Selection

Selection of small sized conveyor chains can be made in the following steps, except for some particular cases.

(1) Preliminarily determining the type of conveyor chain
(2) Confirming allowable load to rollers
(3) Determining maximum tensile force acting on chain
(4) Confirming conveying conditions
(5) Determining the size of conveyor chain

Confirming Conveying conditions

(1) Type of conveyor chain (slat, top roller, carrier, etc.)
(2) Conveying direction (horizontal, vertical, slope, etc.)
(3) Weight and dimensions of material conveyed
(4) Total amount of material conveyed, and frequency of conveying
(5) Speed of conveyor
(6) Length of conveyor
(7) Lubrication
(8) Operating conditions of conveyor, such as temperature and humidity

Preliminarily Determining the Type of Conveyor Chain

$$T\ (kgf) = W_T \times f \times K$$

T : Maximum static tensile force acting to chain
W_T : Weight of materials conveyed, except for chain (kgf)
f : Coefficient of friction (see Table 4)
K : Coefficient of speed (see Table 1)

When two conveyor chains are arranged in parallel, temporarily determine the type and size of the conveyor chain of which maximum allowable tensile force is less than that determined by T × 0.6.

Table 1: Speed Factor

Conveyor Chain Speed (m/min)	Speed Factor K
15 or less	1.0
15～ 30	1.2
30～ 50	1.4
50～ 70	1.6
70～ 90	2.2
90～110	2.8
110～120	3.2

Confirming Allowable Load to Roller

Allowable load-carrying rollers of the conveyor chain shall not exceed those listed in Table 2 and Table 3.

Table 2: Allowable Loads to Main Rollers

KCM Chain No.	Plastic Roller R-Roller	Steel Roller	
		S-Roller	R-Roller
40、2040、2042	20	15	65
50、2050、2052	30	20	100
60、2060、2062	50	30	160
80、2080、2082	90	55	270
100、2100、2102	130	80	400

Unit: kgf/roller

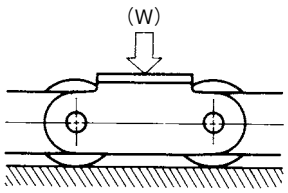
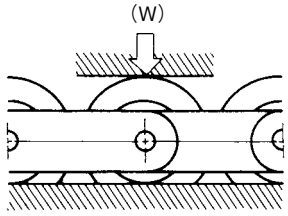


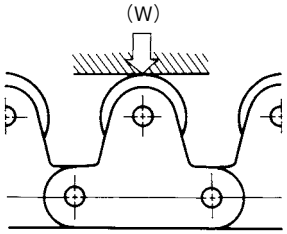
Table 3: Allowable Load to Load-carrying Roller

KCM Chain No.	Triple Speed Chain Roller	Side Rollers		Top Rollers	
		Plastic	Steel	Plastic	Steel
3-type carrier chain, Triple speed chain	6	—	—	—	—
40、2040、2042、4-type Triple speed chain	14	5	15	5	15
50、2050、2052、5-Triple speed chain	22	7	20	7	20
60、2060、2062、6-type Triple speed chain	36	10	30	10	30
80、2080、2082	—	18	55	18	55
100、2100、2102	—	30	80	30	80

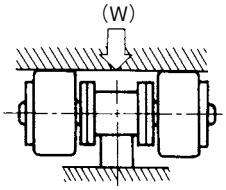
Unit: kgf/roller



Triple Speed Chain Roller



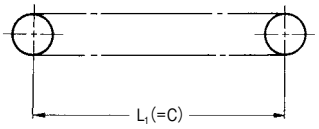
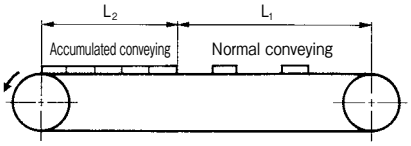
Top Roller



Side Roller

Determining Maximum Tensile Force Acting on Chain

Horizontal conveying

Normal conveying	$T=(W+2.1m\cdot C)f_1$ $kW=\frac{T\cdot V}{5565}\cdot\frac{1}{\eta}$ 
Accumulated conveying (Free flow conveyor)	$T=(w_1+m)\ L_1\cdot f_1+w_2\cdot L_2\cdot f_2+(w_2+m)\ L_2\cdot f_3+1.1m(L_1+L_2)f_1$ $kW=\frac{T\cdot V}{5565}\cdot\frac{1}{\eta}$ 

Determining the Size of Conveyor Chain

Finally determine the size of the conveyor chain of which maximum allowable tensile force of conveyor chain satisfies the following formula, by calculating the product of the maximum tensile force (T) acting on the conveyor chain and the speed factor K (Table 1).

T×K≦Max. allowable tensile force of conveyor chain

When two conveyor chains are arranged in parallel, the maximum tensile force acting on the chain is determined by T × 0.6.

■Symbols and Definitions

T =Max. static tensile force acting on chain (kgf)
V =Conveying speed (chain speed) (m/min)
C =Center-to-center distance between sprockets (m)
W =Max. total weight of conveyed materials on conveyor (kgf)
In case of separated materials: W= C/Conveying interval x Weight of conveyed material (kgf/piece)
L_1 =Length of conveying portion (m)
w_1 =Weight of conveyed material on conveying portion (kgf/m)
L_2 =Length of accumulating portion (m)
w_2 =Weight of conveyed material on accumulating portion (kgf/m)
m =Weight of conveying portion, including chain (kgf/m)
η =Mechanical transmission efficiency for drive unit, kW: Required power
f_1 =Coefficient of friction between chain and rail when conveying (see Table 5)
f_2 =Coefficient of friction between chain and conveyed material when accumulating (see Table 6)
f_3 =Coefficient of friction between chain and rail when accumulating (see Table 7)

Table 4: Coefficient of Rolling Friction

Roller Type	Steel Roller		Plastic Roller
	Not Lubricated	Lubricated	
R-Roller	0.12	0.08	0.08
S-Roller	0.21	0.14	0.12

Coefficient of Sliding Friction (Link Plate)

Not Lubricated	Lubricated
0.3	0.2

Table 5: f_1: Coefficient of friction between chain and rail during conveying

KCM Chain Type	Type of Main Roller		Lubricated	Not lubricated
Triple speed chain	Normal/High Load		—	0.08
Chain w/ side rollers	Plastic Roller	S-Roller	—	0.12
		R-Roller	—	0.08
	Steel Roller	S-Roller	0.14	0.21
		R-Roller	0.08	0.12
Chain w/ top rollers	Steel Roller	S-Roller	0.14	0.21
		R-Roller	0.08	0.12

Table 6: f_2: Coefficient of friction between chain and conveyed material when accumulating

KCM Chain Type	Type of Carrying Roller	Lubricated	Not lubricated
Triple speed chain	Normal	—	0.08
	High load	—	0.14
Chain w/ top rollers	Plastic roller	—	0.06
	Steel roller	0.06	0.09
Chain w/ top rollers	Plastic roller	—	0.06
	Steel roller	0.06	0.09

Table 7: f_3: Coefficient of friction between chain and rail when accumulating

KCM Chain Type	Type of Main Roller	Not Lubricated
Triple speed chain	General type	0.16
	High load	0.2

NOTE: $f_3=f_1$, except for triple speed chain