	Α	А	_	Α	×	Α	lodine	×
Chlorine gas (dry) 20°C	В	×	в	А	-	А	×	В	Seawater 20°C	в	×	Α	А	В	Α	А	В	Lactic acid	×
Chlorine gas (wet) 20°C	×	×	В	А	-	А	×	×	Soapy water 20°C	Α	Α	Α	А	А	Α	Α	Α	Milk	A
Chlorine water	×	×	А	А	Х	-	×	×	Sodium carbonate Saturated boiling point	Α	Α	А	А	_	Α	В	Α	Nitric acid (5%)	×
Chromic acid 5% 20°C	Α	В	Α	А	×	А	×	Α	Sodium chloride 5% 20°C	Α	В	Α	А	А	Α	А	Α	Oils (vegetable, mineral)	А
Citric acid 50% 20°C	Α	Α	Α	А	-	А	Α	Α	Sodium cyanide 20°C	Α	-	Α	А	_	-	-	Α	Paraffin	A
Coffee Boiling	Α	Α	Α	А	А	А	Α	Α	Sodium hydrogen carbonate 20°C	Α	Α	Α	А	А	-	Α	Α	Phosphoric acid (10%)	×
Cola syrup	Α	Α	Α	А	А	А	Α	А	Sodium hydroxide (caustic soda) 25% 20°C	Α	Α	Α	А	А	Α	А	Α	Potassium hydroxide	В
Concentrated nitric acid 65% 20°C	Α	×	Α	А	×	А	×	Α	Sodium hypochlorite 10% 20°C	×	×	Α	А	Х	Α	В	×	Seawater	×
// Boiling	В	×	в	А	×	×	×	В	Sodium perchlorate 10% Boiling point	Α	×	Α	А	_	-	-	Α	Soapy water	В
Creosote 20°C	Α	Α	Α	А	-	-	-	Α	Sodium sulfate Saturated 20°C	Α	Α	Α	А	-	-	-	Α	Sodium chloride	×
Developer (photo) 20°C	Α	В	Α	А	А	А	Α	А	Sodium thiosulfate 25% Boiling point	Α	Α	Α	А	_	_	-	Α	Sodium hydroxide (20%)	×
Ether (ethyl ether) 20°C	Α	Α	Α	А	А	А	Α	Α	Soft drinks 20°C	Α	Α	Α	А	А	Α	А	Α	Soft drinks	А
Ferric chloride 5% 20°C	в	×	в	А	-	_	×	В	Stearic acid 100% Boiling point	×	×	Α	А	X	_	А	×	Sulfuric acid	×
Formalin (formaldehyde) 40% 20°C	Α	Α	Α	А	-	-	В	Α	Sugar solution 20°C	Α	Α	Α	А	А	Α	Α	Α	Vegetable juice	В
Formic acid 50% 20°C	Α	A	Α	А	×	А	×	А	Sulfur dioxide (wet) 20°C	Α	×	Α	А	_	_	-	Α	Vinegar	×
Fruit juice 20°C	Α	В	Α	А	А	А	Α	А	Sulfuric acid 5% 20°C	×	×	Α	А	×	Α	×	×	Water	×
Gasoline 20°C	Α	Α	Α	А	А	А	Α	Α	Synthetic detergent	Α	Α	Α	А	A	Α	А	A	Whiskey	A
Glycerin 20°C	A	A	Α	А	А	А	A	Α	Tartaric acid 10% 20°C	Α	Α	Α	А	A	Α	Α	A	Wine	A
Honey, syrup	A	Α	Α	А	А	А	Α	Α	Turpentine oil 35°C	Α	Α	Α	А	_	_	_	A		
Hydrochloric acid 2% 20°C	×	×	×	А	×	Α	×	×	Varnish	Α	Α	Α	А	_	_	_	A	A: Totally resistant	
Hydrogen peroxide 30% 20°C	A	В	A	А	×	A	×	A	Vegetable juice 20°C	Α	Α	Α	А	Α	Α	Α	A	B: Partially resistant	roting
Hvdrogen sulfide (drv)	A	A	A	А	Α	Α	A	Α	Vinegar 20°C	в	×	Α	А	В	Α	в	В	(depending on ope	rating
Hvdrogen sulfide (wet)	×	×	×	Α	×	_	_	×	Water A A A A A A A A A A A										
Ketchup 20°C	A	A	Α	A	А	Α	Α	А	Wine 20°C	A	A	A	A	A	A	A	A		
Kerosene 20°C	A	A	A	A	_	A	_	A	Whiskey 20°C	A	A	A	A	A	A	A	A		
Lactic acid 10% 20°C	A	B	A	A	А	_	Α	A	Zinc chloride 50% 20°C	В	×	В	A	B	A	×	В		
Lard	A	A	A	Α	_	_	_	A	Zinc sulfate 25% Saturated 20°C	A	А	A	A	_	A	_	A	For information on KV	rollers,
Linseed oil 100% 20°C	A	B	A	Α	Α	_	Α	A										please contact a Tsuba	aki
	17		77	17	17		17	~										representative.	

# Installation

# 1. Sprocket Installation

Proper installation of the sprockets is critical to smooth operation of a conveyor, and it also affects chain life. The installation should be properly carried out in accordance with the procedures described below.

1) Check the levelness of the shafts with a level. Adjust to within a tolerance of  $\pm \frac{1}{300}$ 



## Figure 1: Levelness of Shafts

2) Check the parallelism of the shafts with a scale. Adjust the shafts so that the parallelism as calculated with formula  $\frac{A-B}{I}$  is to within  $\pm \frac{1}{100}$ 



Figure 2: Parallelism of Shafts

3) Align the sprocket axis to match.

Tolerance relative to center distance:

- Up to 1 m: within 1 mm
- 1 to 10 m: within Distance between shafts (mm) 1000
- 10 m or longer: within 10 mm
  - Measure misalignment with: A straight edge when the distance is short A piano wire when the distance is long
    A leveling string or a piano wire when the
    - sprocket positions are different from each

other in terms of height Misalignment Sprocket

Figure 3: Sprocket Misalignment

4) After processes 1) to 3) have been completed, lock each of the sprockets to the shaft(s) by means of keys or Tsubaki POWER-LOCKS. Lock the sprockets that are installed and used on the same shaft so that the teeth of both sprockets align in terms of phase.

## 2. Centering

Because the conveyor chain runs on a guide rail, the precision of the guide rail must be especially high and the conveyor properly centered. In cases like vertical bucket elevators where there are no guide rails, if the conveyor is not precisely centered, the chain will wobble and weave. This will have a significant impact on the life of the conveyor chain.

## 3. Rails

In general, rails wear faster than chain. While it is important that the rail material be matched to the chain material, in general, rolled steel for general structures (SS400) or plastic material (ultra-high molecular weight polyethylene) is recommended.

- 1) Wear is a complex phenomenon and is influenced by a variety of factors, including corrosion, lubrication, load speed, and operating time. Deducing the precise relationship between chain life and rail material is difficult.
- 2) Chain life is influenced by the rail. For new installations, verify the wear state by selecting rail material that is slightly softer than the chain. The smoother the finish on the rail surface, the better.
- 3) Operating conditions must be taken into consideration when selecting materials. In environments involving mechanical impact and other special conditions, there may be cases when plastic should not be used.
- 4) Precautions before putting rails into operation
  - 1. Lubricate all rail connecting parts, chamfer edges, and eliminate uneven levels and gaps. (See Figure 4.)
  - 2. After welding rail, remove spatter or scale.
  - 3. During the trial run, run the conveyor unloaded. Lubricate the chain and check the condition of chain and rails.



Rail width W is generally the sprocket tooth width.



Figure 4: Rail Joints



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# **How to Cut Chain**

Attachment chains are generally sold in unit sections (1 unit = 10 ft/3,048 mm). Configuring chain to a specific length will require cutting units.

# 1. Grind Pin Rivets

Using a grinder, grind down the ends of the two pins on the outer link (on the attachment side) until they are level with the outer plate. Take care that the chain does not overheat (see Figures 6 and 7). Particularly with Lambda Chain, work on the chain slowly so that the oil-impregnated bushes do not become too hot.





Figure 6: Attachment Chain

Figure 7: Grinding Down Pin Ends

# 2. Set Chain in a Vise and Cradle

# 1) S Roller (A, SA, EP, GNK1 attachments)

Place the chain in the jaws of a vise with the attachment side facing up and gently tighten the vise to secure the chain (Figures 8 and 9).



Figure 8: Setting Chain in Chain Vise



Figure 9: Cross Section of Chain Set in Chain Vise

2) S Roller (K, SK attachments), R Roller (K, SK attachments), Plastic R Roller, Poly Steel Chain (with attachments)

For these types, set the chain in a cradle (Figure 11-1). Another method, used only with steel S rollers (Figure 11-2), is to set the pin to be removed on the edge of the chain vise. Whichever method is used, support blocks should be placed under the chain on either side of the vise to ensure that the chain remains stable (Figure 10). Any attachment can be cut using this method. However more force will be required to remove the pin as mentioned in "3. Pin Removal" on the next page.



Figure 10: Cradle and Support Blocks



Figure 11-1: Cradle Cross Section Figure 11-2: Chain Vise Usage

# 3) R Roller (A, SA, EP attachments)

This method cannot be used with plastic rollers.

Secure the non-attachment side plate of the chain in the vise and support the R rollers on the vise (Figure 13). Ensure that the chain is supported on both sides of the vise (Figure 12).



Figure 12: Chain Vise and Support Blocks



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# Engineering Manual Small Size Conveyor Chain

# 3. Pin Removal

 Using a primary punch suitable for the chain size (refer to the Tsubaki Drive Chain Accessories section in a separate catalog), place the punch on the head of the pin that was ground down and strike with a hammer. Be sure to strike the pins on the outer link alternately to remove them evenly and at the same time. Strike the pins until they are just about to release from the outer plate (Figure 14).



Figure 14: Tapping Pin with Primary Punch

2) Using a secondary punch (refer to the Tsubaki Drive Chain Accessories section in a separate catalog) and a hammer, completely remove the pair of pins from the outer link. Check that the bush of the removed pins has not come loose from the inner plate, and that the bush has not become deformed in the process. If the bush has come loose or is deformed, do not continue to use it.

# 4. Poly Steel Chain (Without Attachments)

- Place the outer plate of the chain in a cradle, position a special punch on the head of the pin (see photo in Figure 16 below), and lightly strike with a hammer (Figure 15).
- Work carefully, as there is a risk of damage if excessive force is applied to engineering plastic components in this process.



Figure 15: Cross Section Showing Poly Steel Chain Set in Cradle



Figure 16: Disconnecting Poly Steel Chain

# A Safety Points

- Use a grinder to grind down only the riveted portion of the pin head. Removing the pin without grinding the riveted head off will require additional time and effort, and may damage the chain.
- 2. Do not re-use parts removed from the chain.

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# **How to Connect Chain**

# 1. Assembling with a Connecting Link

- 1) Insert the pins of the connecting link into the bushes of the free inner links. Place the free link plate over the pin ends and secure using a spring clip or cotter pins.
- 2) The pins are slip-fit into the connecting plate, meaning the pins can be inserted manually.



Figure 17: How to Connect Attachment Chain

# 2. Installing Spring Clips

Check that the spring clip is securely attached. Failure to install the spring clip or improper installation may result in an accident.

- Spring clips are used to secure the connecting link of chain sizes smaller than RF2060 and RS60. Insert the pins of the connecting link into the bushes of the free inner links, place the link plate over the pin ends, and slide the spring clip over the ends of the pins so that the slot and the fingers of the clip engage the grooves securely (Figures 18 and 19).
- 2) Pay careful attention to ensure that the fingers of the spring clip are not spread too wide. If the spring clip does not fit securely, it could become detached without warning, leading to an accident (Figures 19 and 20).



Figure 18: Slide Spring Clip Over Grooves in Pin Ends



Figure 19: Use a Pair of Pliers to Secure Spring Clip



 In general, the spring clip should be installed in the direction opposite to chain travel, as shown in the drawing below (Figure 21).



Figure 21: Spring Clip Installation

## 3. Installing Cotter Pins

Securely install the cotter pins in the holes provided on the ends of the pins. Failure to install the cotter pins or improper installation may result in an accident.

 After the cotter pin has been fully inserted into the hole on the end of the pin, open the legs of the cotter pin to an angle of around 60 (Figure 22). Do not re-use cotter pins. Do not use commercially available cotter pins.



# Figure 22: Open Legs of Cotter Pin 2) How to Open the Legs of the Cotter Pin



 Insert the cotter pin into the cotter pin hole.
 Use a pin that is somewhat larger in diameter than the cotter pin to lightly tap the head of the cotter pin. The legs of the pin will open slightly.





(3) Insert the blade of a flathead screwdriver at the point where the legs of the cotter pin have opened slightly.





(4) Insert the blade of the flathead screwdriver at an angle and move the screwdriver back and forth to open the legs of the cotter pin.

(5) Press down the head of the cotter pin tightly so that the cotter pin will not disengage from the cotter pin hole.

(6) Bend the cotter pin legs to the 60 angle mentioned above.

# Lubrication

Proper lubrication of roller chain is essential for peak performance and full chain life. In particular, the greater the level of performance demanded of the chain, the more the need for lubrication increases.

- 1) The purpose of lubrication is to reduce wear on chain parts, prevent corrosion (rust), and economize on power demands.
- 2) Lubricate the chain periodically (about once a week) so that the chain always remains damp with oil. Drip lubricate (using lube listed below) or apply lube with a brush.
- 3) Lubrication locations

Since wear between pins and bushes causes chain elongation, lubrication must be maintained on all contact surfaces. Also, areas where chain parts (plates, etc.) come into contact with guide rails must be lubricated (see Figure 26).



Figure 26: Lubrication points

# Lubricants: SAE Numbers (Table 12)

Lubrication Method	Drip or Brush			
Ambient Temperature Tsubaki Chain No.	–10°C to 0°C	0°C to 40°C	40°C to 50°C	50°C to 60°C
RS50 or lower small-pitch chain	SAE10W	SAE20	SAE30	SAE40
RS60/80	SAE20	64520	SAE 40	
RS100	SAEZU	JAEJU JAE4U		SAE50
RS120 or higher large-pitch chain	SAE30	SAE40	SAE50	

# Commercially Available Lubricants (Table 13)

SAE	SAE10W	SAE20	SAE30	SAE40	SAE50
ISOVG (CST40°C) Manufacturer	32	68	100	1 <i>5</i> 0	220
ldemitsu Kosan	Daphne Mechanic Oil 32	<i>»</i> 68	<i>∞</i> 100		<i>»</i> 220
Exxon Mobil	DTE Oil Light	// Heavy medium		Æxtra heavy	∥ BB
Japan Energy (JOMO)	Lathus 32	<i>»</i> 68	<i>»</i> 100		<i>»</i> 220
Showa Shell Sekiyu	Super MULPUS DX32	<i>»</i> 68	<i>»</i> 100		<i>»</i> 220

# Examples of Low and High Temperature Lubricants (Table 14)

The following lubricants can be applied when conveyor chain is used at low or high temperatures.

Use an equivalent if using another brand.

Ambient and Operating Temperature	−50°C to −25°C	−25°C to 0°C	–10°C to 60°C	60°C to 200°C	150°C to 250°C
Manufacturer/ Lubricant	Dow Corning Toray SH510 Shin-Etsu Chemical KF50 Momentive Performance Materials TSF431	Exxon Mobil Arctic Oil C Heavy	See above	Sato Special Oil Hot Bearing Oil #200 Exxon Mobil DTE Oil HH Moresco Moresco Hilube L-150	Sato Special Oil High Thermo Lube #700 Moresco Moresco Hilube R-220

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# **Tension Adjustment**

The correct amount of chain slack is essential for proper operation of the chain. When the chain is too tight, working parts such as chain, sprocket wheel, shaft, bearings, etc., carry a much heavier load, accelerating chain wear. On the other hand, too much slack is also harmful and causes the chain to ride up on the sprocket teeth.

# 1. Frequency of Adjustment

The chain has a tendency to stretch a certain amount at the beginning of operation due to slight distortion of its components. After such initial elongation, the chain stretches slightly, but constantly, as a result of normal wear. To maintain proper chain tension, adjustments, if necessary, should be made at regular intervals.

Assuming eight hours of operation a day, the frequency schedule for inspection and adjustment is given in the table below. When working hours are increased, the frequency of adjustment should be increased accordingly. Neglecting careful inspection increases the chances of an accident.

3. Even Adjustment of Take-Up on Both Sides
---

Where two parallel chains are adjusted by two independently operated take-ups, care must be taken to ensure even stroke on both the left and right side (not needed when the take-ups are cooperating screw type or counterweight type). An uneven adjustment will cause the link plate and the side of the sprocket teeth to interfere with each other and result in an overload condition. When the right and left sides are uneven, the two chains should be made even by replacing a portion of the right and left chains.

1st week after start of operation	Once a day
2nd to 4th week after start of operation	Twice a week
Thereafter	Twice a month

# 2. Insufficient Take-Up Adjustment

If there is still excessive slack in the chain even after the take-up adjustment is fully tightened, shorten the chain by removing two links. See page 98, "How to Cut Chain" for the steps involved.



Figure 27: Adjusting Chain Slack

Plus Q

# **Trial Run**

After installing the chain, carry out a trial run and check the following items before you actually start running the chain.

# 1. Before Trial Run

- Connecting spring clips and cotter pins are installed correctly.
- 2) Chain slack is adjusted properly.
- 3) Lubrication is adequate.
- The chain does not come into contact with casing or covers.

# 2. Trial Run

- 1) There are no strange noises.
- 2) There is no excessive chain vibration.
- 3) The chain does not ride up on the sprockets.
- 4) The chain is not jammed into the sprockets.
- 5) The rails and sprockets are installed correctly.
- 6) The rollers rotate smoothly.
- 7) There are no stiff areas during chain articulation.

# **≜** Caution

An unloaded trial run should be conducted after installation by intermittently switching the system on and off several times. After inspection, a continuous unloaded trial run should be conducted. Prior to the trial run, be sure to lubricate the chain to allow lubricant to work into various components.

# Inspection

Frequently inspect the chain during the initial operating period in order to carry out necessary adjustment. Inspect the following items.

- 1) Unusual wear of chain.
- 2) Slack in chain.
- 3) Vibration and jerking of chain.
- 4) Unusual wear of sprocket, unusual contact of
  - sprocket with other components due to eccentricity, debris accumulation in teeth valleys.

When the sprocket properly engages with the chain, even contact is represented by the trace of contact shown as A in the illustration, while uneven trace of contact shown as B in the illustration represents improper installation of the sprocket or a twisted chain. Rechecking is needed.

Proper contact should be traced a little above the valley. However, when initial tension remains in the slacked side of the chain,



the chain slightly contacts the valley. However, even in

Figure 28: Trace of Contact

this case, strong contact should be traced around A. With idlers and tighteners, contact happens at the middle of the valley.

- 5) Too much guide rail wear.
- 6) Any abnormality in the lubricating system.

## Causes of Vibration, Jerking, and Unusual Wear

- 1) Overload, glass fragments caught between components.
- 2) Warping of the chain on the return side.
- 3) Insufficient lubrication or no lubrication.
- 4) Wear of the sprocket.
- 5) Unusual wear or breakage of the chain.

Small Size Conveyor Chain

Small Size Conveyor Chain

Corrosion Resistant Small Size Conveyor Chain

Plus

Q

Small Size Conveyor Chain

High Precision Conveyor Chain

Lube Free

Special

# **Usage Limits**

# 1. Chain Wear Elongation

The chain should be measured by stretching it slightly to remove any backlash or looseness. Measure the distance of the inside (L1) and outside (L2) of rollers at both ends of the measured links to obtain measurement (L). When measuring, use at least 6 to 10 links to help keep any measuring error to a minimum.



 $Chain \ wear \ elongation \ (\%) = \frac{Measured \ length \ (L) - Standard \ length}{Standard \ length} \times \ 100\%$ 

Standard length = Chain pitch X No. of links

The chain should be replaced when wear elongation is greater than 2% of the chain pitch.

A chain wear measurement scale that allows easy checking of pitch stretch is available from Tsubaki.

For Lambda Chain, if the chain elongation reaches around 0.5%, then its oil has run out. Indicators of this condition are red wear dust between the plates and occurrence of poor chain articulation. In this situation the chain is no longer usable and should be replaced.

# 2. R Rollers

When wear between the bush and roller causes the under surface of the link plate to contact the guide rail, the chain has usually reached the end of its usable service life. When the link plate starts contacting the guide rail, rolling contact suddenly turns into sliding contact between the link plate and rail, resulting in greater wear, an increase in chain load, and a reduction in transmitted power.

# 3. S Rollers

The chain has reached the end of its service life as soon as holes or cracks appear on the rollers due to wear.

# 4. Link Plates

For conveyor configurations in which link plates move directly on the material to be conveyed or on a guide rail, the service life has come to an end when the



come to an end when the Figure 30: Plate Width Wear worn section equals H/8, as shown in the drawing.

## 5. Sprockets

When the sprocket is worn as illustrated below (to the left), the chain is prone to being caught by the tips of the teeth (A), making the disengagement of the chain from the sprocket difficult, hence resulting in vibration of the chain. Though wear allowance depends on the type of conveyor and the size of the chain to a certain extent, if the sprocket is replaced when the wear reaches 0.3 to 1.0 mm, damage to the chain can be avoided. When the sprocket is worn in the direction of the tooth width as illustrated below (to the right), the shaft may not be properly aligned and should be corrected. A

# Wear

Figure 32: Wear of Sprocket Teeth

Plus

Q

Small Size Conveyor Chain

High Precision Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

Small Size Conveyor Chain

Lube Free

Special

Standard

# **Other Precautions**

## 1. Shutdown/Restart

Stop the conveyor under unloaded conditions to prevent remaining material from overloading the system when the conveyor starts again. Also, if the conveyor system has been shut down for a long period of time, be sure to inspect the chain before restarting.

# 2. Securing Conveyor Parts

Parts fastened to the conveyor such as buckets, aprons, slats, etc., tend to loosen as a result of vibration. Pay careful attention to fastening nuts and bolts, and check periodically that they are tightly fastened.

## 3. Temperature and Prevention of Freezing

Conveyor damage may occur when differences in temperatures (between day and night in winter) are extreme. Under these circumstances, operate the conveyor carefully, taking into account any variations in temperature as well as appropriate lubrication, the moisture content of the conveyed material, inspections, etc.

# 4. Spare Chain Storage

We recommend that a spare chain be prepared in advance in the unlikely event of a failure or accident. This spare chain should be stored in a dry space. Also, if the chain is to be stored for a long period of time, it should be coated with a rust-preventive oil. For convenience, attach a tag noting the product name, chain number, date of purchase, and equipment it is intended to be used on.

# 5. Record of Use and Maintenance

Beyond the maintenance and inspection items mentioned above, after installing the conveyor, prepare a record of the expected capacity to be conveyed, conveying speed, rpm of main shaft, electric current, voltage, power, working hours, actual conveying capacity, inspection dates, lubrication dates, details of problems, and the like. This will serve as protection against unexpected accidents. When updated on a regular basis, this record will also be convenient for maintenance and repairs.

# 6. Cleaning

The chain should be cleaned periodically to remove contamination or particles of conveyed material from the chain and rail.

# 7. Storage of Chain and Sprockets

Chain and sprockets should be stored in a place free of dust and dirt and where they will not be exposed to rain. To prevent rust, use a brush to coat sprockets with oil. No rust-prevention treatment is applied at the time chain is shipped. Therefore, when storing chain, coat with a rust-preventative oil and inspect periodically for corrosion. **Engineering Manual** 

# **Troubleshooting**

When there is significant damage and breakage to the chain and sprockets, please carry out the following procedures.

Stai Sma	1. General	General				
ndarı 11 Size	Symptom	Possible Causes	Remedy			
d Conveyor (		The chain and sprocket do not match.	Replace the chain and sprocket with the correct size.			
Chain		Excessive load.	Reduce the load, add lubrication, or increase the number of strands or the size of the chain.			
<b>Special</b> Small Size (	1 gradation	Elongation of the chain due to wear or excessively worn sprocket teeth.	Replace with new chain and sprockets.			
onveyor Chain		Angle of chain wrap on the sprocket is insufficient.	Angle of chain wrap should be at least 120 degrees or chain must be engaged with at least three sprocket teeth.			
Lub	Chain rides up on the	Inadequate back-tension.	Adjust the catenary or take-up idler.			
e Free 11 Size Conve	sprocket	Distance between the center of the chain and the sprocket do not match.	Inspect and correct.			
yor Chain		Improper installation of the sprocket or shaft.	Inspect and correct.			
Corros Small S	Corrosion Resistant	Chain casing or bearings are loose.	Tighten all bolts and nuts.			
s <b>ion Resis</b> ize Conveyor		Excessive or insufficient slack in the chain.	Adjust the distance between the shafts to obtain the proper amount of slack.			
ant Chain		Excessively worn chain or sprocket.	Replace with new chain and sprockets.			
<b>Plus</b> <i>Q</i> Small Size	Unusual noises	Lack of or unsuitable lubrication.	Provide proper lubrication according to the operating conditions.			
Conveyor Cha		Interference of casing with the chain or other moving parts.	Inspect and correct.			
ain Conveyor		Improper guide rail installation. Difference in Rail Levels Return Radius R Rails Tilted or Skewed	Inspect and correct.			
ision Chain		Excessive slack in the chain.	Adjust the chain length or distance between shafts. Install a tensioner.			
Engir		Elongation of the chain due to wear or excessively worn sprocket teeth.	Replace with new chain and sprockets.			
ineering Manual	Chain winds onto the sprocket (poor separation from	The chain and sprocket do not match.	Replace with new chain and sprockets.			
	the sprocket teeth)	Poor chain articulation due to rust. Inappropriate lubrication. Harsh environment.	Remove and replace the chain. Protect the chain from the environment by appropriate lubrication and/or cover.			

Symptom	Possible Causes	Remedy	
Excessive wear on the inside surface of the link plates and sides of the sprocket teeth	Improper installation.	Correct sprocket and shaft installation.	
	The chain is being pushed to the side.	Remove the cause of the push and/or switch to a chain with guide rollers.	Standard Small Size Conveyor Chain
Excessive wear on the sides of the link plates and pin heads	Improper installation of guides, etc.	Check the condition of the guides and increase the gap between the guides and the chain.	Special Small Size Conve
	Deformation of the chain caused by improper installation.	Inspect installation and correct as necessary.	yor Chain
	Contamination from metal debris or dirt because of improper lubrication.	Remove the chain, wash it thoroughly, and provide proper lubrication.	Lube Fr Small Size
	Excessive load, bent pin, or cracked bush.	Reduce the load or increase the number of strands or the size of the chain.	ee e Conveyor (
	Corrosion or rusting.	Install a chain casing to protect the chain.	Chain S
Improper flex or bending of the chain	Inadequate lubrication.	Provide adequate lubrication.	o <b>rrosion</b> mall Size Cc
	Foreign particles stuck in clearance.	Install a casing to protect the chain.	Resistant Inveyor Chai
	Use in extremely high temperatures.	Provide adequate clearance. (Contact a Tsubaki representative regarding this situation.)	in Sma
Spreading of link plates	Uneven or excessive load caused by improper installation.	Replace with new chain and correct installation.	S <i>Q</i> II Size Conv
			eyor Chain

# 2. Link Plates

Symptom	Possible Causes	Remedy	
Breakage of link plate	Excessively large shock load.	Reduce shock loads by making start-up, stopping, and other actions smoother. Install a shock absorber. Increase the number of strands or the size of the chain.	
	Vibration in the chain.	Install an anti-vibration device such as a tensioner or idler.	
	Corrosion.	Replace with new chain. Install a casing to protect the chain. Periodically clean and lubricate the chain.	



# 1) Static Fracture Stretching the link plate with a tensile load beyond its breaking load will cause it to stretch and then break.



2) Fatigue Fracture By repeatedly applying a load past its fatigue limit (fatigue strength), the fatigue will start at holes and then suddenly cause the chain to break.



3) Offset Link Plate Fatigue Offset link plates are bent at the center, and the resulting concentration of stress at the bend can cause a fatigue break. Avoid using offset links in high-pressure applications.

Cracks in the link plates (fatigue), which are perpendicular to the direction of pull	Loads are greater than allowable.	Remove all large or excessively repetitive loads. Increase the number of strands or the size of the chain.
	Repetitive load on attachments.	Reduce excessive loads. Increase the size of the chain to increase the allowable load of the attachments.
Deformation of link plate holes	Excessive load.	Replace with new chain. Remove the cause of the excessive load.
Corrosion stress cracks (bow-shaped cracks in the link plate)	The chain is being used in an acidic or alkaline environment (not caused by repetitive loads).	Replace with new chain. Install a casing to protect the chain from the environment. Consider a chain with a high resistance to corrosion stress cracking.

Plus a

Small Size Conveyor Chain

Special Small Size Conveyor Chain

Lube Free Small Size Conveyor Chain

Corrosion Resistant Small Size Conveyor Chain

Standard
#### 3. Pins

Symptom	Possible Causes	Remedy
	Excessively large shock load.	Reduce shock loads by making start-up, stopping, and other actions smoother.
Breakage of pin	Subject to a repetitive load greater than the fatigue limit of the pin.	Remove the large repetitive load. Increase the number of strands or the size of the chain.
Dioditago of pill	Corrosion.	Install a casing to protect the chain. Periodically clean and lubricate the chain.







#### 1) Static Fracture

The type of fracture found when subjecting the chain to the breakage test. Occurs when the chain is subjected to a load greater than its breakage strength.

2) Fatigue Fracture

Occurs when the pin is repetitively subjected to loads greater than its fatigue limit. Recheck the size of the peak load and formulate a countermeasure.

3) Shock-Induced Bending Fracture The pin is subjected to a large shock load and breaks. The side with the initiating point receives tensile load and the fracture progresses from this point. The pin is especially susceptible to becoming weak with regard to bending when the surface of the pin has corroded. This type pf phenomenon occurs quite easily.

Pin rotates or begins to stick out	Excessive load or improper lubrication.	Replace with new chain. Improve the lubrication or loading conditions.
DOCOCO THE Normal	Operating a chain at high load without proper lubrication can create friction between the pin and bush, causing the pin to rotate. In this condition, the pin may come out, leading to chain breakage.	Replace with new chain immediately. Do not weld or reuse the pins. Dispose of the old chain to be sure that it is not used again by mistake. Also, if the pin head or link plate surface is worn, check the installation.

#### 4. Bushes/Rollers

Symptom	Possible Causes	Remedy
Roller and/or bush cracks (falls off)	Inadequate lubrication.	Provide adequate lubrication according to the operating conditions. Replace with new chain.
	RS25, RS35	These are bushed chains and have no rollers.
	The inner link plate is moving inward, or the bush is cracked.	Replace with new chain. Re-inspect the installation and load conditions.
Roller does not rotate, roller is corroded on	Foreign particles have gotten between the bush and roller.	Periodically clean the chain. Install a casing to protect the chain.
	Excessive load on the rollers.	Reduce excessive loads. Increase the size of the chain.
	Particles of the conveyed material or other foreign particles have built up on the frame.	Periodic cleaning. Install a partition to protect the chain.
	Rust on the bush and rollers.	Select the appropriate specifications (materials).
	The inner plate is moving inward.	Replace with new chain. Re-inspect the installation and load conditions.
Roller is opening up	Excessive load.	Reduce the load. Provide adequate lubrication.
Roller is becoming hourglass shaped	Excessive load or inadequate lubrication.	Replace with new chain. Improve the lubrication or loading conditions.

Special

## **Free Flow Chain**



### **Free Flow Chain**

Free Flow Conveyor – This is a conveyor system where the speed of conveyed objects can be freely controlled and stopped at any time and at any position for accumulation or for performing a job at a station without stopping the conveyor.

**Double Plus Chain** 



the speed of the chain.

Snap Cover Type

Low Noise

Center Roller Chain

**Double Plus Chain** 

**Outboard Roller Chain** 

**Top Roller Chain** 

Special Sprockets

Engineering Manual



Operating temperature range: -10°C to 60°C

This unique construction combining the use of small and large rollers allows high-speed transfer at 2.5 times

The lower chain speed allows accumulation with low noise.

The snap cover prevents small parts from falling into the frame.



Operating temperature range: –10°C to 60°C

#### **Steel Roller Type**

Steel Roller type is capable of higher-load conveyance compared with plastic roller chain. It is operable at temperatures as high as 150°C and achieves quiet operation. Operating temperature range: -10°C to 150°C



#### Applications

Double Plus Chain is intended for high-speed conveyance. The use of a special rail minimizes chain exposure and thus improves safety. This chain is widely used for assembly and inspection lines in a variety of business fields, such as the automobile and electronics industries.

#### **Center Roller Chain**

#### Same Speed

The speed of the chain and conveyed objects is the same ratio of 1:1.

#### **Stable Conveyance**

Center Roller Chain allows stable conveyance, as its center of gravity is lower than that of Top Roller Chain and conveyed items are received on rollers on both sides.

#### Snap Cover Type

The snap cover prevents small parts from falling into the frame. Operating temperature range: -10°C to 60°C



Operating temperature range: -10°C to 150°C

#### Applications

Center Roller Chain is intended for low-speed conveyance. Steel Roller type is suitable for conveying heavier objects and can be used for conveyance in a furnace.

## Double Pit



#### Applications

Outboard Roller Chain is used for low-speed conveyance of objects of various sizes in a wide range of business areas.

#### **Top Roller Chain**

The width of the chain is smaller than that of other types of Free Flow Chain.

With top rollers supported by plates on both sides, this chain is suitable for use with rugged free-flow conveyors.

#### Double Pitch Chain Type

**RS Chain Type** 

Double-strand Top Roller type and topple prevention attachment type (TG) are available. (See pages 140 and 142.)





#### Applications

Top Roller Chain is used for low-speed conveyance and is widely adopted in the automobile industry. With its wide roller width, Double-Strand Top Roller Chain is suitable for conveying heavier objects directly placed on the conveyor.

## **Free Flow Chain**





## **Double Plus Chain**



#### Standard Type, HCP Type, SS Type



Parts marked with  $\otimes$  are press fit. Other parts are slip fit.

#### Double Plus Chain with Snap Cover



Double Plus Chain with Snap Cover differs from the Double Plus Chain shown above only in terms of the shape of the plate on which the snap cover is installed. The snap cover is detachable. Double Plus Chain with Snap Cover is available in hard chrome plating, stainless steel, and Lambda types, as well as the standard type.

#### Lambda Type (Lube Free)

Construction



Parts marked with  $\otimes$  are press fit.

Other parts are slip fit.

- Uses a special oil-impregnated bush.
- The bush is press-fitted into the inner plate.
- The pin is treated with a special nickel plating.
- The inner and outer plates are treated with a black oxide finish.

#### Urethane Lining Roller Type



#### RF2030VRPUA, RF2030VRPUB

Differs from Double Plus Chain shown above only in the large roller.

**Top Roller Chain** 

Accessories for Double Plus Chain

**Outboard Roller Chain** 

Double Plus Chain



#### **Combination of Base Chain and Roller**

The proper combination of base chain (4 types) and roller (7 types) allows the optimum selection for your intended purpose (The mark  $\bigcirc$  in the table below shows an allowable combination).

The same combination is also allowed for Double Plus Chain with Snap Cover.

Roller Series		Engineering	Plastic Roller		Urethane	e Lining*1	Steel Roller
Base Chain Type, Material, Application	VRPA Standard	VRPB High Friction	VRPC Electro- Conductive	VRPD Electro-Conductive, High Friction	VRPUA Standard	VRPUB High Friction	VR
Standard (Steel)	$\bigcirc$	0	$\bigcirc$	$\bigcirc$	$\bigcirc$	0	0
HCP (Hard Chrome Plating) Rust-inhibitive applications such as in clean rooms	$\bigcirc$	0	$\bigcirc$	0	$\bigcirc$	0	
SS (304 Stainless Steel) Applications requiring non-magnetism and corrosion resistance*2	$\bigcirc$	0	$\bigcirc$	0	$\bigcirc$	0	
Lambda (Lube Free) (Base chain is the same as the standard type) Applications where lubrication is not permitted or not preferable	$\bigcirc$	0	$\bigcirc$	0	$\bigcirc$	0	

 \*1 Urethane lining is available only for RF2030VRP.
 \*2 Slight magnetism occurs due to plastic deformation during parts processing and assembly. For an application requiring complete non-magnetism, contact a Tsubaki representative for details.

#### **Roller Classification by Use**

Ŧ	Ro	ller			F			
Гуре	Large Roller (Roller Color)	Small Roller (Roller Color)	Classification	Lubrication	Environment			
VRPA Standard	Standard (Brown) High Friction (Off-White)		10 dB quieter than standard plastic outboard roller chain					
VRPB High Friction			Rapid start-up Low noise	No. I. Indianation and a stand				
VRPC Electro-Conductive	Conductive (Gray)		Volume resistivity 10 <sup>6</sup> Ω ∙cm	For long-term use, follow the Guidelines for Use	HCP or SS type, the chain cannot be used in			
VRPD Electro-Conductive, High Friction	(Black)	High Friction (Off-White)	Volume resistivity 10 <sup>6</sup> Ω ∙cm Rapid start-up Low noise	on page 151. Lambda type requires no	a place where it is exposed to water due to the use of engineering			
VRPUA Standard	Urethane Lining	Standard (Gray)	Direct placement on conveyor	lubrication.	plastic rollers.			
VRPUB High Friction	(Off- white)	High Friction (Off-White)	Direct placement on conveyor Rapid start-up Low noise					
VR	Steel Steel		High load	Required	Not for use in a humid environment.			

-6	Low noise		Low noise	()	0	Heat resistant
VRPA	VRPB	VRPC	VRPD	VRPUA	VRPUB	VR

# **Double Plus Chain**

## **Double Plus Chain**

Double Plus Chain

Center Roller Chain

## Principle of 2.5 Times Free-Flow Speed Small Roller Large Roller Pallet Base Chain . Aluminum Frame Pallet Aluminum Frame Return Side

#### 1. Conveyance

Friction between the large roller ( $\bigcirc$ ) and the small roller (•) causes the rollers to rotate together. The difference in the diameters of the rollers causes the speed of the conveyed object to be 2.5 times that of the chain.



Chain speed: v Pallet speed: V Radius of the small roller: r Radius of the large roller: R

When the chain runs at speed v, the peripheral speed on the circumference of the small roller (rolling speed on the rail running face) becomes " v ".

Since the large and small rollers now rotate at the same angular speed, the peripheral speed on the circumference of the large roller is calculated as below, based on the ratio of the radii:

 $\left(\frac{\mathsf{R}}{\mathsf{r}}\right)\cdot\mathsf{v}$ 

Consequently, the conveying speed V is the sum of the peripheral speed  $\left(\frac{R}{r}\right) \cdot v$  and the chain speed v.

$$V = \left(\frac{R}{r}\right) \cdot v + v$$
$$V = \left(\frac{R}{r} + 1\right) \cdot v$$
From the ratio of radii  $\left(\frac{R}{r}\right) \approx 1.5$ 
$$V \approx (1.5 + 1) \cdot v \approx 2.5 v$$

Position of Chain and Pallet During Conveyance



#### 2. Accumulation

With a braking force applied to the large roller, a slip occurs between the large ( $\bigcirc$ ) and small ( $\bigcirc$ ) rollers so as to allow free-flow conveyance.



Accessories for Double Plus Chain

Special Sprockets

Small Size Conveyor Chains

# Double Plus Chain

**Top Roller Chain** 

Special Sprockets

Engineering Manual

#### How to Order

In placing an order for Double Plus and Center Roller Chains, please specify the chain length as well as the chain size and type.

#### **1. Model Identification**

In placing an order for a chain, connecting link, or offset link, please specify the product code and chain number to avoid any error. Refer to the information on dimensions for the product code and chain number.

#### 2. Information When Placing a Chain Order

1) If the number of links on the overall chain is even, the link on one end of the chain will be a connecting link and the link on the other will be an inner link.

- 2) If the number of links on the overall chain is odd, please specify the link type on both ends of the chain as per below.(1) Inner links on both ends
  - (2) Connecting links on both ends
  - (3) Outer links on both ends
  - (4) Connecting link on one end and offset link on the other

#### 3. Note for Placing an Order for Peripheral Components

The aluminum frame and pallet guide are offered in standard lengths.

Please use caution when placing an order for the middle-section frame, since the standard length of the middle-section frame differs with size.

Plastic rails are not supplied with the pallet guide rail. Place an order for the plastic rail and pallet guide rail separately by specifying the required number.

#### Max. Allowable Load

#### Max. Allowable Load --- Engineering Plastic Roller Series

		Max. Allowable	e Load kN {kgf}	Operating		Max. Allowable	Operating		
Tsubaki Chain No. Bo	Roller Type	A, C, UA* Type	B, D, UB* Type	Temperature Range °C	Isubaki Chain No.	Load kN {kgf}	Temperature Range °C		
RF2030VRP RF2030VRP-SC	Standard Lambda HCP SS	0.55{56}	0.27{28}		RF2030VR	0.98{100}			
RF2040VRP RF2040VRP-SC	Standard Lambda HCP	0.88{90}	0.44{45}		RF2040VR	1.57{160}			
RF2050VRP RF2050VRP-SC	Standard Lambda HCP	1.37{140}	0.69{70}	-10 to 60	RF2050VR	2.45{250}	-10 to 150 For use at temperatures of 60°C or more, lubricate chain with		
RF2060VRP RF2060VRP-SC	SS Standard Lambda HCP	2.06{210}	1.03{105}		RF2060VR	3.73{380}	high-temperature lubricant.		
RF2080VRP RF2080VRP-SC	SS Standard Lambda HCP	5.30{540}	2.65{270}		RF2080VR	5.30{540}			

\* Urethane lining is available only for RF2030VRP.

#### **Steel Roller Series**

- The steel roller series is capable of conveying heavier loads compared with the engineering plastic roller series. It has twice the allowable conveyance weight and 1.8 times the allowable load.
- 2) Max. operating temperature is 150°C. Use lubricant appropriate for the operating temperature.
- 3) Operating noise is about 10 dB lower compared with that of steel outboard roller chain and steel top roller chain, because the chain speed is 1/2.5 times the conveying speed.

#### **Special Sprockets for Double Plus Chain**

Special sprockets are required when using Double Plus Chain. Refer to page 143 for the dimensions.



Max. Allowable Load --- Steel Roller Series





## **Double Plus Chain**

#### Base Chain



- RF2080VRP connecting links use a cotter pin.

• Lambda bushes are not notched.

Tsubaki C	hain No.	Pitch	Roller		Width		Plate				Pin		Approx. N	lass kg/m	No. of
Plastic Roller	Steel Roller	Р	R	R1	Wı	W2	t	Т	Н	D	Lı	L2	Plastic Roller	Steel Roller	Links per Unit
RF2030VRP	RF2030VR	19.05	11.91	18.3	8.0	4.0	1.5	1.5	9.0	3.59 (3.00)	12.05	13.25	0.6	1.4	160
RF2040VRP	RF2040VR	25.40	15.88	24.6	10.3	5.7	2.0	1.5	12.0	3.97	15.8	17.0	1.0	2.5	120
RF2050VRP	RF2050VR	31.75	19.05	30.6	13.0	7.1	2.4	2.0	15.0	5.09	19.55	21.25	1.4	3.7	96
RF2060VRP	RF2060VR	38.10	22.23	36.6	15.5	8.5	3.2	3.2	17.2	5.96	24.5	26.4	2.0	5.6	80
RF2080VRP	RF2080VR	50.80	28.58	48.0	20.0	15.0	4.0	4.0	23.0	7.94	35.8	38.0	3.9	_	60

The figure inside ( ) is for RF2030VRP-LMC.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### **Chain Numbering**

#### RF2040VRPA-SS

Chain size

Chain type VRP: Double Plus plastic roller VR: Double Plus steel roller

Type of engineering plastic roller A, B, C, D

UA, UB (only for RF2030) No symbol for steel roller

Type of base chain No symbol: Standard LMC: Lambda (lube free) HCP: Hard chrome plating (HCP type) SS: Stainless steel (SS type)

Accessories for Double Plus Chain

#### Base Chain (with Snap Cover)





Snap covers prevent small parts from falling into the frame.



• RF2080VRP connecting links use a cotter pin.

- Lambda bushes are not notched.
- The base chain is for dedicated use with snap covers.
- Snap covers cannot be attached onto Double Plus Chain shown on the left page.
- An offset link with a snap cover is not available.

Tsubaki C	Chain No.	Pitch	Roller		Width		Plate				Pin		Approx. N	No. of	
Engineering Plastic Roller	Steel Roller	P	R	R1	Wı	W <sub>2</sub>	t	Т	Н	D	Lı	L2	Plastic Roller	Steel Roller	Links per Unit
RF2030VRP-SC	RF2030VR-SC	19.05	11.91	18.3	8.0	4.0	1.5	1.5	9.0	3.59 (3.00)	12.05	13.25	0.6	1.4	160
RF2040VRP-SC	RF2040VR-SC	25.40	15.88	24.6	10.3	5.7	2.0	1.5	12.0	3.97	15.8	17.0	1.0	2.5	120
RF2050VRP-SC	RF2050VR-SC	31.75	19.05	30.6	13.0	7.1	2.4	2.0	15.0	5.09	19.55	21.25	1.4	3.7	96
RF2060VRP-SC	RF2060VR-SC	38.10	22.23	36.6	15.5	8.5	3.2	3.2	17.2	5.96	24.5	26.4	2.0	5.2	80
RF2080VRP-SC	RF2080VR-SC	50.80	28.58	48.0	20.0	15.0	4.0	4.0	23.0	7.94	35.8	38.0	3.9	_	60

The figure inside () is for RF2030VRP-LMC. The snap cover is made of engineering plastic and is light gray in color. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.



Gap Between Frame and Snap Cover

Snap covers minimize the gap between the aluminum frame and large rollers and prevent small parts from falling into the frame.

Note: Check for the potential of small parts to fall and get jammed under actual conditions in advance.



**Double Plus Chain** 

**Center Roller Chain** 

Accessories for Double Plus Chain

Max. Gap

1.5

2.2

2.5

3.5

4.7

## **Center Roller Chain**

## Double Pitch

**Double Plus Chain** 

Center Roller Chain

Accessories for Double Plus Chain



#### Same Speed

The speed of the chain and conveyed objects is the same ratio of 1:1.

#### **Stable Conveyance**

Center Roller Chain allows stable conveyance, as its center of gravity is lower than that of Top Roller Chain and conveyed items are received on rollers on both sides.

The aluminum frame of Double Plus Chain can be used with Center Roller Chain. Steel type: Aluminum frame with steel rail.

#### Base Chain



Tsubaki	Pitch	Roller		Width			Plate			Pin		Approx.	No. of Links	
Chain No.	Р	R	Rı	Wi	W2	t	Т	Н	D	Lı	L 2	Mass kg/m	per Unit	
RF2040CR	25.40	15.88	24.6	10.3	5.7	2.0	1.5	12.0	3.97	15.8	17.0	2.5	120	
RF2050CR	31.75	19.05	30.6	13.0	7.1	2.4	2.0	15.0	5.09	19.55	21.25	3.7	96	
RF2060CR	38.10	22.23	36.6	15.5	8.5	3.2	3.2	17.2	5.96	24.5	26.4	5.6	80	
RF2080CR	50.80	28.58	48.0	20.0	15.0	4.0	4.0	23.0	7.94	35.8	38.0	8.6	60	

#### Chain Numbering

#### RF2040CR

Chain size

Center roller
 Roller material: CR steel

Special Sprockets

## **Accessories for Double Plus Chain**

#### Frames

1. Aluminum Frame

This is a frame for Double Plus Chain using engineering plastic for the rollers (including the type with snap covers).

**2. Aluminum Frame with Steel Rail** Steel rails are laid on the small roller area on the conveying side of the aluminum frame. (See the dimensional drawing.)

This aluminum frame can be used with all Double Plus Chains (including snap cover types) and Center Roller Chains.

**3. Frame Dedicated for Drive and Driven Sections** The frame is provided with a notch on the end face for receiving the return-side section of the chain. Standard length: 1 m (for all sizes) Aluminum frames and aluminum frames with steel

Aluminum frames and aluminum frames with steel rails are available.

#### **Pallet Guide Rails**

- 1) This rail is installed on the side of the aluminum frame to guide the pallet.
- 2) The pallet guide rail is available for the middle section, and drive and driven sections.

#### **Plastic Rails**

- 1) The plastic rail is installed on the pallet guide rail for smooth pallet sliding.
- 2) The plastic rail is available for the middle section, and drive and driven sections.

#### **Return Guides**

The return guide guides the Double Plus Chain on the return side at both ends of the aluminum frame.

#### **Brackets**

The bracket is a fitting for attaching the return guide.

#### **Frame Joints**

The frame joint is a nut-type part for connecting frames.

#### **Examples of Use**



















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## **Accessories for Double Plus Chain**

#### Frames for the Middle Section

Aluminum Frame (for chains with engineering plastic rollers) Material: Aluminum

#### Frame No. RF2030VRP-R3

Standard length: 3 m

8.9 <u>6.5</u> 10.5 Approx. mass: 1.4 kg/m 37.95 5 6.5 10.5 20.5 35

9.9

#### Aluminum Frame with Steel Rail



#### RF2040·RF2050·RF2060VRP-R4S

Standard length: 4 m

Dimensions and approx. mass: See table below



#### RF2040·RF2050·RF2060VRP-R4

Standard length: 4 m

Dimensions and approx. mass: See table below







#### Frame No.

#### RF2080VRP-R3S

Standard length: 3 m Steel Rail Approx. mass: 9.9 kg/m



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Aluminum Frame No.																		Approx. N	∕lass kg/m
Aluminum Frame	With Steel Rail	A	В	С	D	Е	F	G	Ηı	H2	Ι	J	К	L	М	N	0	Aluminum Frame	With Steel Rail
RF2040VRP-R4	RF2040VRP-R4S	63	66	44.5	35.25	18.5	13	34.9	11.4	12	13.5	13.5	8.5	7.5	6.5	10.5	5	2.6	3.7
RF2050VRP-R4	RF2050VRP-R4S	78	80	55.5	41.75	23.0	15	43.0	14.3	15	16.5	17.5	10.5	9	8.5	13.5	7.5	3.6	5.0
RF2060VRP-R4	RF2060VRP-R4S	95	91	72.5	51.25	23.5	15	50.5	17.2	18	19.5	17.5	10.5	9	8.5	13.5	7.5	4.2	5.9

Delivery: Please contact a Tsubaki representative.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

**Top Roller Chain** 

Special Sprockets

#### Frames for Drive and Driven Sections

• The cross-sectional shape, dimensions, and material of these frames are the same as those of frames for the middle section.

- The dimension Q is different in frames for drive and driven sections.
- Refer to page 150 for the attachment position of steel rails for aluminum frames with steel rails.



	Drive and Driven	Section Frame No.			 ר	R		Approx. N	∕ass kg/m
Aluminum	Frame No.	Steel Rail I	Frame No.		×	(Standard	S	Aluminum	With
For Drive Section	For Driven Section	For Drive Section	For Drive Section	For Driven Section	Length)		Frame	Steel Rail	
RF2030VRP-R1K	RF2030VRP-R1J	RF2030VRP-R1SK	RF2030VRP-R1SJ	210	80	1m	25	1.3	2.1
RF2040VRP-R1K	RF2040VRP-R1J	RF2040VRP-R1SK	RF2040VRP-R1SJ	300	100	1m	25	2.4	3.5
RF2050VRP-R1K	RF2050VRP-R1J	RF2050VRP-R1SK	RF2050VRP-R1SJ	340	120	1m	30	3 · 4	4.8
RF2060VRP-R1K	RF2060VRP-R1J	RF2060VRP-R1SK	RF2060VRP-R1SJ	430	130	1m	40	4.0	5.7
_	_	RF2080VRP-R1SK	RF2080VRP-R1SJ	550	200	1m	60	_	9.5

Delivery: Please contact a Tsubaki representative.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Other Aluminum Frames (for the Middle Section)

#### Aluminum Frame with Steel Rail

Frame No.

#### RF2050VRP-R3HS

Material: Main body = Aluminum Steel rail = SS400 (JIS) Standard length: 3 m

Approx. mass: 6.3 kg/m



Outboard Roller Chain Top

**Double Plus Chain** 

**Center Roller Chain** 

**Double Plus Chain** 

**B**S

₫

## **Accessories for Double Plus Chain**



\* The plastic rail is commonly used for all models.

Pallet Guic	le Rail No.	Standar	d Length	Approx. Mass	Matorial	
Middle Section No.	Drive and Driven Section No.	For Middle Section	For Drive and Driven Sections	kg/m	Maleria	
RF2030VRP-PGR3	RF2030VRP-PGR1	3m	lm	0.9		
RF2040VRP-PGR4	RF2040VRP-PGR1	4m	lm	1.5		
RF2050VRP-PGR4	RF2050VRP-PGR1	4m	lm	2.2	Aluminum	
RF2060VRP-PGR4	RF2060VRP-PGR1	4m	lm	2.5		
RF2080VRP-PGR3	RF2080VRP-PGR1	3m	lm	3.5		
Plastic Gui	de Rail No.	Standar	d Length		Actorial	
Middle Section No.	Drive and Driven Section No.	For Middle Section	For Drive and Driven Sections	, N	Mulenui	
RF2030VRP-PR3	RF2030VRP-PR1	3m 1m				
RF2040VRP-PR4	RF2040VRP-PR1	4m 1m		1.16		
RF2050VRP-PR4	RF2050VRP-PR1	4m 1m		<ul> <li>Ultra-high molecular weight polyethylene</li> </ul>		
RF2060VRP-PR4	RF2060VRP-PR1	4m	lm			
RF2080VRP-PR3	RF2080VRP-PR1	3m	lm			

Delivery: Please contact a Tsubaki representative.

Note: Plastic rails are not supplied with a pallet guide rail. The rail for the middle section and the rail for the drive and driven sections are different only in their standard length.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Return Guides

#### For Double Plus Chain

(Return guides for RF2030 and RF2040 can also be used for Double Plus Chain with snap cover.)

Can also be used with Center Roller Chain.



Return Guide No.	A	В	С	D	Ε	F	r	R	Applicable Chain
RF2030VRP-RG	34	9	22	6	31	M6	54	60	Double Plus Chain and
RF2040VRP-RG	50	12	30	8	30	M8	52	60	snap cover
RF2050VRP-RG	56	15	35	10	32	M8	50	60	
RF2060VRP-RG	60	18	39	12.5	32	M8	47.5	60	Double Plus Chain
RF2080VRP-RG	70	23	45	15	41	M8	65	80	

Material: Ultra-high molecular weight polyethylene.

Delivery: Please contact a Tsubaki representative.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.



\* The mounting bolt is not supplied with the bracket.

Material: Aluminum. Delivery: Please contact a Tsubaki representative. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### For Double Plus Chain with Snap Cover



Return Guide No.	A	В	С	D	Ε	G	Н	I	r	R		
RF2050VRP-RG-SC	56	15	35	10	32	90.3	57	43	90	100		
RF2060VRP-RG-SC	60	18	39	12.5	32	90.3	57	43	87.5	100		
RF2080VRP-RG-SC	70	23	45	15	41	139.6	77	88	150	165		
Note: The return quides for RE2030 and RE2040 can also be used as												

the return guides for Double Plus Chain.

Material: Ultra-high molecular weight polyethylene

Delivery: Please contact a Tsubaki representative.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Frame Joints



Frame Joint No.	A	В	С	D	Е	F	G
RF2030VRP-FJ	40	24	8	M6	5	10	5
RF2040VRP-FJ	40	24	8	M6	5	10	5
RF2050VRP-FJ	40	24	8	M8	6.5	13	6
RF2060VRP-FJ	40	24	8	M8	6.5	13	6
RF2080VRP-FJ	40	24	8	M8	6.5	13	6

Material: Stainless steel. Delivery: Please contact a Tsubaki representative. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

## **Outboard Roller Chain**

Double Pitch

Outboard Roller Chain is a Free Flow Chain on which the pins of a Double Pitch or RS Chain are extended, and free-running outboard rollers are installed on the extended pins.



#### **Features**

- Outboard rollers allow for a compact conveyor, while the ability to flex backwards allows easy layout on the return side.
- Since numerous rollers can be installed, Outboard Roller Chain is suitable for conveyors on which small objects are placed directly.

Note: 1. "Base chain" refers to all parts of the chain, except the outboard rollers.

\*1: Base chain Telefs to dir parts of the Chain, except the babbaard rollers.
 \*2: Pins are made of precipitation-hardened stainless steel.
 Chains with conductive rollers and NP-type base chain use a spring brake.
 When the outboard roller is a KV roller, the roller of the base chain should be an S roller.



#### **Product Types**

Base Chain

Pollet

Outboard Roller

Rail

## **Outboard Roller Chain**



Special Sprockets

**Engineering Manual** 

## Accessories for

#### **Base Chain Specifications**

#### 1. Standard

Base chain is available with steel rollers (R, S) or engineering plastic R rollers.

RS Chain is available with steel rollers. R roller for Double Pitch Chain is available in steel or plastic.

#### 1) Steel Roller Chain

- (1) All parts are made of heat-treated steel.
- (2) Operating temperature range: -10°C to 150°C
- (3) Lubrication required.



#### 2) Plastic R Roller Chain (available only for Double Pitch Chain) (1) The R roller on the base chain is made of engineering

- plastic.
- (2) Features of engineering plastic R roller chain
  - <1> Lightweight (30% weight reduction compared with steel roller chain)
  - <2> Low noise (5 to 7 dB noise reduction compared with steel roller chain)
  - <3> Lower running resistance (30% less resistance compared with steel roller chain)
  - <4> Color of engineering plastic roller: White
  - <5> Operating temperature range: -10°C to 80°C
  - <6> Lubrication is required between the pins and the bushes.



#### 2. Lambda (lube free)

- The bushes on the base chain are special oil-impregnated bushes and can be used with no lubrication. (Lubrication is required on steel outboard rollers.)
- The allowable tension of Lambda chain is the same as that of standard chain. The inner and outer plates are treated with a black oxide finish for identification.
- Operating temperature range: -10°C to 150°C
- Do not use the chain in environments where it will come into contact with chemicals or water, or in cleansing and degreasing environments.

Note: Lambda chain is available only in RF2060 or smaller.



#### A Safety Precautions for Nickel-Plated Chain

Do not use NP chain if it will come in direct contact with food or where coating flakes or wear dust can contaminate food. Also, in non-food applications, appropriately cover the chain or contact a Tsubaki representative about chain selection if using in environments where coating flakes or wear dust present problems. Though nickel is not subject to the Japan Food Sanitation Law or the Industrial Safety and Health Law, plating on sliding parts can peel.

#### 3. SS (stainless steel)

SS chain is available with stainless steel rollers (R, S) or engineering plastic R rollers.

RS Chain is available with stainless steel rollers. S roller for Double Pitch Chain is available in stainless steel and R roller for Double Pitch Chain is available in plastic or stainless steel.

#### 1) Stainless Steel Roller Chain

- (1) All parts except pins (precipitation-hardened
  - stainless steel) are made of 304 stainless steel.
- (2) Operating temperature range: -20°C to 400°C
- (3) Lubrication required.
- 2) Plastic R Roller Chain (available only for Double Pitch Chain) (1) The R roller of the base chain is made of engineering
  - plastic. Pins are made of precipitation-hardened stainless steel.
  - (2) Features of plastic R roller chain
    - <1> Lightweight (30% weight reduction compared with steel roller chain)
    - <2> Low noise (5 to 7 dB noise reduction compared with steel roller chain)
    - <3> Lower running resistance (30% less resistance compared with steel roller chain)
    - <4> Color of engineering plastic roller: White
    - <5> Operating temperature range: -20°C to 80°C
    - <6> Lubrication is required between the pins and the bushes.

#### 4. Polv Steel

- 1) Poly Steel Chain is composed of inner links made of engineering plastic and outer links made of 304 stainless steel. (The pins are made of precipitation-hardened stainless steel.)
- 2) No lubrication is needed, and is corrosion resistant.
- 3) Lightweight (50% weight reduction compared with steel roller chain)
- 4) Low noise (5 dB noise reduction compared with steel roller chain)
- 5) Color of engineering plastic roller: White
- 6) Operating temperature range: -20°C to 80°C
- 7) Offset links are not available for this type.

#### 5. NP

NP chain is standard chain and Lambda chain treated with nickel plating.

#### Number of Links per Unit

Outboard Roller Chain is supplied by standard length (length of one chain) unless otherwise specified.

Tsubaki Chain No.	No. of Links per Unit	Tsubaki Chain No.	No. of Links per Unit
RF2040	120	RS40	240
RF2050	96	RS50	192
RF2060	80	RS60	160
RF2080	60	RS80	120
RF2100	48	RS100	96

#### **Outboard Roller Specifications**

#### **1. Engineering Plastic Rollers**

#### 1) Plastic Rollers

- (1) Material: Polyacetal (white)
- (2) Operating temperature range: -20°C to 80°C

#### 2) Plastic Brake Rollers

- (1) Material: Special engineering plastic (brown)
- (2) Operating temperature range: -20°C to 80°C
- (3) The use of special engineering plastic with a large coefficient of friction assures proper brake performance and enables rapid response.

#### 3) Electro-Conductive Rollers

- (1) Material: Special engineering plastic (black)
- (2) Operating temperature range: -20°C to 80°C
- (3) Volume resistivity 10°Ω•cm

Note: Electro-conductive rollers are available only for RF2060 or smaller.

#### 4) KV Rollers

- (1) Material: Super engineering plastic (black)
- (2) Operating temperature range: –20°C to 180°C
- (3) With excellent heat resistance, chemical resistance, and flame resistance, the KV roller meets the requirements of the Japan Food Sanitation Law. Note: KV rollers are available only for RF2060 or smaller.

.

#### 2. Steel Rollers

#### 1) Steel Rollers

- (1) Material: Hardened steel
- (2) Operating temperature range: -10°C to 150°C
- (3) Lubrication: Required

#### 2) Stainless Steel Rollers

- (1) Material: 304 stainless steel
- (2) Operating temperature range: -20°C to 400°C
- (3) Lubrication: Required

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#### **Installation of Outboard Rollers**

#### 1. Staggered Installation (Type I)



- 1) The diagram above is an example of outboard rollers installed on every link in a staggered arrangement (Type I).
- 2) It is standard to install plastic brake rollers on every third link (the shaded part in the diagram above) when outboard rollers are installed on every link in a staggered arrangement.

#### 2. Crosswise Installation (Type II)



1) The diagram above is an example of outboard rollers installed on every second link in a crosswise arrangement (Type II).

When the base chain is RF chain, outboard rollers can be spaced every one or more links (two links or more in the case of RS Chain).

2) It is standard to install plastic brake rollers on every sixth link (the shaded part in the diagram above) when outboard rollers are installed on every second link in a crosswise arrangement.

#### **Sprockets**

#### Double Pitch Chain with Outboard Rollers

Double pitch sprockets can be used with all Double Pitch Chains with outboard rollers. RS Roller Chain sprockets can only be used if they have S rollers and 30 or more teeth.

#### RS Chain with Outboard Rollers

RS Roller Chain sprockets having a small number of teeth (gray shaded areas in the table below) cannot be used with RS Chain with outboard rollers since the hub comes in contact with the outboard roller. To use a sprocket having a small number of teeth on RS Chain with outboard rollers, machine the hub diameter of the RS Roller Chain sprocket to adapt to the dimensions shown in the table below. When the number of sprocket teeth is other than listed below, the RS Roller Chain sprocket can be used as is.

No. of Tsubaki Chain No.	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
RS40	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76
RS50	26	31	36	41	46	51	56	61	66	71					
RS60	32	38	44	50	56										
RS80	44				76		92								
RS100		62	72	81											

Refer to page 144 for detailed information on dimensions of sprockets for RS Chain with outboard rollers.



Special Sprockets

### **Outboard Roller Chain**

#### **How to Order**

In placing an order for Outboard Roller Chain, please specify the chain length as well as the chain size and type.

#### 1. Chain Numbering

In placing an order for a chain, connecting link, or offset link, please specify the product code and chain number to avoid any error. Refer to the chain number information for the product code and chain number.

#### 2. Information When Placing a Chain Order

- 1) If the number of links on the overall chain is even, the link on one end of the chain will be a connecting link and the link on the other will be an inner link.
- 2) If the number of links on the overall chain is odd, please specify the link type on both ends of the chain as per below.
  - (1) Inner links on both ends
  - (2) Connecting links on both ends
  - (3) Outer links on both ends
  - (4) Connecting link on one end and offset link on the other
- 3) Position and spacing for installing outboard rollers

Outboard rollers are installed in a staggered (Type I) or crosswise (Type II) arrangement. Refer to the information on the installation position of the outboard rollers. Information on installation spacing and chain number of the outboard roller is given above.

#### Example of Outboard Roller Chain Numbering

#### Double Pitch Chain with Outboard Rollers

#### RF2040R-LMC-NP-2LSRP-H

RF2040R-2LSRPE-H-4LSG

Installation spacing of tab guide attachments

Chain number as described above

(4L: On every 4th link)



Chain type LMC: Lambda (Not available in combination with SS type base chains)

Installation type of outboard rollers T: Staggered H: Crosswise Type of outboard roller SRP: Plastic roller SR: Steel roller SRPE: Electro-conductive roller SRPKVKV roller

Installation spacing of outboard rollers 2L: On every 2nd link

Type of base chain No symbol: Standard NP: Nickel-plated (NP type) SS: 304 stainless steel (SS type)

With tab guide attachments



6 Care

Tab Guide Attachment

Note: 1. KV roller The KV roller can be used only with S roller and SS type base chains. 2. Please specify the installation spacing of brake rollers.

Special Sprockets

**Top Roller Chain** 

Chain with Tab Guide Attachments

**Outboard Roller Chain** 

**Double Plus Chain** 

Center Roller Chain

Accessories for Double Plus Chain



#### Example of Chain Numbering for Outboard Roller Chain Connecting Links

There are four types of connecting links. Please use caution when placing an order for connecting links to avoid any error. (Connecting link symbol: CL)

1) Staggered Installation on Every Link



3) Crosswise Installation on Every Link



2) Staggered Installation on Every Second Link



4) Crosswise Installation on Every Second Link



**Top Roller Chain** 

**Special Sprockets** 

## **Outboard Roller Chain**

#### Double Pitch Chain with Outboard Rollers (same for all types)

#### Chain without Brake



Base Chain R Roller Staggered Installation (Type I)



• All connecting links are cotter pin type.







Tsubaki Chain No.		Pitch		Roller	Width Between	Plo	ate		Pi	'n		Outb Ro	oard ller	Approx kg,	c. Mass /m	
Pla	stic Outboard Ro	ller	oller	Р	R	Plates	Thickness	Width	Dia.		10	10	DS	цс	Base	Base
Standard	Lambda	SS	R			W	Т	Н	D	LI	L2	L3	05	115	Steel Roller	Plastic Roller
RF2040S-SRP	RF2040S-LMC-SRP	RF2040S-SS-SRP		25.40	7.92	7.95	1.5	12.0	3.97	9.65	17.9	19.3	15.88	7.8	0.66	-
RF2050S-SRP	RF2050S-LMC-SRP	RF2050S-SS-SRP		31.75	10.16	9.53	2.0	15.0	5.09	11.9	21.6	23.3	19.05	9.4	1.03	-
RF2060S-SRP	RF2060S-LMC-SRP	RF2060S-SS-SRP	S	38.10	11.91	12.70	3.2	17.2	5.96	16.95	29.65	32.05	22.23	12.6	1.80	-
RF2080S-SRP	_	RF2080S-SS-SRP		50.80	15.88	15.88	4.0	23.0	7.94	20.95	36.65	39.65	28.58	15.8	3.12	-
RF2100S-SRP	_	RF2100S-SS-SRP		63.50	19.05	19.05	4.8 (5.0)	28.6	9.54	24.5 (24.9)	$\substack{44.2\\ \langle 45.1\rangle}$	$\begin{array}{c} 47.3 \\ \langle 47.8 \rangle \end{array}$	39.69	19.0	4.77 〈4.89〉	-
RF2040R-SRP	RF2040R-LMC-SRP	RF2040R-SS-SRP		25.40	15.88	7.95	1.5	12.0	3.97	9.65	23.1	24.5	23.0	13.0	1.24	0.89
RF2050R-SRP	RF2050R-LMC-SRP	RF2050R-SS-SRP	R	31.75	19.05	9.53	2.0	15.0	5.09	11.9	25.3	27.0	27.0	13.0	1.70	1.23
RF2060R-SRP	RF2060R-LMC-SRP	RF2060R-SS-SRP		38.10	22.23	12.70	3.2	17.2	5.96	16.95	29.65	32.05	30.0	12.6	2.64	1.93

Tsubaki Chain No.		Type	Pitch	Roller	Width Between	Plo	ate		Pi	'n		Outb Ro	oard ller	Approx. Mass	
Ste	eel Outboard Rol	ler	oller	Р	R	Plates	Thickness	Width	Dia.		10	10	DS	цс	kg/m
Standard	Lambda	SS	R			W	Т	Н	D	LI	L2	L3	03	пэ	
RF2040S-SR	RF2040S-LMC-SR	RF2040S-SS-SR		25.40	7.92	7.95	1.5	12.0	3.97	9.65	17.9	19.3	15.88	7.8	1.02
RF2050S-SR	RF2050S-LMC-SR	RF2050S-SS-SR		31.75	10.16	9.53	2.0	15.0	5.09	11.9	21.6	23.3	19.05	9.4	1.53
RF2060S-SR	RF2060S-LMC-SR	RF2060S-SS-SR	s	38.10	11.91	12.70	3.2	17.2	5.96	16.95	29.65	32.05	22.23	12.6	2.56
RF2080S-SR	—	RF2080S-SS-SR		50.80	15.88	15.88	4.0	23.0	7.94	20.95	36.65	39.65	28.58	15.8	4.30
RF2100S-SR	_	RF2100S-SS-SR		63.50	19.05	19.05	4.8 (5.0)	28.6	9.54	$\overset{24.5}{\langle 24.9\rangle}$	$\substack{44.2\\ \langle 45.1\rangle}$	$\begin{array}{c} 47.3 \\ \langle 47.8 \rangle \end{array}$	39.69	19.0	7.00 (7.12)
RF2040R-SR	RF2040R-LMC-SR	RF2040R-SS-SR		25.40	15.88	7.95	1.5	12.0	3.97	9.65	23.1	24.5	23.0	13.0	_
RF2050R-SR	RF2050R-LMC-SR	RF2050R-SS-SR	R	31.75	19.05	9.53	2.0	15.0	5.09	11.9	25.3	27.0	27.0	13.0	_
RF2060R-SR	RF2060R-LMC-SR	RF2060R-SS-SR		38.10	22.23	12.70	3.2	17.2	5.96	16.95	29.65	32.05	30.0	12.6	_

Note: 1. The mass given in the above table assumes that outboard rollers are installed on every link in a staggered installation (as illustrated above in the diagram on the left) or on every second link in a crosswise installation (as illustrated above in the diagram on the right).

2. When the base chain plastic R roller is not specified for SS type, the rollers are made of 304 stainless steel.

3. Figures inside < > are for stainless steel chain.

4. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

**Double Plus Chain** 

**Center Roller Chain** 

Accessories for Double Plus Chain

Double Plus Chain

Center Roller Chain

Accessories for Double Plus Chain

**Outboard Roller Chain** 

**Top Roller Chain** 

Special Sprockets

Engineering Manual





• All connecting links are cotter pin type.

• The dimensional drawing is of a conductive type (spring brake). Chains with plastic brakes have the same structure as those with no brakes.

	Turkali Chain Na		e			Width	Plo	ate		Pi	in		Outboar	rd Roller	
Pl	astic Outboard Rol	ler	toller Typ	Pitch P	Roller Dia. <i>R</i>	Between Inner Link Plates	Thickness T	Width H	Dia. D	Lı	L2	Lз	DS	HS	Approx. Mass kg/m
Standard	Lambda	SS	22			W									
RF2040S-SRPB	RF2040S-LMC-SRPB	RF2040S-SS-SRPB		25.40	7.92	7.95	1.5	12.0	3.97	9.65	17.9	19.3	15.88	7.8	1.02
RF2050S-SRPB	RF2050S-LMC-SRPB	RF2050S-SS-SRPB	s	31.75	10.16	9.53	2.0	15.0	5.09	11.90	21.6	23.2	19.05	9.4	1.53
RF2060S-SRPB	RF2060S-LMC-SRPB	RF2060S-SS-SRPB		38.10	11.91	12.70	3.2	17.2	5.96	16.95	29.65	32.05	22.23	12.6	2.56
RF2040R-SRPB	RF2040R-LMC-SRPB	RF2040R-SS-SRPB		25.40	15.88	7.95	1.5	12.0	3.97	9.65	23.1	24.5	23.0	13.0	_
RF2050R-SRPB	RF2050R-LMC-SRPB	RF2050R-SS-SRPB	R	31.75	19.05	9.53	2.0	15.0	5.09	11.90	25.3	27.0	27.0	13.0	_
RF2060R-SRPB	RF2060R-LMC-SRPB	RF2060R-SS-SRPB	]	38.10	22.23	12.70	3.2	17.2	5.96	16.95	29.65	32.05	30.0	12.6	_

Note: 1. The mass given in the above table assumes that outboard rollers are installed on every link in a staggered installation (as illustrated above in

the diagram on the left) or on every second link in a crosswise installation (as illustrated above in the diagram on the right).

2. If using a conductive roller, the brake is a spring brake with chain number SRPBE.

3. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Chain with Tab Guide Attachments

Tab guide attachments are installed to prevent meandering on a longer conveyor. Please use caution so as to avoid contact between the tab guide attachments and the hub of the sprocket. Please specify the installation spacing of outboard rollers and tab guide attachments.



Tsubaki Chain No.	Ditch	Roller	Width Between	Plo	ate		Pin		Outboar	d Roller			Approx. N	Nass kg/m
	Pitch	Dia. R	Inner Link Plates W	Thickness H	Width T	Dia. D	Lı	L2	DS	HS	N	HA	Plastic Out- board Roller	Steel Out- board Roller
RF2050R-SG	31.75	19.05	9.53	15.0	2.0	5.09	11.9	25.3	27	13	20.0	24.0	1.50	2.22
RF2060R-SG	38.10	22.23	12.70	17.2	3.2	5.96	16.95	30.05	30	12.6	25.4	27.0	2.41	3.16

Note: The mass given in the above table assumes that outboard rollers are installed on every link in a staggered installation or on every second link in a crosswise installation.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

## **Outboard Roller Chain**

#### RS Chain with Outboard Rollers (same for all types)





• All connecting links are cotter pin type.

• The construction of the spring brake is the same as for Double Pitch Chain.

Chain v	vithout Bra	ake												
	Tsubaki Chain No.		Dia I	Roller	Width Between	Plo	ate		Р	in		Outboar	rd Roller	Approx.
Plo	Plastic Outboard Roller		Pitch P	Dia.	Inner Link	Thickness	Width	Dia.	1,	12	12	DS	нѕ	Mass kg/m
Standard	Lambda	SS		ĸ	W	Т	Н	D	LI	L2	23	20	110	Kg/ III
RS40-SRP	RS40-LMC-SRP	RS40-SS-SRP	12.70	7.92	7.95	1.5	12.0	3.97	9.65	17.9	19.3	15.88	7.8	0.94
RS50-SRP	RS50-LMC-SRP	RS50-SS-SRP	15.875	10.16	9.53	2.0	15.0	5.09	11.9	21.6	23.2	19.05	9.4	1.42
RS60-SRP	RS60-LMC-SRP	RS60-SS-SRP	19.05	11.91	12.70	2.4	18.1	5.96	15.25	27.95	30.35	22.23	12.6	2.11
RS80-SRP	_	RS80-SS-SRP	25.40	15.88	15.88	3.2	24.1	7.94	19.25	35.05	37.95	28.58	15.8	3.57
RS100-SRP	_	RS100-SS-SRP	31.75	19.05	19.05	4.0	30.1	9.54	22.85	42.55	45.65	39.69	19.0	5.56

	Tsubaki Chain No.		D'i I	Roller	Width Between	Plo	ate		Pi	in		Outboar	d Roller	Approx.
Si	teel Outboard Roll	er	Pitch P	Dia.	Inner Link	Thickness	Width	Dia.	1,	10	10	DS	цс	Mass
Standard	Lambda	SS		ĸ	W	Т	Н	D	LI	L2	L3	03	115	kg/m
RS40-SR	RS40-LMC-SR	RS40-SS-SR	12.70	7.92	7.95	1.5	12.0	3.97	9.65	17.9	19.3	15.88	7.8	1.67
RS50-SR	RS50-LMC-SR	RS50-SS-SR	15.875	10.16	9.53	2.0	15.0	5.09	11.9	21.6	23.2	19.05	9.4	2.42
RS60-SR	RS60-LMC-SR	RS60-SS-SR	19.05	11.91	12.70	2.4	18.1	5.96	15.25	27.95	30.35	22.23	12.6	3.63
RS80-SR	—	RS80-SS-SR	25.40	15.88	15.88	3.2	24.1	7.94	19.25	35.05	37.95	28.58	15.8	5.92
RS100-SR	—	RS100-SS-SR	31.75	19.05	19.05	4.0	30.1	9.54	22.85	42.55	45.65	39.69	19.0	10.02

Note: 1. The mass given in the above table assumes that outboard rollers are installed on every link in a staggered installation (as illustrated above in the diagram on the left) or on every second link in a crosswise installation (as illustrated above in the diagram on the right).

2. Even if the chain with steel outboard rollers is Lambda Chain, the outboard rollers need to be lubricated.

3. When the chain with steel outboard rollers is SS type, the material of the outboard roller is 304 stainless steel

4. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Chain with Brake

	Tsubaki Chain No.		<b>D</b> '' 1	Roller	Width Between	Plo	ate		Pi	in		Outboar	d Roller	Approx.
Plo	Plastic Outboard Roller Standard Lambda SS			Dia.	Inner Link	Thickness	Width	Dia.	1.	12	12	DS	цс	Mass kg/m
Standard	Lambda	SS		ĸ	W	Т	Н	D	LI	L2	13	05	115	1.6,
RS40-SRPB	RS40-LMC-SRPB	RS40-SS-SRPB	12.70	7.92	7.95	1.5	12.0	3.97	9.65	17.9	19.3	15.88	7.8	0.94
RS50-SRPB	RS50-LMC-SRPB	RS50-SS-SRPB	15.875	10.16	9.53	2.0	15.0	5.09	11.9	21.6	23.2	19.05	9.4	1.42
RS60-SRPB	RS60-LMC-SRPB	RS60-SS-SRPB	19.05	11.91	12.70	2.4	18.1	5.96	15.25	27.95	30.35	22.23	12.6	2.11

Note: 1. The mass given in the above table assumes that outboard rollers are installed on every link in a staggered installation (as illustrated above in the diagram on the left) or on every second link in a crosswise installation (as illustrated above in the diagram on the right).
 If using a conductive roller, the brake is a spring brake with chain number SRPBE.

Pouble Pitc

Special Sprockets

#### Poly Steel Chain with Plastic Outboard Rollers



Crosswise Installation (Type II)

• All connecting links are cotter pin type.

Tsubaki	Pitch	Roller	Width Between Inner	Plo	ate		Р	in		Outboa	rd Roller	Approx.
Chain No.	Р	Dia. R	Link Plates	Thickness T	Width <i>H</i>	Dia. D	Lı	L2	Lз	DS	HS	Mass kg/m
RS40-PC-SRP	12.70	7.92	7.95	1.5	12.0	3.97	9.65	17.9	19.3	15.88	7.8	0.69
RS50-PC-SRP	15.875	10.16	9.53	2.0	15.0	5.09	11.9	21.6	23.2	19.05	9.4	0.96
RS60-PC-SRP	19.05	11.91	12.70	2.4	18.1	5.96	15.25	27.95	30.35	22.23	12.6	1.40

Note: 1. Since the offset link is not available, use a chain with an even number of links.

2. The approx. mass given in the above table assumes that outboard rollers are installed as illustrated above.

3. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

## Top Roller Chain

free-running top roller is installed on the plate.

Double Pitch

Construction Double Pitch Chain with Top Rollers **Double Plus Chain** Top Roller Top Roller Pin for Top Roller ( $\otimes$ ) (riveted on both ends) **Center Roller Chain** Inner Plate 0 Cotter Pin Bush Outer Plate Roller А Ó Accessories for Double Plus Chain Ínner Link 0 Outer Link Inner Link Ø Connecting Link Connecting Plate Outboard Roller Chain RS Chain with Top Rollers X  $\bigotimes$ Top Roller Top Roller Top Roller Chain Pin for Top Roller ( $\otimes$ ) (riveted on both ends) 6 Inner Plate Cotter Pin Outer Plate Bush Special Sprockets Roller 0 Inner Link Outer Link Connecting Link **Connecting Plate Engineering Manual** Parts marked with  $\otimes$  are press fit. Other parts are slip fit.

Top Roller Chain is a Free Flow Chain on which the plate of a Double Pitch or RS Roller Chain is extended upward and a

#### **Features**

Top Roller

Base Chain

Pallet

- 1) The width of the chain is smaller than that of other types of Free Flow Chain.
- With top rollers supported by plates on both sides, this chain is suitable for use with rugged free-flow conveyors.

Note: 1. "Base chain" refers to all parts of the chain, except the top rollers.

2. \*1: Even if the base chain is Lambda Chain, the steel top rollers need to be lubricated.



#### Product Types

Double Pitch

## **Top Roller Chain**

**Double Plus Chain** 

Center Roller Chain

#### **Base Chain Specifications**

#### 1. Standard

Base chain is available with steel rollers (R, S) or engineering plastic R rollers.

#### 1) Steel Roller Chain

- (1) All parts are made of heat-treated steel.
- (2) Operating temperature range: -10°C to 150°C
- (3) Lubrication required.

#### 2) Plastic R Roller Chain

- (1) The R roller on the base chain is made of engineering plastic.
- (2) Features of engineering plastic R roller chain
  - <1> Lightweight (40% weight reduction compared with steel roller chain)
  - <2> Low noise (5 to 7 dB noise reduction compared with steel roller chain)
  - <3> Lower running resistance (30% less resistance compared with steel roller chain)
  - <4> Color of engineering plastic roller: White
  - <5> Operating temperature range: -10°C to 80°C
  - <6> Lubrication is required between the pins and the bushes.

#### 2. Lambda (lube free)

- The bushes on the base chain are special oil-impregnated bushes and can be used with no lubrication. (Lubrication is required on steel top rollers.)
- 2) The allowable tension of Lambda chain is the same as that of standard chain. The inner and outer plates are treated with a black oxide finish for identification.
- 3) Operating temperature range: -10°C to 150°C
- 4) Do not use the chain in environments where it will come into contact with chemicals or water, or in cleansing and degreasing environments.

#### 3. SS (stainless steel)

SS chain is available with stainless steel rollers (R, S) or engineering plastic R rollers.

#### 1) Stainless Steel Roller Chain

- (1) All parts are made of 304 stainless steel.
- (2) Operating temperature range: –20°C to 400°C
- (3) Lubrication required.

#### 2) Plastic R Roller Chain

- (1) The R roller of the base chain is made of engineering plastic.
- (2) Features of plastic R roller chain
  - <1> Lightweight (40% weight reduction compared with steel roller chain)
  - <2> Low noise (5 to 7 dB noise reduction compared with steel roller chain)
  - <3> Lower running resistance (30% less resistance compared with steel roller chain)
  - <4> Color of engineering plastic roller: White
  - <5> Operating temperature range: -20°C to 80°C
  - <6> Lubrication is required between the pins and the bushes.

#### 4. NP

NP chain is standard chain and Lambda chain treated with nickel plating.

#### Number of Links per Unit

Top Roller Chain is supplied by standard length (length of one chain) unless otherwise specified.

Tsubaki Chain No.	No. of Links per Unit	Tsubaki Chain No.	No. of Links per Unit
RF2040	120	RS40	240
RF2050	96	RS50	192
RF2060	80	RS60	160
RF2080	60	RS80	120
RF2100	48	RS100	96

#### A Safety Precautions for Nickel-Plated Chain

Do not use NP chain if it will come in direct contact with food or where coating flakes or wear dust can contaminate food. Also, in non-food applications, appropriately cover the chain or contact a Tsubaki representative about chain selection if using in environments where coating flakes or wear dust present problems.

Though nickel is not subject to the Japan Food Sanitation Law or the Industrial Safety and Health Law, plating on sliding parts can peel.

#### **Top Roller Specifications**

#### **1. Engineering Plastic Rollers**

#### 1) Plastic Rollers

- (1) Material: Polyacetal (white)
- (2) Operating temperature range: –20°C to 80°C

#### 2) KV Rollers

- (1) Material: Super engineering plastic (black)
- (2) Operating temperature range: -20°C to 180°C

#### 2. Steel Rollers

- 1) Steel Rollers
- (1) Material: Hardened steel
- (2) Operating temperature range: -10°C to 150°C
- (3) Lubrication: Required

#### 2) Stainless Steel Rollers

- (1) Material: 304 stainless steel
- (2) Operating temperature range: -20°C to 400°C
- (3) Lubrication: Required

Special Sprockets





#### **Sprockets**

#### Sprockets for Double Pitch Chain with Top Rollers

If the base chain roller is an R roller, a standard sprocket for Double Pitch Chain (R roller) cannot be used since the tooth end of the sprocket comes in contact with the top roller.

In this case, use the sprocket for Top Roller Chain shown on page 143.

If the base chain roller is an S roller, a standard sprocket for RF Double Pitch Chain (S roller) can be used as is. RS Roller Chain sprockets can only be used if they are the S roller type and when the number of the engaging teeth is 15 or more (number of sprocket teeth: 30).



When placing an order for Top Roller Chain, please specify the chain length as well as the chain size and type.

#### 1. Model Identification

In placing an order for a chain, connecting link, or offset link, please specify the product code and chain number to avoid any error. Refer to the chain number information for the product code and chain number.

#### 2. Information When Placing a Chain Order

- 1) If the number of links on the overall chain is even, the link on one end of the chain will be a connecting link and the link on the other will be an inner link.
- 2) If the number of links on the overall chain is odd, please specify the link type on both ends of the chain as per below. Inner links on both ends
  - (2) Connecting links on both ends
  - (3) Outer links on both ends
  - (4) Connecting link on one end and offset link on the other
- 3) Installation of top rollers
  - (1) Single-strand installation
    - When a top roller is installed on each even-numbered link, the top roller is installed on the inner link unless otherwise specified.
  - (2)Double-strand installation
  - When a top roller is installed on each even-numbered link, the top roller is installed on the outer link unless otherwise specified.



Double-strand chain

## **Top Roller Chain**

#### Double Pitch Chain with Top Rollers (same for all types)



<ul> <li>RF2040 to RF2060 connecting links are spring clip type, and those of other models are cotter pin type.</li> </ul>	<ul> <li>RF2040 to RF2060 connecting</li> </ul>	links are spring cl	ip type, and those o	f other mode	ls are cotter pin type.
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٦	Tsubaki Chain No		D'I I	Width	Roller	Dia. R		Pin		Plo	ate			Tem	مالم			Appro	x. Mass	kg/m
	Plastic Top Roller		Pitch	Between Inner	S	R	Dia.	1.	10	Width	Thickness			юрі	Koller			S	R	Plastic
Standard	Lambda	SS		W	Roller	Roller	D	LI	L2	Н	Т	DF	CS	XS	<b>L</b> 1	<b>l</b> 2	d	Roller	Roller	R Roller
RF2040S-TRP	RF2040S-LMC-TRP	RF2040S-SS-TRP	25.40	7.95	7.92	15.88	3.97	8.25	9.95	12.0	1.5	15.88	15.0	21.0	8.25	9.65	3.97	0.91	-	
RF2050S-TRP	RF2050S-LMC-TRP	RF2050S-SS-TRP	31.75	9.53	10.16	19.05	5.09	10.3	12.0	15.0	2.0	19.05	19.0	26.5	10.3	11.9	5.09	1.44	-	_
RF2060S-TRP	RF2060S-LMC-TRP	RF2060S-SS-TRP	38.10	12.70	11.91	22.23	5.96	14.55	16.55	17.2	3.2	22.23	23.0	31.6	14.55	16.95	5.96	2.77	-	-
RF2080S-TRP	-	RF2080S-SS-TRP	50.80	15.88	15.88	28.58	7.94	18.3	20.9	23.0	4.0	28.58	29.0	40.5	18.5	21.3	11.32	4.29	-	
RF2100S-TRP	_	RF2100S-SS-TRP	63.50	19.05	19.05	39.69	9.54	21.8 22.3>	24.5 24.9>	28.6	4.8 (5.0)	39.69	35.4	49.7	22.1	27.2	14.52	6.51 6.63〉		_
RF2040R-TRP	RF2040R-LMC-TRP	RF2040R-SS-TRP	25.40	7.95	7.92	15.88	3.97	8.25	9.95	12.0	1.5	15.88	15.0	21.0	8.25	9.65	3.97	-	1.27	0.92
RF2050R-TRP	RF2050R-LMC-TRP	RF2050R-SS-TRP	31.75	9.53	10.16	19.05	5.09	10.3	12.0	15.0	2.0	19.05	19.0	26.5	10.3	11.9	5.09	-	1.90	1.43
RF2060R-TRP	RF2060R-LMC-TRP	RF2060R-SS-TRP	38.10	12.70	11.91	22.23	5.96	14.55	16.55	17.2	3.2	22.23	23.0	31.6	14.55	16.95	5.96	-	3.46	2.75
RF2080R-TRP	-	RF2080R-SS-TRP	50.80	15.88	15.88	28.58	7.94	18.3	20.9	23.0	4.0	28.58	29.0	40.5	18.5	21.3	11.32	-	5.40	4.52
RF2100R-TRP	_	RF2100R-SS-TRP	63.50	19.05	19.05	39.69	9.54	21.8 22.3>	24.5 24.9>	28.6	4.8 (5.0)	39.69	35.4	49.7	22.1	27.2	14.52	- (	8.77 8.89〉	6.60 (6.72)

T	subaki Chain No		Dir I	Width	Roller	Dia. R		Pin		Plo	ate			т., г	۰			Approx. N	∕lass kg/m
	Steel Top Roller		Pitch	Between Inner	S	R	Dia.	1.	10	Width	Thickness			Iop I	Koller			S	R
Standard	Lambda	SS	'	W	Roller	Roller	D	LI	L2	Н	T	DF	CS	XS	<b>L</b> 1	<b>l</b> 2	d	Roller	Roller
RF2040S-TR	RF2040S-LMC-TR	RF2040S-SS-TR	25.40	7.95	7.92	15.88	3.97	8.25	9.95	12.0	1.5	15.88	15.0	21.0	8.25	9.65	3.97	1.33	-
RF2050S-TR	RF2050S-LMC-TR	RF2050S-SS-TR	31.75	9.53	10.16	19.05	5.09	10.3	12.0	15.0	2.0	19.05	19.0	26.5	10.3	11.9	5.09	2.04	-
RF2060S-TR	RF2060S-LMC-TR	RF2060S-SS-TR	38.10	12.70	11.91	22.23	5.96	14.55	16.55	17.2	3.2	22.23	23.0	31.6	14.55	16.95	5.96	3.68	-
RF2080S-TR	-	RF2080S-SS-TR	50.80	15.88	15.88	28.58	7.94	18.3	20.9	23.0	4.0	28.58	29.0	40.5	18.5	21.3	11.32	5.65	_
RF2100S-TR	_	RF2100S-SS-TR	63.50	19.05	19.05	39.69	9.54	21.8 22.3>	24.5 24.9>	28.6	4.8 (5.0)	39.69	35.4	49.7	22.1	27.2	14.52	9.11 〈9.23〉	-
RF2040R-TR	RF2040R-LMC-TR	RF2040R-SS-TR	25.40	7.95	7.92	15.88	3.97	8.25	9.95	12.0	1.5	15.88	15.0	21.0	8.25	9.65	3.97	—	1.69
RF2050R-TR	RF2050R-LMC-TR	RF2050R-SS-TR	31.75	9.53	10.16	19.05	5.09	10.3	12.0	15.0	2.0	19.05	19.0	26.5	10.3	11.9	5.09	—	2.50
RF2060R-TR	RF2060R-LMC-TR	RF2060R-SS-TR	38.10	12.70	11.91	22.23	5.96	14.55	16.55	17.2	3.2	22.23	23.0	31.6	14.55	16.95	5.96	_	4.36
RF2080R-TR	_	RF2080R-SS-TR	50.80	15.88	15.88	28.58	7.94	18.3	20.9	23.0	4.0	28.58	29.0	40.5	18.5	21.3	11.32	—	6.76
RF2100R-TR	_	RF2100R-SS-TR	63.50	19.05	19.05	39.69	9.54	21.8 22.3>	24.5 24.9〉	28.6	4.8 (5.0)	39.69	35.4	49.7	22.1	27.2	14.52	_	11.37 (11.49)

Note: 1. Figures inside < > are for stainless steel chain.

When a top roller is installed on each even-numbered link, the top roller is installed on the inner link unless otherwise specified.
 When the base chain plastic R roller is not specified for SS type, the rollers are made of 304 stainless steel.
 The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

Double Pitch R S

#### Double Pitch Chain with Topple Prevention Attachments

Special attachments are installed on a long conveyor so as to prevent toppling and meandering of the conveyor. Please use caution so as to avoid contact between these attachments and the hub of the sprocket. Please specify the installation spacing of the top rollers and attachments (four links or more).



Trubali	Ditch	Width Between	Roller	Dia. R		Pin		Plo	ate			Top Ro	oller & A	Attachme	nt		
Chain No.	P	Inner Link Plates W	S Roller	R Roller	Dia. D	Lı	L2	Width <i>H</i>	Thickness T	DF	CS	XS	L1	<b>l</b> 2	d	N	XSA
RF2040-TG	25.40	7.95	7.92	15.88	3.97	8.25	9.95	12.0	1.5	15.88	15.0	21.0	8.45	9.65	3.97	19.1	12.7
RF2050-TG	31.75	9.53	10.16	19.05	5.09	10.3	12.0	15.0	2.0	19.05	19.0	26.5	10.5	11.9	5.09	23.8	15.9
RF2060-TG	38.10	12.70	11.91	22.23	5.96	14.55	16.55	17.2	3.2	22.23	23.0	31.6	14.75	16.95	5.96	28.6	19.1
RF2080-TG	50.80	15.88	15.88	28.58	7.94	18.3	20.9	23.0	4.0	28.58	29.0	40.5	18.5	21.3	11.32	38.1	25.4
RF2100-TG	63.50	19.05	19.05	39.69	9.54	21.8	24.5	28.6	4.8	39.69	35.4	49.7	22.1	27.2	14.52	47.6	31.8

Note: Sprockets for base chains with R rollers are made to order.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### Double Pitch Chain with Double-Strand Top Rollers

This chain allows a larger conveying capacity than single-strand Top Roller Chain.



<b>T</b>    ·	Diada	Width Between	Transverse	Roller	Dia. R		Pin		Plo	ate			Top F	Roller		
Chain No.	Plich	Inner Link Plates W	Pitch C	S Roller	R Roller	Dia. D	Lı	L2	Width <i>H</i>	Thickness T	DF	CS	XS	<b>L</b> 1	<b>l</b> 2	d
RF2040-2-TR	25.40	7.95	14.4	7.92	15.88	3.97	15.45	17.15	12.0	1.5	15.88	15.0	21.0	15.65	17.25	3.97
RF2050-2-TR	31.75	9.53	18.1	10.16	19.05	5.09	19.35	21.15	15.0	2.0	19.05	19.0	26.5	19.55	21.95	5.09
RF2060-2-TR	38.10	12.70	26.2	11.91	22.23	5.96	27.7	29.6	17.2	3.2	22.23	23.0	31.6	27.85	30.85	5.96
RF2080-2-TR	50.80	15.88	32.6	15.88	28.58	7.94	34.6	37.2	23.0	4.0	28.58	29.0	40.5	34.8	37.5	11.32
RF2100-2-TR	63.50	19.05	39.1	19.05	39.69	9.54	41.4	44.1	28.6	4.8	39.69	35.4	49.7	41.65	46.75	14.52

Accessories for Double Plus Chain

**Double Plus Chain** 

**Center Roller Chain** 

Special Sprockets

## **Top Roller Chain**

#### RS Chain with Top Rollers (same for all types)



Tsubaki Chain No. Width Plate Approx. Mass kg/m Base Pin Top Roller Pitch Chain Roller Dia. R Between Inner Link Plates Plastic Top Roller Width Thickn On Ever Dia. On Every Ρ Lı L2 Standard SS D Н Т DF1 DF2 CS Ν XS d Link 2nd Link Lambda W **l**1 **l**2 RS40-TRP RS40-LMC-TRP RS40SS-TRP 12.70 7.95 7.92 3.97 8.25 9.95 12.0 1.5 11.0 15.88 12.7 9.5 17.45 8.25 9.65 3.97 0.92 0.85 2.0 15.0 19.05 15.9 12.7 22.25 10.3 11.9 5.09 1.38 RS50-TRP RS50-LMC-TRP RS50SS-TRP 15.875 9.53 10.16 5.09 10.3 12.0 15.0 1.56 RS60-TRP RS60-LMC-TRP RS60SS-TRP 19.05 12.70 11.91 5.96 12.85 14.75 18.1 2.4 18.0 22.23 18.3 15.9 26.25 12.85 15.25 5.96 2.30 2.03 RS80-TRP RS80SS-TRP 25.40 15.88 15.88 7.94 16.25 19.25 24.1 3.2 24.0 28.58 24.6 19.1 34.15 16.25 19.25 7.94 3.90 3.44 4.0 30.0 39.69 31.8 25.4 44.5 19.75 22.85 9.54 RS100-TRP RS100SS-TRP 31.75 19.05 19.05 9.54 19.75 22.85 30.1 6.06 5.41

Ts	ubaki Chain N	о.	Dia L	Width	Base		Pin		Plo	ate				Taral	مالم				Approx. N	∆ass kg/m
:	Steel Top Rollei	r	Pitch	Between Inner	Chain	Dia.	1.	1.	Width	Thickness				торт	Coller				On Every	On Every
Standard	Lambda	SS	<b>'</b>	W	Dia. R	D	LI	L2	Н	Т	DF1	DF2	CS	Ν	XS	<b>l</b> 1	<b>l</b> 2	d	Link	2nd Link
RS40-TR	RS40-LMC-TR	RS40SS-TR	12.70	7.95	7.92	3.97	8.25	9.95	12.0	1.5	11.0	15.88	12.7	9.5	17.45	8.25	9.65	3.97	1.83	1.41
RS50-TR	RS50-LMC-TR	RS50SS-TR	15.875	9.53	10.16	5.09	10.3	12.0	15.0	2.0	15.0	19.05	15.9	12.7	22.25	10.3	11.9	5.09	2.39	2.18
RS60-TR	RS60-LMC-TR	RS60SS-TR	19.05	12.70	11.91	5.96	12.85	14.75	18.1	2.4	18.0	22.23	18.3	15.9	26.25	12.85	15.25	5.96	3.60	3.18
RS80-TR	-	RS80SS-TR	25.40	15.88	15.88	7.94	16.25	19.25	24.1	3.2	24.0	28.58	24.6	19.1	34.15	16.25	19.25	7.94	6.09	5.27
RS100-TR	_	RS100SS-TR	31.75	19.05	19.05	9.54	19.75	22.85	30.1	4.0	30.0	39.69	31.8	25.4	44.5	19.75	22.85	9.54	9.30	8.85

Note: 1. "On Every Link" and "On Every 2nd Link" described in the column of the "Approx. Mass" refer to the spacing for the installation of the top rollers. 2. When a top roller is installed on each even-numbered link, the top roller is installed on the inner link unless otherwise specified.

3. Even if the chain with steel top rollers is Lambda Chain, the top rollers need to be lubricated.

4. When the chain with steel top rollers is SS type, the material of the top roller is 304 stainless steel.

5. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

Double Pitch

**Double Plus Chain** 

**Center Roller Chain** 

Accessories for Double Plus Chain

**Outboard Roller Chain** 

**Top Roller Chain** 

**Special Sprockets** 

**Engineering Manual** 

#### RS Chain with Topple Prevention Attachments

Special attachments are installed on a long conveyor so as to prevent toppling and meandering of the conveyor. Please use caution so as to avoid contact between these attachments and the hub of the sprocket. Please specify the installation spacing of the top rollers and attachments (four links or more).



<ul> <li>RS40 to RS60 connecting</li> </ul>	links are spring cli	ip type, and those of c	other models are cotter pin type.

<b>T</b>    ·	Ditch	Width	Roller		Pin		Ple	ate			Top R	oller & A	ttachme	nt		
Chain No.	P	Link Plates	Dia. R	Dia. D	Lı	L2	Width <i>H</i>	Thickness T	DF	CS	N	xs	<b>L</b> 1	<b>l</b> 2	d	XSA
RS40-TG	12.70	7.95	7.92	3.97	8.25	9.95	12.0	1.5	15.88	12.7	9.5	17.45	8.25	9.65	3.97	17.4
RS50-TG	15.875	9.53	10.16	5.09	10.3	12.0	15.0	2.0	19.05	15.9	12.7	22.25	10.3	11.9	5.09	23.05
RS60-TG	19.05	12.70	11.91	5.96	12.85	14.75	18.1	2.4	22.23	18.3	15.9	26.25	12.85	15.25	5.96	26.85
RS80-TG	25.40	15.88	15.88	7.94	16.25	19.25	24.1	3.2	28.58	24.6	19.1	34.15	16.25	19.25	7.94	35.45
RS100-TG	31.75	19.05	19.05	9.54	19.75	22.85	30.1	4.0	39.69	31.8	25.4	44.5	19.75	22.85	9.54	44.0

Note: Please specify whether to install the top rollers on the inner or outer link.

The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

#### RS Chain with Double-Strand Top Rollers

This chain allows a larger conveying capacity than single-strand Top Roller Chain.



• RS40-2 to RS60-2 connecting links are spring clip type, and those of other models are cotter pin type.

Tsubaki Chain No.	Pitch P	Width Between Inner Link Plates W	Roller Dia. <i>R</i>	Transverse Pitch C	Pin			Plate		Top Roller						
					Dia. D	Lı	L2	Width <i>H</i>	Thickness T	DF	CS	XS	N	L1	<b>l</b> 2	d
RS40-2-TR	12.70	7.95	7.92	14.4	3.97	15.45	17.15	12.0	1.5	15.88	12.7	17.45	9.5	15.45	16.95	3.97
RS50-2-TR	15.875	9.53	10.16	18.1	5.09	19.35	21.15	15.0	2.0	19.05	15.9	22.25	12.7	19.35	21.15	5.09
RS60-2-TR	19.05	12.70	11.91	22.8	5.96	24.25	26.25	18.1	2.4	22.23	18.3	26.25	15.9	24.25	26.75	5.96
RS80-2-TR	25.40	15.88	15.88	29.3	7.94	30.9	33.9	24.1	3.2	28.58	24.6	34.15	19.1	30.9	33.9	7.94
RS100-2-TR	31.75	19.05	19.05	35.8	9.54	37.7	40.8	30.1	4.0	39.69	31.8	44.5	25.4	37.7	40.8	9.54

Note: 1. Dimension DF changes when top rollers are installed on every link.

2. RS standard sprockets (double-strand) can be used.

3. When a top roller is installed on each even-numbered link, the top roller is installed on the outer link unless otherwise specified.

4. The dimensions shown in this catalog are nominal dimensions and may differ from actual dimensions.

## **Special Sprockets**

#### Sprockets for Double Plus Chain: Same as for Double Plus Chain without snap cover (steel type)





Tsubaki Sprocket No.	No. of Sprocket Teeth	Pitch Dia. Dp	Outer Dia. <i>Do</i>	Facewidth T	Total Facewidth M	Bore [ Pilot Hole	Dia. <i>d</i> Max.	Hub Dia. <i>D</i> н	Total Width L	Approx. Mass kg	Material (Specification)
RF2030VRP-10T-SC	10	61.65	63	3.0	15.3	12.7	20	37	25	0.2	
RF2040VRP-10T-SC	10	82.20	85	4.0	20.4	15.9	32	52	40	0.8	
RF2050VRP-10T-SC	10	102.75	107	5.0	25.5	15.9	45	66	45	1.5	
RF2060VRP-10T-SC	10	123.30	128	6.0	30.5	19	55	81	50	2.5	(machined)
RF2080VRP-10T-SC	10	164.39	172	12.0	47.5	23	72	110	67	7.0	

Note: 1. The tooth tip is not hardened on any model.

2. Delivery: Please contact a Tsubaki representative.

3. 304 stainless steel type is also manufactured in the same dimensions as the steel type.

#### Sprockets for Double Pitch Chain with Top Rollers (steel type)



Sprocket Numbe	ering
<u>RF2040R</u> 120	DOT-TR
Applicable chain size	Top roller
	No. of engaging teeth (1200 T: 12)

Tsubaki	Roller	No. of	Pitch Dia.	Outer Dia.	Facewidth	Bore [	Dia. d	Hub Dia.	Total Width	Approx. Mass	Material
Sprocket No.	Туре	Engaging Teeth	Dp	Do	Т	Pilot Hole	Max.	Dн	L	kg	(Specification)
RF2040R 1100T-TR		11	90.16	97						0.8	
RF2040R 1200T-TR		12	98.14	105	7.3	12.7	42	63	25	0.9	
RF2040R 1300T-TR		13	106.14	114						0.9	
RF2050R 1100T-TR		11	112.70	124		15.9				1.3	
RF2050R 1200T-TR		12	122.67	134	8.9	10	48	73	28	1.3	
RF2050R 1300T-TR		13	132.67	144		10				1.5	Carbon steel
RF2060R 1100T-TR	R roller	11	135.24	150						2.6	(machined)
RF2060R 1200T-TR		12	147.21	162	11.9	18	55	83	45	2.8	
RF2060R 1300T-TR		13	159.20	175						3.1	
RF2080R 1100T-TR		11	180.31	109						4.8	
RF2080R 1200T-TR		12	196.28	216	15	28	75	107	45	5.3	
RF2080R 1300T-TR		13	212.27	232						5.9	
RF2100R 1100T-TR		11	225.39	244	18	33	80	117	56	7.9	Rolled steel (welded)

Note: 1. The tooth tip is not hardened on any model.

2. Delivery: Please contact a Tsubaki representative.

3. RS standard sprockets can be used with RF Double Pitch Chain (S roller) or when the number of engaging teeth of the sprocket is 15 or more (sprocket teeth: 30).

Special Sprockets
# Sprockets for RS Chain with Outboard Rollers (steel type)



#### **Sprocket Numbering**

RS401B 9T-SR

Applicable chain size

Outboard roller

No. of teeth: 9

Accessories for Double Plus Chain

**Outboard Roller Chain** 

**Top Roller Chain** 

**Special Sprockets** 

Double Plus Chain

Tsubaki	No. of Tooth	Pitch Dia.	Outer Dia.	Facewidth	Bore I	Dia. d	Hub Dia.	Total Width	Approx. Mass	Material
Sprocket No.	INO. OF IEEM	Dp	Do	Т	Pilot Hole	Max.	Dн	L	kg	(Specification)
RS401B 09T-SR	9	37.13	42			10	20		0.08	
RS401B 10T-SR	10	41.10	46		0.5	11	24		0.10	
RS401B 11T-SR	11	45.08	51		7.5	14	28		0.14	
RS401B 12T-SR	12	49.07	53			16	32		0.17	
RS401B 13T-SR	13	53.07	58			20	36		0.22	
RS401B 14T-SR	14	57.07	63			22	40	22	0.27	
RS401B 15T-SR	15	61.08	67			26	44		0.32	
RS401B 16T-SR	16	65.10	71	7.3		28	48		0.38	
RS401B 17T-SR	17	69.12	75			32	52		0.44	
RS401B 18T-SR	18	73.14	78		12.7	35	56		0.50	
RS401B 19T-SR	19	77.16	83			38	60		0.57	
RS401B 20T-SR	20	81.18	88			42	64		0.72	
RS401B 21T-SR	21	85.21	92			44	68	25	0.80	
RS401B 22T-SR	22	89.24	96			46	72	25	0.90	
RS401B 23T-SR	23	93.27	98			50	76		0.98	Carbon stool
RS501B 09T-SR	9	46.42	53		0.5	12	26		0.15	(machined)
RS501B 10T-SR	10	51.37	58		7.5	16	31		0.21	(machinea)
RS501B 11T-SR	11	56.35	63			20	36		0.25	
RS501B 12T-SR	12	61.34	68			23	41		0.32	
RS501B 13T-SR	13	66.34	73	00		27	46	25	0.41	
RS501B 14T-SR	14	71.34	78	0.7	12.7	31	51		0.51	
RS501B 15T-SR	15	76.35	83		12.7	35	56		0.61	
RS501B 16T-SR	16	81.37	88			38	61		0.71	
RS501B 17T-SR	17	86.39	93			43	66		0.82	
RS501B 18T-SR	18	91.42	98			46	71	28	0.98	
RS601B 09T-SR	9	55.70	63		9.5	16	32		0.30	
RS601B 10T-SR	10	61.65	68			20	φ37		0.37	
RS601B 11T-SR	11	67.62	76	11.9	12.7	26	44	32	0.52	
RS601B 12T-SR	12	73.60	82			30	50		0.68	
RS601B 13T-SR	13	79.60	88		15.9	35	56		0.80	
RS801B 09T-SR	9	74.26	85		15.9	26	44		0.65	
RS801B 13T-SR	13	106.14	118	15	10	50	76	40	1.88	
RS801B 15T-SR	15	122.17	135		17	62	92		2.57	
RS1001B 10T-SR	10	102.75	117		18	40	62		1.82	
RS1001B 11T-SR	11	112.70	127	18	23	46	72	50	2.21	
RS1001B 12T-SR	12	122.67	138		23	52	81		2.73	

Note: 1. The tooth tip is hardened on all models.

Delivery: Please contact a Tsubaki representative.
 Models other than those listed above can be used with RS standard sprockets.

#### Sprockets for RF Outboard Roller Chain

RF Double Pitch sprockets can be used with all RF outboard roller chains.

## **Chain Selection**

An appropriate chain size and type can be selected based upon the type and capacity of the conveyor. In some cases, it may be difficult to determine the most appropriate chain size and type, since there are a variety of operating conditions for the conveyor. The general procedure for chain selection is as follows:

## Step 1: Check Conveyance Conditions

- (1) Type, mass, dimensions, and quantity of the conveyed objects (including pallet)
- (2) Conveying speed
- (3) Conveyor length (length of accumulating and conveying sections)
- (4) Environment and lubrication requirements

## Step 2: Select Chain Type

Select the base chain and roller type according to the operating conditions and environment.

## Step 3: Tentatively Determine Chain Type

Perform tentative checking of chain load. SI units: F =  $9.80665 \times W_T \times f \times K_V/1000$ Gravimetric units:  $F = W_T \times f \times K_V$ 

Note: In this catalog, values are indicated in both SI and gravimetric units. The weight (kgf) used to calculate the max. load F in the gravimetric units is the same value as the mass (kg).

F: Max. tension applied to chain kN {kgf}

- WT: Total mass of conveyed objects excluding chain kg
- f: Coefficient of friction f2 (Table 2)+ f3 (Table 3)
- Kv: Speed coefficient (Table 7)

When two chains arranged in parallel are used, their working loads will be unequal. Allowing for the imbalance of working loads, determine the model and size of a chain tentatively to ensure the max. allowable load (Tables 8 and 9) of the chain is F×0.6 or more.

#### Table 1:

f1: Coefficient of Friction Between Chain and Rail	During
Conveyance	

Chain Type	Typ Ch	e of Base ain Roller	Dry	Lubricated
Double Plus Chain	Plastic roller UA·UB		0.08	
	Steel roller			0.05
Center Roller Chain	Ste	eel roller	_	0.08
	Charlen III	S roller	(0.21)	0.14
Outboard Roller Chain	Steel rolle	R roller	(0.12)	0.08
Top Roller Chain	ון יי ום	S roller	_	_
	Plastic roller R roller		0.08	_
Poly Steel Chain	(Plasti	(Plastic inner link)		_

Figures inside () are given for reference purposes.

Table 2:

#### f2: Coefficient of Friction Between Chain and Conveyed Objects **During Accumulation**

	Chain Type	Type of Transfer Roller	Dry	Lubricated
		A·C·UA	0.10	_
	Double Plus Chain	B·D·UB	0.15	_
		Steel roller		0.10
	Center Roller Chain	Steel roller	_	0.06
	Quiltanum	Plastic outboard roller	0.06	_
		Outboard roller with plastic brake	0.20*	_
	Koller Chain	Steel outboard roller	(0.09)	0.06
трШ	Tan Dallar Chain	Plastic top roller	0.06	_
	iop Koller Chain	Steel top roller	(0.09)	0.06

Figures inside ( ) are given for reference purposes. \* Coefficient of friction for each outboard roller with plastic brake. When the number of brake outboard rollers accounts for about one third of the total number of outboard rollers, the coefficient of friction is 0.1. (Refer to "Installation of Outboard Rollers" on page 128.)

#### Table 3:

#### f3: Coefficient of Friction Between Chain and Rail During Accumulation

Chain Type	Type of Tro	ansfer Roller	Dry	Lubricated
	A·C	∙UA	0.20	—
Double Plus Chain	B∙D	∙UB	0.25	_
	Steel roller		_	0.10
Center Roller Chain	Steel	roller	_	0.10
	Steel weller	S roller	(0.21)	0.14
Outboard	Steel roller	R roller	(0.12)	0.08
Roller Chain	م المعالم	S roller	_	_
	Plastic roller	R roller	0.08	_
Poly Steel Chain	Chain (Plastic inner link)		0.25	_

Figures inside ( ) are given for reference purposes.



**Double Plus Chain** Accessories for

Special Sprockets

## Step 4: Check Allowable Roller Load

The load applied on the roller should not exceed the values given below. The values for steel rollers assume lubricated conditions.

#### 1. Double Plus Chain and Center Roller Chain



#### RF2030 to RF2080

The values given below are the allowable conveying load per two strands of chain (allowable load per one meter of pallet).

Table 4: Allowab	Unit: kN {kgf}/m		
Roller	Plastic	Steel Roller	
Tsubaki Chain No.	Aluminum Frame	Aluminum Fram	e with Steel Rail
RF2030 (urethane roller) RF2040 RF2050 RF2060 RF2080	0.39{ 40} 0.20{ 20} 0.59{ 60} 0.78{ 80} 0.98{100}	0.78{ 80} 0.20{ 20} 1.18{120} 1.57{160} 1.96{200} 2.94{300}	1.57{160} 

#### 2. Outboard Roller Chain and Top Roller Chain 1) Allowable Load of Outboard Roller and Top Roller

Allowable Load of Outboard Roller





Allowable Load of Top Roller

#### Table 5: Allowable Roller Load

Table 5: Allowa	l Ur	nit: kN {kgf}/roller	
Tsubaki	Outboard Single-Stran	Double-Strand Top Roller	
Chain No.	Plastic Roller Steel Roller		Steel Roller
RF2040 · RS 40	0.05{ 5}	0.15{15}	0.29{ 30}
RF2050 · RS 50	0.07{ 7}	0.20{20}	0.39{ 40}
RF2060 · RS 60	0.10{10}	0.29{30}	0.59{ 60}
RF2080 · RS 80	0.18{18}	0.54{55}	1.08{110}
RF2100 · RS100	0.29{30}	0.78{80}	1.57{160}

#### 2) Allowable Load of Base Chain Roller





Allowable Load of Base Chain Roller

Allowable Load of Base Chain Roller

Table 6: Allowable Load of Base Chain Roller Unit:  $kN {kgf}/roller$ 

				-
Tsubaki	Steel Roller		Plastic Roller	Daly Steal
Chain No.	R Roller	S Roller	R Roller	Foly Steel
RF2040 · RS 40	0.64{ 65}	0.15{15}	0.20{ 20}	0.02{2}
RF2050 · RS 50	0.98{100}	0.20{20}	0.29{ 30}	0.04{4}
RF2060 · RS 60	1.57{160}	0.29{30}	0.49{ 50}	0.06{6}
RF2080 · RS 80	2.65{270}	0.54{55}	0.88{ 90}	—
RF2100 · RS100	3.92{400}	0.78{80}	1.27{130}	_

Note:

- 1. The above values for Poly Steel Chain represent the allowable load for each plastic inner link.
- 2. The allowable load of Lambda Chain is the same as that of steel roller chain.
- 3. Please use S45C (JIS), 1045 (AISI) or higher high-tensile material for the base chain steel roller guide rail.
- 4. The plastic roller includes heat-resistant type rollers (KV type).

**Double Plus Chain** 

**Center Roller Chain** 

# Step 5: Calculate Chain Load (T)



#### SI Units





#### **Gravimetric Units**

 $\begin{aligned} \mathsf{F}{=}\,(\mathsf{W}{1}{+}\mathsf{M})\,\mathsf{L}{1}{\cdot}\mathsf{f}{1}{+}\mathsf{W}{2}{\cdot}\mathsf{L}{2}{\cdot}\mathsf{f}{2}{+}\,(\mathsf{W}{2}{+}\mathsf{M})\,\mathsf{L}{2}{\cdot}\mathsf{f}{3} \\ \\ {+}1.1\mathsf{M}\,(\mathsf{L}{1}{+}\mathsf{L}{2})\,\mathsf{f}{1} \end{aligned}$ 

$$kW = \frac{F \cdot V}{6120} \times 1.1 \times \frac{1}{\eta}$$

- F : Maximum load applied to chain : kN {kgf}
- L1 : Length of conveying portion : m
- W1 : Mass of conveyed objects in conveying portion :  $\ensuremath{\mathrm{kg/m}}$
- L2 : Length of accumulating portion : m
- W2 : Mass of conveyed objects in accumulating portion :  $\ensuremath{\mathrm{kg/m}}$
- ${\rm f1} \quad : {\rm Coefficient} \ {\rm of} \ {\rm friction} \ {\rm between} \ {\rm chain} \ {\rm and} \ {\rm rail} \ {\rm during} \ {\rm conveyance}$
- f2 : Coefficient of friction between chain and conveyed objects during accumulation
- f3 : Coefficient of friction between chain and rail during accumulation
- M  $\,$  : Mass of chain, slats, etc. : kg/m
- kW : Power required : kW
- V : Chain speed : m/min
- $\eta$   $\phantom{a}$  : Transmission efficiency of drive unit
- <u>G</u> : Gravitational acceleration: 9.80665 m/s<sup>2</sup>

Since the free flow conveyor uses two strands of chain generally laid in parallel, the chain mass is assumed to be that of two strands of chain. Consequently, "F" in the above formula represents the maximum chain load applied to two strands of chain. Allowing for the imbalance of the working loads, it is assumed that a load of 0.6 F is applied to a single strand.

# Step 6: Determine Chain Size

Multiply the maximum load (0.6 F) applied to a single strand of chain by the speed coefficient (Kv) given in Table 7 for a chain that satisfies the following formula:

0.6  $F \times Kv \leq$  Maximum allowable chain load

#### Table 7: Speed Coefficient (Kv)

Chain Speed (m/min)	Speed Coefficient (Kv)
15 or less	1.0
15 to 30	1.2
30 to 50	1.4
50 to 70	1.6
70 to 90	2.2
90 to 110	2.8
110 to 120	3.2

The recommended speed of the following chains is as follows:Double Plus Chain: 5 to 15 m/min or lessPlastic R roller chain: 70 m/min or lessPoly Steel Chain: 70 m/min or less

Table 9: Max	Unit:	kN {kgf}				
Chain Type	Type of Base Chain Roller	RS40 RF2040	RS50 RF2050	RS60 RF2060	RS80 RF2080	RS100 RF2100
Outboard Roller Chain	Steel roller	2.65 {270}	4.31 {440}	6.28 {640}	10.7 {1090}	17.1 {1740}
	Plastic R roller	0.44 { 45}	0.69 { 70}	1.03 {105}	1.77 { 180}	2.55 { 260}
	Poly Steel roller	0.44 { 45}	0.69 { 70}	0.88 { 90}	_	_
Top Roller	Steel roller	2.65 {270}	4.31 {440}	6.28 {640}	10.7 {1090}	17.1 {1740}
(Single-Strand)	Plastic R roller	0.44 { 45}	0.69 { 70}	1.03 {105}	1.77 { 180}	2.55 { 260}

Note: 1. The max. allowable Load of Lambda Chain is the same as that of steel roller chain.

<sup>2.</sup> The max. allowable load of double-strand top roller chain is 1.7 times that of single-strand top roller chain (1.4 times for Lambda Chain).

Table 8: Max. A	Unit: kN {kgf}			
Tsubaki Chain No.	Roller Type Chain Type	A∙C UA	B•D UB	
RF2030VRP	Standard HCP Lambda	0.55{56}	0.27{28}	
	SS	0.27	{28}	
RF2040VRP	Standard HCP Lambda	0.88{90}	0.44{45}	
	SS	0.44	{45}	
RF2050VRP	Standard HCP Lambda	1.37{140}	0.69{70}	
	SS	0.69{70}		
RF2060VRP	Standard HCP Lambda	2.06{210}	1.03{105}	
	SS	1.03	105}	
RF2080VRP	Standard HCP Lambda	5.30{540}	2.65{270}	
	SS	2.65	[270]	
Tsubaki Chain No.	Roller Type Base Chain Type	Steel (Double Plus Chain)	Center Roller (Equal Speed)	
RF2030VR	Standard	0.98{100}		
RF2040VR · CR	Standard	1.57{160}	1.57{160}	
RF2050VR · CR	Standard	2.45{250}	2.45{250}	
RF2060VR · CR	Standard	3.73{380}	3.73{380}	

**Double Plus Chain** 

Accessories for Double Plus Chain

**Special Sprockets** 

Engineering

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### **Design Information on Double Plus Chain Conveyors**

Please use the dimensional information given below for reference in configuring and installing your conveyor.

#### 1. Conveyor Ends and Sprocket Position



Table 1						
Tsubaki Chain No.	RF2030VRP	RF2040VRP	RF2050VRP			
Rail No.	RF2030VRP-R3 RF2030VRP-R3S	RF2040VRP-R4 RF2040VRP-R4S	RF2050VRP-R4 RF2050VRP-R4S			
Ζ	21.3	14.7	16.1			
L	40	50	60			
Tsubaki Chain No.	RF2050VRP	RF2060VRP	RF2080VRP			
Rail No.	RF2050VRP-R3H RF2050VRP-R3HS	RF2060VRP-R4C RF2060VRP-R4 RF2060VRP-R4S	RF2080VRP-R3S			
Z	76.2	14.9	24			
L	60	70	100			

#### 2. Dimensions for Machining Aluminum Frame

The rails listed on the right do not have an aluminum frame for the drive and driven sections. Add a frame for the middle section, referring to the dimensions in Table 2.

Table 3



Table 2		
Tsubaki Chain No.	RF2050VRP	RF2060VRP
Rail No.	RF2050VRP-R3H RF2050VRP-R3HS	RF2060VRP-R4C
X (drive side)	340	430
X (driven side)	120	130
Y	30	40

#### 3. Mounting Bolt and Conveyor Height



	ltem Frame	1	2	3	4	(5)	6	Н	L
	RF2030VRP-R3	11/1/100						(1.5	145
	RF2030VRP-R3S	MOXIUL	MO	см	Mo	мэ	MO × 8L	01.3	14.5
	RF2040VRP-R4	14/120			110			10	20 E
	RF2040VRP-R4S	1V10×12k	11/0	10/0	14/9	14/0	1MO × 86	00	28.3
	RF2050VRP-R4	110,000				110	M0×100	0.0 5	24
	RF2050VRP-R4S	M8×20k	11/10	1010	MIU	14/9	MOX106	82.3	30
*	RF2050VRP-R3H	110,000				140	100-100	1 40 5	27
*	RF2050VRP-R3HS	M8×20k	14/9	10/0	MIU	14/9	M8×10k	142.5	3/
	RF2060VRP-R4C								
	RF2060VRP-R4	M8×20l	M8	M8	M10	M8	M8×10l	95	44.5
	RF2060VRP-R4S								
	RF2080VRP-R3S	M8×25l	M8	M8	м10	M8	M8×12ℓ	130	47

1) Positioning Between the Aluminum Frames

Position the frames using the V groove (marked with (A) in the above diagram) as a guide and secure them with bolts (4) on the base.

2) Connecting the Aluminum Frames

After positioning is complete, connecting the frames via the frame joint is recommended so as to reinforce the connection. The frame joint is not intended for positioning between aluminum frames.

3) Installing the Pallet Guide Rail

Make a hole of an appropriate size at the V groove position marked (B) in the above diagram and secure the rail using the hexagonal bolt ① listed in Table 3.

4) On models marked with % in Table 3, there is a difference of 60 mm in height between the aluminum frame and pallet guide rail. To offset the height difference, fit a collar for height adjustment under the pallet guide rail.

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#### 4. Conveyor Leg Pitch

Determine the conveyor leg pitch based on the mass of the conveyed objects and the geometrical moment of inertia given in Table 4.



■ Calculation of Leg Pitch (ℓ)

$$=\left\{\frac{384\text{EI}}{5\times(0.6\text{W})}\times\delta\times10^7\right\}^{\frac{1}{4}}(\text{mm})$$

I = Geometrical moment of inertia (cm<sup>4</sup>) (See Table 4)

W = Total conveyed mass (kg/m)  $\delta$  = Slack (2 mm)

 $E = 7.0 \times 10^{3} (kg/mm^{2})$ 

Note: The total conveyed mass (W) is not always distributed evenly between the two conveyor strands. This is taken into account with the factor (0.6).

### 5. Aluminum Frame with Steel Rail

#### 1) Cross Section

#### RF2030VRP



#### Table 4

Туре	Frame No.	Geometrical Moment of Inertia (I) (cm <sup>4</sup> )
	RF2030VRP-R3	17.127
	RF2040VRP-R4	40.185
Aluminum Frame	RF2050VRP-R4	84.039
	RF2050VRP-R3H	408.283
	RF2060VRP-R4	135.137
	RF2060VRP-R4C	108.508
	RF2030VRP-R3S	17.821
	RF2040VRP-R4S	44.312
Aluminum Frame with	RF2050VRP-R4S	95.623
Steel Rail	RF2050VRP-R3HS	442.093
	RF2060VRP-R4S	171.761
	RF2080VRP-R3S	360.726

The geometrical moment of inertia (I) of the frame for the drive and driven sections is the same as given in the table above.

RF2040VRP to RF2080VRP



Frame No.For Middle SectionFor Drive and Driven SetRF2030VRP-R3SRF2030VRP-R1SK, -IRF2040VRP-R4SRF2040VRP-R1SK, -IRF2050VRP-R4SRF2050VRP-R1SK, -IRF2050VRP-R3HSRF2060VRP-R4SRF2060VRP-R1SK, -I		Steel Rai	l (No. 3)	Steel Rail Mounting Screw	Inner Rail Mounting Screw
For Middle Section	For Drive and Driven Sections	Dimensions (Plate Thickness × Width)	Dimension A	(No. 4) Cross-Recessed Pan Head Screw	(No. 5) Cross-Recessed Countersunk Head Screw
RF2030VRP-R3S	RF2030VRP-R1SK, -R1SJ	3×13	4.75	M3×7 Q	_
RF2040VRP-R4S	RF2040VRP-R1SK, -R1SJ	3×13	8.4	M4×5 Q	M4×6 Q
RF2050VRP-R4S	RF2050VRP-R1SK, -R1SJ	3×13	8.4	M4×6 Q	M4×6 Q
RF2050VRP-R3HS	_	3×13	8.4	M4×6 Q	M4×6 Q
RF2060VRP-R4S	RF2060VRP-R1SK, -R1SJ	3×13	8.4	M4×6 Q	M4×6 Q
RF2080VRP-R3S	RF2080VRP-R1SK, -R1SJ	6×16	10.5	M5×8 Q	M6×10 Q

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**Top Roller Chain** 

#### 2) Construction Diagram of Middle-Section Frame

overall length of 3,000 mm.

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The steel rail is cut at an angle of 45° at the center of the base chain rail.

3) Construction Diagram of Frame for the Drive and Driven Sections

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► A

Unit: mm

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| | | | **Double Plus Chain** 

Accessories for Double Plus Chain

**Top Roller Chain** 

■ RF2050VRP-R3HS has no frame for the drive and driven sections.

A notch is provided on the right-end bottom in the diagram above (See page 122).

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Installation Pitch of Steel Rail and Inner Rail

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A-A View

#### 4) Note for Handling Aluminum Frame with Steel Rail

#### (1) When Cutting the Aluminum Frame with Steel Rail for Use

- <1> Do not cut the center area or the screw section on the frame.
- <2> Remove burrs and chips from the cut surface.
- <3> Connect and secure the steel rail with the inner rail, and the inner rail with the frame of the base chain by screws 15 to 30 mm away from the cut area.

RF2030VRP-R3S, RF2050VRP-R3HS, RF2080VRP-R3S --- The dimensions in ( ) are those for the frame of the

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<4> Machine all parts individually. Completely remove burrs and chips produced by machining cleanly before starting reassembly. Fit the 45 cut area correctly to prevent misalignment.

#### (2) Connecting the Frame

If there is a difference in level on the abutting surface of the steel rail after connecting the frame (in vertical and horizontal directions), chamfer the corners slightly to avoid chain rollers getting caught.

## **Guidelines for Use**

#### 1. Double Plus Chain (Common with Double Plus Chain with Snap Cover)

- 1) Recommended conveyor length is 15 m or less.
- 2) Avoid using a chain with engineering plastic rollers in an environment where it will be exposed to oil or water. (Use in such an environment may cause the double-speed capability to deteriorate.)
- 3) Use caution not to drop pallets or conveyed objects on the chain and avoid any operation that may expose the chain to impact and pressure by pressing it down.
- 4) When unusual noises are heard from a curved section around a sprocket after use for an extended period, apply a small amount of lubricant (SAE10 to 20) onto the pin through the gap between the outer plate and inner plate ("A" in the diagram below). Wipe off excess oil from plastic rollers.



Since noise is unlikely to occur between pins and bushes on Lambda Chain, Lambda Chain is suitable for use where lubrication is best avoided.

- 5) Lubrication is required on steel rollers. Apply a small amount of lubrication (SAE10 to 20) in areas "A," "B" and "C." A lubricator with a sharp pointed tip like a syringe is convenient to use for lubrication. Wipe off excess oil from the periphery of large and small rollers.
- 6) Finishing the Ends on the Conveying Side Put a chamfer on the ends of the upper rail that the chain's small rollers travel on.





7) Large Roller Support

It is possible to prevent the chain's large roller from dipping at the chamfered portion by installing a support for the large roller on the ends of the rail on the driven side.



#### 8) Transfering Objects Between Conveyors (straight line transfer)

To convey pallets in a stable condition at the transfer portion of the conveyor, install a roller between the two conveyors or the shafts of sprockets. Be sure that the distance (l) from the ends of the rail to the roller that supports the pallets is less than 1/2.5 times the pallet's length in the conveying direction.



9) Take-Up (1)



Take-up amount L = Chain pitch  $\times$  2 + Allowance length Allow for a little sag up to 10% of span on the chain under the drive-side sprocket during operation. When the amount of sagging increases, adjust the take-up or cut the chain.



Chain Sag		Unit: mm
Chain Size	Normal Sag	Max. Sag
RF2030	25	75
RF2040	35	105
RF2050	40	120
RF2060	50	150
RF2080	65	190

The sag in the table above is given on the basis of the conveyor design information on page 148.

#### 10) Take-Up (2)

Where take-up configuration shown above is not allowed because of the presence of conveyors, design the take-up configuration referring to the diagram below. With Double Plus Chain with snap cover, make the dimension %R larger than the dimension R of the return guide (see the dimensional diagram).



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#### 11) Sprocket and Shaft

Drive sprocket --- Should be keyed, with both left and right sprockets aligned.

Take-up sprocket --- Should be keyless (free), with separate shafts on the left and right sprockets. Other sprockets --- Keyless (free)

If a conveyed object is placed directly on the chain, the large roller may leave a mark on the conveyed object.

RF2030VRPUA and RF2030VRPUB (urethane-lined rollers) are designed so that the large roller is less likely to leave a mark on conveyed objects.

#### 2. Double Plus Chain with Snap Cover

- 1) Handle the chain with care, as the snap cover is made of engineering plastic.
- 2) There are two types of snap covers; one for the outer link and another for the inner link. Use caution to avoid installing the wrong type of snap cover. (See the diagram below.) (The snap cover is fitted on the chain at time of shipment.)





For Inner Link

 When connecting chains, connect them via a special connecting link and then fit the snap cover for the outer link correctly at the notch of the plate. (See the diagram below.)



4) If a snap cover is damaged in handling, replace it with a new snap cover.

#### 3. Outboard Roller Chain and Top Roller Chain

 If parts making up the chain are made of steel, lubrication is generally required. (See the diagram below.) There is no need for lubrication on the base chain and engineering plastic rollers of Lambda chain.

#### Lubrication Positions on Outboard Roller Chain



Inner Plate Base Chain Roller Steel Outboard Roller

#### Lubrication Positions on Top Roller Chain



 Lubricate these parts regularly (about once a week) to avoid running out of lubrication. Perform drip lubrication (using lube listed below) or apply lube with a brush.

#### Lubrication (SAE No.)

Lubrication Method		Drip or Brush												
Ambient Temperature Tsubaki Chain No.	–10°C to 0°C	0°C to 40°C	40°C to 50°C	50°C to 60°C										
RS50 or smaller pitch	SAE10W	SAE20	SAE30	SAE40										
RS60.80.100	SAE20	SAE30	SAE40	SAE50										
RS120 or larger pitch	SAE30	SAE40	SAE50	SAESU										

ISOVG: Please refer to page 101.

Engineering Manual

#### 4. Installation

#### 1) Sprocket Installation

Proper installation of the sprockets is critical to smooth operation of a conveyor, and it also affects chain life. The installation should be properly carried out in accordance with the procedures described below.

- 1) Check the levelness of the shafts with a level.
  - Adjust to within a tolerance of  $\pm \frac{1}{300}$ .



2) Check the parallelism of the shafts with a scale.

Adjust the shafts so that the parallelism as calculated with formula  $\frac{A-B}{L}$  is to within  $\pm \frac{1}{100}$ .



- Align the sprocket axis to match.
   Tolerance relative to center distance:
  - Up to 1 m: within 1 mm
  - 1 to 10 m: within Distance between shafts (mm) 1000
  - 10 m or longer: within 10 mm

Measure misalignment with:

- A straight edge when the distance is short
- A piano wire when the distance is long
- A leveling string or a piano wire when the sprocket positions are different from each other in terms of height

Misalignment Sprocket

4) After processes 1) to 3) have been completed, lock each of the sprockets to the shaft(s) by means of keys or Tsubaki POWER-LOCKS. Lock the sprockets that are installed and used on the same shaft so that the teeth of both sprockets align in terms of phase.

### 5. Cutting and Connecting Double Plus Chain

#### 1) Cutting Double Plus Chain



Chain Vise (optionally available RSCV-1)

- (1) Shear off the rivet on the pin end of the outer link to be cut using a hand grinder.
- (2) Set the Double Plus Chain (for chain with snap cover, remove the snap covers from about three links of the area to be cut) on a chain vise (or its equivalent) and drive in the pin using a punch or other means until the outer plate on the upper side is removed.
- (3) The chain can be cut by using a chain vise and a fork-shaped tool.



#### 2) Connecting Double Plus Chain (using a connecting link)

#### (1) Connecting Using a Spring Clip (RF2060 or smaller)

<1> Pass the two pins of the connecting link through the bushes of the inner link and then through the holes of the connecting plate.



Spring Clip-Type Connecting Link

<2> Fit the spring clip securely into the pin groove.



#### (2) Connecting Using a Cotter Pin (for RF2080)

- <1> Pass the two pins of the connecting link through the bushes of the inner link and then through the holes of the connecting plate.
- <2> Pass the cotter pin through the hole of the pin and open the legs of the cotter pin to an angle of about 60°.





#### 6. Cutting and Connecting Outboard Roller Chain

**1) Cutting Chain When the Base Chain Roller Is an S Roller** For cutting Poly Steel Chain with outboard rollers, refer to 6. 3).



- (1) Determine the outer link to be cut and mark the link for identification.
- (2) Set the chain on a chain vise (sold separately) as shown above and shear off the rivets on the pin ends (two rivets on one side) using a hand grinder.
- (3) Remove the two pins using a pin with a diameter slightly smaller than the pin diameter of the chain (using a Tsubaki Punch or its equivalent). When the pins are pulled out a little, the two outboard rollers on the upper side can be removed.(The diagram above shows the outboard rollers)

being removed.)(4) Directly tap the pin with a small hammer until the end of the pin reaches the upper face of the outer plate to remove. Tap the two pins alternately to ensure they come off evenly.

Use caution not to damage the outboard rollers on the right and left.

(5) Tap and pull out the two pins using a punch until the outer plate on the upper side can be removed.

Chain Vise No.	Applicable OR Chain Size (Base Chain Roller: S Type)
RS-CV1	RS40, RF2040
RS-CV2	RS40 to 80, RF2040 to 2080
RS-CV3	RS80 to 100, RF2080 to 2100

OR: Outboard Roller

2) Cutting Chain When the Base Chain Roller Is an R Roller



- (1) Determine the outer link to be cut and mark the link for identification.
- (2) Shear off the rivets on the pin ends (four rivets) using a hand grinder so as to remove the four outboard rollers. In doing so, shear down to the washers with the grinder to remove the washers.
- (3) Remove the four outboard rollers. (Receive the outboard roller on the cradle, apply the punch on the pin end face, and tap the pin out until the washer is removed.
   Follow the same procedure to remove the washers on the other side.)
- (4) Set the chain on the cradle as shown above and remove the two pins by tapping the punch with a hammer. Prepare a cradle yourself as appropriate.
  (5) Fallow steps (4) and (5) of 0, 1)
- (5) Follow steps (4) and (5) of 6. 1).
- (6) If outboard rollers are spaced every two or more links, the rivet parts to be sheared off will differ from those shown in the above diagram. (See the diagram below.)
- Outer Link to Be Cut

No need to file off this rivet

- 3) Cutting Poly Steel Chain with Outboard Rollers
- (1) When the Outboard Rollers Are Arranged in a Staggered Installation



- <1> Determine the outer link to be cut and mark the link for identification.
- <2> Although the chain can be set in a chain vise in the same manner as shown in 6. 1) (with S type), this setting damages the chain because the inner link is made of engineering plastic. For this reason this cutting method cannot be used.
- <3> Lightly tighten the washer on the pin end with a chain vise. Since no rivet is provided on the pin end on this chain, proceed to cutting the chain.
- <4> Use a pin with a diameter slightly smaller than the pin diameter of the chain (using a Tsubaki Punch or its equivalent), tap the punch lightly with a hammer, and pull out the pin of the chain gradually (see the above diagram). When the pin is removed from the upper outer plate as shown above, stop tapping the pin.
- <5> When pins (a) and (b) are pulled out in the same procedure, the chain can be cut. The diagram above shows the state whereby pin (a) has been pulled out to the specified position and pin (b) has already been pulled out.
- <6> Discard the cut outer links (shown below).



Center Roller Chain

**Double Plus Chain** 

(2) When the Outboard Rollers Are Arranged in a Crosswise Installation



- <1> Determine the outer link to be cut and mark the link for identification.
- <2> Although the chain can be set in a chain vise in the same manner as shown in 6. 1) (with S type), this setting damages the chain because the inner link is made of engineering plastic. For this reason this cutting method cannot be used.
- <3> Support outboard roller "A" on the upper side with a chain vise as shown above and lightly tighten the chain vise. Bring the outer link to be cut to the end of the chain vise, as shown above.
- <4> Apply the punch to the pin end of outboard roller "A" and lightly tap the punch with a light hammer. Outboard roller "A" will be removed as shown below.



Outboard Roller B

- <5> Turn the chain upside down and remove outboard roller "B" by following the same procedure for removing outboard roller "A."
- <6> Set the chain after removing outboard rollers "A" and "B" on the cradle as shown below, tap the punch lightly with a hammer, and remove the two pins.

Pull out the pins up to a position where the upper outer link is removed.

(Prepare a cradle yourself as appropriate.)



- 4) Connecting Chain with Outboard Rollers Chains are connected using connecting links.
- (1) When the Outboard Rollers Are Arranged in a Staggered Installation



- <1> Pass the two pins of the connecting link through the holes of the inner link and then through the slip fit connecting plate.
- <2> Insert a cotter pin through each pin and open the legs of the cotter pin to an angle of about 60 degrees.

#### (2) When the Outboard Rollers Are Arranged in a Crosswise Installation



- <1> Pass the two pins of the connecting link through the holes of the inner link and then through the slip fit connecting plate.
- <2> When installing outboard rollers on both sides of a pin as shown above, pass the pin through the outboard rollers and washer, and attach cotter pins in two places. Open the legs of the cotter pins to an angle of about 60 degrees.

7. Cutting and Connecting Top Roller Chain
1) Cutting Chain When the Base Chain Roller Is an S Roller
<1> Mark the outer link to be cut for identification.



- <2> Shear off the rivets on the base chain pin ends and top roller pin ends using a hand grinder or other means (three rivets on one side of the chain).
- <3> Turn the chain side ground by the grinder upward and set the chain on a cradle, as shown above. Prepare a cradle yourself as appropriate. To remove the three pins including the top roller pin at the same time, prepare a cradle integrating the part shown by the phantom line.
- <4> Tap the punch (or its equivalent) with a hammer until the two (three) pins are removed from the outer plate (up to the position shown in the diagram).
- <5> Change the setting of the cradle as shown below to remove the top roller pin. (When top rollers are not attached to the outer link, this procedure is not necessary.)
- <6> Remove the top roller pin by repeating Step <4>.



#### 2) Connecting Top Roller Chain

- <1> Chains are connected using connecting links.
- <2> Pass the two pins of the connecting link through the bushes of the inner link and then through the holes of the connecting plate (the connecting plate is slip fit).

#### Spring Clip-Type Connecting Link



Cotter Pin-Type Connecting Link Spring Clip



<3> Fit a cotter pin or spring clip securely on the pin. Open the legs of the cotter pin to an angle of about 60°. Refer to the description of Double Plus Chain for detailed information on fitting the spring clip.

#### – Top Roller Chain Connecting Links

- 1) There are two types of connecting links. Use caution when placing an order for connecting links to ensure correct order placement.
- 2) The outer diameter of the top roller differs in chain with top rollers installed on every link and in chain with top rollers installed on every second link. Refer to the dimensional drawing for the dimensions of these top roller chains. (The diameter of double pitch rollers is the same in both these installation types.)
- When an attachment other than top rollers is attached to the connecting link, please diagram it. (Symbol for the connecting link: CL)
- For chain with top rollers installed on every link



Special Sprockets

# For Your Safety When Using the Chain

## **Warning** To avoid danger, observe the following rules.

Do not use chain or chain accessories for any purpose other than their originally intended use.

- Never perform additional work on chain.
  - ·Do not anneal any chain parts.
  - ·Do not clean chain with acids or alkalis. These may cause cracking.
  - •Never attempt to electroplate chain or chain parts. This may cause hydrogen embrittlement.
  - ·Do not weld chain. Heating effects will cause weakening and cracking.
- When a torch is used to heat or cut chain, remove the links on each side and do not reuse them.
- When replacing a worn or damaged part, do not replace just the worn or damaged part. Replace all parts with new parts.
- If a material that causes hydrogen embrittlement (acid, strong alkali, battery fluid, etc.) comes in contact with the chain, immediately stop using the chain and replace it with new chain.
- When using chain in a lifting device, set up a safety barrier and do not allow anyone to go under the equipment.
- Always install safety equipment (safety covers, etc.) on chain and sprockets.
- 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. When installing, removing, inspecting, maintaining and oiling chain,
- •Perform the work as instructed in the manual, catalog or other documentation that was provided with the product. •Before starting work, turn off the power switch and take measures to prevent it from being turned on accidentally.
- Secure the chain and parts to prevent them from moving freely.
- $\cdot \textsc{Use}$  a press tool or other special tools to separate or connect chain, and follow the correct procedures.
- $\cdot \text{Remove}$  and insert pins and rivets in the correct direction.
- Wear clothing and protective gear (safety glasses, gloves, safety shoes, etc.) that are appropriate for the work.
- ·Only experienced personnel should perform chain replacement.

## **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.
   Minimum tensile strength refers to the failure point when the corresponding load is applied to the chain once and does not refer

#### to the allowable operational load.

# 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.

#### 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.

#### Please give us the following information when placing an order for or inquiring about a chain:

Machine Used			Minimum Tensile	kN {kջք}
			Strength	(
Object to be Conveyed			Chain Pitch	mm
Corrosiveness			Attachments	Installed on every links
Abrasiveness			Conveyance Method	Pushed by dog, Directly placed, Other
Temperature of Conveyed Object	Normal Temperature	°C	Operating Time	hours/day
Dims. of Conveyed Object			Operating Method	Continuous, Intermittent, Reverse running (Yes / No)
Mass of Conveyed Object	Max.	kg/piece	Lubrication	Permitted / Not Permitted
Conveyance Amount	Max.	ton/hour (bulk)	Motor Used	AC/DC kW × r/min × (no. of motors)
		kg/piece (countable object)	No. of Sprocket Teeth	NT (PCD mm)
Conveyor Length		m	Hole Dia. of Sprocket Shaft	Dia. H8 · H7
Lifting Height		m	Hub	Type())Dia. × L
No. of Strands of Chain	Strand	ds (Spacing: m)	Key Groove	Not required ( ) JIS $\cdot$ b $\times$ t Parallel / Driving
Chain Speed		m/min	Finishing of Teeth	Machine-cut Induction hardening

Brief description of machine used and chain:

Configuration of conveyor, method for loading and unloading of objects to be conveyed, rail configuration, method of receiving on return side, and other remarks.

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# **Custom Attachment Chain Worksheet**

Use this sheet to identify the Attachments and Chain you need, then fax the form to your authorized distributor or your nearest Tsubaki representative. If you have any questions, please call your Tsubaki representative.

Name:	Special Dimensions
Title:	Pitch:
Telephone/Fax:	Single:
Company:	Double:
Address:	Special (Specify):
	Side Plate (Thickness):
NOTES:	Rollers:
	Width:
	Diameter:
	Solid:
Base Chain Size (ANSI/BS):	Split:
Quantity/Number of Chains:	Other Special Requirements:
Length: Number of Pitches: or Inches:	
If uneven number of pitches, specify:	
Roller link on each end:	
Connecting link on each end:	
Offset/Connecting link:	
Type of offset: Riv Cot	
Construction: RivetedCottered	
Material: 🗌 Standard Carbon 🗌 Nickel-Plated	
□ Stainless □ SS □ NS □ AS □ LSC	
□ Lambda <sup>®</sup> □ NEP	
Attachment: Standard 🛛 YES 🗌 NO	
Wide contour	Sketch the attachment and spacing
Special (Drawing required)	below. Note if you want the attachment
Spacing: Pitches Inches	on the pin or roller links, if you want
Extended Pin: 🗌 YES 🗌 NO	straight or bent attachments, or if you
Projection:	require extended pins.
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#### Please give us the following information when placing an order for or inquiring about a chain:

Machine Used			Minimum Tensile Strength	kN {kgf}	
Object to be Conveyed			Chain Pitch	mm	
Corrosiveness			Attachments	Installed on every links	
Abrasiveness			Conveyance Method	Pushed by dog, Directly placed, Othe	er
Temperature of Conveyed Object	Normal Temperature	°C	Operating Time	hours/da	ау
Dims. of Conveyed Object			Operating Method	Continuous, Intermittent, Reverse running	g (Yes / No)
Mass of Conveyed Object	Max.	kg/piece	Lubrication	Permitted / Not Permitted	d
Conveyance Amount	Max.	ton/hour (bulk)	Motor Used	AC/DC kW × r/min	× (no. of motors)
		kg/piece (countable object)	No. of Sprocket Teeth	NT (PCD mn	n)
Conveyor Length		m	Hole Dia. of Sprocket Shaft	Dia. H8 · H7	
Lifting Height		m	Hub	Type ( ) Dia. × L	
No. of Strands of Chain	Strar	nds (Spacing: m)	Key Groove	Not required ( ) JIS · b × t Paral	llel / Driving
Chain Speed		m/min	Finishing of Teeth	Machine-cut Induction harde	ening

Brief description of machine used and chain:

Configuration of conveyor, method for loading and unloading of objects to be conveyed, rail configuration, method of receiving on return side, and other remarks.

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Object to be Conveyed			Chain Pitch	mm	
Corrosiveness			Attachments	Installed on every links	
Abrasiveness			Conveyance Method	Pushed by dog, Directly placed, Othe	er
Temperature of Conveyed Object	Normal Temperature	°C	Operating Time	hours/da	ау
Dims. of Conveyed Object			Operating Method	Continuous, Intermittent, Reverse running	g (Yes / No)
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Name:	Special Dimensions
Title:	Pitch:
Telephone/Fax:	Single:
Company:	Double:
Address:	Special (Specify):
	Side Plate (Thickness):
NOTES:	Rollers:
	Width:
	Diameter:
	Solid:
Base Chain Size (ANSI/BS):	Split:
Quantity/Number of Chains:	Other Special Requirements:
Length: Number of Pitches: or Inches:	· ·
If uneven number of pitches, specify:	
Roller link on each end:	
Connecting link on each end:	
Offset/Connecting link:	
Type of offset: Riv Cot	
Construction: RivetedCottered	
Material: 🗌 Standard Carbon 🗌 Nickel-Plated	
🗌 Stainless 🔲 SS 🛛 🗌 NS 🗔 AS 🔲 LSC	
Lambda <sup>®</sup> NEP	
Attachment: Standard 🛛 YES 🗌 NO	
Wide contour	Sketch the attachment and spacing
Special (Drawing required)	below. Note if you want the attachment
Spacing: Pitches Inches	on the pin or roller links. if you want
Extended Pin: YES NO	straight or bent attachments, or if you
Projection:	require extended pins.
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Corrosiveness			Attachments	Installed on every links
Abrasiveness			Conveyance Method	Pushed by dog, Directly placed, Other
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		kg/piece (countable object)	No. of Sprocket Teeth	NT (PCD mm)
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Lifting Height		m	Hub	Type ( ) Dia. × L
No. of Strands of Chain	Stra	nds (Spacing: m)	Key Groove	Not required ( ) JIS · b × t Parallel / Driving
Chain Speed		m/min	Finishing of Teeth	Machine-cut Induction hardening

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