The following technical data will serve as a guide in selecting the proper Hilman Roller for many applications. The **Application Analysis Form** (see back cover) provides an excellent basis upon which to formulate a complete proposal. **HILMAN SALES ENGINEERING SHOULD BE CONSULTED TO CONFIRM OR AID IN THE SELECTION PROCESS.**

Capacity Formulas

The formulas below can help determine the capacity required For Hilman Rollers, depending how they are used. These formulas do not guarantee a proper selection for the Hilman rollers; they are intended as a guideline only. Contact Hilman sales or engineering for further guidance. If the capacity determined in FORMULAS A is less or greater than that of FORMULA B, the higher capacity should take precedence.

Formula A *Occasional Moves*

The large majority of roller moves are of an occasional nature on a smooth, level steel surface. To help in the selection of roller capacity for these occasional moves, use the following formula. When moving on a crowned rail, contact Hilman sales engineering. The formula assumes that entire roll of the chain is in full contact with the surface.

$$C = \frac{W}{N \times P}$$

C = capacity of roller in metric tons
W = weight of total load, converted to metric tons
N = number of rollers to be used
P = load Coefficient (see table for correct load Coefficient)

Load Coefficient	
Coefficient up to 100 tons	.75
Coefficient up to 300 tons	.70
Coefficient up to 1000 tons	.65
Coefficient over 1000 tons	.50

Formula B *Extended Service Life*

For extended use or repetitive moves, both the number of cycles and the rolling surface should be considered in the roller selection. The Cycle Life Factor is based on the number of cycles of stress produced in any roll in the chain during the total distance the Roller will move during the life of the Roller. The following formula takes into account the higher number of moves.

$$C = \frac{L}{S \times F}$$

C = capacity of roller in metric tons
L = load per roller
S = surface Coefficient
F = cycle life factor

Surface Coefficient	
Yield Strength	Coefficient
100,000 psi (690 MPa)	.85
80,000 psi (550 MPa)	.75
50,000 psi (345 MPa)	.65
36,000 psi (250 MPa)	.50

Cycle Life Factor	
No. of Cycles	Factor
10^2	.85
10^3	.70
10^4	.50
10^5	.30
10^6	.15

$$\text{no. of cycles} = \frac{\text{dist}}{\pi D \times 2}$$

dist = total distance roller will move
D = roll diameter

Coefficient of Friction *Level surface*

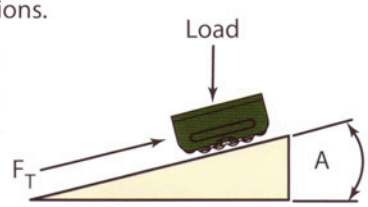
The coefficient of friction for breakaway for moving a load on a smooth, hard, level surface should not exceed 5%. On a hardened steel surface, this should be a little less. Hilman has friction test results on file that show actual ratings under ideal laboratory conditions. As job site conditions vary greatly, it is best to use 5% of the vertical dead load. In a dynamic state, the load will most often be moved slowly enough that the rating will almost always approach breakaway.

Coefficient of Friction *Inclined surface*

The following formula solves for F_T, a total force rating when defection or uphill moving is encountered. This formula considers friction and gravity. Please contact our sales or engineering staff with any questions.

$$F_T = \text{LOAD} (\text{Sin}A + \mu \text{Cos}A)$$

A = Angle of the inclined surface
μ = Coefficient of breakaway friction ≤ 5%
F_T = Total force required to move up an incline



Roller on Inclined Surface

Lubrication

Hilman Rollers as a standard product have no internal bearings. Rollers most often do not require lubrication because of their occasional use at a relatively slow speed. When used outside or in a marine environment, it is best to protect them with an environmentally safe grease. GNLI Grade 2 (PTFE) is a suggested temporary lubricant. If marine use is constant, a corrosion resistant alloy should be specified.

Materials Standards

Hilman Rollers as a standard product are manufactured as an all-steel product. The frame material is available in various grades of steel materials and a variety of coatings and paint finishes are available. Chain material is available in several different grades, but furnished in Grade A as standard product.

CHAIN MATERIAL GRADES	
Grade A	Standard High Alloy Steel
Grade B	Bearing Quality Steel
Grade D	Chrome Vanadium Steel
Grade S	Stainless Steel
Grade N	Nyton TM brand *(Nylon)

Moving Speeds

Most Hilman Roller applications involve very slow speeds for moving because most heavy loads dictate very slow movement. Some applications do require faster speeds, but in short or occasional bursts. Most moving speeds do not exceed 30 feet (10 meters) per minute. With special precautions taken, speeds up to 50 feet (15 meters) per minute and beyond are possible. Please contact us with the project parameters.

Accuracy

Hilman Rollers are able to be supplied with one or more dimensions having an accuracy of .002 inch (.05 mm). In some cases the tolerances can be tightened even more. Hilman welcomes request for special tolerances.

Rail or Track Conditions

In some cases, the rail or track intended to interface with the Hilman Rollers nay need to be set to a specific tolerance. The application results can have a great bearing on how the track is set. Hilman can and will supply a track and installation for your application. Please contact our sales staff with the application details.