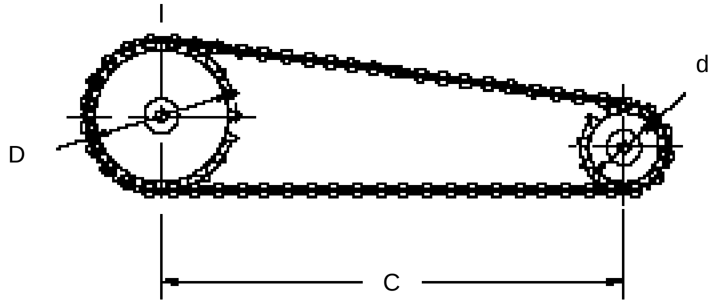
Belt and Chain Technical

A
3



Belt/Chain Length Calculations

$$L = 2C + 1.57\,(D + d) + \frac{(D-d)^2}{4C}$$

Where:

L = Length of belt at pitch line (in inches)
C = Center distance (in inches)
D = Pitch diameter (in inches) of large sprocket
(for V- or O-Ring Belts, use the Pulley O.D.)
d = Pitch diameter (in inches) of small sprocket
(for V- or O-Ring Belts, use the Pulley O.D.)

Belt/Chain Pitch Calculations

$$N = \frac{L}{C.P.}$$

Where:

N = Number of pitches
L = Length of belt (calculated above)
C.P. = Circular Pitch

Horsepower Calculations

$$H.P. = \frac{TN}{63024}$$

Where:

T = Torque (in. lbs.)
N = RPM

T = FR

Where:

F = Force(load) on Belts (lbs.)
R = Pitch Radius of Pulley/Sprocket (in.)
T = Torque (in lbs.)

Figure A

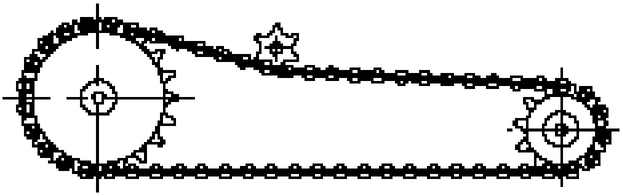
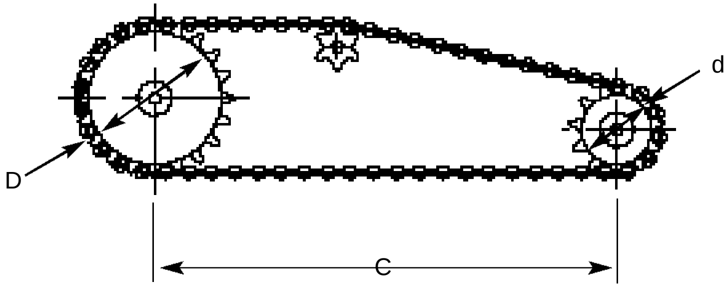


Figure B



Plastic Chain/Belt Tension

For proper tensioning of Berg's steel reinforced polyurethane belts, the tensioner should be designed inside the system as shown in B). Design of an external tensioner, shown in A), should be avoided when using steel reinforced belts. This will cause reverse bending of the belt which leads to shortened belt life. If an external tensioner is required BERG recommends the use of a Kevlar® reinforced belt. For Kevlar® reinforced belts see page 2, Alternate Belt Constructions.

"O" Ring Belt Length Calculations

$$LF = \frac{L}{1+(E/200)}$$

Where:
- LF = Free Length (before stretch)
- L = Installed Length
- E = Elongation (Percent)

Belt Tension Calculations

$$X = (1/64)C$$

Where:
- C = Center distance (in inches)
- F = Force (5% of ultimate load for belt)
- X = Deflection should be 1/64" per inch of center distance

Belt and Chain Technical

Figure A

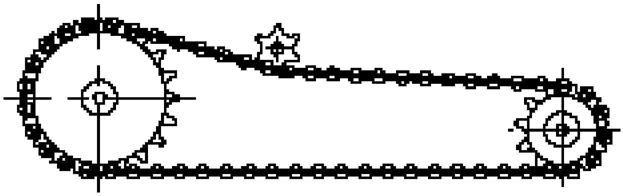
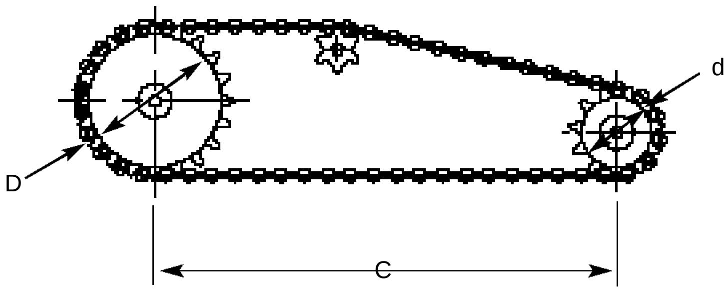


Figure B



Plastic Chain/Belt Tension

For proper tensioning of Berg's steel reinforced polyurethane belts, the tensioner should be designed inside the system as shown in B). Design of an external tensioner, shown in A), should be avoided when using steel reinforced belts. This will cause reverse bending of the belt which leads to shortened belt life. If an external tensioner is required BERG recommends the use of a Kevlar® reinforced belt. For Kevlar® reinforced belts see page 2, Alternate Belt Constructions.

"O" Ring Belt Length Calculations

$$LF = \frac{L}{1+(E/200)}$$

Where:

LF = Free Length (before stretch)
L = Installed Length
E = Elongation (Percent)

Belt Tension Calculations

$$X = (1/64)C$$

Where:

C = Center distance (in inches)
F = Force (5% of ultimate load for belt)
X = Deflection should be 1/64" per inch of center distance

Belt Technical

Life Expectancy

Due to the variety of applications in which our belts are used, it is impossible to offer life curves that will apply to every situation. We therefore offer this list of how operating parameters might effect the life of our belts. Please contact our Engineering Department for assistance in designing your system to receive optimal belt life.

Torque: Torque will directly effect the life of the belt. The torque at the pulley times .5 the PD of that pulley will give you your belt load. This value should not exceed 20% to 25% of the ultimate load listed in the catalog.

Start-Up Torque: For optimal life, it is important to ensure that your power source is not inducing a start-up torque larger than your operating torque. This is a common problem in belting systems.

Belt Speed: Belt speed should always be below 376 ft/min (115 meters/minute). Our tests have shown that higher end speeds shorten the life, while lower end speeds increase the life.

Reverse Bending: Steel reinforced belts should not be used in a reverse bending application as this degrades the life significantly. For these applications we manufacture Kevlar® reinforced belts. For information on Kevlar® reinforced belts see alternate belt construction. *(See page 2.)*

Pulley Ratio: A ratio other than 1:1 will cause less than a full 180˚ wrap around the smaller pulley. This could shorten the life by causing each belt pin to carry too much of the load. It should be ensured that 5 or 6 teeth minimum be in contact with all load carrying pulleys in the system for optimal life.

Belt Tension: Proper tension is essential for optimal life. Too much tension will cause excessive pin abrasion resulting in premature wear of the belt. Too little tension will result in a whipping motion that will cause cable fatigue and mistracking of belt entrance into pulley. Tension should be set by pressing on the belt half way between the pulleys with 5% of the ultimate load. The belt should deflect 1/64” per inch of center distance.

(Continued on next page)

(Continued from previous page)

Direction Reversing: Changing the rotational direction of the pulleys will shorten the life of the belt by causing abrasive wear on the pins. It can also cause major damage if the transition is abrupt and the torque effectively doubles through inertia of the system. This effect can be limited by ensuring that the transition in direction is controlled by not permitting such an increase in torque.

Pulley Alignment: Some of our belts are designed to handle pulley misalignment. As a general guideline, our belts that contain a single load carrying member down the center can handle up to 7˚ of pulley misalignment (This does not hold for our TB line of timing belts; Consult our Engineering Department for specific information on a particular belt). Our ladder style belts (belts containing 2 load carrying members) are not designed to handle any pulley misalignment. Pulley alignments should be held within 1/2˚ or life can be adversely affected. Excessive misalignment will cause abrasive wear on the belt, resulting in shortened life.

Alternate Belt Constructions

Fiber Cable Construction: Some belts are available with a BERG fiber cable spine. This flexible aramid cable allows greater flexibility and longer life in applications requiring reverse bending of the belt. It should be noted that the tensile strength of the belt must be derated to 50% of the value given for the stainless steel construction. There would be no change to the load per pin ratings. To specify a fiber cable spine belt, add “K” to the part number.
Example: 32GCF-49-EK

Anti-Static Construction: Some belts are available in anti-static construction. This material allows BERG belts to be used in environments where electrostatic discharge could be hazardous. It should be noted that this type of polyurethane is only available in black, but is approximately the same hardness as the standard material (90A Duro). To specify an anti-static belt, add “AS” to the part number.
Example: 37TB-100AS
Contact our Engineering Department for more information on our anti-static belts, or availability of other belts in this material.