Designing of Chain Drive Mechanism 1

Selection of Power Transmission Efficiency

The table of transmission performance in this catalog (P. 3506) is based on the following conditions.

1) The chain drive mechanism is run in an atmosphere with a temperature of -10˚C~+60˚C and with no abrasive particles.
2) There is no adverse impact on the mechanism, such as corrosive gas or high humidity.
3) The two shafts between which power is transmitted are parallel with each other and correctly installed.
4) The recommended lubrication method and oil are used.
5) The power transmission is subjected to minimum load variation.

Application Coefficient Table

The power transmission efficiency table (P.3506) is based on minimum load variation. The transmitted kW shown in the table should be corrected as follows depending on the actual magnitude of load variation.

Table 1. Application Coefficient Table

Impact Type	Prime Motor Type / Typical	Turbine Motor	Internal Combustion Engine: With Fluidic Mechanism	Internal Combustion Engine: Without Fluidic Mechanism
Smooth Transmission	Belt conveyor with small load variation, Chain conveyor, Centrifugal pump, Centrifugal blower, General textile machinery, General machinery with small load variation.	x1.0	x1.0	x1.2
Transmission with Moderate Impact	Centrifugal compressor, Marine propeller, Conveyor with moderate load variation, Automatic furnace, Drier, Pulverizer, General machine tools, Compressor, General earth-moving machinery, General paper manufacturing machinery	x1.3	x1.2	x1.4
Transmission with Large Impact	Press, Crusher, Construction and mining machinery, Vibrator, Oil well digger, Rubber mixer, Roll, Rollgang, General machinery with reverse or impact load	x1.5	x1.4	x1.7

Power Transmission Coefficient for Multiple Chains

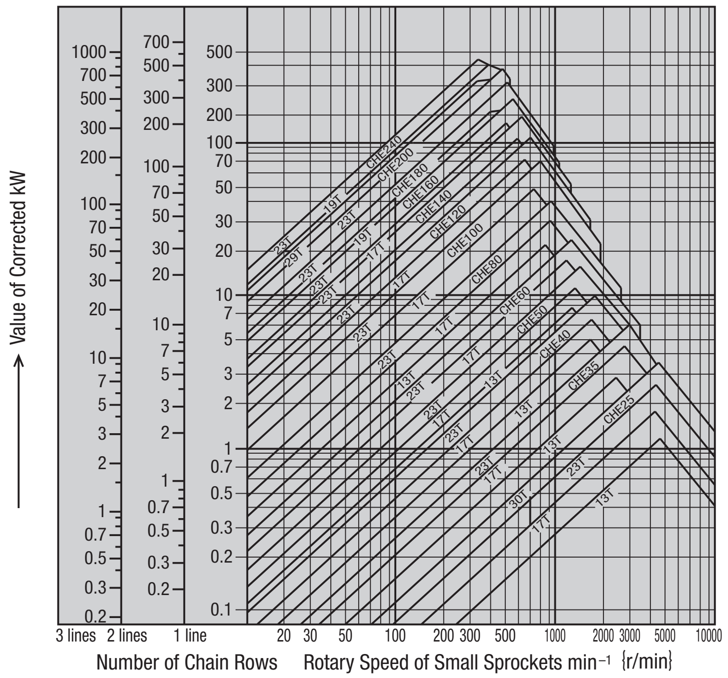
On multiple roller chains, the load is not shared evenly between each chain row. Therefore, the power transmission efficiency of multiple roller chains cannot be obtained by simply multiplying the power transmission efficiency of a single chain by the number of chain rows. The power transmission efficiency of multiple roller chains should be obtained by multiplying the power transmission efficiency of a single chain by the multiple chain power transmission coefficient.

Table 2. Power Transmission Coefficient for Multiple Chains

Number of Roller Chain Rows	Multiple Row Coefficient
2 lines	x1.7
3 lines	x2.5
4 lines	x3.3
5 lines	x3.9
6 lines	x4.6

Selection Guide Table

Table 3. Selection Guide Table



How to Read The Table

Ex. Corrected kW=5kW
Rotary Speed of Small Sprockets=300r/min
When single chain

The intersection point of the vertical axis (corrected kW) and the horizontal axis (rotary speed 300r/min) is below CHE 60 23T (23 toothed) and above 17T (17 toothed). A closer look at the location of the intersection point indicates that it most probably corresponds to 19T.

Specification Selection for Operation under Normal Conditions

1.Operating Conditions

When selecting roller chains, the following 7 parameters should be taken into account.

1. Machine to be used
2. Impact Type
3. Prime Motor Type
4. Power Transmission(kW)
5. Diameter and Rotary Speed of High-Speed Shaft
6. Diameter and Rotary Speed of Low-Speed Shaft
7. Inter-Shaft Distance

2. Application Coefficient

Select the application coefficient from the application table(Table 1) that is appropriate for the machine to be driven and the prime motor type.

3. Corrected Power Transmission(kW)

Correct the power transmission(kW)using the application coefficient.

•Single Chain…Corrected Power Transmission(kW)=Power Transmission(kW)×Application Coefficient
•Multiple Chains…Select the appropriate coefficient from the table multiple-chain power transmission coefficients(Table 2).

$$\text{Corrected Power Transmission(kW)} = \frac{\text{Power Transmission(kW)} \times \text{Application Coefficient}}{\text{Multiple Row Coefficient}}$$

4. Chain and Number of Sprocket Teeth

Using the selection guide table(Table 3)or the power transmission efficiency tables, select the chain and the number of small sprocket teeth that satisfy the rotary speed of the high-speed shaft and the corrected power transmission(kW). The chain pitch should be as small as possible, as long as the required power transmission efficiency is achieved. This should minimize noise and ensure smooth transmission of power. (If a single chain does not provide the required power transmission efficiency, use multiple chains instead. If the installation space requires that the inter-shaft distance as well as the outer diameter of sprocket be minimized, use small-pitch multiple chains.)There should be a minimum wrap angle of 120˚ between the small sprocket and the chain.

5. Number of Large Sprocket Teeth

Number of Large Sprocket Teeth = Number of Small Sprocket Teeth × Speed Ratio Once the number of small sprocket teeth is determined, multiplying this by the speed ratio provides the number of large sprocket teeth. Generally, the appropriate number of small sprocket teeth is 17 or greater, or 21 or greater for high-speed operation, or 12 or greater for low speed operation. The number of large sprocket teeth should be 120 or less.Select the sprocket with as great a number of teeth as possible for a speed ratio of 1:1 or 2:1. The speed ratio should normally be 1:7 or less, and ideally 1:5.

6. Shaft Diameter

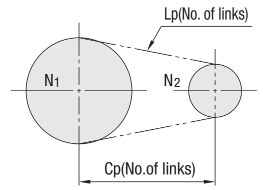
Ensure that the small sprocket selected as above is compatible with the diameter of the existing shaft on which it is to be installed. Refer to the specification table on this page. When the shaft diameter is too large for the bore in the sprocket, select another sprocket with a greater number of teeth or a larger chain.

7. Inter-shaft Distance between Sprockets

The distance between the shafts can be reduced as long as the sprockets do not interfere with each other and the wrap angle between the small sprocket and the chain is 120˚ or more. Generally, the inter-shaft distance should preferably be 30~50 times the pitch of the chain used. Under pulsating load conditions, decrease the distance to 20 times the chain pitch or less.

8. Chain Length and Distance between Shaft Centers

Once the chain, the number of teeth on both sprockets, and the inter-shaft distance are available, determine the number of chain links as follows.



Lp:Chain Length Expressed in Number of Links
N_1 : Number of Large Sprocket Teeth
N_2 : Number of Small Sprocket Teeth
Cp: Distance between Shaft Centers Expressed in Number of Links
π : ≈3.14

(1) Calculating the chain length (when the number of sprocket teeth N_1 and N_2 and the distance between shaft centers Cp are available)

$$Lp = \frac{N_1+N_2}{2} + 2Cp + \frac{\left(\frac{N_1-N_2}{2\pi}\right)^2}{Cp}$$

*Round up decimals of Lp to the next whole number.

Generally, when the chain length number of chain links obtained is an odd number, this should be raised to the next even number. When the inter-shaft distance demands the chain length to be an odd number, an offset link needs to be used. However, it should be avoided and an even number should be used as much as possible by adjusting the number of sprocket teeth or the inter-shaft distance.

(2) Calculating the distance between shaft centers (when the number of sprocket teeth N_1,and N_2 as the chain length Lp are available)

$$Cp = \frac{1}{8}\left\{2Lp - N_1 - N_2 + \sqrt{(2Lp-N_1-N_2)^2 - \frac{8}{\pi^2}(N_1-N_2)^2}\right\}$$

The pitch number obtained by the chain length formula is, in most cases, only approximate and not in exact agreement with a given inter-shaft distance. Therefore, it will be necessary to calculate the exact distance between the shaft centers based on the required overall length.

Example of Selection for Operation under Normal Conditions

The following is an example of selection when a 3.7 kW 1,000r/min electric (motor) is used to drive a compressor.

[1] Operating Conditions
1) Machine to be used………… Compressor,10 hours operation
2) Impact Type …………………… Smooth Transmission
3) Prime Motor Type…………… Electric Motor
4) Power Transmission ………… 3.7kW
5) Rotary Speed ………………… 1000r/min

[2] Application Coefficient
From Table 1, an application coefficient of 1.2 is selected.

[3] Corrected Power Transmission(kW)
Corrected Power Transmission(kW)=Power Transmission(kW)×Application Coefficien
=3.7kW×1.2=4.44kW

[4] Chain and Number of Sprocket Teeth
Searching the selection guide table(Table 3)for a combination of 1,000 r/min and 4.44 kW provides a CHE40 chain and 17T sprocket.
On the power transmission efficiency table for the CHE40 chain, a combination of 13T and 1,000r/min provides a power transmission efficiency of 4.09 kW, which does not meet the required 4.44 kW. Therefore, 19T, which achieves 4.6 kW, should be selected to meet the requirement.
Results The CHE40 chain should be selected.
Number of Small Sprocket Teeth=19T

[Technical Data]
Designing of Chain Drive Mechanism 2

Specification Selection for Low-Speed Operation

In operations using a chain speed of 50 m/min. or less, chain elongation due to wear can almost be ignored. Under such low-speed conditions, the service life of the chain largely depends on its fatigue strength. Low-speed operation is more economical than operation under "normal conditions". Low speed is recommended for operations with fewer startups and stops that enable smooth power transmission. Selection of ambient atmosphere, layout, lubrication, etc. for low-speed operation is the same as that for operation under normal conditions. Selection should be made in accordance with the following formula.

[Max. Allowable Tension of Chain] ≥ [Max. Tension N Working on Chain] x [Application Coefficient (Table 1) P.3503] x [Speed Coefficient (Table 4)]

Table 4. Speed Coefficients

Roller Chain Speed	Speed Coefficient
0~15 m/min	1.0
15~30	1.2
30~50	1.4
50~70	1.6

[1]Operating Conditions

Same as for "Specifications Selection for Operation under Normal Conditions"

[2] Chain and Number of Small Sprocket Teeth

From the selection guide table 3(P. 3503), select a chain and a sprocket slightly undersized for the rotary speed(r/min)and the prime mover(kW)used.

[3] Calculating the Chain Speed

Based on the sprocket selected(chain pitch, number of teeth)and the number of revolutions(r/min), calculate the chain speed as follows.

$$V=\frac{P \cdot N \cdot n}{1000}\ \text{(m/min)}$$

V: Chain Speed(m/min)
P: Chain Pitch(mm)
N: Number of Sprocket Teeth
n: Rotary of Sprocket Teeth(r/min)

[4] Calculating the Max. Working Load on Chain

Calculating the Maximum Working Load on the Chain

$$F=\frac{60 \cdot kW}{V}\ \text{(kN)}$$

F : Load on Chain(kN)
V : Chain Speed(m/min)
kW: Power Transmission(kW)

[5] Application Coefficient

From the application coefficient table(Table 1), select the appropriate coefficient.

[6] Speed Coefficient

Based on the chain speed obtained in[3]above, calculate the appropriate speed coefficient.

[7] Maximum Allowable Tension of Chain

In the formula, substitute the values obtained in[4]~[6]above as well as the maximum allowable tension(P.1235~P.1245)for the chain selected in[2]above. Check whether these values satisfy the formula. If not, try again with another chain and sprocket set.

[8] Number of Large Sprocket Teeth, Shaft Diameter, and Chain Length same as for "Specification Selection for Operation under Normal Conditions".

Specification Selection for Low-Speed Operation with Impact Load

In operations with a great amount of impact loading due to frequent startups, stops, reversing, or braking, the inertia(GD^2)of the prime mover and the driven machine needs to be taken into account.

Under such conditions, exercise extreme caution, as the chain can be subjected to loads much greater than in operation under normal conditions.

Select the chain using the following formula.

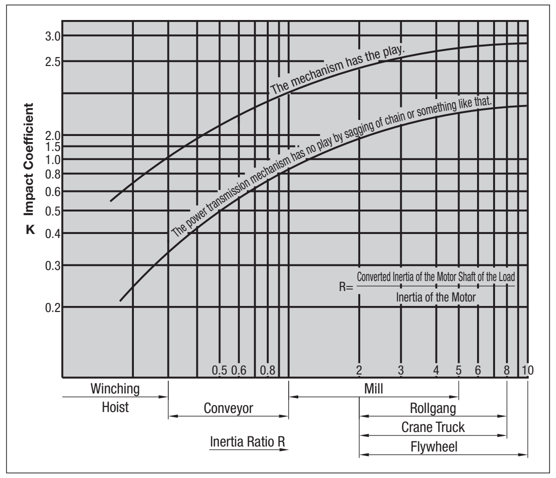
[Max. Allowable Load of Chain N] ≥ [Load Acting on Chain as Calculated from the Starting Torque of the Prime Mover] x [Impact Coefficient (Table 5)] x [Speed Coefficient (Table 4)]

Impact Coefficient

This is a constant, shown in(Table 5), determined by the ratio of inertia(GD^2)of prime mover to driven machine as well as the magnitude of play in the power transmission mechanism used.

When the power transmission mechanism has excessive play, it loads greater impact than those in the table can result.

Table 5. Impact Coefficient



Selection of Stainless Roller Chains(CHES)

Selection of stainless roller chains follows the specification selection for low-speed operation.

1). The maximum allowable tension for CHES(stainless type) is lower than that for CHE(steel type).

2). Avoid using offset links as much as possible.

Selection based on temperature

Selection of Roller Chains Based on Temperature

The following table shows selection criteria for roller chains by size based on temperature and the associated reduction in strength.

1) Problems associated with roller chain operation at high temperature
 (1)Reduced hardness and resultant increase in wear
 (2)Elongation due to softening
 (3)Poor lubrication and flexing and wear increase due to oil deterioration and carbonization
 (4)Wear increase and poor flexing due to scale

2) Problems associated with roller chain operation at low temperature
 (1)Low-temperature brittleness and resultant reduction in impact strength
 (2)Solidification of lubricating oil
 (3)Poor flexing due to attachment of frost and ice

Guide Table for Roller Chain Power Transmission Efficiency at High, Low Temperature

Temperature	CHE Roller Chain	
	CHE60 or Less	CHE80 or Above
-60˚C or below	–	–
-60˚C ~ -50˚C	–	–
-50˚C ~ -40˚C	–	Cannot Be Used
-40˚C ~ -30˚C	Cannot Be Used	Catalog Value×1/4
-30˚C ~ -20˚C	Catalog Value×1/4	Catalog Value×1/3
-20˚C ~ -10˚C	Catalog Value×1/3	Catalog Value×1/2
-10˚C ~ 60˚C	Catalog Value	Catalog Value
60˚C ~ -150˚C	Catalog Value	Catalog Value
150˚C ~ 200˚C	Catalog Value×3/4	Catalog Value×3/4
200˚C ~ 250˚C	Catalog Value×1/2	Catalog Value×1/2
Above 250˚C	Cannot Be Used	Cannot Be Used

Selection of Stainless Roller Chains for High-Temperature Operation

(1)Follow the specification selection for low-speed operation up to 400˚C.(Do not use the specification selection method for operation under normal conditions.)
(2)Above 400˚C, use the temperature coefficient described below.
(3)Formula

[Max. Working Load on Chain] × [Application Coefficient (Table 1)] × [Speed Coefficient (Table 4)] × [Temperature Coefficient (Kt)] ≤ [Max. Allowable Tension of Chain]

Temperature Coefficient(Kt)

Temperature	Coefficient(Kt)
400˚C Less	1.0
400˚C ~ 500˚C	1.2
500˚C ~ 600˚C	1.5
600˚C ~ 700˚C	1.8
Above 700˚C	Cannot Be Used

Take account of corrosion resistance, which begins to decline above 400˚C.

Power and Torque

1kW=102kgf·m/sec 1PS=735.5W(Metric Power) } ≈750W
1kW=1000W 1HP=745.7W(Imperial Power)

*Torque :1kg·m=100kg·cm
1kg·m=9.8N·m (newton metre)
1N·m=0.120kg·m
1r/min =1rpm

Obtaining Power from Torque and Rotary Speed

$$\text{Output (kW)}=\frac{\text{Torque((N·m)}\times\text{Rotary speed(r/min)}}{9.55\times1000}$$

CHE35 (Single Chain) (kW)

Number of Small Sprocket Teeth	Rotary Speed of Small Sprockets min(r/min)																								
	50	100	300	500	700	900	1200	1500	1800	2100	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	10000
9	0.06	0.11	0.29	0.46	0.63	0.79	1.02	1.25	1.48	1.69	1.98	1.62	1.29	1.05	0.88	0.75	0.66	0.57	0.51	0.46	0.41	0.37	0.34	0.31	0.27
10	0.07	0.12	0.33	0.52	0.71	0.89	1.15	1.40	1.65	1.89	2.22	1.90	1.51	1.23	1.04	0.88	0.77	0.67	0.60	0.53	0.48	0.43	0.40	0.37	0.31
11	0.07	0.13	0.37	0.57	0.78	0.98	1.27	1.55	1.83	2.10	2.46	2.19	1.74	1.42	1.19	1.02	0.88	0.78	0.69	0.61	0.55	0.50	0.46	0.43	0.36
12	0.08	0.15	0.40	0.63	0.86	1.07	1.40	1.71	2.01	2.31	2.70	2.50	1.98	1.62	1.36	1.16	1.01	0.88	0.78	0.70	0.63	0.57	0.52	0.48	0.41
13	0.09	0.16	0.44	0.69	0.94	1.17	1.52	1.86	2.19	2.52	2.95	2.81	2.24	1.83	1.53	1.31	1.13	0.99	0.88	0.79	0.71	0.65	0.59	0.54	0.46
14	0.10	0.18	0.47	0.75	1.01	1.28	1.65	2.01	2.37	2.73	3.19	3.15	2.50	2.04	1.72	1.46	1.27	1.11	0.98	0.88	0.80	0.72	0.66	0.60	0.51
15	0.10	0.19	0.51	0.81	1.10	1.37	1.78	2.17	2.56	2.94	3.44	3.49	2.77	2.27	1.90	1.62	1.40	1.23	1.10	0.98	0.88	0.80	0.73	0.67	0.57
16	0.11	0.20	0.54	0.87	1.17	1.47	1.90	2.33	2.75	3.15	3.69	3.84	3.05	2.50	2.10	1.79	1.55	1.36	1.21	1.08	0.97	0.88	0.81	0.74	0.63
17	0.12	0.22	0.58	0.93	1.25	1.57	2.04	2.48	2.93	3.36	3.94	4.21	3.34	2.74	2.29	1.95	1.69	1.49	1.32	1.18	1.07	0.97	0.88	0.81	0.69
18	0.13	0.23	0.62	0.98	1.33	1.67	2.16	2.64	3.12	3.58	4.19	4.59	3.64	2.98	2.50	2.13	1.85	1.62	1.44	1.29	1.16	1.05	0.96	0.88	0.75
19	0.13	0.25	0.66	1.04	1.41	1.77	2.29	2.80	3.30	3.80	4.44	4.98	3.95	3.23	2.71	2.31	2.01	1.76	1.56	1.40	1.26	1.14	1.04	0.95	0.82
20	0.14	0.26	0.69	1.10	1.49	1.87	2.42	2.96	3.49	4.01	4.69	5.37	4.27	3.49	2.94	2.50	2.16	1.90	1.69	1.51	1.36	1.23	1.13	1.04	0.88
21	0.15	0.28	0.73	1.16	1.57	1.97	2.55	3.13	3.68	4.23	4.95	5.78	4.59	3.75	3.15	2.69	2.33	2.04	1.81	1.62	1.46	1.33	1.21	1.11	0.95
22	0.16	0.28	0.77	1.22	1.66	2.07	2.69	3.28	3.87	4.47	5.20	6.12	4.92	4.03	3.37	2.88	2.50	2.19	1.95	1.74	1.57	1.42	1.30	1.19	1.02
23	0.16	0.30	0.81	1.28	1.74	2.18	2.82	3.45	4.06	4.66	5.45	6.43	5.26	4.30	3.60	3.08	2.67	2.34	2.08	1.86	1.68	1.52	1.39	1.28	1.09
24	0.17	0.31	0.85	1.34	1.82	2.28	2.95	3.61	4.25	4.89	5.71	6.73	5.60	4.59	3.84	3.28	2.84	2.50	2.22	1.98	1.79	1.62	1.48	1.36	1.16
25	0.18	0.33	0.89	1.40	1.90	2.38	3.08	3.77	4.44	5.10	5.97	7.03	5.96	4.88	4.09	3.49	3.02	2.66	2.36	2.10	1.90	1.72	1.57	1.45	1.23
26	0.19	0.34	0.93	1.46	1.98	2.48	3.22	3.93	4.63	5.33	6.23	7.34	6.32	5.17	4.33	3.70	3.21	2.81	2.50	2.24	2.01	1.83	1.67	1.53	1.31
28	0.20	0.37	1.00	1.58	2.15	2.69	3.48	4.26	5.02	5.77	6.75	7.98	7.06	5.78	4.84	4.14	3.59	3.15	2.79	2.50	2.25	2.04	1.87	1.72	1.46
30	0.22	0.40	1.08	1.71	2.31	2.90	3.75	4.59	5.41	6.21	7.27	8.58	7.83	6.41	5.37	4.59	3.98	3.49	3.10	2.77	2.50	2.27	2.07	1.90	1.62
32	0.23	0.43	1.16	1.83	2.48	3.11	4.02	4.92	5.80	6.60	7.76	9.18	8.65	7.06	5.92	5.05	4.38	3.84	3.41	3.05	2.75	2.50	2.28	2.10	0
35	0.25	0.48	1.28	2.01	2.73	3.42	4.44	5.42	6.39	7.34	8.58	10.1	9.85	8.06	6.77	5.78	5.01	4.40	3.90	3.49	3.15	2.86	2.61	2.40	0
40	0.29	0.54	1.47	2.33	3.16	3.95	5.13	6.27	7.38	8.50	9.92	11.7	12.1	9.85	8.28	7.06	6.12	5.37	4.77	4.27	3.84	3.49	0		
45	0.34	0.62	1.67	2.65	3.58	4.49	5.82	7.11	8.36	9.62	11.3	13.3	14.4	11.8	9.85	8.43	7.30	6.41	5.68	5.09	0				
Lubrication Method	A		B							C															

Lubrication Method A:Drop Lubrication, B:Oil Bath Lubrication C:Forced Circulation Lubrication by Pump

Not applicable to selection of CHES-type chains.

[Technical Data]
Designing of Chain Drive Mechanism 3

CHE40 (Single Chain)

(kW)

Number of Small Sprocket Teeth	Rotary Speed of Small Sprockets min (r/min)																								
	10	25	50	100	200	300	400	500	700	900	1000	1200	1400	1600	1800	2100	2400	2700	3000	3500	4000	5000	6500	7000	8000
9	0.03	0.07	0.14	0.26	0.48	0.69	0.90	1.10	1.49	1.87	2.05	2.42	2.78	3.07	2.57	2.04	1.67	1.40	1.19	0.95	0.78	0.56	0.43	0.34	0.28
10	0.04	0.08	0.16	0.29	0.54	0.78	1.01	1.23	1.67	2.10	2.31	2.72	3.12	3.51	3.01	2.39	1.96	1.64	1.40	1.11	0.91	0.65	0.49	0.40	0.32
11	0.04	0.09	0.17	0.32	0.60	0.87	1.12	1.37	1.85	2.32	2.55	3.01	3.45	3.89	3.48	2.76	2.26	1.89	1.62	1.28	1.05	0.75	0.57	0.46	0.37
12	0.04	0.10	0.19	0.35	0.66	0.95	1.23	1.50	2.04	2.55	2.80	3.30	3.80	4.28	3.96	3.15	2.57	2.16	1.84	1.46	1.19	0.86	0.65	0.51	0.43
13	0.04	0.11	0.21	0.39	0.72	1.04	1.34	1.64	2.22	2.78	3.06	3.60	4.14	4.67	4.47	3.55	2.90	2.43	2.08	1.65	1.35	0.96	0.73	0.58	0.48
14	0.05	0.12	0.22	0.42	0.78	1.12	1.45	1.78	2.40	3.01	3.31	3.90	4.48	5.06	5.00	3.96	3.25	2.72	2.32	1.87	1.51	1.09	0.82	0.65	0.53
15	0.05	0.13	0.24	0.45	0.84	1.21	1.57	1.91	2.59	3.25	3.57	4.21	4.83	5.45	5.54	4.39	3.60	3.01	2.57	2.04	1.67	1.19	0.91	0.72	0.59
16	0.06	0.14	0.26	0.48	0.90	1.30	1.68	2.05	2.78	3.48	3.83	4.51	5.18	5.84	6.10	4.84	3.96	3.32	2.83	2.25	1.87	1.32	1.00	0.80	0.65
17	0.06	0.15	0.28	0.51	0.96	1.38	1.79	2.19	2.96	3.72	4.09	4.81	5.53	6.24	6.68	5.30	4.34	3.64	3.11	2.47	2.02	1.45	1.10	0.87	0.72
18	0.07	0.16	0.29	0.54	1.02	1.47	1.90	2.33	3.15	3.95	4.34	5.12	5.88	6.63	7.28	5.78	4.73	3.96	3.39	2.69	2.20	1.57	1.19	0.95	0
19	0.07	0.16	0.31	0.58	1.09	1.66	2.02	2.47	3.34	4.19	4.60	5.42	6.24	7.03	7.83	6.27	5.13	4.30	3.67	2.92	2.39	1.71	1.30	1.03	0
20	0.07	0.18	0.33	0.61	1.14	1.65	2.13	2.61	3.53	4.43	4.87	5.74	6.59	7.43	8.28	6.77	5.54	4.64	3.96	3.15	2.57	1.87	1.40	1.11	0
21	0.08	0.19	0.34	0.65	1.21	1.74	2.25	2.75	3.72	4.67	5.13	6.05	6.95	7.83	8.73	7.28	5.96	5.00	4.27	3.39	2.77	1.98	1.51	1.19	0
22	0.08	0.19	0.37	0.68	1.27	1.83	2.36	2.89	3.92	4.91	5.39	6.36	7.30	8.21	9.18	7.83	5.39	5.36	4.57	3.63	2.97	2.13	1.62	1.28	0
23	0.09	0.20	0.38	0.72	1.33	1.92	2.48	3.04	4.11	5.15	5.66	6.67	7.68	8.65	9.62	8.36	6.83	5.73	4.89	3.88	3.18	2.28	1.73	1.37	0
24	0.10	0.22	0.40	0.75	1.40	2.01	2.60	3.18	4.30	5.39	5.93	6.98	8.06	9.03	10.1	8.88	7.28	6.10	5.21	4.13	3.39	2.42	1.84	1.46	0
25	0.10	0.22	0.42	0.78	1.45	2.10	2.72	3.32	4.49	5.63	6.19	7.30	8.36	9.47	10.5	9.47	7.76	6.49	5.54	4.39	3.60	2.57	1.96	0	
26	0.10	0.23	0.43	0.81	1.52	2.19	2.83	3.46	4.68	5.88	6.46	7.61	8.73	9.85	11.0	10.1	8.21	6.89	5.88	4.66	3.82	2.73	2.08	0	
28	0.11	0.25	0.47	0.88	1.64	2.37	3.07	3.75	5.08	6.37	7.01	8.28	9.47	10.7	11.9	11.2	9.18	7.68	6.56	5.21	4.27	3.05	2.32	0	
30	0.12	0.28	0.51	0.95	1.78	2.55	3.30	4.04	5.47	6.66	7.53	8.88	10.2	11.5	12.8	12.5	10.1	8.50	7.28	5.78	4.73	3.39	2.57	0	
32	0.13	0.29	0.54	1.01	1.90	2.74	3.54	4.33	5.86	7.36	8.06	9.55	11.0	12.3	13.7	13.7	11.2	9.40	8.06	6.37	5.21	3.73	0		
35	0.14	0.32	0.60	1.12	2.10	3.01	3.91	4.77	6.46	8.13	8.88	10.5	12.1	13.6	15.1	15.7	12.8	10.7	9.18	7.28	5.96	4.27	0		
40	0.16	0.37	0.69	1.30	2.42	3.48	4.51	5.51	7.46	9.33	10.3	12.2	14.0	15.7	17.5	19.2	15.7	13.1	11.2	8.88	7.28	5.21	0		
45	0.19	0.43	0.79	1.47	2.75	3.95	5.13	6.27	8.50	10.6	11.7	13.8	15.8	17.8	19.8	22.8	18.7	15.7	13.4	10.6	8.73	0			
Lubrication Method			A							B									C						

Lubrication Method A:Drop Lubrication B:Oil Bath Lubrication C:Forced Circulation Lubrication by Pump

Not applicable to selection of CHES-type chains. See P.3509 for CHEM Type.

CHE50 (Single Chain)

(kW)

Number of Small Sprocket Teeth	Rotary Speed of Small Sprockets min (r/min)																								
	10	25	50	100	200	300	400	500	700	900	1000	1200	1400	1600	1800	2100	2400	2700	3000	3500	4000	4500	5000	5500	6000
9	0.07	0.14	0.27	0.50	0.94	1.35	1.75	2.14	2.90	3.64	4.00	4.71	4.49	3.67	3.08	2.44	2.00	1.68	1.43	1.13	0.93	0.78	0.66	0.57	0.51
10	0.07	0.16	0.31	0.57	1.05	1.51	1.69	2.40	3.25	4.07	4.48	5.28	5.26	4.30	3.60	2.86	2.34	1.96	1.68	1.33	1.09	0.91	0.78	0.67	0.59
11	0.08	0.18	0.34	0.63	1.16	1.68	2.18	2.66	3.60	4.52	4.97	5.86	6.06	4.96	4.16	3.30	2.70	2.27	1.93	1.54	1.25	1.05	0.90	0.78	0.69
12	0.09	0.19	0.37	0.69	1.28	1.84	2.39	2.92	3.96	4.96	5.45	6.43	6.91	5.65	4.74	3.76	3.08	2.58	2.20	1.75	1.43	1.20	1.02	0.89	0.78
13	0.10	0.22	0.40	0.75	1.40	2.01	2.61	3.19	4.31	5.41	5.95	7.01	7.76	6.38	5.34	4.24	3.47	2.91	2.48	1.97	1.61	1.35	1.16	1.00	0
14	0.10	0.23	0.43	0.81	1.51	2.18	2.83	3.45	4.68	5.86	6.45	7.61	8.73	7.12	5.98	4.74	3.88	3.25	2.76	2.20	1.81	1.51	1.29	1.12	0
15	0.11	0.25	0.47	0.87	1.63	2.35	3.04	3.72	5.04	6.32	6.95	8.21	9.40	7.91	6.62	5.26	4.30	3.60	3.08	2.44	2.00	1.68	1.43	1.24	0
16	0.12	0.27	0.50	0.94	1.75	2.52	3.26	3.99	5.40	6.77	7.45	8.80	10.1	8.73	7.30	5.79	4.74	3.97	3.39	2.69	2.20	1.84	1.57	1.37	0
17	0.13	0.29	0.54	1.00	1.87	2.69	3.48	4.26	5.77	7.23	7.98	9.40	10.7	9.55	7.98	6.34	5.19	4.35	3.72	2.95	2.41	2.02	1.72	1.50	0
18	0.13	0.31	0.57	1.07	1.98	2.86	3.71	4.53	6.13	7.68	8.43	10.0	11.4	10.4	8.73	6.91	5.65	4.74	4.04	3.21	2.63	2.20	1.88	0	
19	0.14	0.32	0.60	1.13	2.10	3.04	3.93	4.80	6.51	8.13	8.95	10.6	12.2	11.3	9.47	7.46	6.13	5.14	4.39	3.48	2.85	2.39	2.04	0	
20	0.15	0.34	0.64	1.19	2.22	3.21	4.16	5.07	6.87	8.58	9.47	11.2	12.8	12.2	10.2	8.06	6.62	5.55	4.74	3.76	3.08	2.58	2.20	0	
21	0.16	0.36	0.67	1.26	2.34	3.38	4.38	5.35	7.24	9.10	10.0	11.8	13.5	13.1	11.0	8.73	7.12	5.98	5.10	4.04	3.31	2.78	2.37	0	
22	0.16	0.38	0.71	1.37	2.47	3.55	4.60	5.62	7.61	9.55	10.5	12.4	14.2	14.0	11.8	9.33	7.61	6.41	5.47	4.34	3.55	2.98	2.54	0	
23	0.17	0.40	0.75	1.39	2.59	3.73	4.83	5.90	7.98	10.0	11.0	13.0	14.9	15.0	12.6	10.0	8.21	6.85	5.85	4.64	3.80	3.19	0		
24	0.19	0.42	0.78	1.45	2.71	3.90	5.06	6.18	8.36	10.5	11.6	13.6	15.6	16.0	13.4	10.7	8.73	7.30	6.23	4.95	4.04	3.39	0		
25	0.19	0.43	0.81	1.51	2.83	4.08	5.28	6.46	8.73	11.0	12.1	14.2	16.3	17.0	14.2	11.3	9.25	7.76	6.62	5.26	4.30	3.60	0		
26	0.20	0.46	0.85	1.58	2.95	4.25	5.51	6.74	9.10	11.4	12.6	14.8	17.0	18.1	15.1	12.0	9.85	8.21	7.03	5.57	4.57	3.83	0		
28	0.22	0.49	0.92	1.72	3.20	4.61	5.98	7.30	9.85	12.4	13.7	16.0	18.4	20.1	16.9	13.4	11.0	9.18	7.83	6.23	5.10	4.27	0		
30	0.23	0.53	0.99	1.85	3.45	4.97	6.44	7.83	10.70	13.5	14.7	17.3	19.8	22.4	18.7	14.8	12.2	10.2	8.73	6.91	5.65	0			
32	0.25	0.57	1.06	1.98	3.70	5.33	6.90	8.43	11.4	14.3	15.7	18.6	21.3	24.0	20.7	16.4	13.4	11.3	9.62	7.61	6.23	0			
35	0.28	0.63	1.17	2.19	4.07	5.86	7.61	9.33	12.6	15.7	17.3	20.4	23.5	26.5	23.6	18.7	15.4	12.8	11.0	8.73	7.12	0			
40	0.32	0.72	1.35	2.52	4.71	6.77	8.80	10.70	14.5	18.2	20.0	23.6	27.1	30.6	28.9	22.9	18.7	15.7	13.4	10.7	0				
45	0.36	0.82	1.54	2.86	5.34	7.68	10.0	12.2	16.5	20.7	22.8	26.8	30.8	34.6	34.4	27.3	22.4	18.7	16.0	0					
Lubrication Method			A					B										C							

Lubrication Method A:Drop Lubrication B:Oil Bath Lubrication C:Forced Circulation Lubrication by Pump

Not applicable to selection of CHES-type chains. See P.3509 for CHEM Type.

CHE60 (Single Chain)

(kW)

Number of Small Sprocket Teeth	Rotary Speed of Small Sprockets min (r/min)																								
	10	25	50	100	150	200	300	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2500	3000	3500	4000	4500
9	0.11	0.25	0.46	0.87	1.25	1.61	2.33	3.01	3.69	4.34	4.98	5.62	6.25	6.87	7.45	6.54	5.19	4.25	3.56	3.04	2.18	1.66	1.31	1.07	0.90
10	0.12	0.28	0.52	0.97	1.40	1.81	1.86	3.38	4.13	4.86	5.59	6.30	7.00	7.68	8.36	7.68	6.08	4.98	4.17	3.56	2.55	1.94	1.54	1.26	1.05
11	0.13	0.31	0.57	1.07	1.54	2.01	2.89	3.74	4.57	5.39	6.19	6.98	7.76	8.50	9.33	8.88	7.02	5.74	4.81	4.11	2.94	2.24	1.78	1.45	1.22
12	0.15	0.34	0.63	1.18	1.70	2.20	3.17	4.11	5.03	5.92	6.80	7.68	8.50	9.40	10.2	10.1	7.98	6.54	5.48	4.68	3.35	2.55	2.02	1.66	1.39
13	0.16	0.37	0.69	1.29	1.86	2.40	3.46	4.48	5.48	6.45	7.42	8.36	9.33	10.2	11.1	11.3	9.03	7.38	6.18	5.28	3.77	2.87	2.28	1.87	0
14	0.18	0.40	0.75	1.40	2.01	2.60	3.74	4.86	5.94	6.99	8.06	9.03	10.1	11.0	12.1	12.7	10.1	8.28	6.91	5.90	4.22	3.22	2.55	2.09	0
15	0.19	0.43	0.81	1.50	2.16	2.80	4.04	5.28	6.39	7.53	8.65	9.77	10.8	11.9	13.0	14.0	11.2	9.18	7.68	6.54	4.68	3.56	2.83	2.31	0
16	0.20	0.46	0.87	1.61	2.32	3.01	4.33	5.61	6.86	8.06	9.25	10.4	11.6	12.8	14.0	15.1	12.3	10.1	8.43	7.21	5.15	3.92	3.11	2.55	0
17	0.22	0.49	0.93	1.72	2.48	3.21	4.63	5.99	7.32	8.65	9.92	11.2	12.5	13.7	14.8	16.1	13.5	11.0	9.25	7.91	5.65	4.30	3.41	2.79	0
18	0.23	0.52	0.98	1.83	2.63	3.42	4.92	6.37	7.76	9.18	10.5	11.9	13.2	14.5	15.8	17.1	14.7	12.0	10.1	8.58	6.15	4.68	3.72	3.04	0
19	0.25	0.56	1.04	1.94	2.79	3.62	5.21	6.75	8.28	9.70	11.2	12.6	14.0	15.4	16.8	18.1	16.0	13.1	10.9	9.33	6.68	5.08	4.03	3.30	0
20	0.26	0.59	1.10	2.05	2.95	3.83	5.51	7.14	8.73	10.3	11.8	13.4	14.8	16.3	17.8	19.2	17.2	14.1	11.8	10.1	7.21	5.48	4.35	0	
21	0.27	0.62	1.16	2.16	3.11	4.03	5.80	7.53	9.18	10.8	12.5	14.0	15.6	17.2	18.7	20.2	18.5	15.1	12.7	10.8	7.76	5.90	4.68	0	
22	0.28	0.65	1.22	2.28	3.27	4.24	6.11	7.91	9.70	11.4	13.1	14.8	16.4	18.1	19.7	21.3	19.8	16.3	13.6	11.6	8.28	6.33	5.02	0	
23	0.30	0.69	1.28	2.38	3.43	4.45	6.41	8.28	10.1	11.9	13.7	15.5	17.2	18.9	20.7	22.3	21.2	17.4	14.5	12.5	8.88	6.77	5.36	0	
24	0.31	0.72	1.34	2.50	3.60	4.66	6.71	8.65	10.6	12.5	14.4	16.2	18.1	19.8	21.6	23.3	22.6	18.5	15.5	13.3	9.47	7.21	5.72	0	
25	0.33	0.75	1.40	2.61	3.76	4.86	7.01	9.10	11.1	13.1	15.0	16.9	18.9	20.7	22.6	24.4	24.0	19.7	16.5	14.1	10.1	7.68	6.08	0	
26	0.34	0.78	1.45	2.72	3.92	5.08	7.31	9.47	11.6	13.7	15.7	17.7	19.7	21.6	23.6	25.4	25.5	20.9	17.5	14.9	10.7	8.13	6.45	0	
28	0.37	0.84	1.58	2.95	4.24	5.50	7.91	10.3	12.5	14.8	17.0	19.2	21.3	23.4	25.5	27.6	28.5	23.3	19.5	16.7	11.9	9.10	0		
30	0.40	0.91	1.70	3.18	4.57	5.92	8.50	11.0	13.5	16.0	18.3	20.7	23.0	25.2	27.5	29.7	31.6	25.9	21.7	18.5	13.3	10.1	0		
32	0.43	0.98	1.83	3.40	4.90	6.36	9.18	11.9	14.5	17.1	19.6	22.2	24.6	27.1	29.5	31.9	34.8	28.5	23.9	20.4	14.6	11.1	0		
35	0.47	1.07	2.01	3.75	5.40	7.00	10.1	13.1	16.0	18.8	21.6	24.4	27.1	29.8	32.5	35.1	39.8	32.6	27.3	23.3	16.7	12.7	0		
40	0.54	1.25	2.32	4.33	6.24	8.06	11.6	15.1	18.4	21.7	25.0	28.1	31.3	34.4	37.5	40.6	46.6	39.8	33.3	28.5	20.4	0			
45	0.62	1.41	2.63	4.92	7.09	9.18	13.2	17.2	21.0	24.7	28.3	32.0	35.6	39.1	42.6	46.0	52.9	47.5	39.8	34.0	24.3	0			
Lubrication Method		A					B											C							

Lubrication Method A:Drop Lubrication B:Oil Bath Lubrication C:Forced Circulation Lubrication by Pump

Not applicable to selection of CHES-type chains. See P.3509 for CHEM Type.

CHE80 (Single Chain)

(kW)

Number of Small Sprocket Teeth	Rotary Speed of Small Sprockets min (r/min)																								
	10	25	50	100	150	200	300	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2700	3000	3400
9	0.25	0.58	1.08	2.02	2.91	3.77	5.43	7.03	8.58	10.1	11.6	13.1	12.7	10.8	9.40	8.21	6.53	5.35	4.48	3.83	3.32	2.91	2.44	2.08	1.73
10	0.28	0.65	1.22	2.26	3.26	4.22	6.09	7.91	9.62	11.3	13.1	14.7	14.8	12.7	11.0	9.62	7.68	6.27	5.25	4.48	3.89	3.41	2.86	2.44	2.02
11	0.31	0.72	1.34	2.51	3.61	4.68	6.74	8.73	10.7	12.6	14.5	16.3	17.2	14.6	12.7	11.1	8.80	7.23	6.06	5.17	4.48	3.93	3.30	2.81	1.27
12	0.35	0.79	1.48	2.75	3.97	5.14	7.41	9.62	11.7	13.8	15.9	17.9	19.5	16.6	14.5	12.7	10.1	8.21	6.90	5.89	5.11	4.48	3.76	3.21	0
13	0.38	0.87	1.61	3.01	4.33	5.61	8.06	10.4	12.8	15.1	17.3	19.5	21.7	18.8	16.3	14.3	11.3	9.33	7.76	6.65	5.76	5.06	4.24	3.62	0
14	0.41	0.93	1.75	3.25	4.69	6.07	8.73	11.3	13.9	16.3	18.7	21.2	23.5	21.0	18.2	16.0	12.7	10.4	8.73	7.43	6.44	5.65	4.74	4.04	0
15	0.44	1.01	1.88	3.51	5.05	6.54	9.40	12.2	14.9	17.6	20.2	22.8	25.4	23.3	20.2	17.8	14.1	11.5	9.62	8.21	7.14	6.27	5.25	4.48	0
16	0.47	1.08	2.01	3.76	5.42	7.02	10.1	13.1	16.0	18.9	21.6	24.5	27.2	25.7	22.2	19.5	15.5	12.7	10.6	9.10	7.83	6.90	5.79	4.94	0
17	0.51	1.16	2.15	4.01	5.78	7.46	10.8	14.0	17.1	20.1	23.1	26.1	29.0	28.1	24.4	21.4	16.9	13.9	11.6	9.92	8.58	7.53	6.33	5.41	0
18	0.54	1.22	2.29	4.27	6.15	7.98	11.5	14.8	18.2	21.4	24.6	27.8	30.9	30.7	26.6	23.3	18.5	15.1	12.7	10.8	9.40	8.21	6.90	5.89	0
19	0.57	1.30	2.42	4.53	6.52	8.43	12.2	15.7	19.2	22.7	26.1	29.4	32.7	33.2	28.8	25.3	20.1	16.4	13.7	11.7	10.1	8.95	7.46	6.39	0
20	0.60	1.37	2.57	4.78	6.89	8.95	12.8	16.6	20.4	24.0	27.6	31.1	34.5	35.9	31.1	27.3	21.6	17.8	14.8	12.7	11.0	9.62	8.06	0	
21	0.63	1.45	2.70	5.04	7.27	9.40	13.6	17.5	21.5	25.3	29.1	32.7	36.5	38.6	33.4	29.4	23.3	19.1	16.0	13.7	11.9	10.4	8.73	0	
22	0.67	1.52	2.84	5.30	7.61	9.92	14.2	18.5	22.6	26.6	30.6	34.5	38.3	41.4	35.9	31.5	25.0	20.4	17.2	14.6	12.7	11.1	9.33	0	
23	0.70	1.60	2.98	5.57	7.98	10.4	15.0	19.4	23.7	27.9	32.1	36.2	40.2	44.2	38.3	33.6	26.7	21.9	18.4	15.7	13.6	11.9	10.0	0	
24	0.73	1.67	3.13	5.83	8.43	10.9	15.7	20.3	24.8	29.2	33.6	37.9	42.1	46.3	40.9	35.9	28.5	23.3	19.5	16.6	14.5	12.7	10.6	0	
25	0.77	1.75	3.26	6.09	8.80	11.3	16.3	21.2	25.9	30.9	35.1	39.5	44.0	48.4	43.4	38.1	30.3	24.6	20.7	17.8	15.4	13.5	11.3	0	
26	0.80	1.83	3.40	6.36	9.18	11.9	17.1	22.2	27.0	31.9	36.6	41.3	45.9	50.4	46.1	40.4	32.1	26.3	22.0	18.8	16.3	14.3	12.0	0	
28	0.87	1.98	3.69	6.89	9.92	12.8	18.5	23.9	29.3	34.5	39.7	44.7	49.8	54.7	51.5	45.2	35.9	29.4	24.6	21.0	18.2	16.0	0		
30	0.93	2.13	3.98	7.42	10.7	13.8	19.9	25.8	31.6	37.2	42.7	48.2	53.6	58.9	57.1	50.1	39.8	32.5	27.3	23.3	20.2	17.8	0		
32	1.00	2.28	4.26	7.98	11.4	14.8	21.3	27.7	33.9	39.9	45.8	51.6	57.4	63.1	62.9	55.2	43.8	35.9	30.1	25.7	22.2	19.5	0		
35	1.10	2.51	4.69	8.73	12.6	16.3	23.6	30.5	37.3	43.9	50.4	56.9	63.3	69.6	72.0	63.2	50.1	41.0	34.4	29.4	25.4	0			
40	1.28	2.90	5.42	10.1	14.5	18.9	27.2	35.2	43.0	50.7	58.3	65.7	73.9	80.6	87.3	76.8	61.3	50.1	42.0	35.9	14.9	0			
45	1.45	3.30	6.15	11.5	16.6	21.4	30.9	40.0	48.9	57.6	66.2	74.6	82.8	91.0	99.2	91.8	73.1	59.8	50.1	40.3	0				
Lubrication Method	A					B											C								

Lubrication Method A:Drop Lubrication B:Oil Bath Lubrication C:Forced Circulation Lubrication by Pump

Not applicable to selection of CHES-type chains. See P.3509 for CHEM Type.

[Technical Data]

Designing of Chain Drive Mechanism 4

■The table of transmission performance CHEM40 (1line Chain) (kw)

Number of Small Sprocket Teeth	Rotary Speed of Small Sprockets (r/min)											
	10	25	50	100	200	300	400	500	700	900	1000	1200
9	0.05	0.11	0.21	0.39	0.71	1.04	1.34	1.68	2.22	2.77	3.08	3.59
10	0.05	0.13	0.24	0.44	0.79	1.15	1.49	1.87	2.47	3.08	3.42	
11	0.06	0.15	0.26	0.48	0.87	1.27	1.64	2.05	2.72	3.39	3.80	
12	0.06	0.16	0.29	0.52	0.95	1.38	1.79	2.24	2.96	3.73		
13	0.07	0.18	0.31	0.57	1.03	1.50	1.94	2.43	3.27	4.05		
14	0.08	0.19	0.33	0.61	1.13	1.64	2.13	2.64	3.53			
15	0.08	0.20	0.36	0.65	1.21	1.76	2.29	2.83	3.78			
16	0.09	0.22	0.38	0.70	1.29	1.88	2.44	3.02	4.03			
17	0.09	0.23	0.41	0.74	1.37	2.00	2.59	3.21				
18	0.10	0.24	0.43	0.80	1.45	2.11	2.74	3.40				
19	0.10	0.26	0.45	0.86	1.57	2.28	2.95	3.65				
20	0.11	0.27	0.48	0.91	1.66	2.40	3.11	3.85				
21	0.11	0.28	0.50	0.95	1.74	2.52	3.26	4.04				
22	0.12	0.30	0.53	1.00	1.82	2.66	3.45	4.23				
23	0.12	0.31	0.55	1.04	1.92	2.81	3.61	4.42				
24	0.13	0.32	0.60	1.11	2.03	2.96	3.84					
25	0.13	0.34	0.63	1.15	2.11	3.08	4.00					
26	0.14	0.35	0.65	1.20	2.19	3.20	4.16					
27	0.15	0.36	0.68	1.25	2.28	3.33	4.32					
28	0.15	0.38	0.70	1.29	2.36	3.45	4.48					
30	0.16	0.40	0.75	1.40	2.53	3.70						
32	0.17	0.43	0.80	1.51	2.80	4.05						
35	0.19	0.47	0.88	1.65	3.06	4.43						
40	0.22	0.54	1.00	1.88	3.50							
45	0.24	0.61	1.13	2.12	3.94							

■The table of transmission performance CHEM50 (1line Chain) (kw)

Number of Small Sprocket Teeth	Rotary Speed of Small Sprockets (r/min)											
	10	25	50	100	200	300	400	500	600	700	800	900
9	0.11	0.24	0.44	0.82	1.49	2.17	2.80	3.39	3.99	4.61	5.19	5.72
10	0.12	0.27	0.49	0.91	1.66	2.41	3.11	3.76	4.44	5.12	5.80	
11	0.14	0.29	0.54	1.00	1.83	2.65	3.42	4.14	4.88	5.63		
12	0.15	0.32	0.59	1.09	1.99	2.89	3.74	4.51	5.35	6.18		
13	0.16	0.35	0.64	1.18	2.16	3.14	4.07	4.91	5.80			
14	0.17	0.37	0.69	1.27	2.32	3.38	4.45	5.29	6.24			
15	0.19	0.40	0.74	1.36	2.49	3.62	4.76	5.67				
16	0.20	0.43	0.79	1.45	2.66	3.86	5.08	6.05				
17	0.21	0.45	0.84	1.54	2.82	4.10	5.40	6.43				
18	0.22	0.48	0.89	1.63	2.99	4.34	5.72					
19	0.24	0.51	0.97	1.79	3.31	4.81	6.21					
20	0.25	0.53	1.03	1.89	3.49	5.07	6.54					
21	0.26	0.56	1.08	1.98	3.66	5.32	6.86					
22	0.27	0.58	1.13	2.08	3.83	5.57						
23	0.29	0.61	1.18	2.17	4.01	5.83						
24	0.30	0.66	1.23	2.29	4.26	6.14						
25	0.31	0.68	1.28	2.38	4.44	6.39						
26	0.32	0.71	1.33	2.48	4.62	6.65						
27	0.34	0.74	1.38	2.57	4.80	6.90						
28	0.35	0.77	1.44	2.67	4.97	7.16						
30	0.37	0.82	1.54	2.86	5.33							
32	0.40	0.88	1.66	3.05	5.68							
35	0.44	0.97	1.81	3.34	6.22							
40	0.50	1.11	2.07	3.81	7.11							
45	0.56	1.24	2.33	4.29								

■The table of transmission performance CHEM60 (1line Chain) (kw)

Number of Small Sprocket Teeth	Rotary Speed of Small Sprockets (r/min)											
	10	25	50	100	150	200	250	300	400	500	600	700
9	0.18	0.41	0.76	1.41	2.02	2.63	3.22	3.78	4.91	6.00	7.06	8.14
10	0.21	0.46	0.85	1.57	2.24	2.93	3.58	4.20	5.45	6.66	7.92	
11	0.23	0.51	0.93	1.73	2.47	3.22	3.94	4.62	6.00	7.33		
12	0.25	0.55	1.02	1.89	2.69	3.51	4.34	5.04	6.54	8.07		
13	0.27	0.60	1.10	2.04	2.97	3.88	4.75	5.46	7.23			
14	0.29	0.64	1.21	2.24	3.23	4.22	5.16	6.12	7.86			
15	0.31	0.69	1.30	2.41	3.46	4.52	5.53	6.56	8.43			
16	0.33	0.73	1.38	2.57	3.69	4.82	5.90	6.99				
17	0.35	0.78	1.47	2.73	3.92	5.12	6.27	7.43				
18	0.37	0.83	1.56	2.89	4.16	5.42	6.64	7.87				
19	0.39	0.89	1.69	3.17	4.51	5.89	7.21	8.46				
20	0.41	0.94	1.78	3.33	4.75	6.20	7.59	8.91				
21	0.43	0.98	1.87	3.50	4.99	6.51	7.97					
22	0.45	1.03	1.96	3.67	5.23	6.82	8.35					
23	0.47	1.08	2.05	3.83	5.46	7.13	8.73					
24	0.49	1.16	2.14	4.04	5.81	7.58	9.11					
25	0.51	1.21	2.23	4.20	6.05	7.90	9.67					
26	0.53	1.25	2.32	4.37	6.29	8.22						
28	0.58	1.35	2.49	4.71	6.78	8.85						
30	0.62	1.45	2.67	5.05	7.26	9.48						
32	0.66	1.56	2.93	5.53	7.96							
35	0.72	1.70	3.21	6.05	8.71							
40	0.82	1.95	3.66	6.92	9.95							
45	0.92	2.19	4.12	7.78								

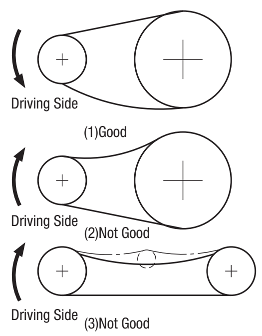
Installation Way

(A) Arrangement of Shafts

Horizontal Arrangement

Even when the shafts are arranged horizontally, the following points should be taken into account in terms of the rotary direction of the shafts. In (2) and (3) shown, elongation of the chain may prevent the chain links from leaving the sprocket teeth smoothly, resulting in biting. In (3) shown, the load bottom and slack top sides of the chain may come into contact with each other; to prevent this, use an idler or something equivalent.

Horizontal Arrangement

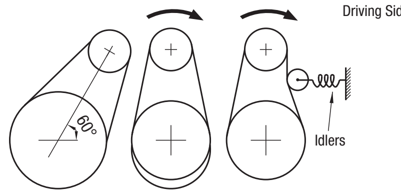


(Change the rotating direction or use an idler)

Vertical Arrangement

In (5) shown, an elongated chain may sag below the bottom sprockets. In this case, when a small sprocket is arranged below a large sprocket, the elongated chain may drop away from the small sprocket. To prevent this, the shafts should be arranged as in (4) , maintaining the angle at a maximum of 60°. When the mechanism in question or the installation space requires a vertical arrangement, place the small sprocket above the large sprocket and use an idler, etc. on the outside or inside as shown in (6) .

Vertical Arrangement

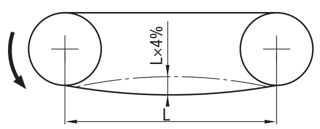


(4)Good (5)Not Good (6)Good

(B) Deflection

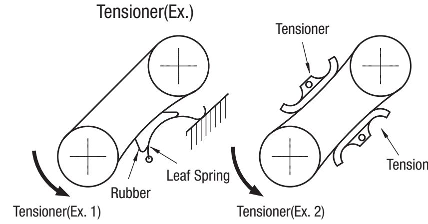
The deflection should normally be maintained at approximately 4% of the distance between the shafts, and approximately 2% in the following instances.

A. The shafts are arranged almost vertical transmission.
B. The distance between the shafts is 1 m or more.
C. The chain needs to be started and stopped frequently under heavy load.
D. The chain needs to be run in the reverse direction.



(C)Load Fluctuation

When the load varies during operation, install an initial tension either on the load or loose side of the chain. This can remove vibration and reduce the noise of the chain.



Lubrication

The service life of roller chains depends heavily on lubrication. Therefore, correct lubrication is extremely important. Today, as chains are increasingly run at higher speeds, they need to be lubricated more efficiently.

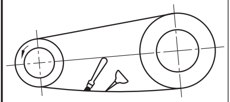
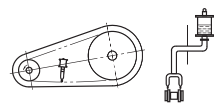
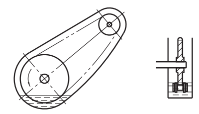
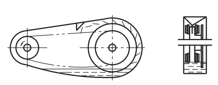
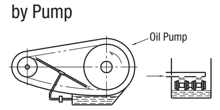
Benefits of Lubrication Oil

Oil applied into the space between pins, bushings and rollers forms oil film. Which then helps reduce wear of parts as well as absorb impact. Oil also cools down heat generated in the chain. Use good quality mineral oil to lubricate roller chains.

Recommended Lubricating Oil

Lubrication Method	A , B				C			
Temperature(℃) / Chain No.	-10 ~ 0	0 ~ 40	40 ~ 50	50 ~ 60	-10 ~ 0	0 ~ 40	40 ~ 50	50 ~ 60
CHE25~50	SAE10	SAE20	SAE30	SAE40	SAE10	SAE20	SAE30	SAE40
CHE60~80	SAE20	SAE30	SAE40	SAE50				

The lubrication methods(mentioned in the power transmission efficiency tables are based on the followings.)

Lubrication	Method	Service Interval and Oiling Quantity	Notes
A	Hand Oiling 	Apply oil by hand using a hand oiler or a brush, normally at least once everyday.	While slowly turning the chain, apply oil evenly 3~4 times onto the entire length of the chain. Be careful not to allow hands or clothing to be caught between the chain and the sprocket. When the mechanism is run for the first time after oiling, be careful to excess oil splashing over.
	Drop Lubrication 	Oil the chain in a manner such that approximately 5~20 drops of oil are applied onto the chain per minute.	It is recommended that a simple casing be installed over the chain to prevent oil from splashing over.
B	Oil Bath Lubrication 	Dip the bottom of the chain approximately 10 mm below the oiled surface.	Use a leak-free oil container. Before installing the oil container, wash it carefully to remove dust, dirt and other foreign particles. Maintain the correct oil level. Do not overfill the container.
	Rotating Plate Lubrication 	The chain is oiled by a rotating plate. Dip the plate approximately 20mm below the oil level. The wind velocity of the plate should be 200 m/min or faster.	
C	Forced Circulation Lubrication by Pump 	It is necessary to adjust the oil quantity appropriately to prevent overheating.	Use a leak-free oil container. Before installing the oil container, wash it carefully to remove dust, dirt and other foreign particles.