

CATALOGUE 1 | DRIVE CHAIN





CATALOGUE 1 DRIVE CHAIN

Classification			Chain Series	Tsubaki Chain Type	Features	
General			Standard Roller Chain Series	BS GT4 Winner ANSI G7	Superior Performance Chain in both BS/DIN and ANSI	
Lube-Free			LAMBDA Series	BS LAMBDA ANSI LAMBDA	Self Lube Chain; Maintenance Free	
			X-LAMBDA Series	BS X-LAMBDA	Self Lube under Severe Dust Conditions	
Heavy Duty			Heavy Duty Series	ANSI H ANSI HT	Higher Tensile Strength Anti-Shock Performance	
			SUPER Series	ANSI SUPER ANSI SUPER-H ANSI ULTRA SUPER	Better Fatigue Strength Better Fatigue Strength and Anti-Shock Performance Ultimate Strength	
Anti Corrosion	Corrosion Protected	Carbon Steel Base	NP Series	BS (LAMBDA) NP ANSI (LAMBDA) NP	Shining Nickel Plated Parts	
			N.E.P. Series	BS N.E.P. BS LAMBDA N.E.P. ANSI N.E.P. ANSI LAMBDA N.E.P.	Environmental Friendly Corrosion Protection	
	Corrosion Resistant	Stainless Steel Base	SS Series	BS SS ANSI SS	Stainless Steel SUS304 Excellent Corrosion Resistant	
			AS Series	ANSI AS	Higher Maximum Allowable Load	
			PC Series	BS PC ANSI PC	SUS304+Engineering Plastic Inner Link; Lube Free	
	Specialty Chain			Leaf Chain Series	ANSI AL ANSI BL	Ideally Suited for Lifting Applications
				Low Noise Series	ANSI SNS	Unique Spring Roller for Noise Reduction

CATALOGUE 1

Classification			Chain Series	Tsubaki Chain Type	Features
General			BS Standard Attachment Chain Series	BS Single Pitch Standard BS Single Pitch RF	All Major Chain Attachments Available Straight Side Plate for Direct Conveying
			ANSI Standard Attachment Chain Series	ANSI Single Pitch Standard ANSI Single Pitch HP ANSI Single Pitch CU ANSI Double Pitch Standard ANSI Double Pitch HP	All Major Chain Attachments Available Hollow Pin Chain Curved Chain (Side Bow Chain) For Longer Conveyor Lines Hollow Pin Chain
Lube-Free			BS LAMBDA Attachment Chain Series	BS Single Pitch LAMBDA BS Single Pitch LAMBDA RF	Self Lube, Maintenance Free Self Lube, Maintenance Free
			ANSI LAMBDA Attachment Chain Series	ANSI Single Pitch LAMBDA ANSI Single Pitch LAMBDA HP ANSI Double Pitch LAMBDA	Self Lube, Maintenance Free Self Lube, Hollow Pin Chain Self Lube, Maintenance Free
Anti Corrosion	Corrosion Protected	Carbon Steel Base	N.E.P. Attachment Chain Series	BS Single Pitch N.E.P.	Environmental Friendly Corrosion Protection
	Corrosion Resistant	Stainless Steel Base	SS Attachment Chain Series	BS Single Pitch SS ANSI Single Pitch SS ANSI Single Pitch SS HP ANSI Double Pitch SS ANSI Double Pitch SS HP	Stainless Steel SUS304 Stainless Steel SUS304 SUS304, Hollow Pin SUS304, Double Pitch SUS304, Double Pitch, Hollow Pin
				BS Single Pitch PC ANSI Single Pitch PC	SUS304+Engineering Plastic Inner Link SUS304+Engineering Plastic Inner Link
		Plastic Base	P Attachment Chain Series	ANSI Single Pitch P	Engineering Plastic Block+SUS304 Pins

Classification			Chain Series	Tsubaki Chain Type	Features
ANSI Drive Chain			Lube-Free Series	ANSI LAMBDA Heavy Duty ANSI X-LAMBDA ANSI LAMBDA DKF	Self Lube, Increased Tensile Strength Self Lube under Severe Dust Conditions High Temperature up to 230°C Food Grade
				ANSI TI ANSI PC-SY ANSI NS	All Titanium Superior Chemical Resistance Ultimate Corrosion Protection, Heat Application
			Cold Resistant Series	ANSI KT	Low Temperature Freezing Application down to -60°C
			Standard Series	ANSI Single Pitch Standard ANSI Double Pitch Standard	Flexible Design Capability
ANSI Attachment Chain			Lube-Free Series	ANSI Single Pitch LAMBDA ANSI Single Pitch LAMBDA CU ANSI Double Pitch LAMBDA	Self Lube Chain Curved Chain Self Lube Chain
				ANSI Single Pitch LAMBDA CKF ANSI Double Pitch LAMBDA CKF	High Temperature up to 230°C Food Grade High Temperature up to 230°C Food Grade
			Corrosion Resistant Series	ANSI Single Pitch SS ANSI Single Pitch SS CU ANSI Double Pitch SS	SUS304, Excellent Corrosion Resistant SUS304, Curved Chain SUS304, Excellent Corrosion Resistant
Conveyor Chain	Tsubaki Standard		Standard Series	RF	Wide Variation
			Low Maintenance Series	RF LAMBDA BR Bearing Roller	Self Lube, Direct Conveying Low Friction of Roller, Save Energy
			Deep Link Series	RFD	Ideal for Direct Conveying
			Free Flow Series	VR Double Plus	Chain Speed can be Reduced 2,5 Times, Save Energy
	DIN Standard		Standard Series	M FV	Wide Variation
			Hollow Pin Series	MC FVC	Hollow Pin
			Deep Link Series	MT FVT	Ideal for Direct Conveying
			Scraper Series	TFM TF	Scrapping Attachments



LEADING PRODUCTS AND EXCELLENT SERVICE

At TSUBAKI we know that customers want the best. We are also aware that each and every one of our customers has unique requirements. Therefore, we take pride in our ability to deliver an extensive product line-up that satisfies these high expectations. We believe that in coming years there will be an increase in demand for quality in products as well as in services. With an eye on these future trends, we are committed to take on the challenge of technical innovation.

Our main products, along with automotive timing-drive systems, are industrial drive chains, attachment chains and large size conveyor chains. Related products such as cam clutches, sprockets, shaft couplings, safety devices, toothed belts & pulleys compliment the program. In the new and modern workshop in Dordrecht, standard attachment chains can be assembled as ready-to-use items, thus saving customers time and achieving highest quality. In case of special needs it is possible to manufacture chains completely to order.

For optimum performance and reliability, a chain has to be selected carefully. In respect of this customers can rely on our specialised sales people and our experienced field engineers for technical advice (including maintenance and chain inspection on site). To ensure a close customer contact and excellent service an extensive network of distribution points is strategically placed throughout Europe and other designated markets.



Tsubakimoto Europe B.V. serves the Pan-European market, Africa and the Middle East. Our headquarters are located in Dordrecht, the Netherlands, serving Power Transmission customers. From the subsidiary office in Nottingham, Tsubaki UK serves the United Kingdom, Ireland and Iceland and from the office in Gilching, Germany customers in Germany, Austria and Switzerland are served. The TSUBAKI Group includes 46 production locations and 63 group companies worldwide. Our production and sales networks are now more developed than ever.

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Note:

Chains which are included in this catalogue are available from stock, with the exception of the chains of which the Tsubaki chain number is indicated with gray characters.

INTRODUCTION TO TSUBAKI ROLLER CHAIN

Glossary

1. Minimum Tensile Strength as per ISO Standardisation

This is the Minimum Tensile Strength determined by ISO. If a roller chain fails a tensile load below this value, it does not surpass the standards.

2. Minimum Tensile Strength as per TSUBAKI Standardisation

This is a minimum value determined by statistical processes at TSUBAKI. If a roller chain fractures at a tensile load below this value, it does not surpass TSUBAKI standards. TSUBAKI standards are higher than ISO standards.

3. Average Tensile Strength as per TSUBAKI Standardisation

This is a fracture load reading obtained after a long period of actual tensile strength testing of a large number of chain strands. Of course, when any given strand of roller chain fractures, this value may be higher or lower, so it does not represent a guaranteed value.

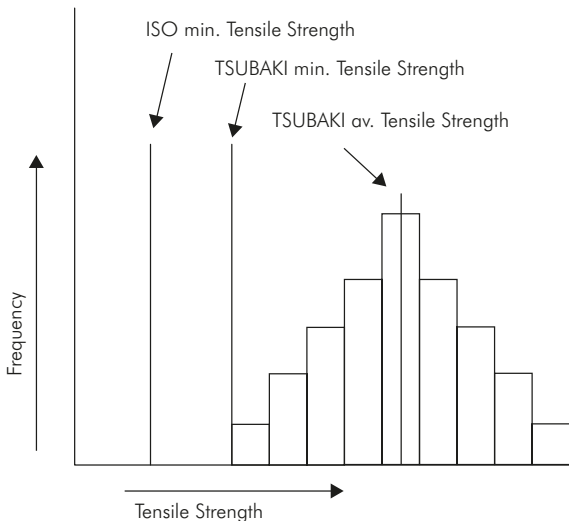


Fig. 1 Relationship between the three tensile strengths mentioned above.

4. Tensile Strength Testing Method

As shown in Fig. 2, a roller chain with minimum of five links is fixed at both ends by clevises and tensioned until fracture occurs. The type of fracture can be used to determine the cause of the breakage of the chain (Fig. 3).

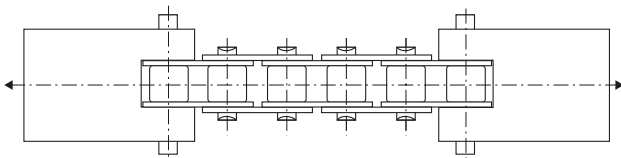


Fig. 2 Tensile Strength test

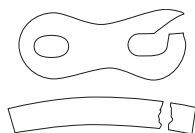


Fig. 3 Shape of fracture

5. Maximum Allowable Load

The Maximum Allowable Load (M.A.L.) of a roller chain (excluding Stainless Steel Chain and Engineering Plastic Chain) is the value derived from the lowest fatigue limit. When a load lower than this value is repetitively applied to the roller chain, fatigue failure will never occur.

The TSUBAKI M.A.L. is determined after 10 million repetitive loads instead of 3 million repetitive loads which is the European Standard.

The Maximum Allowable Load of Stainless Steel Chain and Engineering Plastic Chain is determined by the surface pressure between the pins and bushes.

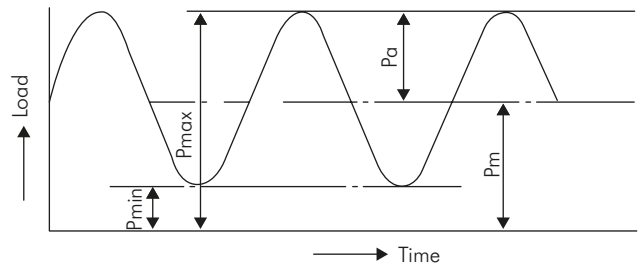


Fig. 4 Summary chart for repetitive loads

6. Ring Coining Process

For easy assembling the pin and link plate of a connecting link are slip fit. In general, this type of connecting link has a 20% lower fatigue strength than the chain itself. However, TSUBAKI developed a special process to eliminate that loss of fatigue strength and still satisfy the customers demand for easy assembling: the patented Ring Coining process. By applying the patented Ring Coining process, TSUBAKI generates a cold deformation around the pin hole of the connecting link plate. This results in residual stress around the pin hole and thereby adds strength. By using this process, transmission capacity is increased back to 100%.

TSUBAKI applies the patented Ring Coining process to all slip fit connecting links.

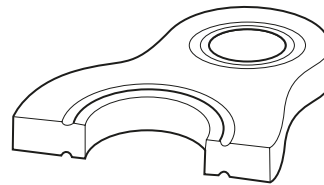


Fig. 5 Ring Coin

For severe conditions, TSUBAKI has developed the Heavy Duty Chain series. These chains are standard equipped with press fit connecting links. The installation is more difficult than in case of standard connecting links.

INTRODUCTION TO TSUBAKI ROLLER CHAIN

7. Ball Drifting Process

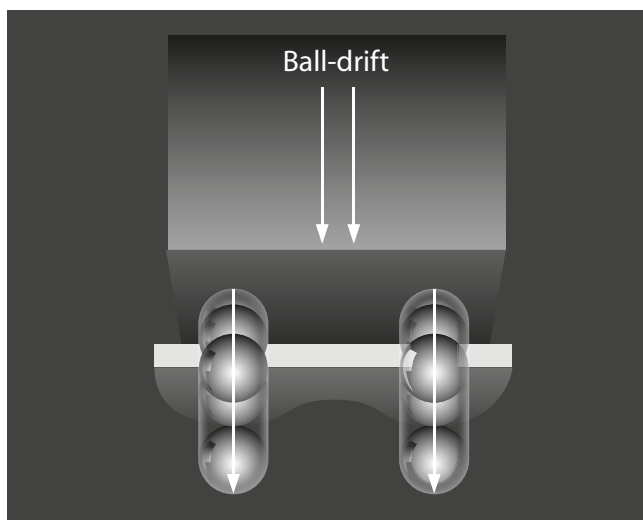


Fig. 6 Ball Drifting

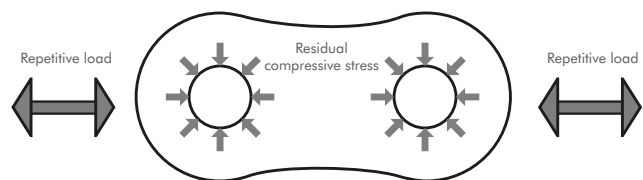


Fig. 7 Residual Compressive Stress

Ball drifting is the process of pressing a hardened steel ball through a hole in an already hardened steel plate (Fig. 6). The goal of this process is to create local plastic deformation and effectively add compressive stress (Fig. 7) to the walls of the hole. Besides this, the process generates precisely controlled holes for an optimum press fit. Together, this leads to significantly improved fatigue life (up to 30%).

8. Shot Peening Process

Shot peening is a process used to produce a compressive residual stress layer and modify mechanical properties of metals. It means impacting a surface with shot (round metallic or ceramic particles) with force sufficient to create plastic deformation.

At TSUBAKI, all basic chain parts (except pins) are shot peened.

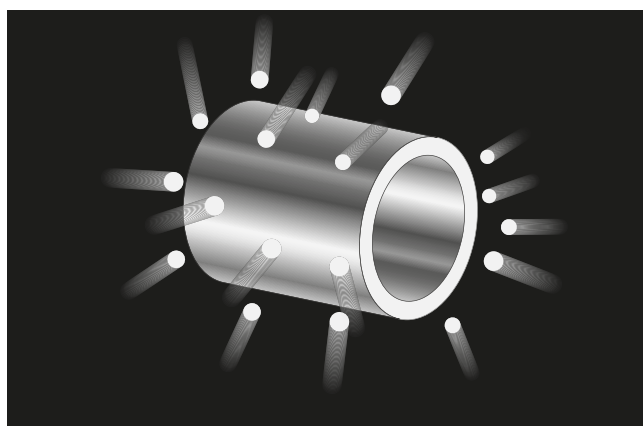


Fig. 8 Shot Peening

Shot Peening increases resistance to:

- fatigue failure
- corrosion fatigue
- hydrogen assisted cracking
- cavitation erosion
- stress corrosion cracking
- galling
- fretting

9. Pre-Loading Process

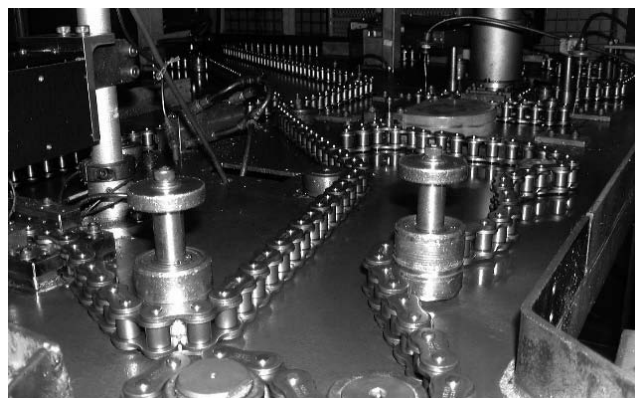


Fig. 9 Pre-Loading

After the assembly of a chain, TSUBAKI always applies an initial load, which is called a pre-load. The pre-load force approximates the recommended Maximum Allowable Load and is applied to seat the various chain components such as pins, bushes and link plates. The benefit of pre-loading is that it minimizes the initial elongation. Minimization of this initial elongation increases the chains service life therefore pre-loading is very important.

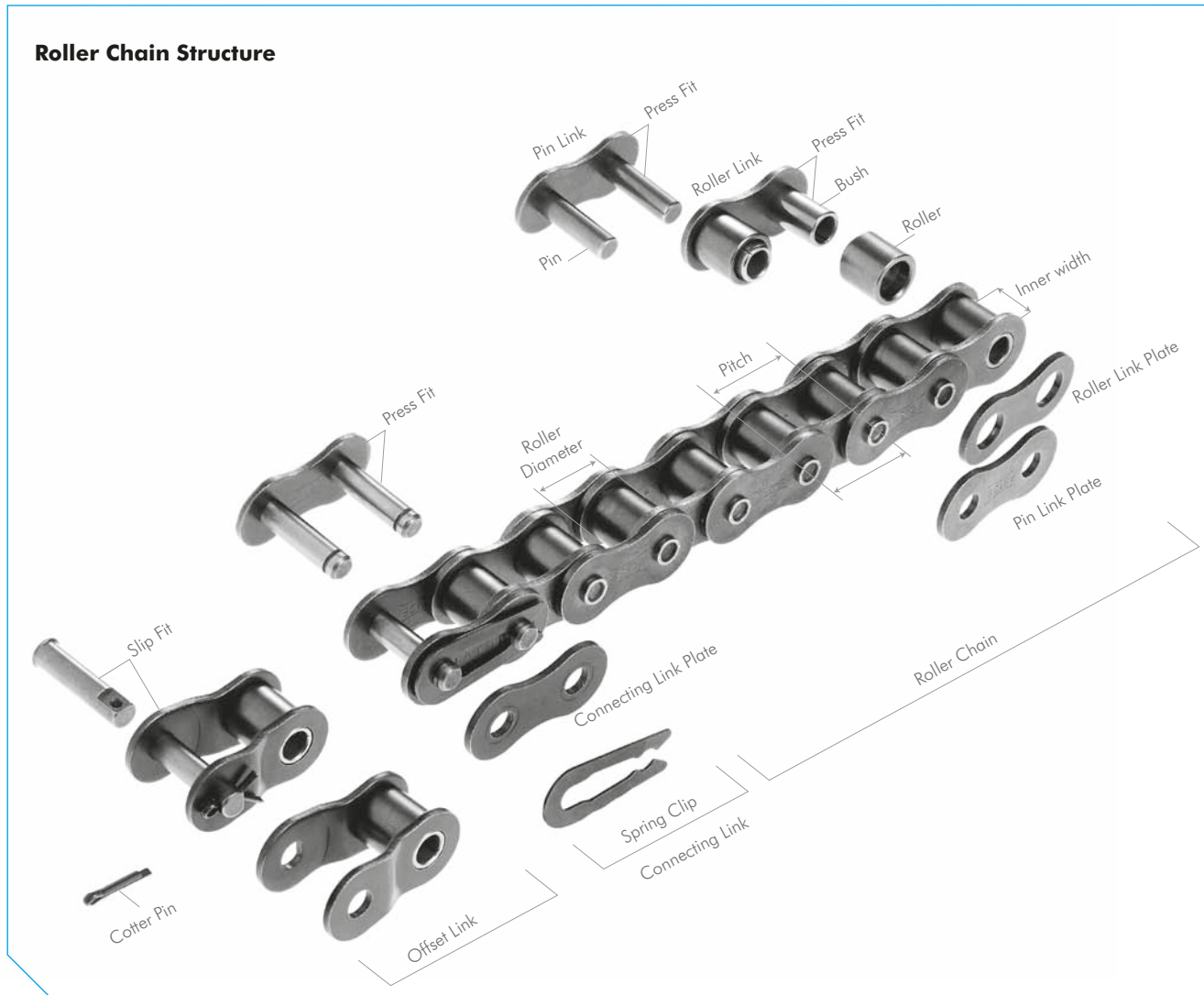
10. Super Long Length

As chain size increases, so does the burden of connecting it for the user. TSUBAKI can connect the chain at the desired length prior to delivery increasing our customer's work productivity and helps maintain a safe working environment.

11. Match & Tag

The "Matchy" is an in-house facility which allows TSUBAKI Europe to supply customers with drive or attachment chain in pairs or multiples that require a specific overall chain length tolerance.

INTRODUCTION TO TSUBAKI ROLLER CHAIN



Roller Chain Structure

1. Three Basic Dimensions

Pitch, Roller Diameter and Inner Width are known as the “Three Basic Dimensions of Roller Chain.” When these three dimensions are identical, roller chains and sprockets are dimensionally compatible.

2. Basic Parts Link Plate

The plate is the component that bears the tension placed on the chain. Usually this is a repeated loading, sometimes accompanied by shock. Therefore, the plate must not only have great static tensile strength, it must also hold up to the dynamic forces of load and shock.

Pin

The pin is subject to shearing and bending forces transmitted by the plate. At the same time, it forms a load-bearing part (together with the bush) when the chain flexes during sprocket engagement. Therefore, the pin needs high tensile and shear strength,

resistance to bending, and must also have sufficient endurance against shock and wear.

Bush

The bush is subject to complex forces from all parts, especially from the repetition of shock loads when the chain engages the sprocket. Therefore, the bush needs extremely high shock resistance. In addition, the bush forms a load-bearing part together with the pin and as such requires great wear resistance.

Roller

The roller is subject to impact load as it mates with the sprocket teeth during engagement of the chain with the sprocket. After engagement, the roller changes its point of contact and balance. It is held between the sprocket teeth and bush, and moves on the tooth face while receiving a compression load. Therefore, it must be resistant to wear and still have strength against shock, fatigue and compression. (RS25 and RS35 are bush chains and do not have rollers).

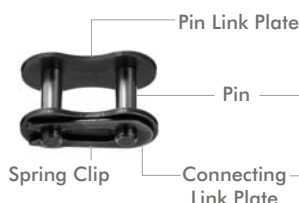
Roller Link

Two bushes are press fit into two roller link plates and rollers are

INTRODUCTION TO TSUBAKI ROLLER CHAIN

Connecting Links

Spring Clip Connecting Link



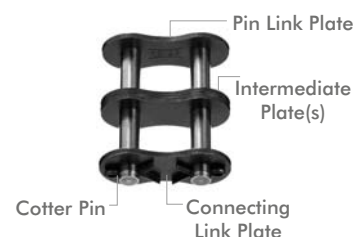
Cotter Pin Connecting Link



Spring Pin Connecting Link



Cotter Pin Connecting Link Multi-Strand (2-strand shown)



ONE Pitch Offset Links (OL)

Single Strand



Multi-strand (2-strand shown)



TWO Pitch Offset Links (2POL)

Single Strand



Multi-strand (2-strand shown)



inserted to allow rotation around the outside of the bushes during operation. This is the same for single and for multi strand chains.

Pin Link and Intermediate Plate

The pin link consists of two pins that have been press fit into two pin link plates. In case of multi-strand roller chain up till size 08B, an intermediate plate is added to the pin link. In case of multi-strand roller chain above size 08B, two intermediate plates are added to the pin link. The intermediate plates are slip fit for standard roller chain and press fit for SUPER roller chain.

3. Assembly Parts

Roller chains are usually made up of a number of inner and outer links in an endless formation. Although offset links can be used when there is an odd number of links in the roller chain, it is better to use a design that requires an even number of links. If an odd number of links cannot be avoided, it is recommended to use a two-pitch offset link in stead of a one-pitch offset link. As it is riveted into the chain, a two-pitch offset link has a 100% Maximum Allowable Load, where as the one-pitch offset link has a Maximum Allowable Load of 65%.

Connecting Links

There are three types of connecting links: spring clip connecting link, cotter pin connecting link and spring pin connecting link.

It's common to use slip fit spring clip connecting links for small size roller chains. Cotter pin and spring pin connecting links are used for large size roller chains and on customer request.

Offset Links

An offset link is used when an odd number of chain links is required. Different types are available:

One pitch offset link (OL).

The pin and two plates are slip fit. The fatigue strength is 35% lower than the chain itself.

Two pitch offset link (2POL).

Two pitch offset links are the combination of a roller link and an offset link connected with a rivet pin. The fatigue strength is the same as the fatigue strength of the base chain. Please refer to the dimension tables for roller chain types and sizes suitable for offset links.

BS LAMBDA LUBE FREE ROLLER CHAIN

TSUBAKI's LAMBDA Chains were the first in the industry to use a special oil impregnated bush. Since their launch in 1988, they have been adopted for diverse industries and applications, and their performance has been highly rated. TSUBAKI has a wide line-up of lube-free, long life products that help customers reduce costs.

Technical Evolution

As a pioneer in the lube-free chain market, TSUBAKI will reveal some of the key elements behind BS LAMBDA's outstanding performance:

Sintered Oil Impregnated Bush

The microscopic pores in the seamless sintered bush are vacuum filled with high performance lubricant. The upgraded bush design provides a 50% increase in wear-life performance.

* Average increase compared to the previous generation of Lambda chain.

Special Coated Pin

The special coating on the pin surface enhances the long term internal lubrication.

Centre Sink Rivet

The unique centre sink pin design offers easy chain disassembly and the markings on the rivet head will identify pin rotation.

Ring Coin

The patented Ring Coin connecting link ensures that the chain can be specified up to its full chain capacity.

Special Environments

TSUBAKI BS LAMBDA has outstanding performance in temperatures up to +150°C.

For temperatures above +150°C: Due to the special NSF-H1 certified lubrication impregnated bushes, TSUBAKI BS LAMBDA KF Series is usable in a wide temperature range (from -10°C to +230°C), and for food product applications while at the same time being kind to the environment.

Please consult TSUBAKI for more detailed information.

When an application needs water wash downs or is exposed to moisture, and lubrication is not possible or desirable, LAMBDA N.E.P. is most efficient.

Advantages

TSUBAKI has enhanced the BS LAMBDA with the following advantages:

Save Maintenance Costs

No expensive labour costs as it is not required to manually lubricate this chain.

Save Purchasing Costs

Lower frequency of purchasing due to the high quality of the chain and its long economic life. No purchasing of lubricants or lubrication systems necessary.

Higher Productivity

No unforeseen downtime due to chain breakdown.

Less time required for maintenance and therefore more time for production.

Environmental Friendly

Applications run clean thus reducing the risk of contaminating products, machines, floor etc.

Inter-Changeability

Chains:

BS LAMBDA Chains are fully interchangeable with standard BS roller chains.

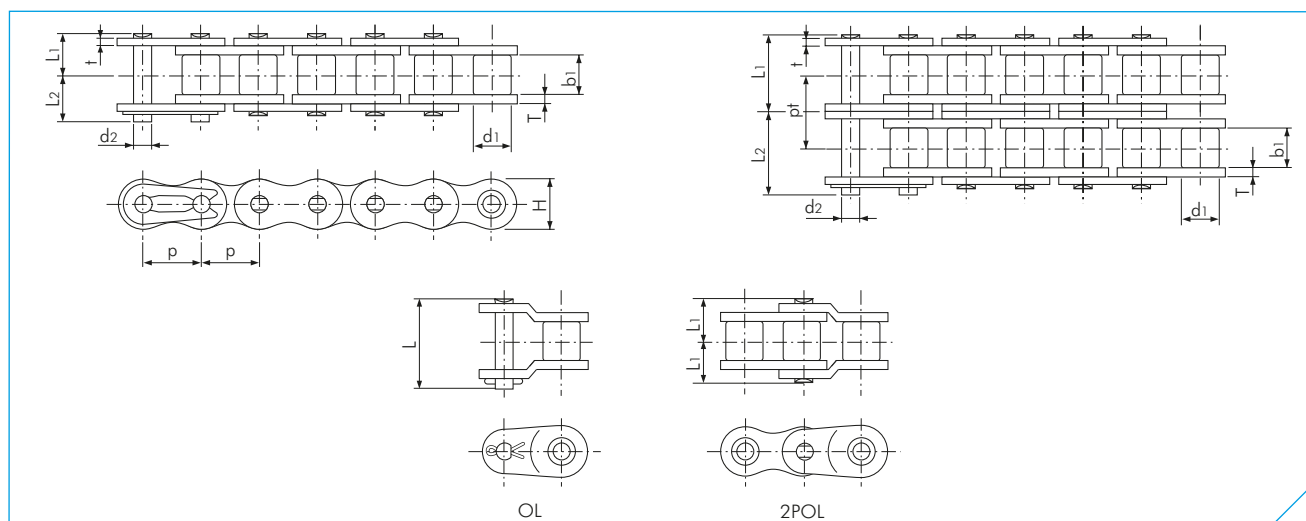
Sprockets:

Standard BS roller chain sprockets can be used. However, due to the extended lifetime of BS LAMBDA chain, TSUBAKI recommends to install sprockets with hardened teeth in every LAMBDA application.



Fig. 10 Basic Construction

BS LAMBDA LUBE FREE ROLLER CHAIN



BS LAMBDA Chain

Dimensions in mm

TSUBAKI Chain No.	Pitch p	Roller Diameter d1	Inner Width b1	Pin				Link Plate			Transverse Pitch pt	Min. Tensile Strength acc. to ISO 606 kN	Approx. Mass kg/m
				Diameter d2	Length L1	Length L2	Length L	Thickness T	Thickness t	Height H (max)			
RF06B-LM-1	9.525 (3/8")	6.35	5.72	3.28	6.10	7.70	15.10	1.30	1.00	8.20	-	8.9	0.39
RF06B-LM-2					11.20	12.80	25.90				10.24	16.9	0.75
RS08B-LM-1	12.70 (1/2")	8.51	7.75	4.45	8.40	10.00	18.60	1.60	1.60	11.80	-	17.8	0.70
RS08B-LM-2					15.30	16.90	34.50				13.92	31.1	1.35
RS10B-LM-1	15.875 (5/8")	10.16	9.65	5.08	9.55	11.25	20.80	1.50	1.50	14.70	-	22.2	0.95
RS10B-LM-2					17.85	19.55	39.40				16.59	44.5	1.85
RS12B-LM-1	19.05 (3/4")	12.07	11.68	5.72	11.10	13.00	24.40	1.80	1.80	16.10	-	28.9	1.25
RS12B-LM-2					20.85	22.75	45.90				19.46	57.8	2.50
RS16B-LM-1	25.40 (1")	15.88	17.02	8.28	17.75	19.95	41.10	4.00	3.20	21.00	-	60.0	2.70
RS16B-LM-2					33.55	35.75	75.20				31.88	106.0	5.40
RS20B-LM-1	31.75 (1 1/4")	19.05	19.56	10.19	19.90	23.10	46.60	4.40	3.40	26.00	-	95.0	3.85
RS20B-LM-2					38.25	41.45	84.60				36.45	170.0	7.65
RS24B-LM-1	38.10 (1 1/2")	25.40	25.40	14.63	26.65	31.85	61.70	6.00	5.60	33.40	-	160.0	7.45
RS24B-LM-2					50.80	56.00	112.80				48.36	280.0	14.65

Note:

1. Connecting links are clip type for sizes up to RS16B-LM, and cotter type for sizes RS20B-LM to RS24B-LM.
2. RF06B-LM chain has flat shaped link plates.
3. Intermediate plate of RF06B-LM-2 and RS08B-LM-2 is a solid plate.
4. Centre sink riveting is applied for RS08B-LM-1 to RS16B-LM-1. Double stake riveting is applied to all other sizes including multi-strand chain.
5. Warning: previous generations of Lambda chain can not be connected with the above chains due to different dimensions.
6. When a single pitch offset link is used, please calculate a 35% reduction of the fatigue strength.
7. Also available in N.E.P. specification.
8. The improved bush design is applicable on RF06B until RS16B.

BS X-LAMBDA LUBE FREE ROLLER CHAIN

Ten years after introducing the number-one LAMBDA Chain to the market in 1988, TSUBAKI has developed innovative technology that sets the bar even higher for lube-free chain performance. To the user the benefits that X-LAMBDA provides mean increased productivity, reduced maintenance and a cleaner working environment.

Technical Evolution of BS LAMBDA

BS X-LAMBDA chain is a quantum leap for power transmission technology. The basic BS LAMBDA components (a special coated pin and an oil-impregnated sintered bush) come completed with special felt seals (patent pending) between inner and outer link plate that lock in lubrication while keeping dirt and abrasives out.

Because of this evolution BS X-LAMBDA chain greatly increases the performance of the BS LAMBDA chains. When your operation needs to run clean, when machines and conveyed materials must be free from contact with oil, or when lubrication is difficult, BS X-LAMBDA chain can extend the life of your operation drastically.

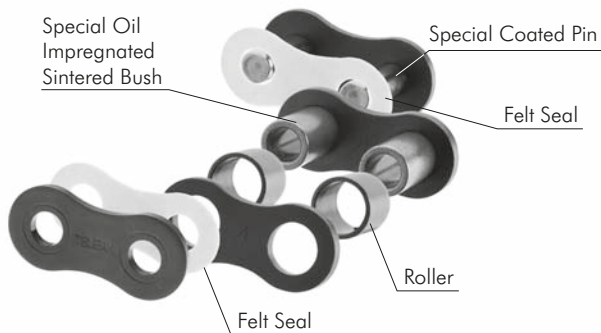


Fig. 11 Basic Construction

Advantages

Additional to all BS LAMBDA advantages, TSUBAKI has enhanced the BS X-LAMBDA with the following additional advantages:

Extended Wear Life

Even longer wear life than BS LAMBDA chain (over 5 times longer).

Applicable in Dusty Environments

Extra protection of critical areas due to the specially developed felt seal.

Connecting Method

When connecting the chain, use a BS X-LAMBDA chain connecting link (with a felt seal). As shown in Fig. 12 insert felt seals between the outer plate and the connecting link plate, then attach the link.

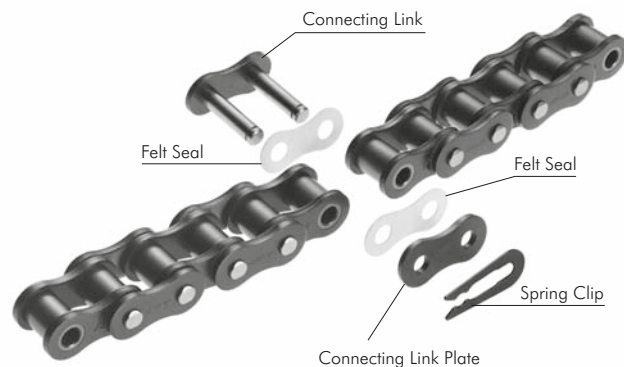


Fig. 12 Connecting Method BS X-LAMBDA

Inter-Changeability

Chains:

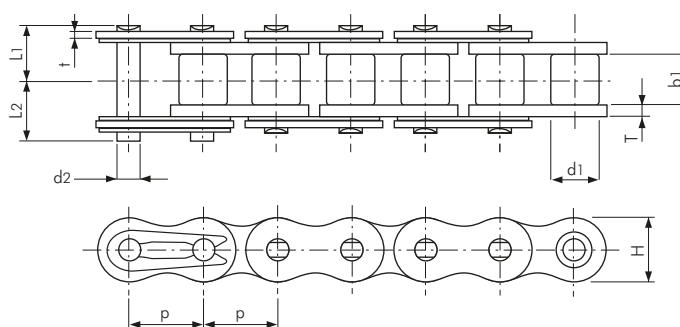
BS X-LAMBDA chain is interchangeable with standard BS roller chain. However, as the pins are longer than those of the standard BS roller chain, please make sure that there is no interference with the machine.

Sprockets:

Standard BS roller chain sprockets can be used. However, due to the extended lifetime of BS X-LAMBDA chain, TSUBAKI advises to install sprockets with hardened teeth in every LAMBDA application.



BS X-LAMBDA LUBE FREE ROLLER CHAIN



BS X-LAMBDA Chain

Dimensions in mm

[illegible]

Note:

1. Connecting links are clip type for sizes up to RS12B-LMX, and cotter type for size RS16B-LMX.
2. Due to the use of the felt seal, the pins are longer. Check for machine interference.
3. X-LAMBDA offset links are not available.
4. X-LAMBDA double strand chain is not available.
5. Due to the oil in the felt seal, more oil adheres to the surface of X-LAMBDA chain than regular LAMBDA chain.

RS ROLLER CHAIN GT4 WINNER

TSUBAKI GT4 Winner is the most advanced BS/DIN standard roller chain in the European market. Since 1917 Tsubakimoto Chain Company has maintained a line-up of cutting-edge chain products with exceptional quality and performance. TSUBAKI is proud of the 4th generation, enhanced European premium BS/DIN chain.

Advantages

TSUBAKI RS roller chain GT4 Winner is enhanced with the following advantages:

Wear resistance

TSUBAKI's patented LG (Lube Groove) seamless bushes are precision components and perfectly cylindrical. Our special lube grooves hold oil at the point of contact, where the chain needs it most. The result is a chain that lasts longer with lower maintenance costs over the lifetime of the chain. The Lube Groove is applied to RS16B, RS20B and RS24B.

Easy disassembling with centre sink pin design

The chains can be easily and safely disassembled with a standard screw type cutter without damaging bushes. Center sink riveting is applied to RS08B up to RS16B single strand chain.

Increased kW Rating

The patented TSUBAKI Ring Coining process on the connecting link plate allows the chain to be specified up to its full kW rating.



Fig. 13 Ring Coined Connecting Link Plate

In general, connecting links have a 20% lower fatigue strength than the chain itself. However, TSUBAKI developed a special process to eliminate that loss of fatigue strength and still satisfy the customers demand for easy assembly: the patented Ring Coining process. Generating a cold deformation around the pin hole of the connecting link plate results in residual stress around this region, thereby adding strength. By using this process we can achieve 100% transmission capacity of the base chain.

Constant Quality Level

In pursuit of outstanding quality, every TSUBAKI chain is made of a special steel alloy, the specification of which has been developed by the TSUBAKI engineering department for selected steel mills to work with. TSUBAKI produces the GT4 Winner under highly controlled conditions in its advanced heat treatment facilities. This, in combination with TSUBAKI fatigue strength tests, ensures that our customers can always rely on a constant level of quality whenever using TSUBAKI products.

Customized Pre-Lubrication Service

Proper lubrication is the key to extending the life and improving the performance of a chain. In order to get the best performance in general applications (-10°C to +60°C), all GT4 Winner drive chains are pre-lubricated.

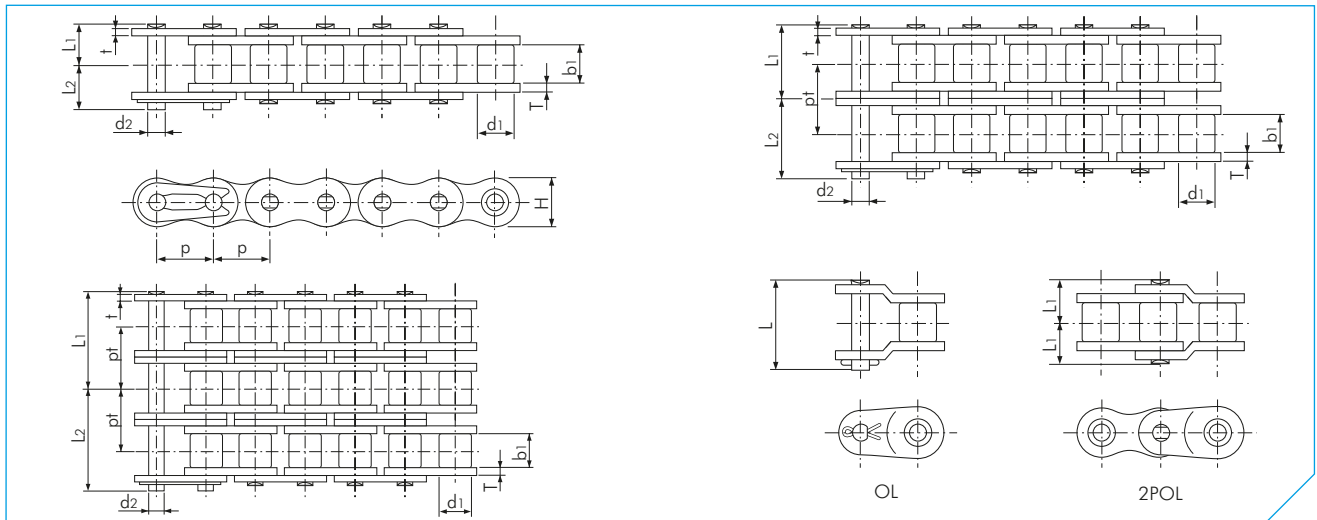
For special applications, TSUBAKI can provide chains which are pre-lubricated with a special lubricant on customer demand:

- High temperature
- Low temperature
- Food safe
- Outdoor exposure
- Dusty environment

Please consult TSUBAKI for more detailed information.



RS ROLLER CHAIN GT4 WINNER



BS GT4 WINNER

Dimensions in mm

TSUBAKI Chain No.	Pitch p	Roller Diameter d1	Inner Width b1	Pin			Link Plate			Transverse Pitch pt	Min. Tensile Strength acc. to ISO 606	Min. Tensile Strength acc. to Tsubaki	Av. Tensile Strength acc. to Tsubaki	Approx. Mass kg/m
				Diameter d2	Length L1	Length L2	Length L	Thickness T	Thickness t	Height H (max)				
RS05B-1	8.00 (0.315")	5.00	3.00	2.30	3.80	4.70	-	0.75	0.75	7.10	-	4.4	5.0	5.8
RS05B-2					6.65	7.52	-				5.64	7.8	7.8	8.9
RS05B-3					9.45	10.34	-				5.64	11.1	11.2	12.8
RF06B-1	9.525 (3/8")	6.35	5.72	3.28	6.10	7.70	15.10	1.30	1.00	8.20	-	8.9	9.0	9.9
RF06B-2					11.20	12.80	25.90				10.24	16.9	17.0	18.7
RF06B-3					16.40	17.90	-				10.24	24.9	24.9	27.4
RS08B-1	12.70 (1/2")	8.51	7.75	4.45	8.40	10.00	18.60	1.60	1.60	11.80	-	17.8	19.0	20.9
RS08B-2					15.30	16.90	34.50				13.92	31.1	32.0	35.2
RS08B-3					22.25	23.85	48.40				13.92	44.5	47.5	52.3
RS10B-1	15.875 (5/8")	10.16	9.65	5.08	9.55	11.25	20.80	1.50	1.50	14.70	-	22.2	23.0	25.3
RS10B-2					17.85	19.55	39.40				16.59	44.5	44.5	49.0
RS10B-3					26.15	27.85	56.00				16.59	66.7	66.8	73.5
RS12B-1	19.05 (3/4")	12.07	11.68	5.72	11.10	13.00	24.40	1.80	1.80	16.10	-	28.9	31.0	34.1
RS12B-2					20.85	22.75	45.90				19.46	57.8	61.0	67.1
RS12B-3					30.60	32.50	65.40				19.46	86.7	92.0	101.0
RS16B-1	25.40 (1")	15.88	17.02	8.28	17.75	19.95	41.10	4.00	3.20	21.00	-	60.0	70.0	77.0
RS16B-2					33.55	35.75	75.20				31.88	106.0	128.0	141.0
RS16B-3					49.50	51.70	107.10				31.88	160.0	192.0	211.0
RS20B-1	31.75 (1 1/4")	19.05	19.56	10.19	19.90	23.10	46.60	4.40	3.40	26.00	-	95.0	98.1	108.0
RS20B-2					38.25	41.45	84.60				36.45	170.0	197.0	217.0
RS20B-3					56.50	59.70	121.00				36.45	250.0	295.0	325.0
RS24B-1	38.10 (1 1/2")	25.40	25.40	14.63	26.65	31.85	61.70	6.00	5.60	33.40	-	160.0	167.0	184.0
RS24B-H-1					29.30	34.20	-				-	-	234.0	270.0
RS24B-2					50.80	56.00	112.80				48.36	280.0	335.0	369.0
RS24B-3					75.10	80.20	161.10				48.36	425.0	500.0	550.0
RS28B-1	44.45 (1 3/4")	27.94	30.99	15.90	32.45	37.45	74.40	7.50	6.30	36.40	-	200.0	200.0	220.0
RS28B-2					62.15	67.15	136.60				59.56	360.0	374.0	411.0
RS28B-3					91.95	96.95	195.90				59.56	530.0	560.0	616.0
RS32B-1	50.80 (2")	29.21	30.99	17.81	32.10	37.70	73.30	7.00	6.30	42.20	-	250.0	255.0	281.0
RS32B-2					61.25	66.85	134.50				58.55	450.0	485.0	534.0
RS32B-3					90.50	96.10	192.60				58.55	670.0	729.0	802.0
RS40B-1	63.50 (2 1/2")	39.37	38.10	22.89	39.25	45.05	88.60	8.50	8.00	52.90	-	355.0	373.0	410.0
RS40B-2					75.40	81.20	163.20				72.29	630.0	716.0	788.0
RS40B-3					111.50	117.30	235.30				72.29	950.0	1080.0	1190.0
RS48B-1	76.20 (3")	48.26	45.72	29.23	49.30	58.80	117.70	12.10	10.00	63.80	-	565.0	565.0	618.0
RS48B-2					95.00	104.40	209.00				91.21	1000.0	1000.0	1150.0
RS48B-3					140.60	150.00	-				91.21	1500.0	1520.0	1750.0

Note:

1. For sizes RS16B - RS24B the Lube Groove(LG) is applied
2. Connecting links are clip type for sizes up to RS16B, and cotter type for sizes RS20B to RS48B.
3. RF06B chain has flat-shaped link plates.
4. Intermediate plate of multi strand RF06B-2 and RS08B-2 chain is a solid plate.
5. Center sink riveting is applied to RS08B-1 to RS16B-1 single strand chain.
6. Double stake riveting is applied to all other sizes including multi-strand chain.
7. When a single pitch offset link is used, please calculate a 35% reduction of the fatigue strength.
8. RS24B-H-1 chain is a reinforced RS24B-1 chain.

BS CHAIN FOR CORROSIVE ENVIRONMENTS

Whether your operation requires a sanitary environment, is exposed to corrosive chemicals, is heated to extreme temperatures, runs through a freezer, is exposed to the outdoors or is affected by excessive moisture: our specially designed and tested chains will outlast your current chains and contribute to a cost effective application.

Corrosion Resistant Chain (Stainless Steel base)

BS PC Engineering Plastic Combination Chain

The pins and pin link plates of these chains are made of SUS304 (spring clips SUS301). Engineering plastic (white) is used for the inner link. This combination makes it a lube-free, low noise (5 dB lower than BS standard roller chain) and lightweight chain (50% lighter than BS standard roller chain). Working temperature range: -20°C to +80°C. For details on corrosion resistance, please check out the table in the back of this catalogue.

BS SS Stainless Steel Chain

All basic components of this chain are made of Stainless Steel SUS304 (except the spring clips, which are made of SUS301). This chain can be used in special environments such as under-water, acidic and alkaline applications. It can also be used in high and low temperatures (-20°C to +400°C). SUS304 is only marginally magnetic, which is the result of the cold-forging process. For details on corrosion resistance, please check out the table in the back of this catalogue.

Corrosion Protected Chain (Carbon Steel base)

BS N.E.P. New Environmental Plating Chain

BS N.E.P. Chain is a TSUBAKI BS chain that has undergone a special surface treatment.

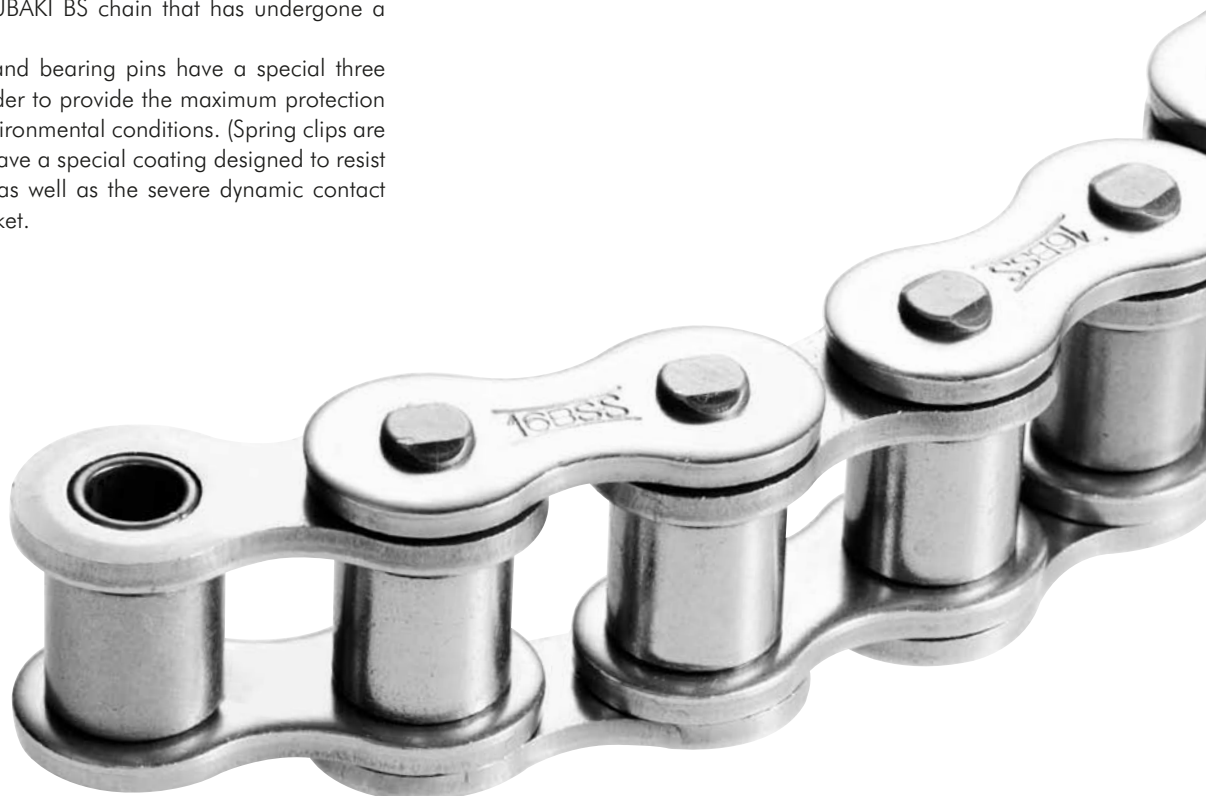
The link plates, bushes and bearing pins have a special three stage layer applied in order to provide the maximum protection from the operating or environmental conditions. (Spring clips are SUS301). N.E.P. Rollers have a special coating designed to resist the corrosive conditions as well as the severe dynamic contact between roller and sprocket.

This chain is suitable for use in environments exposed to seawater, acid-rain and other adverse weather conditions. This chain does not contain any chemically hazardous substances such as Hexavalent Chromium, Lead, Cadmium and Mercury as regulated by RoHS[✓]. The kilowatt ratings are the same as those of the corresponding BS chain with a working temperature range: -10°C to +150°C. Above +60°C a special high-temperature lubrication is required. Of course, BS LAMBDA N.E.P. chain is also available.

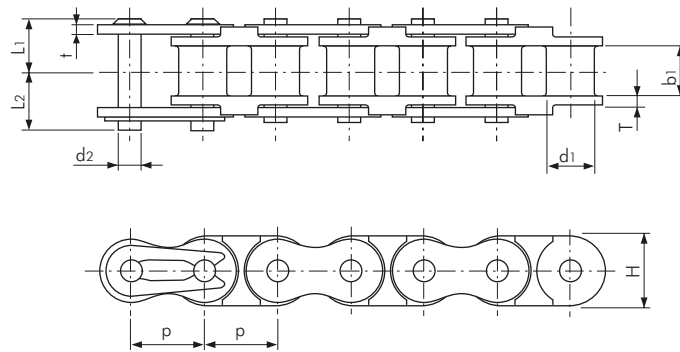
BS NP Nickel Plated Chain

BS NP Chain is a TSUBAKI BS chain that has been plated with Nickel. NP Chain has a light corrosion resistance and an attractive appearance. NP Chain is suitable for outdoor conditions exposed to water. There is a 15% reduction in Maximum Allowable Load compared to the corresponding BS chain, so please take this into account when making your chain selection. It has a working temperature range of: -10°C to +60°C. Of course, BS LAMBDA NP chain is also available.

[✓] RoHS = Restriction of Hazardous Substances



BS CHAIN FOR CORROSIVE ENVIRONMENTS



BS PC Chain

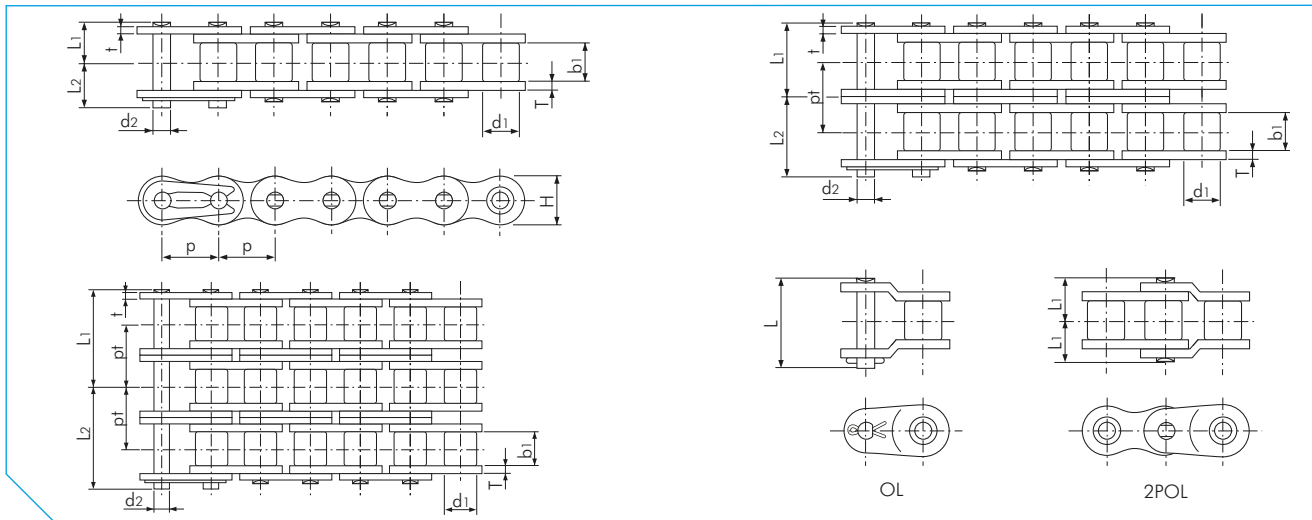
Dimensions in mm

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Note:

1. Make sure to check the chain load again when replacing Stainless Steel Chain with PC Chain.
2. Offset links are not available.
3. Use a chain tensioner with an idler sprocket to adjust chain tension.
4. Guide rails should support the underside of the inner links.
5. For details on corrosion resistance selection, please consult our Corrosion Resistance Guide in this catalogue.

BS CHAIN FOR CORROSIVE ENVIRONMENTS



BS SS Chain

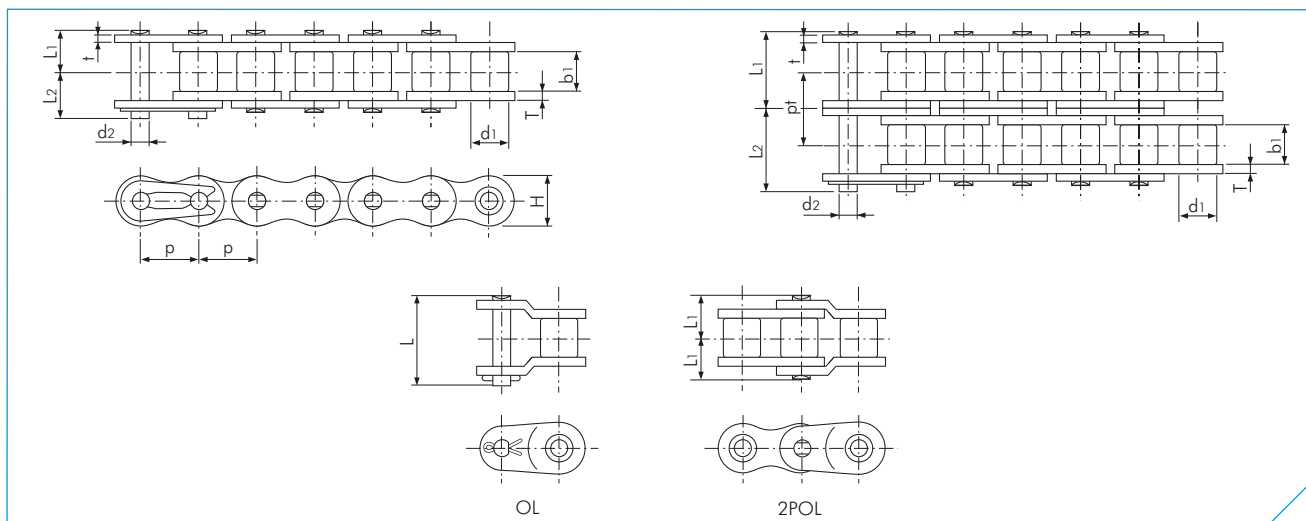
Dimensions in mm

TSUBAKI Chain No.	Pitch p		Roller Diameter d1	Inner Width b1	Pin			Link Plate			Transverse Pitch pt	Max. Allowable Load acc. to Tsubaki kN	Approx. Mass kg/m
					Diameter d2	Length L1	Length L2	Length L	Thickness T	Thickness t	Height H (max)		
RF06B-SS-1	9.525 (3/8")		6.35	5.72	3.28	6.50	7.25	15.45	1.30	1.00	8.20	-	0.28
RF06B-SS-2						11.60	12.30	28.85				10.24	0.56
RS08B-SS-1						8.35	10.05	20.05				-	0.50
RS08B-SS-2	12.70 (1/2")		8.51	7.75	4.45	15.30	17.00	34.60	1.50	1.50	11.80	13.92	1.00
RS08B-SS-3						22.25	23.95	48.60				13.92	1.50
RS10B-SS-1						9.55	11.25	22.90				-	0.67
RS10B-SS-2	15.875 (5/8")		10.16	9.65	5.08	17.85	19.55	39.40	1.50	1.50	14.70	16.59	1.34
RS10B-SS-3						26.20	27.80	56.00				16.59	2.01
RS12B-SS-1						11.10	13.00	26.70				-	0.89
RS12B-SS-2	19.05 (3/4")		12.07	11.68	5.72	20.90	22.70	46.10	1.80	1.80	16.10	19.46	1.78
RS12B-SS-3						30.65	32.60	65.60				19.46	2.67
RS16B-SS-1						17.75	19.95	38.90				-	2.10
RS16B-SS-2	25.40 (1")		15.88	17.02	8.28	33.55	35.75	73.80	4.00	3.20	21.00	31.88	4.20
RS20B-SS-1						20.10	23.10	48.40	4.50	3.50	26.00	-	2.95

Note:

1. Connecting links are clip type for sizes up to RS16B-SS, and cotter type for sizes RS12B-SS to RS20B-SS.
2. RF06B-SS chain has flat shaped link plates.
3. Center sink pins are not available. Double stake riveting is applied.
4. For details on corrosion resistance selection, please consult our Corrosion Resistance Guide in this catalogue.

BS CHAIN FOR CORROSIVE ENVIRONMENTS



BS LAMBDA N.E.P. Chain

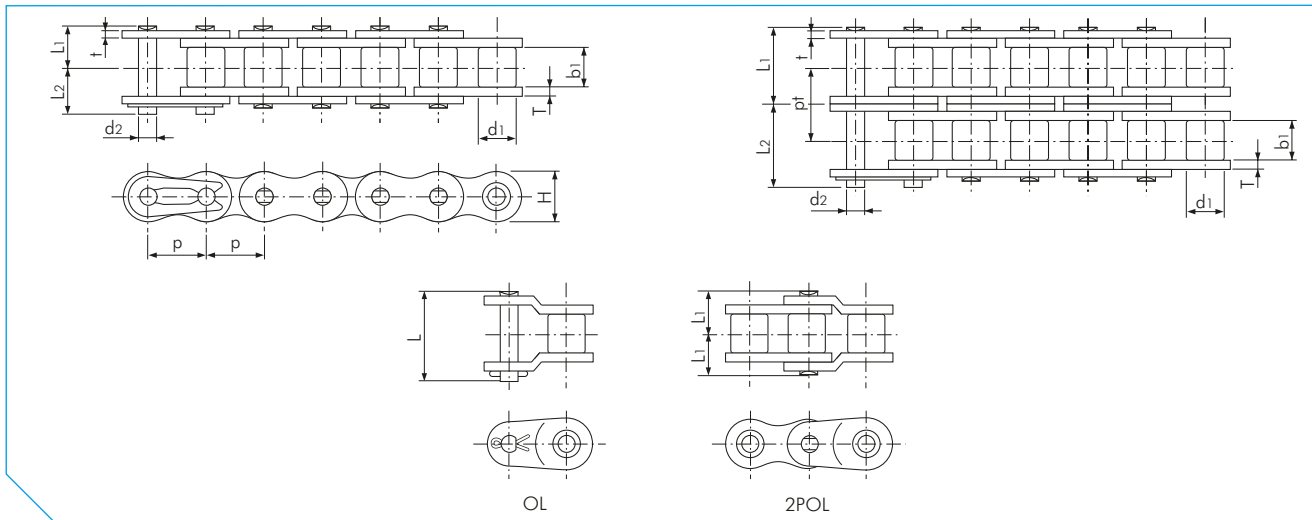
Dimensions in mm

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Note:

1. Connecting links are clip type for sizes up to RS16B-LM-NEP, and cotter type for sizes RS20B-LM-NEP to RS24B-LM-NEP.
2. RF06B-LM-NEP chain has flat shaped link plates.
3. Intermediate plate of RF06B-LM-NEP-2 and RS08B-LM-NEP-2 is a solid plate.
4. Centre sink riveting is applied for RS08B-LM-NEP-1 to RS16B-LM-NEP-1. Double stake riveting is applied to all other sizes including multi-strand chain.
5. Warning: previous generations of Lambda chain can not be connected with the above chains due to different dimensions.
6. When a single pitch offset link is used, please calculate a 35% reduction of the fatigue strength.

BS CHAIN FOR CORROSIVE ENVIRONMENTS



BS N.E.P. Chain

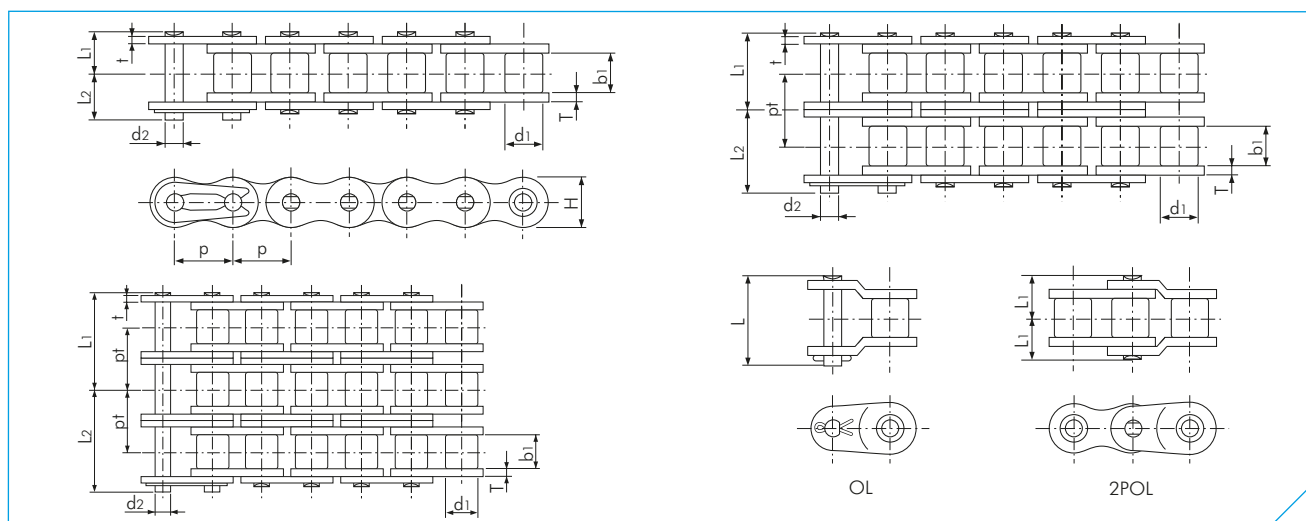
Dimensions in mm

TSUBAKI Chain No.	Pitch p	Roller Diameter d1	Inner Width b1	Pin				Link Plate			Transverse Pitch pt	Min. Tensile Strength acc. to ISO 606 kN	Min. Tensile Strength acc. to Tsubaki kN	Av. Tensile Strength acc. to Tsubaki kN	Approx. Mass kg/m
				Diameter d2	Length L1	Length L2	Length L	Thickness T	Thickness t	Height H (max)					
RF06B-NEP-1	9.525 (3/8")	6.35	5.72	3.28	6.10	7.70	15.10	1.30	1.00	8.20	-	8.9	9.0	9.9	0.39
RF06B-NEP-2					11.20	12.80	25.90				10.24	16.9	17.0	18.7	0.75
RS08B-NEP-1	12.70 (1/2")	8.51	7.75	4.45	8.40	10.00	18.60	1.60	1.60	11.80	-	17.8	19.0	20.9	0.70
RS08B-NEP-2					15.30	16.90	34.50				13.92	31.1	32.0	35.2	1.35
RS10B-NEP-1	15.875 (5/8")	10.16	9.65	5.08	9.55	11.25	20.80	1.50	1.50	14.70	-	22.2	23.0	25.3	0.95
RS10B-NEP-2					17.85	19.55	39.40				16.59	44.5	44.5	49.0	1.85
RS12B-NEP-1	19.05 (3/4")	12.07	11.68	5.72	11.10	13.10	24.40	1.80	1.80	16.10	-	28.9	31.0	34.1	1.25
RS12B-NEP-2					20.85	22.75	45.90				19.46	57.8	61.0	67.1	2.50
RS16B-NEP-1	25.40 (1")	15.88	17.02	8.28	17.75	19.95	41.10	4.00	3.20	21.00	-	60.0	70.0	77.0	2.70
RS16B-NEP-2					33.55	35.75	75.20				31.88	106.0	128.0	141.0	5.40
RS20B-NEP-1	31.75 (1 1/4")	19.05	19.56	10.19	19.90	23.10	46.60	4.40	3.40	26.00	-	95.0	98.1	108.0	3.85
RS20B-NEP-2					38.25	41.45	84.60				36.45	170.0	197.0	217.0	7.65
RS24B-NEP-1	38.10 (1 1/2")	25.40	25.40	14.63	26.65	31.85	61.70	6.00	5.60	33.40	-	160.0	167.0	184.0	7.45

Note:

1. Connecting links are clip type for sizes up to RS16B-NEP, and cotter type for sizes RS20B-NEP to RS24B-NEP.
2. RF06B-NEP chain has flat-shaped link plates.
3. Intermediate plate of multi strand RF06B-NEP-2 and RS08B-NEP-2 chain is a solid plate.
4. Center sink riveting is applied to RS08B-NEP-1 to RS16B-NEP-1 single strand chain.
5. Double stake riveting is applied to all other sizes including multi-strand chain.
6. When a single pitch offset link is used, please calculate a 35% reduction of the fatigue strength.

BS CHAIN FOR CORROSIVE ENVIRONMENTS



BS NP Chain

Dimensions in mm

TSUBAKI Chain No.	Pitch p	Roller Diameter d1	Inner Width b1	Pin			Link Plate			Transverse Pitch pt	Min. Tensile Strength acc. to ISO 606 kN	Min. Tensile Strength acc. to Tsubaki kN	Av. Tensile Strength acc. to Tsubaki kN	Approx. Mas kg/m
				Diameter d2	Length L1	Length L2	Length L	Thickness T	Thickness t	Height H (max)				
RF06B-NP-1	9.525 (3/8")	6.35	5.72	3.28	6.10	7.70	15.10	1.30	1.00	8.20	-	8.9	9.0	9.9
RF06B-NP-2					11.20	12.80	-				10.24	16.9	17.0	18.7
RF06B-NP-3					16.40	17.90	-				10.24	24.9	24.9	27.4
RS08B-NP-1	12.70 (1/2")	8.51	7.75	4.45	8.40	10.00	18.60	1.60	1.60	11.80	-	17.8	19.0	20.9
RS08B-NP-2					15.30	16.90	34.50				13.92	31.1	32.0	35.2
RS08B-NP-3					22.25	23.85	48.40				13.92	44.5	47.5	52.3
RS10B-NP-1	15.875 (5/8")	10.16	9.65	5.08	9.55	11.25	20.80	1.50	1.50	14.70	-	22.2	23.0	25.3
RS10B-NP-2					17.85	19.55	39.40				16.59	44.5	44.5	49.0
RS10B-NP-3					26.15	27.85	56.00				16.59	66.6	66.8	73.5
RS12B-NP-1	19.05 (3/4")	12.07	11.68	5.72	11.10	13.00	24.40	1.80	1.80	16.10	-	28.9	31.0	34.1
RS12B-NP-2					20.85	22.75	45.90				19.46	57.8	61.0	67.1
RS12B-NP-3					30.60	32.50	65.40				19.46	86.7	92.0	101.0
RS16B-NP-1	25.40 (1")	15.88	17.02	8.28	17.75	19.95	41.10	4.00	3.20	21.00	-	60.0	70.0	77.0
RS16B-NP-2					33.55	35.75	75.20				31.88	106.0	128.0	141.0
RS20B-NP-1	31.75 (1 1/4")	19.05	19.56	10.19	19.90	23.10	46.60	4.40	3.40	26.00	-	95.0	98.1	108.0
RS20B-NP-2					38.25	41.45	84.60				36.45	170.0	197.0	217.0
RS24B-NP-1	38.10 (1 1/2")	25.40	25.40	14.63	26.65	31.85	61.70	6.00	5.60	33.40	-	160.0	167.0	184.0
RS24B-NP-2					50.80	56.00	112.80				48.36	280.0	335.0	370.0
RS28B-NP-1	44.45 (1 3/4")	27.94	30.99	15.90	32.45	37.45	74.40	7.50	6.30	36.40	-	200.0	200.0	220.0
RS28B-NP-2					62.15	67.15	136.60				59.56	360.0	374.0	411.0
RS32B-NP-1	50.80 (2")	29.21	30.99	17.81	32.10	37.70	73.30	7.00	6.30	42.20	-	250.0	255.0	281.0
RS32B-NP-2					61.25	66.85	134.50				58.55	450.0	485.0	534.0

Note:

1. Connecting links are clip type for sizes up to RS16B-NP, and cotter type for sizes RS16B-NP to RS32B-NP.
2. RF06B-NP chain has flat-shaped link plates.
3. Intermediate plate of multi strand RF06B-NP-2 and RS08B-NP-2 chain is a solid plate.
4. Center sink riveting is applied to RS08B-NP-1 to RS16B-NP-1 single strand chain.
5. Double stake riveting is applied to all other sizes including multi-strand chain.
6. When a single pitch offset link is used, please calculate a 35% reduction of the fatigue strength.

ANSI LAMBDA LUBE FREE ROLLER CHAIN

TSUBAKI's LAMBDA Chains were the first in the industry to use a special oil impregnated bush. Since their launch in 1988, they have been adopted for diverse industries and applications, and their performance has been highly rated. TSUBAKI has a wide line-up of lube-free, long life products that help customers reduce costs.

Technical Evolution

As a pioneer in the lube-free chain market, TSUBAKI will reveal some of the key elements behind ANSI LAMBDA's outstanding performance:

Sintered Bush

A special oil-impregnated sintered bush in combination with a special coated pin for long-term internal lubrication is the secret of TSUBAKI ANSI LAMBDA's long economic life and wear resistance.

Patented Ring Coining Process

Breakage of the chains connecting link is no issue at TSUBAKI thanks to this unique feature. By applying the patented Ring Coining process, TSUBAKI generates a cold deformation around the pin hole of the connecting link plate. This results in residual stress around the pin hole and thereby adds strength. By using this process transmission capacity is increased to 100% of the base chain.

Special Environments

TSUBAKI ANSI LAMBDA has outstanding performance in temperatures up to +150°C.

For temperatures above +150°C: Due to the special NSF-H1 certified lubrication impregnated bushes, TSUBAKI ANSI LAMBDA KF Series is usable in a wide temperature range (from -10°C to +230°C), and for food product applications while at the same time being kind to the environment.

Please consult TSUBAKI for more detailed information.

When an application needs water wash down or is exposed to moisture, and lubrication is not possible or desirable, LAMBDA N.E.P. is most efficient.

Advantages

TSUBAKI has enhanced the ANSI LAMBDA with the following advantages:

Save Maintenance Costs

No expensive labour costs as it is not required to manually lubricate this chain.

Save Purchasing Costs

Lower frequency of purchasing due to the high quality of the chain and its long economic life. No purchasing of lubricants or lubrication systems necessary.

Higher Productivity

No unforeseen downtime due to chain breakdown.

Less time required for maintenance and therefore more time for production.

Environmental Friendly

Applications run clean thus reducing the risk of contaminating products, machines, floor etc.

Inter-Changeability

Sprockets:

Only simplex ANSI roller chain sprockets are interchangeable. Multi strand sprockets need to be customised due to the thickness of the roller link plates.

Due to the extended lifetime of ANSI LAMBDA chain, TSUBAKI advises to install sprockets with hardened teeth in every LAMBDA application.

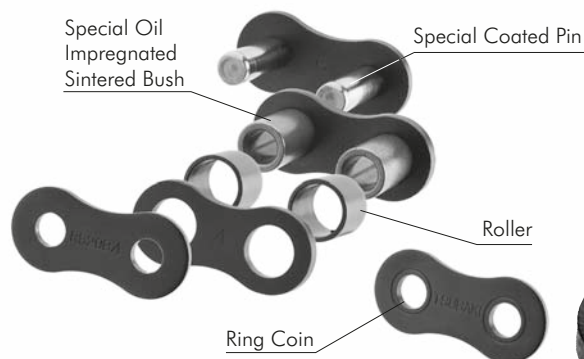
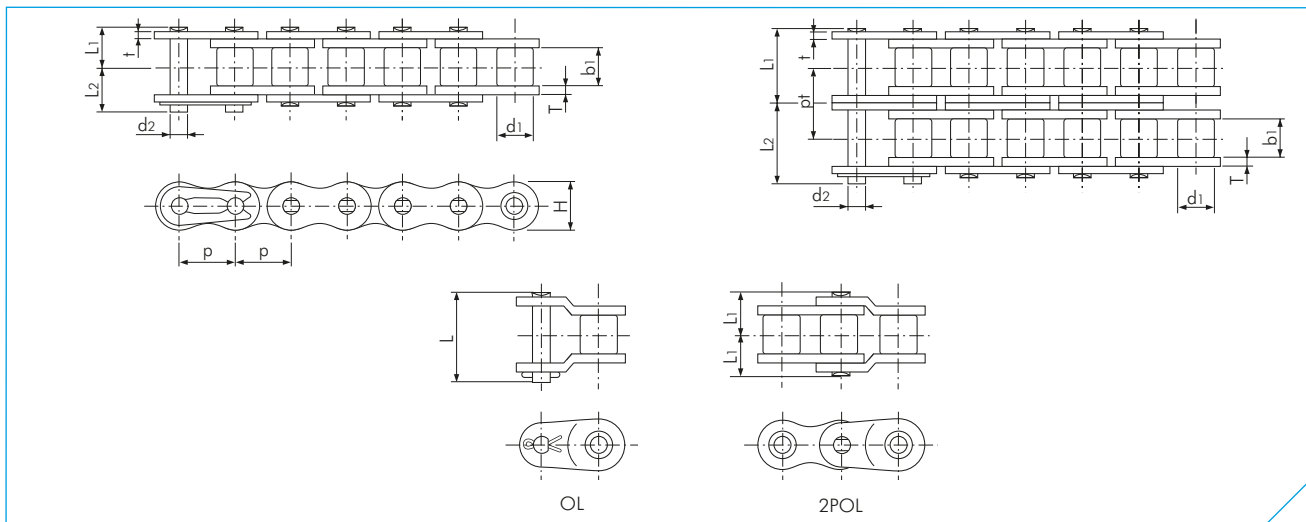


Fig. 14 Basic Construction

ANSI LAMBDA LUBE FREE ROLLER CHAIN



ANSI LAMBDA Chain

Dimensions in mm

[illegible]

Note:

1. Connecting links are clip type for sizes RS40-LMD to RS60-LMD, and cotter type for sizes RS80-LMD to RS140-LMD.
2. Drive and Conveyor series LAMBDA chain cannot be intercoupled or interchanged.
3. Due to increased roller link plate thickness, Drive LAMBDA connecting links are required.
4. Due to increased roller link plate thickness, LAMBDA double strand chains require special sprockets.
5. Due to increased roller link plate thickness, the pins are longer. Check for machine interference.
6. Offset links for LAMBDA double strand chains are not available.
7. When a single pitch offset link is used, please calculate a 35% reduction in fatigue strength.
8. Also available in N.E.P. specification.

ANSI G7 STANDARD ROLLER CHAIN

TSUBAKI's 7th model upgrade, celebrating 90 years of quality. Pursuing the ultimate in quality, TSUBAKI has created the world's highest standard of roller chain.

Technical Evolution

All ANSI Chains Are Not Created Equal

ANSI defines minimum threshold standards: acceptable, but they won't improve your bottom line. TSUBAKI ANSI G7 Chains set the bar higher with design innovations that deliver solid results!

Solid Lube Groove Bush - Our Latest Innovation

Unlike curled bush, TSUBAKI SOLID Lube Groove Bush does not have a split. This means that oil cannot leak from the bearing area as a result of that type of manufacturing process. Additional to that innovation TSUBAKI developed a unique process to add grooves to the inner surface of the solid bush. This lube groove process ensures longer and better lubrication which results in an extended chain life.

The Lube Groove Bush is available in ANSI sizes RS80 through RS140, perfectly sized for the most demanding applications.

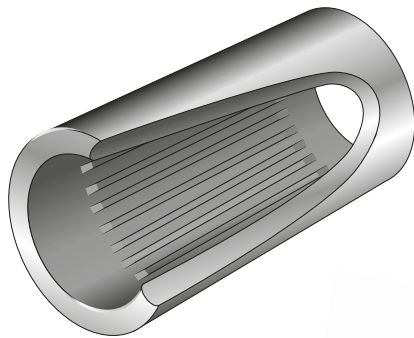


Fig. 15 Solid Lube Groove Bush

Advantages

TSUBAKI has enhanced the ANSI G7 with the following advantages:

Save Operating Costs and Reduce Downtime

Normally, ANSI chains are removed or replaced due to elongation caused by wear in the pin-bush joint. The patented Lube Groove retains lubricant right where it's needed: in the pin-bush joint. In many applications you'll notice a significant difference in maintenance, operating, and replacement costs due to the increased reliability of the ANSI G7 chains.

Increased kW Rating

Transmission capacity has been increased by applying the patented TSUBAKI Ring Coining process on the connecting link plate.

For easy assembling the pin and link plate of a connecting link are slip fit. In general, this type of connecting link has a 20% lower fatigue strength than the chain itself. However, TSUBAKI developed a special process to eliminate that loss of Fatigue Strength and still satisfy the customers demand for easy assembly: the patented Ring Coining process. By applying the patented Ring Coining process, TSUBAKI generates a cold deformation around the pin hole of the connecting link plate. This results in residual stress around the pin hole and thereby adds strength. By using this process transmission capacity is increased to 100% of that of the base chain.

Constant Quality Level

In pursuit of outstanding quality, every TSUBAKI chain is made of a special steel alloy developed by the TSUBAKI Engineering Department.

Besides that, TSUBAKI produces the ANSI G7 under highly controlled conditions in its advanced heat treatment facilities. This, in combination with the TSUBAKI fatigue strength confirmation tests, ensures that our customers can always rely on a constant level of TSUBAKI quality.

Customised Pre-Lubrication Service

Proper lubrication is the key to extend the life and improve the performance of a chain. In order to get the best performance in general applications (-10 to +60°C), all ANSI G7 drive chains are pre-lubricated.

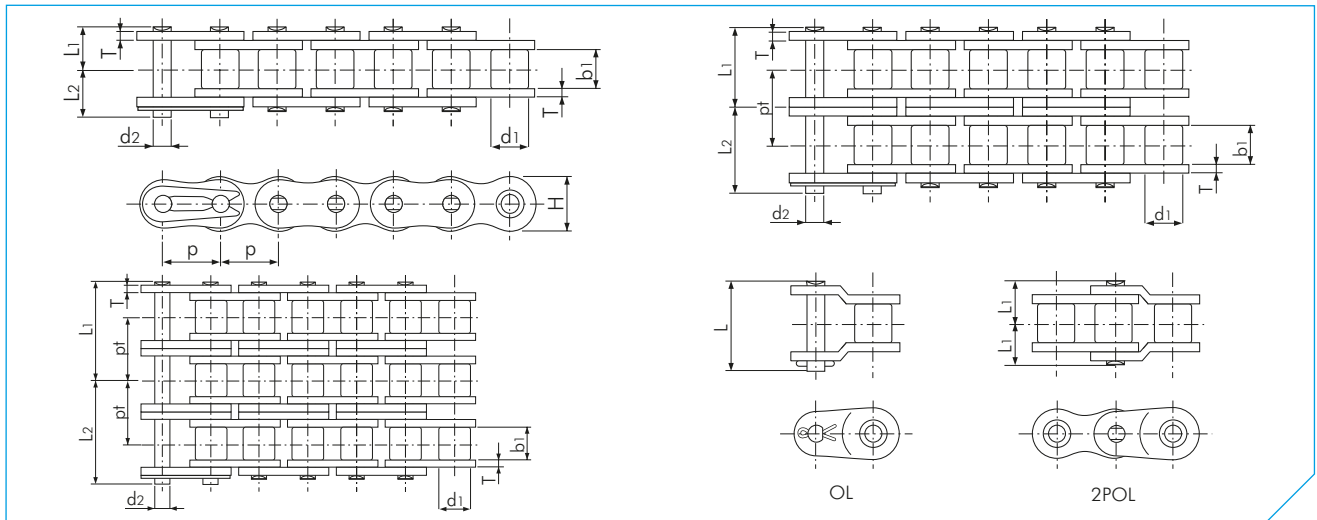
For special applications, TSUBAKI can provide chains which are pre-lubricated with a special lubricant on customer demand:

- High temperature
- Low temperature
- Food safe
- Outdoor exposure
- Dusty environment

Please consult TSUBAKI for more detailed information.



ANSI G7 STANDARD ROLLER CHAIN



ANSI G7

Dimensions in mm

TSUBAKI Chain No.	Pitch		Roller Diameter	Inner Width	Pin			Link Plate		Transverse Pitch	Min. Tensile Strength acc. to ANSI	Min. Tensile Strength acc. to Tsubaki	Approx. Mass kg/m	
					Diameter	Length	Length	Length	Thickness					Height
	p		d1	b1										
RS25-1	6.35	(1/4")	3.30	3.18	2.31	3.80	4.50	-	0.74	5.84	-	3.5	4.1	0.14
RS25-2						6.95	7.75	-			6.40	7.0	8.2	0.27
RS25-3						10.15	10.95	-			6.40	10.5	12.4	0.42
RS35-1	9.525	(3/8")	5.08	4.78	3.59	5.85	6.85	13.50	1.25	9.00	-	7.9	9.8	0.33
RS35-2						10.90	11.90	24.50			10.10	15.8	19.6	0.69
RS35-3						16.00	16.90	34.60			10.10	23.7	29.4	1.05
RS35-4						21.05	21.95	44.70			10.10	-	39.2	1.41
RS37-1	12.70	(1/2")	7.80	3.40	3.63	5.10	5.90	12.45	1.00	9.80	-	-	8.1	0.29
RS38-1	12.70	(1/2")	7.80	4.80	3.63	6.00	7.10	14.10	1.10	9.80	-	-	8.1	0.35
RS41-1	12.70	(1/2")	7.77	6.38	3.59	6.75	7.95	15.10	1.25	9.80	-	6.7	10.3	0.41
RS40-1	12.70	(1/2")	7.92	7.95	3.97	8.25	9.95	17.90	1.50	12.00	-	13.9	17.7	0.64
RS40-2						15.45	17.15	33.50			14.40	27.8	35.3	1.27
RS40-3						22.65	24.15	47.90			14.40	41.7	53.0	1.90
RS40-4						29.90	31.30	62.30			14.40	-	70.6	2.53
RS50-1	15.875	(5/8")	10.16	9.53	5.09	10.30	11.90	22.50	2.00	15.00	-	21.8	28.4	1.04
RS50-2						19.35	21.15	41.80			18.10	43.6	56.9	2.07
RS50-3						28.40	30.20	59.90			18.10	65.4	85.3	3.09
RS50-4						37.45	39.25	78.10			18.10	-	114.0	4.11
RS60-1	19.05	(3/4")	11.91	12.70	5.96	12.85	14.75	28.20	2.40	18.10	-	31.3	40.2	1.53
RS60-2						24.25	26.25	52.60			22.80	62.6	80.4	3.04
RS60-3						35.65	38.15	75.50			22.80	93.9	121.0	4.54
RS60-4						47.05	49.55	98.30			22.80	-	161.0	6.04
RS80-1	25.40	(1")	15.88	15.88	7.94	16.25	19.25	36.60	3.20	24.10	-	55.6	71.6	2.66
RS80-2						30.90	33.90	67.50			29.30	111.2	143.0	5.27
RS80-3						45.60	48.50	96.90			29.30	166.8	215.0	7.89
RS80-4						60.25	63.25	126.30			29.30	-	286.0	10.50
RS100-1	31.75	(1 1/4")	19.05	19.05	9.54	19.75	22.85	43.70	4.00	30.10	-	87.0	107.0	3.99
RS100-2						37.70	40.80	81.50			35.80	174.0	214.0	7.85
RS100-3						55.65	58.75	117.30			35.80	261.0	321.0	11.77
RS100-4						73.55	76.65	153.10			35.80	-	428.0	15.70
RS120-1	38.10	(1 1/2")	22.23	25.40	11.11	24.90	28.90	55.00	4.80	36.20	-	125.0	148.0	5.93
RS120-2						47.60	51.60	103.20			45.40	250.0	296.0	11.70
RS120-3						70.40	74.40	148.60			45.40	375.0	444.0	17.53
RS120-4						93.10	97.10	194.00			45.40	-	592.0	23.36
RS140-1	44.45	(1 3/4")	25.40	25.40	12.71	26.90	31.70	59.50	5.60	42.20	-	170.0	193.0	7.49
RS140-2						51.35	56.15	112.30			48.90	340.0	386.0	14.83
RS140-3						75.85	80.75	161.30			48.90	510.0	580.0	22.20
RS160-1	50.80	(2")	28.58	31.75	14.29	31.85	36.85	70.20	6.40	48.20	-	223.0	255.0	10.10
RS160-2						61.15	66.15	132.20			58.50	446.0	510.0	20.04
RS160-3						90.45	95.45	190.70			58.50	669.0	765.0	30.02
RS180-1	57.15	(2 1/4")	35.71	35.72	17.46	35.65	42.45	80.60	7.15	54.20	-	281.0	336.0	13.45
RS180-2						68.75	75.35	151.10			65.80	562.0	673.0	26.52
RS180-3						101.70	108.50	216.90			65.80	843.0	1010.0	38.22
RS200-1	63.50	(2 1/2")	39.68	38.10	19.85	39.00	44.80	87.30	8.00	60.30	-	347.0	427.0	16.49
RS200-2						74.85	80.65	161.20			71.60	694.0	853.0	32.63
RS200-3						110.75	116.45	233.00			71.60	1041.0	1280.0	49.02
RS240-1	76.20	(3")	47.63	47.63	23.81	47.90	55.50	106.70	9.50	72.40	-	500.0	623.0	24.50
RS240-2						91.90	99.40	198.40			87.80	1000.0	1250.0	48.10

Note:

1. RS25 - RS35 are rollerless chain (only bush). The figure shown is the bush diameter.
2. Connecting links are clip type for sizes up to RS60, and cotter type for sizes RS80 to RS200. RS240 connecting links are spring pin type.
3. When a single pitch offset link is used, please calculate a 35% reduction of the fatigue strength.

ANSI CHAIN FOR CORROSIVE ENVIRONMENTS

Whether your operation requires a sanitary environment, is exposed to corrosive chemicals, is heated to extreme temperatures, runs through a freezer, is exposed to the outdoors or is affected by excessive moisture: our specially designed and tested chains will outlast your current chains and contribute to a cost effective application.

Corrosion Resistant Chain (Stainless Steel base)

ANSI PC Engineering Plastic Combination Chain

The pins and pin link plates of these chains are made of SUS304 (spring clips SUS301). Engineering Plastic (white) is used for the inner link. This combination makes it a lube-free, low noise (5 dB lower than ANSI standard roller chain) and lightweight chain (50% lighter than ANSI standard roller chain). Working temperature range: -20°C to +80°C. For details on corrosion resistance, please check out the table in the back of this catalogue as a basic guide.

ANSI SS Stainless Steel Chain

All basic components of this chain are made of Stainless Steel SUS304 (except the spring clips, which are made of SUS301). This chain can be used in special environments such as under-water, acidic and alkaline applications. It can also be used in high and low temperatures (-20°C to +400°C). SUS304 is only marginally magnetic, due to the cold-forging process. For details on corrosion resistance, please check out the table in the back of this catalogue as a basic guide.

ANSI AS Stainless Steel Chain

The pins and rollers of this roller chain are made of precipitation-hardened, tempered stainless steel (SUS600). The link plates and the bushes are made of SUS304 stainless steel (spring clips are SUS301). The Maximum Allowable Load is 1.5 times that of ANSI SS chain. Corrosion resistance is slightly lower than standard SS chain. This chain is suitable where corrosion and heat resistance is required in a heavy duty drive application and where a smaller ANSI SS chain is preferred. Magnetism exists due to the use of precipitation-hardened SUS600. The working temperature range: -20°C to +400°C.

Corrosion Protected Chain (Carbon Steel base)

ANSI N.E.P. New Environmental Plating Chain

ANSI N.E.P. Chain is a TSUBAKI ANSI G7 chain that has undergone a special surface treatment. The link plates, bushes and pins have a special three stage layer applied in order to provide the maximum protection from the operating or environmental conditions. (Spring clips are SUS301). N.E.P. Rollers have a special coating designed to resist the corrosive conditions as well as the severe dynamic contact between roller and sprocket.

This chain is suitable for use in environments exposed to seawater, acid-rain and other adverse weather conditions. This chain does not contain any chemically hazardous substances such as Hexavalent Chromium, Lead, Cadmium and Mercury as regulated by RoHS[√]. The kilowatt ratings are the same as those of the corresponding ANSI G7 chain. Working temperature range is: -10°C to +150°C. Above +60°C a special high-temperature lubrication is required. Of course, ANSI LAMBDA N.E.P. chain is also available.

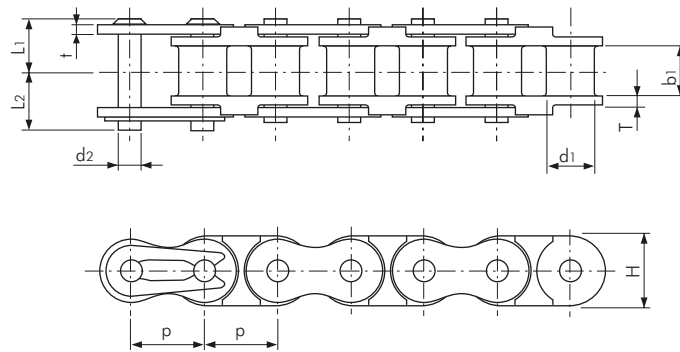
ANSI NP Nickel Plated Chain

ANSI NP Chain is a TSUBAKI ANSI G7 chain that has been plated with Nickel. NP chain has a light corrosion resistance and an attractive appearance. NP chain is suitable for outdoor conditions exposed to water. There is a 15% reduction in Maximum Allowable Load compared to the corresponding ANSI G7 chain, so please take this into account when making your chain selection. The working temperature range is: -10°C to +60°C. Of course, ANSI LAMBDA NP chain is also available.

[√]RoHS = Restriction of Hazardous Substances



ANSI CHAIN FOR CORROSIVE ENVIRONMENTS



ANSI PC Chain

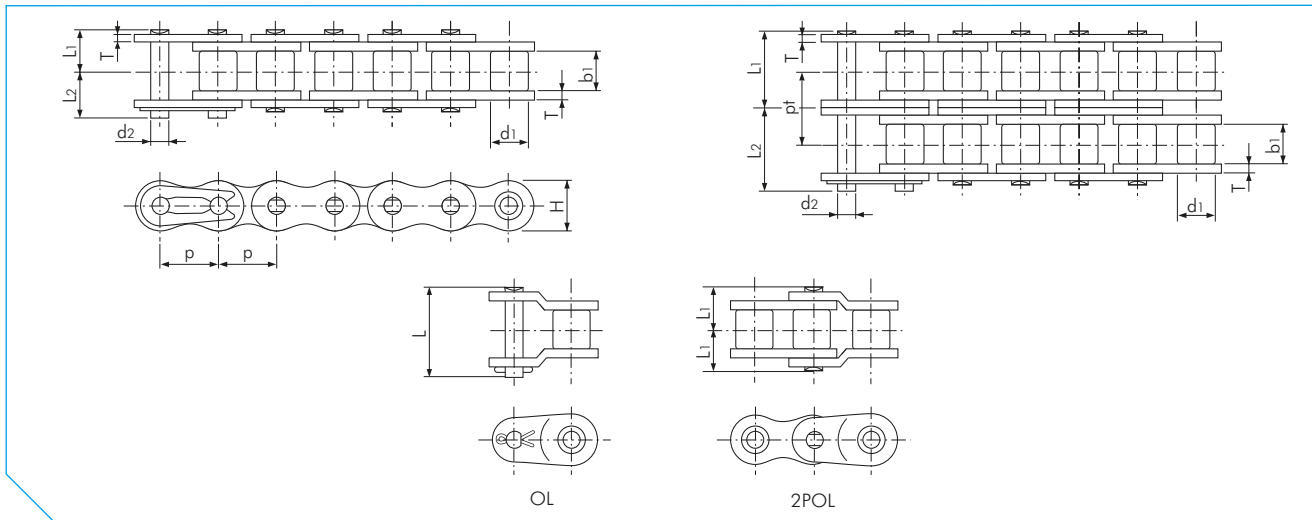
Dimensions in mm

[illegible]

Note:

1. Make sure to check the chain load again when replacing Stainless Steel Chain with PC Chain.
2. Offset links are not available.
3. Use a chain tensioner with an idler sprocket to adjust chain tension.
4. Guide rails should support the underside of the inner links.
5. For details on corrosion resistance selection, please consult our Corrosion Resistance Guide in this catalogue.

ANSI CHAIN FOR CORROSIVE ENVIRONMENTS



ANSI SS Chain

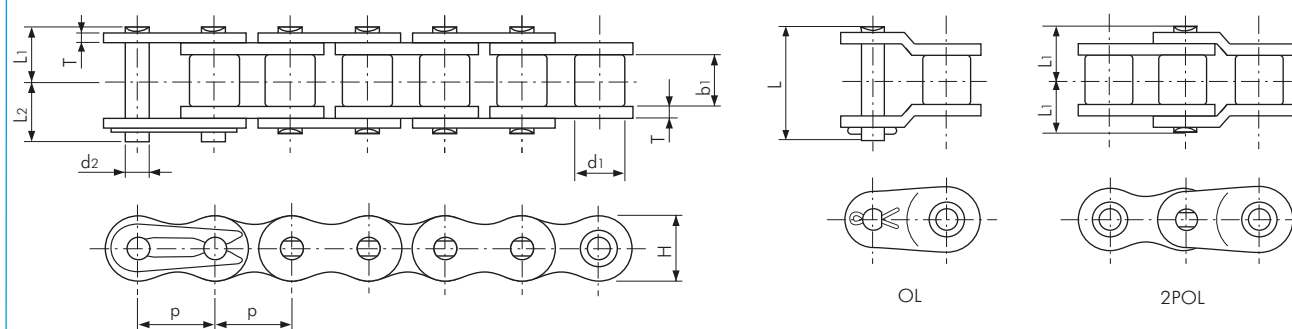
Dimensions in mm

TSUBAKI Chain No.	Pitch p	Roller Diameter d1	Inner Width b1	Pin				Link Plate		Transverse Pitch pt	Max. Allowable Load acc. to Tsubaki kN	Approx. Mass kg/m
				Diameter d2	Length L1	Length L2	Length L	Thickness T	Height H (max)			
RS11-SS-1	3.7465 (-)	2.285	1.83	1.57	2.275	3.165	-	0.38	3.50	-	0.05	0.052
RS25-SS-1	6.35 (1/4")	3.30	3.18	2.31	3.80	4.80	-	0.75	5.84	-	0.12	0.14
RS35-SS-1	9.525 (3/8")	5.08	4.78	3.59	5.85	6.85	14.70	1.25	9.00	-	0.26	0.33
RS35-SS-2					11.05	11.95	24.60			10.10	0.52	0.69
RS40-SS-1	12.70 (1/2")	7.92	7.95	3.97	8.25	9.95	18.60	1.50	12.00	-	0.44	0.64
RS40-SS-2					15.45	17.15	33.50			14.40	0.88	1.27
RS50-SS-1	15.875 (5/8")	10.16	9.53	5.09	10.30	12.00	23.90	2.00	15.00	-	0.69	1.04
RS50-SS-2					19.35	21.15	41.80			18.10	1.37	2.07
RS60-SS-1	19.05 (3/4")	11.91	12.70	5.96	12.85	14.75	29.40	2.40	18.10	-	1.03	1.53
RS60-SS-2					24.25	26.25	52.60			22.80	2.06	3.04
RS80-SS-1	25.40 (1")	15.88	15.88	7.94	16.25	19.25	39.00	3.20	24.10	-	1.77	2.66
RS80-SS-2					30.90	33.90	68.05			29.30	3.53	5.30
RS100-SS-1	31.75 (1 1/4")	19.05	19.05	9.54	19.75	22.85	46.50	4.00	30.10	-	2.55	4.01
RS100-SS-2					37.70	40.80	81.60			35.80	5.10	7.99

Note:

1. RS11-SS to RS35-SS are rollerless chain (only bush). The figure shown is the bush diameter.
2. Connecting links are clip type for sizes RS11-SS to RS60-SS, and cotter type for sizes RS80-SS to RS100-SS.
3. The rivet-type for single-strand and multi-strand chain above RS80-SS is quad-rivet.
4. For details on corrosion resistance selection, please consult our Corrosion Resistance Guide in this catalogue.

ANSI CHAIN FOR CORROSIVE ENVIRONMENTS



ANSI AS Chain

Dimensions in mm

[illegible]

Note:

1. Connecting links are clip type for sizes RS35-AS to RS60-AS, and cotter type for size RS80-AS.
2. RS35-AS is rollerless chain (only bush). The figure shown is the bush diameter.
3. For details on corrosion resistance selection, please consult our Corrosion Resistance Guide in this catalogue.

ANSI LAMBDA N.E.P. Chain

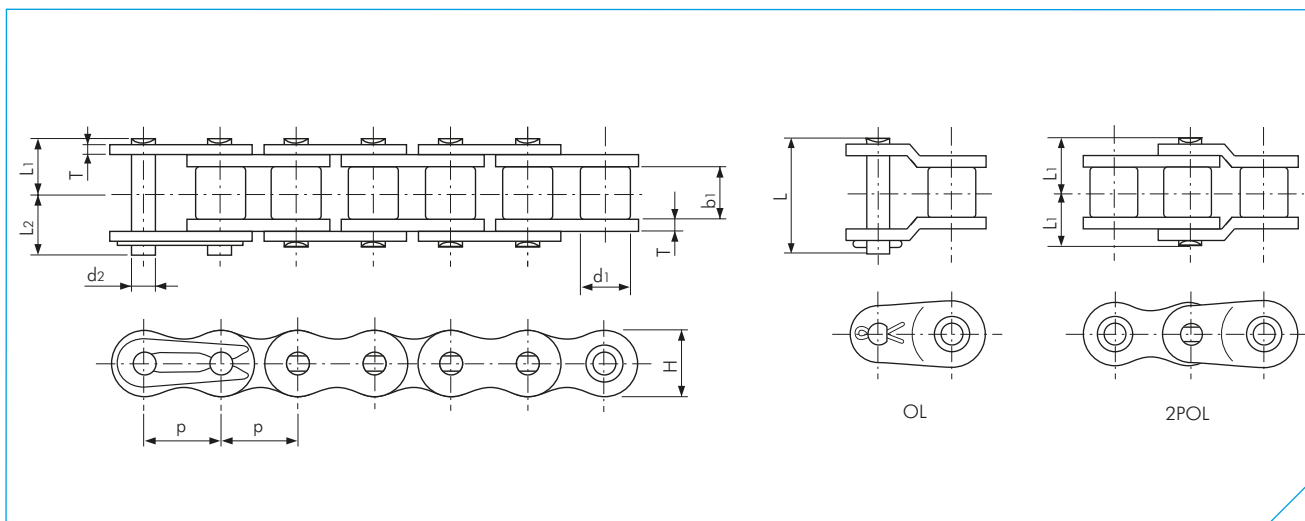


ANSI LAMBDA N.E.P. Chain

[illegible]

1. Connecting links are clip type for sizes RS40-LMD-NEP to RS60-LMD-NEP, and cotter type for sizes RS80-LMD-NEP to RS140-LMD-NEP.
2. Drive and Conveyor series LAMBDA chain cannot be intercoupled or interchanged.
3. Due to increased roller link plate thickness, Drive LAMBDA connecting links are required.
4. Due to increased roller link plate thickness, the pins are longer. Check for machine interference.
5. When a single pitch offset link is used, please calculate a 35% reduction in fatigue strength.

ANSI CHAIN FOR CORROSIVE ENVIRONMENTS



ANSI N.E.P. Chain

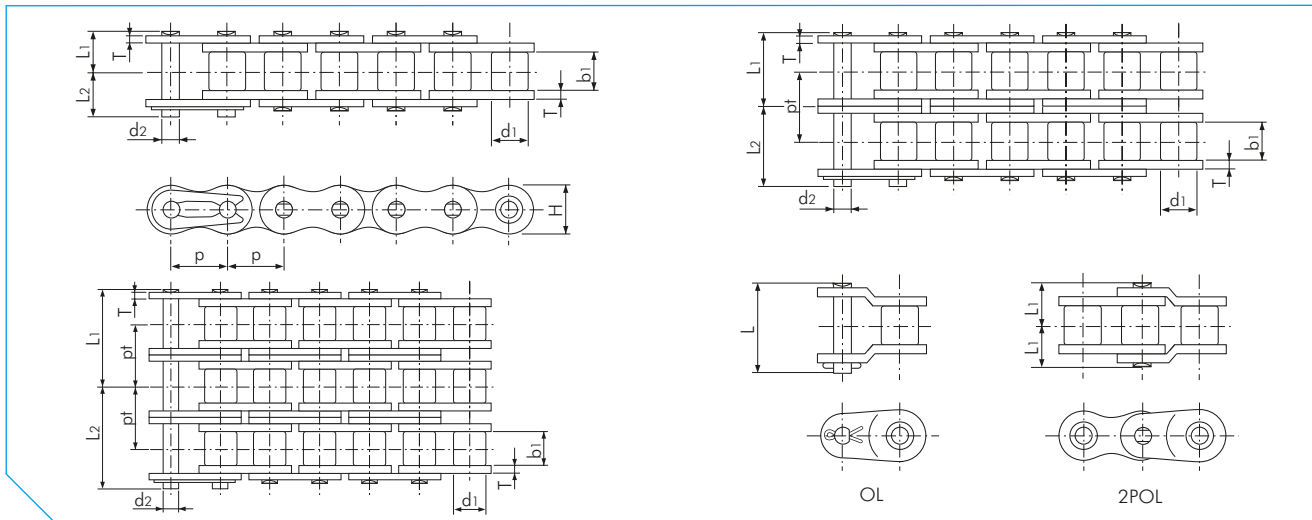
Dimensions in mm

[illegible]

Note:

1. Connecting links are clip type for sizes RS35-NEP to RS60-NEP, and cotter type for size RS80-NEP.
2. When a single pitch offset link is used, please calculate a 35% reduction of the fatigue strength.

ANSI CHAIN FOR CORROSIVE ENVIRONMENTS



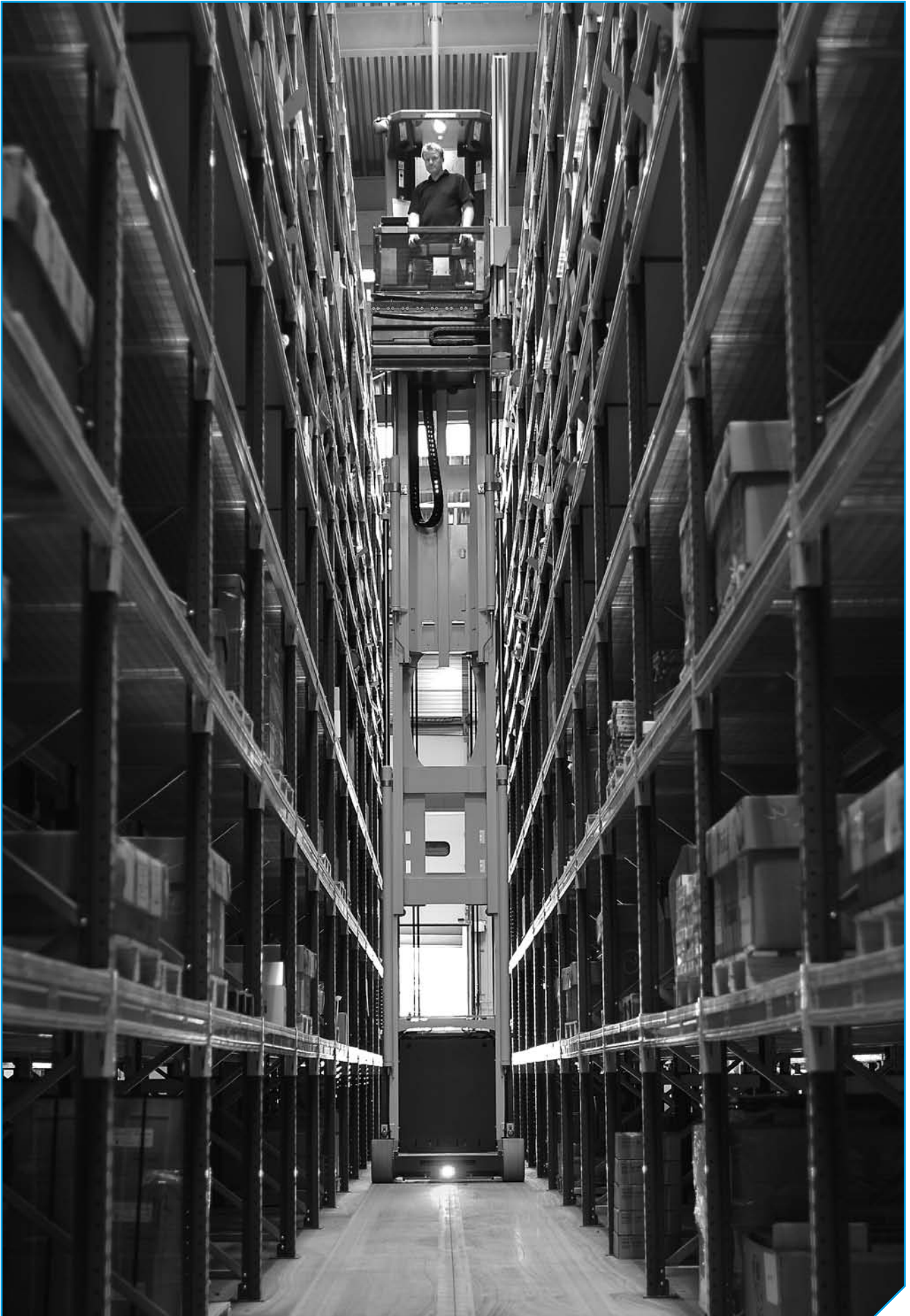
ANSI NP Chain

Dimensions in mm

TSUBAKI Chain No.	Pitch p	Roller Diameter d1	Inner Width b1	Pin				Link Plate		Transverse Pitch pt	Min. Tensile Strength acc. to Tsubaki kN	Approx. Mass kg/m
				Diameter d2	Length L1	Length L2	Length L	Thickness T	Height H (max)			
RS25-NP-1	6.35 (1/4")	3.30	3.18	2.31	3.80	4.50	7.60	0.75	5.84	-	4.1	0.14
RS35-NP-1	9.525 (3/8")	5.08	4.78	3.59	5.85	6.85	13.50	1.25	9.00	-	9.8	0.33
RS35-NP-2					10.90	11.90	24.50			10.10	19.6	0.69
RS35-NP-3					16.00	16.90	34.60			10.10	29.4	1.05
RS40-NP-1	12.70 (1/2")	7.92	7.95	3.97	8.25	9.95	18.00	1.50	12.00	-	17.7	0.64
RS40-NP-2					15.45	17.15	33.50			14.40	35.3	1.27
RS40-NP-3					22.65	24.15	47.90			14.40	53.0	1.90
RS50-NP-1	15.875 (5/8")	10.16	9.53	5.09	10.30	12.00	22.50	2.00	15.00	-	28.4	1.04
RS50-NP-2					19.35	21.15	41.80			18.10	56.9	2.07
RS50-NP-3					28.40	30.20	59.90			18.10	85.3	3.09
RS60-NP-1	19.05 (3/4")	11.91	12.70	5.96	12.85	14.75	28.20	2.40	18.10	-	40.2	1.53
RS60-NP-2					24.25	26.25	52.60			22.80	80.4	3.04
RS60-NP-3					35.65	38.15	75.50			22.80	121.0	4.54
RS80-NP-1	25.40 (1")	15.88	15.88	7.94	16.25	19.25	36.00	3.20	24.10	-	71.6	2.66
RS80-NP-2					30.90	33.90	67.50			29.30	143.0	5.27
RS80-NP-3					45.60	48.50	96.90			29.30	215.0	7.89
RS100-NP-1	31.75 (1 1/4")	19.05	19.05	9.54	19.75	22.85	44.40	4.00	30.10	-	107.0	3.99

Note:

1. RS25-NP to RS35-NP are rollerless chains (only bush). The figure shown is the bush diameter.
2. Connecting links are clip type for sizes RS25-NP to RS60-NP, and cotter type for size RS80-NP to RS100-NP.
3. When a single pitch offset link is used, please calculate a 35% reduction of the fatigue strength.



Logistic Warehouse Dordrecht

ANSI HEAVY DUTY ROLLER CHAIN

The superior performance of TSUBAKI Heavy Duty chains is the result of a comprehensive quality control network that begins with selection of the world's finest steel materials. It continues with inspection and analysis of quality and performance in 20 different work areas. At TSUBAKI quality control is not just a one time check; it is a total dedication. It is your assurance of long lasting and dependable performance.

TSUBAKI offers Heavy Duty chains for applications that exceed the capabilities of TSUBAKI ANSI G7 standard roller chain. Heavy Duty chain should be considered in the following situations:

1. Harsh environments where the chain will be subjected to heavy impact.
2. Compact drives for equipment or machines that must work in tight spaces.
3. When higher transmission power, allowable load or tensile strength is required.
4. When a lower rate of elastic elongation is required.

H Series

H Series chain differs only from the ANSI G7 Series chain in the thickness of the link plates. The link plates have the same thickness as the link plates of the next larger pitch size in ANSI G7 Series. The increased thickness of the link plates provides a 10% greater capacity for absorbing shock loads. In short, H Series chains are especially suitable for situations where the load is heavy and operating speed is low (up to 50 m/min) or where operating conditions are severe.

HT Series

HT Series chain provides a (10% to 20%) higher Tensile Strength than ANSI G7 Series chain by using through-hardened pins and link plates of the next larger pitch size in ANSI G7 series. HT Series chain also provides a higher shock load resistance and is best suited for low operating speeds - up to 50 m/min. Dimensions of the chain are identical to the H Series chain.

SUPER Series

The dimensions of these series are identical to those of ANSI G7 Series chain. The special design of the SUPER Series link plate delivers exceptional performance. The pin holes are critically formed and ball drifted and the pins are through-hardened for greater shock resistance (25% to 30%). SUPER Series chains offer 10% higher tensile strength than the equivalent size ANSI G7 Series chain. SUPER Series chains can be used to replace the next larger pitch size of ANSI G7 Series, making them ideal for applications where chain space is limited. Best suited for low speed operating conditions - up to 50 m/min.

SUPER-H Series

The thickness of the SUPER-H Series link plates is the same as the next larger pitch size of SUPER Series chain. The pins are also through-hardened which provides a higher tensile strength and a higher shock load resistance than SUPER Series chain. The pin holes are critically formed and ball drifted. SUPER-H Series chains can be used to replace the next larger size of ANSI standard chain, making them ideal for applications where space is limited. Best suited for low speed operating conditions - up to 50 m/min.

ULTRA SUPER Series

ULTRA SUPER Series offer longer wear life, greater shock load resistance (170%) and higher tensile strength (150%) than any other TSUBAKI roller chain. The pins are through-hardened and the pin holes are critically formed and ball drifted. The diameter of the pins has been increased. This chain is well suited for applications where there are space limitations. The heavy duty construction of the ULTRA SUPER Series chain allows it to replace chains up to two pitch sizes larger ANSI G7 Series chain. It is best suited for low speed operating conditions up to 50 m/min.

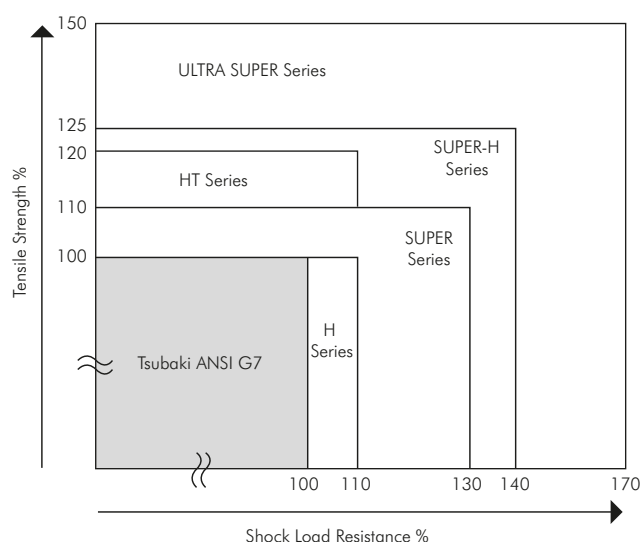
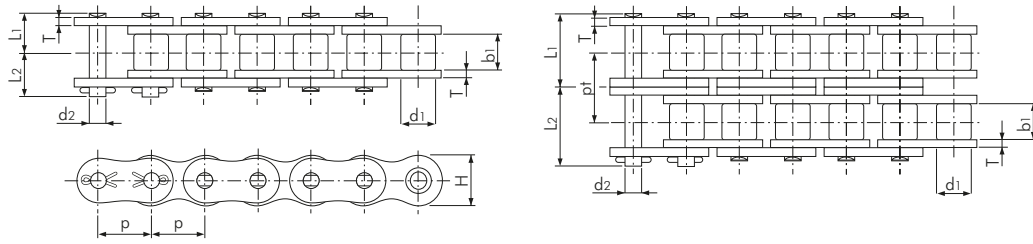


Fig. 16 Comparison of Tensile Strength / Shock Load Resistance

ANSI HEAVY DUTY ROLLER CHAIN



H Series

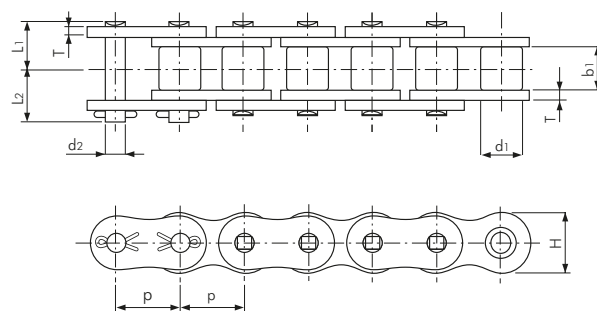
Dimensions in mm

TSUBAKI Chain No.	Pitch p	Roller Diameter d1	Inner Width b1	Diameter d2	Pin		Link Plate		Transverse Pitch pt	Av. Tensile Strength acc. to Tsubaki kN	Approx. Mass kg/m
					Length L1	Length L2	Thickness T	Height H (max)			
RS60-H-1	19.05 (3/4")	11.91	12.70	5.96	14.80	17.00	3.20	18.10	-	44.1	1.80
RS60-H-2					27.80	29.90			26.10	88.3	3.59
RS80-H-1	25.40 (1")	15.88	15.88	7.94	18.30	20.90	4.00	24.10	-	78.5	3.11
RS80-H-2					34.60	37.20			32.60	157.0	6.18
RS100-H-1	31.75 (1 1/4")	19.05	19.05	9.54	21.80	24.50	4.80	30.10	-	117.7	4.58
RS100-H-2					41.40	44.10			39.10	235.4	9.03
RS120-H-1	38.10 (1 1/2")	22.23	25.40	11.11	26.95	30.55	5.60	36.20	-	166.8	6.53
RS120-H-2					51.40	55.00			48.90	319.8	12.90
RS140-H-1	44.45 (1 3/4")	25.40	25.40	12.71	28.90	33.10	6.40	42.20	-	215.8	8.27
RS140-H-2					54.95	59.50			52.20	419.9	16.38
RS160-H-1	50.80 (2")	28.58	31.75	14.29	33.95	38.45	7.15	48.20	-	269.8	10.97
RS160-H-2					64.90	69.60			61.90	529.7	21.78
RS200-H-1	63.50 (2 1/2")	39.68	38.10	19.85	42.90	48.10	9.50	60.30	-	461.0	18.41

Note:

1. Standard ANSI sprockets can be used for single strand chain.
2. Multi strand chains need special sprockets, contact Tsubaki for more detailed information.
3. Sprockets with a low teeth number must have hardened teeth.
4. Steel grade of sprockets must be C45 or higher.

ANSI HEAVY DUTY ROLLER CHAIN



HT Series

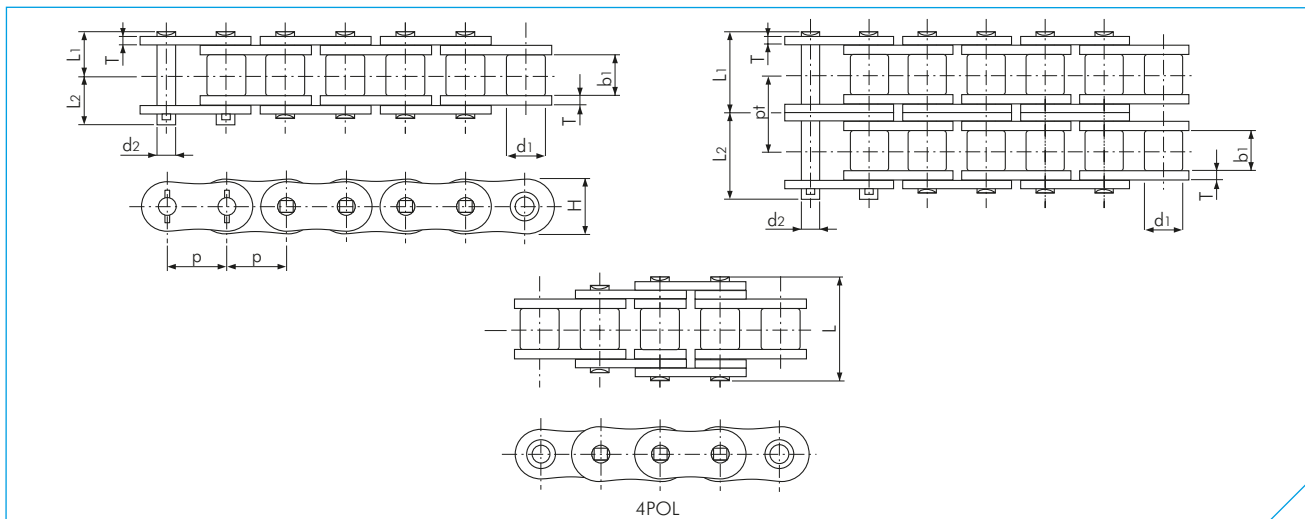
Dimensions in mm

[illegible]

Note:

1. Semi press-fit type connecting links are supplied.
2. Standard ANSI sprockets can be used for single strand chain.
3. Sprockets with a low teeth number must have hardened teeth.
4. Steel grade of sprockets must be C45 or higher.
5. Multi strand chains are available on request.
6. Pins are quad riveted.

ANSI HEAVY DUTY ROLLER CHAIN



SUPER Series

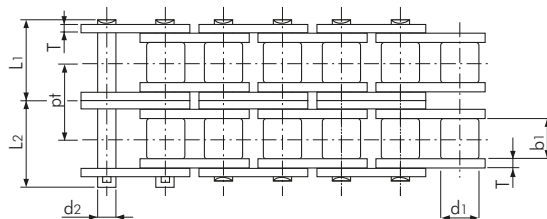
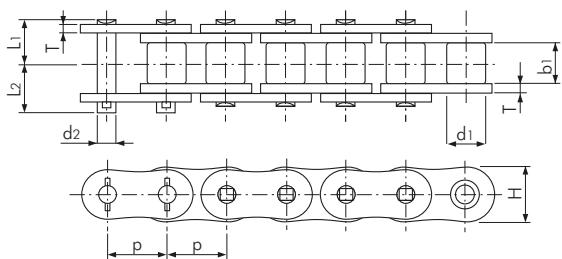
Dimensions in mm

[illegible]

Note:

1. When a 4POL is used, please calculate a 10% reduction of the fatigue strength.
2. Standard ANSI sprockets can be used.
3. Pins are quad riveted.

ANSI HEAVY DUTY ROLLER CHAIN



SUPER-H Series

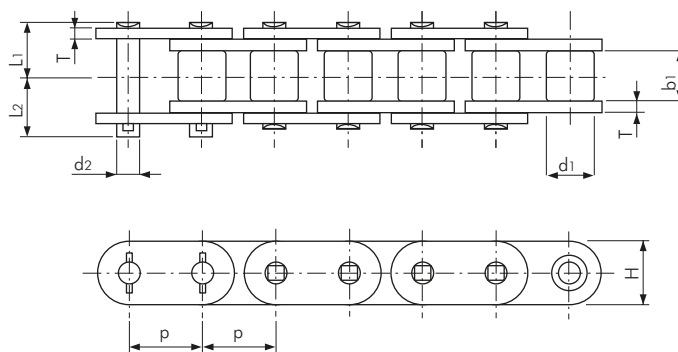
Dimensions in mm

[illegible]

Note:

1. Offset links are not available.
2. Press-fit type connecting links are supplied.
3. Standard ANSI sprockets can be used with single strand chain only.
4. Sprockets with a low teeth number must have hardened teeth.
5. Steel grade of sprockets must be C45 or higher.
6. Multi strand chains need special sprockets, contact Tsubaki for more detailed information.
7. Pins are quad riveted.

ANSI HEAVY DUTY ROLLER CHAIN



ULTRA SUPER Series

Dimensions in mm

[illegible]

Note:

1. Standard ANSI sprockets can be used if the sprocket teeth have been hardened.
2. Steel grade of sprockets must be C45 or higher.
3. Offset links are not available.
4. Multi-strand chains are not available.
5. Press-fit type connecting links are supplied.
6. Pins are quad riveted.

ANSI LOW NOISE ROLLER CHAIN

Low Noise Drive Chain - a TSUBAKI innovation - creates a worker-friendly, environmentally friendly plant. It reduces equipment noise, and it eliminates the need for expensive, hard-to-work-around soundproof enclosures.

Technical Evolution

TSUBAKI's uniquely structured spring rollers are used for chain rollers. When TSUBAKI's Low Noise roller chain engages the sprocket, the spring roller deforms and absorbs the force of impact, reducing impact noise between chain and sprocket. Compared with TSUBAKI's standard roller chain, noise levels of Low Noise Roller Chain are 6 - 8 dB lower. Working temperature range: -10°C to +60°C. Allowable chain speed: 200 m/min.

Advantages

Noise Reduction

Lower noise levels increase comfort levels in the workplace. Besides, lower noise levels also eliminate the need for costly, soundproof enclosures.

Stronger than Belts

In some applications, belts are considered as a countermeasure to noise. However, there are many limitations in terms of strength when considering belts. The TSUBAKI Low Noise roller chain is perfect for applications where the strength of a roller chain is needed without the accompanying noise.

Inter-Changeability

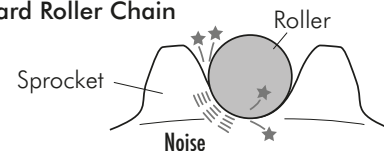
Chains:

TSUBAKI Low Noise roller chain is directly interchangeable with ANSI standard roller chain.

Sprockets:

Standard ANSI roller chain sprockets can be used. However, if the chain cannot be sufficiently lubricated, TSUBAKI recommends installing sprockets with hardened teeth.

Standard Roller Chain



Low Noise Drive Chain

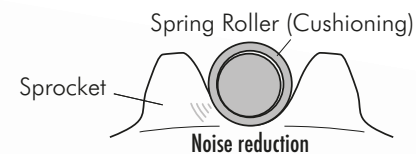
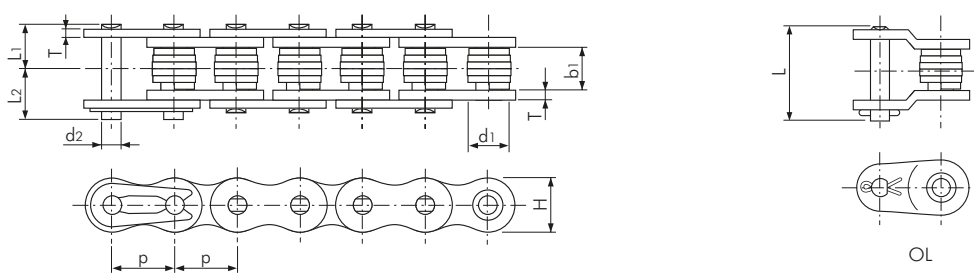


Fig. 17 Cushioning Effect



ANSI LOW NOISE ROLLER CHAIN



ANSI SNS Chain

Dimensions in mm

[illegible]

Note:

1. Connecting links are clip type for sizes RS40-SNS to RS60-SNS, and cotter type for size RS80-SNS.
2. When a single pitch offset link is used, please calculate a 35% reduction of the Fatigue Strength.
3. Standard ANSI sprockets can be used.

ANSI LEAF CHAIN

Leaf Chain is the most simple of steel chains, consisting only of link plates and pins. This chain generally has greater tensile strength than roller chains and runs over sheaves rather than sprockets. They are suitable for hanging, balancing or motion transmitting applications. Leaf chains are often used as counterweight chains for machine tools, elevator and oven doors, forklift truck masts, spinning frames and similar lifting or balancing applications.

Plates are connected by pins and hold the tension loaded on the chain.

AL Type

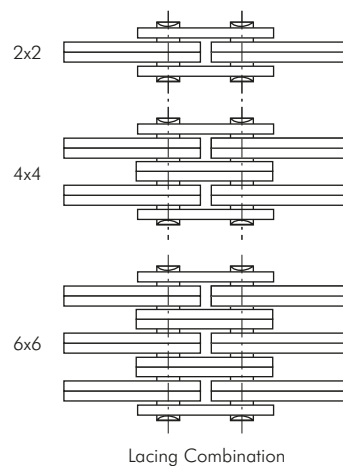
Plate configuration and thickness are the same as ANSI G7 roller chain. Pin diameter is almost the same as ANSI G7 roller chain.

BL Type

BL Series leaf chains consist of link plates which are thicker and larger in contour than the AL Series link plates of the same pitch. The link plates have the same thickness as the link plates of the next larger pitch size in ANSI G7 roller chains. The pins have the same diameter as those of ANSI G7 roller chains of the next larger pitch.



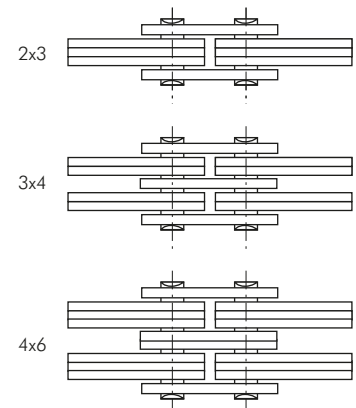
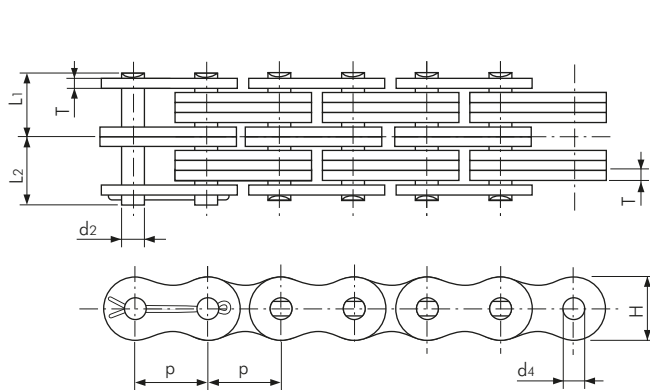
AL Type



Note:

1. For more detailed information regarding clevises and sheaves, please contact Tsubaki.

ANSI LEAF CHAIN



Lacing Combination

BL Type

Dimensions in mm

TSUBAKI Chain No.	Pitch	Lacing Combination	Pin			Link Plate			Min. Tensile Strength acc. to Tsubaki	Approx. Mass
			Diameter	Length	Length	Thickness	Height	Hole Diameter		
p	LC	d2	L1	L2	T	H (max)	d4	kN	kg/m	
BL 422	12.70 (1/2")	2 x 2	5.08	5.44	6.99	2.00	12.00	5.13	23.5	0.68
BL 423		2 x 3		6.48	8.02				23.5	0.84
BL 434		3 x 4		8.61	10.15				35.3	1.13
BL 444		4 x 4		9.70	11.25				47.1	1.28
BL 446		4 x 6		11.80	13.35				47.1	1.65
BL 466		6 x 6		13.89	15.44				69.4	1.96
BL 522	15.875 (5/8")	2 x 2	5.94	6.32	8.23	2.40	15.00	6.00	39.2	1.07
BL 523		2 x 3		7.55	9.45				39.2	1.27
BL 534		3 x 4		10.05	11.95				58.8	1.69
BL 544		4 x 4		11.28	13.18				78.5	1.89
BL 546		4 x 6		13.75	15.65				78.5	2.40
BL 566		6 x 6		16.23	18.14				117.4	2.80
BL 622	19.05 (3/4")	2 x 2	7.90	8.20	11.02	3.20	18.10	7.97	63.7	1.68
BL 623		2 x 3		9.88	12.67				63.7	2.04
BL 634		3 x 4		13.23	16.02				95.6	2.83
BL 644		4 x 4		14.91	17.70				127.0	3.18
BL 646		4 x 6		18.25	21.05				127.0	4.01
BL 666		6 x 6		21.62	24.41				191.2	4.73
BL 822	25.40 (1")	2 x 2	9.48	10.08	13.28	4.00	24.10	9.57	103.0	2.59
BL 823		2 x 3		12.10	15.30				103.0	3.20
BL 834		3 x 4		16.28	19.47				155.0	4.44
BL 844		4 x 4		18.47	21.67				206.0	5.04
BL 846		4 x 6		22.50	25.70				206.0	6.32
BL 866		6 x 6		26.64	29.85				309.0	7.54
BL 1022	31.75 (1 1/4")	2 x 2	11.04	11.99	15.67	4.80	30.10	11.14	141.0	3.76
BL 1023		2 x 3		14.45	18.15				141.0	4.69
BL 1034		3 x 4		19.43	23.12				216.0	6.55
BL 1044		4 x 4		21.69	25.37				282.0	7.48
BL 1046		4 x 6		26.85	30.55				282.0	9.29
BL 1066		6 x 6		31.93	35.61				424.0	11.16
BL 1222	38.10 (1 1/2")	2 x 2	12.64	14.02	18.54	5.60	36.20	12.74	186.0	4.83
BL 1223		2 x 3		16.95	21.45				186.0	6.54
BL 1234		3 x 4		22.75	27.25				299.0	9.10
BL 1244		4 x 4		25.65	30.18				373.0	10.39
BL 1246		4 x 6		31.48	35.97				373.0	12.01
BL 1266		6 x 6		37.29	41.81				559.0	14.58
BL 1422	44.45 (1 3/4")	2 x 2	14.21	15.82	20.83	6.40	42.20	14.32	235.0	7.31
BL 1423		2 x 3		19.10	24.10				235.0	9.06
BL 1434		3 x 4		25.70	30.70				387.0	11.32
BL 1444		4 x 4		29.03	34.04				471.0	12.96
BL 1446		4 x 6		35.63	40.62				471.0	18.00
BL 1466		6 x 6		42.24	47.24				706.0	22.51
BL 1622	50.80 (2")	2 x 2	17.38	17.81	24.41	7.20	48.20	17.49	353.0	9.84
BL 1623		2 x 3		21.63	28.22				353.0	12.16
BL 1634		3 x 4		29.20	35.80				554.0	16.95
BL 1644		4 x 4		32.94	39.55				706.0	18.97
BL 1646		4 x 6		40.53	47.12				706.0	24.09
BL 1666		6 x 6		48.08	54.69				1060.0	28.73

Note:

1. For more detailed information regarding clevises and sheaves, please contact Tsubaki.

TEMPERATURE SELECTION METHOD

This selection method is for chains that may experience strength degradation from temperature. Additionally, lubrication should be carried out using a suitable lubricant according to the operating temperatures.

High Temperature

When chains are used in high temperatures, the following problems may occur:

- Increased wear due to decreased hardness.
- Poor articulation and increased wear due to lubricant deterioration and carbonization.
- Stiff joints and increased wear due to oxide scale formation.
- Increased elongation due to softening.
- Decreased strength.

To prevent lubricant deterioration at high temperatures, use a special lubricant.

When chains are used in temperatures above +250°C, pay special attention to the composition and heat-treatment of the chain. The most popular type of chain for high temperature is SS specification, which is made of 304 stainless steel and has a maximum working temperature of +650°C at low speeds. However, to maintain an adequate safety margin at a high temperature like this, we suggest NS specification chain. NS chain is made of 316 stainless steel, which contains molybdenum and less carbon. NS specification has worked at low speed in environments up to +700°C.

If your operation runs at temperatures higher than +400°C, consult Tsubaki before making your chain selection. Production methods and materials may be specially adapted for your application.

Low Temperature

When chains are used in low temperatures, the following problems may occur:

- Decreased shock strength due to low-temperature brittleness.
- Lubricant solidification.
- Stiff joints caused by frost or ice adhesion.

Two types of chain are especially useful at lower temperatures. KT specification chain is specially heat-treated to withstand very cold environments. SS specification chain, which is made of 304 stainless steel, may also be used at low temperatures. Low-temperature brittleness does not occur in austenitic stainless steel. These chains cannot fix the problems of solidification of the lubricant or stiff joints caused by frost or ice. Use cold-temperature oil or grease and apply it to the inner clearances and the outside of the chain.

Standard engineered plastic chain can be run at temperatures between -20°C and +80°C. At higher temperatures, it may become soft and not keep its shape; at lower temperatures it may become brittle.

Temperature	Standard Roller Chain		KT Cold Resistant Chain*	SS, NS, AS Chain
	upto 1" pitch	1" pitch and over		
Below -60°C	-	-	unusable	-
-60°C to -50°C	-	-	MAL / 2	-
-50°C to -40°C	-	unusable	MAL / 1.5	-
-40°C to -30°C	unusable	MAL / 4	MAL	-
-30°C to -20°C	MAL / 4	MAL / 3	MAL	#
-20°C to -10°C	MAL / 3	MAL / 2	MAL	MAL
-10°C to +60°C	MAL	MAL	MAL	MAL
+60°C to +150°C	MAL	MAL	unusable	MAL
+150°C to +200°C	MAL / 1.3	MAL / 1.3	-	MAL
+200°C to +250°C	MAL / 2	MAL / 2	-	MAL
+250°C to +400°C	unusable	unusable	-	MAL
+400°C to +500°C	-	-	-	#
+500°C to +600°C	-	-	-	-
+600°C to +700°C	-	-	-	-
above +700°C	-	-	-	-

Notes:

* KT Cold Resistant Chain: Made to order.

The ambient temperature is different from the temperature of the roller chain itself.

MAL = Maximum Allowable Load. For details contact Tsubaki.

Please consult TSUBAKI for more detailed information.

CORROSION RESISTANCE GUIDE

☆☆ Highly corrosion resistant
 ☆ Partially corrosion resistant
 ✕ Not corrosion resistant
 - Not tested

Substance	Concentration	Temp. °C	SS	AS	PC
Acetic Acid	10%	20	☆☆	☆☆	☆☆
Acetone		20	☆☆	☆☆	☆☆
Alcohol			☆☆	☆☆	☆☆
Aluminum Sulfate	Saturated	20	☆☆	✕	-
Ammonia Water		20	☆☆	☆☆	☆☆
Ammonium Chloride	50%	Boiling point	☆	✕	-
Ammonium Nitrate	Saturated	Boiling point	☆☆	☆☆	☆
Ammonium Sulfate	Saturated	20	☆☆	☆	-
Beer		20	☆☆	☆☆	☆☆
Benzene		20	☆☆	☆☆	☆☆
Boric Acid	50%	100	☆☆	☆☆	-
Butyric Acid		20	☆☆	☆☆	☆☆
Calcium Chloride	Saturated	20	☆	✕	☆
Calcium Hydroxide	20%	Boiling point	☆☆	☆☆	☆☆
Calcium Hypochlorite	11-14%	20	☆☆	✕	✕
Carbonated water			☆☆	☆☆	-
Carbon Tetrachlorite (dry)		20	☆☆	☆☆	☆☆
Chlorinated Water			✕	✕	✕
Chlorine Gas (dry)		20	☆	✕	-
Chlorine Gas (moist)		20	✕	✕	-
Chromic Acid	5%	20	☆☆	☆	✕
Citric Acid	50%	20	☆☆	☆☆	-
Coffee		Boiling point	☆☆	☆☆	☆☆
Creosote		20	☆☆	☆☆	-
Developing Solution		20	☆☆	☆	☆☆
Ethyl Ether		20	☆☆	☆☆	☆☆
Ferric Chloride	5%	20	☆	✕	-
Formalin	40%	20	☆☆	☆☆	-
Formic Acid	50%	20	☆☆	☆☆	✕
Fruit Juice		20	☆☆	☆	☆☆
Gasoline		20	☆☆	☆☆	☆☆
Glycerol		20	☆☆	☆☆	☆☆
Honey			☆☆	☆☆	☆☆
Hydrochloric Acid	2%	20	✕	✕	✕
Hydrogen Peroxide	30%	20	☆☆	☆	✕
Hydrogen Sulfide (dry)			☆☆	☆☆	☆☆
Hydrogen Sulfide (moist)			✕	✕	✕
Hydroxybenzene		20	☆☆	☆☆	✕
Kerosene		20	☆☆	☆☆	-
Ketchup		20	☆☆	☆☆	☆☆
Lactic Acid	10%	20	☆☆	☆	☆☆
Lard			☆☆	☆☆	-
Linseed Oil	100%	20	☆☆	☆	☆☆
Malic Acid	50%	50	☆☆	☆☆	☆☆
Mayonnaise		20	☆☆	☆	☆☆
Milk		20	☆☆	☆☆	☆☆

Key: SS: 304 SS Series PC: Poly-Steel Chain
 AS: 600 AS Series

CORROSION RESISTANCE GUIDE

Substance	Concentration	Temp. °C	SS	AS	PC/P
Nitric Acid	5%	20	☆☆	☆	×
Nitric Acid	65%	20	☆☆	×	×
Nitric Acid	65%	Boiling point	☆	×	×
Oil (Plant, Mineral)		20	☆☆	☆☆	☆☆
Oleic Acid		20	☆☆	☆☆	☆☆
Oxalic Acid	10%	20	☆☆	☆	-
Paraffin		20	☆☆	☆☆	☆☆
Petroleum		20	☆☆	☆☆	☆☆
Phosphoric Acid	5%	20	☆☆	☆	×
Phosphoric Acid	10%	20	☆	☆	×
Picric Acid	Saturated	20	☆☆	☆☆	-
Potassium Bichromate	10%	20	☆☆	☆☆	☆☆
Potassium Chloride	Saturated	20	☆☆	☆	-
Potassium Hydroxide	20%	20	☆☆	☆☆	☆☆
Potassium Nitrate	25%	20	☆☆	☆☆	☆☆
Potassium Nitrate	25%	Boiling point	☆☆	×	-
Potassium Permanganate	Saturated	20	☆☆	☆☆	-
Sea-Water		20	☆	×	☆
Soap-and-Water-Solution		20	☆☆	☆☆	☆☆
Sodium Carbonate	Saturated	Boiling point	☆☆	☆☆	-
Sodium Chloride	5%	20	☆☆	☆	☆☆
Sodium Cyanide		20	☆☆	-	-
Sodium Hydrocarbonate		20	☆☆	☆☆	☆☆
Sodium Hydroxide	25%	20	☆☆	☆☆	☆☆
Sodium Hypochlorite	10%	20	×	×	×
Sodium Perchlorate	10%	Boiling point	☆☆	×	-
Sodium Sulfate	Saturated	20	☆☆	☆☆	-
Sodium Thiosulfate	25%	Boiling point	☆☆	☆☆	-
Soft Drink		20	☆☆	☆☆	☆☆
Stearic Acid	100%	Boiling point	×	×	×
Sugar Solution		20	☆☆	☆☆	☆☆
Sulfuric Acid	5%	20	×	×	×
Sulfur Dioxide (moist)		20	☆☆	×	-
Synthetic Detergent			☆☆	☆☆	☆☆
Syrup			☆☆	☆☆	☆☆
Tartaric Acid	10%	20	☆☆	☆☆	☆☆
Turpentine		35	☆☆	☆☆	-
Varnish			☆☆	☆☆	-
Vegetable Juice		20	☆☆	☆☆	☆☆
Vinegar		20	☆☆	☆☆	☆☆
Water			☆☆	☆☆	☆☆
Whiskey		20	☆☆	☆☆	☆☆
Wine		20	☆☆	☆☆	☆☆
Zinc Chloride	50%	20	☆	×	☆
Zinc Sulfate	Saturated	20	☆☆	☆☆	-
Wine		20	☆☆	☆☆	☆☆
Zinc Chloride	50%	20	-	☆	☆
Zinc Sulfate	25%	20	☆☆	☆☆	×

This table is intended only as a guide and TSUBAKI does not take responsibility for mishaps arising from its use.

TSUBAKI DRIVE CHAIN APPLICATION CHECK SHEET

Company name:		Tel. no.	
Contact person:		Fax no.	
1) Description of machine			
2) Requirement		<input type="checkbox"/> New design	<input type="checkbox"/> Replacement <input type="checkbox"/> Investigation
3) Current drive (for replacement & investigation)			
Chain size:			
No. of links:			
No. of drive sprocket teeth:			
No. of driven sprocket teeth:			
4) Operation time _____ hours per day _____ days per week _____ weeks per year			
5) Please complete either A or B			
A		B	
Torque of motor output shaft (Rated) (N/m)		Type of motor:	
(lay-out)		Rated output:(kW)	
		Output of reducer: (N/m)	
		Reduction ratio:	
		RPM of driver shaft: (1/min.)	
		RPM of driven shaft: (1/min.)	
6) Does the drive use a fluid coupling or other soft-start/stop feature? <input type="checkbox"/> Yes <input type="checkbox"/> No			
7) Shaft centre distance:			
8) Load fluctuations		<input type="checkbox"/> smooth	<input type="checkbox"/> some impact <input type="checkbox"/> large impact
9) Frequency of starting (stopping) or forward (reverse) operation _____ Times/day(8h)			
<i>Note - for wrapping transmission drives, suspension drive, bogie traction or pin gear drives with > 5 times per day, please complete 10-13</i>			
10) Moment of inertia of the motor (GD ²):		(kg/m ²)	
11) Converted moment of inertia for the driven shaft (GD ²):		(kg/m ²)	
12) Starting torque:		(N/m)	
13) Stalling torque:		(N/m)	
14) Acceleration and deceleration:		(m/sec ²)	
15) Lubrication condition:		<input type="checkbox"/> With lubrication	<input type="checkbox"/> Without lubrication
16) Ambient temperature:			
17) Atmosphere (corrosiveness, humidity, acid/alkaline etc.):			
18) Diameter of drive and driven shaft:		Drive shaft (mm),	Driven shaft (mm)

Please complete and return to Tsubakimoto Europe B.V. on fax: +31-(0)78 6204001

GENERAL TERMS AND CONDITIONS OF SALE TSUBAKIMOTO EUROPE B.V.

1. General

In these general terms and conditions 'Tsubaki' shall mean Tsubakimoto Europe B.V.

2. Applicability

- 2.1 The applicability of the general terms and conditions used by the customer is hereby expressly excluded.
- 2.2 These general terms and conditions are applicable to all legal relationships in which Tsubaki acts as a seller and/or supplier or as a potential seller and/or supplier of products and/or services.
- 2.3 Deviations from the provisions in these general terms and conditions shall be permitted only in writing. No rights in relation to agreements that are concluded later may be derived from such deviations.

3. Conclusion of the agreement / Measurements & Weight

- 3.1 If the customer issues an order, the agreement shall have been concluded if Tsubaki accepts the order in writing or electronically or makes a start with its implementation.
- 3.2 Drawings, measurements and weights that are shown or provided on the website of Tsubaki or otherwise, shall only be used as indications. The product and/or service to be provided under the agreement need not correspond with the drawing, measurement and weight.

4. Prices / Delivery conditions

- 4.1 Prices are exclusive of VAT.
- 4.2 Prices are ex warehouse, unless otherwise agreed in writing.
- 4.3 Prices are as per Tsubaki described standard unit or packaging only.
- 4.4 In addition to the price, the customer shall fully pay, unless otherwise agreed in writing, any and all, local taxes, duties, excises, licence fees and other charges levied, assessed or imposed upon Tsubaki due to the manufacture, sale, purchase, export or delivery of the products.
- 4.5 The customer shall also pay the cost by which such manufacture is increased by reason of any law, ordinance or regulation adopted or promulgated by any government or governmental subdivision, department or agency, or other source, after the date hereof, but prior to the completion and delivery hereunder.
- 4.6 Changes in labour costs, cost prices of raw materials or materials and/or exchange rate movements related to the performance agreed on, shall entitle Tsubaki to pass on these costs to the customer.

5. Delivery/delivery times

- 5.1 The delivery period indicated by Tsubaki starts as from the moment that all data, drawings and the like necessary for the performance of the agreement have been received by Tsubaki in its entirety.
- 5.2 Delivery times agreed with Tsubaki are indicative and shall not constitute deadlines.
- 5.3 Failure to deliver within the indicated delivery period does not entitle the customer to additional or substitute damages, nor to the customer's non-fulfilment, withholding or postponement of any of its own obligations arising from the agreement.
- 5.4 If the customer requests Tsubaki to make changes in the performance of the agreement (including, but not limited to, changes in the design or construction of products), or otherwise delay or interrupt the progress of the work under the agreement, the customer shall fully reimburse Tsubaki for any and all additional expenses arising there from.
- 5.5 Tsubaki shall be entitled to perform its due obligation(s) in stages or in parts. Each partial delivery shall be deemed an independent delivery with respect to the applicability of these general terms and conditions.

6. Returned products

- 6.1 No products shall be acceptable for return without prior written consent of Tsubaki.
- 6.2 Special or made-to-order products are not returnable.
- 6.3 The customer shall prepay freight on all returns, and each return is subject to inspection and acceptance by Tsubaki to assure that the products are in a "re-sellable" condition.
- 6.4 The customer shall pay a maximum of 10% (ten percent) of the price for handling and restocking costs charge with regard to all authorized returns.

7. Payment

- 7.1 Payment of Tsubaki's invoices shall ultimately take place within 30 (thirty) days after the invoice date in the manner described by Tsubaki, provided however that Tsubaki may at all times request for payment in advance. Payment shall take place effectively in the currency agreed on and without deduction, set-off, discount and/or deferment.
- 7.2 In case of overdue payment, all payment obligations of the customer, regardless of whether Tsubaki has already issued an invoice in the matter and of whether Tsubaki has duly performed its obligations, shall be immediately due and payable and the customer shall owe an interest of 1.5% (one and a half percent) per month or per part of a month on the amount due.
- 7.3 Extra-judicial collection costs shall be charged to the customer in accordance with the collection rates of the Netherlands Bar Association.
- 7.4 Payment by or on behalf of the customer shall extend to payment of the following charges incurred, in the following order: extra-judicial collection costs, the legal costs, the interest due, and after that the unpaid capital sums according to the order of receipt, regardless of other instructions of the customer.
- 7.5 The customer can only object to the invoice within the term of payment.

8. Intellectual Property Rights and know-how

- 8.1 All documentation, sales leaflets, pictures, drawings etc., provided by Tsubaki to the customer, shall at all times remain the exclusive property of Tsubaki.
- 8.2 The customer shall not be entitled to use the documents referred to in paragraph 1 for any purpose other than for the use of the products to which they relate.
- 8.3 The customer shall not be entitled to use the documents referred to in paragraph 1 or to duplicate and/or make public to third parties data included therein or in any other way made known to the customer without express prior written consent of Tsubaki.

- 8.4 In the event of any violation of what has been stipulated under paragraph 2 and/or 3, the customer shall pay Tsubaki an immediately payable fine of EUR 10,000 (ten thousand euros) for each violation, regardless of any other of Tsubaki's rights to performance, dissolution, compensation, etc.

9. Retention of title

- 9.1 All products that are delivered or are to be delivered by Tsubaki remain the property of Tsubaki until Tsubaki is fully paid with regard to:
 - A. all performances due by the customer for all products that are delivered or are to be delivered in accordance with the agreement; and;
 - B. all claims that are the result of the customer's failing in the performance of such agreement(s); the customer shall not be allowed to claim its right of retention concerning costs of custody and to deduct these costs with the performances required by the customer.
- 9.2 If the customer creates a new product from or partly from products referred to in paragraph 1, this product belongs to Tsubaki and the customer shall consider Tsubaki its owner, until the customer has fully performed all of its obligations referred to in paragraph 1.
- 9.3 If any product belongs to Tsubaki in accordance with paragraph 1 and/or 2, the customer can have exclusive possession of this product or product within the framework of its normal business operations.
- 9.4 If the customer is in default in the performance of its obligations referred to in paragraph 1, Tsubaki shall be entitled to recover all the products from their location, at the expense of the customer. The customer hereby irrevocably grants authority to Tsubaki to enter the area used by or for the customer.

10. Security

- 10.1 If there are valid grounds to expect that the customer shall not perform its obligations, the customer shall be obliged, at the first request of Tsubaki, to immediately furnish adequate security in the form requested by Tsubaki (including complete payment in cash before or on delivery) without prejudice to customer's obligations under the agreement. If and to the extent that the customer has not fully performed its obligations, Tsubaki shall be entitled to suspend performance of its obligations.
- 10.2 If the customer takes no action on the request referred to in paragraph 1 within 14 (fourteen) days after having received a written warning to that effect, all its obligations shall be immediately due and payable.

11. Guarantee

- 11.1 With regard to the assembly carried out by Tsubaki, the following guarantee is provided: For 6 (six) months, Tsubaki shall repair faults in the assembly, free of charge, at the discretion of Tsubaki.
- 11.2 If and to the extent Tsubaki can claim guarantee with respect to its own suppliers, Tsubaki shall provide the following guarantee on products obtained from them: For 6 (six) months, Tsubaki shall supply alternative products, free of charge, if the products supplied exhibit manufacturing defects or defects in the material, at the discretion of Tsubaki.
- 11.3 The customer can only make a non-recurring claim under the guarantee mentioned in paragraphs 1 and 2 if the customer has performed all its obligations towards Tsubaki.
- 11.4 Defects which are the result of normal wear, improper use or improper or incorrect maintenance or which occur after changes or repair carried out by or on behalf of the customer, shall not be part of the guarantee.
- 11.5 Minor differences, which means 10% (ten percent) or less with regard to amounts, measures, weights, numbers and other such data provided, are not considered defects.

12. Complaints / obligation to examine / limitation period

- 12.1 On delivery, the customer has the obligation to examine whether the products are in conformity with the agreement. If this is not the case, the customer cannot make a claim regarding non-conformity if the customer does not notify Tsubaki in writing in a well-founded manner as soon as possible, but in any event within 8 (eight) days after delivery or after detection of non-conformity was reasonably possible.
- 12.2 Any and all of the customer's claims and defences based on facts that support the view that the product delivered is not in conformity with the agreement, shall expire 6 (six) months after delivery.

13. Dissolution and release

- 13.1 If the customer does not perform or incorrectly performs any of its obligations arising from the agreement (such as overdue payment), if the customer is placed under guardianship, involuntary liquidation, suspension of payment or closure or winding up of its company, and also in the case of prejudgment or executory attachment against the customer or if an offer or agreement with regard to an extra-judicial debt settlement with the customer has been made, Tsubaki shall be entitled, at its option, without any obligation for compensation and without prejudice to its other rights, to dissolve the agreement in whole or in part, or to suspend the further execution of the agreement. In these cases, Tsubaki shall be also entitled to claim immediate compensation of the amount due.
- 13.2 If the proper performance by Tsubaki is partially or completely impossible, whether temporarily or permanently, due to one or more circumstances which cannot be held accountable to Tsubaki, including the circumstances mentioned in the paragraph 14.6, Tsubaki, at its option, shall be entitled to suspend its performance or to dissolve the agreement.
- 13.3 If the customer is not willing to cooperate with the delivery after Tsubaki has given the customer 14 (fourteen) days to do so, Tsubaki will be released from its obligations, without prejudice to the obligations of the customer.

14. Compensation

- 14.1 Tsubaki shall only be liable for damages suffered by the customer which can be attributed to gross negligence or intention by Tsubaki to the amount that Tsubaki is insured in accordance with an insurance commonly used in this line of industry and which is actually paid out with respect thereto. The aggregate compensation payable by Tsubaki shall not exceed EUR 500.000 (five hundred thousand euros) per event, whereby a series of related events shall be considered as one event.

GENERAL TERMS AND CONDITIONS OF SALE TSUBAKIMOTO EUROPE B.V.

- 14.2 Tsubaki shall never be liable to pay any compensation other than personal injury or property damage.
- 14.3 Tsubaki shall never be liable for loss of income, profit or revenue, loss due to shutdown or delay in business activities, production losses, loss of operating hours and/or wages paid in vain, extra costs incurred due to external purchasing, loss due to restoration of lost information, missed savings or agreements, discounts or penalties.
- 14.4 Tsubaki stipulates all legal and contractual defences, which it can invoke to fend off its own liability towards the customer, also on behalf of its employees and non-employees for whose acts it is liable in accordance with the law.
- 14.5 Tsubaki shall not be liable with regard to products supplied by Tsubaki which originate from third parties if and to the extent that the applicable third party has excluded its liability.
- 14.6 Under no circumstance shall Tsubaki be held liable for the following circumstances: actions, except gross negligence or intention, of persons used by Tsubaki for the realisation of the agreement; unsuitability of products which Tsubaki uses for the realisation of the agreement; exercising one or more rights by a third party vis-à-vis the customer in the case of a failure in the performance by the customer of an agreement between the customer and the third party concerning products supplied by Tsubaki; industrial action, lockout of workers, illness, bans on import, export and/or transport, problems with transport, failure to comply with the obligations by suppliers, production failure, natural and/or nuclear disasters, and war and/or threat of war.
- 14.7 The customer shall indemnify Tsubaki against all claims from any third party, in whatever form, with regard to damage and/or loss, which any third party may have suffered due to products of Tsubaki.
- 14.8 Everything stipulated in this article shall be without prejudice to Tsubaki's liability pursuant to mandatory provisions of law.

15. Amendment of general terms and conditions

- 15.1 Tsubaki has the right to amend these general terms and conditions from time to time. Amendments apply also with regard to agreements already concluded. Amendments shall be notified in advance in writing or electronically to the customer and shall enter into effect 30 (thirty) days after this notification or on such date as specified in the notification.
- 15.2 In the event the customer fails, with respect to the amended general terms and conditions, to give written notice that it does not accept these amended general terms and conditions prior to the day on which the aforementioned terms enter into effect, such as is indicated

here above, the customer shall be deemed to have accepted these amended general terms and conditions.

16. Conversion

If and to the extent that any provision in these general terms and conditions cannot be invoked on grounds of reasonableness and fairness or its unreasonably onerous nature, the provision shall be given a meaning that corresponds as much as possible to its content and purpose, making it thereby possible to invoke this provision.

17. Assignment

- 17.1 Tsubaki is entitled to assign one or more of its obligations or its entire legal relationship with the customer to a third party without consent of the customer. Tsubaki shall inform the customer of this transfer in writing.
- 17.2 The customer is only entitled to assign one or more of its obligations or its entire legal relationship with Tsubaki to a third party upon Tsubaki's express prior written consent.

18. Applicable law / competent court

- 18.1 All legal relationships between Tsubaki and the customer shall be governed by the laws of the Netherlands, without taking into account the principles of conflict of laws.
- 18.2 The applicability of the United Nations Convention on Contracts for the International Sale of Goods is expressly excluded.
- 18.3 All disputes which may arise between Tsubaki and the customer that fall under the jurisdiction of a district court, shall only be submitted to the court in the judicial district in which Tsubaki has its registered office, unless Tsubaki as a plaintiff or an applicant opts for the competent court in which the customer has its registered office or address for service.

19. Dutch text prevails

If and insofar as there is a discrepancy between the general terms and conditions in the Dutch language and those in the English language, those in the Dutch language shall prevail.

These conditions were filed at the Chamber of Commerce and Industry in Rotterdam.

For Safe Use



WARNING Obey the following points in order to prevent hazardous situations.

- Do not use chains and accessories (accessories and parts) for anything other than their original purpose.
- Never perform additional processing on the chain:
 - Do not anneal the various parts of the chain.
 - Do not clean the chain with either acid or alkali, as they may cause cracking.
 - Do not electroplate the chain or its parts, as they may cause cracking due to hydrogen embrittlement.
 - Do not weld the chain, as the heat may cause cracking or a reduction in strength.
 - When heating or cutting the chain with a torch, remove the links immediately adjacent and do not use them again.
- When there is need to replace a lost or damaged portion of a chain, always replace the whole chain with a new product rather than replacing only the lost or damaged portion.
- When using a chain on suspension equipment, establish a safety manual, etc., and strictly prevent entry to the area directly below the suspended object.
- Always employ hazard protector devices for the chain and sprocket (safety cover, etc.).
- If a substance that can cause embrittlement cracking (acid, strong alkali, battery fluid, etc.) adheres to the chain, stop using the chain immediately and replace it with a new one.
- During installation, removal, maintenance inspection and lubrication of the chain:
 - Perform the operation according to the instruction manual or this catalog.
 - Always turn off the power switch to the device and make sure that it cannot be turned on accidentally.
 - Anchor the chain and parts so that they cannot move freely.
 - Perform cutting and connecting procedures properly using a press or other special tool.
 - Wear clothing and employ protective devices that are appropriate to the job (safety glasses, gloves, safety shoes, etc.).
 - Only allow experienced personnel to perform chain replacement procedures.
- In order to prevent hazards, damage, or injury when cutting a Leaf Chain, always install hazard protection devices (safety device, etc.) on the suspension equipment employing the Leaf Chain.



CAUTION Obey the following points in order to prevent accident.

- Only handle the chain after thoroughly understanding its structure and specifications.
- When installing a chain, inspect it in advance to confirm that it has not been damaged in transport.
- Be sure to perform regular maintenance inspections on the chain and sprocket.
- Chain strength varies according to manufacturer. When selecting a chain based on a Tsubaki catalog, always use the corresponding Tsubaki product.
- Minimum tensile strength refers to the failure point when the corresponding load is applied to the chain once and does not refer to the allowable operational load.

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