SELECTION OF ROLLER CHAIN DRIVES

The following data should be taken into consideration while selecting roller chain drives.
a. Horsepower to be transmitted
b. RPM of the driving and driven sprocket(Speed ratio)
c. Load classification
d. Space limitations if any
e. Driven machine
f. Source of power

If the pitch centre distance and number of teeth on both driving and driven sprockets are known, you can use the following formula, tables and charts to calculate chain lengths.

SELECTION PROCEDURE

For maximum service life, smooth operation and optimum performance, the following points should be considered, while determining the number of teeth in the pinion.

a) As most drives have an even number of pitches in the chain, the use of a pinion with an odd number of teeth ensures even distribution of chain and wheel tooth we
b) Pinions for normal, steady drives should generally not have less than 17 teeth, the reason being that a chain forms a polygon around the pinion. When the pinion speed is constant, the chain speed is subject to a regular cyclic variation. The percentage of cyclic variation becomes less marked as the number of teeth increases - and in fact becomes insignificant for the majority of applications when the number of teeth in the pinion exceeds 17.
c) A minimum of 23 teeth is recommended on moderate shock drives where the speed of the pinion exceeds 50 % of the maximum rated speed, and for heavy shock drives where the speed of the pinion exceeds 25% of the maximum rated speed.
d) The pinion should be heat treated to HV 10 - 550 for smooth drives where the pinion speeds exceeds 70 % of the maximum speed and operates under full horsepower rating. For heavy shock drives, the pinion should be treated in all cases.

DETERMINE THE CLASS OF LOAD

If shock loads are expected, then first determine the class of load on the basis of the drives equipment (see table 1).
Note : If table 1 does not list your equipment, go by its similarity to a listed item 89

LOAD CLASSIFICATIONS — TABLE 1

UNIFORM LOAD	MODERATE SHOCK LOAD	HEAVY SHOCK LOAD
Centrifugal pumps,Agitator for liquids,Conveyors, Fans-Uniform load Generators, M/c'sall types with uniformnon - reversing loads	Reciprocating pumps, Wood working M/c'sGrinders, Conveyors-Irregular load Mixers and Machinesall types with moderateshock and non-reversing loads	Presses, Earthmoving equipmentShears, Cranes &Hoists, Reciprocatingand Shaker typeconveyors, Crushers,Reciprocating feedersMachines-all typeswith severe impactshock loads orvariation andreversing service

Note : If table 1 does not list your equipment, go by its similarity to a listed item

ESTABLISH THE DESIGN HORSEPOWER

Establish the design horsepower by multiplying the specified horsepower value with the service factor given in Table 2.

LOAD CLASSIFICATIONS — TABLE 1

Type of Driven Load	TYPE OF INPUT POWER		
Uniform Moderate Shock Heavy Shock	Internal Combustion Engine with Hydraulic Drive 1.0 1.2 1.4	Electric Motor or Turbine 1.0 1.3 1.5	Internal Combustion Engine with Mechanical Drive 1.2 1.4 1.7

FINAL SELECTION OF CHAIN

Selection of multi- strand chains will become necessary if available space is limited or high speeds call for a chain wi t h l owe r p i t c h The strand factors are given in Table 3. To facilitate selection of multistrand
chains, multiply the horsepower rating for single strand chains by the corresponding strand factor.
ISO 10823 - 1996 standard of guidance can be referred for selectior chain drive power.

Actual power = Input power x service factor x strand factor.
Considering the actual power and rpm of the pinion, using the horsepower rating chart select the chain for the application.

SELECT THE LARGE SPROCKET

By using the required shaft speed ratio select the number of teeth in the large sprocket. If the required shaft speed ratio cannot be obtained with a standard sprocket, increase the number of teeth in the small sprocket by one or two, to obtain an acceptable speed ratio with a slightly larger standar sprocket. The size of the large sprocket is affected by the allowable wear elongation of the chain which may go up to 3 %. The use of sprockets with more than 67 tee reduces the life of the chain expressed in percentageelongation as :

Permissible wear elongation = 200 / N (%). The speed ratio for a single drive should be not exceed 10:1
A greater ratio will make it necessary to provide for two drives in series.

DETERMINE CHAIN LENGTH

Compute the length of chain required using the formula given below. If possible, adjust the centre distance, so that the length of chain required is always in an even number of pitches. For optimum life of the chain and sprockets the centre distance between the two sprockets should be 30 to 50 times the chain pitch.

$$L = \frac{2C}{P} + \left\{\frac{N+n}{2}\right\} + \left\{\frac{N-n}{2\pi}\right\}^2 \frac{P}{C}$$

Where L= Chain length in pitches
P= Chain Pitch
C= Contemplated centre distance
N= Number of teeth on large sprocket
N= Number of teeth on small sprocket

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