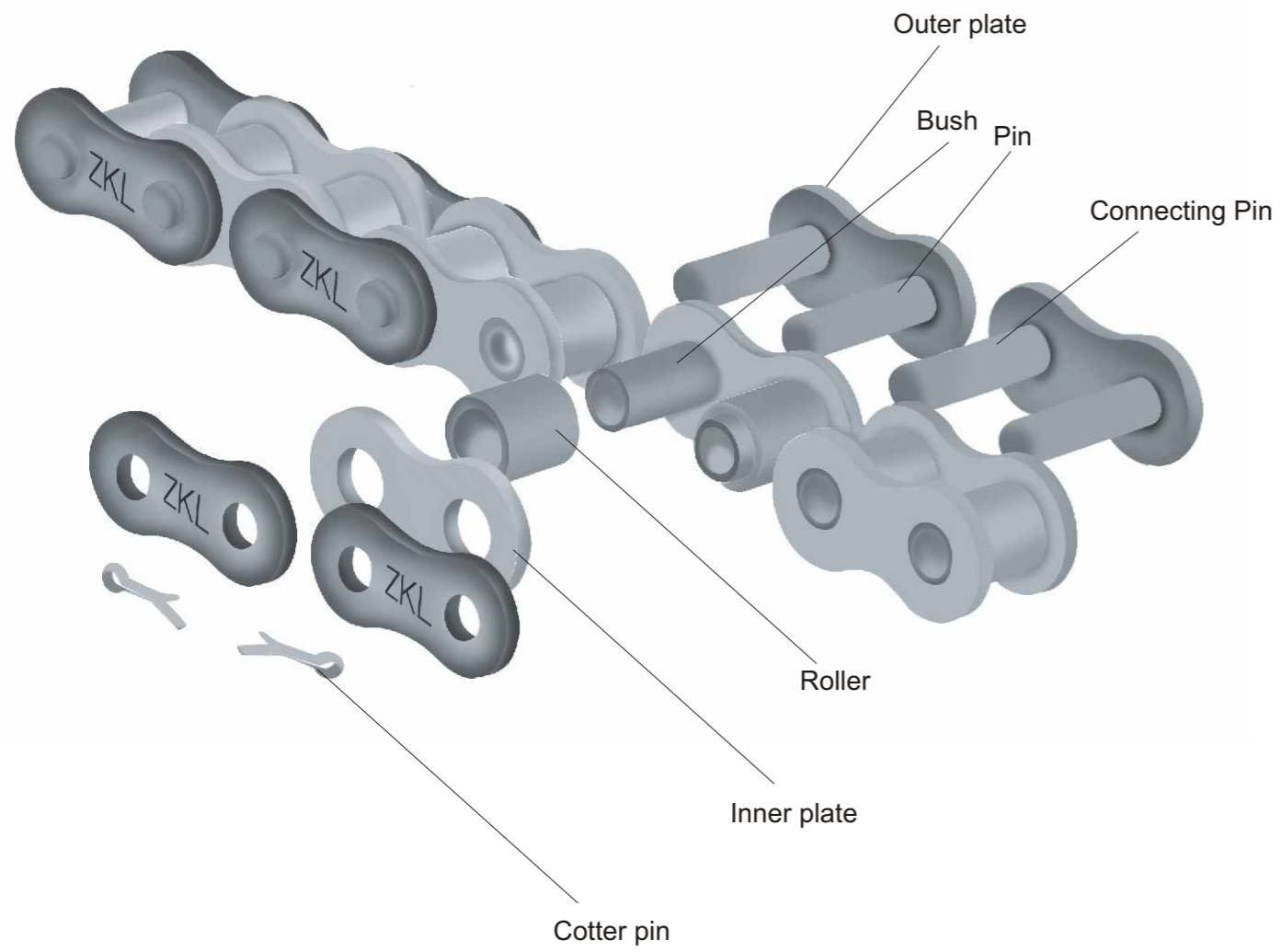


## ZKL BEARINGS (INDIA) PVT. LTD.

-  **Corporate & Regd. Office :** B-3/1A Gillander House, 8 Netaji Subhash Road, Kolkata-700 001, West Bengal.  
Tel : +91 33-22138591-95, 22428441, Fax : +91 33-22428440, E-mail : [kolkata@zklindia.com](mailto:kolkata@zklindia.com)
-  **North** 210, Golf Coures Road, Suncity Business Tower, Sector- 54, Gurgaon-122 002 , Haryana.  
Tel :+91 124-2385492, Fax : +91 124-2385493, E-mail : [delhi@zklindia.com](mailto:delhi@zklindia.com)
-  **West** C- 402, "Mangalya", Marol Maroshi Road, Opp. Maro Fire Brigade Station, Andheri (East), Mumbai-400 059, Maharashtra.  
Tel : +91 22-29250412/528/32669035/36, Fax : +91 22-29250396, E-mail : [mumbai@zklindia.com](mailto:mumbai@zklindia.com)
-  **South** 44, Armenian Street, 2nd Floor, Chennai-600 001, Tamilnadu.  
Tel : +91 44-25279004/03/32976965, Fax : +91 44-25279013, E-mail : [chennai@zklindia.com](mailto:chennai@zklindia.com)



# Industrial Chain



# Industrial Chain



Roller link / Inner link



Pin link / Rivet link



Connecting link with open spring clip



Connecting link with half-close spring clip



Connecting link with close spring clip



Connecting link with solid long cotter pin



Connecting link with cotter pin



Offset link



Double offset link



The standard of "Guidelines for the Selection of Roller Chain Drives" is carried out as per ISO 10823:2004. To calculate the actual transmission power of chain, we must consider revising the transmission power of driving sprocket (input power).  
**Actual power(Corrected power) = input power x service factor x teeth factor**  
 Service factor is listed in the following table.

**Teeth factor =  $(19/Z_s)^{1.08}$**  (Zs - number of teeth of the small sprocket)

Service factor table

Driven Mechanism Characteristic	Driving Mechanism Characteristic		
	Smooth Running	Slight Vibration	Medium Vibration
Smooth Running	1.0	1.1	1.3
Medium Vibration	1.4	1.5	1.7
Severe Vibration	1.8	1.9	2.1

The chain factories with long history in the world have their own chain transmission power rating graph and power diagram. We can refer to the ISO 10823:2004 standard selecting the drive power or selecting chain according to the drive power, the condition is that we should know the tooth number of the small sprocket and its speed. Only if the actual power is within the range of rating power of the power rating graph, the selected chain is suitable.

Now we use the transmission part in walking tractor and the transmission power in rotary tillage to proof whether the chain selection is correct.

**1. Chain drive part**

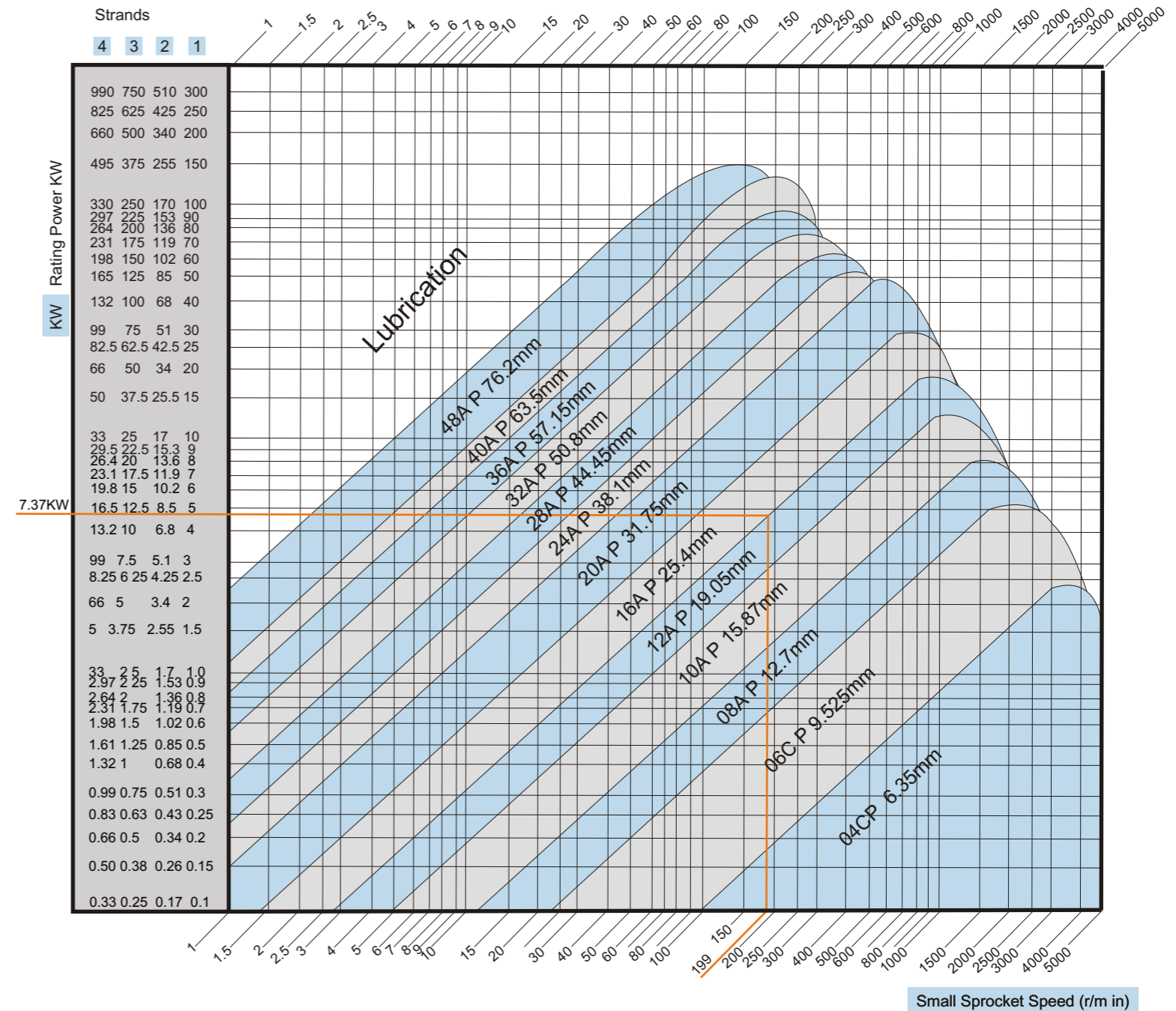
Small sprocket speed ns=1351 Tooth number of small sprocket Zs=14 Actual power (Corrected power) =10.944hp=8.16kW. From B series horsepower rating graph, you will find selected 08B-2 chain is suitable.

**2. Rotary tillage chain part**

Small sprocket speed ns=199 Tooth number of small sprocket Zs=13 Actual power (Corrected power) =9.888hp=7.37kW. From A series horsepower rating graph, you will find selected 12A-2 chain is unsuitable. You should choose 16A-1 or 60H-2 heavy duty roller chain instead of 12A-2.

The main characteristics of this power graph are as follows  
 For drive Zs=19  
 Chain length: 120 pitches  
 Transmission ratio: 1 : 3 to 3 : 1  
 Service life of chain: 15000 hours

**POWER RATING GRAPH (A SERIES ROLLER CHAIN)**



Note: The rating power of multiple strand chain can be obtained by multiplying the strand factor by the rating power of single strand chain .

S strand factor table

Number of strand	1	2	3	4	5	6
Factor	1.0	1.7	2.5	3.3	4.1	4.9





**POWER RATING GRAPH  
(B SERIES ROLLER CHAIN)**

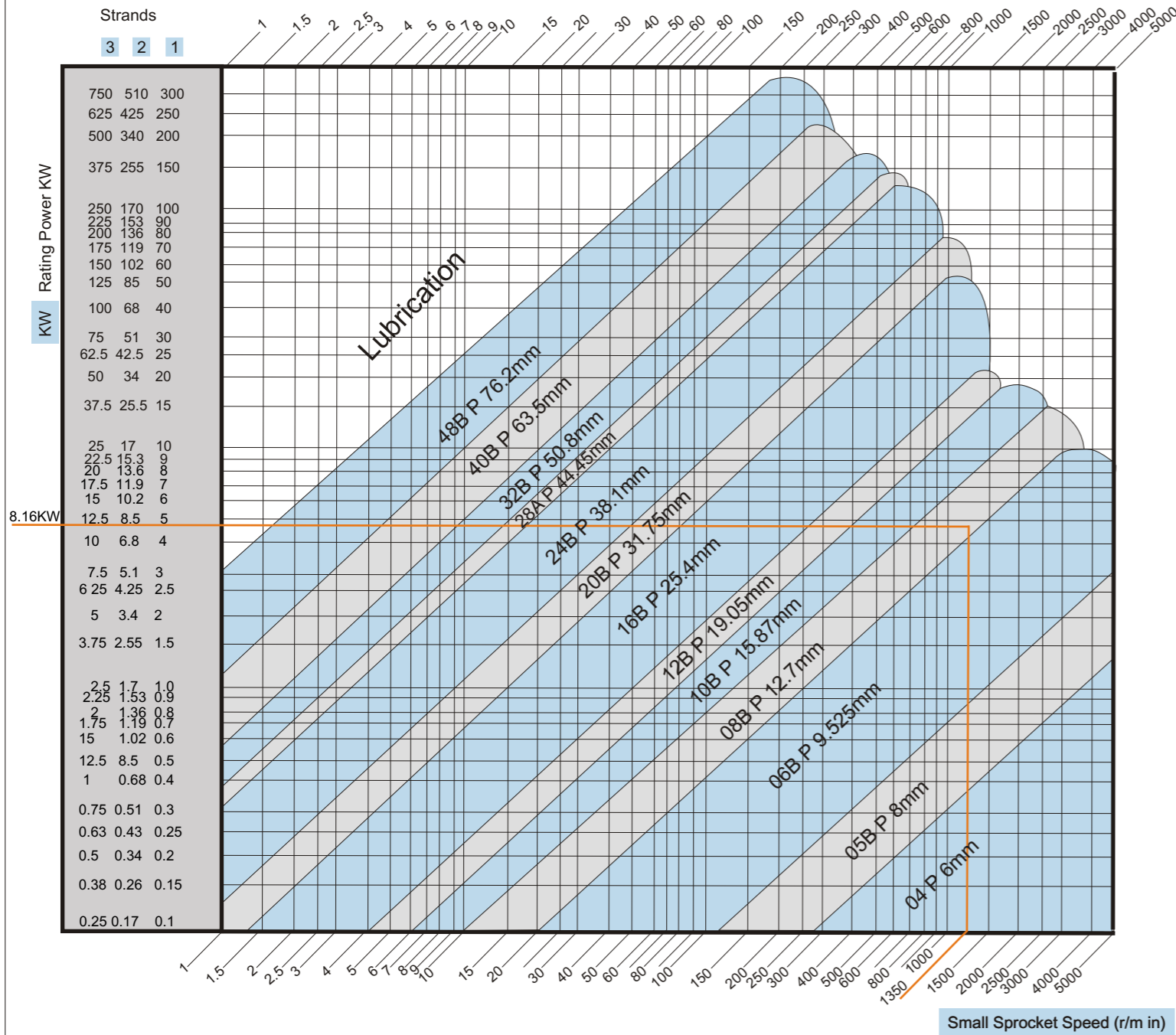
The main characteristics of this power graph are as follows

For drive Zs=19

Chain length: 120 pitches

Transmission ratio: 1 : 3 to 3 : 1

Service life of chain: 15000 hours



Note: The rating power of multiple strand chain can be obtained by multiplying the strand factor by the rating power of single strand chain .

S strand factor table

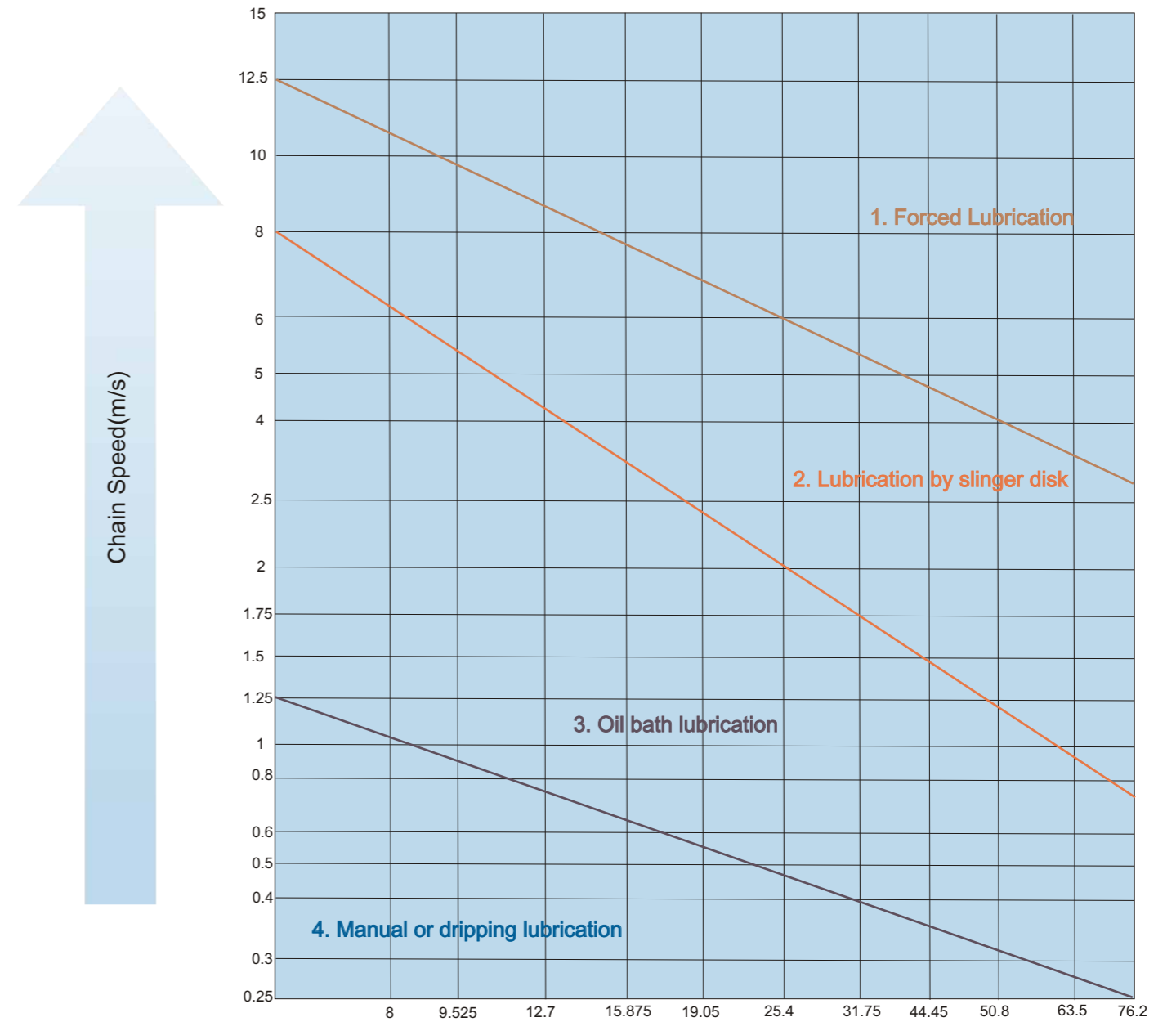
Number of strand	1	2	3	4	5	6
Factor	1.0	1.7	2.5	3.3	4.1	4.9



**SELECTION OF LUBRICATION**

Lubrication of chain depends on the working environment, temperature, chain speed and so on.

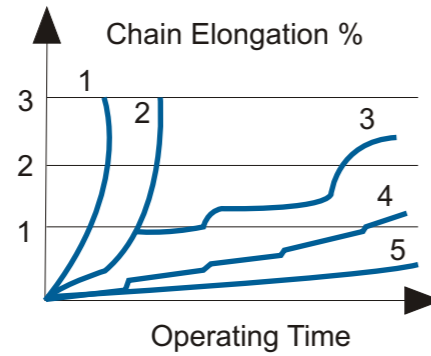
- Influence of working environment**  
For open drive such as combine chain, swather chain etc., grease lubrication is recommended.  
For closed drive such as walking tractor chain transmission case etc., oil lubrication is recommended.
- Influence of temperature**  
Application in the temperature range of -5°C to +60°C is recommended.  
In winter, lower viscosity oil is recommended; But in summer, higher viscosity oil is recommended.
- Influence of chain speed**  
The lubrication method is related to chain speed.  
Refer to the following chart for details.



## SELECTION OF LUBRICATION

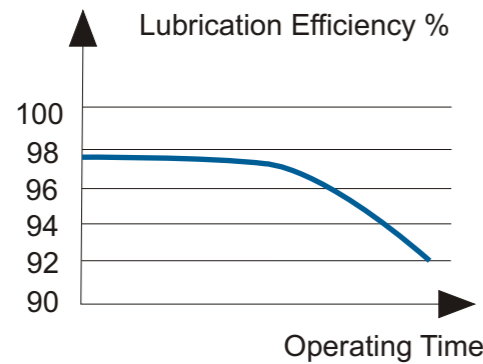
### Lubrication

Wear is mainly caused by bearing pressure, angle-sliding movements of the pins and rotation of the rollers etc.. Effective lubrication of the chain hinges is utmost important for reducing wear, power loss and noise etc. Effectively.



- Curve 1: Without lubrication. Chain would be worn out and destroyed within a very short time.
- Curve 2: Optimum initial lubrication only. High wear would occur within a short time after the lubricant has been used up.
- Curve 3: Manual lubrication. Intermittent dry rub frequently occurs, especially when regular periodical relubrication is not well implemented.
- Curve 4: Incorrect lubrication. Uneven chain wear results from incorrect lubrication.
- Curve 5: Correct lubrication. The right lubrication is the utmost important to obtain a optimum service life.

### Lubrication & Efficiency



The left graph shows the efficiency of lubrication decrease with operating time.

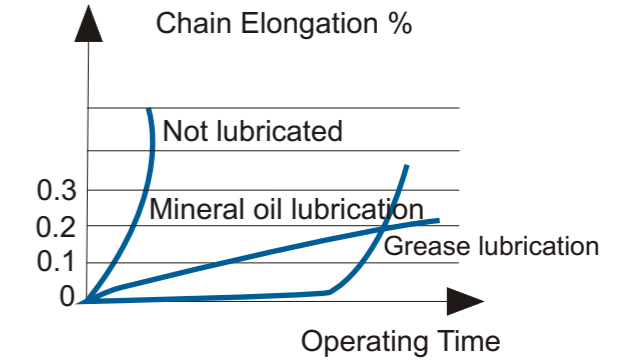
Relubrication shall be done before discoloration of the rub surface which indicates the lubrication failure of the former lubrication. The specific lubrication intervals shall be determined by tests based on specific conditions and running conditions.

## SELECTION OF LUBRICATION

### Lubricant

First of all, the selection of an appropriate lubricant depends on the type of lubrication.

Just as the right diagram shows, low viscosity mineral oils are particularly suitable for chain drives.



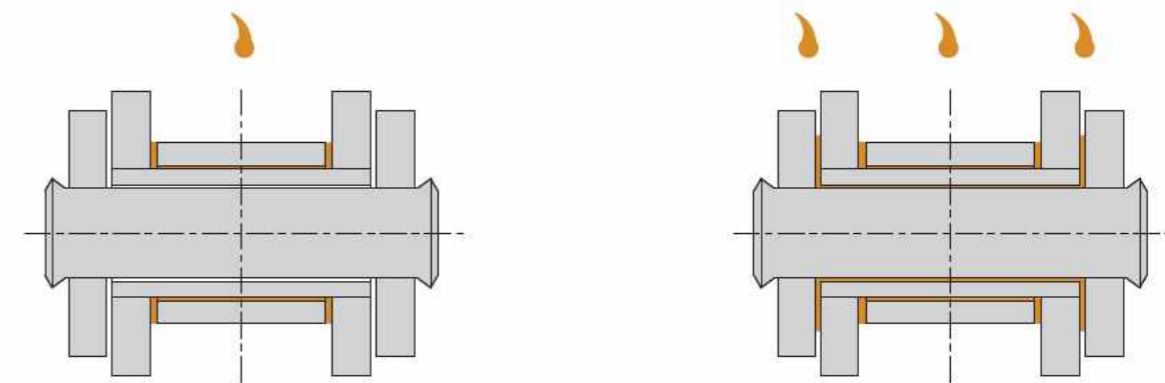
### Recommended viscosity

Ambient temperature	Viscosity of lubricant
-5°C~+25°C	ISO VG 100
+25°C~+45°C	ISO VG 150
+45°C~+60°C	ISO VG 220

For higher temperatures (e.g. furnace chains) or severe operating conditions, mud spattering open-type etc. or heavy-duty low speed chains, graphite or molybdenum disulfide (MoS<sub>2</sub>) applied either as additive or spray will improve lubrication performance.

Low-viscosity or the grease products with a drop point of 70°C are also suitable for manual lubrication. Liquidized grease may be sprayed on the chains in special conditions and chains can start running immediately after the evaporation of the volatile carrier substance.

No matter which kind of lubricants and lubrication methods chosen, the most important issue is to ensure the lubricant flow in evenly to all moving/mating parts (between pin and bush, between bush and roller).



a) Incorrect method

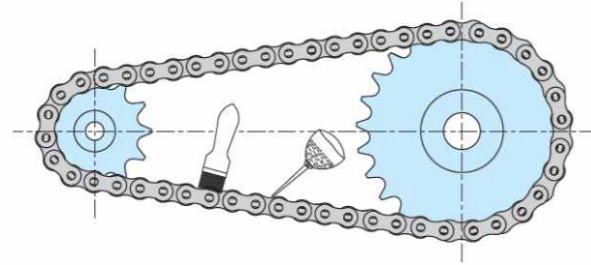
b) Correct method



## SELECTION OF LUBRICATION

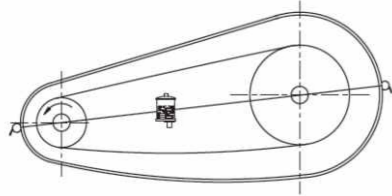
### Selection of lubrication method

Normally, there are five lubrication methods as mentioned below:



#### 1. Manual lubrication

This type of lubrication by means of oil can and brush, which adding lubricant into the gap between outer and inner link plate of chain loose side periodically is not very safe and therefore this type lubrication only suitable for those chains with occasional operation or for those secondary drives and low chain speeds. Sufficient lubrication should take place at least once a day (if possible once every eight running hours). Lubricant colouration should be avoided as far as possible.

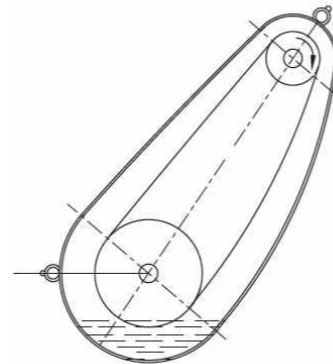


#### 2. Drip lubrication

Drip lubrication by means of wick oilers, needle oilers or drip oilers is only suitable for low bearing pressure drives. Lubricant colouration should be avoided as far as possible.

#### 3. Oil bath lubrication (submerged lubrication)

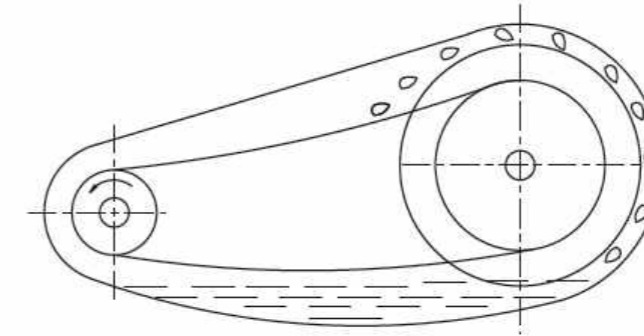
There is just enough oil in a proper chain box for preventing the worn and elongated chain knocking against the casing wall to allow the chain plates to submerge into the bath up to the rollers or the bushings respectively. But immersion should not be too deep or too shallow. Too shallow immersion lubrication is not reliable. Too deep immersion may cause the oil to heat up and lead to untimely oxidation of the oil.



## SELECTION OF LUBRICATION

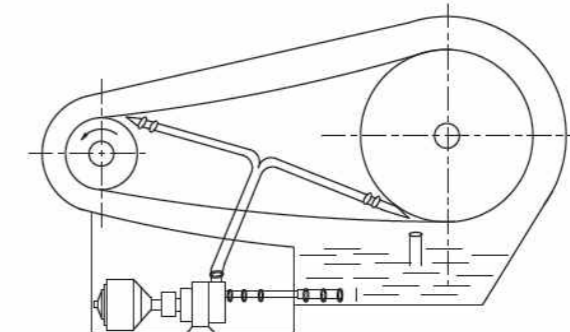
#### 4. Splash Lubrication

With this type of lubrication, the chain operates above oil level. A disk submerging into the lower oil level, the depth is about 12.7mm-25.4mm, Peripheral velocity between min. 3m/s and max. 40m/s, normally not bigger than 12.5m/s, centrifuges oil against the casing walls from where it continuously runs down onto the chain via drip rails. The disk should be mounted on both sides of sprocket when the chain width above 127mm.



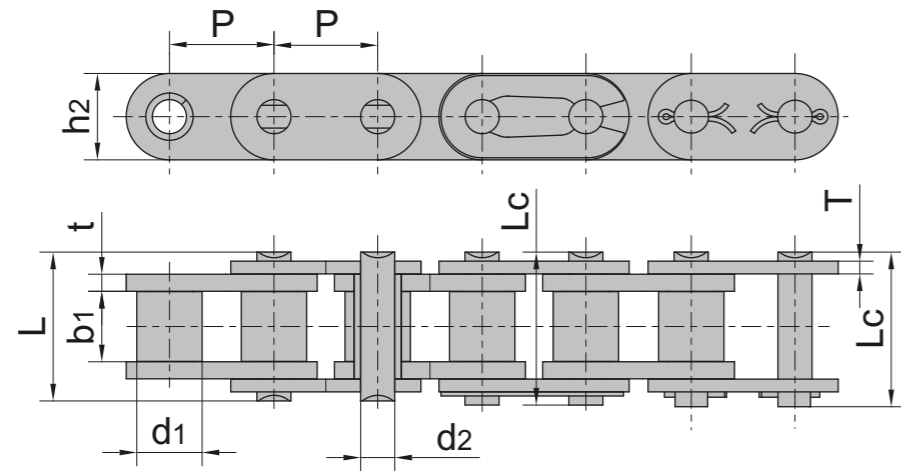
#### 5. Force feed lubrication (pressurised lubrication)

This type of lubrication is suitable for high-speed and heavy-duty type drives. Force feed lubrication is carried out to realize the circulating cooling of chains by means of oil pump and oil feeding pipe. The spray nozzles should be situated near the gearing places of chain and sprocket, and the nozzle number should be one more than the chain strands number to make them aim at the gap of each row link plate.



## Short pitch precision roller chains (B series)

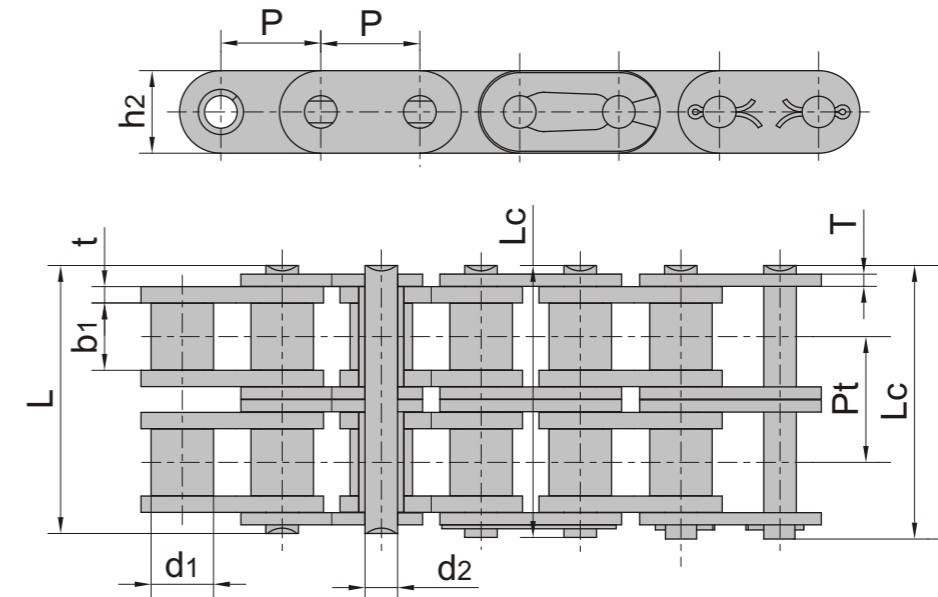
### Simplex roller chains



DIN/ISO Chain No.	Pitch	Roller Diameter	Width Between Inner Plates	Pin Diameter	Pin Length		Inner plate depth	Plate thickness	Ultimate tensile strength	Average tensile strength	Weight per meter
	P	d1 max	b1 min	d2 max	L max	Lc max	h2 max	t / T max	Q min	Q0	q
	mm	mm	mm	mm	mm	mm	mm	mm	kN/lbf	KN	Kg/m
04B-1	6.000	4.00	2.80	1.85	6.80	7.8	5.00	0.60	3.0/682	3.2	0.11
05B-1	8.000	5.00	3.00	2.31	8.20	8.9	7.10	0.80	5.0/1136	5.9	0.20
*06B-1	9.525	6.35	5.72	3.28	13.15	14.1	8.20	1.30	9.0/2045	10.4	0.41
08B-1	12.700	8.51	7.75	4.45	16.70	18.2	11.80	1.60	18.0/4091	19.4	0.69
10B-1	15.875	10.16	9.65	5.08	19.50	20.9	14.70	1.70	22.4/5091	27.5	0.93
12B-1	19.050	12.07	11.68	5.72	22.50	24.2	16.00	1.85	29.0/6591	32.2	1.15
16B-1	25.400	15.88	17.02	8.28	36.10	37.4	21.00	4.15/3.1	60.0/13636	72.8	2.71
20B-1	31.750	19.05	19.56	10.19	41.30	45.0	26.40	4.5/3.5	95.0/21591	106.7	3.70
24B-1	38.100	25.40	25.40	14.63	53.40	57.8	33.20	60.0/4.8	160.0/36364	72.8	2.71
28B-1	44.450	27.94	30.99	15.90	65.10	69.5	36.70	7.0/6.0	200.0/45455	222.0	8.50
32B-1	50.800	29.21	30.99	17.81	66.00	71.0	42.00	7.0/6.0	250.0/56818	277.5	10.25
40B-1	63.500	39.37	38.10	22.89	82.20	89.2	52.96	8.5/8.0	355.0/80682	394.0	16.35
48B-1	76.200	48.26	45.72	29.24	99.10	107.0	63.80	12.0/10.0	560.0/127272	621.6	25.00
56B-1	88.900	53.98	53.34	34.32	114.6	123.0	77.80	13.5/12.0	850.0/193180	940.0	35.78
64B-1	101.600	63.50	60.96	39.40	130.0	138.5	90.17	15.0/13.0	112.0/254544	1240.0	46.00
72B-1	114.300	72.39	68.58	44.48	147.4	156.4	103.60	17.0/15.0	1400.0/318180	1550.0	60.80

\*Straight side plates

### Duplex roller chains

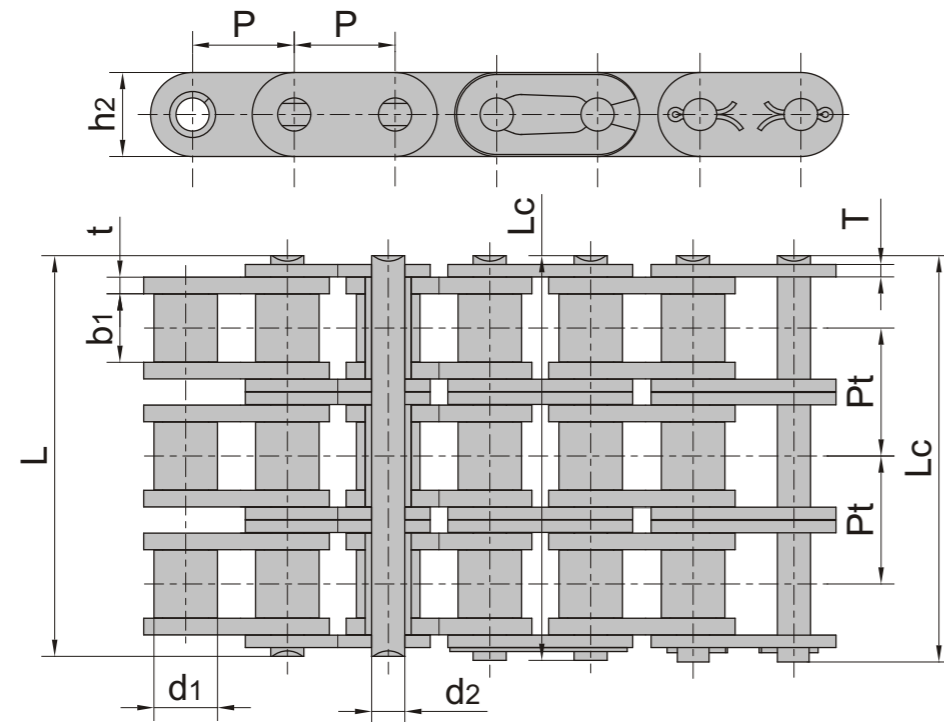


DIN/ISO Chain No.	Pitch	Roller Diameter	Width Between Inner Plates	Pin Diameter	Pin Length		Inner plate depth	Plate thickness	Transverse pitch	Ultimate tensile strength	Average tensile strength	Weight per meter
	P	d1 max	b1 min	d2 max	L max	Lc max	h2 max	t / T max	pt	Q min	Q0	q
	mm	mm	mm	mm	mm	mm	mm	mm	kN/lbf	kN/LB	kN	Kg/m
05B-2	8.000	5.00	3.00	2.31	13.9	14.5	7.10	0.80	5.64	7.8/1773	10.2	0.33
*06B-2	9.525	6.35	5.72	3.28	23.4	24.4	8.20	1.30	10.24	16.9/3841	18.7	0.77
08B-2	12.700	8.51	7.75	4.45	31.0	32.2	11.80	1.60	13.92	32.0/7273	38.7	1.34
10B-2	15.875	10.16	9.65	5.08	36.1	37.5	14.70	1.70	16.59	44.5/10114	56.2	1.84
12B-2	19.050	12.07	11.68	5.72	42.0	43.6	16.00	1.85	19.46	57.8/13136	66.1	2.31
16B-2	25.400	15.88	17.02	8.28	68.0	69.3	21.00	4.15/3.1	31.88	106.0/24091	133.0	5.42
20B-2	31.750	19.05	19.56	10.19	77.8	81.5	26.40	4.5/3.5	36.45	170.0/38636	211.2	7.20
24B-2	38.100	25.40	25.40	14.63	101.7	106.2	33.20	6.0/4.8	48.36	280.0/63636	319.2	13.40
28B-2	44.450	27.94	30.99	15.90	124.6	129.1	36.70	7.5/6.0	59.56	360.0/81818	406.8	16.60
32B-2	50.800	29.21	30.99	17.81	124.6	129.6	42.00	7.0/6.0	58.55	450.0/102273	508.5	21.00
40B-2	63.500	39.37	38.10	22.89	154.5	161.5	52.96	8.5/8.0	72.29	630.0/143182	711.9	32.00
48B-2	76.200	48.26	45.72	29.24	190.4	198.2	63.80	12.0/10.0	91.21	1000.0/227272	1130.0	50.00
56B-2	88.900	53.98	53.34	34.32	221.2	229.6	77.80	13.5/12.0	106.60	1600.0/363635	1760.0	71.48
64B-2	101.600	63.50	60.96	39.40	249.9	258.4	90.17	15.0/13.0	119.89	2000.0/454544	2200.0	91.00
72B-2	114.300	72.39	68.58	44.48	283.7	292.7	103.60	17.0/15.0	136.27	2500.0/568180	2750.0	120.40





Triplex roller chains

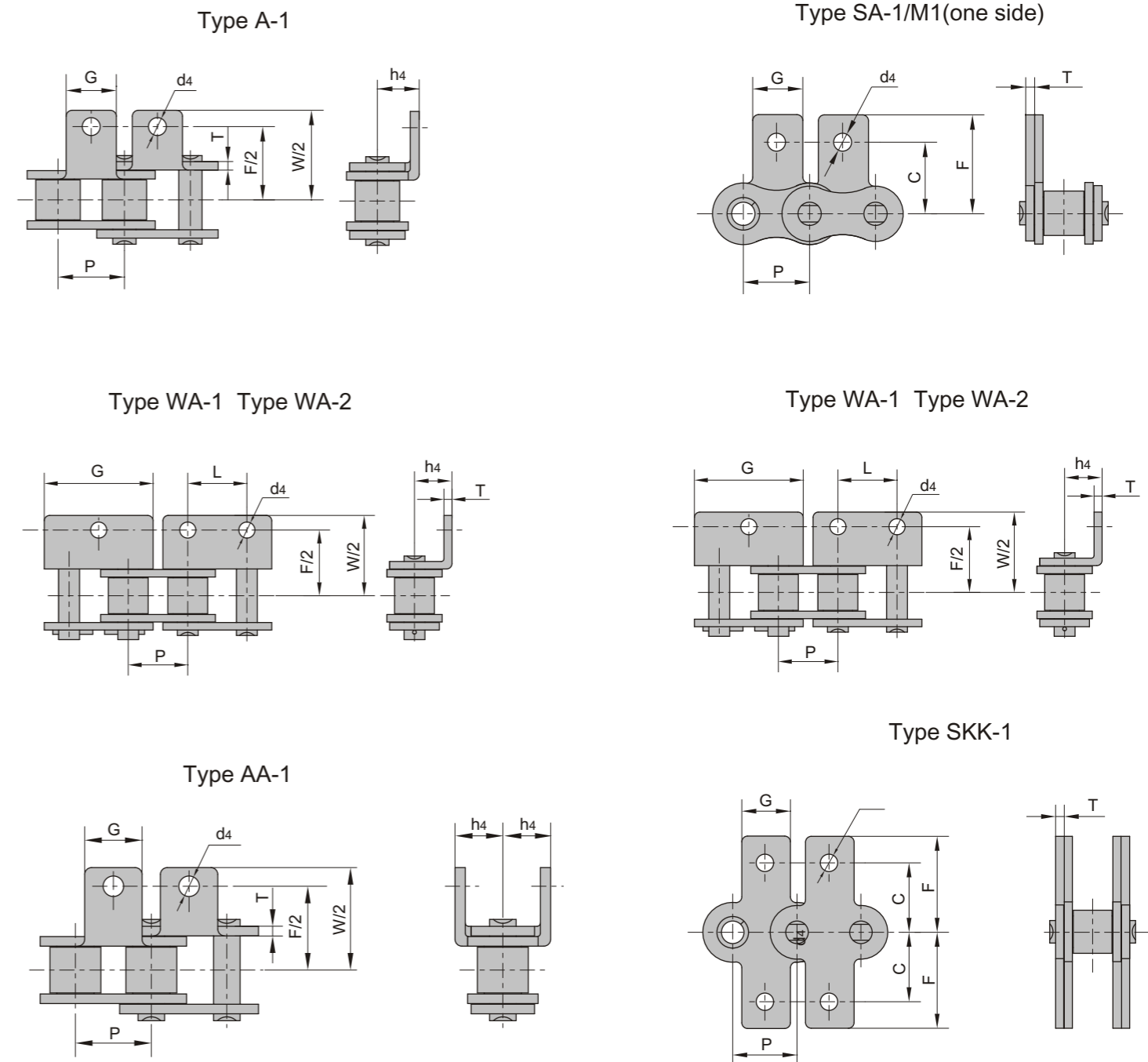


DIN/ISO Chain No.	Pitch	Roller Diameter	Width Between Inner Plates		Pin Diameter		Pin Length		Inner plate depth h2 max mm	Plate thickness t / T max mm	Transverse pitch pt kN/lbf	Ultimate tensile strength Q min kN/LB	Average tensile strength Q0 kN	Weight per meter q Kg/m
	P mm	d1 max mm	b1 min mm	d2 max mm	L max mm	Lc max mm	h2 max mm							
05B-3	8.000	5.00	3.00	2.31	19.5	20.2	7.10	0.80	5.64	11.1/2523	13.8	0.48		
*06B-3	9.525	6.35	5.72	3.28	33.5	34.6	8.20	1.30	10.24	24.9/5659	30.1	1.16		
08B-3	12.700	8.51	7.75	4.45	45.1	46.1	11.80	1.60	13.92	47.5/10795	57.8	2.03		
10B-3	15.875	10.16	9.65	5.08	52.7	54.1	14.70	1.70	16.59	66.7/15159	84.5	2.77		
12B-3	19.050	12.07	11.68	5.72	61.5	63.1	16.00	1.85	19.46	86.7/19705	101.8	3.46		
16B-3	25.400	15.88	17.02	8.28	99.8	101.2	21.00	4.15/3.1	31.88	160.0/36364	203.7	8.13		
20B-3	31.750	19.05	19.56	10.19	114.2	117.9	26.40	4.5/3.5	36.45	250.0/56818	290.0	10.82		
24B-3	38.100	25.40	25.40	14.63	150.1	154.6	33.20	6.0/4.8	48.36	425.0/96591	493.0	20.10		
28B-3	44.450	27.94	30.99	15.90	184.2	188.7	36.70	7.5/6.0	59.56	530.0/120454	609.5	24.92		
32B-3	50.800	29.21	30.99	17.81	183.2	188.2	42.00	7.0/6.0	58.55	670.0/152273	770.5	31.56		
40B-3	63.500	39.37	38.10	22.89	226.8	233.8	52.96	8.5/8.0	72.29	950.0/215909	1092.5	48.10		
48B-3	76.200	48.26	45.72	29.24	281.6	289.4	63.80	12.0/10.0	91.21	1500.0/340909	1710.0	75.00		
56B-3	88.900	53.98	53.34	34.32	327.8	336.2	77.80	13.5/12.0	106.60	2240.0/545450	2240.0	107.18		
64B-3	101.600	63.50	60.96	39.40	369.8	378.3	90.17	15.0/13.0	119.89	3000.0/681820	3300.0	136.00		
72B-3	114.300	72.39	68.58	44.48	420.0	429.0	103.60	17.0/15.0	136.27	3750.0/852270	4125.0	180.00		

Conveyor Chain

Various types of conveyor chains are also available.

Short pitch conveyor chain attachments



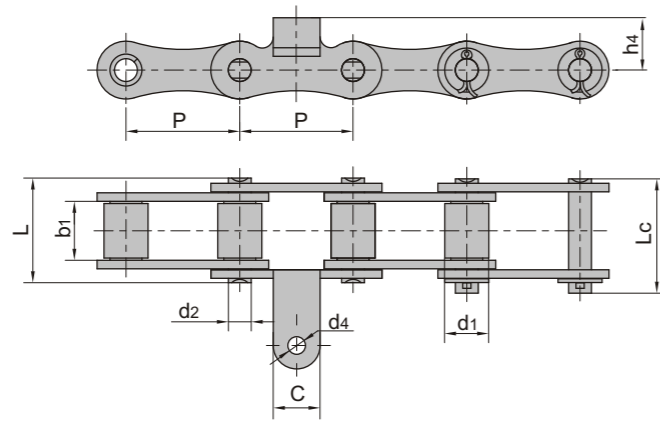
Technical details shall be provided on request





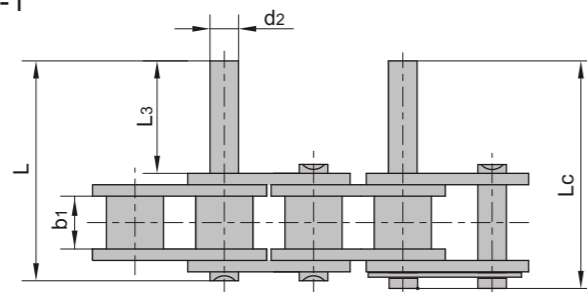
# Industrial Chain

## Conveyor chain special attachments(B series)

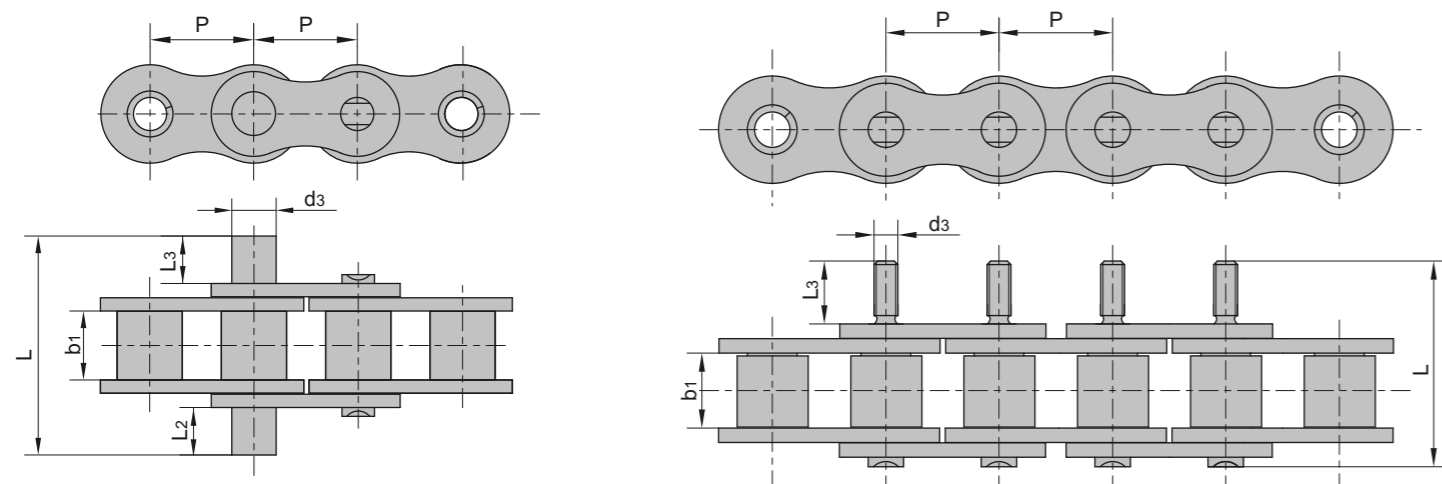


## Short pitch conveyor chains with extended pins

Type D-1



## Conveyor chains with special extended pins



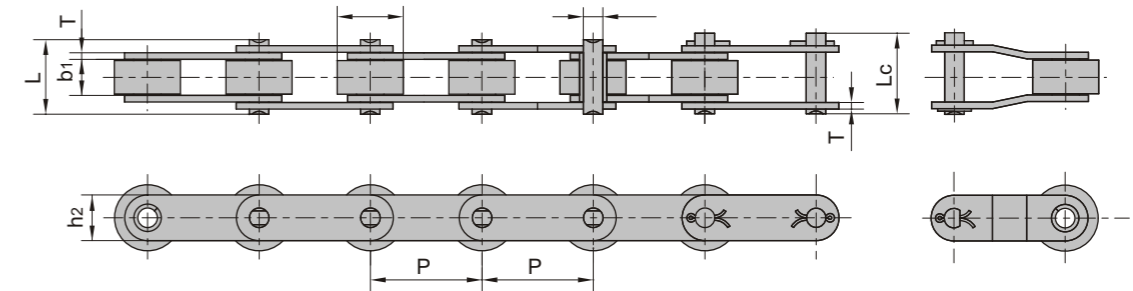
Technical details shall be provided on request

# Industrial Chain



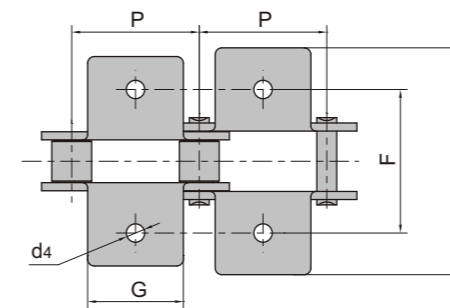
## Double pitch conveyor chains

Large Roller Type

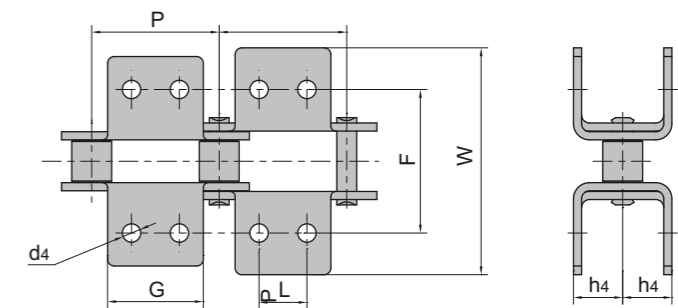


## Double pitch conveyor chain attachments

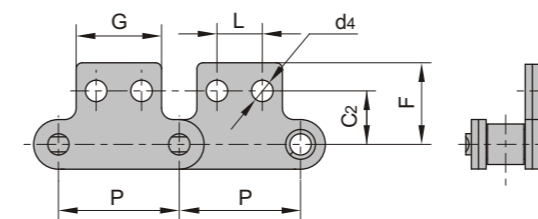
Type KK-1



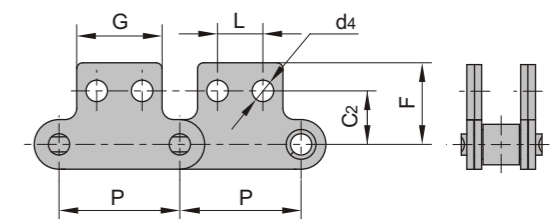
Type KK-2



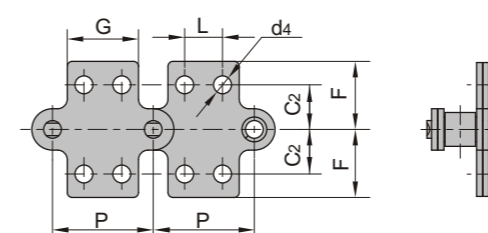
Type SA-2



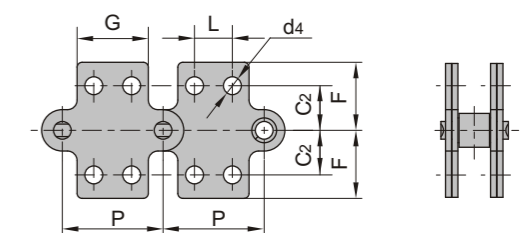
Type SK-2



Type SAA-2



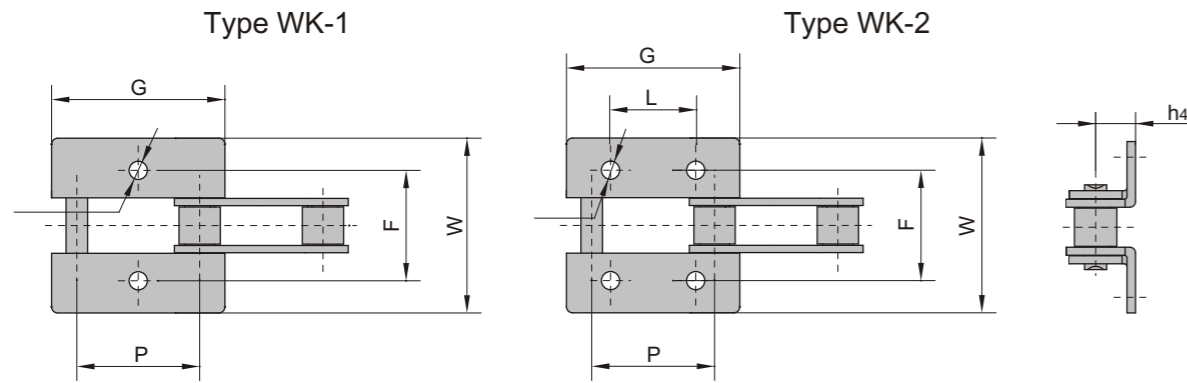
Type SKK-2



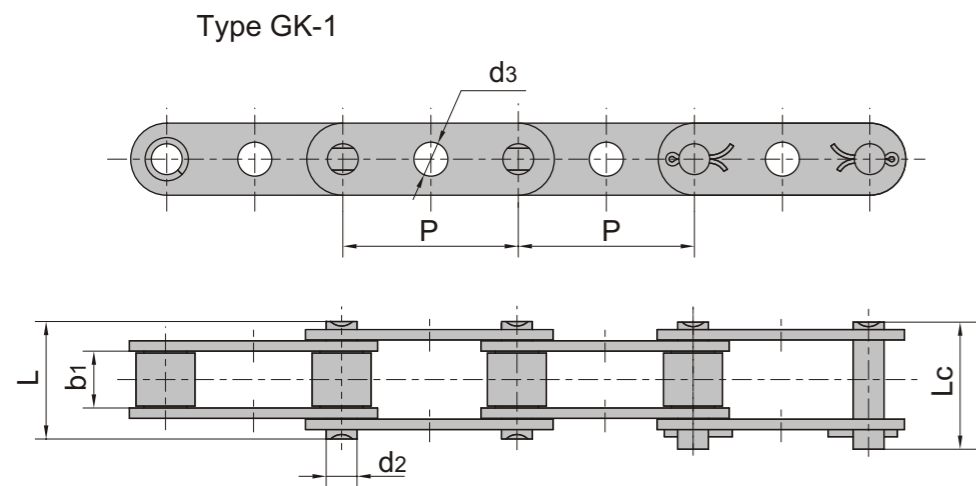
Technical details shall be provided on request



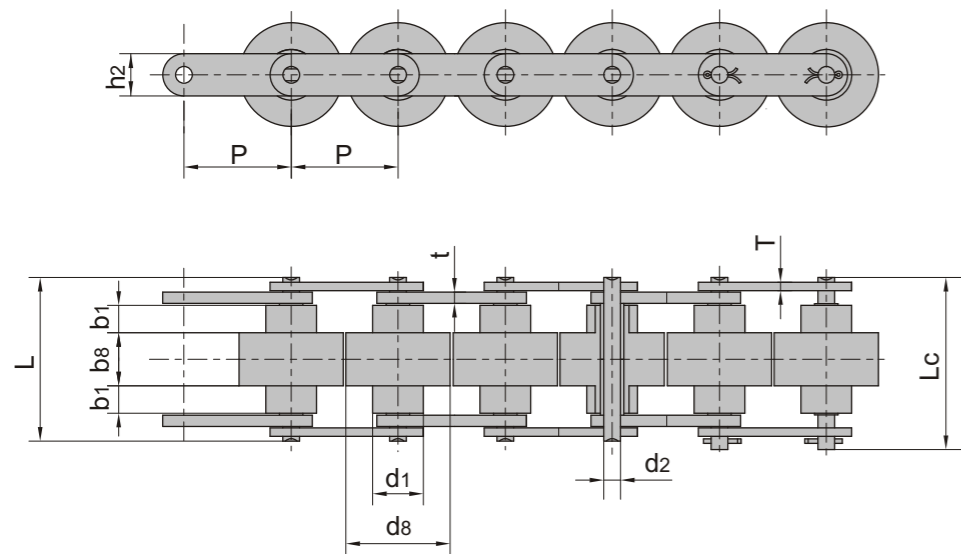
Double pitch conveyor chains



Double pitch conveyor chain special attachments



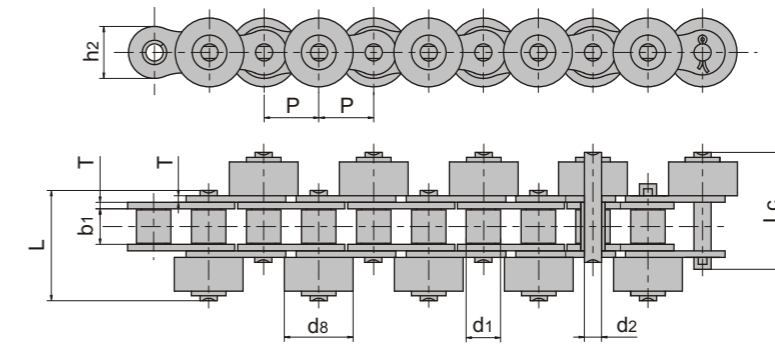
Double plus chains



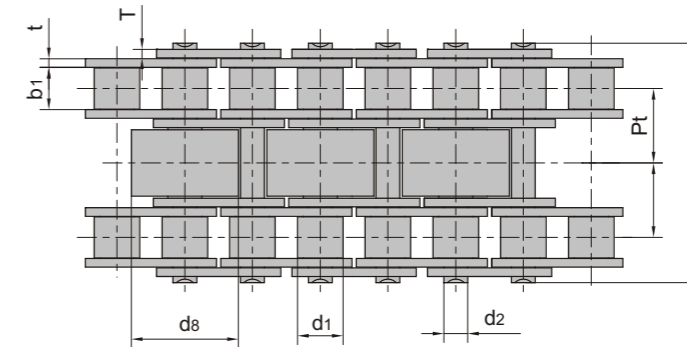
Technical details shall be provided on request



Conveyor chains with outboard rollers



Conveyor chains with special rollers



Technical details shall be provided on request