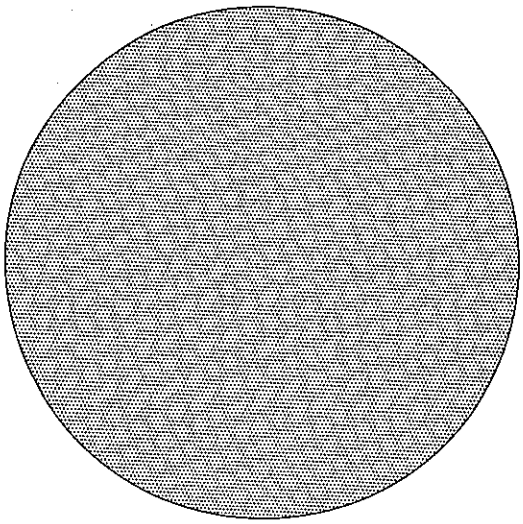
TSUBAKI



TSUBAKI CONVEYOR CHAINS

TSUBAKIMOTO CHAIN CO.

TSUBAKI CONVEYOR CHAIN

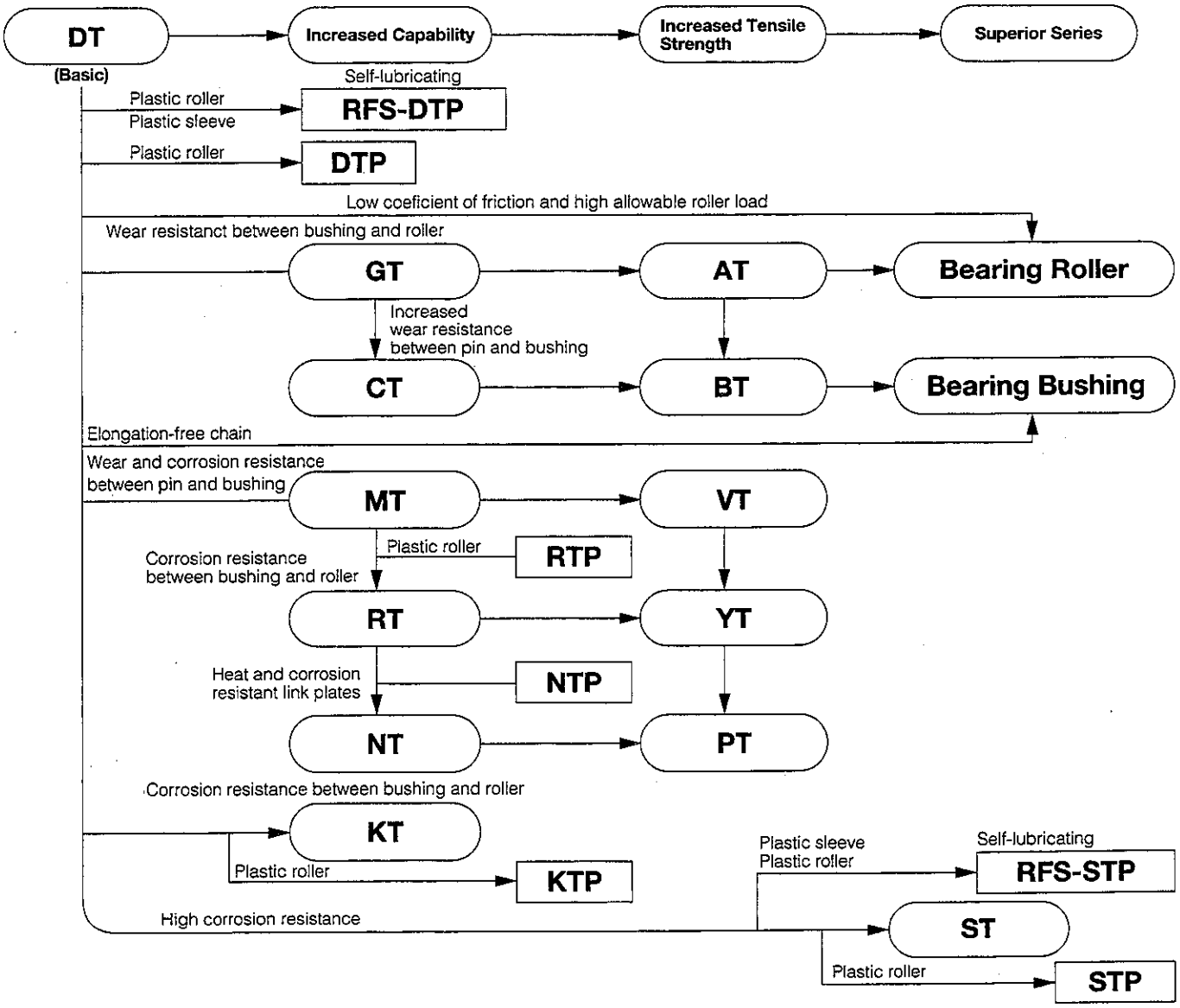
YOU CAN'T FIND A WIDER SELECTION OF CONVEYOR CHAINS.

TSUBAKI Conveyor Chains and Sprocket Wheels Solve Material Handling Problems

A Wide Selection of Versatile, Standardized TSUBAKI Conveyor Chains and Sprocket Wheels

As a leading manufacturer of chains and conveyor equipment, with over 75 years of experience, TSUBAKI has vigorously been carrying out R & D for both manufacturing and applications. With these results, many of TSUBAKI's conveyor chains have been standardized to meet various applications for different operating conditions and circumstances. Any standardized chain can now be supplied within a short delivery time. Apply the most suitable chain to meet your application by selecting from the wide range of standardized TSUBAKI Conveyor Chains.

■FEATURE DIAGRAM FOR RF CONVEYOR CHAIN SERIES



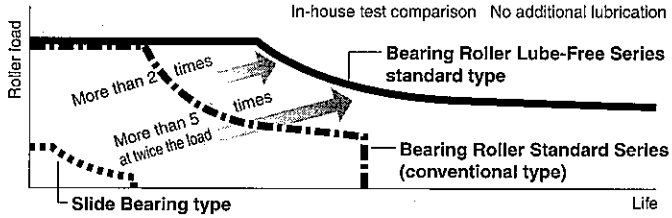
Bearing Roller Conveyor Chain

Lube-Free Series

The Bearing Roller Conveyor Chain Lube-Free Series is an "economical" and "environmentally friendly" conveyor chain which excels in a variety of environmental applications.

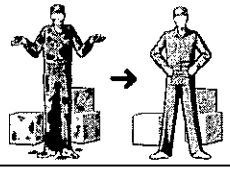
Lubrication Unnecessary · Long Life	Due to the adoption of a unique cylindrical roller bearing having a self-lubricating function between the bushing and roller, this chain can be used without lubrication and boasts a long life second to none.

When using the chain without lubricant, the wear life between the bushing and the roller is more than 2 times that of the current Bearing Roller Conveyor Chain standard series, and has more than 5 times the wear life of the general slide bearing type at twice the load.



- **Large scale reduction in maintenance frequency and related expenses**
- **Maintains a clean environment**
- **Sharp reduction in replacement frequency**

Large-scale reductions in maintenance frequency and attributable expenses are realized. Conveyed items, equipment, and machinery are all kept clean maintaining a clean environment. Moreover, its long life also contributes to the reduction of replacement costs.



Compactness (low energy, minimal space)	Chain running resistance is small compared to the standard slide bearing type.

- **Reduction of required power**
- **Chain/Conveyor size reduced**

It is possible to reduce the required power by downsizing the chain and conveyor. This allows for a reduction in the overall cost of the equipment.

Running Stability	As the chain's running resistance variation is low, the stick-slipping phenomenon is reduced.

- **Improves Productivity**
- **Reduction in sea-sickness phenomenon**

Running stability assists in the prevention of toppling products and product deformation. Moreover, the sea-sickness phenomenon, typical when working on a conveyor, can be avoided.

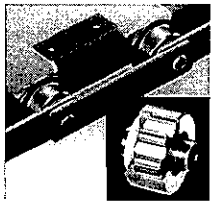
Copes in Various Environmental Applications

The lube-free series has been prepared to satisfy 3 specifications according to environmental use and can be used in a wide variety of applications. The roller can be used without a lubricant in all 3 specifications thanks to the adoption of a unique cylindrical roller bearing, which has a self-lubricating function between the bushing and roller.

General Environment

Lube-Free Series Standard Type
This is a lube-free Bearing Roller Conveyor Chain for general conveyance.

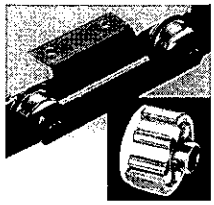
Examples of use:
- Automobile assembly conveyor
- Paper roll conveyor
- Building materials conveyor
- Other general conveyors



Wet Environment

Lube-Free Series Water Resistant Type
The anti-corrosive performance and wear resistance of the roller has been raised remarkably through the chain's design giving it longer life.

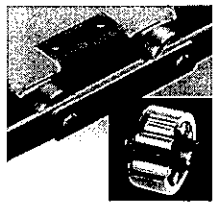
Examples of use:
- Car wash
- Outdoors
- Automobile shower lines
- Other lines exposed to water



High Temperature Environments up to 300°C

Lube-Free Series Heat Resistant Type
Designed to increase wear resistance significantly in high temperature environments (max 300°C) resulting in longer life.

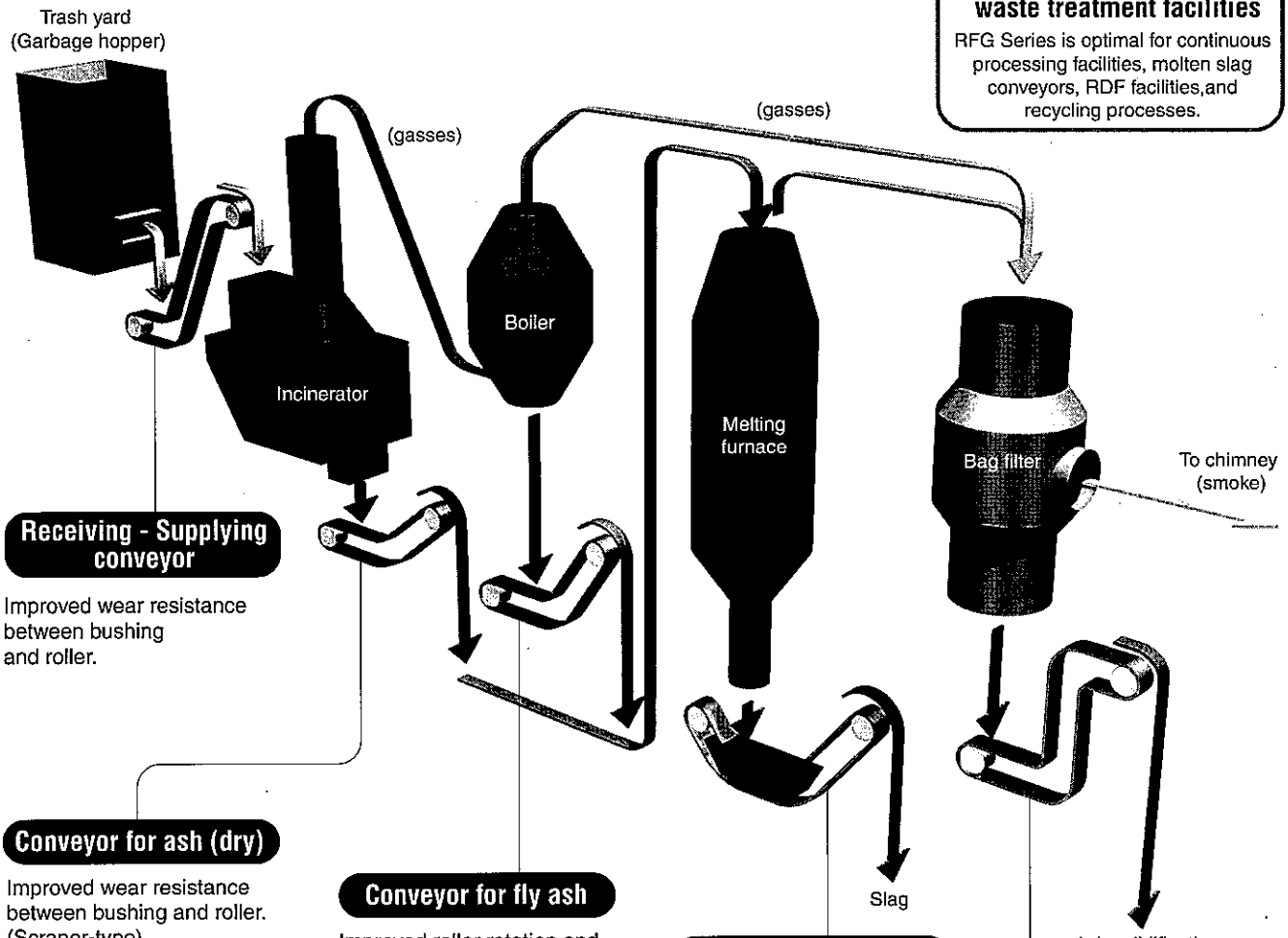
Examples of use:
- Bread baking ovens
- Other high temperature environments where the temperature reaches 300°C
- All types of dryers



Tsubaki RFG Series Conveyor Chains play an active role in tough environments

Whether in the fly ash environment of waste processing or underwater, RFG Series has the toughness required for operation in harsh conditions. As well as superior resistance to corrosion and wear, our new chains for slag conveyors offer excellent roller rotation and chain articulation performance.

First in the industry!
Chains designed for waste treatment facilities
RFG Series is optimal for continuous processing facilities, molten slag conveyors, RDF facilities,and recycling processes.

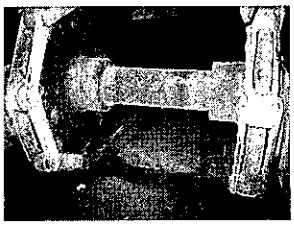


Receiving - Supplying conveyor

Improved wear resistance between bushing and roller.

Conveyor for ash (dry)

Improved wear resistance between bushing and roller.
(Scraper-type)
Chain used:
RFG12200R(AG)

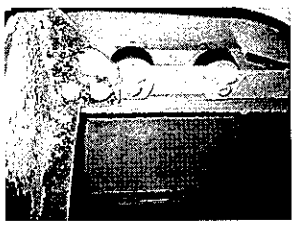


Conveyor for wet ash

Improved roller rotation and chain articulation despite a build up of ash, ash sludge, and other matter.

Conveyor for fly ash

Improved roller rotation and chain articulation despite a build up of fly ash.
(Scraper-type)
Chain used:
RFG03075R(FG)



Conveyor for fly ash (corrosive content)

Made to counteract corrosion and poor chain articulation caused by a build up of ash.

Conveyor for molten slag

To allow use in harsh conditions,corrosion resistance and wear resistance has been improved.
(Scraper-type)
Chain used:
RFG17200R(YP)

Conveyor for fly ash

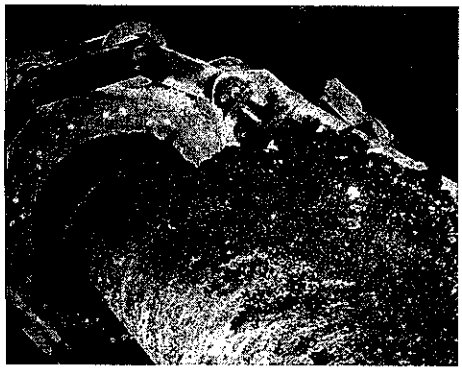
Improved roller rotation and chain articulation despite a build up of fly ash.

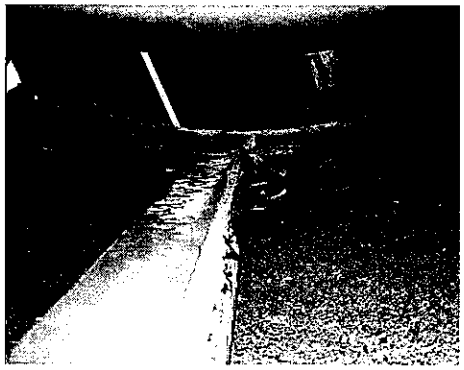
Chains for molten slag conveyors

Recommended with confidence.

At Tsubaki we are proud of our hard-won expertise and proven track record. Try our YP-type chains, designed to resist wear and corrosion, and see for yourself how effective they really are.

■ Typical applications

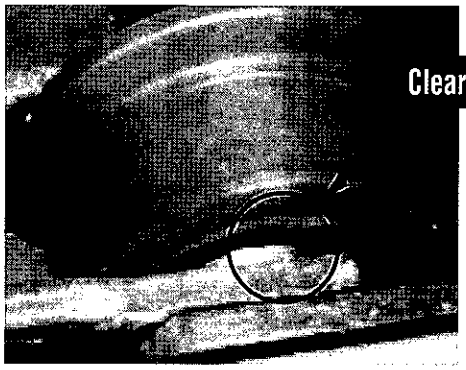




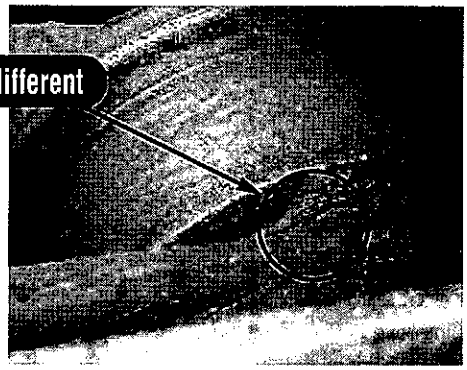
■ Comparative durability

After one year's service in a molten slag conveyor

Wear life between bushing and roller of Tsubaki AT-specification strengthened chain



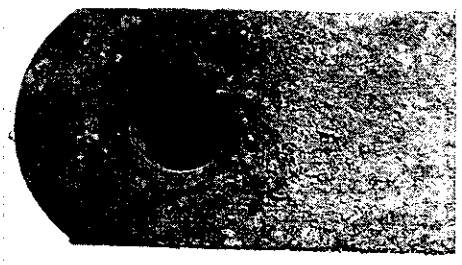
Minimum wear between bushing and roller of YP-specification molten slag conveyor chain (1/10 the wear of AT-specification).



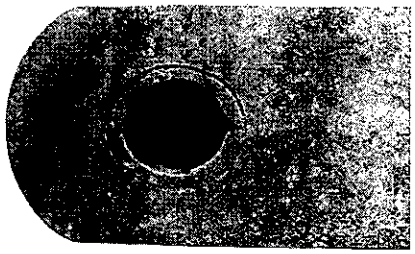
■ Corrosion trial

Results after a six-week immersion in corrosive liquid at approx. 80°C (176°F).

Tsubaki reinforced AT-type chain shows severe rusting and pitting.



YP-type molten slag conveyor chain shows no rusting or pitting.



■INTRODUCTION TO TSUBAKI CONVEYOR CHAINS

NAME	FEATURES	APPLICATION	Page
RF Conveyor Chain	Most popular and economical	Standard	170a
Bearing Roller Series	Two chain sizes smaller Minimum maintenance	Compact applications High allowable roller load	174a
RF Type Bucket Elevator Chain	Wear resistant High fatigue resistant	Cement bucket elevator	183a
BF Type Bucket Elevator Chain	Wear resistant High fatigue resistant	Cement bucket elevator	185a
Flow Conveyor Chain	A variety of attachments standardized for material handling	Conveying bulky materials	187a
NF Flow Conveyor Chain	Strong and highly abrasion resistant	Abrasive, high-temperature and high-humidity environments.	190a
RF Conveyor Chain with Side Roller Chain	Stable operation	Special attachments and outboard rollers support heavier loads.	191a
RF Conveyor Chain with Top Roller	Conveys and accumulates materials	Assembly and transport lines	192a
NF Block Chain	Strong and compact, highly wear resistant	Pushing trucks conveying hot materials and drawbench	193a
RFD Deep Link Chain	Direct loading	Conveying heavy materials in steel and automobile assembly lines, erc.	194a
Water Screen Chain	Through-hardened stainless steel pins and bushings; rollers have special bushings for smoother operation and longer service life. anti-corrosive	Water inlet screening processor at paper and steel mills, water purification plants, etc.	195a
Sanitation Chain	Strong stainless steel chain which is both lightweight and highly corrosion resistant	Sewage disposal and processing	196a
Tooth Insert Sprockets for Sanitation Chain	Minimal maintenance corrosion resistant low operation costs	Sewage disposal and processing	201a
Sugar Mill Chain	Increased corrosion resistance, light-weight with longer wear life	Sugar mill	203a
Engineering Information	Engineering information for chain selection, installation and maintenance	Engineering services	211a

Chain Series	Component Parts				
	Link Plate	Pin	Bushing	Roller Type	
				R, F	S, M, N
DT (Basic)	Car	Aly-TH	Car-CH Aly-TH	Car CI	Car-CH Aly-TH
AT	Aly-TH	Aly-TH	Aly-CH Aly-TH	Car-CH Aly-TH	Aly-TH
CT	Car	Aly-TH	Car-CH Aly-TH	Car-CH Aly-TH	Car-CH Aly-TH
BT	Aly-TH	Aly-TH Aly-TH-IH	Aly-CH Aly-TH	Car-CH Aly-TH	Aly-TH
PT	S4-TH	S4-TH	S4-TH	S4-TH	S4-TH
ST	S3	S3	S3	S3	S3

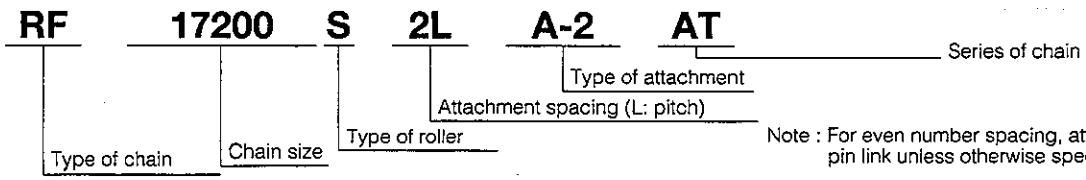
Steel Materials
Car···Cartion Steel
Aly··· Alloy Steel
CI··· Cast Iron
S4···400 Series Stainless Steel
S3···300 Series Stainless Steel

Heat Treatment
TH··· Through Hardened
CH···Case Hardened
IH··· Induction Hardened

AVERAGE TENSILE STRENGTH

TSUBAKI Chain No.	DT (Basic) kN (kgf)	AT kN (kgf)	NT kN (kgf)	PT kN (kgf)	ST kN (kgf)	BT kN (kgf)	GT·CT·KT MT·RT kN (kgf)	DT·YT kN (kgf)
RF03075 RF03100	29 (3,000)	70 (7,100)	29 (3,000)	54 (5,500)	33 (3,400)	51 (5,200)	29 (3,000)	70 (7,100)
RF 430	54 (5,500)	98 (10,000)	52 (5,300)	83 (8,500)	48 (4,900)	70 (7,100)	54 (5,500)	98 (10,000)
RF05075 RF05100 RF05150	69 (7,000)	142 (14,500)	69 (7,000)	108 (11,000)	69 (7,000)	98 (10,000)	69 (7,000)	142 (14,500)
RF 204	78 (8,000)	142 (14,500)	78 (8,000)	123 (12,500)	69 (7,000)	98 (10,000)	78 (8,000)	142 (14,500)
RF 450	78 (8,000)	142 (14,500)	78 (8,000)	123 (12,500)	69 (7,000)	98 (10,000)	78 (8,000)	142 (14,500)
RF08150	78 (8,000)	142 (14,500)	78 (8,000)	123 (12,500)	69 (7,000)	98 (10,000)	78 (8,000)	142 (14,500)
RF 650	78 (8,000)	142 (14,500)	78 (8,000)	142 (14,500)	69 (7,000)	98 (10,000)	78 (8,000)	142 (14,500)
RF10100 RF10150	113 (11,500)	225 (23,000)	113 (11,500)	176 (18,000)	108 (11,000)	225 (23,000)	123 (12,500)	226 (23,000)
RF 214	127 (13,000)	240 (24,500)	118 (12,000)	186 (19,000)	123 (12,500)	240 (24,500)	127 (13,000)	240 (24,500)
RF 205	127 (13,000)	240 (24,500)	118 (12,000)	186 (19,000)	123 (12,500)	240 (24,500)	127 (13,000)	240 (24,500)
RF 6205	186 (19,000)	279 (28,500)	167 (17,000)	265 (27,000)	132 (13,500)	279 (28,500)	186 (19,000)	279 (28,500)
RF12200 RF12250	186 (19,000)	279 (28,500)	167 (17,000)	265 (27,000)	132 (13,500)	279 (28,500)	186 (19,000)	279 (28,500)
RF 212	245 (25,000)	387 (39,500)	221 (22,500)	358 (36,500)	186 (19,000)	387 (39,500)	245 (25,000)	387 (39,500)
RF17200 RF17250 RF17300	245 (25,000)	387 (39,500)	221 (22,500)	358 (36,500)	186 (19,000)	387 (39,500)	245 (25,000)	387 (39,500)
RF26200 RF26250 RF26300 RF26450	314 (32,000)	519 (53,000)	294 (30,000)	461 (47,000)	250 (25,500)	519 (53,000)	314 (32,000)	519 (53,000)
RF36250 RF36300 RF36450 RF36600	475 (48,500)	681 (69,500)	–	–	–	681 (69,500)	475 (48,500)	681 (69,500)
RF52300 RF52450 RF52600	500 (51,000)	1,030 (105,000)	–	–	–	1,030 (105,000)	500 (51,000)	1,030 (105,000)
RF60300 RF60350 RF50400	500 (51,000)	1,040 (106,000)	–	–	–	1,040 (106,000)	500 (51,000)	1,040 (106,000)
RF90350 RF90400 RF90500	789 (80,500)	1,630 (166,000)	–	–	–	1,630 (166,000)	789 (80,500)	1,630 (166,000)
RF120400 RF120600	1,110 (113,000)	2,210 (225,000)	–	–	–	2,210 (225,000)	1,110 (113,000)	2,210 (225,000)

MODEL IDENTIFICATION



Note : For even number spacing, attachments will be fitted on pin link unless otherwise specified.

	Specifications		Features · Applications	Temperature (°C)	Series
Normal Conditions	Standard Series		Can be used for a wide variety of applications.	−20 to 200	DT
	Plastic Sleeve Series		The chain is self-lubricating, light weight, low noise and has a low coefficient of friction. This chain has a very long life, while requiring no lubrication.	−20 to 80 〃	RFS
	Wear resistant between bushing and roller		The composition of R and F rollers is altered, increasing the wear life between the bushing and roller allowing a higher allowable roller load.	−20 to 200	GT
	Reinforced Series		Approximately two times tensile strength of the standard series with much higher roller load capacity.	−60 to 450*	AT
	Wear resistant pin and bushing	Standard	Wear resistance between pin and bushing is improved using a special heat-treating process	−20 to 200	CT
		Reinforced	For use where high tensile strength is required without added weight. Tensile strength approximately. Two times as strong as that of the CT Series.	−20 to 200	BT
	Bearing Roller Series		With a low coefficient of friction and high allowable roller load, a chain two sizes smaller may be used.	−20 to 80	B-DT
					B-AT
	Bearing Bushing Series		For use with equipment for which where even slight elongation is unacceptable. Assures smooth movement and accurate positioning.	−10 to 60	RFN
Corrosive Environments	Stainless 400 Series	Standard	For use in sanitary environments where high temperatures are present. Long life. Avoid alkali environments.	−70 to 600*	NT
		Plastic Roller Series	Self-lubricating, low coefficient of friction, low noise, lightweight and anti-corrosive. Avoid alkali environments.	−20 to 80	NTP
		Reinforced	With a tensile strength 1.6 times as strong as that of the NT Series, it is useful where a light-weight, strong chain is required.	−70 to 600*	PT
	Stainless 300 Series	Standard	For high temperature, strictly sanitary environments, and for rust prevention.	−100 to 700*	ST
		Plastic Roller Plastic Sleeve	Self-lubricating, low coefficient of friction, low noise, lightweight and highly anti-corrosive with a long life that is completely free of oil.	−20 to 80 〃	STP RFS
Light Corrosive Environments	Corrosion resistant between bushing and roller	Standard	Increased wear resistance between bushing and roller, tolerance of slightly wet conditions.	−20 to 200	KT
		Plastic Roller Series	Self-lubricating, low coefficient of friction, low-noise, lightweight for use in sanitary environments with slighty wet conditions	−20 to 80	KTP
	Wear and corrosion resistant between pin and bushing	Standard	Corrosion resistant between pin and bushing with an increased wear life	−20 to 200	MT
		Reinforced	Stronger than the MT Series	−20 to 200	VT
	Corrosion resistant between pin, bushing and roller	Standard	Corrosion resistant between pin and bushing, and between bushing and roller. Effective for applications in water.	−20 to 200	RT
		Plastic Roller Series	Low noise, lightweight, low coefficient of friction with a longer wear life than the RT Series.	−20 to 80	RTP
		Reinforced	Tensile strength approximately two times as strong as that of the RT Series.	−60 to 450*	YT
	Others		From our wide selection, we can select a suitable chain material to match your requirements.	–	–

* Please consult TSUBAKI if temperatures reach 400°C or over.

RF CONVEYOR CHAINS

■FEATURES

1) Wide Selection

Thousands of combinations of steel materials and specifications of component parts are available in addition to standardized chain specifications.

2) Quick Delivery

RF Conveyor Chains, even if made of special alloy steels, are standardized in the respective stages from design to production and are always carried in stock in large quantity to ensure quick delivery.

3) High Quality

RF Standard Conveyor Chains have uniform and high quality based on our ever improving production technology and standardization. This high quality gives longer life and reduced maintenance costs.

■CONSTRUCTION OF RF CONVEYOR CHAINS

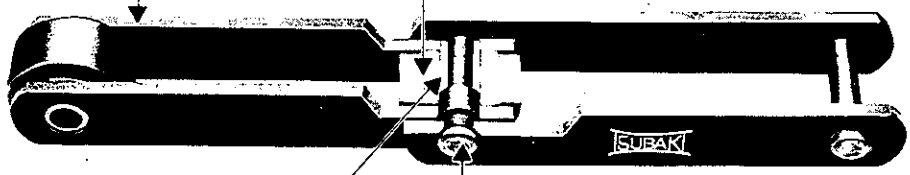
The RF Conveyor Chains are the basic TSUBAKI Conveyor Chain line.

LINK PLATES

Link plates are the component parts receiving chain tension. The holes for press-fitted pins or bushings are accurately punched to maintain uniform pitch.

ROLLERS

Rollers are free to rotate over the bushings. When the chain engages with the sprocket, rollers work as bearings and serve to reduce shock and wear. When the chain is running on rails or wear strips, the rollers reduce running friction on the chain.



BUSHINGS

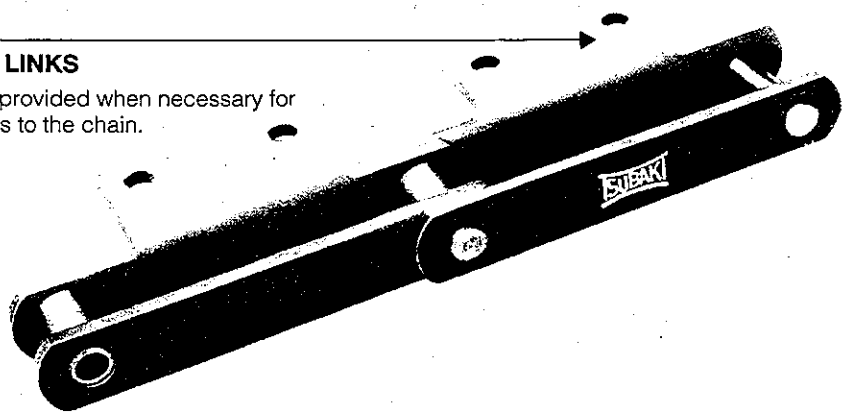
Bushings are made to obtain high wear resistance then press-fitted to the roller link plates, providing a bearing surface for pin rotation.

PINS

Pins are made to exact specifications for high strength, sturdiness and wear resistance, then rigidly press-fitted to the link plates. Pins resist shearing force through chain tension and rotate in the bushings, providing bearing surfaces when the chain articulates over a sprocket.

ATTACHMENT LINKS

Attachments are provided when necessary for fixing attachments to the chain.



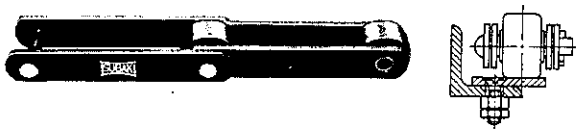
Easy detachable T-pins are used on every pin to facilitate easy disconnection at the required link. Connecting links are not necessary.

TYPES OF ROLLERS

TSUBAKI Conveyor Chains have three basic types of rollers. Illustrated below are examples used with guide rails.

1) R ROLLERS

Outside diameter of roller is larger than the height of the link plate, so the chain can roll on the guide rail. R Rollers are suitable for carrying large and heavy materials.

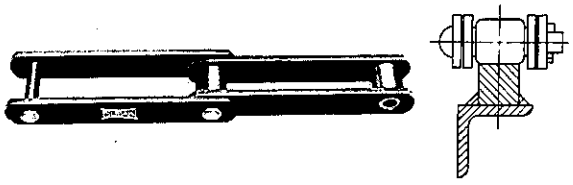


2) F ROLLERS

Flanged rollers serve to retain the chain on the rails. F Rollers are also suitable for carrying large and heavy materials.

3) S, M and N ROLLERS

The outside diameters of the S, M and N rollers are less than the height of the link plate and are specified depending on the application. The M Roller is a little larger than the S Roller, but the same size as the N Roller. For chains with the N Roller, the pin diameter is a little larger than that of the M Roller chain.



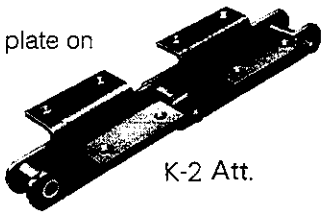
TYPES OF ATTACHMENTS

Various types of chain attachments can be provided according to the application and the size and shape of the material to be conveyed. Some of them are standardized with the A, K, SK and G Attachments. For details and dimensions, see page 176a-178a. Attachments can be assembled at any required spacing.

STANDARD ATTACHMENTS

1) K Attachment

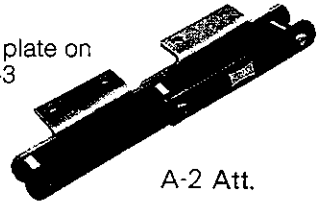
K Attachment: bent type link plate on both sides. K-1, K-2, or K-3 indicates K Attachment with one, two or three holes, respectively.



K-2 Att.

2) A Attachment

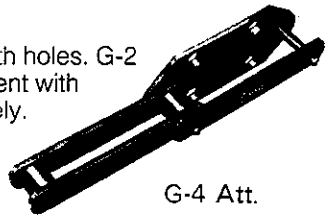
A Attachment: bent type link plate on one side only. A-1, A-2, or A-3 indicates A Attachment with one, two or three, holes, respectively.



A-2 Att.

3) G Attachment

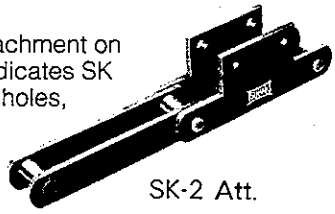
G Attachment: Link plate with holes. G-2 or G-4 indicates G Attachment with two or four holes, respectively.



G-4 Att.

4) SK Attachment

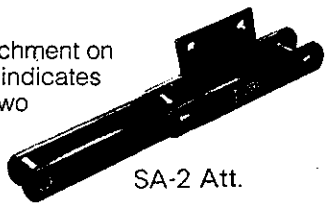
SK Attachment: straight attachment on both sides. SK-1 or SK-2 indicates SK Attachment with one or two holes, respectively.



SK-2 Att.

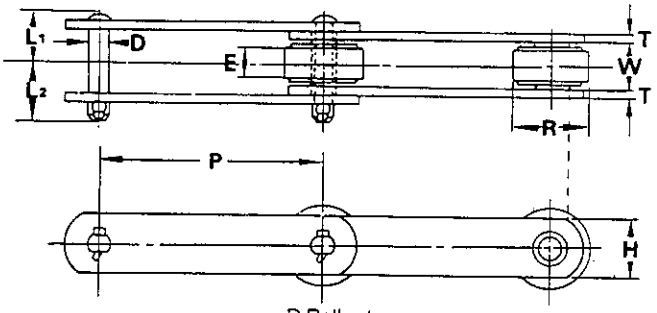
5) SA Attachment

SA attachment: straight attachment on one side only. SA-1 or SA-2 indicates SA Attachment with one or two holes, respectively.

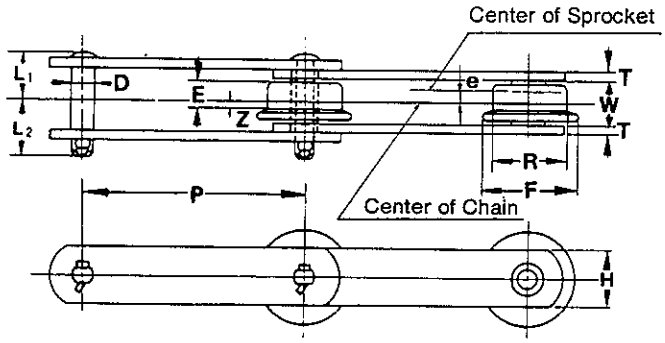


SA-2 Att.

RF CONVEYOR CHAIN BASIC SERIES

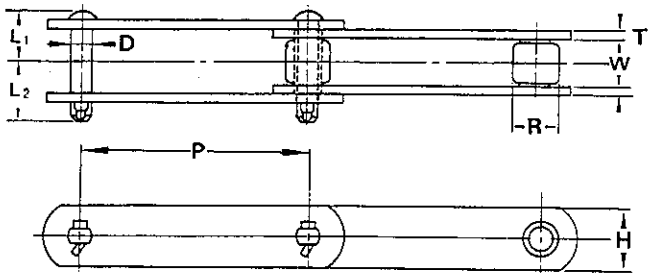


R Roller type



F Roller type

TSUBAKI Chain No.	Roller Type	Average Tensile Strength kN (kgf)	Pitch P	Roller							S Roller R	M Roller N Roller R	Width between Roller Link Plates W
				R Roller		F Roller							
				R	E	R	F	E	e	Z			
RF 03075	R·F·S	29 (3,000)	75	31.8	15.5	31.8	42	12	1.8	4.3	15.9	–	16.1
RF 03100	R·F·S		100										
RF 430	R· S	54 (5,500)	101.6	38.1	19	–	–	–	–	–	20.1	–	22.6
RF 05075	S	69 (7,000)	75	40	19	40	50	14	2.5	4.5	22.2	–	22
RF 05100	R·F·S		100										
RF 05150	R·F·S		150										
RF 204	S	78 (8,000)	66.27	–	–	–	–	–	–	–	22.2	–	27
RF 450	R·F·S·M	78 (8,000)	101.6	44.5	23	44.5	55	18	2.5	6.5	22.2	25.4	27
RF 08150	R·F·S·M	78 (8,000)	150	44.5	23	44.5	55	18	2.5	6.5	22.2	25.4	27
RF 650	R·F·S·M	78 (8,000)	152.4	50.8	26	50.8	65	20	3	7	25.8	31.8	30.2
RF 10100	R· S·M	113 (11,500)	100	50.8	27	–	–	–	–	–	29	31.8	30
RF 10150	R·F·S·M		150			50.8	65	20	3	7			
RF 214	R· S·M	127 (13,000)	101.6	44.5	27	–	–	–	–	–	31.8	34.9	31.6
RF 205	S	127 (13,000)	78.11	–	–	–	–	–	–	–	31.8	–	37.1
RF 6205	R·F·S·M	186 (19,000)	152.4	57.2	32	57.2	70	25	3.5	9	34.9	38.1	37.1
RF 12200	R·F·S·M	186 (19,000)	200	65	32	65	80	24	4	8	34.9	38.1	37.1
RF 12250	R·F·S·M		250										
RF 212	R· S·M	245 (25,000)	152.4	69.9	32.5	–	–	–	–	–	40.1	44.4	37.1
RF 17200	R·F·S·M	245 (25,000)	200	80	44	80	100	34	5	12	40.1	44.5	51.4
RF 17250	R·F·S·M		250										
RF 17300	R·F·S·M		300										
RF 26200	S·M	314 (32,000)	200	–	–	–	–	–	–	–	44.5	50.8	57.2
RF 26250	R·F·S·M		250	100	50	100	125	38	6	13			
RF 26300	R·F·S·M		300										
RF 26450	R·F·S·M		450										
RF 36250	S·M	475 (48,500)	250	–	–	–	–	–	–	–	50.8	57.2	66.7
RF 36300	R·F·S·M		300	125	56	125	150	42	7	14			
RF 36450	R·F·S·M		450										
RF 36600	R·F·S·M		600										
RF 52300	R·F·S	500 (51,000)	300	140	65	140	170	49	8	16.5	57.2	–	77
RF 52450	R·F·S		450										
RF 52600	R·F·S		600										
RF 60300	R·F·N	500 (51,000)	300	140	68	140	170	49	8	16.5	–	70	77
RF 60350	R·F·N		350										
RF 60400	R·F·N		400										
RF 90350	N	789 (80,500)	350	–	–	–	–	–	–	–	–	85	88
RF 90400	R·F·N		400	170	76	170	205	56	10	18			
RF 90500	R·F·N		500										
RF120400	R·N	1,110 (113,000)	400	200	87	–	–	–	–	–	–	100	100
RF120600	R·F·N		600			200	240	64	11.5	20.5			



S, M, and N Roller types

Link Plate		Pin				Appox. Mass				Attachment Type						
H	T	D	L_1+L_2	L_1	L_2	R Roller kg/m	F Roller kg/m	S Roller kg/m	M Roller N Roller kg/m	A-1 K-2	A-2 K-2	A-2 (Welded)	A-3 (Welded)	SA-2 SK-2	G-2	G-4
22	3.2	8.0	38	18	20	2.7	2.8	1.9	—	R·F·S	R·F·S			R·S		
						2.3	2.4	1.7	—							
25.4	4.8 (5.0)	9.7	55	25.5	29.5	4.3	—	3.0	—	R·S	R·S			R·S		
32	4.5	11.3	53.5	25	28.5	—	—	4.2	—	S	S					
						5.0	5.2	3.7	—	R·F·S	R·F·S			R·S	R·S	
						4.1	4.1	3.2	—						R·F·S	
28.6	6.3 (6.0)	11.3	65.5	31	34.5	—	—	5.6	—	S	S	—	—		—	
28.6	6.3 (6.0)	11.3	65.5	31	34.5	6.8	7.2	4.6	4.9	R·F·S·M	R·F·S·M			R·S·M		
28.6	6.3 (6.0)	11.3	65.5	31	34.5	5.5	5.6	4.0	4.2	R·F·S·M	R·F·S·M			R·S·M		
38.1	6.3 (6.0)	11.3	69	32.5	36.5	7.7	8.0	6.0	6.4	R·F·S·M	R·F·S·M			R·S·M	R·F·S·M	S·M
38.1	6.3 (6.0)	14.5	69	33	36	9.8	—	6.8	7.1	R·S·M	R·S·M			R·S·M	S·M	
						7.9	8.1	5.9	6.1	R·F·S·M	R·F·S·M				R·F·S·M	S·M
38.1	7.9	15.9	77.5	37.5	40	10.4	—	8.7	9.1	R·S·M	R·S·M			R·S·M		
38.1	7.9	15.9	83.5	40.5	43	—	—	10.4	—		S	—	—		—	
44.5	7.9	15.9	83.5	40.5	43	12.1	12.4	9.3	9.6	R·F·S·M	R·F·S·M			R·S·M	R·F·S·M	S·M
44.5	7.9	15.9	83.5	40.5	43	11.4	11.9	8.4	8.7	R·F·S·M	R·F·S·M			R·S·M	R·F·S·M	S·M
						10.3	10.6	7.8	8.0							
50.8	9.5 (10)	19.1	95.5	44.5	51	17.1	—	12.6	13.1	R·S·M	R·S·M			R·S·M		
50.8	9.5 (10)	19.1	109.5	51.5	58	18.8	19.8	12.0	12.6	R·F·S·M	R·F·S·M				R·F·S·M	S·M
						16.5	17.3	11.1	11.6							
						15.0	15.7	10.5	10.9			R·F·S·M			R·F·S·M	
63.5	9.5 (10)	22.2	116.5	55.5	61	—	—	16.0	17.0		S·M					S·M
						25.3	26.2	14.7	15.5		R·F·S·M					S·M
						22.3	23.6	13.8	14.5			R·F·S·M			R·F·S·M	S·M
						18.0	18.9	12.4	12.9			R·F·S·M	R·F·S·M			
76.2	12.7	25.4	146	68	78	—	—	24.4	25.5							S·M
						39.0	40.1	22.9	23.8			R·F·S·M				S·M
						30.7	31.9	20.2	20.8			R·F·S·M	R·F·S·M		R·F·S·M	
						26.9	27.8	19.0	19.5			R·F·S·M	R·F·S·M		R·F·S·M	
76.2	16	31.8	172	82	90	48.8	52.5	29.7	—			R·F·S				
						37.5	39.3	26.2	—			R·F·S	R·F		R·F·S	
						32.9	34.3	24.4	—			R·F·S	R·F		R·F·S	
90	12.7	35.0	160.5	77	83.5	52.4	55.1	—	31.0			R·F·N				
						47.2	49.5	—	28.8			R·F·N	R·F·N			
						43.8	45.8	—	27.7			R·F·N	R·F·N			
110	16	42.0	189.5	89.5	100	—	—	—	47.6			N				
						71.0	74.4	—	45.1			R·F·N				
						62.3	65.0	—	41.6			R·F·N	R·F·N			
130	19	50.0	218.5	105.5	113	105.7	—	—	63.9			R·N				
						83.3	88.0	—	55.4			R·F·N	R·F·N			

Notes: 1. Thickness of link plate T in ( ) is for ANSI300 Series Stainless Steel.

2. R, F, S, M, and N in the column of attachment type show rollers available tor attachment type.

TSUBAKI BEARING ROLLER CONVEYOR CHAINS

Backed up by over 75 years chain manufacturing experience and advanced production technology, TSUBAKI is able to offer a revolutionary new kind of chain for conveying applications — the Tsubaki Bearing Roller Conveyor Chain.

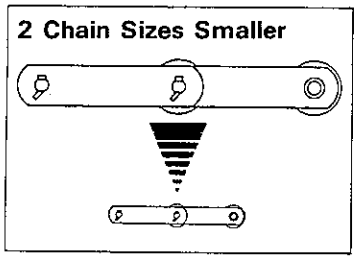
This recently developed conveyor chain incorporates finely machined cylindrical roller bearings. The result is less friction, higher maximum allowable load, and a reduced need for lubrication and maintenance.

Cylindrical Roller Bearings Improve Performance.

Obtain the Benefits of Quality.

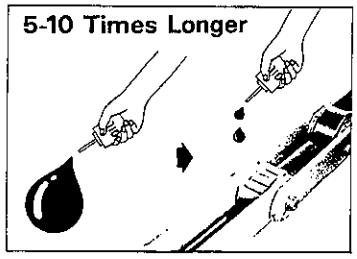
1 COMPACT AND HIGH PERFORMANCE

The cylindrical roller bearing provide superior performance through increased strength and reduced friction. This allows selection of a chain two sizes smaller and greater cost effectiveness for your application.



2 VIRTUALLY MAINTENANCE FREE AND LONG CHAIN LIFE

Use of cylindrical roller bearings inside the chain rollers lowers frictional forces and reduces the need for lubrication and maintenance by 5-10 times (depending on the application) compared to conventionally constructed conveyor chains. The result is a chain with an increased life and almost no required maintenance.



3 WIDE SELECTION OF SIZES

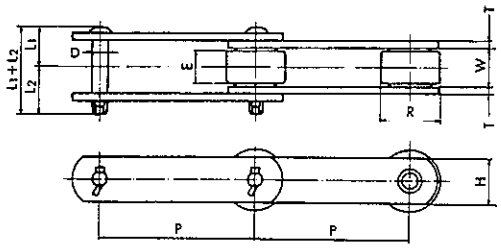
Small pitch to large, heavy duty sizes of TSUBAKI Bearing Roller Conveyor Chains are readily available in a range of specifications and can be delivered quickly upon receipt of your order.

4 PREVENTION OF STICK SLIPPING

There is no stick slipping with TSUBAKI Bearing Roller Conveyor Chains. Use this chain in applications where stick slipping cannot be tolerated.

Chain speed	Chain selection
over 2 m/min	max. allowable tension ≧ chain tension
2 m/min to 0.5 m/min	max. allowable tension ≧ chain tension×3

Note: For chain speeds under 0.5 m/min, please consult TSUBAKI.



■MODEL IDENTIFICATION

RF03075 BR - 1L A1 - DT

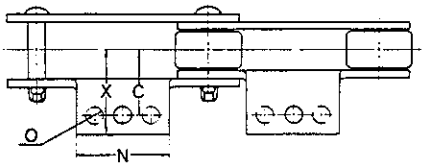
- RF03075: Bearing Roller Chain number
- BR: Series
- 1L: Attachment type
- A1: Attachment spacing
- DT: Series

TSUBAKI Chain No.	Average Tensile Strength & Max. Allowable Load				Allowable Roller Load kgf	Pitch	Roller		Width between Roller Link Plates
	Basic Series (DT)		Reinforced Series (AT)						
	kN (kgf)	kN (kgf)	kN (kgf)	kN (kgf)		P	R	E	W
RF03075BR RF03100BR	29 (3,000)	4 (420)	70 (7,100)	8 (800)	200	75 100	31.8	14	16.1
RF05100BR RF05150BR	69 (7,000)	10 (1,000)	142 (14,500)	15 (1,500)	310	100 150	40	19	22
RF 450BR	78 (8,000)	11 (1,100)	142 (14,500)	15 (1,500)	420	101.6	44.5	23	27
RF08150BR	78 (8,000)	11 (1,100)	142 (14,500)	15 (1,500)	420	150	44.5	23	27
RF10100BR RF10150BR	113 (11,500)	16 (1,600)	226 (23,000)	24 (2,400)	560	100 150	50.8	27	30
RF12200BR RF12250BR	186 (19,000)	26 (2,700)	279 (28,500)	36 (3,700)	850	200 250	65	32	37.1
RF17200BR RF17250BR RF17300BR	245 (25,000)	34 (3,500)	387 (39,500)	55 (5,600)	1,440	200 250 300	80	44	51.4
RF26250BR RF26300BR RF26450BR	314 (32,000)	44 (4,500)	520 (53,000)	73 (7,400)	2,000	250 300 450	100	50	57.2
RF36300BR RF36450BR RF36600BR	476 (48,500)	68 (6,900)	682 (69,500)	97 (9,900)	2,800	300 450 600	125	56	66.7

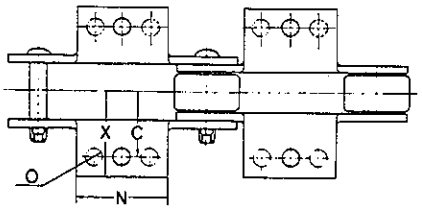
TSUBAKI Chain No.	Link Plate			Pin			Approx. Weight	Standard Attachment Type					
	H	T	D	L_1+L_2	L_1	L_2	kgf/m	A-1 K-1	A-2 K-2	A-2 (Welded)	A-3 (Welded)	SA-2 SK-2	G-2
RF03075BR	22	3.2	8.0	38	18	20	2.7	○	○			○	
RF03100BR							2.3	○	○			○	
RF05100BR	32	4.5	11.3	53.5	25	28.5	5.0	○	○			○	○
RF05150BR							4.1	○	○			○	○
RF 450BR	28.6	6.3	11.3	65.5	31	34.5	6.8	○	○			○	
RF08150BR	28.6	6.3	11.3	65.5	31	34.5	5.5	○	○			○	
RF10100BR	38.1	6.3	14.5	69	33	36	9.8	○	○			○	
RF10150BR							7.9	○	○			○	○
RF12200BR	44.5	7.9	15.9	83.5	40.5	43	11.4	○	○			○	○
RF12250BR							10.3	○	○			○	○
RF17200BR	50.8	9.5	19.1	109.5	51.5	58	18.8	○	○				○
RF17250BR							16.5	○	○				○
RF17300BR							15.0			○			○
RF26250BR	63.5	9.5	22.2	116.5	55.5	61	25.3						
RF26300BR							22.3			○			○
RF26450BR							18.0				○		○
RF36300BR	76.2	12.7	25.4	146	68	78	39.0						
RF36450BR							30.7				○		○
RF36600BR							26.9				○		○

Note : Various other chain pitches are also available upon your request.
The attchment dimensions are the same as those for the standard conveyor chains.

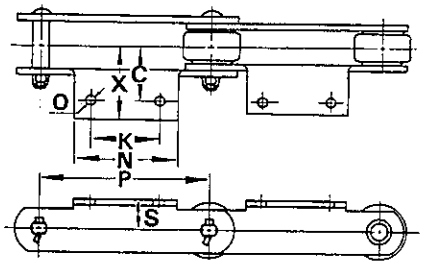
RF CONVEYOR CHAIN A/K ATTACHMENTS



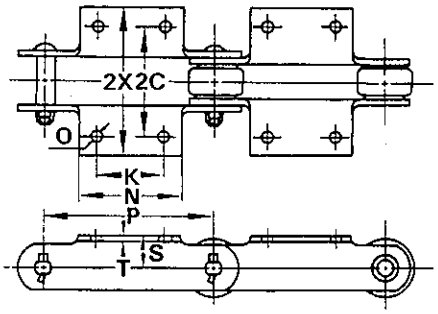
A-1 Attachment*
(See note below)



K-1 Attachment*
(*See note below)



A-2 Attachment

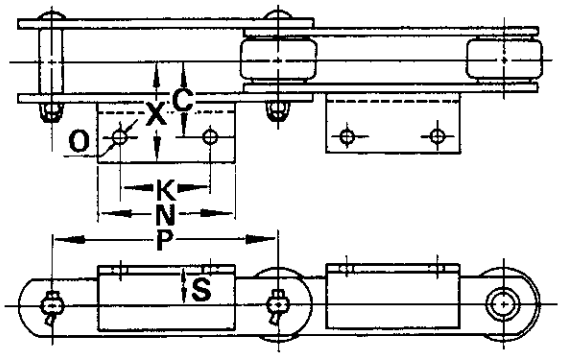


A-2 Attachment

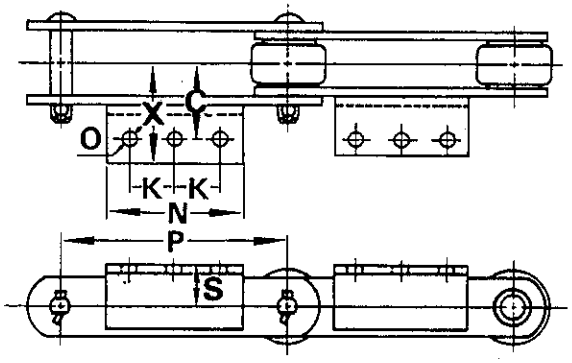
TUBAKI Chain No.	Roller Type	Pitch	Attachment									Size of Bolt	Additional Mass. per A Attachment kg/att.
		P	S	C	2C	X	2X	K	N	T	O		
RF03075	R·F·S	75	20	30	60	46	92	30	55	3.2	10	M 8	0.05
RF03100	R·F·S	100	20	30	60	46	92	40	65	3.2	10	M 8	0.06
RF 430	R·S	101.6	22	40	80	54	108	40	70	4.8 (5.0)	12	M10	0.11
RF05075	S	75	22	35	70	52	104	30	55	4.5	10	M 8	0.07
RF05100	R·F·S	100	22	35	70	52	104	40	65	4.5	10	M 8	0.08
RF05150	R·F·S	150	22	35	70	52	104	60	85	4.5	10	M 8	0.10
RF 204	S	66.27	24	45	90	59	118	—	35	6.3 (6.0)	12	M10	0.08
RF 450	R·F·S·M	101.6	28	50	100	64	128	40	70	6.3 (6.0)	12	M10	0.18
RF08150	R·F·S·M	150	28	50	100	64	128	60	90	6.3 (6.0)	12	M10	0.22
RF 650	R·F·S·M	152.4	32	50	100	64	128	60	90	6.3 (6.0)	12	M10	0.22
RF10100	R·S·M	100	28	50	100	65	130	40	70	6.3 (6.0)	12	M10	0.16
RF10150	R·F·S·M	150	28	50	100	65	130	60	90	6.3 (6.0)	12	M10	0.20
RF 214	R·S·M	101.6	35	55	110	73	146	40	80	7.9	15	M12	0.28
RF 205	S	78.11	35	60	120	75	150	30	65	7.9	12	M10	0.23
RF 6205	R·F·S·M	152.4	38	60	120	79	158	60	100	7.9	15	M12	0.37
RF12200	R·F·S·M	200	38	60	120	79	158	80	120	7.9	15	M12	0.45
RF12250	R·F·S·M	250	38	60	120	79	158	125	170	7.9	15	M12	0.62
RF 212	R·S·M	152.4	45	65	130	83	166	60	100	9.5 (10.0)	15	M12	0.49
RF17200	R·F·S·M	200	45	75	150	98	196	80	120	9.5 (10.0)	15	M12	0.66
RF17250	R·F·S·M	250	45	75	150	98	196	125	170	9.5 (10.0)	15	M12	0.86

Notes: 1. Thickness of attachment T in ( ) is for ANSI 300 Series Stainless Steel.
2. K-attachment is twice as heavy as A-attachment.
3. RF204 is available only for A-1 / K-1 attachment. and RF205 is available only for A-2 / K-2 attachment.
*4. For DT (Basic Series) A-1 (K-1) attachment with one hole will be supplied in the style of A-3 (K-3) attachment with three holes unless otherwise specified.
5. The dimensions of the attachment for Bearing Roller Chain are the same as those for the standard attachment.

RF CONVEYOR CHAIN A-2/A-3 ATTACHMENTS

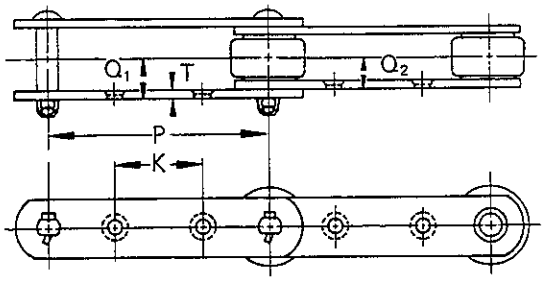


A-2 Attachment

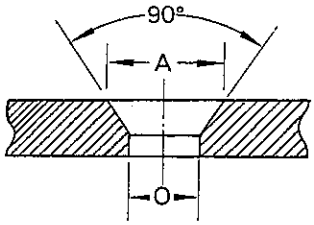


A-3 Attachment

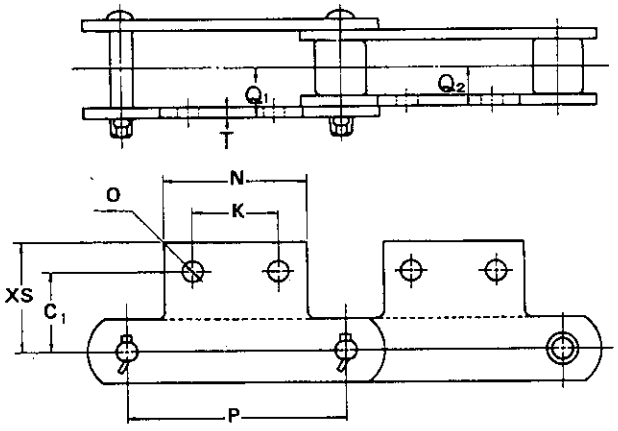
RF CONVEYOR CHAIN G-2 ATTACHMENT



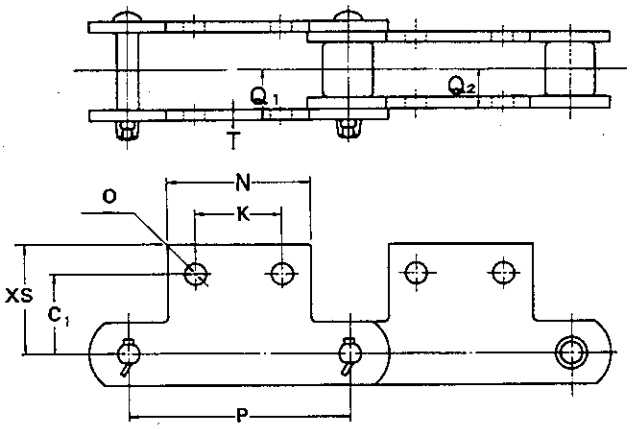
G-2 Attachment



RF CONVEYOR CHAIN SA-2/SK-2 ATTACHMENTS



SA-2 Attachment



SK-2 Attachment

A-2/A-3 Attachments

	TSUBAKI Chain No.	Roller Type	Pitch	Attachment						Angle Steel	Size of Bolt	Additional Mass. per Attachment kg/att.
			P	S	C	X	K	N	O			
A-2 Att.	**RF 17300**	R·F·S·M	300	45	75	111	180	220	15	L 65× 65× 6	M12	1.34
	RF 26300	R·F·S·M	300	55	80	124	180	220	15	L 75× 75× 9	M12	2.22
	RF 60300	R·F·N	300	90	115	165	110	160	24	L100×100×13	M20	3.30
	RF 90350	N	350	100	140	210	100	180	28	L130×130×15	M24	5.20
	RF 90400	R·F·N	400	100	140	210	150	230	28	L130×130×15	M24	6.60
	RF120400	R · N	400	120	150	220	120	200	28	L130×130×15	M24	5.80
A-3 Att.	**RF 26450**	R·F·S·M	450	55	80	124	140	320	15	L 75× 75× 9	M12	3.26
	RF 36450	R·F·S·M	450	70	100	160	140	330	19	L100×100×10	M16	5.07
	RF 36600	R·F·S·M	600	70	100	160	180	410	19	L100×100×10	M16	6.26
	RF 52450	R·F	450	80	120	171	140	330	24	L100×100×13	M20	6.30
	RF 52600	R·F	600	80	120	171	180	410	24	L100×100×13	M20	7.80
	RF 60350	R·F·N	350	90	115	165	80	220	24	L100×100×13	M20	4.20
	RF 60400	R·F·N	400	90	115	165	100	260	24	L100×100×13	M20	6.00
	RF 90500	R·F·N	500	100	140	210	130	340	28	L130×130×15	M24	9.80
	RF120600	R·F·N	600	220	150	220	160	400	28	L130×130×15	M24	11.50

G-2 Attachments

TSUBAKI Chain No.	Roller Type	Pitch	Attachment						Max. Length of Bolt		Size of Bolt
		P	K	T	Q_1	Q_2	A	O	Pin Link	Roller Link	
RF05100	R · S	100	40	4.5	21	15.5	15	10	36	26	M 8
RF05150	R·F·S	150	60	4.5	21	15.5	15	10	36	26	M 8
RF 650	R·F·S·M	152.4	60	6.3 (6)	28.5 (28)	21.5 (21)	20	12	49	35	M10
RF10100	S·M	100	30	6.3 (6)	28.5 (28)	21.5 (21)	20	12	49	35	M10
RF10150	R·F·S·M	150	60	6.3 (6)	28.5 (28)	21.5 (21)	20	12	49	35	M10
RF 6205	R·F·S·M	152.4	50	7.9	35.5	26.5	26	15	63	45	M12
RF12200	R·F·S·M	200	80	7.9	35.5	26.5	26	15	63	45	M12
RF12250	R·F·S·M	250	125	7.9	35.5	26.5	26	15	63	45	M12
RF17200	R·F·S·M	200	70	9.5 (10.0)	45.5 (46.5)	35 (35.5)	26	15	81	61	M12
RF17250	R·F·S·M	250	110	9.5 (10.0)	45.5 (46.5)	35 (35.5)	26	15	81	61	M12
RF17300	R·F·S·M	300	150	9.5 (10.0)	45.5 (46.5)	35 (35.5)	26	15	81	61	M12
RF26300	R·F·S·M	300	140	9.5 (10.0)	48 (49)	35 (35.5)	26	15	88	67	M12
RF26450	R·F·S·M	450	220	9.5 (10.0)	48 (49)	35 (35.5)	26	15	88	67	M12
RF36450	R·F·S·M	450	220	12.7	60	46	32	19	105	75	M16
RF36600	R·F·S·M	600	300	12.7	60	46	32	19	105	75	M16
RF52450	R·F·S	450	200	12.7	71.5	45.5	38	24	125	90	M20
RF52600	R·F·S	600	300	16	71.5	45.5	38	24	125	90	M20

SA-2 Attachments

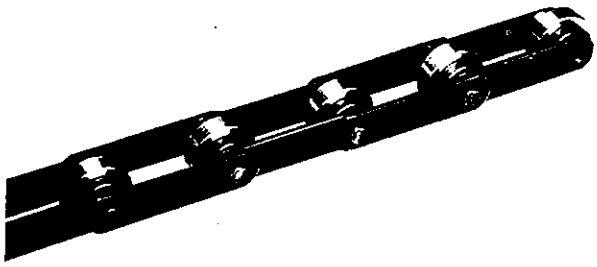
TSUBAKI Chain No.	Roller Type	Pitch	Attachment								Size of Bolt	Additional Mass per SA-2 Attachment kg/att.
		P	C_1	XS	Q_1	Q_2	K	N	T	O		
RF03075	R·S	75	33	49	15.5	11.5	30	55	3.2	10	M 8	0.05
RF03100	R·S	100	33	49	15.5	11.5	40	65	3.2	10	M 8	0.06
RF 430	R·S	101.6	37.6	51.6	22 (22.5)	16 (16.5)	40	70	4.8 (5.0)	12	M10	0.11
RF05100	R·S	100	33.4	50.7	21	15.5	40	65	4.5	10	M 8	0.08
RF05150	R·S	150	33.4	50.7	21	15.5	60	85	4.5	10	M 8	0.10
RF 450	R·S·M	101.6	47.6	60.7	27 (26.5)	20 (19.5)	40	70	6.3 (6.0)	12	M10	0.18
RF08150	R·S·M	150	46.1	58.7	27 (26.5)	20 (19.5)	60	90	6.3 (6.0)	12	M10	0.22
RF 650	R·S·M	152.4	50	63	28.5 (28)	21.5 (21)	60	90	6.3 (6.0)	12	M10	0.22
RF10100	R·S·M	100	46.1	61	28.5 (28)	21.5 (21)	40	70	6.3 (6.0)	12	M10	0.16
RF10150	R·S·M	150	46.1	61	28.5 (28)	21.5 (21)	60	90	6.3 (6.0)	12	M10	0.20
RF 214	R·S·M	101.6	50	70	32.5	23.5	40	80	7.9	15	M12	0.28
RF 6205	R·S·M	152.4	55	75.7	35.5	26.5	60	100	7.9	15	M12	0.37
RF12200	R·S·M	200	55	75.7	35.5	26.5	80	120	7.9	15	M12	0.45
RF12250	R·S·M	250	55	75.7	35.5	26.5	125	165	7.9	15	M12	0.62
RF 212	R·S·M	152.4	60	83.6	38 (39.5)	28 (28.5)	60	100	9.5 (10.0)	15	M12	0.49

Notes: 1. Thickness of attachment T in ( ) is for ANSI 300 Series Stainless Steel.

2. SK-2 attachment is twice as heavy as SA-2 attachment.

3. The dimensions of the attachment for the Bearing Roller Chain are the same as those for standard attachment.

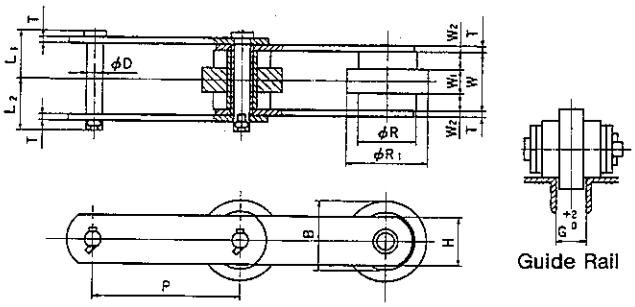
LARGE SIZE STEEL DOUBLE PLUS CHAIN



HOW TSUBAKI DOUBLE PLUS CHAIN WORKS

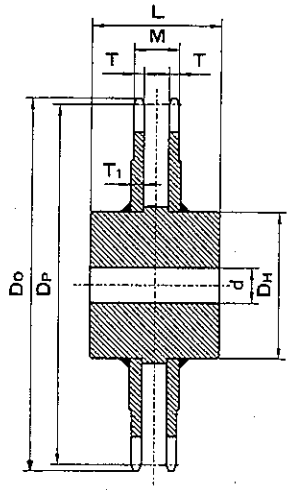
- **When Conveying**
  Friction between the large center roller and the small roller allows them to rotate together in unison. The difference in diameter of the two rollers causes the speed of the conveyed object to be 2.5 times the speed of the chain.
- **When Accumulating**
  The large roller then rotates freely in the opposite direction of the small roller allowing conveyed objects to accumulate. We call this free-flow conveying.

- **Energy-Saving**
  Rolling friction of the chain is less than conventional type, so the required power of the conveyor is less.
- **Longer Life**
  Lower chain speed (1/2.3) and large allowable roller load provide longer chain life.



TSUBAKI Chain No.	P	R1	R	W1	W2	W	T	H	D	L1+L2	L1	L2	B	G	Maximum Allowable Tension kN(kgf)	Maximum Allowable Roller Load kN(kgf)/Roller	Approx. Mass kg/m
RF03075VR	75	42.0	31.8	12	8.5	30	3.2	22	8.0	51.5	24.5	27	36.9	14.5	4.1 (420)	1.3 (130)	4.7
RF03100VR	100																4
RF05100VR	100	53.0	40.0	16	11	39	4.5	32	11.32	70.5	33.5	37	46.5	18.5	9.8 (1,000)	2.4 (240)	8
RF05150VR	150																6
RF10150VR	150	67.0	50.8	20	14	54	6.3	38.1	14.5	93	45	48	58.9	25	15.7 (1,600)	3.4 (350)	12
RF6205VR	152.4	75.5	57.2	22	16	62	7.9	44.5	15.9	108.5	53	55.5	66.3	28	26.5 (2,700)	4.9 (500)	18
RF12200VR	200																15
RF17200VR	200	86.0	65.0	25	18	69	9.5	50.8	19.1	127	60.5	66.5	75.5	31	34.3 (3,500)	6.1 (620)	20

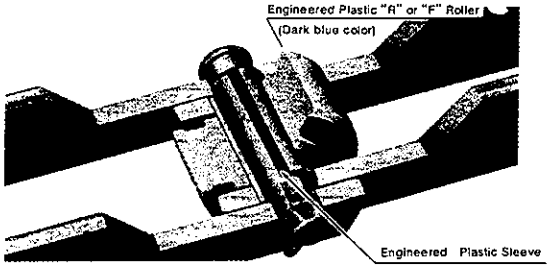
SPROCKET



TSUBAKI Sprocket No.	Number of teeth	Outer Dia. Do	Pitch Dia. Dp	Pilot Bore Dia. d	Applicable Bore	Hub Dia. DH	Hub Length L	Tooth Thickness T(T1)	M	Approx. Mass kg
RF03075VR-6T	6	158	150.0	20	25– 40	65	55	5 (6)	26	3
RF03075VR-8T	8	209	196.0	20	25– 45	70	60	5 (6)	26	4.5
RF03100VR-6T	6	206	200.0	20	25– 45	70	60	5 (6)	26	4.5
RF03100VR-8T	8	272	261.3	20	25– 50	80	70	5 (6)	26	7.5
RF05100VR-6T	6	205	200.0	25	30– 60	95	80	8 (9)	35.5	7.5
RF05100VR-8T	8	273	261.3	25	30– 70	105	90	8 (9)	35.5	13
RF05150VR-6T	6	304	300.0	25	30– 70	105	90	8 (9)	35.5	15
RF05150VR-8T	8	402	392.0	30	35– 75	115	100	8 (9)	35.5	24
RF10150VR-6T	6	309	300.0	30	35– 80	125	105	11 (12)	48	20
RF10150VR-8T	8	408	392.0	35	35– 85	135	115	11 (12)	48	32
RF 6205VR-6T	6	330	304.8	35	40– 95	145	125	14 (16)	56	29
RF 6205VR-8T	8	432	398.2	35	40–100	145	125	14 (16)	56	42
RF12200VR-6T	6	434	400.0	35	40–100	145	125	14 (16)	56	43
RF12200VR-8T	8	557	522.6	40	45–110	155	135	14 (16)	56	67
RF17200VR-6T	6	439	400.0	40	45–110	155	135	15 (16)	62	47
RF17200VR-8T	8	562	522.6	45	50–120	175	150	15 (16)	62	76

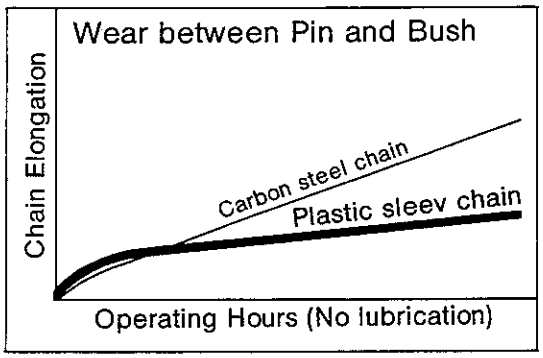
PLASTIC SLEEVE CHAIN (RF Engineering Chain Series) DTP.STP

Tsubaki Plastic Sleeve Chains have an engineered plastic sleeve between pin and bushing which makes it self-lubricating. The engineered plastic roller is also available in combination with the sleeve.



●Lube-Free
Because of the self-lubricating feature of engineered plastic, suits applications where lubrication is impossible or unsuitable.

●Longer wear life
Contact between plastic and steel results in the great improvement of chain wear life.



■SPECIFICATIONS

Standard Series(DTP)
Carbon-based standard (DT) series with engineered plastic "R (F)" roller and engineered plastic sleeve installed between pin and bushing

Stainless Steel Series(STP)
300 stainless steel-based (ST) series with engineered plastic roller and engineered plastic sleeve installed between pin and bushing

■SPROCKET

You can use the same RF Engineering Chain sprockets.

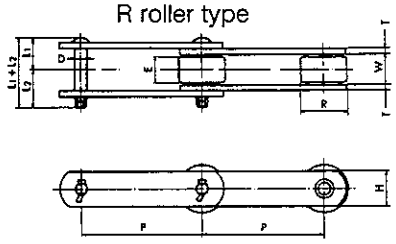
■IDENTIFICATION

RFS 03100-R-1L K2-DTP

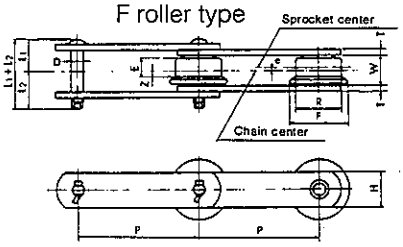
■DIMENSIONS

(Please refer to page 176a-178a for attachment dimensions.)

R roller type



F roller type



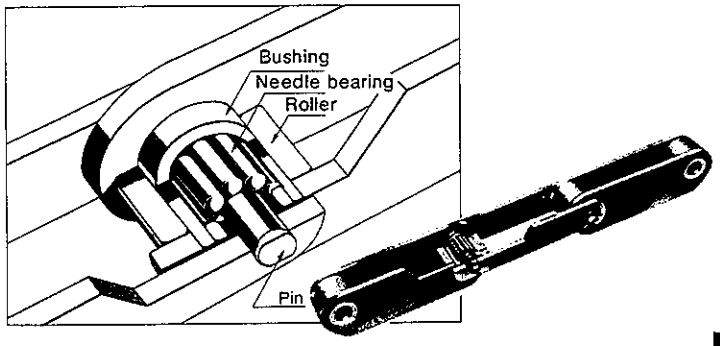
TSUBAKI Chain No.		Roller type	Maximum Allowable Tension kN(kgf)	Maximum Allowable Roller Load kN(kgf)	Pitch P	"R" roller		"F" roller				
Standard (DTP)	Stainles steel (STP)					R	E	R	F	E	e	Z
RFS03075□-□□DTP RFS03100□-□□DTP	RFS03075□-□□STP RFS03100□-□□STP	R・F	1.96 (200)	0.88 (90)	75 100	31.8	15.5	31.8	42	12	1.8	4.3
RFS05100□-□□DTP RFS05125□-□□DTP RFS05150□-□□DTP	RFS05100□-□□STP RFS05125□-□□STP RFS05150□-□□STP	R・F	5.20 (530)	1.42 (145)	100 125 150	40	19	40	50	14	2.5	4.5
RFS 450□-□□DTP	RFS 450□-□□STP	R・F	6.37 (650)	2.06 (210)	101.6	44.5	23	44.5	55	18	2.5	6.5
RFS10100□-□□DTP	RFS10100□-□□STP	R	8.83 (900)	2.45 (250)	100	50.8	27	—	—	—	—	—
RFS10125□-□□DTP RFS10150□-□□DTP	RFS10125□-□□STP RFS10150□-□□STP	R・F			125 150			50.8	65	20	3	7

TSUBAKI Chain No.	W	Plate		Pin				Approx. Mass kg/m	The combination of att. and roller type		
		H	T	D	L_1+L_2	L_1	L_2		A-1, A-2 K-1, K-2	SA-2 SK-2	G-2
RFS03075 RFS03100	16.1	22	3.2	8.0	38	18	20	1.9 1.7	R・F	R	—
RFS05100 RFS05125 RFS05150	22	32	4.5	11.3	53.5	25	28.5	3.6 3.4 3.2	R・F	R	R R・F
RFS 450	27	28.6	6.3(6.0)	11.3	65.5	31	34.5	4.7	R・F	R	—
RFS10100 RFS10125 RFS10150	30	38.1	6.3(6.0)	14.5	69	33	36	6.8 6.3 5.8	R R・F	R	— R R・F

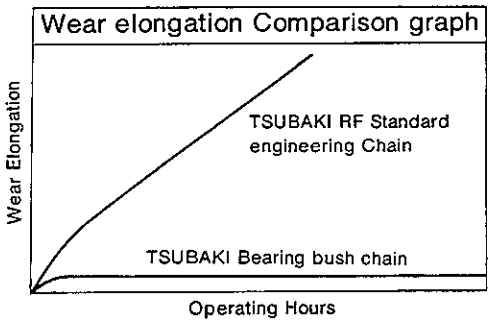
Notes: 1. Plate thickness "T" with ( ) indicates stainless steel.
2. The maximum allowable tension will be changed based on the number of sprocket teeth.
3. The maximum allowable roller load is based on the case with no lubrication and chain speed is less than 10 m/min.

BEARING BUSH CHAIN (RF Engineering Chain Series)

Needle bearings are installed between pin and bushing, so wear elongation is virtually zero. Recommended for applications requiring accurate positioning or precise indexing.



- The three base dimensions (chain pitch, large roller diameter, width between roller link plates) are the same as those of standard RF Engineering Chain.
- Special grease is enclosed between pin and bushing.
- Appropriate sprockets are also standardized.
- Bearing Bush Chain with smaller pitches are shown with Double Pitch Conveyor Chain.



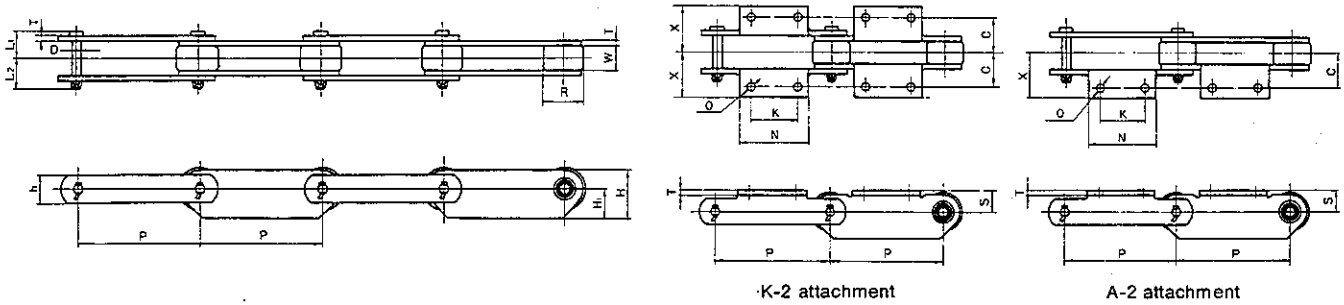
■CHAIN SELECTION

1. The coefficient of rolling friction between chain and rail is 0.21.
2. Max. chain speed is 30 m/min. Please consult TSUBAKI for faster applications.
3. The ambient temperature should be within −10°C to +60°C. Please consult TSUBAKI when it exceeds this range.
4. Please be careful when assembling chain because there is a risk of needle bearings being dropped.

■IDENTIFICATION

RFN 05100 R-1L A2

■DIMENSIONS



TSUBAKI Chain No.	Maximum Allowable Tension kN(kgf)	Maximum Allowable Roller Load kN(kgf)	Pitch P	Width Between RollerLink Plates W	Roller Dia. R	Pin			Plate				Approx. Mass kg/m
						L_1	L_2	D	h	H	H_1	T	
RFN03075R	2.45 (250)	0.54 (55)	75	16.1	31.8	18	20	8.0	22	35	20	3.2	3.0
RFN05100R	4.90 (500)	1.03 (105)	100	22	40	25	28	11.3	32	47	26	4.5	5.8
RFN10150R	7.85 (800)	1.77 (180)	150	30	50.8	33	36	14.5	38.1	61	35	6.3	8.7
RFN12200R	9.81 (1000)	2.50 (255)	200	37.1	65	40.5	43	15.9	44.5	71	40	7.9	13.0
RFN17200R	12.7 (1300)	4.02 (410)	200	51.4	80	51.5	58	19.1	50.8	85	51	9.5	21.5
RFN26250R	19.6 (2000)	5.30 (540)	250	57.2	100	55.5	61	22.2	63.5	105	64	9.5	28.5
RFN36300R	24.5 (2500)	7.45 (760)	300	66.7	125	68	78	25.4	76.2	125	75	12.7	41.5

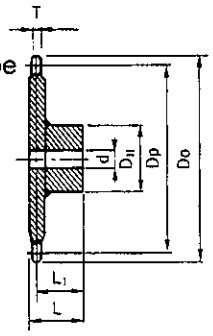
TSUBAKI Chain No.	Pitch P	Attachment							The additional mass per attachment kg	
		S	C	X	K	N	T	O	A2	K2
RFN03075R	75	20	30	46	30	55	3.2	10	0.05	0.10
RFN05100R	100	22	35	47	40	65	4.5	10	0.08	0.16
RFN10150R	150	28	50	67	60	90	6.3	12	0.20	0.40
RFN12200R	200	38	60	79	80	120	7.9	15	0.45	0.90
RFN17200R	200	45	75	100	80	120	9.5	15	0.66	1.32
RFN26250R	250	55	80	108	125	170	9.5	15	1.07	2.14
RFN36300R	300	70	100	135	150	220	12.7	19	1.8	3.6

Notes: 1. Other sizes are also available.
2. Some attachments may have different dimensions from RF Engineering Chain standard attachment.

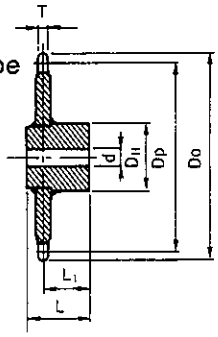
■SPROCKET

Teeth are processed by machine, precisely in order to enhance the performance of chain.
Also, the shape of teeth is precise with minimum clearance between rollers and teeth.

BW Type



BWI Type

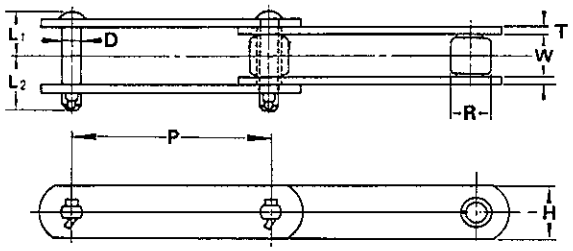


TSUBAKI Sprocket No.	No.of teeth	Type	Pitch dia. DP	Outer dia. Do	Thickness of tooth T	Bore dia.		Hub dia. DH	Hub length		Approx. mass kg
						Min.	Max.		L	L1	
RFN03075R-8T	8	BW	196.0	209	13	20	45	70	61	53	5.0
RFN03075R-10T	10		242.7	255		20	50	75	66	58	7.0
RFN03075R-12T	12		289.8	303		20	50	75	66	58	9.0
RFN05100R-8T	8	BW	261.3	273	17	25	65	100	84	74.5	12.0
RFN05100R-10T	10		323.6	340		25	65	100	84	74.5	16.5
RFN05100R-12T	12		386.4	402		25	75	110	94	84.5	23.5
RFN10150R-8T	8	BW	392.0	410	23	30	85	130	110	97.5	33.0
RFN10150R-10T	10		485.4	503		35	95	140	120	107.5	47.5
RFN10150R-12T	12		579.6	600		35	100	150	125	112.5	67.0
RFN12200R-8T	8	BW	522.6	549	29	40	110	160	135	110	65
RFN12200R-10T	10		647.2	673		45	120	180	150	125	102
RFN12200R-12T	12		772.7	799		45	130	190	160	135	141
RFN17200R-8T	8	BW	522.6	555	42	45	120	180	150	118	90
RFN17200R-10T	10		647.2	679		45	130	190	160	128	134
RFN17200R-12T	12		772.7	805		50	145	210	180	148	192
RFN26250R-8T	8	BW	653.3	693	47	50	145	210	180	144	156
RFN26250R-10T	10		809	849		50	145	210	180	144	224
RFN26250R-12T	12		965.9	1006		50	160	230	200	164	315
RFN36300R-8T	8	BW	783.9	834	57	60	175	250	220	178	269
RFN36300R-10T	10		970.8	1021		70	190	270	240	198	397
RFN36300R-12T	12		1159.1	1209		80	210	300	260	218	563

Notes: 1. Sprockets with other sizes of hub and induction hardened teeth are also available.
2. If the sprocket mass is more than 30 kg, it may have holes for handling.

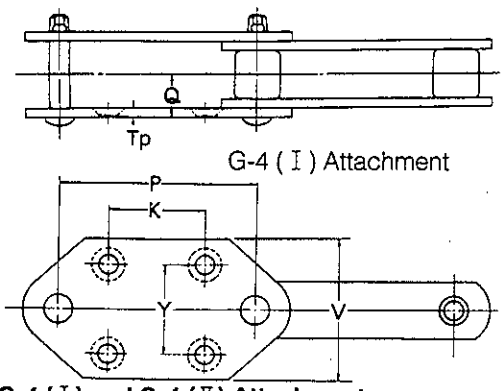
TSUBAKI RF TYPE BUCKET ELEVATOR CHAINS

Bucket Elevator Chains are specially designed to withstand the severe demands placed on bucket elevators.
For general wear resistance.....CT or BT Series
The steel materials, hardness and clearance between the bearing parts of the chains are suitable for conveying abrasive materials such as cement.
For coal dust (corrosive)..... Special specifications are available.
Please consult TSUBAKI.



Base chain

TSUBAKI Chain No.	Pitch P	Roller Dia. R	Width between Roller Link Plates W	Link Plate H	Link Plate T	Pin L_1	Pin L_2	Approx. Mass kg/m	Average Tensile Strength CT kN (kgf)	Average Tensile Strength BT kN (kgf)
B 10150-S	150	29	30	38.1	6.3	33	36	5.9	123 (12,500)	226 (23,000)
B 12006-S	152.4	34.9	37.1	44.5	7.9	40.5	43	9.3	186 (19,000)	279 (28,500)
B 12200-S	200	34.9	37.1	44.5	7.9	40.5	43	8.4	186 (19,000)	279 (28,500)
B 17200-S	200	40.1	51.4	50.8	9.5	51.5	58	12.0	245 (25,000)	387 (39,500)
B 17250-S	250	40.1	51.4	50.8	9.5	51.5	58	11.1	245 (25,000)	387 (39,500)
B 26200-N	200	50.8	57.2	63.5	9.5	56	61	16.9	299 (30,500)	564 (57,500)
B 26250-N	250	50.8	57.2	63.5	9.5	56	61	15.4	299 (30,500)	564 (57,500)
B 26300-N	300	50.8	57.2	63.5	9.5	68.5	61	14.4	299 (30,500)	564 (57,500)
B 36250-N	250	57.2	66.7	76.2	12.7	69	78	25.5	—	868 (88,500)
B 36300-N	300	57.2	66.7	76.2	12.7	81	78	23.8	—	868 (88,500)
B 36350-N	350	57.2	66.7	76.2	12.7	81	78	22.5	—	868 (88,500)
B 60300-N	300	70	77	90	12.7	88	84	31.4	—	1,040 (106,000)
B 60350-N	350	70	77	90	12.7	88	84	29.5	—	1,040 (106,000)
B 60400-N	400	70	77	90	12.7	88	84	28.0	—	1,040 (106,000)
B 90350-N	350	85	88	110	16	101.5	95.5	47.6	—	1,630 (166,000)
B 90400-N	400	85	88	110	16	101.5	95.5	45.1	—	1,630 (166,000)
B120400-N	400	100	100	130	19	119.5	108	65.5	—	2,210 (225,000)



G-4 (I) and G-4 (II) Attachments

	TSUBAKI Chain No.	Pitch P	Attachment V	K	Y	Tp	Q	A	O	θ	Size of Screw Bolt	Approx. mass of Chain with Att. Every 2nd Link kg./m
G-4 (I) Att.	**RF 650-S (M)**	152.4	110	75	70	6.3	28.5	20	12	90°	M10	7.2 (7.6)
	RF 10150-S (M)	150	110	75	70	6.3	28.5	20	12	90°	M10	7.2 (7.4)
	B 10150-S	150	110	75	70	6.3	28.5	26	15	90°	M12	7.2
	RF 6205-S (M)	152.4	110	75	70	7.9	35.5	26	15	90°	M12	11.0 (11.3)
	B 12006-S	152.4	110	75	70	7.9	35.5	26	15	90°	M12	11.0
	RF 12200-S (M)	200	110	100	70	7.9	35.5	26	15	90°	M12	10.2 (10.5)
	B 12200-S	200	120	100	80	7.9	35.5	26	15	90°	M14	10.2
	RF 17200-S (M)	200	120	100	80	9.5	45.5	26	15	90°	M12	14.0 (14.6)
	B 17200-S	200	120	100	80	9.5	45.5	26	15	90°	M14	14.0
	RF 17250-S (M)	250	150	140	100	9.5	45.5	26	15	90°	M12	14.5 (15.0)
	B 17250-S	250	150	140	100	9.5	45.5	32	19	90°	M16	14.5
	RF 26200-S (M)	200	120	100	80	9.5	48	26	15	90°	M12	17.5 (18.5)
	B 26200-N	200	120	100	80	9.5	48	26	15	90°	M14	18.3
	RF 26250-S (M)	250	150	140	100	9.5	48	26	15	90°	M12	17.6 (18.4)
	B 26250-N	250	150	140	100	9.5	48	32	19	90°	M16	17.8
	RF 26300-S (M)	300	150	180	100	9.5	48	26	15	90°	M12	16.7 (17.4)
	B 36250-S (M)	250	150	140	100	12.7	60	32	19	90°	M16	27.6 (28.6)
	RF 36250-N	250	150	140	100	12.7	60	32	19	90°	M16	27.5
	RF 36300-S (M)	300	150	180	100	12.7	60	32	19	90°	M16	26.2 (27.1)
G-4 (II) Att.	**B 26300-N**	300	200	170	140	12	60	38	24	90°	M20	23.1
	B 36300-N	300	200	170	140	12	72	38	24	90°	M20	33.1
	B 36350-N	350	240	200	170	12	72	40	28	60°	M24	33.1
	B 60300-N	300	200	170	140	12	77	38	24	90°	M20	41.7
	B 60350-N	350	240	200	170	12	77	40	28	60°	M24	41.0
	B 60400-N	400	280	230	200	16	81	50	35	60°	M30	45.0
	B 90350-N	350	240	200	170	12	89.5	40	28	60°	M24	60.1
	B 90400-N	400	280	230	200	16	93.5	50	35	60°	M30	63.2
	B120400-N	400	280	230	200	16	105.5	50	35	60°	M30	84.7

Note: Weight in ( ) is for M roller type chain.

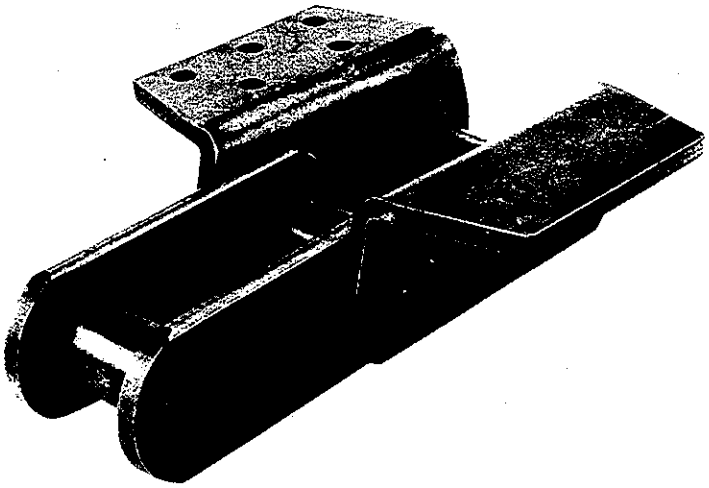
Connecting link with G-4(II) attchment for easy assembly

TSUBAKI Chain No.	Pitch P	Pin D	L_1	L_2	L_1+L_2	G-4 (2) Attachment Tp
B 36250-N	250	28	83	81	164	12.7
B 36300-N	300	28	83	81	164	12
B 36350-N	350	28	83	81	164	12
B 60300-N	300	35	88	88	176	12
B 60350-N	350	35	88	88	176	12
B 60400-N	400	35	88	88	176	16
B 90350-N	350	42	102.5	101.5	204	12
B 90400-N	400	42	102.5	101.5	204	16
B120400-N	400	50	114.5	115.5	230	16

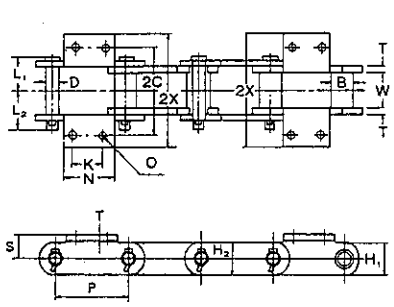
Notes: 1. Chain will be supplied in standard lengths of approximately 3 meters with ordinary outer link (with/without attachment).
2. Connecting links will be supplied only upon request.

TSUBAKI BF TYPE BUCKET ELEVATOR CHAINS

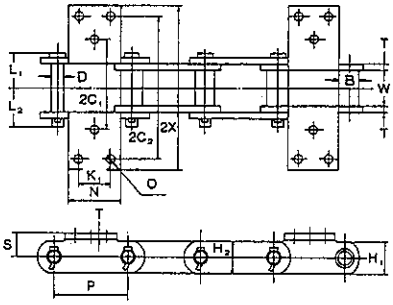
Specially designed for centrifugal discharge type bucket elevators, our BF 3000 Series Bucket Elevator Chains have become highly valued in cement factories around the world. Attachments are now available in five standard styles. TSUBAKI will also supply special attachments upon request. Special Series Bucket Elevator Chains for greater tensile and fatigue strength plus higher wear are available.



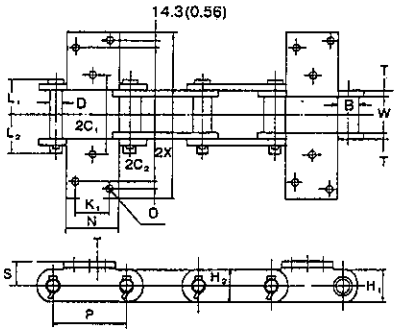
TSUBAKI Chain No.	Pitch P	Average Tensile Strength kN(kgf)	Bushing Dia. B	Width between Inner Link Plates W	Link Plate			Pin			Approx. Mass kg/m
					H_1	H_2	T	D	L_1	L_2	
BF2856	152.4	539 (55,000)	44.5	76.2	63.5	63.5	12.7	25.4	72.5	83.0	24.5
BF3856		647 (66,000)	44.5	76.2	63.5	63.5	12.7	25.4	72.5	83.0	24.5
BF2857	152.4	637 (65,000)	44.5	76.2	82.6	63.5	12.7	25.4	72.5	83.0	30
BF3857		775 (79,000)	44.5	76.2	82.6	63.5	12.7	25.4	72.5	83.0	30
BF2859	152.4	902 (92,000)	60.3	95.3	101.6	76.2	16	31.75	91.0	99.0	51
BF3859		1,180 (120,000)	60.3	95.3	101.6	76.2	16	31.75	91.0	99.0	51
BF2864	177.8	932 (95,000)	60.3	95.3	101.6	90.0	16	31.75	91.0	99.0	51
BF3864		1,230 (125,000)	60.3	95.3	101.6	90.0	16	31.75	91.0	99.0	51



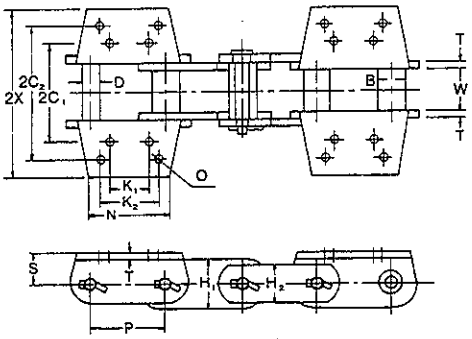
K-24 Attachment



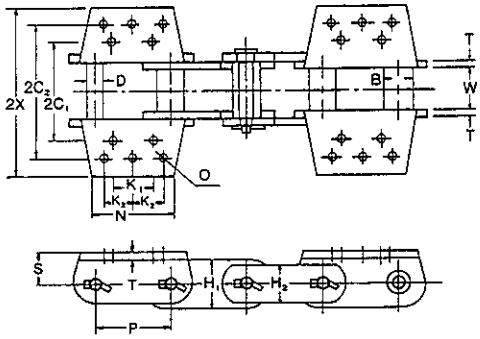
K-3 Attachment



K-35 Attachment



K-44 Attachment



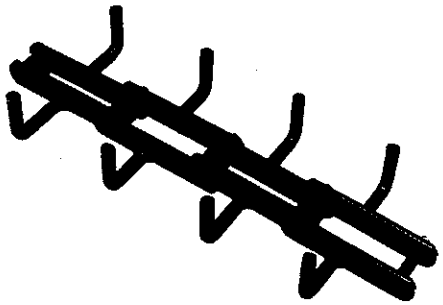
K-443 Attachment

Attachment (Dimensions in mm)

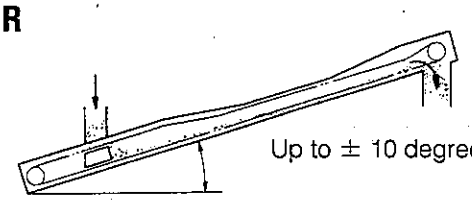
Attachment Style	TSUBAKI Chain No.	Pitch	Attachment									Approx. Additional mass per Attachment kg/att.
		P	S	$2C_1$	$2C_2$	2X	K_1	K_2	N	T	O	
K-24	BF2856	152.4	47.6	184.2	–	241	63.5	–	108	12.7	18	1.5
	BF3856											
K-3	BF2856	152.4	47.6	166.7	277.8	344	70	–	108	12.7	15	2.8
	BF3856											
K-35	BF2856	152.4	47.6	184.2	298.5	344	63.5	–	108	12.7	18	2.8
	BF3856											
K-44	BF2857	152.4	63.5	177.8	304.8	355.6	88.9	88.9	152.4	12.7	14.3	5.0
	BF3857											
K-44	BF2859	152.4	76.2	228.6	330.2	381	70	114.5	152.4	16	17.5	5.0
	BF3859											
K-443	BF2864	177.8	76.2	228.6	330.2	381	95.3	69.85	197	16	17.5	7.5
	BF3864											

FLOW CONVEYOR CHAINS

These chains are based on TSUBAKI RF Standard Conveyor Chains. Various types of standardized attachments are available to perfectly suit the conveyed material.
The materials of the standard chain are identical to those of the DT (Basic) Series or AT Series, but other series are also available upon request.

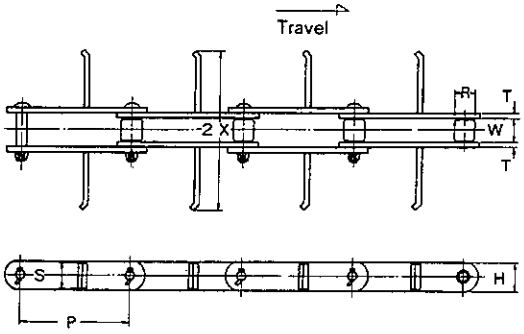


■ FOR TSUBAKI FC TYPE HORIZONTAL FLOW CONVEYOR

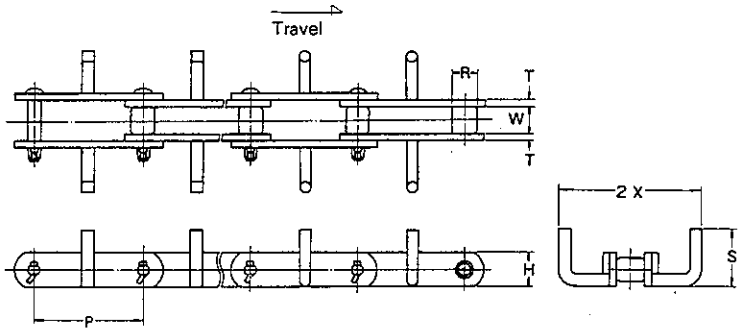


Attachment	Application
L	Conveying grain or cement
KL	Conveying adhesive powder
B (round)	Conveying powdered material like flour or cement with higher conveying efficiency than attachment L
B (square)	Conveying massive, powdered, or adhesive materials that are hard to convey with B (round) attachment.
U2V (round)	A larger or an upgrade conveyor
U2V (square)	Conveying massive, powdered, or adhesive materials that are hard to convey with U2 V (round) attachment.

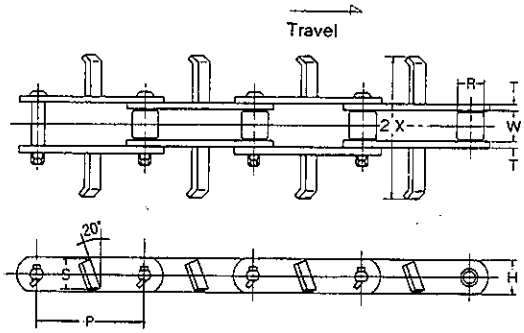
TSUBAKI Chain No.	Previous Chain No.	TSUBAKI Flow Model No.	Pitch **P**	Roller Dia. **R**	Width between Roller Link Plates **W**	Link Plate **H**	Link Plate **T**	Attachment **2X**
RF 10125-M		FC200	125	31.8	30	38.1	6.3	185
RF 10150-M		FC270	150	31.8	30	38.1	6.3	250
RF 6205-M	F6, FA6	FC270	152.4	38.1	37.1	44.5	7.9	250
RF 12200-M		FC350	200	38.1	37.1	44.5	7.9	330
RF 17200-M		FC350	200	44.5	51.4	50.8	9.5	330
RF 17250-M		FC450	250	44.5	51.4	50.8	9.5	430
RF 26200-M	F8, FA8	FC410	200	50.8	57.2	63.5	9.5	390
RF 26250-N		FC450	250	50.8	57.2	63.5	9.5	430
RF 26300-N		FC580	300	50.8	57.2	63.5	9.5	560
RF 36300-M	F12	FC580	300	57.2	66.7	76.2	12.7	560
RF 36300-N	FA12	FC580	300	57.2	66.7	76.2	12.7	560



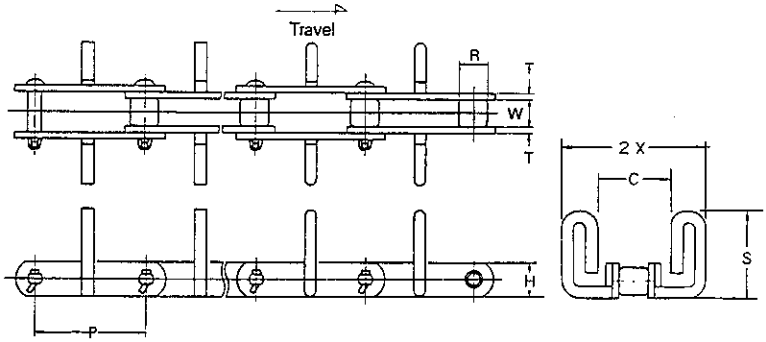
L Attachment



B (square) Attachment and B (round) Attachment



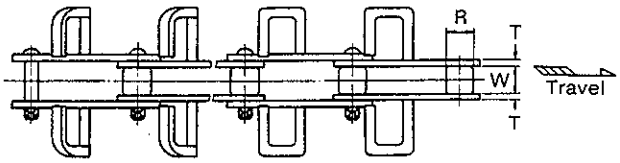
KL Attachment

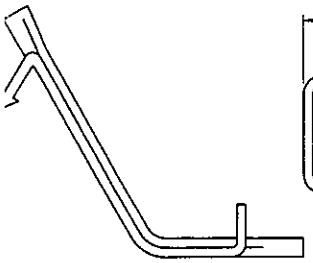


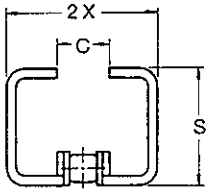
U2V (square) Attachment and U2V (round) Attachment

L Attachment		KL Attachment		B Attachment		U₂V-Attachment			Average Tensile Strength	
S	Approx. Mass kg/m	S	Approx. Mass kg/m	S	Approx. Mass kg/m	S	C	Approx. Mass kg/m	DT (Basic) Series kN (kgf)	AT Series kN (kgf)
34	8.1	34	8.1	80	8.9	115	85	10.3	113 (11,500)	226 (23,000)
34	8.1	34	8.1	100	9.8	140	105	12.7	113 (11,500)	226 (23,000)
40	12.0	40	12.0	100	12.4	140	105	15.6	186 (19,000)	279 (28,500)
40	12.0	40	12.0	125	13.6	185	130	18.4	186 (19,000)	279 (28,500)
46	17.0	46	17.0	125	17.5	185	130	22.3	245 (25,000)	387 (39,500)
46	16.3	46	16.3	160	18.8	230	135	23.7	245 (25,000)	387 (39,500)
58	28.0	58	28.0	150	25.0	233	100	34.0	314 (32,000)	520 (53,000)
58	21.0	58	21.0	160	22.4	230	135	29.5	299 (30,500)	564 (57,500)
58	23.0	58	23.0	200	27.0	290	160	42.0	299 (30,500)	564 (57,500)
70	34.0	70	34.0	200	36.2	290	160	50.5	476 (48,500)	682 (69,500)
70	34.0	70	34.0	200	36.2	290	160	50.5	–	868 (88,500)

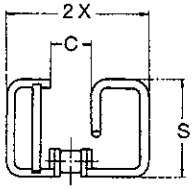
■ FOR TSUBAKI LC TYPE INCLINED FLOW CONVEYOR



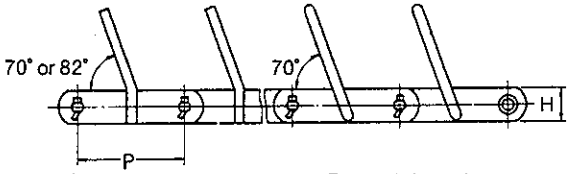




U Attachment



U2, U2N Attachments



Square Attachment Round Attachment

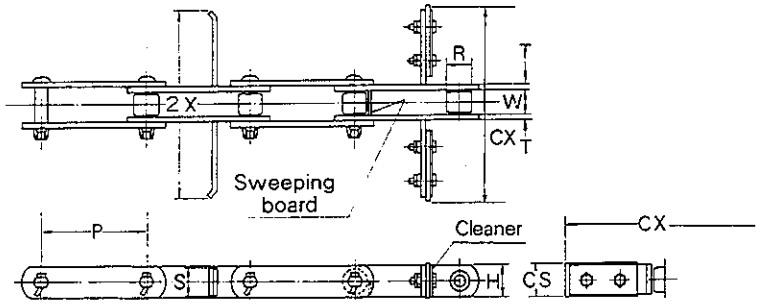
Attachment	Application
U (round steel bar)	Conveying general powdered materials
U (square steel bar)	Conveying massive, powdered, or adhesive materials

Attachment	Application
U2 U2N (round steel bar)	Conveying materials at higher efficiency than U (round)
U2 U2N (square steel bar)	Conveying materials at higher efficiency than U (square)

TSUBAKI Chain No.	Previous Chain No.	TSUBAKI Flow Model No.	Pitch P	Roller Dia. R	Width between Roller Link Plates W	Link Plate H	Link Plate T	U Attachment 2X	U Attachment S	U Attachment C	U Attachment Approx. Mass kg/m	U2-Attachment S	U2-Attachment C	U2-Attachment Approx. Mass kg/m	Average Tensile Strength DT (Basic) Series kN (kgf)	Average Tensile Strength AT Series kN (kgf)
RF 450W-M	F4, FW4	LC LS160	101.6	25.4	27	31.8	6.3	145	110	50	8.6	110	50	9.6	108 (11,000)	142 (14,500)
RF 10125-M		LC LS240	125	31.8	30	38.1	6.3	225	140	65	13.0	140	65	14.8	113 (11,500)	226 (23,000)
RF 6205-M	F6, FA6	LC LS320	152.4	38.1	37.1	44.5	7.9	300	175	80	19.5	175	80	22.4	186 (19,000)	279 (28,500)
RF 17200-M		LC LS410	200	44.5	51.4	50.8	9.5	390	220	100	26.5	220	100	30.3	245 (25,000)	387 (39,500)
RF 26200-M	F8, FA8	LC LS410	200	50.8	57.2	63.5	9.5	390	220	100	30.5	220	100	33.9	314 (32,000)	520 (53,000)
RF 26200-N	F8, FA8	LC LS410	200	50.8	57.2	63.5	9.5	390	220	100	30.5	220	100	33.9	299 (30,500)	564 (57,500)
RF 36300-M	F12	LC LS500	300	57.2	66.7	76.2	12.7	480	260	120	42.5	260	120	47.0	476 (48,500)	–
		LC LS600	300	57.2	66.7	76.2	12.7	580	305	140	47.2	305	140	53.0	476 (48,500)	–
RF 36300-M	FA12	LC LS500	300	57.2	66.7	76.2	12.7	480	260	120	42.5	260	120	47.0	–	868 (88,500)
		LC LS600	300	57.2	66.7	76.2	12.7	580	305	140	47.2	305	140	53.0	–	868 (88,500)

■ FOR TSUBAKI FK TYPE FLOW CONVEYOR FOR GRAIN

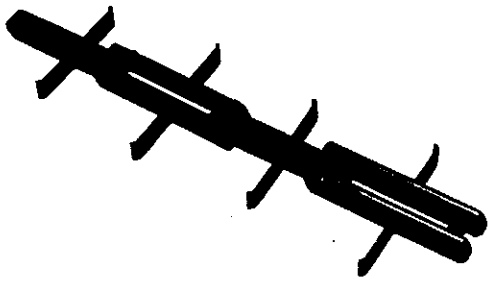
These chains are specially designed for grain conveying horizontal flow conveyors (upgrade or downgrade within an angle of 10 degrees).
The sweeping board can prevent material on the rail from being crushed and the cleaner can sweep the material off the case.

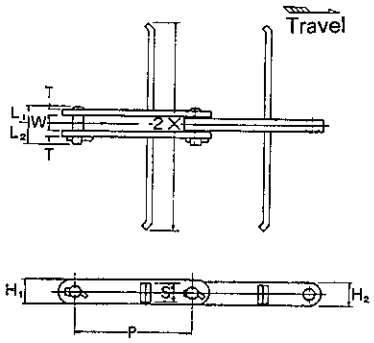


TSUBAKI Chain No.	TSUBAKI Flow Model No.	Pitch P	Roller Dia. R	Width between Roller Link Plates W	Link Plate H	Link Plate T	Attachment 2X	Attachment S	Cleaner CX	Cleaner CS	Approx. Mass kg/m	Average Tensile Strength kN(kgf)
RF 03075-S	FK110	75	15.9	16.1	22	3.2	95	20	105	28	2.1	29 (3,000)
RF 430-S	FK150	101.6	20.1	22.6	25.4	4.8	135	22	145	32	3.4	54 (5,500)
RF 450-S	FK150	101.6	22.2	27	28.6	6.3	135	25	145	34	5.0	78 (8,000)
RF 08125-S	FK200	125	22.2	27	28.6	6.3	185	25	195	34	5.0	78 (8,000)
RF 10125-S	FK200	125	29	30	38.1	6.3	185	34	195	47	7.2	113 (11,500)
RF 10125-S	FK240	125	29	30	38.1	6.3	225	34	235	47	7.5	113 (11,500)
RF 10150-S	FK270	150	29	30	38.1	6.3	250	34	265	47	6.9	113 (11,500)
RF 10150-S	FK320	150	29	30	38.1	6.3	300	34	315	47	7.2	113 (11,500)
RF 6205-S	FK270	152.4	34.9	37.1	44.5	7.9	250	40	265	53	10.5	186 (19,000)
RF 12200-S	FK350	200	34.9	37.1	44.5	7.9	330	40	345	53	10.3	186 (19,000)
RF 17200-S	FK350	200	40.1	51.4	50.8	9.5	330	46	345	58	14.5	245 (25,000)
RF 17200-S	FK450	200	40.1	51.4	50.8	9.5	430	46	445	58	15.2	245 (25,000)
RF 26200-S	FK450	200	44.5	57.2	63.5	9.5	430	58	445	68	20.0	314 (32,000)

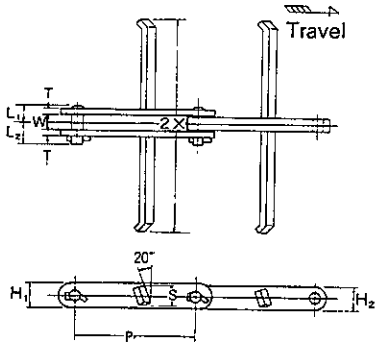
NFX BLOCK CHAINS FOR FLOW CONVEYORS

The base chain consists of outer link plates, inner link plates, and pins. Attachments can be welded onto the base chain. Special alloy steel provides greater tensile strength and the chain's simple construction provides greater allowable wear. Consequently, these chains are ideal for conveying material that is very abrasive, wet, or hot.

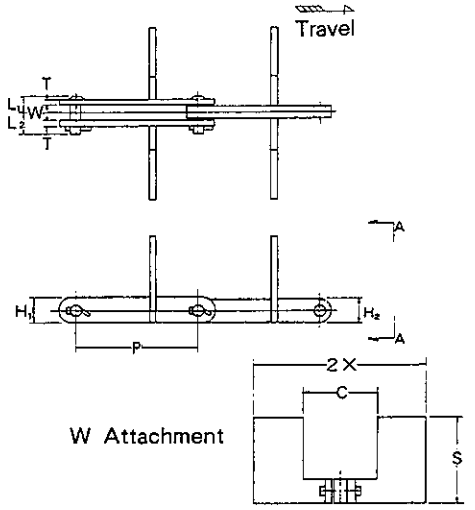




L Attachment



KL Attachment



W Attachment

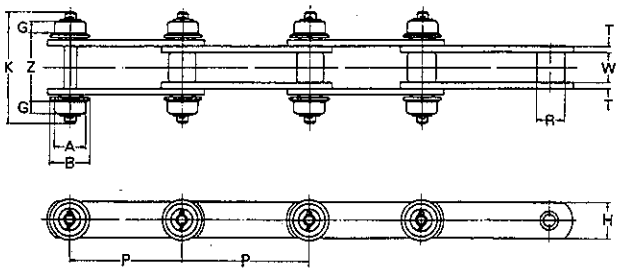
A-A Cross Section

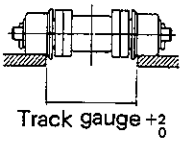
TSUBAKI Chain No.	Pitch P	Width between Outer Link Plates W	Link Plate H1	Link Plate H2	Link Plate T	Pin L1	Pin L2	Approx. Mass kg/m	Average Tensile Strength kN (kgf)
NFX 30150	150	23.3	44.5	38.1	7.9	23.5	32	7.9	309 (31,500)
NFX 30200	200	23.3	44.5	38.1	7.9	23.5	32	7.6	309 (31,500)
NFX 56200	200	29.5	63.5	54.0	9.5	28.5	39.5	14.7	554 (56,500)
NFX 56250	250	29.5	63.5	54.0	9.5	28.5	39.5	14.5	554 (56,500)

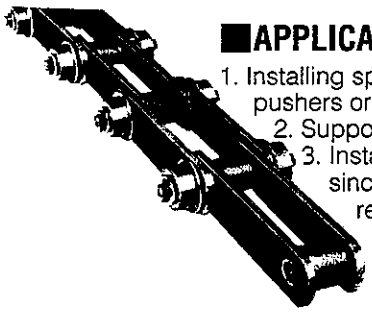
TSUBAKI Chain No.	TSUBAKI Flow Model No.	L Attachment 2X	L Attachment S	L Attachment Additional Mass Per Att. kg/att	KL Attachment 2X	KL Attachment S	KL Attachment Additional Mass Per Att. kg/att	W Attachment 2X	W Attachment S	W Attachment C	W Attachment Additional Mass Per Att. kg/att
NFX 30150 NFX 30200	FC150	135	34	0.18	135	34	0.18	135	80	80	0.32
	FC200	185	34	0.26	185	34	0.26	185	115	85	0.68
	FC270	250	34	0.36	250	34	0.36	250	140	105	1.12
	FC350	330	34	0.74	330	34	0.74	330	185	130	2.94
	FC450	430	34	0.98	430	34	0.98	430	230	135	5.14
NFX 56200 NFX 56250	FC410	390	51	1.3	390	51	1.3	390	233	100	5.0
	FC450	430	51	1.44	430	51	1.44	430	230	135	5.2
	FC580	560	51	1.92	560	51	1.92	560	290	160	8.6

RF CONVEYOR CHAINS WITH SIDE ROLLERS

These chains are based on the S roller type of TSUBAKI RF Standard Conveyor Chain. The pins of which are extended to hold flanged outboard rollers on both sides, The sprockets drive the chain by engaging the S rollers at the chain center. The outboard rollers are for running and supporting the load.
When ordering, specify the series name (DT-Basic, AT or BT) and the required spacing of the outboard rollers.







■APPLICATIONS

1. Installing special attachments such as pushers or tilting dogs.
2. Supporting heavier loads.
3. Installing guides for return strand of chain since special attachments interfere with the return guide.

TSUBAKI Base Chain No.	Pitch P	Rollers Dia. R	Width between RollerLink Plates W	Link Plate H	Link Plate T	Outboard Roller A	Outboard Roller B	Outboard Roller G	Outboard Roller K	Outboard Roller Z	Track Gauge	Approx. Mass of Outboard Rollers per Pitch kg	Maximum Allowable Load on a Pair of Outboard Rollers: Non Heat-treated N (kgf)	Maximum Allowable Load on a Pair of Outboard Rollers: Heat-treated N (kgf)
RF03075-S	75	15.9	16.1	22	3.2	31.8	42	12	76	38	40	0.3	690 (70)	1080 (110)
RF03100-S	100													
RF 430-S	101.6	20.1	22.6	25.4	4.8	38.1	50	15	103	56	58	0.5	980 (100)	1570 (160)
RF05075-S	75	22.2	22	32	4.5	40	50	14	102	55	57	0.5	1180 (120)	1960 (200)
RF05100-S	100													
RF05150-S	150													
RF 450-S	101.6	22.2	27	28.6	6.3	44.5	55	20	130	70.5	72.5	0.7	1670 (170)	2350 (240)
RF10100-S	100	29	30	38.1	6.3	50.8	65	20	136	73	75	1.0	1960 (200)	3240 (330)
RF10150-S	150													
RF 6205-S	152.4	34.9	37.1	44.5	7.9	57.2	70	25	167	90.5	92.5	1.3	2750 (280)	4610 (470)
RF12200-S	200	34.9	37.1	44.5	7.9	65	80	24	167	92.5	94.5	1.8	2750 (280)	4610 (470)
RF12250-S	250													
RF17200-S	200	40.1	51.4	50.8	9.5	65	80	24	192	112.5	114.5	3.8	3140 (320)	5300 (540)
RF17250-S	250													
RF17300-S	300													
RF26200-S	200	44.5	57.2	63.5	9.5	80	100	34	229	124.5	126.5	6.9	4900 (500)	8430 (860)
RF26250-S	250													
RF26300-S	300													
RF36250-S	250	50.8	66.7	76.2	12.7	100	125	38	268	151	153	11.7	6570 (670)	11080 (1,130)
RF36300-S	300													
RF36450-S	450													

Note: For average tensile strength, refer to the table on page 168a.

■MODEL IDENTIFICATION

RF6205-S-DT-OBR-N

- N: Non Heat-Treated, HT: Heat-Treated
- Outboard Roller
- Chain Series
- Base Chain No.

RF CONVEYOR CHAINS WITH TOP ROLLERS

These chains are based on RF Conveyor Chain. Extra rollers are mounted on top of the chain pitch line in the middle of each link to directly support conveyed materials.
When ordering, specify the following:

1. Series name such as DT(Basic), AT or BT.
2. Spacing of top rollers. Top rollers spaced every even number of links are usually furnished on the inner link unless otherwise specified. Special sprockets are required for this chain, since the standard sprocket for RF Conveyor Chain interferes with the top roller.

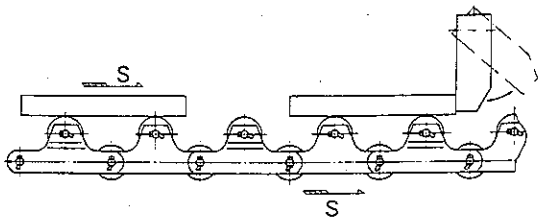
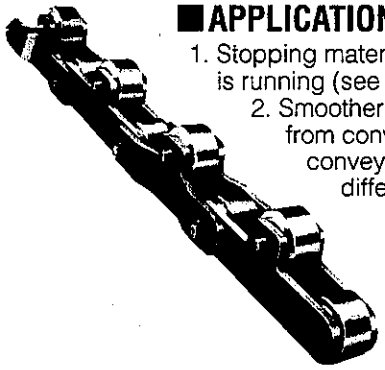


Fig. 1



■APPLICATIONS

1. Stopping material while chain is running (see Fig. 1).
2. Smoother transfer of material from conveyor to conveyor where conveyor speeds are considerably different (see Fig. 2).

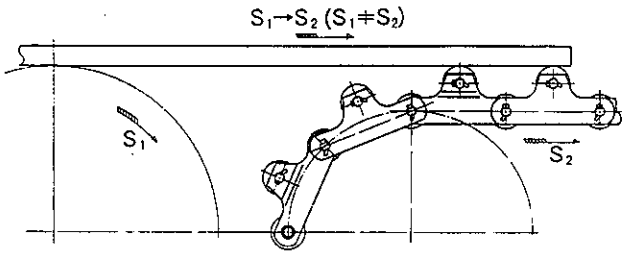
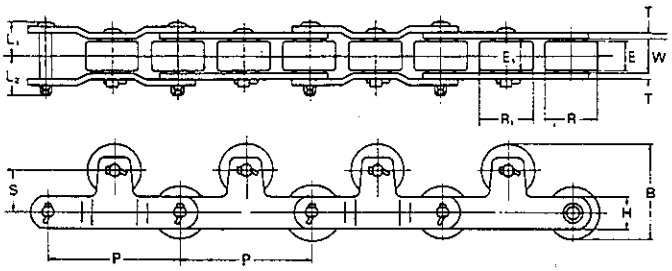
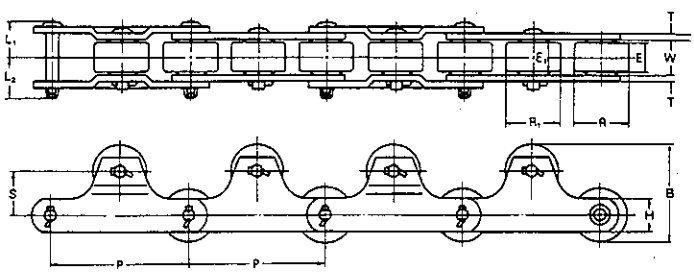


Fig. 2


Type Ⅰ


Type Ⅱ

TSUBAKI Base Chain No.	Pitch	Roller		Width between Roller Link plates	Link plate		Pin		Top roller				Type	Approx. Mass kg/m	Additional Mass per Top Roller kg/roller	Allowable Load of Top Roller	
																Non Heart-treated N (kgf)	Heat-treated N (kgf)
	P	R	E	W	H	T	L_1	L_2	S	R_1	E_1	B					
RF 03075-R	75	31.8	15.5	16.1	22	3.2	18	20	23.1	40	13	59	*	2.7	0.18	340 (35)	590 (60)
RF 03100-R	100													2.3			
RF 05100-R	100	40	19	22	32	4.5	25	28.5	30	40	19	70	I	5.0	0.26	640 (65)	1030 (105)
RF 05150-R	150													4.1			
RF 10150-R	150	50.8	27	30	38.1	6.3	33	36	30	50.8	27	80.8	I	7.9	0.56	1130 (115)	1910 (195)
RF 6205-R	152.4	57.2	32	37.1	44.5	7.9	40.5	43	37.8	57.2	32	95	I	12.1	0.91	1470 (150)	2500 (255)
RF 12200-R	200	65	32	37.1	44.5	7.9	40.5	43	45	65	32	110	I	11.4	1.15	1470 (150)	2500 (255)
RF 17200-R	200	80	44	51.4	50.8	9.5	51.5	58	65	80	44	145	II	18.8	2.58	2450 (250)	4120 (420)

Note: For average tensile strength, refer to the table on page 172a. *No bending portion at pin link plate.

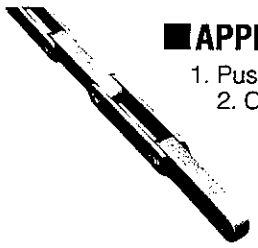
■MODEL IDENTIFICATION

RF05150-R-DT-TR-HT

- Base Chain No.
- Series of Chain
- Top Roller
- N : Non Heat Treated
  HT: Heat Treated

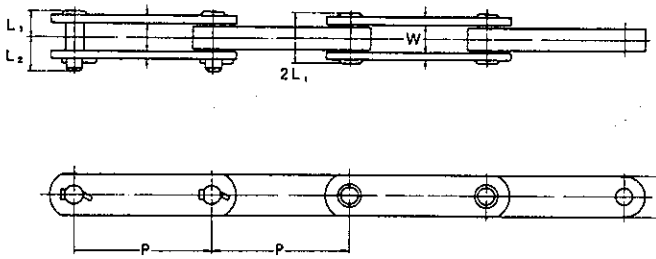
NF BLOCK CHAINS

These chains consist of outer link plates, inner block links and pins.
They have excellent rigidity with greater tensile strength.
Key chain components are made of heat-treated steel for higher wear resistance.
These chains are usually used as shown on the right.



■APPLICATIONS

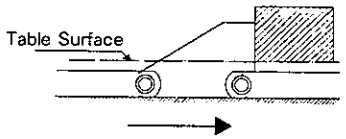
1. Pushing trucks
2. Conveying hot material on chain
3. Drawbench usage



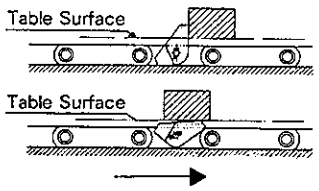
TSUBAKI Chain No.	Pitch P	Width between Outer Link Plates W	Link Plate H	Link Plate T	Pin L_1	Pin L_2	Pin $2L_1$	Average Tensile Strength kN (kgf)	Approx. Mass kg/m
NF 30150	150	23.3	38.1	7.9	24	32	47	309 (31,500)	7.0
NF 30200	200								6.6
NF 40150	150	26.5	44.5	7.9	25.5	33.5	50	397 (40,500)	9.0
NF 40200	200								8.5
NF 56200	200	29.5	54	9.5	29.5	40.5	57	554 (56,500)	12.3
NF 56250	250								12.0
NF 63200	200	31.5	57	9.5	30.5	41.5	59	618 (63,000)	13.7
NF 63250	250								13.0
NF 70200	200	33.5	63.5	9.5	31.5	42.5	61	721 (73,500)	16.2
NF 70250	250								15.5
NF 90200	200	38	72	10.5	34.5	45.5	68	907 (92,500)	21.0
NF 90250	250								20.0
NF115250	250	40	76.2	12.7	38	49	76	1120 (114,000)	25.0
NF115300	300								24.0
NF140250	250	47.5	85	14	44	54	84	1400 (143,000)	32.0
NF140300	300								31.0
NF180300	300	52.5	95	16	48.5	58.5	94	1740 (177,500)	39.0
NF180350	350								37.8
NF210300	300	59	110	16	51.5	61.5	101	2150 (219,500)	50.0
NF210350	350								48.3
NF250300	300	66	112	19	58.5	68.5	114	2440 (248,500)	58.8
NF250350	350								56.7
NF280300	300	67	122	19	58.5	68.5	115	2720 (277,500)	66.0
NF280350	350								62.3

The style of pusher dog is determined by the shape of the conveyed material and the application. The spacing of pusher dogs is determined by the conveyor capacity and the size of the conveyed material.
The following types of dog attachments are commonly used:.

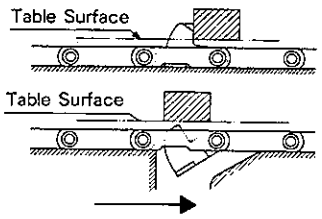
1. Solid pusher
   Inner or outer pusher link to push material.



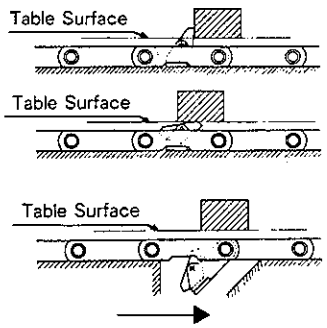
2. Tilting dog
   When material on the conveyor runs relatively faster than the chain, the dog is pushed down from behind to enable material to pass over. The dog then springs back to resume its original position.



3. Ducking dog
   The dog is supported on the guide rail to convey material. When the guide rail is interrupted, the dog ducks down, leaves the material and passes beneath it.

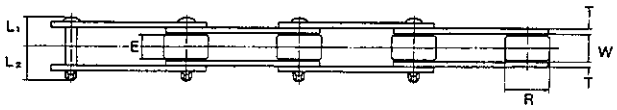


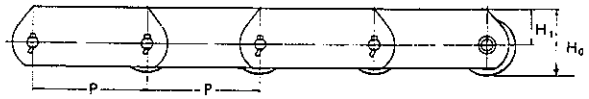
4. Tilting and ducking dog
   Both tilting and ducking functions are combined.
   When the dog comes in contact with the table surface, it lets the material pass over. When the guide rail is discontinued, the dog leaves the material and passes beneath it.



RFD DEEP LINK CHAINS

This type of chain provides solid contact between the chain and material to be conveyed. Due to roller rotation over the chain guide rail less friction is provided.





■APPLICATIONS

1. Conveyor lines of thick plate or section steel in steel mills
2. Automobile or container assembly lines

TSUBAKI Chain No.	Pitch	Roller		Width Between Roller Link Plates	Chain Height	Link Plate		Pin		Average Tensile Strength kN (kgf) (DT-Basic Series)	Approx. Mass kg/m
	P	R	E	W	Ho	H1	T	L1	L2		
RFD03100-R	100	31.8	15.5	16.1	36.9	21	3.2	18	20	29 (3,000)	3.2
RFD05100-R	100	40	19	22	44	24	4.5	25	28.5	69 (7,000)	5.9
RFD05150-R	150										4.9
RFD10150-R	150	50.8	27	30	57.4	32	6.3	33	36	113 (11,500)	10.0
RFD10200-R	200										8.8
RFD 6205-R	152.4	57.2	32	37.1	63.5	35	7.9	40.5	43	186 (19,000)	14.6
RFD12200-R	200	65	32	37.1	73.5	41	7.9	40.5	43	186 (19,000)	15.2
RFD12250-R	250										14.1
RFD17250-R	250	80	44	51.4	90	50	9.5	51.5	58	245 (25,000)	23.0
RFD17300-R	300										21.5
RFD26300-R	300	85*	50	57.2	95.5	53	9.5	55.5	61	314 (32,000)	24.3
RFD36300-R	300	100*	56	66.7	112	62	12.7	68	78	476 (48,500)	39.0
RFD36400-R	400										34.2
RFD52450-R	450	110*	56	77	125	70	16	82	90	500 (51,000)	46.0

Note: Roller diameter marked with *in the table is different from the diameter of RF Standard Conveyor Chain

TSUBAKI STEEL CHAINS FOR SUGAR MILLS

■BENEFITS

Greater resistance to wear
High strength with comparatively light weight
Increased resistance to corrosion

TSUBAKI Steel Chains for cane sugar mills have earned a superior reputation over many years for high quality, uniformity, and durability.
These steel chains, like other fine TSUBAKI chains, are built to the most exacting specifications with select materials, and then heat-treated and tested to ensure maximum performance.

■TSUBAKI SUGAR MILL CHAIN SERIES LINE-UP

The most convenient, not to mention advanced features of the TSUBAKI Sugar Mill Chain line-up is the number of combinations and options available. This allows the chosen chain to be exactly in tune with the special conditions pertaining to each sugar mill.
Great variation in type of steel can be selected from carbon steel through alloy steel, or stainless steel with a suitable choice of heat-treatment available to suit the individual needs of each mill. Fitting is no problem since all components, irrespective of material and hardening, are based on standard sizes.

Series	Link Plate	Pin	Bushing	Roller	Special Characteristics
GT					TSUBAKI basic series
CT			or		Greater pin and bushing wear resistance than GT
AT					Greater wear resistance in link plate Improved tensile strength over GT
BT					Pin and bushing wear resistance superior to AT
MT		4SS	4SS		Pin and bushing corrosion resistance better than GT
RT		4SS	4SS	4SS	Roller corrosion resistance better than MT
VT		4SS	4SS		Tensile strength with link plate wear resistance greater than MT
YT		4SS	4SS	4SS	Superior chain with corrosion-resistant rollers improved over VT and link plate stronger than RT
ST	3SS	3SS	3SS	3SS	Top corrosion-resistant chain
PT	4SS	4SS	4SS	4SS	High performance chain with link plate corrosion resistance surpassing RT and YT
ZT-1		4SS	4SS	4SS	Excellent bushing and roller wear resistance better than RT
ZT-2		4SS	4SS	4SS	Excellent bushing and roller wear resistance better than YT Unbeatable strength with link plate tougher than ZT-1
ZT-3		4SS	4SS		Excellent bushing wear resistance better than VT
XT					Ultra-hardened pin and bushing with strengthened link plate

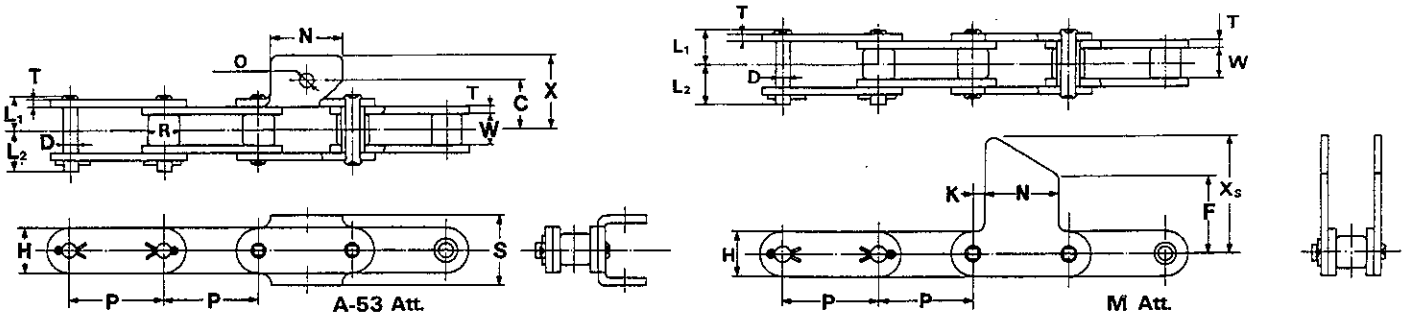
No mark - Carbon or alloy steel
4SS-400 series stainless steel
3SS-300 series stainless steel

- Non-hardened
- Hardened
- Specially hardened
- Ultra-hardened

CANE HARVESTER CHAINS

TSUBAKI offers a wide variety of chains for use in the harvesting of cane. For example, RS80 can be used in the harvester to remove the cane tops and RF Double Pitch and Hollow Pin Type Chain can be used for various other functions in harvesting machines. A new addition is the TSUBAKI XT Series Chain which is anti-wear, specially heat-treated, and ideal for the severe conditions of sugar cane harvesting.

■RF DOUBLE PITCH ROLLER CHAIN

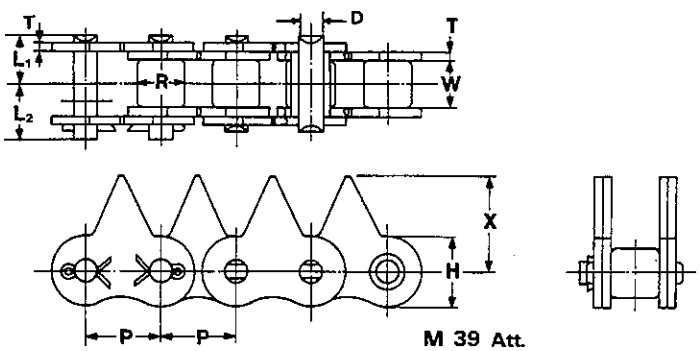


(Dimensions in mm)

TSUBAKI Chain No.	TSUBAKI Standard Specification	Pitch P	Width Between Inner Link Plates W	Roller Dia. R	Pin D	Pin L_1	Pin L_2	Link Plate T	Link Plate H	Average Tensile Strength kN(kgf)	Approx. Mass kg/m
RF2080S	BT	50.80	15.88	15.88	7.94	18.3	20.9	4.0	23.0	69 (7,000)	2.66
RF2100S	BT	63.50	19.05	19.05	9.54	21.8	24.5	4.8	28.6	109 (11,000)	3.99

Attachment Type	TSUBAKI Chain No.	Pitch P	Attachment S	X	Xs	C	N	O	K	F	Additional Mass per Attachment kg/att.
A-53	RF2100S	63.50	23.37	50.3	—	34.04	47.45	9.91	—	—	0.18
M	RF2080S	50.80	—	—	82.55	—	38.10	—	6.35	50.8	0.17
M-4	RF2100S	63.5	—	—	76.20	—	47.75	—	7.87	50.8	
M-6			—	—	133.25	—		—		95.25	
M-7			—	—	50.80	—		—		25.40	
M-8			—	—	88.90	—		—		63.50	

■RS ROLLER CHAIN

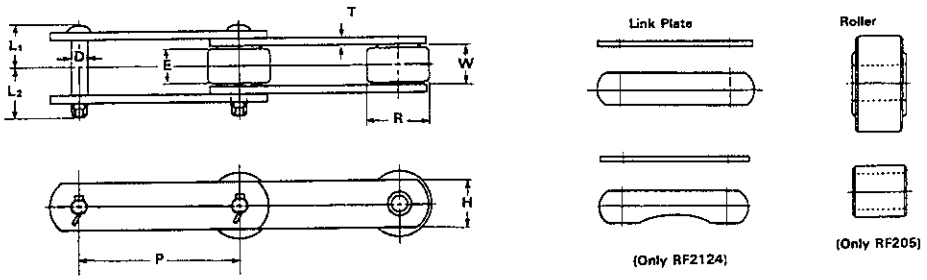


(Dimensions in mm)

TSUBAKI Chain No.	TSUBAKI Standard Specification	Pitch P	Width Between Inner Link Plates W	Roller Dia. R	Pin D	Pin L_1	Pin L_2	Link Plate H	Link Plate T	Attachment X	Average Tensile Strength kN (kgf)	Approx. Mass kg/m
RS80-M39	**STD**	25.4	15.88	15.88	7.94	16.25	19.25	24.1	3.2	31.8	32(3,300)	3.68

CANE CARRIER CHAIN

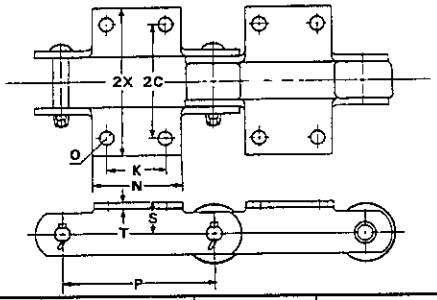
A wide variety of Cane Carrier Chains are available with tensile strength ranging from 127 to 623kN (13,000 to 63,500kgf). These chains have pins, bushings and rollers that provide excellent durability and wear resistance. The link plate of the AT Series has been strengthened for extra wear. The ZT-2 Series has outstanding corrosion resistant characteristics - it is TSUBAKI'S premium chain.



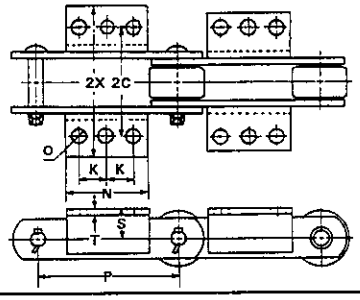
(Dimensions in mm)

TSUBAKI Chain No.	Tsubaki Standard Specification	Pitch	Roller		Pin			Link Plate		Width Between Inner Link plates	Average Tensile Strength	Approx. Mass
		P	E	R	D	L_1	L_2	T	H		kN(kgf)	kg/m
RF205	GT	78.11	–	31.8	15.88	40.5	43	7.9	38.1	37.1	127(13,000)	10.4
RF2188	GT	101.6	27	44.45	15.88	37.5	40	7.9	38.1	31.6	127(13,000)	10.3
RF0904	GT	101.6	23.9	50.8	17.5	37.5	43.5	7.9	44.5	29.4	177(18,000)	12.1
RF1113	GT	102.6	27	50.8	15.88	37.5	40	7.9	38.1	31.6	127(13,000)	11.3
RF2124	GT	152.4	32.5	69.9	19.05	44.5	51	9.5	50.8	37.1	245(25,000)	16.9
RF0906	GT	152.4	32.5	69.9	19.05	44.5	51	9.5	50.8	37.1	245(25,000)	17.0
RF09060	AT	152.4	32.5	69.9	19.05	44.5	51	9.5	50.8	37.1	392(40,000)	17.0
RF09061	AT	152.4	32.5	69.9	19.05	44.5	51	9.5	57.2	37.1	387(39,500)	18.6
RF2178A	AT	152.4	33	69.9	22.23	46	51.5	9.5	57.2	38.1	490(50,000)	19.2
RF2198A	AT	152.4	33	69.9	22.23	52.5	57.5	12.7	57.2	38.1	510(52,000)	23.4
RF09063	AT	152.4	32	76.2	24	48.5	57.5	10.5	63.5	36.5	623(63,500)	23.0
RF2315	GT	228.6	38.4	76.2	22.23	49	58	9.5	63.5	43	314(32,000)	18.8
RF2129	GT	228.6	34.5	82.5	19.05	44.5	51	9.5	57.2	37.1	294(30,000)	17.4

■K-2 ATTACHMENT



■K-3 ATTACHMENT

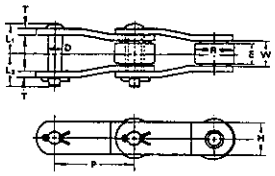


(Dimensions in mm)

Attachment Style	TSUBAKI Chain No.	Pitch	Attachment							Additional Mass per Attachment
		P	S	C	X	K	N	T	O	kg/att.
K-2	RF205	78.11	35	60	75	30	65	7.9	12	0.50
	RF0904	101.6	31.8	44.5	62.5	36.6	62	7.9	12	0.35
	RF1113	102.6	31.8	52.4	67.4	38.1	68	7.9	10	0.40
	RF2124	152.4	41.5	55.6	73	76.2	120	9.5	16	0.60
	RF0906	152.4	41.5	55.6	77	76.2	110	9.5	15	0.88
	RF09060	152.4	41.5	55.6	77	76.2	110	9.5	15	0.88
	RF09061	152.4	41.5	55.6	84	76.2	110	9.5	15	1.13
	RF2178A	152.4	41.5	55.6	85	76.2	110	9.5	15	0.90
	RF2198A	152.4	41.5	55.6	82	76.2	110	12.7	15	1.10
	RF09063	152.4	44.5	55.6	82.6	76.2	114.3	10.5	15	1.08
	RF2315	228.6	45	76.2	105.5	139.7	178	9.5	14	1.00
K-3	RF2129	228.6	45	73	104.5	51	152	9	15	2.80

INTERMEDIATE AND BAGASSE CARRIER CHAIN

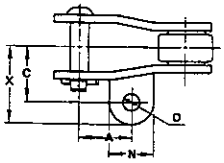
Resistance to both corrosion and wear is essential for Intermediate and Bagasse Carrier Chains.



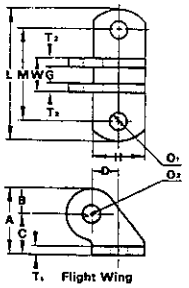
(Dimensions in mm)

TSUBAKI Chain No.	TSUBAKI Standard Specification	Pitch P	Width Between Inner Link Plates W	Roller E	Roller R	Pin D	Pin L_1	Pin L_2	Link Plate T	Link Plate H	Average Tensile Strength kN(kgf)	Approx. Mass kg/m
R01112	GT	93.7	27.6	24	44.45	15.88	33	35	6.3	38.1	93 (9,500)	9.0
R01124	GT	101.6	32.0	27	50.8	12.7	36.7	42.8	7.9	38.1	98 (10,000)	11.0
R01125	GT	101.6	32.6	27.1	50.8	17.5	39	45	7.9	44.5	152 (15,500)	12.7
R00904	GT	101.6	29.4	23.9	50.8	17.5	37.5	43.5	7.9	44.5	177 (18,000)	12.1
R01113	GT	102.6	37.5	32	50.8	17.5	38	45	6.3	38.1	93 (9,500)	10.8
R01130	GT	152.4	37.6	32	63.5	19.05	38.5	45.0	6.3	50.8	152 (15,500)	12.7
R02184	GT	152.4	34.9	31.8	76.2	22.23	44.5	49.5	9.5	50.8	196 (20,000)	18.5
R02184A	AT	152.4	34.9	31.8	76.2	22.23	44.5	49.5	9.5	50.8	333 (34,000)	18.5
R00906	GT	152.4	37.1	32.5	69.9	19.05	44.5	51.0	9.5	50.8	245 (25,000)	16.7
R009060	AT	152.4	37.1	32.5	69.9	19.05	44.5	51.0	9.5	50.8	392 (40,000)	16.7
R009061	AT	152.4	37.1	32.5	69.9	19.05	44.5	51.0	9.5	57.2	387 (39,500)	18.6
R02178A	AT	152.4	38.1	33	69.9	22.23	46	51.5	9.5	57.2	490 (50,000)	19.2

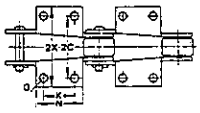
Attachments



A-42 Attachment



T₁ Flight Wing



K-2 Attachment

(Dimensions in mm)

Attachment Style	TSUBAKI Chain No.	Pitch P	Flight Wing No.	Attachment A	Attachment C	Attachment X	Attachment N	Attachment O	Attachment T	Additional Mass per Attachment kg/att.
A-42	R01112	93.7	1C	46.8	44	59	31.8	16.3	13.5	0.15
	R01124	101.6	17C	50.8	50.8	64.8	35	11.1	10.3	0.10
	R01125	101.6	0C	50.8	54.0	75	42	16.3	12.7	0.20
	R00904	101.6	4C	50.8	58.7	76	32	16.3	12.7	0.15
	R01113	102.6	1C&3C	50.8	60.3	80.3	49.6	16.3	13.5	0.30
	R01130	152.4	2C	76.2	62	87	76.2	16.3	16	0.60
	R02184	152.4	2C	76.2	66.7	92	50	16.3	16	0.40
	R02184A	152.4	2C	76.2	66.7	92	50	16.3	16	0.40
	R00906	152.4	5C	76.2	66.7	90	40	16.3	16	0.30
	R009060	152.4	5C	76.2	66.7	90	40	16.3	16	0.30
	R009061	152.4	5C	76.2	66.7	90	40	16.3	16	0.30

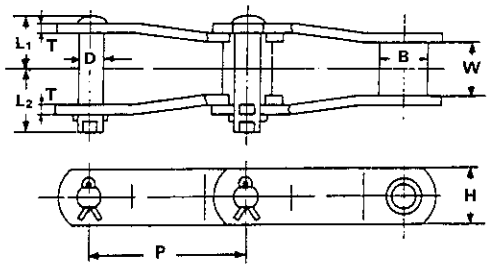
Attachment Style	Flight Wing No.	A	B	C	D	G	H	L	M	O_1	O_2	W	T_1	T_2	Approx. Mass kg/att.
Flight Wing	0C	49.1	19	30.1	20.6	14.3	44.5	111	84.1	11	16.3	30.1	7.9	7.9	0.50
	1C	64	19	40	25	14.3	50.8	127	88.9	15	16.3	32.3	7.9	9	0.70
	2C	91	24	67	25	17	50.8	127	88.9	15	16.3	35	7.9	9	0.90
	3C	65	24	41	32	14.3	50.8	127	77.8	11	16.3	32.3	7.9	9	0.70
	17C	50	15	35	28	11	44.5	111	76.2	15	11	26.8	7.9	7.9	0.50
	4C	47.6	19	28.6	19	14.3	44.5	111	82.6	11	16.3	32.3	7.9	9	0.50
	5C	59	24	35	25.4	17	50.8	127	84.1	15	16.3	35	7.9	9	0.70

Attachment Style	TSUBAKI Chain No.	Pitch P	Attachment S	Attachment C	Attachment X	Attachment K	Attachment N	Attachment T	Attachment O	Approx. Mass kg/att.
K-2	R02178A	152.4	41.5	55.6	73	76.2	111.1	9.5	15	0.90

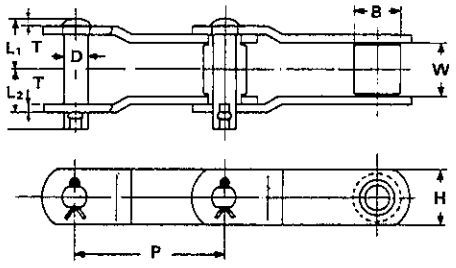
TSUBAKI has developed a new type of BO Series Rollerless Chain which has been acclaimed for its remarkably long service life in the bagasse carrier process of many moden sugar mills.

TSUBAKI recommends the VT and PT Series.

■BO/BOP TYPE CHAIN



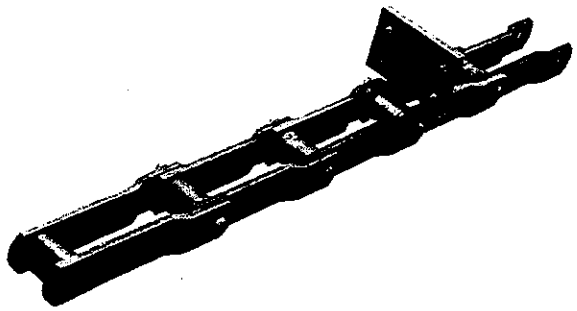
BO type

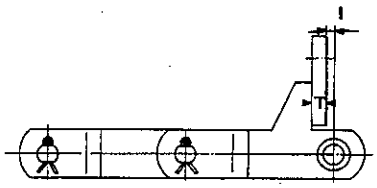


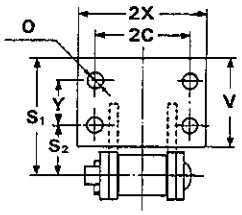
BOP type

(Dimensions in mm)

TSUBAKI Chain No.	Chain Style	TSUBAKI Standard Specification	Pitch P	Average Tensile Strength kN (kgf)	Approx. Mass kg/m	Bushing B	Bushing W	Pin D	Pin L_1	Pin L_2	Link Plate T	Link Plate H
BO09060	BO	AT	152.4	304 (31,000)	12.5	35	37.1	19.05	44.5	51	9.5	50.8
BO2184A	BO	AT	152.4	333 (34,000)	13.2	42	34.9	22.23	44.5	49.5	9.5	50.8
BOP160	BOP	AT	160	338 (34,500)	17.5	48	56	25.4	56	66	9.5	57.2
BOP160A	BOP	AT	160	446 (45,500)	19.2	48	56	25.4	56	66	9.5	63.5
BOP200	BOP	AT	200	338 (34,500)	15.5	48	56	25.4	56	66	9.5	57.2
BOP200A	BOP	AT	200	446 (45,500)	17.4	48	56	25.4	56	66	9.5	63.5





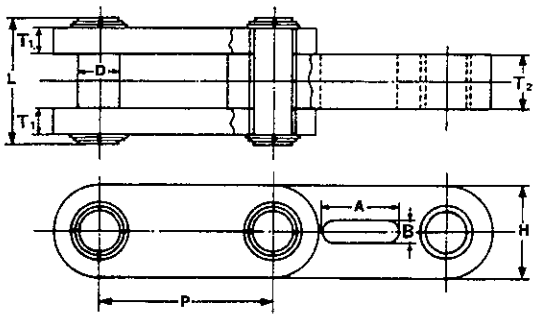


(Dimensions in mm)

TSUBAKI Chain No.	Attachment 2C	2X	Y	V	S_1	S_2	I	T	O	Additional Mass per Attachment kg/att.
BO09060	130	180	65	115	140.4	50.4	8	9	14	2.0
BO2184A	140	180	65	115	140.4	50.4	8	9	17	2.0
BOP160	108	148	50	102	136	59	10	16	14	3.5
BOP160A	108	148	50	102	136	59	20	16	14	3.5
BOP200	108	148	50	102	136	59	10	16	14	3.5
BOP200A	108	148	50	102	136	59	20	16	14	3.5

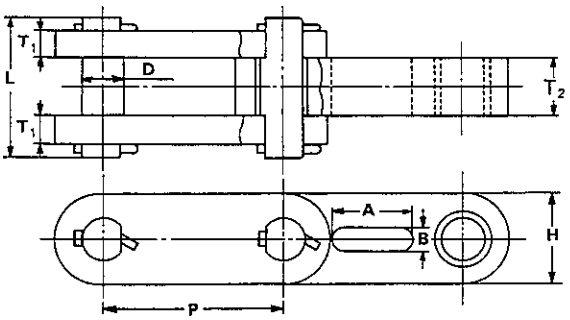
DIFFUSER CHAIN

In order to withstand the corrosive effect of hot acid water, TSUBAKI Diffuser Chains use tough stainless steel in the principal components to provide high resistance against corrosion and wear. TSUBAKI Diffuser Chains have successfully been used to improve and increase production in many sugar mills around the world. Not only is the NF Block Type Chain more economical than the RF Type but it is easier to assemble and disassemble.



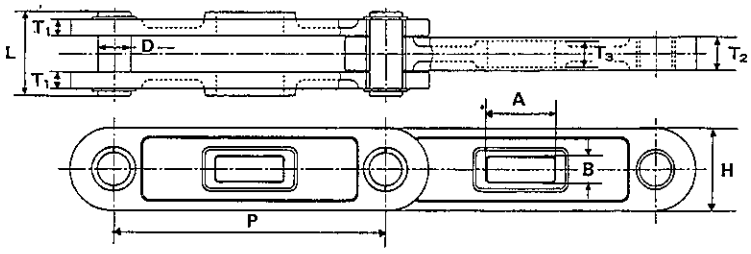
(Dimensions in mm)

TSUBAKI Chain No.	Chain Type	TSUBAKI Standard Specification	Pitch	Pin		Link Plate					Average Tensile Strength kN (kgf)	Approx. Mass
			P	D	L	T_1	T_2	H	A	B		kg/m
NF250	I	**VT**	250	47	161.5	30	60	110	111	35	1720(175,000)	52



(Dimensions in mm)

TSUBAKI Chain No.	Chain Type	TSUBAKI Standard Specification	Pitch	Pin		Link Plate					Average Tensile Strength kN (kgf)	Approx. Mass
			P	D	L	T_1	T_2	H	A	B		kg/m
NF250	II	**VT**	250	47	150	20	60	110	111	35	2010(205,000)	60



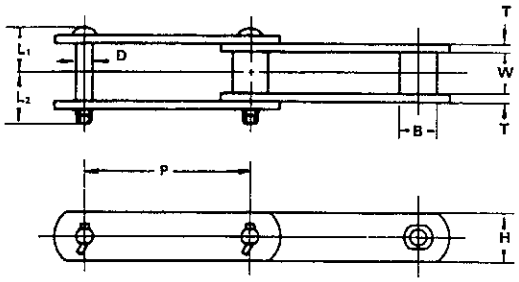
(Dimensions in mm)

TSUBAKI Chain No.	Chain Type	TSUBAKI Standard Specification	Pitch	Pin		Pitch						Average Tensile Strength	Approx. Mass
			P	D	L	T_1	T_2	T_3	H	A	B	kN(kgf)	kg/m
NF500	—	—	500	60	157.5	31	62	50	150	125	45	2940(300,000)	77

ELEVATOR CHAIN

TSUBAKI ANSI Bushed Chains for use in elevators and conveyors have been specially designed to offer maximum performance and durability. These high-strength chains are compatible with sprockets used for cast iron combination chains.

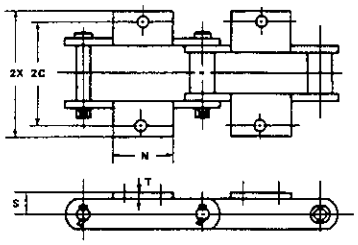
■BF TYPE CHAIN



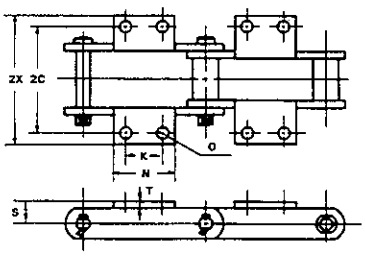
(Dimensions im mm)

TSUBAKI Chain No.	TSUBAKI Standard Specification	Pitch	Bushing		Link Plates		Pin			Average Tensile Strength kN (kgf)	Approx. Mass
		P	B	W	H	T	D	L_1	L_2		kg/m
BF188	AT	66.27	22.2	27.0	28.6	6.3	12.70	32.0	35.0	123 (12,500)	5.7
BF131	AT	78.11	31.8	33.3	38.1	9.5	15.88	41.5	44.5	186 (19,000)	12.0
BF102B	AT	101.60	25.4	54.0	38.1	9.5	15.88	52.5	55.0	186 (19,000)	10.5
BF111	AT	120.90	36.5	66.7	50.8	9.5	19.05	59.5	66.5	226 (23,000)	16.5
BF110	AT	152.40	31.8	54.0	38.1	9.5	15.88	52.5	55.0	186 (19,000)	9.7
BF150	AT	153.67	44.5	84.1	63.5	12.7	25.4	76.5	84.5	445 (45,500)	25.0

K-1 Att.



K-2 Att.



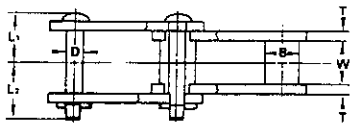
(Dimensions in mm)

Attachment Style	TSUBAKI Chain No.	Attachment							Additional Mass per Att
		C	K	S	N	X	T	O	kg/att.
K-1Att.	BF188	47.6	—	20.6	54	65	6.3	11.0	0.2
	BF131	52.4	—	28.6	72	67.5	9.5	15.0	0.35
	BF102B	60.3	—	25.4	75	82	9.5	11.0	0.4
	BF111	79.4	—	38.1	92	97	9.5	15.0	0.75
K-2Att.	BF188	53.2	31.8	20.6	54	65	6.3	9.5	0.2
	BF131	52.4	38.1	28.6	72	67.5	9.5	15.0	0.35
	BF102B	67.5	44.5	25.4	75	82	9.5	11.0	0.4
	BF111	79.4	58.7	38.1	92	97	9.5	15.0	0.75
	BF110	67.5	44.5	25.4	75	82	9.5	11.0	0.45
	BF150	95.3	69.9	47.6	108	116	12.7	15.0	1.3

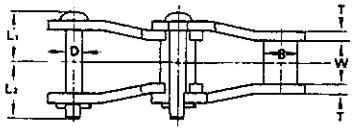
JUICE HANDLING CHAINS

Chains exposed to sugar juice are in perhaps the most corrosive section of the sugar mill. TSUBAKI's SR Chains have heat-treated pins and bushings for increased strength and greater durability with more protection against rust and corrosion than the standard cast iron pintle chain. Under severe corrosive conditions, stainless steel pins and bushings are recommended for maximum performance.
TSUBAKI recommends the MT, PT and ST Series.

■SR TYPE CHAIN



Chain Style "BF"

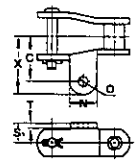


Chain Style "BO"

(Dimensions in mm)

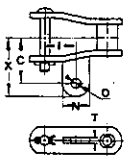
TSUBAKI Chain No.	Chain Style	TSUBAKU Standard Specification	Pitch P	Average Tensile Strength kN (kgf)	Approx. Mass kg/m	Bushing B	Bushing W	Bushing D	Bushing L_1	Bushing L_2	Link Plate T	Link Plate H
SR234	BF	GT	66.27	78.5(8,000)	5.6	22.58	27	11.32	31	34.5	6.3	28.6
SR488	BO	GT	66.27	78.5(8,000)	5.4	22.23	28.6	11.11	31.5	37.5	6.3	28.6
SR4103	BO	GT	78.11	142(14,500)	13.2	31.8	31.8	19.05	39	45.5	7.9	44.5
SR0340	BO	GT	101.6	142(14,500)	11.0	36.5	41.3	15.88	43.0	49.5	7.9	44.5
SRH124	BO	GT	101.6	142(14,500)	12.9	36.5	54	19.05	49.5	57	7.9	44.5

■ATTACHMENT



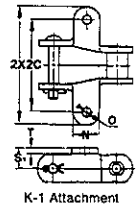
A-1 Attachment

Attachment Style	TSUBAKI Chain No.	Pitch P	Attachment S_1	C	O	X	N	T	Additional Mass per Attachment kg/att.
A-1	SR488	66.27	21.4	48.4	7	64.3	28.6	6.3	0.08



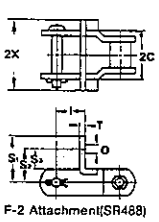
A-42 Attachment

Attachment Style	TSUBAKI Chain No.	Pitch P	Attachment C	O	X	N	I	T	Additional Mass per Attachment kg/att.
A-42	SR0340	101.6	55.56	11.1	71.5	31.8	50.8	10	0.11

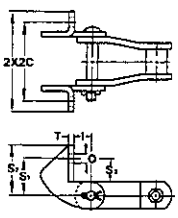


K-1 Attachment

Attachment Style	TSUBAKI Chain No.	Pitch P	Attachment S_1	C	O	X	N	T	Additional Mass per Attachment kg/att.
K-1	SR488	66.27	21.4	48.4	7	64.3	28.6	6.3	0.16



F-2 Attachment(SR488)



F-2 Attachment

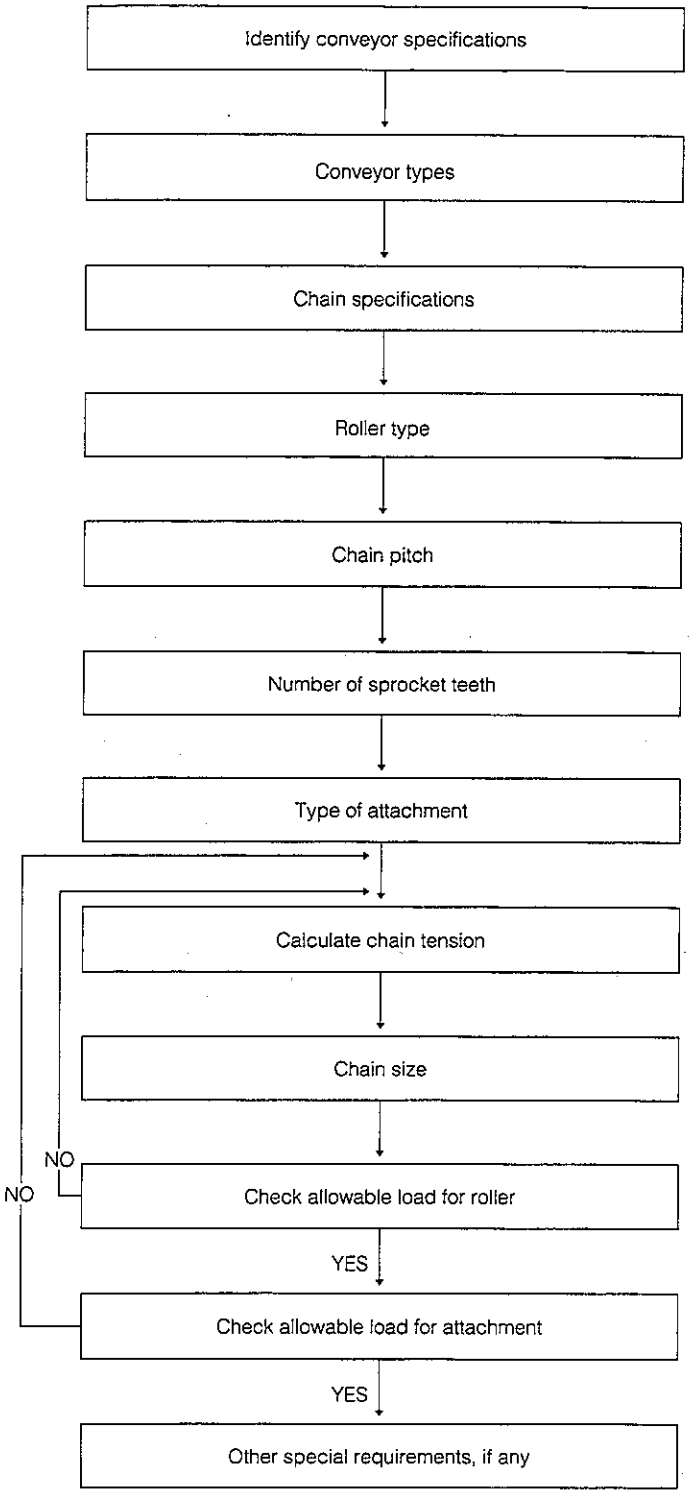
Attachment Style	TSUBAKI Chain No.	Pitch P	Attachment S_1	S_2	S_3	C	O	X	I	T	Additional Mass per Attachment kg/att.
F-2	SR488	66.27	35	50	20.7	25.8	9.5	37.5	30	6.0	0.14
	SR4103	78.11	57.75	79.3	35.5	57.1	13.5	75.8	28	7.9	0.90
	SRH124	101.6	47.75	72.8	25.4	68	12	83	30.1	7.9	0.90

TSUBAKI ENGINEERING INFORMATION

1. CHAIN SELECTION

The following are the general procedures for selecting various types of conveyor chains.

SELECTION PROCEDURE



*Please utilize INQUIRY CHART on the right.

INQUIRY CHART

Type of Conveyor:

Conveyed Material:

Corrosion:

Wear:

Temperature of Material Conveyed: ℃

Size of Material Conveyed: Max

Mass of Material Conveyed: Max kg/pc

Conveying Quantity (Bulk): Max ton/h

Conveying Quantity (Unit): Max kg

(Total mass of material conveyed on conveyor)

Center Distance Between Shafts: m

Lift: m

Number of Chain Strands: Strand (s)

Traverse Distance Between Chains: m

Average Tensile Strength: kN(kgf)

Chain Pitch: mm

Chain Speed: m/min

Attachment Type and Spacing:

Conveying Method: e.g. Material to be loaded directly to chain.

Operating Time: hrs/days

Use Lubrication: Yes/No

Motor: AC/DC kW, r/min, unit (s)

Number of Sprocket Teeth:

Bore Diameter: mm

Specifications of Boss: Type

Diameter mm

Length mm

Specifications of Keyway:

Specifications of Sprocket Teeth:

2. CONVEYOR TYPES

CONVEYOR TYPES	MATERIAL CONVEYED			
	UNIT	TYPE OF CHAIN	BULK	TYPE OF CHAIN
LOADING	Slat Conveyor	RF-B RFN RF (CT)	Apron Conveyor	RF
	Pusher Conveyor Tow Conveyor Roller Coaster	RF RFN NF RF-SR		
	Free Flow Conveyor	RF-VR RF-TR RF-SR		
	Plain Chain Conveyor	RF NF EPC RFD		
ELEVATING	Trolley Conveyor	RF	Bucket Elevator	RF B-type
	Tray Elevator	RFN RF NF	Bucket Type Continuous Unloader	Special Chain
	Tower Parking	RF Special Chain		
PUSHING OR CONVEYING WITH FRICTION			Scraper/Flight Conveyor	RF
	Pusher Conveyor	RF NF RFD	Flow Conveyor	RF NFX
	Horizontal Circulating Conveyor	RF RFN	Drag Conveyor	Special Chain

Note: Please refer to Table 1 (page 214a) for the wear and corrosive characteristics of materials conveyed.

3. CONVEYOR CHAIN SPECS

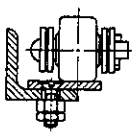
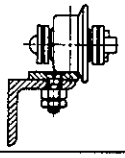
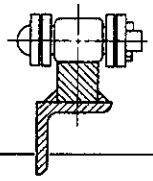
When selecting the type of conveyor chain, it is necessary to identify the physical properties of the materials conveyed. Then, the conveying method and the type of chain conveyor should be determined, considering cost performance. Three basic types of conveyor are shown on page 169a, which can be used for determining the type of conveyor chain.

Key Points in Determining the Type of Conveyor Chain

1) To reduce the running resistance of the conveyor chain when conveying material, a Loading Type Conveyor is adopted. Energy saving can be achieved with this conveyor.
   Bearing Roller Chain and CT Chain are most suitable for this application.
2) Powdery or dusty material should be conveyed in a sealed casing such as with Flow Conveyor.
3) When material conveyed is very abrasive, the conveyer should be designed to prevent the material from directly contacting the conveyor chain. If this cannot be done, the chain speed should be reduced as much as possible.
4) For very corrosive materials or atmospheres, suitable specifications for the conveyor chain should be selected. Please refer to Table 13 (page 224a).

4. ROLLER TYPE

The most suitable type of roller should be selected according to the requirements of the application.

TYPE	R roller 	F roller 	S.M.N. roller 
REMARKS	*Most basic type *Less friction *For large and heavy materials *Long center distance	*Lateral movement to be avoided *Long center distance *Less friction	*Lower cost *For light conveyor *Vertical conveyor *Shorter center distance

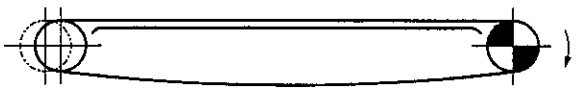
5. BASIC LAYOUT OF CONVEYOR CHAIN

Horizontal Conveyor

1) A catenary is made on the drive sprocket side.

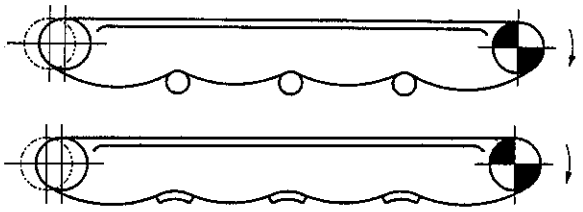
Tension of the catenary makes chain-sprocket engagement smooth.
Lubrication at the catenary is effective.

2) No guide on return side



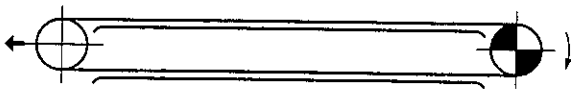
For short center distance and slow chain speed.
The mass of the chain on the return side may cause vibration and this affects chain operation.

3) To support the chain on return side by guide or roller.



Contact between chain and guide or roller may enhance wear of chain or damage chain as chain articulates at the roller or guide.
This may also cause vibration and affect chain operation.
In case of a long center distance, it is practical to divide the return side into several catenaries.
Catenary sag can absorb chain elongation/shrinkage by heat,etc.
This arrangement can be used when chain speed is comparatively slow and the catenary sag should be about 10 percent of free span. This cannot be recommended for reverse drive.

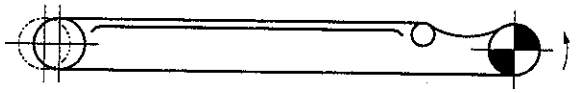
4) To support all the return side



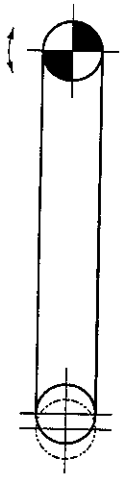
Chain sag should be adjusted regularly by take-up as there is no catenary.
This arrangement can be used for reverse drive.

Caution: If tension given by take-up is excessive, it will increase wear of chain.

5) Tension side under type.



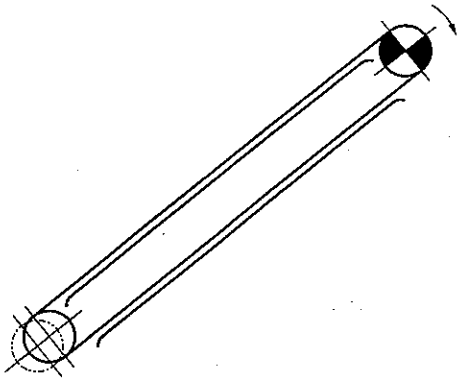
Vertical Conveyor



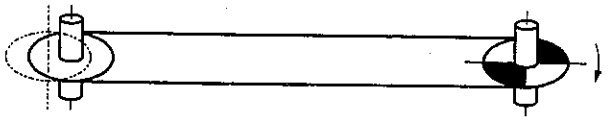
When the conveyor stops while loaded, it is necessary to install a brake or Tsubaki Back Stop Cam Clutch on the drive side.

Caution: If tension given by take-up is excessive, it will increase wear of chain.

Inclined Conveyor



Vertical Shaft Conveyor



Installation of guide roller makes chain running smoother.

6. CHAIN SPECIFICATIONS FOR CONVEYING BULK MATERIALS

Table 1 shows popular types of conveyor and recommended chain specifications. The properties of the listed material are not always the same. Type of conveyor and specifications of chain should be determined taking this point and past performance into consideration.

Table 1 Material and Chain Specifications

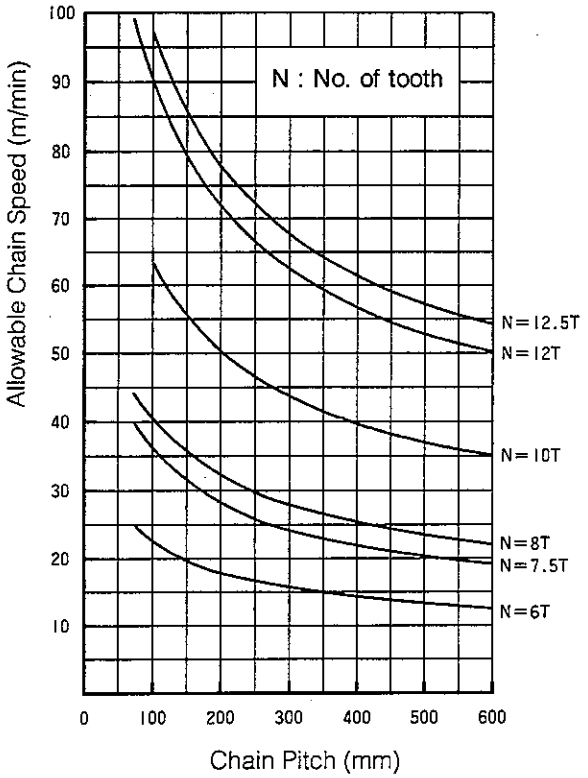
Material	Abrasiveness	Corrosiveness	Type of Conveyor				Recommended Chain Series
			Scraper	Flow	Apron	Bucket	
Rice	C	C	○	○		○	DT
Barley	C	C	○	○		○	DT
Wheat	C	C	○	○		○	DT
Soybean	C	C	○	○		○	DT
Maize	C	C	○	○		○	DT
Wheat Flour	C	C	○	○		○	DT
Starch	C	C	○	△		△	DT
Suger Cane	C	C	○		○		GT
Bagasse	C	C	○				GT
Sugar	C	C	○	○		○	ST
Rock Salt	C	C	○	△		△	DT
Mixed Feed	C	B	○	△		△	DT
Soda Ash	B	E	○	△		△	DT
Carbide	B		○	○	○	○	DT
Glauber's Salt	B	B		△			PT
Dry Unslaked Lime	B	E	○	△		△	DT
Dry Slaked Lime	C	E	○	△		△	DT
Polyethylene	B	C	○	△		△	DT
Vinyl Chloride Powder	B			△		△	MT
Carbon	B	C	○	△		△	BT
Activated Charcoal	B	C	○	△		△	DT
Dry Ammonium Sulfate	B	B	○	△		△	DT
Dry Ammonium Chloride	C	C	○	△		△	DT
Dry Urea Powder	C	C	○	△		△	DT
Wet Urea Powder	B	E	○	△		△	NT
Synthetic Detergent	B	C	○	△		△	DT
Wet Gypsum	B	A	○	○		○	PT/RT
Dolomite	B	D	○	△	○	△	DT(*GT)
Dry Limestone	B	D	○	△	○	△	DT(*GT)
Dry Clay	B	C		△		△	ET
Cement Clinker	A	E	○	△	○	△	CT
Cement Products	B	E		○		○	CT
Dry Wood Chips	C	D	○	△			DT
Dry Sawdust	C	D	○	△			DT
Coal	B	B	○		○		CT
Coke	A	C			○	△	BT
Alumina	B	E		△		△	CT
Foundry Sand	A	C	○		△		BT
Scale	B	C	○	△		△	BT
Coke Dust	A	C		△			BT
Wet Coal Dust	B	B		△			RT
Clinker Dust	A	E		△			BT
Garbage	B		△		○		RT
Dry Incinerated Garbage (Room Temperature)	C	D	○				GT
Wet Incinerated Garbage	C	D	○				RT

Note: Abrasiveness - A B C
Corrosiveness - A (Strong acid), B (Moderate acid), C (Neutral), D (Moderate alkali), E (Strong alkali)
Type of Conveyor - ○(Common), △(Sometimes), Blank (Seldom)
*GT in case of Apron Conveyor

7. CHAIN PITCH AND NUMBER OF SPROCKET TEETH

1) Smoother chain operation can be expected as the number of sprocket teeth increases. This means that for a sprocket with the same outer diameter, a shorter pitch chain can operate more smoothly due to a reduction in the polygonal speed fluctuation or less articulating angle of chain on the sprocket. This also results in less wear between pin and bushing.
2) Longer pitch chain, though more expensive per link, would be cheaper for a unit length of chain in general.
   Chain pitch for Unit Conveyor is determined by unit size or attachment spacing.
   (Example) Attachment spacing = 2 m
   *Chain pitch = 100, 200, 250
   *Chain pitch can be selected by dividing attachment spacing by an even number.
3) The chain pitch for Bulk Conveyor is determined not only by material itself, but also by conveyor capacity. Conveyor capacity is determined by sizes of bucket, apron, scraper, etc. Chain pitch is in turn determined by these sizes.
4) Space limitation should also be kept in mind when selecting sprocket.
5) Chain pitch relates to the number of sprocket teeth and chain speed shown in Table 2.

Table 2 : Chain Pitch and Allowable Chain Speed



8. TYPE OF ATTACHMENT

Please refer to pages 176a—178a.

9. CALCULATE CHAIN TENSION

Maximum static tension to chain, T max, during operation can be calculated using the formulas in Table 3. The formulas are based on mass M (weight W) X friction factor. In the following cases, inertia becomes very large, and the tension and required kW should be calculated while considering the inertia.

Sudden start or stop in high speed conveyor
Sudden load in pusher conveyor, etc.

9. 1 Terms

T_{max} : Maximum static tension to chain : kN (kgf)
T : Static tension to chain : kN (kgf)
Q : Maximum conveying quantity : t/h (tf/h)
V : Chain speed : m/min
H : Center distance between sprockets (Vertical) : m
L : 〃 (Horizontal) : m
C : 〃 (Inclined direction): m
m (W) : Mass (weight) of conveying device (Chain X Strands, Buckets, Apron, etc.): kg/m (kgf/m)
f_1 : Friction factor between chain and guide rail (Tables 5 and 6)
f_2 : Friction factor between material conveyed and casing (Table 7)
f : Material to be loaded directly to chain : f=1
Material to be scraped : $f=\frac{f_2}{f_1}$
g : Gravity accelaration : 9.80665m/s²
M(W) : Mass (Weight) of material conveyed : kg/m (kgf/m)
(Bulk)

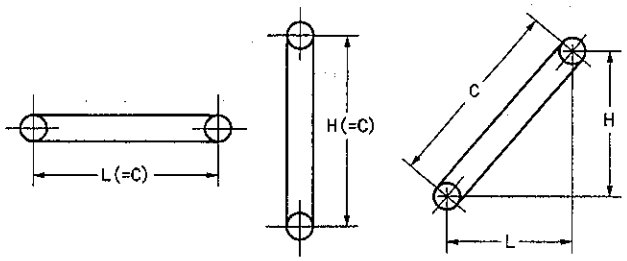
$$M=*16.7 \times \frac{Q}{V} \quad (w=16.7 \times \frac{Q}{V})$$

(Unit)

$$M=\frac{\text{Mass of material conveyed (kg/pc)}}{\text{Loading spacing (m)}}$$

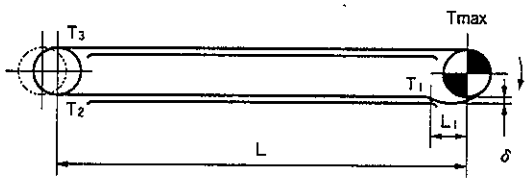
$$(W=\frac{\text{Weight of material conveyed (kgf/m)}}{\text{Loading spacing (m)}})$$

* Factor to get mass (weight) per meter. $16.7=\frac{1000}{60}$



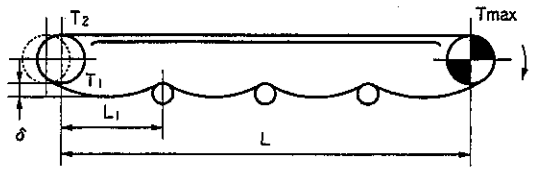
9.2 Calculate Chain Tension (Table 3)

Horizontal Conveyor



SI Unit	Gravimetric Unit
$T_1=1.35^{*1}\times m\times L1\times\frac{g}{1000}$ (kN)	$T_1=1.35\times\omega\times L_1$ (kgf)
$T_2=(L-L_1)\times m\times f_1\times\frac{g}{1000}+T_1$ (kN)	$T_2=(L-L1)\times\omega\times f_1+T_1$ (kgf)
$T_3=1.1^{*2}\times T_2$ (kN)	$T_3=1.1\times T_2$ (kgf)
$T_{MAX}=(M\times f+m)\times L\times f_1\times\frac{g}{1000}+T_3$ (kN)	$T_{MAX}=(W\times f+\omega)\times L\times f_1+T_3$ (kgf)

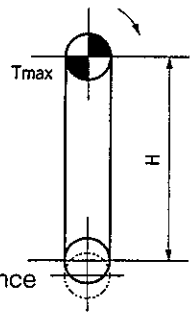
*1) Refer to Table 4
*2) 1.1 is for increase of tension at driven sprocket.



$T_1=1.35\times m\times L_1\times\frac{g}{1000}0.1^{*}\times m\times L\times\frac{g}{1000}$ (kN)	$T_1=1.35\times\omega\times L_1+0.1^{*}\times\omega\times L$ (kgf)
$T_2=1.1\times T_1$ (kN)	$T_2=1.1\times T_1$ (kgf)
$T_{MAX}=(M\times f+m)\times L\times f_1\times\frac{g}{1000}+T_2$ (kN)	$T_{MAX}=(W\times f+\omega)\times L\times f_1+T_2$ (kgf)

※ 0.1 is coefficient of roller resistance at return side.

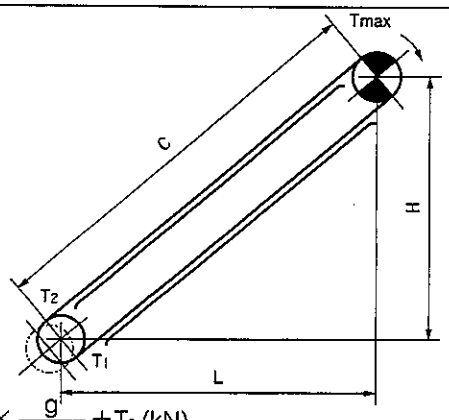
Vertical Conveyor



$T_{MAX}=(M+m)\times H\times\frac{g}{1000}$ (kN)	$T_{MAX}=(W\times\omega)\times H$ (kgf)

Note : In bucket elevator, 1 m is added to center distance (H) for shock load at loading material.

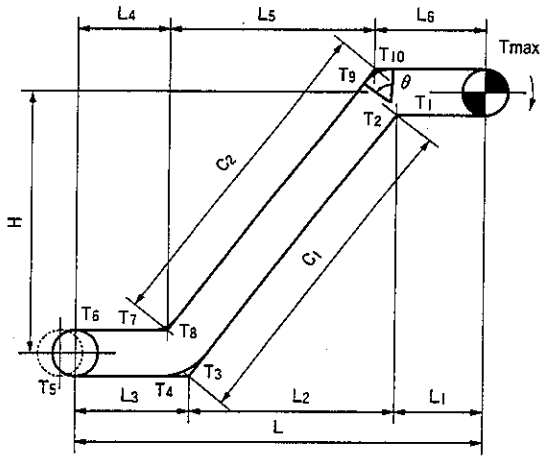
Inclined Conveyor



$T_1=m(Lf_1-H)\times\frac{g}{1000}$ (kN)	$T_1=w(Lf_1-H)$ (kgf)
When $T_1<O$, $T_2=0$	When $T_1<0$, $T_2=0$
$T_2=1.1\times T_1$ (kN)	$T_2=1.1\times T_1$ (kN)
$T_{MAX}=M(Lf1\times f+H)\times\frac{g}{1000}+m\,(Lf_1+H)\times\frac{g}{1000}+T_2$ (kN)	$T_{MAX}=W(Lf_1\times f+H)+w(Lf_1+H)+T_2$ (kgf)

SI Unit

Practical Example



$T_1=m\times L_1\times f_1\times \frac{g}{1000}$ (kN)

$T_2=T_1\times kc_1$ (kN)

$T_3=m(L_2f_1-H)\times \frac{g}{1000}+T_2$ (kN)

$T_4=T_3\times kc_2$ (kN)

when $T_3<0$, $T_4=0$

$T_5=m\times L_3\times f_1\times \frac{g}{1000}$ (kN)

$T_6=1.1\times T_5$ (kN)

$T_7=(m+M\times f)\times L_4\times f_1\times \frac{g}{1000}+T_6$ (kN)

$T_8=T_7\times kc_3$ (kN)

$T_9=M(L_5f_1\times f+H)\times \frac{g}{1000}+m(L_5f_1+H)\times \frac{g}{1000}+T_8$ (kN)

$T_{10}=T_9\times kc_4$ (kN)

$T_{MAX}=(m+M\times f)\times L_6\times f_1\times \frac{g}{1000}+T_{10}$ (kN)

Gravity Unit

Corner Factor (kc) θ : Radian

f1 \ Angle	30°	60°	90°	120°	180°
0.03	1.02	1.03	1.05	1.06	1.10
0.10	1.05	1.11	1.17	1.23	1.37
0.15	1.08	1.17	1.27	1.37	1.60
0.20	1.11	1.23	1.37	1.52	1.87
0.24	1.13	1.29	1.46	1.65	2.13
0.30	1.17	1.37	1.60	1.87	2.57
0.40	1.23	1.52	1.87	2.31	3.51

$T_1=\omega\times L_1\times f_1$ (kgf)

$T_2=T_1\times kc_1$ (kgf)

$T_3=\omega(L_2f_1-H)+T_2$ (kgf)

$T_4=T_3\times kc_2$ (kgf)

when $T_3<0$, $T_4=0$

$T_5=\omega\times L_3\times f_1$ (kgf)

$T_6=1.1\times T_5$ (kgf)

$T_7=(\omega+W\times f)\times L_4\times f_1+T_6$ (kgf)

$T_8=T_7\times kc_3$ (kgf)

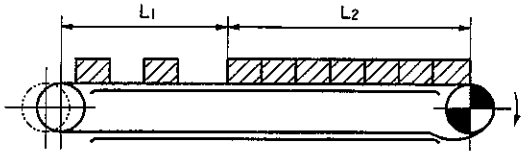
$T_9=W(L_5f_1\times f+H)+w(L_5f_1+H)+T_8$ (kgf)

$T_{10}=T_9\times kc_4$ (kgf)

$T_{MAX}=(\omega+W\times f)\times L_6\times f_1+T_{10}$ (kgf)

Example using Double Plus Chain

$T_{MAX}=2.1m(L_1+L_2)f_1\times \frac{g}{1000}+(M\times L_1\times f_1)\times \frac{g}{1000}+(M_1\times L_2\times f_3\times \frac{g}{1000})$ (kN)



$T_{MAX}=2.1\omega(L_1+L_2)f_1+(W\times L_1\times f_1)+(W_1\times L_2\times f_3)$ (kgf)

L_1 : Length of conveying section (m)
L_2 : Length of accumulating section (m)
$M_1(W_1)$: Mass of material conveyed at accumulating section (kg)
Weight of material conveyed at accumlating section (kgf/m)
f_1 : Friction factor between chain and rail at conveying material = 0.05
f_3 : Friction factor at accumulation=0.2

Static tension to chain varies with layouts as follows:-

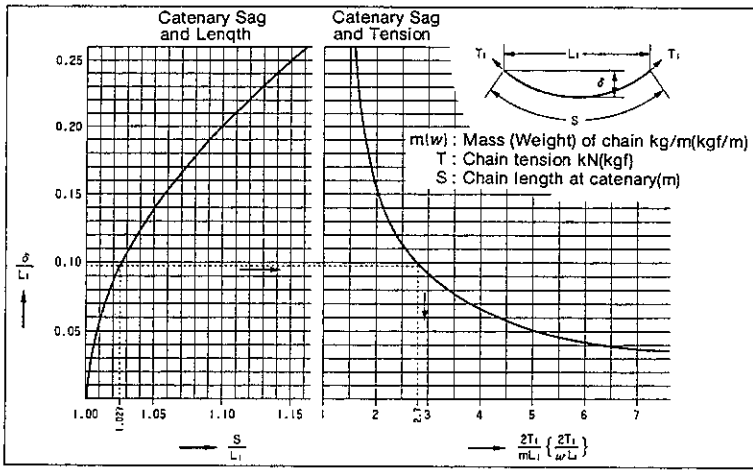
Horizontal $T=T_{MAX}-T_1$

Vertical $T=T_{MAX}-mH\times \frac{g}{1000}$ $\{T=T_{MAX}-\omega H\}$

Inclined $T=T_{MAX}-m(Lf_1-H)\times \frac{g}{1000}$ $\{T=T_{MAX}-\omega(Lf_1-H)\}$

When $Lf_1-H<0$, $T=T_{MAX}$

Table 4 : Catenary Tension Graph



Catenary Tension

$T_1 = 1.35 \times m \times L_1 \times \frac{g}{1000}$ (kN)

1.35 factor in the above formula is worked out as follows:

When catenary sag is 10%, $\delta = 0.10L$

Then from the graph

$\frac{\delta}{L_1} = 0.10 \rightarrow \frac{2T_1}{mL_1} = 2.7 \quad T_1 = 1.35 \times m \times L_1 \times \frac{g}{1000}$

Chain Length at Catenary

$\frac{\delta}{L_1} = 0.10 \rightarrow \frac{S}{L_1} = 1.027$

$S = 1.027L_1$

Table 5: Rolling Friction Factor f_1 Between Chain And Rail

Roller diameter	Lubricated		Dry	
	R.F	S.M.N.	R.F	S.M.N.
D<65	0.08	0.16	0.15	0.24
65≦D<100	0.08	0.15	0.14	0.23
100≦D	0.08	0.14	0.13	0.22
RF214(exception)	0.12	0.15	0.18	0.22

Conditions: Clean and room temperature
Lubricant ISO VG100 (SAE30-40)

The friction factor f1 between top roller and material conveyed is the same as that of R roller in the above.

Series	f_1
Plastic Roller Series Plastic Sleeve Series	0.08 (Dry)
Bearing Roller Series	0.03 (Lubricated)
Bearing Bush Series	0.14 (Lubricated) 0.21 (Dry)

Table 6: Sliding Friction Factor f_1 Between Chain And Rail

Temperature of conveyed material	Lubricated	Dry
Room temperature−400°C	0.20	0.30
400°C−600°C	0.30	0.35
600°C−800°C	0.35	0.40
800°C−1000°C	·····	0.45

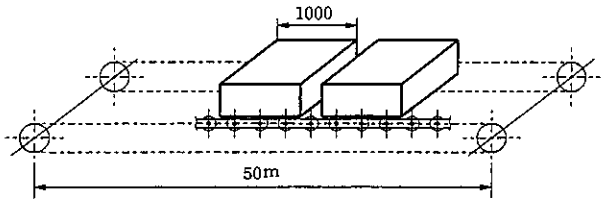
Table 7: Friction Factor f_2 Between Material Conveyed And Casing

Material	f_2	Apparent specific gravity (g/cc)
Scale	0.67	1.54
Red iron ore	0.47	2.99
Pyrites	0.58	1.54
Slag	0.48	0.90
Scrap	0.73	0.54
Lead ore powder	0.77	3.26
Zinc ore powder	0.79	1.93
Nickel ore powder	0.45	0.92
Chrome powder	0.51	1.14
Alumina	0.55	0.83
Magnesium	0.84	1.48
Gypsum	0.64	0.77
Quartz powder	0.55	1.24
Feldspar	0.55	1.36
Dolomite	0.54	1.62
Clay	0.63	0.77
Molding sand	0.41	1.59
Phosphate rock	0.42	1.51
Quicklime	0.46	1.53
Slaked lime	0.63	0.69
Asbestos	0.58	0.19
Limestone	0.47	0.35−0.55
Cement	0.54	0.60−0.75
Cement clinker	0.46	1.30
Charcoal	0.41	0.44
Carbon	0.53	0.30
Pitch	0.41	0.70
Soda ash	0.45	0.52
Alum	0.63	1.01
Polyethylene	0.52	0.34
Rubber powder	0.53	0.39
Soap material	0.27	0.65
Urea	0.63	0.64
Ammonium chloride	0.79	0.67
Calcium chloride	0.43	0.68
Surphurated calcium	0.64	1.01
Calcium carbonate	0.49	0.88
Wood chips	0.74	0.36
Rice	0.40	0.77
Barley	0.71	0.39
Wheat	0.43	0.73
Soybean	0.41	0.68
Corn	0.40	0.71
Starch	0.57	0.71
Sugar	0.47	0.68
Rock salt	0.57	1.09
Mixed feed	0.50	0.55
Coal		0.30−0.70
Coke		0.35−0.70

10. EXAMPLES OF CHAIN SELECTION

10.1 Bearing Roller Conveyor Chain

1) Conditions



Chain speed : 10 m/min
Material conveyed : 2000 kg/pc ×40 pcs
Chain strand : 2
Chain pitch : 250 mm
"F" roller, A2 attachment

Standard Chain (DT) is selected tentatively.

2) Selection

1. Roller Load

No. of rollers = $\frac{\text{Length of material}}{\text{Chain pitch}} = \frac{1000}{250}$ = 4 pcs

4 pcs X 2(strands) = 8 pcs

Considering uneven load, if only 4 rollers receive load, roller load per roller is :

2000 X $\frac{g}{1000}$ X 1/4 = 4.9 kN (500 kgf)/pc

From Table 10, the following chains can be selected:

Bearing Roller Chain = RF12250BF − 1LA2

RF Standard Chain = RF26250F − 1LA2

2. Allowable Loading Mass on Conveyor

Due to simplified selection, tension of conveyor weight and starting impact is not considered in the following procedure.

2000 kg X 40 pcs/2 strands = 40000kg

From the table below, RF10ton type Bearing Roller Chain and RF17ton type RF Conveyor Chain can be selected.

Allowable Loading Mass Quick Reference Table

Conditions: Horizontal Conveyor, Safety Factor = 7, Friction Fractor = RF type: 0.08, Bearing Roller Chain:0.03

(kg/strand)

Chain Size	RF Chain (DT)	Bearing Roller Chain (DT)
RF 03	5400	14000
RF 05	12500	33300
RF 08 · 450	14300	36700
RF 10	20500	53300
RF 12	33900	90000
RF 17	44600	116700
RF 26	57100	150000
RF 36	86600	230000
RF 60	91100	–
RF 90	143800	–
RF120	201800	–

From the comparison between allowable roller load and allowable loading mass, chain should be selected from allowable roller load as follows:

Bearing Roller Chain = RF12250F − 1LA2 (DT)

RF Standard Chain = RF26250F − 1LA2 (DT)

3. Motor Size

Motor kW = $\frac{TXV}{54.5}$ X 1/η

Bearing Roller Chain (When f = 0.03 and η = 0.85)

T = 2000 kg X g/1000 X 40 pcs X 0.03 = 23.5 kN (2400 kgf)

kW = $\frac{23.5 \text{ X } 10}{54.5}$ X 1/0.85 = 5.1kW

RF Standard Chain (When f = 0.08 and η = 0.85)

T = 2000 kg X g/1000 X 40 pcs X 0.08 = 62.8 kN (6400 kgf)

kW = $\frac{62.8 \text{ X } 10}{54.5}$ X 1/0.85 = 13.6kW

10.2 Conveyor Type: Horizontal Slat Conveyor

Material conveyed: Carton Box
Mass of material conveyed: 40 kg/pc
Slat mass : 2 kg/pc Chain strand: 2 strands
Loading spacing: One carton box/m
Center distance: 30 m
Chain speed: 15 m/min
Sprocket: 12T
Chain spec.: Pitch = 100 mm, A2 att attachment every link F roller
Others: No lubrication

The following are calculated or selected:-

(1) Required chain quantity in links
(2) Chain size at safety factor 10
(3) Drive sprocket torque
(4) Required kW

1) Required Chain Quantity in Link (n)

n = (30000/100 X 2 + 12) X 2 = 612 X 2 = 1224 links

2) Chain Size at Safety Factor 10

From the above conditions and Table 5, tension T_1 required to convey only carton boxes is:

T_1 = 1200 X g/1000 X 0.15 = 1.77 kN

(T_1 = 1200 X 0.15 = 180 kgf)

Tension T_2 required to convey only slats is:-

Slat Mass = 2 X 1000/100 = 20 kg/m

T_2 = 2.1 X 20 X 30 X g/1000 X 0.15 = 1.85 kN

(T_2 = 2.1 X 20 X 30 X 0.15 = 189 kgf)

$T_1 + T_2$ = 1.77 + 1.85 = 3.62 kN

($T_1 + T_2$ = 180 + 189 = 369 kgf)

Tentatively select *RF03100F − 1LA2 to calculate tension T_3 required to move only chain.

A.T.S = 29 kN/strand X 2 strands = 58 kN (6000 kgf)

T_3 = 2.1 X (2.4 X 2 + $\frac{0.06}{100/1000}$ X 2) X 30 X g/1000 X 0.15 = 0.56 kN

(2.4 = Chain mass, 0.06 = Attachment mass, 2 = 2 strands, 100 = pitch, 1000 = To convert to mass per meter)

(T_3 = 2.1 X (2.4 X 2 + $\frac{0.06}{100/1000}$ X 2) X 30 X 0.15 = 426 kgf)

Safety Factor when RF03100F 1LA2 is used is:

$T=T_1+T_2+T_3=1.77+1.85+0.56=4.18$ kN

$(T=T_1+T_2+T_3=180+189+56.7=426$ kgf)

$Sf=\frac{29 \times 2}{4.18}=14$ $(Sf=\frac{3000 \times 2}{426}=14)$

Allowable roller load and allowable attachment load are satisfied with RF03100F 1LA2.

3) Drive Sprocket Torque: Tr

PCD=386.4 mm

$Tr=4.18 \times 386.4 \times 1/2 \times 1/1000=0.8$ kN·m

$(Tr=426 \times 386.4 \times 1/2 \times 1/1000=82.3$ kgf·m)

4) Required kW

$kW=\frac{4.18 \times 15}{54.5} \times 1/0.85=1.35$ kW

$(kW=\frac{426 \times 15}{5565} \times 1/0.85=1.35$ kW)

10.3 Conveyor Type: Continuous Vertical Bucket Elevator

Lift distance: 30 m
Chain spec.: Pitch=250, G4 attachment. at every 2nd link, S roller, Bucket elevator chain
Conveyor capacity: 100 ton/hour
Chain speed: 28 m/min
Sprocket: 12T
Mass of bucket: 25 kg/pc

The following are calculated or selected:-

(1) Required chain quantity in links

(2) Chain size at Safety Factor 10 or over

(3) Drive sprocket torque

(4) Required kW

1) Required Chain Quantity in Links (n)

$n=(30000/250 \times 2+12) \times 2=252 \times 2=504$ links

2) Chain Size

Tension T required to convey only material is:

$T_1=16.7 \times 100/28 \times (30+1) \times g/1000=18.1$ kN

$(T_1=16.7 \times 100/28 \times (30+1)=1849$ kgf)

Tension T required to convey only buckets is:-

Mass of Bucket=25 kg X 2=50 kg/m

$T_2=50 \times g/1000 \times (30+1)=15.2$ kN

$(T_2=50 \times (30+1)=1550$ kgf)

$T_1+T_2=18.1+15.2=33.3$ kN

$(T_1+T_2=1849+1550=3399$ kgf)

Tentatively select*B17250S 2LG4 (15 kg/m) to calculate tension T_3 required to move only chain.

A.T.S.=245 X 2=490 kN

(25000 X 2=50000 kgf)

$T_3=15 \times 2 \times (30+1) \times g/1000=9.12$ kN

$(T_3=15 \times 2 \times (30+1)=930$ kgf)

$T=T_1+T_2+T_3=18.1+15.2+9.12=42.4$ kN

$(T=T_1+T_2+T_3=1849+1550+930=4329$ kgf)

Safety Factor when B17250S 2LG4 is used is:

$Sf=490/42.4=11.6$ $(Sf=50000/4329=11.6)$

B17250S 2LG4 can be selected.

3) Drive Sprocket Torque: Tr

In vertical bucket elevator, mass of chain and bucket are counterbalanced. From this, tension related to torque and kW is only tension T.

PCD=965.9 mm

$Tr=18.1 \times (965.9 \times 1/2) \times 1/1000=8.74$ kN/m.

$(Tr=1849 \times (965.9 \times 1/2) \times 1/1000=893$ kgf/m)

4) Required kW

$kW=\frac{18.1 \times 28}{54.5} \times 1/0.85=10.9$ kW

$(kW=\frac{1849 \times 28}{5565} \times 1/0.85=10.9$ kW)

Calculation of Required kW

1 kW=1 kW·m/s (1 kW=102kgf·m/s)

$kW=\frac{T \times V}{60}$ $(kW=\frac{T \times V}{102 \times 60})$

Supposed power transmission loss due to rotating friction of sprocket, engagement of chain and sprocket, etc. is about 10%. (1/0.9=1.1)

η =Mecanical efficiency of drive unit

$kW=\frac{T \times V}{60} \times 1.1 \times \frac{1}{\eta}$

$(kW=\frac{T \times V}{102 \times 60} \times 1.1 \times \frac{1}{\eta})$

11.CHAIN SIZE

Multiply tension TMAX calculated with formulas in Table 3 by Safety Factors in Table 8 for required tensile strength, and then select chain which satisfies the strength.

Chain Tension TMAX: kN(kgf) X 1/Chain Strands X Chain Speed-Temperature Safety Factor (Kv) X Operation Time Factor (Ks)

≦ Average Tensile Strength kN (kgf)

Notes:

1) When there are any regulations, guidelines, etc. effecting chain selection, select chain based on the regulation and the Safety Factor Selection explained in this page. Then take the larger or stronger chain.
2) When a conveyor consists of multiple strands of chain, correct the number of strands in the above formula to allow for uneven load to the chain.
3) In the following applications, chain life is reduced to 1/2 - 1/10. Determine safety factor referring to clause 14.

CONSIDERATIONS FOR SPECIAL ENVIRONMENTS

1. Short distance transportation of heavy load
2. Exposure of chain to abrasive, adhesive and corrosive material
3. High temperature environments
4. High humidity
5. No lubrication

4)Bearing Roller Chain, Plastic Sleeve chain, Bearing Bush Chain and EPC78 to be selected by allowable tension.

Table 8: Chain Speed-Temperature Safety Factor Kv conditions: Clean environment and well lubricated.

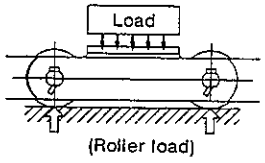
Chain Series / Temperature / Chain Speed m/min	Standard Series		Reinforced Series				Stainless Steel 400 Series				Stainless Steel 300 Series			
	Under 100	100–200	Under 100	100–200	200–300	300–400	Under 100	100–200	200–300	300–400	Under 100	100–200	200–300	300–400
Over 50–Under 60 (incl.) 50–60	10		10				14				16			
Over 40–Under 50 (incl.) 40–50	9		9				13				15			
Over 30–Under 40 (incl.) 30–40	8	10	8	10			12	12			14	14		
Over 20–Under 30 (incl.) 20–30	7	9	7	9	10		11	11	12		13	13		
Under 20 (incl.) 20	7	8	7	8	9	10	10	10	10	10	12	12	12	12

Table 9: Operation Time Factor Ks

Operation Time h/day	Ks
Less than 10 hours	1.0
10 to 24 hours	1.2

12. ALLOWABLE ROLLER LOAD UNDER LUBRICATED CONDITIONS

Allowable load per roller under luricated condition in loading type conveyor is as per Table 10. Where A2 attachment is used, its allowable load should be compared to that of roller, and smaller value to be taken. Tensile strength 400N/mm²(41kgf/mm²) is minimum requirement for guide rail. Allowable roller load should also be checked when corner rail is set up in a conveyor.



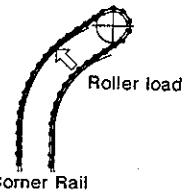
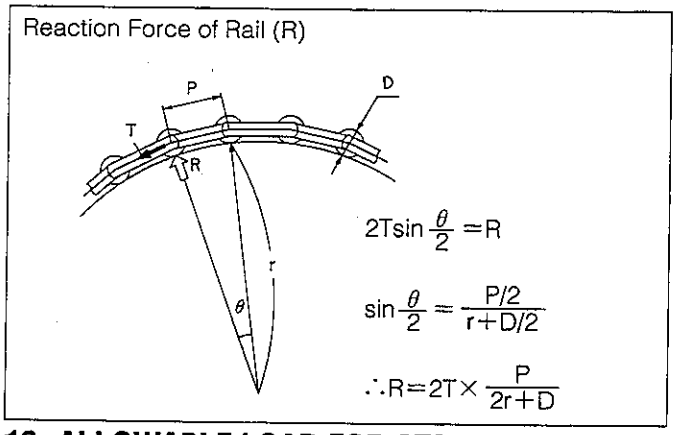


Table 10: Allowable Roller Load Under Luricated Conditions kN(kgf)/pc

Chain Size	R,F		S,M,N, Roller (Heat Treated)	Plastic Roller Series	Bearing Roller Series		Bearing Bush Series
	Standard Series	Reinforced Series			R Roller	F Roller	
RF03075	0.54	0.88	0.54	0.88	1.96	1.27	0.54
RF03100	(55)	(90)	(55)	(90)	(200)	(130)	(55)
RF430	0.93 (95)	1.57 (160)	0.93 (95)	—	—	—	—
RF05075							
RF05100	1.03	1.72	1.03	1.42	2.94	1.96	1.03
RF05125	(105)	(175)	(105)	(145)	(310)	(200)	(105)
RF05150							
RF204	—	—	1.27 (130)	—	—	—	—
RF450	1.27 (130)	2.11 (215)	1.27 (130)	2.06 (210)	4.12 (420)	2.65 (270)	—
RF08125	1.27	2.11	1.27	—	4.12	2.65	—
RF08150	(130)	(215)	(130)		(420)	(270)	
RF650	1.42 (145)	2.35 (240)	1.42 (145)	—	—	—	—
RF10100							
RF10125	1.77	2.94	1.77	2.45	5.49	3.43	1.77
RF10150	(180)	(300)	(180)	(250)	(560)	(350)	(180)
RF214	2.11 (215)	3.58 (365)	2.11 (215)	—	—	—	—
RF205	—	—	2.50 (255)	—	—	—	—
RF6205	2.50 (255)	4.17 (425)	2.50 (255)	—	—	—	—
RF12200	2.50	4.17	2.50	—	8.34	5.49	2.50
RF12250	(255)	(425)	(255)		(850)	(560)	(255)
RF212	2.89 (295)	4.85 (495)	2.89 (295)	—	—	—	—
RF17200							
RF17250	4.02	6.67	4.02	—	14.1	9.81	4.02
RF17300	(410)	(680)	(410)		(1440)	(1000)	(410)
RF26200							
RF26250	5.30	8.83	5.30	—	19.6	13.7	5.30
RF26300	(540)	(900)	(540)		(2000)	(1400)	(540)
RF26450							
RF36250							
RF36300	7.45	12.4	7.45	—	27.5	18.6	7.54
RF36450	(760)	(1260)	(760)		(2800)	(1900)	(760)
RF36600							
RF52300							
RF52450	9.81	16.6	9.81	—	—	—	—
RF52600	(1000)	(1690)	(1000)				
RF60300							
RF60350	10.8	18.1	10.8	—	—	—	—
RF60400	(1100)	(1850)	(1100)				
RF90350							
RF90400	15.2	25.5	15.2	—	—	—	—
RF90500	(1550)	(2600)	(1550)				
RF120400	19.6	33.3	19.6	—	—	—	—
RF120600	(2000)	(3400)	(2000)				



13. ALLOWABLE LOAD FOR STANDARD "A" ATTACHMENT

Allowable vertical load for A type attachment is as per Table 11. Where the load works with roller, allowable roller load should be compared to that of attachment, and smaller value to be taken. When "A" attachment receives twisting force, please consult TSUBAKI.

Table 11: Allowable Load For "A"Attachment kN(kgf)/pc

Chain Size	Standard Series DT	Reinforced Series AT
RF03075	0.78 (80)	1.18 (120)
RF03100	0.93 (95)	1.42 (145)
RF430	1.57 (160)	2.35 (240)
RF05075	1.03 (105)	1.57 (160)
RF05100	1.32 (135)	1.96 (200)
RF05125	1.52 (155)	2.26 (230)
RF05150	1.72 (175)	2.55 (260)
RF204	1.08 (110)	1.62 (165)
RF450	2.16 (220)	3.24 (330)
RF08125	2.45 (250)	3.68 (375)
RF08150	2.79 (285)	4.17 (425)
RF650	2.35 (240)	2.35 (240)
RF10100	2.06 (210)	3.09 (315)
RF10125	2.30 (235)	3.48 (355)
RF10150	2.60 (265)	3.92 (400)
RF214	3.24 (330)	4.81 (490)
RF205	2.40 (245)	3.63 (370)
RF6205	3.68 (375)	4.31 (440)
RF12200	4.41 (450)	5.30 (540)
RF12250	5.30 (540)	5.30 (540)
RF212	4.95 (505)	5.88 (600)
RF17200	4.85 (495)	5.74 (585)
RF17250	6.72 (685)	6.86 (700)
RF17300	2.21 (225)	2.21 (225)
RF26300	4.61 (470)	4.61 (470)
RF26450	6.67 (680)	6.67 (680)
RF36450	6.86 (700)	6.86 (700)
RF36600	8.63 (880)	8.63 (880)
RF52450	9.71 (990)	9.71 (990)
RF52600	12.1 (1230)	12.1 (1230)
RF60300	5.49 (560)	5.49 (560)
RF60350	7.06 (720)	7.06 (720)
RF60400	8.34 (850)	8.34 (850)
RF90350	6.47 (660)	6.47 (660)
RF90400	8.29 (845)	8.29 (845)
RF90500	12.3 (1250)	12.3 (1250)
RF120400	6.33 (645)	6.33 (645)
RF120600	12.7 (1290)	12.7 (1290)

Note: Please multiply "A" by two for "K" attachment.

14.CONSIDERATIONS FOR SPECIAL ENVIRONMENTS

Special environments mean the following conditions:-
- high temperature
- low temperature
- high humidity
- high dust
- high chemical reactions

Combinations of the above conditions often exist where chain is used. Therefore, to achieve satisfactory chain life, it is important that to select adequate material.

14.1 At Low Temperatures

When chain is used at low temperatures, the following should be considered.

(1) Low temperature brittleness of material.
In general, steel materials become brittle at low temperatures depending on chemical composition, etc. RF Conveyor Chain should not be used at temperatures lower than those specified in Table 12.

Table 12: Applicable Lowest Temperature

RF Conveyor Chain	Lowest Temperature
Standard Series (DT)	−20°C
Reinforced Series (AT)	−60°C
400 Stainless Series (NT, PT)	−70°C
300 Stainless Series (ST)	−100°C

Note: Please consult TSUBAKI about safety factor.

(2) Freezing of chain.
Freezing between pin and bushing, inner and outer linkplates, or bushing and roller will cause an excessive load on chain and drive unit. Freezing should be avoided by generally filling gaps between parts with lubricant which does not freeze at the temperapture the chain is used in. For this purpose, silicon grease is recommended.

14.2 At High Temperatures Over 400℃

Strength of chain decreases as temperature of chain increases by being heated up by the heat of material conveyed or environment. Limits to use of each chain are determined by temperature of chain and material. For Safety Factor at temperature up to 400℃, please refer to Table 8, and for over 400℃, please consult with TUBAKI.

Points Concerning Heated Chain
(1) Friction factor gets larger than usual.
(2) There is a possibility to cause heat fatigue when different materials have been welded, due to the difference of heat expansion coefficient.
(3) In environments at temperatures over 400℃, heat expansion and clearance are to be considered.
(4) Creep breakage
(5) High temperature brittleness
(6) Carbide precipitation brittleness
(7) Effect of fluctuating temperatures (cooling and expansion)

Points Conceming Lubricant
(1) Heat resistance of silicon, graphite and molybedenum disulphide oil are superior.

14.3 Abrasiveness

Points Concerning Abrasive Conditions
(1) Install chain cover to avoid exposure to abrasive material.
(2) Select adequate conveyor type when exposing chain to abrasive material.
(3) Slow down chain speed as much as possible.
(4) Make chain size larger to reduce bearing pressure between pin and bushing.
(5) Lubricate through grease fitting.(Please consult with TSUBAKI)

14.4 Corrosiveness

When chain is exposed to corrosive material:
(1) Chain parts get thin. Wear is accelerated.
(2) Rust affects rotation of roller and articulation of chain.
(3) Special considerations to be taken for stress corrosiveness and intergranular corrosiveness when chain is used under acid or alkaline environments.

Please refer to Table 13 when selecting chain. It shows anticorrosiveness of chain material to various kinds of solvent. Chain parts made of 400 stainless steel may rust depending upon conditions.
Specifications for antistress corrosiveness are available.(Please consult TSUBAKI.) With regard to corrosiveness, please inform TSUBAKI of materials of accessories and related equipment. For example, when chain is used in a tank, the material of the tank is important information. In this case, it may be possible to prevent electric corrosion beforehand.

Table 13: Anticorrosiveness to Various Kinds of Solvent

When selecting chain, please check whether or not material is fully anticorrosive by referring to this table. This table shows properties of material at 20℃ and is only to be taken as a guide. To determine final specificacations of chain, please consider all conditions together.
○ : Resistant × : Not resistant △ : Resistant depending upon conditions — : Unknown

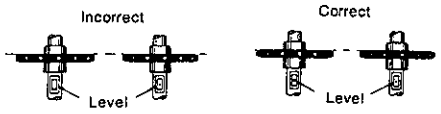
Solvent	Steel	400 Stainless Steel	300 Stainless Steel	EPC78 STP
Acetone	—	○	○	○
Oil (Vegetable, Mineral)	○	○	○	○
Sulphurous Acid Gas (Wet) 20°C	×	×	○	—
Sulphurous Acid Gas (Dry) 20°C	—	—	—	—
Methyl-,Ethyl-,Propyl-, Butyl Alcohol	○	○	○	○
Ammonia Water	△	○	○	○
Ammonia Gas (Cold)	—	—	—	—
Ammonia Gas (Hot)	—	—	—	—
Whisky	×	○	○	○
Sodium Chloride	×	△	○	—
Hydrochloric Acid (2%)	×	×	×	×
Chlorine Gas (Wet) 20°C	×	×	×	—
Sea Water	×	×	△	△
Hydorogen Peroxide 30%	—	△	○	×
Caustic soda 25%	—	○	○	○
Gasoline	○	○	○	○
Potassium Permanganic Acid (Saturation) 20%	—	○	○	—
Formic Acid	×	○	○	×
Formaldehyde	○	○	○	○
Milk	×	○	○	○
Citric Acid	×	○	○	—
Glycerin 20°C	○	○	○	○
Acetic Acid 10%	×	○	○	○
Carbon Tetrachloride (Water Cont. 1%) Boil	—	—	—	—
Carbon Tetrachloride (Dry) 20°C	○	○	○	○
Tartaric Acid 10% 20°C	×	○	○	○
Oxalic Acid	×	△	○	—
Vitric Acid 5%	×	△	○	×
Vinegar	×	×	△	△
Sodium Hypochlorite 10%	×	×	×	×
Calcium Hypochlorite	×	×	○	×
Sodium Bicarbonate 20°C	—	○	○	○
Soft Drinks	×	○	○	○
Water	×	○	○	○
Calcium Hydroxide 20%Boil	—	○	○	○
Carbolic Acid 20°C	—	○	○	×
Petroleum 20°C	○	○	○	○
Soap Solution	×	○	○	○
Carbonated Water	×	○	○	—
Sodium Carbonate (Saturation) Boiling Point	—	○	○	—
Kerosene	○	○	○	—
Lactic Acid 10%20°C	×	△	○	○
Paraffin	○	○	○	○
Beer	×	○	○	○
Benzene	○	○	○	○
Boric Acid 5%	×	○	○	—
Vegetable Juice	×	○	○	○
Iodine	—	—	—	—
Butyric Acid 20°C	—	○	○	○
Sulphuric Acid 5%	×	×	×	×
Phosphoric Acid 10%	×	△	△	×
Sodium Sulfate Saturation 20°C	—	○	○	—
Wine	×	○	○	○

■INSTALLATION AND MAINTENANCE

1. Installation of Sprocket

Proper alignment of sprocket and shaft is essential for smooth operation of conveyors and long lasting service of conveyor chain. To ensure correct alignment, proceed using following steps.

a. Level the shaft. Angular alignment should be adjusted within a gradient of 1/300.



b. Align the shaft for parallelism using a straight edge or a scale. Tolerance for parallel alignment of shafts should be within 1mm.

c. Align the sprockets axially on the shafts using a straight bar or a stretched wire as illustrated below.

Alignment accuracy should be as follows:

Center distance up to 1 m : ±1 mm

1 m to 10 m : $\frac{\text{Center Distance (mm)}}{1000}$

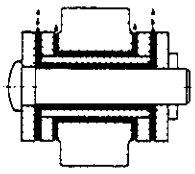
over 10 m : ±10 mm

Notes:

1. It is required that at least three teeth of the sprocket are engaged with chain.
2. Installation of take-up unit is an effective way to adjust for chain elongation.
3. It is required to phase teeth of sprockets when multiple strands of chain are used in parallel.

2. Lubrication

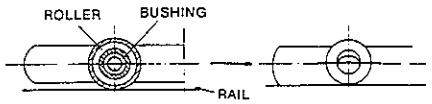
Conveyor chain requires proper lubrication which reduces wear on the conveyor chain and economizes the horsepower.
Lubrication is generally applied once a week by pouring or brushing ISO VG100-150(SAE30-40)oil.



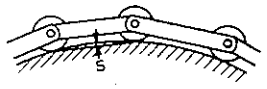
3. Life of Conveyor Chain and Sprocket

As conveyor chain runs, wear appears on each part of the chain. The life of conveyor chain is determined not only by the pitch elongation but also by the wear of each component part. It is recommended to do periodical inspection on the wearing parts as per the following examples.

1) Roller
   A) "R" roller,"F" roller
   If the link plates start to contact with the track or rail due to wear of the rollers, replacement of chain is required.



When there is a corner rail, allowable wear amount is decreased by a dimension equivalent to "S".



   B) "S" roller
   Chain life comes to an end when holes or crevices appear on some rollers due to wear.

2) Bushing
   Chain can last until holes appear on bushings.

3) Link plate
   Reciprocal friction between inner and outer link plates and contact between side surface of roller and inside surface of link plate develop such wear as (A) and (B) in Fig. 3.
   If the amount of wear exceeds 1/3 of original plate thickness, tensile strength of chain is decreased critically.

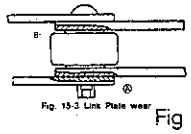
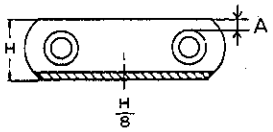


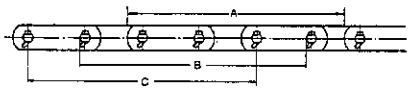
Fig 3

   When such wear appears prior to that of other component parts, misalignment is the probable cause in most cases.
   Careful and periodical inspection is required to keep correct alignment of sprockets and shafts, refer to the first paragraph of INSTALLATION OF SPROCKET.



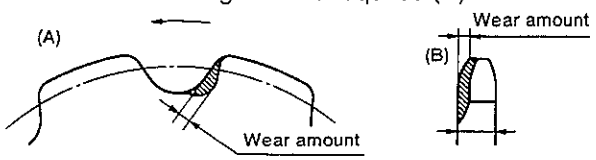
   For Flow Conveyor Chain, link plates slide directly on the material conveyed or on casing steel plate, the chain life ends when the wear amount reaches approx. 1/3 of "H".
   The following should be avoided as it may deform link plate hole or break chain:
   1) To apply overload
   2) To grind down outer diameter of pin, outer diameter of bushing and link plate hole or to heat up link plate at disassembly or assembly of chain.

4) Elongation of chain pitch
   When chain engages with sprocket or runs on the bent section of the track rail, flexion of the chain arises, thereby causing the chain to stretch due to the wear of such bearing parts as pins and bushings. When the chain pitch becomes larger, the chain tends to climb the sprocket tooth.
   The limit of pitch elongation is generally 2% of the chain pitch.



To check elongation of chain pitch, measure as many number of pitches as possible (at least 4 pitches required).
Measuring points are:
A=Pin center to pin center
B=Pin edge to pin edge
The elongation of chain is calculated by comparing the actually measured pitch with the original chain pitch.

5) Wear of sprocket
When a sprocket is worn out, chain tends to cling to the sprocket and to vibrate. In this case, build up welding is required for repair. Although allowable wear amount slightly varies with conveyor type and chain size, it is recommended to repair or replace sprocket with wear amount 3 - 6 mm to prevent chain from being damaged.(A)
Misalignment causes wear on side of sprocket teeth. Correction of the alignment is required.(B)



■INSTALLATION AND MAINTENANCE FOR CONVEYOR CHAINS

Check Point

When handling and dismantling Conveyor chains:

- Always wear the proper protective clothing (safety glasses, gloves, safety shoes, etc.) suitable for the operations involved.
- When supporting Conveyor chains, make sure that the Conveyor chain and it's parts do not move freely.
- The use of pressing equipment is recommended. Jigs should be properly used.
- Pins should be inserted and removed in the correct direction.

Make sure to install safety devices (safety covers, etc.) on the equipment of all Conveyor chains and sprockets.

Make sure that power is OFF before installation, dismantling, lubrication and maintenance inspection of Conveyor chains and take precautions to ensure that the power will remain off throughout.

Perform operations in a safe manner by arranging the surroundings so that no secondary accidents may occur.

When replacing Conveyor chains, note the following:

- The strengths of Conveyor chains differ depending on the maker. When a selection has been made at the time of purchasing or replacing based on this catalog, make sure to use our company's products.

- Avoid replacing only areas that are partially worn or damaged. In such cases replace all with new parts.

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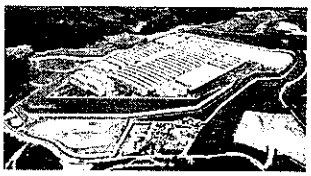

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