



Poly Chain® GT® Carbon® Belt Drive Design Manual 2009

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**Gates Corporation**

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**DRIVE DESIGN MANUAL**

Design your drives online at [www.gates.com/drivedesign](http://www.gates.com/drivedesign)

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## Foreword

Synchronous belts are being used more extensively than ever before in the industry where synchronization of one shaft speed to another is of primary importance. Gates Corporation has prepared this complete Poly Chain GT Carbon Belt Drive Design Manual to handle these exacting applications. Poly Chain drives also eliminate maintenance and noise problems associated with chain drives and reduce maintenance required on other problem power transmission drives.

Stock Belt Drives are presented in this manual for your convenience. If your drive requirements (Speed, Ratio, Center Distance, Space, Horsepower) are not met, contact your local Gates representative.



# SAFETY POLICY

**WARNING!** Be Safe! Gates belt drive systems are very reliable when used safely and within Gates application recommendations. However, there are specific **USES THAT MUST BE AVOIDED** due to the risk of serious injury or death. These prohibited misuses include:

## Primary In-Flight Aircraft Systems

Do not use Gates belts, pulleys or sprockets on aircraft, propeller or rotor drive systems or in-flight accessory drives. Gates belt drive systems are not intended for aircraft use.

## Braking Systems

Do not use Gates belts, pulleys or sprockets in applications that depend solely upon the belt to slow or stop a mass, or to act as a brake without an independent safety backup system. Gates belt drive systems are not intended to function as a braking device in “emergency stop” systems.

## DRIVE DESIGN SOFTWARE

Drive design software can be found at [www.gates.com/drivedesign](http://www.gates.com/drivedesign).

This software assists designers in quickly selecting optimum drive solutions.

# Gates Poly Chain® GT® Carbon® Belt System Specifications

To satisfy a wide range of loads, speeds and applications, Poly Chain GT Carbon belts and sprockets are made in a selection of sizes, capacities and dimensions.

The three principal dimensions of a belt are:

**pitch      pitch length      width**

Belt pitch is the distance in millimeters between two adjacent tooth centers as measured on the pitch line of the belt. Belt pitch length is the total length (circumference) in millimeters as measured along the pitch line. The theoretical pitch line of a Poly Chain GT Carbon belt lies within the tensile member.

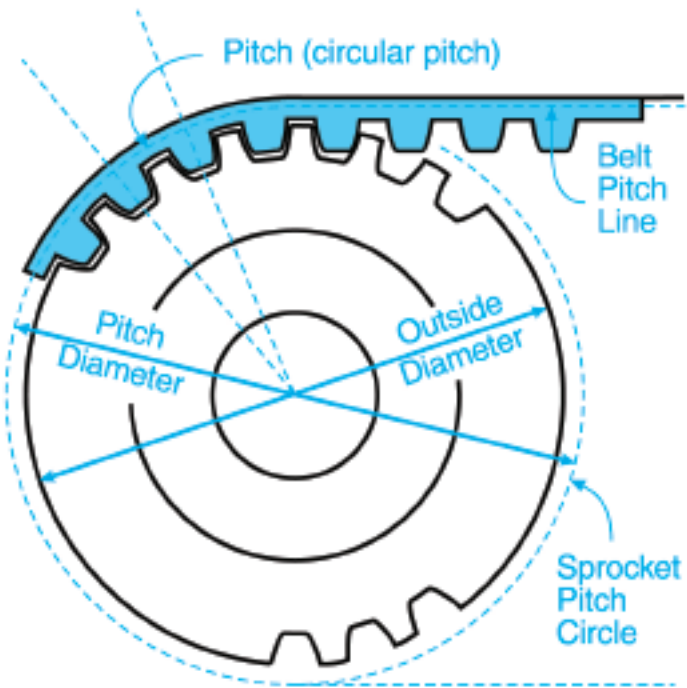
The three principal dimensions of a sprocket are:

**pitch      number of sprocket grooves      width**

On the sprocket, pitch is the distance between groove centers and is measured on the sprocket's pitch circle. See illustration at right. The pitch circle of the sprocket coincides with the pitch line of the belt mating with it. The sprocket's pitch diameter is always greater than its outside diameter.

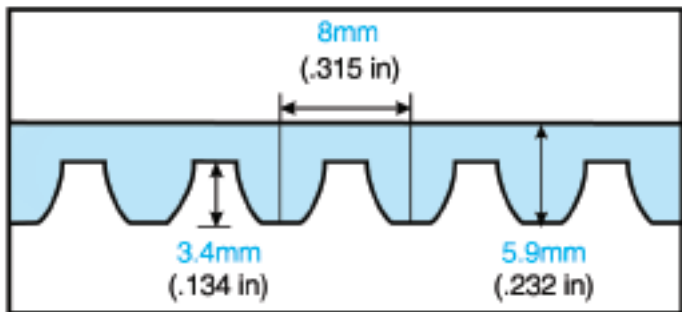
Any Poly Chain GT Carbon belt must be run with Poly Chain GT2 sprockets of the same pitch.

Gates Poly Chain GT Carbon belts are made in 8mm and 14mm pitches. Standard belt sizes are listed in the stock Poly Chain GT Carbon Belt Tables on page 3. Specifications for the 8mm and 14mm pitch belts list the belt pitch lengths, number of teeth, stock widths and appropriate weights. Using the information from these tables, a code for ordering a specific belt can be determined as shown in the following examples:



Belt Pitch (mm)	Belt Pitch Length (mm)	Belt Width (mm)
8MGT	640	12
14MGT	1190	37

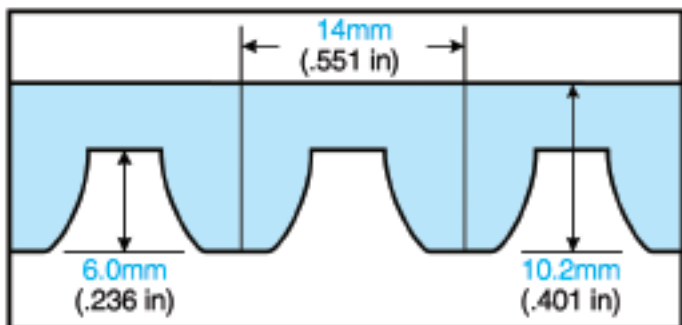
## 8mm Pitch — Reference Dimensions



Sprockets for Poly Chain GT Carbon belts are also made in 8mm and 14mm pitches. Standard sprocket sizes are listed in the Sprocket Specification Tables on Pages 64 through 74. For each Poly Chain GT Carbon belt width, there is a table listing the sprocket code symbol, the applicable bushing style and pertinent dimensional information. The sprocket code symbol components are determined by using the following examples:

Pitch (mm)	Sprocket Designation & No. of Grooves	Width (mm)
8MX	48S*	12
14MX	36S*	37

## 14mm Pitch — Reference Dimensions



\*The "S" is used after the number of grooves to help identify it is a sprocket and avoid any confusion with the belt code.

The bushing style to be used with a specific sprocket is listed in the Sprocket Specifications Tables. Reference to the Stock Bushings for Poly Chain GT2 plus Bore and Keyseat information will give you the data needed to order the proper bushing. For example,

**Style 2517 Bushing with a 2-inch bore**

# Gates Poly Chain® GT® Carbon® Belt Standard Line

## Stock Sizes

### 8mm Pitch Lengths

Description	No. of Teeth	Length	
		mm	in
8MGT-640	80	640	25.20
8MGT-720	90	720	28.35
8MGT-800	100	800	31.50
8MGT-896	112	896	35.28
8MGT-960	120	960	37.80
8MGT-1000	125	1000	39.37
8MGT-1040	130	1040	40.95
8MGT-1120	140	1120	44.09
8MGT-1200	150	1200	47.24
8MGT-1224	153	1224	48.19
8MGT-1280	160	1280	50.39
8MGT-1440	180	1440	56.69
8MGT-1600	200	1600	62.99
8MGT-1760	220	1760	69.29
8MGT-1792	224	1792	70.55
8MGT-2000	250	2000	78.74
8MGT-2200	275	2200	86.61
8MGT-2240	280	2240	88.19
8MGT-2400	300	2400	94.49
8MGT-2520	315	2520	99.21
8MGT-2600	325	2600	102.36
8MGT-2800	350	2800	110.24
8MGT-2840	355	2840	111.81
8MGT-3048	381	3048	120.00
8MGT-3200	400	3200	125.98
8MGT-3280	410	3280	129.13
8MGT-3600	450	3600	141.73
8MGT-4000	500	4000	157.48
8MGT-4400	550	4400	173.23
8MGT-4480	560	4480	176.38

### 14mm Pitch Lengths

Description	No. of Teeth	Length	
		mm	in
14MGT-994	71	994	39.13
14MGT-1120	80	1120	44.09
14MGT-1190	85	1190	46.85
14MGT-1260	90	1260	49.61
14MGT-1400	100	1400	55.12
14MGT-1568	112	1568	61.73
14MGT-1610	115	1610	63.84
14MGT-1750	125	1750	68.90
14MGT-1890	135	1890	74.41
14MGT-1960	140	1960	77.17
14MGT-2100	150	2100	82.68
14MGT-2240	160	2240	88.19
14MGT-2310	165	2310	90.95
14MGT-2380	170	2380	93.70
14MGT-2450	175	2450	96.46
14MGT-2520	180	2520	99.21
14MGT-2590	185	2590	101.97
14MGT-2660	190	2660	104.72
14MGT-2800	200	2800	110.24
14MGT-3136	224	3136	123.46
14MGT-3304	236	3304	130.08
14MGT-3360	240	3360	132.28
14MGT-3500	250	3500	137.80
14MGT-3850	275	3850	151.58
14MGT-3920	280	3920	154.33
14MGT-4326	309	4326	170.32
14MGT-4410	315	4410	173.62

### 8mm Widths

<b>12mm</b> (.47 in.)	<b>21mm</b> (.83 in.)	<b>36mm</b> (1.42 in.)	<b>62mm</b> (2.44 in.)
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### 14mm Widths

<b>20mm</b> (.79 in.)	<b>37mm</b> (1.46 in.)	<b>68mm</b> (2.68 in.)	<b>90mm</b> (3.54 in.)	<b>125mm</b> (4.92 in.)
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### Long Length Poly Chain GT2 Belting Stock Widths

8mm Pitch Widths			14mm Pitch Widths	
<b>12mm</b>	<b>21mm</b>	<b>36mm</b>	<b>20mm</b>	<b>37mm</b>

Special widths available upon request.

Dimensions are given in inches and millimeters. Inches are shown in black type. Millimeters are shown in blue type.

# Poly Chain® GT® Carbon® Low-Speed Design Load Calculations

## For use when designing Poly Chain GT Carbon belt drives for gear reducer output shafts and general roller chain conversions.

When designing Poly Chain GT Carbon belt drives to be used in low-speed applications (generally 500 rpm and less), traditional drive design procedures may yield drives with greater-than-needed capacity. These design load calculations are intended primarily for applications on the output side of gear reducers, and will yield Poly Chain GT Carbon belt drives competitive in both cost and performance with roller chain and superior to other belt drives.

A recent power transmission industry publication estimated that half of all U.S. motors operate at less than 60 percent of their rated load and one third

operate at below 50 percent of their rated load. Significant power losses can also occur in speed reducers, further reducing the actual torque loads carried by belt drives.

In order to prevent over sizing belt drives for these low speed applications, the design should be based upon the actual system running load. Because the actual running load may or may not be known, the following three approaches are recommended to assist the designer in determining the appropriate design load:

### I. Actual Operating Loads Known

In those cases where the actual operating load is known, design the belt drive for the actual operating load rather than for a load based upon the motor name plate. Use Formula 1 to calculate the proper drive design load based upon motor load (name plate or measured) when the belt drive will be installed on the reducer output shaft.

### Design Load

#### Formula 1

$$\text{Design Load} = (\text{Motor Load}) \times \text{Service Factor} \times (\% \text{ Reducer Efficiency}/100)$$

Motor Load: From user/OEM

Service Factor: From Service Factor table

% Efficiency: From Speed Reducer Catalog (also refer to the Reference Data Section)

### II. Actual Operating Loads Unknown — With Measurements

When the actual system running load is unknown, it must be estimated. This can be done with reasonable accuracy by measuring the average electrical amperage draw from the motor while under load, and calculating a motor horsepower output. Speed reducer efficiency can also be calculated and applied as well.

Use Formulas 2-4 for the most accurate results if all of the needed formula values are available.

Because values for motor efficiency and power factor may not be readily available, a common industry accepted practice is to proportion the motor name plate horsepower rating with the motor name plate amperage rating and actual measured amperage value. Use Formula 5 for a reasonable estimate of actual motor horsepower load.

### Three Phase A.C. Motors

#### Formula 4

$$\text{Horsepower}^* = \frac{1.73 \times (\text{Amps}) \times (\text{Volts}) \times (\text{Eff}) \times (\text{PF})}{746}$$

Amps: as measured (average of 3 phases)

Volts: as measured

Eff: % Eff/100 (from Motor Catalog or Motor Nameplate)

Power Factor: as measured or from Motor Catalog

(Note: Refer to Power Factor on page 5 for general power factor and efficiency values.)

### Alternative Approach

#### Formula 5

$$\text{Horsepower} = \frac{(\text{Nameplate hp})(\text{Measured Amps})}{(\text{Nameplate Amps})}$$

Nameplate hp: maximum rated motor horsepower (Motor Nameplate or Motor Catalog)

Measured Amps: as measured (if 3 phase; average of 3 phases)

Nameplate Amps: maximum rated motor amps (Motor Nameplate or Motor Catalog)

Now with a good estimate of the actual motor horsepower load, use Formula 6 to calculate the proper drive design load (when the belt drive will be installed on the reducer output shaft).

#### Formula 6

$$\text{Design Load} = (\text{Estimated Motor Load}) \times (\text{Service Factor}) \times \frac{\% \text{ Reducer Efficiency}}{100}$$

Estimated Motor Load: From Formulas 2-5

Service Factor: From Table 5

% Efficiency: from Speed Reducer Catalog

(also refer to Speed Reducer Efficiency on page 6.)

### D.C. Motors

#### Formula 2

$$\text{Horsepower}^* = \frac{(\text{Amps}) \times (\text{Volts}) \times (\text{Eff})}{746}$$

Amps: as measured

Volts: as measured

Eff: % Eff/100 (from Motor Catalog or Motor Nameplate)

### Single Phase A.C. Motor

#### Formula 3

$$\text{Horsepower}^* = \frac{(\text{Amps}) \times (\text{Volts}) \times (\text{Eff}) \times (\text{PF})}{746}$$

Amps: as measured

Volts: as measured

Eff: % Eff/100 (from Motor Catalog or Motor Nameplate)

Power Factor: as measured or from Motor Catalog

\*With an estimate of actual motor load, and the belt drive connected directly to a speed reducer output shaft, use Formula 1 to calculate the drive design load.

# Poly Chain® GT® Carbon® Low-Speed Design Load Calculations – continued

## III. Actual Operating Loads Unknown — Without Measurements

It is not always possible to determine actual motor operating loads, as it may not be possible to take amperage draw measurements from the motor. In those cases, the following guidelines should be used with caution, as they may not yield successful results in every case. They should, however, yield at least comparable, if not improved, service compared to the old roller chain drive.

The procedures which follow in Table 2 should yield at least comparable, if not improved, service compared to the old roller chain drive.

**Table 1**

Situation	Conclusion	Recommendation
Properly lubricated. Provides more than four months of continuous service	System is either properly designed or lightly loaded.	Base belt drive design load on the roller chain drive horsepower rating.
Properly lubricated. Provides less than four months of continuous service.	System may have less than adequate load capacity.	Belt drive design load based on roller chain drive horsepower rating may result in a poorly performing system. Exercise good engineering judgment.
Unlubricated. Provides more than four months continuous service.	System is lightly loaded.**	Base belt drive design load on roller chain drive horsepower rating.
Unlubricated. Provides less than four months continuous service.	It is difficult to conclude whether the system has been designed with adequate load capacity.**	Base belt drive design load on roller chain power rating but exercise good engineering judgment.

\*\*Unlubricated roller chain drives do not typically provide more than three to four months of service regardless of design capacity.

In those cases where the belt drive design load is based upon the power rating of the existing roller chain drive, use Formula 7 along with good engineering judgment to calculate the proper drive design load.

### Formula 7

$$\text{Design Load} = (\text{Roller Chain Power Rating}) \times \text{Service Factor}$$

Roller Chain Power Rating: from Roller Chain Manufacturer's Catalog

Service Factor: from Table 1

$$Q = \frac{hp \times 63025}{rpm}$$

Q = torque (lb-in)

hp = horsepower

rpm = shaft revolutions/min.

Reducer efficiency is then calculated as follows:

$$\text{Reducer Efficiency} = \frac{\text{Output hp or Q}}{\text{Input hp or Q}}$$

A general comparison of speed reducer efficiency is included in Table 3.

## Drive Selection Procedure

Having used one of the previous three approaches to determine a belt drive design horsepower load, proceed to step 2 of the Belt Drive Selection Procedure on page 10.

### Motor Data

Motor efficiency and power factor data may not be readily available. Actual values vary and are motor dependent. If catalog data are not available, typical values are as follows:

## Reference Information

### Speed Reducer Efficiency

If the efficiency of a speed reducer is not published, it can be calculated indirectly from the catalog data. Speed reducer manufacturers generally publish rated input horsepower and rated output torque for each speed reducer unit in their product line. In order to calculate speed reducer efficiency, either the rated output torque must be converted to output horsepower or the rated input horsepower must be converted to input torque. The torque/horsepower conversion formulas are as follows:

$$(hp) = \frac{Q \times (rpm)}{63025}$$

hp = horsepower

Q = torque (lb-in)

rpm = shaft revolutions/min

### Power Factor

Standard Motor: 0.80 typical (range from 0.55 to 0.90)

High Efficiency Motor: 0.85 typical (range from 0.73 to 0.88)

### Efficiency

Standard Motor: 80% typical (range from 70% to 87%)

High Efficiency Motor: 88% typical (range from 84% to 93%)

### Belt Tensioning

Adequate belt installation tension is critical in preventing belt ratcheting under peak motor starting loads. To calculate proper belt installation tension values for Poly Chain GT Carbon belts, follow the procedures starting on page 103.

# Poly Chain® GT® Carbon® Low-Speed Design Load Calculations – continued

**Table 2**

Reducer Type	Ratio Range	Reduction	Approx. Efficiency, (%)
Straight Bevel Reducer	1:1 - 4:1	Single	97.0%
Spiral Bevel Reducer	1:1 - 5:1	Single	97.0%
Helical Reducer	1.2:1 - 6:1	Single	97.0%
	to 30:1	Double	94.1%
	to 200:1	Triple	91.3%
Planetary Reducer	3.5:1 - 6:1	Single	97.5%
	to 30:1	Double	95.1%
	to 200:1	Triple	92.7%
	to 1800:1	Quadruple	90.4%
Cycloidal Reducer	6:1 - 119:1	Single	92.5%
	to 7,500:1	Double	85.6%
	to 658,000:1	Triple	79.1%
Worm Gear Reducer	5:1 - 75:1	Single	45%-94%
	to 6,000:1	Double	28%-65%

**Note:** Speed ratio ranges and efficiency values are approximate and vary with each manufacturer.

**Copy and use this worksheet to estimate actual belt drive operating loads  
based upon the Low-Speed Drive Design Procedure**

## Drive Design Load Worksheet for Low-Speed Poly Chain GT Carbon Drives

**Table 3**

To Find ▼	Known Values									Direct Current	Alternating Current	
	Amps	Volts	Motor %Eff/100	Power Factor	hp Load	Motor rpm	Reducer Ratio	Reducer %Eff/100	Motor Torque		Single Phase	Three Phase
Motor Amps										$\frac{(hp) (746)}{(V) (Eff)}$	$\frac{(hp) (746)}{(V) (Eff) (PF)}$	$\frac{(hp) (746)}{(173) (V) (Eff) (PF)}$
Motor hp										$\frac{(Amp) (V) (Eff)}{746}$	$\frac{(Amp) (V) (Eff) (PF)}{746}$	$\frac{(173) (Amp) (V) (Eff) (PF)}{746}$
Motor Torque (lb-in)										$\frac{(hpLoad) (63025)}{(Motor\ rpm)}$		
Reducer Output Torque										$(Motor\ Torque) (Reducer\ Speed\ Ratio) (Reducer\ Efficiency)$		
Reducer Output Torque										$\frac{(hp\ Load) (Reducer\ Speed\ Ratio) (Reducer\ Efficiency) (63025)}{(Motor\ rpm)}$		

**Notes:**

1. Amperage measurements should be made under normal operating conditions, or recorded continuously as a function of time.
2. In three phase systems, the formula amperage value is determined by averaging the three individual phase measurements together.

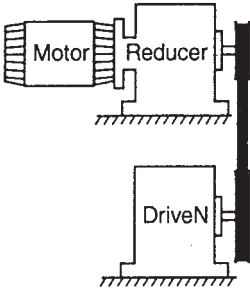
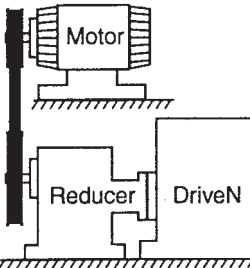
**See Low-Speed Drive Design Information Sheet on page 7  
for assistance in collecting drive design information.**





## Low-Speed Drive Design information Sheet

For Drive Selections with Shaft Speeds Less Than 500 rpm

<p><b>Distributor</b> _____</p> <p><b>Customer:</b> _____</p> <p><b>Drive Identification (location, number, etc.)</b> _____</p> <hr/> <p><b>DriveR Information:</b></p> <p><b>Motor Nameplate Data</b></p> <p>Rated Horsepower = _____ Rated RPM = _____ Efficiency = _____</p> <p>Rated Voltage = _____ Rated Amps = _____ Rated Torque = _____</p> <p>Actual Motor Load = _____</p> <p>Motor Type:    AC    <input type="checkbox"/>    DC    <input type="checkbox"/>    Gear Motor    <input type="checkbox"/></p> <p style="padding-left: 100px;">Output Speed:    Constant    <input type="checkbox"/>    Variable    <input type="checkbox"/></p> <hr/> <p><b>Reducer Information:</b></p> <p><b>Reducer Type (worm, right angle helical, cycloidal, etc):</b></p> <p>Reducer Efficiency = _____ Output RPM = _____ Reducer Ratio = _____</p> <p>Rated Input HP/Torque = _____ Rated Output HP/Torque = _____</p> <hr/> <p><b>Existing Drive Information:</b></p> <p>Drive Type:    Chain    <input type="checkbox"/>    V-Belt    <input type="checkbox"/>    Synchronous Belt    <input type="checkbox"/></p> <p style="padding-left: 20px;">If chain, type; 2/#60. #80, etc.    Lubed    <input type="checkbox"/>    Unlubed    <input type="checkbox"/></p> <p>Current Drive Service Life = _____</p> <p>DriveR Sprocket/Sheave = _____ (teeth/OD)    DriveR Shaft Diameter = _____</p> <p>DriveN Sprocket/Sheave = _____ (teeth/OD)    DriveN Shaft Diameter = _____</p> <p>Center Distance = _____ + _____ - _____</p> <p style="padding-left: 100px;">Type of Center Distance Adjustment: _____</p> <p>Idler used:    Yes    <input type="checkbox"/>    No    <input type="checkbox"/>    Inside    <input type="checkbox"/>    Backside    <input type="checkbox"/></p> <hr/> <p><b>DriveN Information:</b></p> <p>Type of Equipment: _____ Actual Horsepower Required = _____</p> <p>DriveN RPM = _____</p> <p>Hours/Day = _____ Days/Week = _____ Weeks/Year = _____</p> <hr/> <p><b>Special Requirements:</b></p> <p><b>Space Limitations:</b></p> <p>Maximum DriveR Dia. = _____ Maximim DriveN Dia = _____</p> <p>Maximum DriveR Width = _____ Maximum DriveN Width = _____</p> <p>Environmental Conditions:</p> <p>Temperature Range = _____ Belt Conductivity Required    <input type="checkbox"/></p> <p>Oil Mist    <input type="checkbox"/>    Oil Splash    <input type="checkbox"/>    Moisture    <input type="checkbox"/>    Abrasives    <input type="checkbox"/></p>	<p style="text-align: center;"><b>Drive Layout</b></p> <p style="text-align: center;">(check one)</p> <p><input type="checkbox"/> <b>Motor Reducer Belt Drive Driven</b></p> <div style="text-align: center; margin-top: 20px;">  </div> <p style="text-align: center; margin-top: 10px;">Belt Drive on Reducer Output Shaft</p> <hr/> <p><input type="checkbox"/> <b>Motor Belt Drive Reducer Driven</b></p> <div style="text-align: center; margin-top: 20px;">  </div> <p style="text-align: center; margin-top: 10px;">Belt Drive on Reducer Input Shaft</p>
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# High-Speed Drive Survey and Energy Savings Worksheet

## Customer Information

Company: \_\_\_\_\_ Distributor: \_\_\_\_\_  
Address: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
E-mail: \_\_\_\_\_

## Drive Information

I.D. of Drive (location, number, etc.) \_\_\_\_\_  
Description of DriveN Equipment \_\_\_\_\_  
Manufacturer of DriveN Equipment \_\_\_\_\_  
Horsepower rating of Motor \_\_\_\_\_ DriveN HP Load (Peak) \_\_\_\_\_  
(Normal) \_\_\_\_\_  
Motor Frame Size \_\_\_\_\_ Motor Shaft Dia. \_\_\_\_\_ DriveN Shaft Dia. \_\_\_\_\_

### Speed:

DriveR RPM \_\_\_\_\_ RPM Measured with Contact or Strobe Tachometer  Yes  No  
DriveN RPM \_\_\_\_\_ RPM Measured with Contact or Strobe Tachometer  Yes  No  
Speed Ratio \_\_\_\_\_ Speed Up \_\_\_\_\_ or Speed Down \_\_\_\_\_

Center Distance: Minimum \_\_\_\_\_ Normal \_\_\_\_\_ Maximum \_\_\_\_\_

Existing Drive Components: DriveR \_\_\_\_\_ DriveN \_\_\_\_\_  
Belts \_\_\_\_\_ Belt Manufacturer \_\_\_\_\_

### Ambient Conditions:

Temperature \_\_\_\_\_ Moisture \_\_\_\_\_ Oil, etc. \_\_\_\_\_  
Abrasives \_\_\_\_\_ Shock Load \_\_\_\_\_  
Static Conductivity Required?  Yes  No

### Maximum Sprocket Diameter (OD) and Width Limitations (for guard clearance):

DriveR: Max. OD \_\_\_\_\_ Max. Width \_\_\_\_\_ DriveN: Max. OD \_\_\_\_\_ Max Width \_\_\_\_\_  
Guard Description \_\_\_\_\_

### Motor Mount:

Double Screw Base?  Yes  No Motor Mounted on Sheet Metal?  Yes  No  
Adequate Structure?  Yes  No Floating/Pivot Motor Base?  Yes  No

### Start Up Load:

% Motor Rating at Start Up \_\_\_\_\_ AC Inverter  Yes  No Soft Start?  Yes  No

### Duty Cycle:

Number of Starts/Stops \_\_\_\_\_ times per \_\_\_\_\_ (hour, day, week, etc.)

## Energy Savings Information

Energy Cost per KW-Hour \_\_\_\_\_  
Hours of Operation \_\_\_\_\_ Hours per Day \_\_\_\_\_ Days per Week \_\_\_\_\_ Weeks per Year \_\_\_\_\_





# Poly Chain® GT® Carbon® Belt Drive Selection Procedure

Selection of a stock Poly Chain GT Carbon belt drive system involves these seven steps:

1. Calculate the Design Horsepower
2. Select the Belt Pitch
3. Select the Sprockets And Belt Length
4. Select the Proper Belt Width
5. Check and Specify Stock Drive Component
6. Installation and Take-up
7. Calculate Belt Tensioning Requirements

## Sample Drive Selection Problem

A gear pump is to be driven by a 20 hp normal torque electric motor with an output speed of 1160 rpm. The gear pump is to be driven at 580 rpm  $\pm$ 5%. The center distance is to be approximately 30 inches, but can be altered  $\pm$ 3 inches, if necessary. The motor shaft has a 1 7/8 inch O.D. and the pump shaft has a 2 inch O.D. The pump will operate 16 hours a day, five days a week. The pump sprocket is limited to a maximum of 18 inches O.D. There are no unusual drive conditions. Design using Poly Chain GT Carbon.

### Step 1 Calculate The Design Horsepower

#### Procedure

To calculate the design horsepower, first determine the relative severity, then select a service factor for the drive. Average hours per day of service also should be considered. Locate the power source and the driveN unit in the Service Factor Table on page 15. The design hp then is determined by multiplying the rated hp (usually the nameplate rating) by the service factor determined above.

#### Example

Using the Service Factor Table, the driveR can be found in the first group. Since the pump will run 16 hours per day, follow the continuous service column down to the driveN machines group for gear pumps. The recommended Service Factor is 1.5.

$$\begin{aligned} \text{Design Horsepower} &= (\text{Motor Load}) \times (\text{Service Factor}) \\ &= (20) \times (1.5) \end{aligned}$$

**Design Horsepower = 30 hp**

### Step 2 Select The Belt Pitch

#### Procedure

Using the design hp and the rpm of the smaller sprocket, select the belt pitch from the Belt Pitch Selection Guide on page 13.

#### Example

Design Horsepower = **30 hp**  
Motor Speed = **1160 rpm**

Locate 1160 rpm on the "RPM of Faster Shaft" scale on the left side of the chart and move over to where the 34 Design Horsepower line intersects. The intersection falls within the 8mm pitch range.

### Step 3 Select The Sprockets and Belt Length

#### Procedure

**A. Determine the speed ratio:** The speed ratio can be calculated by dividing the rpm of the faster shaft by the rpm of the slower shaft.

#### Example

Motor Speed = 1160 rpm  
Gear Pump Speed = 580 rpm

$$\text{Speed Ratio} = \frac{\text{rpm of faster shaft}}{\text{rpm of slower shaft}} = \frac{1160}{580} = 2.00$$

**B. Select the sprocket combination and belt length:** Referring to the Stock Drive Selection Tables on pages 16-45, find the proper set of tables for the belt pitch (8mm or 14mm) found in Step 2. Looking down the speed ratio column, find the value which most closely matches the belt drive speed ratio required. Reading across the selected speed ratio line, find the stock DriveR and DriveN sprocket combination available. Reading further across, locate the belt drive center distance which most closely matches the target center distance specified. The belt sizes are listed across the top of the table for each corresponding center distance.

Multiple sprocket combinations will often be available for a given speed ratio. In such cases, selection of the proper drive combination will depend on the center distance required, minimum or maximum required sprocket diameters and the recommended minimum sprocket diameter for electric motors (see Table 4 on page 14).

After selecting possible sprocket combinations and center distances, record the belt length (top of column) and the length factor (bottom of column).

#### Example

Belt pitch = **8mm**  
Belt Drive Speed Ratio = **2.00**  
Center Distance = **30.00  $\pm$ 3.00 in.**

Refer to the 8mm Pitch Stock Drive Selection Tables on pages 16-31. Reading down the Speed Ratio column locate 2.00 on page 26. There are six various sprocket combinations within the allowable center distance range. The minimum sprocket diameter of 4.7 inches for a 20 hp motor at 1160 rpm (See Table 4 on page 14) eliminates the 25 to 50 and 40 to 80 groove sprocket combinations. Therefore, the 56 to 112 groove sprocket combination is selected.

The 56 groove driveR sprocket, 112 groove driven sprocket, and 8MGT-2240 (280 tooth) belt combination has a center distance of 30.74". Note that Belt Length Correction Factor is 1.26.

# Poly Chain® GT® Carbon® Belt Drive Selection Procedure (continued)

**C. Check the belt speed.** Do not exceed 6500 fpm (feet per minute) with stock sprockets. Belt Speed can be calculated using the following formula:

$$V \text{ (fpm)} = PD \text{ (inches)} \times \frac{\text{Speed (rpm)}}{3.82}$$

**Example**

8mm Pitch Drive with 56 groove driveR:

$$V = \frac{5.614 \times 1160}{3.82} = 1704.8 \text{ fpm}$$

Calculating the belt speed for the drive system being considered shows that the belt speed does not exceed 6500 fpm and can be considered further.

## Step 4 Select The Proper Belt Width

### Procedure

**Horsepower Rating Tables are located on Pages 46-63 for standard belt pitches and stock belt widths.** The base horsepower rating is given in the upper table as a function of the speed (rpm) of the faster shaft and diameter of the small sprocket. The speed of the faster shaft is located in the left hand column. Across the top are various stock sprocket sizes. The base horsepower rating of a given sprocket, at a specific speed, is the point at which the “rpm” row and the “sprocket size” column intersect.

This base horsepower rating must be corrected for speed down speed ratios, and for the belt length selected. The following formula should be used to calculate the total drive horsepower rating:

$$\text{Rated Drive Horsepower} = [\text{Rated Base Horsepower} + \text{Additional Horsepower for Speed Ratio}] \times (\text{Belt Length Correction Factor})$$

Referring to the Additional Horsepower for Speed Ratio Factor Table, select a value based upon the drive operating speed and the speed ratio. This value should be added to the base horsepower rating. Multiply the corrected rating by the applicable Belt Length Correction Factor determined in Step 3B or from the Belt Length Correction Factor Table. The drive horsepower rating must equal or exceed design horsepower.

Where there are several choices, space limitations may control the selection. In addition, the following guidelines should be considered:

1. Larger sprockets result in reduced belt width.
2. Larger sprockets yield longer drive service life.
3. Avoid drives where the belt width exceeds the smaller sprocket diameter.
4. Avoid drives where center distance is greater than 8 times the diameter of the smaller sprocket. Refer to Engineering Section I-10 on page 98 for additional details.

**Example**

Refer to the 8mm pitch Horsepower Rating Table for 12mm Wide belts on page 47. Read down the left hand column for “RPM of Faster Shaft” and locate 1160 rpm. Read the sprocket sizes listed across the top of the table and locate the 56 groove, 5.614 inch P.D. column. Read across the “RPM” row and down the sprocket size column until the two intersect at a **Rated Base Horsepower of 23.8 hp.**

Next, referencing the Additional Horsepower for Speed Ratio Factor Table, find the listing for a 2.00 speed ratio. An **add-on factor of .74 hp** is listed. Then, referencing the Belt Length Correction Factor Table, find the listing for an 8MGT-2240 belt. A **correction factor of 1.26** is listed.

Calculate the Corrected Horsepower Rating:

$$\begin{aligned} \text{Rated Drive Horsepower} = & \\ & [\text{Rated Base Horsepower} + \text{Added HP for Speed Ratio}] \times \\ & (\text{Belt Length Correction Factor}) = [23.8 \text{ hp} + .74 \text{ hp}] \times \\ & (1.26) \end{aligned}$$

**Rated Drive Horsepower = 30.92 hp**

The Drive Horsepower Rating of 30.92 hp exceeds the Design Horsepower target of 30 hp. So, a **belt width of 12mm** is acceptable.

## Step 5 Check and Specify Stock Drive Components

### Procedure

**A. Check the sprockets selected in Steps 3 and 4 against the design requirements** using the dimensions provided in the Sprocket Specification Tables on pages 64 through 73. Use flange diameters when checking against maximum diameter requirements.

**Example**

From the table on page 65, we find the 8MX-112S-12 driveN Sprocket has an overall diameter of 11.166 inches, which is less than the 18 inch maximum diameter specified.

**B. Determine the bushing size required for each sprocket and check bore sizes** by using the Sprocket Specification Tables. From the Stock Bushing tables on page 77, check the bore range and keyway dimensions against the design requirements.

**Example**

Also from the sprocket data on page 65 we note that the **8MX-56S-12 sprocket requires a 2012 bushing** and the **8MX-112S-12 sprocket requires a 2012 bushing**. In the bushing table on page 80, a **2012 bushing has a bore range of 1/2 to 2 1/4 inches**, which includes the 1 1/8 inch bore required for the driveR shaft. **The 2012 bushing has a bore range from 1/2 to 2 1/4 inches**, which includes the 2 inch bore required for the driveN shaft.

**C. Specify stock drive components using proper designations.**

**Example**

- Stock drive components are as follows:
- 1 ea. 8MGT-2240-12 Poly Chain GT Carbon belt
  - 1 ea. 8MX-56S-12 driveR sprocket
  - 1 ea. 2012 Bushing with a 1-7/8 in. bore
  - 1 ea. 8MX-112S-12 driveN sprocket
  - 1 ea. 2012 Bushing with a 2 in. bore

# Poly Chain® GT® Carbon® Belt Drive Selection Procedure (continued)

## Step 6 Installation and Takeup

### Procedure

Because of its high resistance to elongation (stretch), there is no need to re-tension and take up a Poly Chain GT Carbon belt drive. However, some adjustment must be provided when installing synchronous belt drives, as with nearly all power transmission systems, to account for manufacturing and assembly tolerances and initial tensioning requirements. Table 12 on page 105 lists the standard installation and take-up requirements for a given belt length. Additional center distance adjustment is needed when installing the belt over flanged sprockets (see Table 12 on page 105.)

#### Example

As can be seen in the Sprocket Specifications Table on page 65, one of the sprockets is flanged. The total installation and tensioning allowances, are shown below.

**Installation Allowance = 0.13 in. + 0.86 in. = 0.99 in.**

**Tensioning Allowance = 0.04 in.**

Subtracting this from the nominal center distance value gives a minimum center distance necessary for belt installation of (30.74 inch – .99 inch) = 29.75 inches. From the problem statement, the center distance can be reduced down to 27.0 in. if necessary. So, **there is sufficient center distance adjustment to easily install the belt.**

## Step 7 Calculate Belt Tensioning Requirements

### Procedure

**A. Calculate base static tension** using appropriate Formula 14 on page 103. The m value is listed in Table 11 on page 103.

#### Example

Belt Pitch = 8mm

**Belt Size = 8MGT-2240, 280 teeth (88.19 in. P.L.)**

**Belt Width = 12mm**

**DriveR Sprocket = 56 grooves (5.614 in. P.D.)**

DriveR Shaft Speed = 1160 rpm

DriveN Sprocket = 112 grooves (11.229 in. P.D.)

Actual Center Distance = 30.74 in.

Design Horsepower = 30 hp

$$T_{ST} = \frac{20 \text{ HP}}{S} + MS^2, \text{ pounds}$$

Where:

HP = Horsepower = **20 hp**

M = **0.33**, constant for 8mm pitch, 12mm wide belt from Table 11 on page 103

S = (Sprocket Diameter) x (Shaft Speed) / 3820  
= (5.614 in.) x (1160 rpm) / 3820

S = **1.70**

$$T_{ST} = \frac{20 (20)}{1.70} + (0.33)(1.70)^2$$

$$T_{ST} = 235.29 + 0.95 \text{ lb.}$$

**$T_{ST} = 236.24 \text{ lb.}$**

**B. Calculate minimum and maximum deflection forces** using Formulas 15 and 16 on page 104. The Y value is listed in Table 11.

#### Example

**a. Calculate the belt span length**

$$t = \sqrt{C^2 - \left(\frac{D - d}{2}\right)^2}$$

where:

t = Span Length, inches

C = Center Distance = **30.74 in.**

D = diameter of larger sprocket = **11.229 in. P.D.**

d = diameter of smaller sprocket = **5.614 in. P.D.**

$$t = \sqrt{30.74^2 - \left(\frac{11.229 - 5.614}{2}\right)^2}$$

**t = 30.61 in.**

**b. Calculate Minimum and Maximum belt deflection forces referring to Formulas 15 and 16 on page 104:**

$$\text{Min Deflection Force} = \frac{1.1T_{ST} + \left(\frac{t}{L}\right)Y}{16}$$

where:

$T_{ST}$  = **236.24** pounds static tension as calculated before

t = **30.61** inches span length as calculated before

L = **88.19** inches belt length

Y = **65** (constant for Table 11 on page 103)

$$\text{Min Deflection Force} = \frac{1.1(236.24) + \left(\frac{30.61}{88.19}\right)(65)}{16}$$

**Min. Deflection Force = 17.65 lb.**

$$\text{Max Deflection Force} = \frac{1.2T_{ST} + \left(\frac{t}{L}\right)Y}{16}$$

$$\text{Max Deflection Force} = \frac{1.2(236.24) + \left(\frac{30.61}{88.19}\right)(65)}{16}$$

**Max. Deflection Force = 19.13 lb.**

# Poly Chain® GT® Carbon® Belt Drive Selection Procedure (continued)

## Step 7 Calculate Belt Tensioning Requirements

### Procedure - continued

**C. Determine the deflection distance** using  $\frac{1}{64}$ " per inch of span length.

**NOTE: Deflection forces must be applied evenly across the entire belt width.**

**Example**

$$\text{Deflection Distance} = \frac{t}{64}, \text{ inches}$$

$$\text{Deflection Distance} = \frac{30.61}{64}$$

**Deflection Distance = 0.48 in.**

### D. Applying The Tension:

At the center of span (t), apply a measured force perpendicular to the belt span large enough to deflect the belt 0.48 inch from its normal free position. Be sure that the force is applied evenly across the entire belt width. Note that one sprocket should be free to rotate during the belt tensioning process.

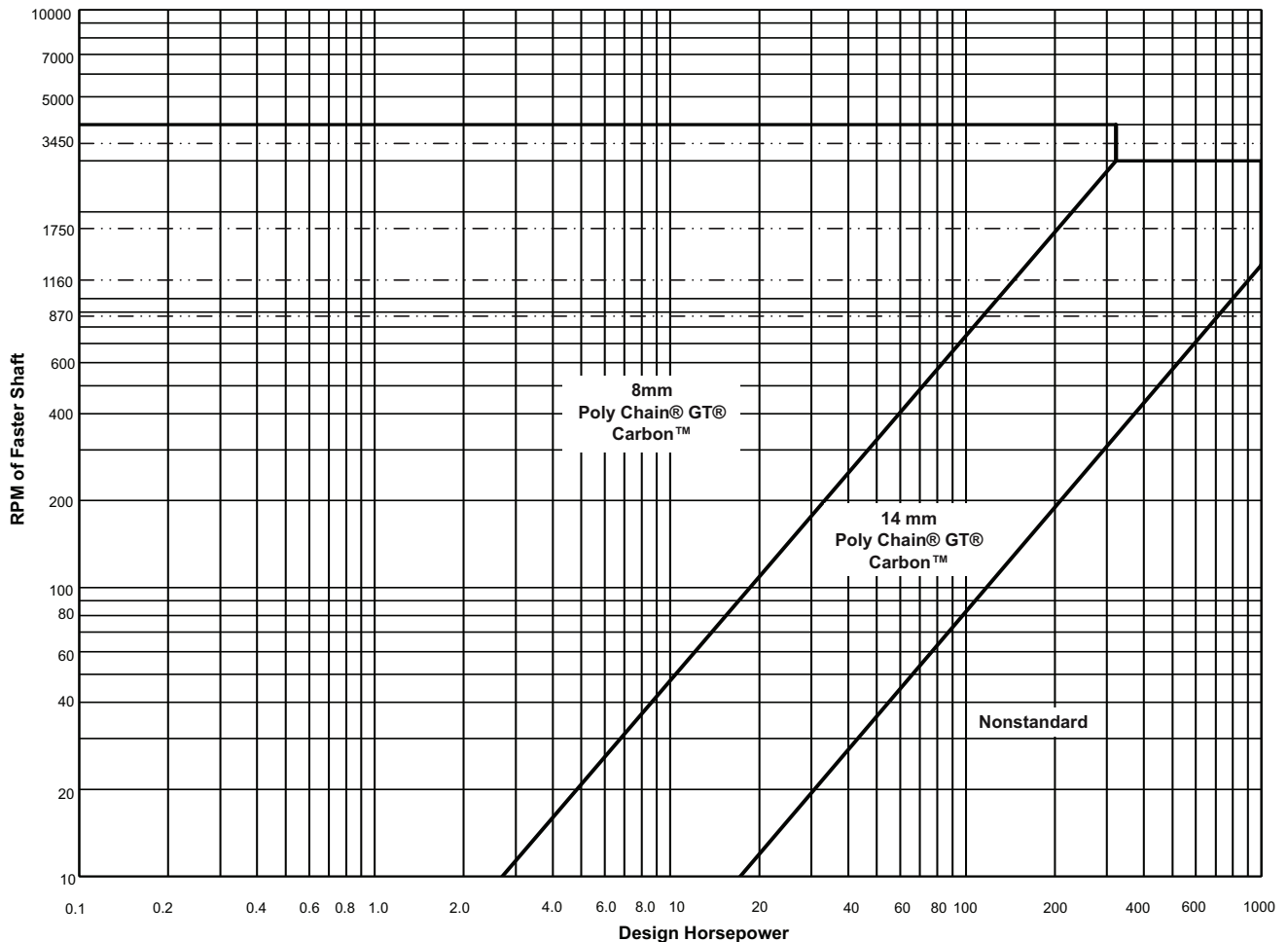
Compare the measured deflection force with the range of minimum to maximum deflection forces calculated before.

1. If the measured deflection force is less than the minimum recommended deflection force, the belt should be tightened.
2. If the measured deflection force is greater than the maximum recommended deflection force, the belt should be loosened.

**Example**

When the Gear Pump belt drive is properly tensioned, a belt span deflection of 0.48 in. should require a deflection force within the range of 17.65 to 19.13 lb.

Belt Pitch Selection Guide



## Table No. 4

### Minimum Recommended Sprocket Pitch Diameters for General Purpose Electric Motors

#### Synchronous Belt Drives

For a given motor horsepower and speed, the total belt pull is related to the motor sprocket size. As this size decreases, the total belt pull increases. Therefore, to limit the resultant load on motor shaft and bearings, NEMA lists minimum sprocket sizes for the various motors. The sprocket on the motor (DriveR sheave) should be at least as large as the diameter specified in Table No. 4.

Motor Horsepower	Motor RPM (60 Cycle and 50 Cycle Electric Motors)						Motor Horsepower
	575 485*	690 575*	870 725*	1160 950*	1750 1425*	3450 2850*	
1/2	—	—	2.0	—	—	—	1/2
3/4	—	—	2.2	2.0	—	—	3/4
1	2.7	2.3	2.2	2.2	2.0	—	1
1 1/2	2.7	2.7	2.2	2.2	2.2	2.0	1 1/2
2	3.4	2.7	2.7	2.2	2.2	2.2	2
3	4.1	3.4	2.7	2.7	2.2	2.2	3
5	4.1	4.1	3.4	2.7	2.7	2.2	5
7 1/2	4.7	4.1	4.0	3.4	2.7	2.7	7 1/2
10	5.4	4.7	4.0	4.0	3.4	2.7	10
15	6.1	5.4	4.7	4.0	4.0	4.0	15
20	7.4	6.1	5.4	4.7	4.0	2.2	20
25	8.1	7.4	6.1	5.4	4.0	4.0	25
30	9.0	8.1	6.1	6.1	4.7	—	30
40	9.0	9.0	7.4	6.1	5.4	—	40
50	9.9	9.0	7.6	7.4	6.1	—	50
60	10.8	9.9	9.0	7.2	6.7	—	60
75	12.6	11.7	8.6	9.0	7.7	—	75
100	16.2	13.5	10.8	9.0	7.7	—	100
125	18.0	16.2	13.5	10.8	9.5#	—	125
150	19.8	18.0	16.2	11.7	9.5	—	150
200	19.8	19.8	19.8	—	11.9	—	200
250	19.8	19.8	—	—	—	—	250
300	24.3	24.3	—	—	—	—	300

\* These RPM are for 50 cycle electric motors.

# Use 8.6 for Frame Number 444 T only.

Data in the white area of Table No. 4 are from NEMA Standard MG-1-14-42, June, 1972. Data in the gray area are from MG-1-14-43, January, 1968. The blue area is a composite of electric motor manufacturers data. They are generally conservative, and specific motors and bearings may permit the use of a smaller motor sprocket. Consult the motor manufacturer. See Engineering Section I-3 page 96.



## Table No. 5

# Poly Chain® GT® Carbon® Service Factors

DriveN Machine	DriveR					
<p><b>The driveN machines listed below are representative samples only. Select a driveN machine whose load characteristics most closely approximate those of the machine being considered.</b></p>	<p><b>AC Motors: Normal Torque, Squirrel Cage, Synchronous, Split Phase, Inverter Controlled</b></p>			<p><b>AC Motors: High Torque, High Slip, Repulsion-Induction, Single Phase, Series Wound, Slip Ring.</b></p>		
	<p><b>DC Motors: Shunt Wound, Stepper Motors</b></p>			<p><b>DC Motors: Series Wound, Compound Wound, Servo Motors.</b></p>		
	<p><b>Engines: Multiple Cylinder Internal Combustion.</b></p>			<p><b>Engines: Single Cylinder Internal Combustion. Line shafts Clutches</b></p>		
	Intermittent Service	Normal Service	Continuous Service	Intermittent Service	Normal Service	Continuous Service
Up to 8 Hours Daily or Seasonal	8-16 Hours Daily	16-24 Hours Daily	Up to 8 Hours Daily or Seasonal	8-16 Hours Daily	16-24 Hours Daily	
Display, Dispensing Equipment Instrumentation Measuring Equipment Medical Equipment Office, Projection Equipment	1.0	1.2	1.4	1.2	1.4	1.6
Appliances, Sweepers, Sewing Machines Screens, Oven Screens, Drum, Conical Woodworking Equipment: (Light) Band Saws, Drills, Lathes	1.1	1.3	1.5	1.3	1.5	1.7
Agitators for Liquids Conveyors: Belt, Light Package Drill Press, Lathes, Saws Laundry Machinery Woodworking Equipment: (Heavy) Circular Saws, Joiners, Planers	1.2	1.4	1.6	1.6	1.8	2.0
Agitators: Semi-liquid Compressors: Centrifugal Conveyor Belt: Coal, Ore, Sand Dough Mixers Line Shafts Machine Tools: Grinder, Shaper Boring Mill, Milling Machines Paper Machinery (except Pulpers) Presses, Punches, Shears Printing Machinery Pumps: Centrifugal, Gear Screens: Revolving, Vibratory	1.3	1.5	1.7	1.6	1.8	2.0
Brick Machinery (except Pug Mills) Conveyor: Apron, Pan, Bucket, Elevator Extractors, Washers Fans, Centrifugal Blowers Generators & Exciters Hoists Rubber Calendar, Mills, Extruders	1.4	1.6	1.8	1.8	2.0	2.2
Centrifuges Screw Conveyors Hammer Mills Paper Pulpers Textile Machinery	1.5	1.7	1.9	1.9	2.1	2.3
Blowers: Positive Displacement Mine Fans Pulverizers	1.6	1.8	2.0	2.0	2.2	2.4
Compressors, Reciprocating Crushers: Gyratory, Jaw, Roll Mills: Ball, Rod, Pebble, etc. Pumps, Reciprocating Saw Mill Equipment	1.7	1.9	2.1	2.1	2.3	2.5







Table with columns for Center Distance (Inches), Sprocket Combinations (DriveR, DriveN), and Speed Ratio. Rows represent different sprocket sizes and their corresponding center distances.

Note: 26, 27, 29 and 31 groove sprockets are only available as stock products in 12 and 21 mm widths. 33, 35, 37, 39 and 41 groove sprockets are only available as stock products in 12, 21, and 36 mm widths. Check sprocket specification tables on pages 65 and 66 for stainless steel and nickel plated sprocket availability.

\* This length factor must be used to determine the proper belt width.

Center distance is greater than eight times the small sprocket and the large sprocket is not flanged. See Engineering Section for details.

























# Drive Selection Table

Sprocket Combinations				Speed Ratio	Center Distance, Inches													
DriveR		DriveN			8MGT-640 P.L. 25.20 80 Teeth	8MGT-720 P.L. 28.35 90 Teeth	8MGT-800 P.L. 31.50 100 Teeth	8MGT-886 P.L. 35.28 112 Teeth	8MGT-960 P.L. 37.80 120 Teeth	8MGT-1000 P.L. 39.37 125 Teeth	8MGT-1040 P.L. 40.94 130 Teeth	8MGT-1120 P.L. 44.09 140 Teeth	8MGT-1200 P.L. 47.24 150 Teeth	8MGT-1224 P.L. 48.19 155 Teeth	8MGT-1280 P.L. 50.39 160 Teeth	8MGT-1440 P.L. 56.69 180 Teeth	8MGT-1600 P.L. 62.99 200 Teeth	8MGT-1760 P.L. 69.29 220 Teeth
Number of Grooves	Pitch Diameter (Inches)	Number of Grooves	Pitch Diameter (Inches)															
63	6.316	224	22.457	3.556														
39	3.910	140	14.036	3.590														
25	2.506	90	9.023	3.600			7.90	9.27	10.10	10.93	12.57	14.19	14.68	15.80	19.01	22.20	25.38	
50	5.013	180	18.046	3.600													15.11	
31	3.108	112	11.229	3.613						8.18	9.94	11.64	12.15	13.31	16.59	19.82	23.03	
22	2.206	80	8.020	3.636			7.12	9.14	10.46	11.28	12.09	13.70	15.31	15.80	16.91	20.10	23.28	
38	3.810	140	14.036	3.684										9.81	13.34	16.69	19.97	
30	3.008	112	11.229	3.733						8.24	10.01	11.71	12.21	13.38	16.65	19.89	23.10	
60	6.015	224	22.457	3.733														
48	4.812	180	18.046	3.750													15.23	
37	3.709	140	14.036	3.784											9.87	13.40	16.76	
29	2.907	112	11.229	3.862						7.37	8.30	10.07	11.77	12.28	13.44	16.72	19.96	
36	3.609	140	14.036	3.889											9.93	13.46	16.82	
28	2.807	112	11.229	4.000						7.43	8.36	10.13	11.84	12.35	13.51	16.79	20.03	
35	3.509	140	14.036	4.000											9.99	13.53	16.89	
45	4.511	180	18.046	4.000													11.77	
56	5.614	224	22.457	4.000													15.42	
22	2.206	90	9.023	4.091			5.92	8.09	9.46	10.30	11.12	12.77	14.40	14.88	16.01	19.22	22.42	
34	3.409	140	14.036	4.118											10.05	13.59	16.95	
27	2.707	112	11.229	4.148						7.49	8.42	10.20	11.90	12.41	13.58	16.86	20.10	
53	5.314	224	22.457	4.226													23.31	
33	3.308	140	14.036	4.242														
42	4.211	180	18.046	4.286											10.11	13.66	17.02	
26	2.607	112	11.229	4.308													20.31	
32	3.208	140	14.036	4.375						7.55	8.48	10.26	11.97	12.48	13.64	16.93	20.17	
41	4.110	180	18.046	4.390											10.17	13.72	17.09	
25	2.506	112	11.229	4.480													20.38	
50	5.013	224	22.457	4.480						7.61	8.54	10.32	12.03	12.54	13.71	16.99	20.17	
40	4.010	180	18.046	4.500													11.77	
31	3.108	140	14.036	4.516													15.42	
39	3.910	180	18.046	4.615													20.17	
30	3.008	140	14.036	4.667										8.89	10.23	13.78	17.15	
48	4.812	224	22.457	4.667													20.45	
38	3.810	180	18.046	4.737													15.79	
29	2.907	140	14.036	4.828													20.51	
37	3.709	180	18.046	4.865													20.51	
45	4.511	224	22.457	4.978													20.51	
28	2.807	140	14.036	5.000													20.51	
36	3.609	180	18.046	5.000													20.51	
22	2.206	112	11.229	5.091													20.51	
35	3.509	180	18.046	5.143													20.51	
27	2.707	140	14.036	5.185													20.51	
34	3.409	180	18.046	5.294													20.51	
42	4.211	224	22.457	5.333													20.51	
26	2.607	140	14.036	5.385													20.51	
33	3.308	180	18.046	5.455													20.51	
41	4.110	224	22.457	5.463													20.51	
25	2.506	140	14.036	5.600													20.51	
40	4.010	224	22.457	5.600													20.51	
32	3.208	180	18.046	5.625													20.51	
39	3.910	224	22.457	5.744													20.51	
31	3.108	180	18.046	5.806													20.51	
38	3.810	224	22.457	5.895													20.51	
30	3.008	180	18.046	6.000													20.51	
37	3.709	224	22.457	6.054													20.51	
29	2.907	180	18.046	6.207													20.51	
36	3.609	224	22.457	6.222													20.51	
22	2.206	140	14.036	6.364													20.51	
35	3.509	224	22.457	6.400													20.51	
28	2.807	180	18.046	6.429													20.51	
34	3.409	224	22.457	6.588													20.51	
27	2.707	180	18.046	6.667													20.51	
33	3.308	224	22.457	6.788													20.51	
26	2.607	180	18.046	6.923													20.51	
32	3.208	224	22.457	7.000													20.51	
25	2.506	180	18.046	7.200													20.51	
31	3.108	224	22.457	7.226													20.51	
30	3.008	224	22.457	7.467													20.51	
29	2.907	224	22.457	7.724													20.51	
28	2.807	224	22.457	8.000													20.51	
22	2.206	180	18.046	8.182													20.51	
27	2.707	224	22.457	8.296													20.51	
26	2.607	224	22.457	8.615													20.51	
25	2.506	224	22.457	8.960													20.51	
22	2.206	224	22.457	10.182													20.51	
Length Factor*				0.79	0.83	0.87	0.91	0.94	0.96	0.97	1.00	1.03	1.03	1.05	1.10	1.14	1.17	

Note: 26, 27, 29 and 31 groove sprockets are only available as stock products in 12 and 21 mm widths. 33, 35, 37, 39 and 41 groove sprockets are only available as stock products in 12, 21, and 36 mm widths. Check sprocket specification tables on pages 65 and 66 for stainless steel and nickel plated sprocket availability.

\* This length factor must be used to determine the proper belt width

Center distance is greater than eight times the small sprocket and the large sprocket is not flanged. See Engineering Section for details.





8mm PITCH BELTS

Table with columns for Center Distance, Inches (19 models: 8MGT-1792 to 8MGT-4480), Speed Ratio, Sprocket Combinations (DriveR, DriveN), and Number of Grooves.

\* This length factor must be used to determine the proper belt width

Center distance is greater than eight times the small sprocket and the large sprocket is not flanged. See Engineering Section for details.



14mm PITCH BELTS

Table with columns: 14MGT-2380 P.L. 92.70 170 Teeth, 14MGT-2450 P.L. 96.46 175 Teeth, 14MGT-2520 P.L. 99.21 180 Teeth, 14MGT-2580 P.L. 101.97 185 Teeth, 14MGT-2660 P.L. 104.72 190 Teeth, 14MGT-2800 P.L. 110.24 200 Teeth, 14MGT-3136 P.L. 123.46 224 Teeth, 14MGT-3304 P.L. 130.08 236 Teeth, 14MGT-3360 P.L. 132.28 240 Teeth, 14MGT-3500 P.L. 137.79 250 Teeth, 14MGT-3650 P.L. 151.57 275 Teeth, 14MGT-3920 P.L. 154.33 280 Teeth, 14MGT-4326 P.L. 170.31 309 Teeth, 14MGT-4410 P.L. 173.62 315 Teeth, Center Distance, Inches, Speed Ratio, Driver (Number of Grooves), Driven (Number of Grooves). Rows include center distances from 39.13 to 1.01 and 1.02 to 1.03.

Note: Check Sprocket Specification table on page 69 for Nickel Plated sprocket availability.

\* This length factor must be used to determine the proper belt width.

























# 14mm Pitch Poly Chain® GT® Carbon® Belts Drive Selection Table

Sprocket Combinations				Speed Ratio	Center Distance, Inches												
DriveR		DriveN			14MGT-984 P.L. 39.13 71 Teeth	14MGT-1120 P.L. 44.09 80 Teeth	14MGT-1190 P.L. 46.85 85 Teeth	14MGT-1260 P.L. 49.61 90 Teeth	14MGT-1400 P.L. 55.12 100 Teeth	14MGT-1568 P.L. 61.73 112 Teeth	14MGT-1610 P.L. 63.39 115 Teeth	14MGT-1750 P.L. 68.90 125 Teeth	14MGT-1890 P.L. 74.41 135 Teeth	14MGT-1960 P.L. 77.17 140 Teeth	14MGT-2100 P.L. 82.68 150 Teeth	14MGT-2240 P.L. 88.19 160 Teeth	14MGT-2310 P.L. 90.94 166 Teeth
Number of Grooves	Pitch Diameter (Inches)	Number of Grooves	Pitch Diameter (Inches)														
34	5.965	140	24.562	4.118												17.60	19.19
48	8.421	200	35.089	4.167													
43	7.544	180	31.580	4.186													
40	7.018	168	29.475	4.200													
53	9.299	224	39.300	4.226													
33	5.790	140	24.562	4.242											17.70	19.30	
39	6.842	168	29.475	4.308													
32	5.614	140	24.562	4.375											17.81	19.41	
38	6.667	168	29.475	4.421													
45	7.895	200	35.089	4.444													
50	8.772	224	39.300	4.480													
40	7.018	180	31.580	4.500													
31	5.439	140	24.562	4.516											17.91	19.51	
37	6.492	168	29.475	4.541													
39	6.842	180	31.580	4.615													
43	7.544	200	35.089	4.651													
30	5.263	140	24.562	4.667											18.02	19.62	
36	6.316	168	29.475	4.667													
48	8.421	224	39.300	4.667													
38	6.667	180	31.580	4.737													
35	6.141	168	29.475	4.800													
29	5.088	140	24.562	4.828											18.12	19.73	
37	6.492	180	31.580	4.865													
34	5.965	168	29.475	4.941													
45	7.895	224	39.300	4.978													
28	4.912	140	24.562	5.000											18.23	19.83	
36	6.316	180	31.580	5.000													
40	7.018	200	35.089	5.000													
33	5.790	168	29.475	5.091													
39	6.842	200	35.089	5.128													
35	6.141	180	31.580	5.143													
43	7.544	224	39.300	5.209													
32	5.614	168	29.475	5.250													
38	6.667	200	35.089	5.263													
34	5.965	180	31.580	5.294													
37	6.492	200	35.089	5.405													
31	5.439	168	29.475	5.419													
33	5.790	180	31.580	5.455													
36	6.316	200	35.089	5.556													
30	5.263	168	29.475	5.600													
40	7.018	224	39.300	5.600													
32	5.614	180	31.580	5.625													
35	6.141	200	35.089	5.714													
39	6.842	224	39.300	5.744													
29	5.088	168	29.475	5.793													
31	5.439	180	31.580	5.806													
34	5.965	200	35.089	5.882													
38	6.667	224	39.300	5.895													
28	4.912	168	29.475	6.000													
30	5.263	180	31.580	6.000													
37	6.492	224	39.300	6.054													
33	5.790	200	35.089	6.061													
29	5.088	180	31.580	6.207													
36	6.316	224	39.300	6.222													
32	5.614	200	35.089	6.250													
35	6.141	224	39.300	6.400													
28	4.912	180	31.580	6.429													
31	5.439	200	35.089	6.452													
34	5.965	224	39.300	6.588													
30	5.263	200	35.089	6.667													
33	5.790	224	39.300	6.788													
29	5.088	200	35.089	6.897													
32	5.614	224	39.300	7.000													
28	4.912	200	35.089	7.143													
31	5.439	224	39.300	7.226													
30	5.263	224	39.300	7.467													
29	5.088	224	39.300	7.724													
28	4.912	224	39.300	8.000													
Length Factor*					0.68	0.73	0.75	0.77	0.81	0.85	0.86	0.89	0.92	0.94	0.96	0.99	1.00

Note: Check Sprocket Specification table on page 69 for Nickel Plated sprocket availability.

\* This length factor must be used to determine the proper belt width.





# Horsepower Rating for 12mm Wide 8mm Pitch Poly Chain® GT® Carbon® Belts

RPM OF FASTER SHAFT	Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)																								
	22	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	45					
10	2.206	2.506	2.607	2.707	2.807	2.907	3.008	3.108	3.208	3.308	3.409	3.509	3.609	3.709	3.810	3.910	4.010	4.110	4.211	4.511					
20																									
35																									
44																									
58																									
70																									
88	0.72	0.87	0.92	0.97	1.02	1.07	1.12	1.17	1.21	1.26	1.31	1.36	1.41	1.46	1.51	1.56	1.61	1.66	1.71	1.85					
100	0.79	0.96	1.02	1.08	1.13	1.19	1.24	1.30	1.35	1.41	1.46	1.52	1.57	1.63	1.68	1.74	1.79	1.85	1.90	2.06					
117	0.90	1.10	1.16	1.23	1.29	1.35	1.42	1.48	1.55	1.61	1.67	1.74	1.80	1.86	1.93	1.99	2.05	2.11	2.18	2.36					
175	1.27	1.55	1.64	1.73	1.82	1.91	2.01	2.10	2.19	2.28	2.37	2.46	2.55	2.64	2.73	2.82	2.91	3.00	3.09	3.36					
200	1.42	1.73	1.84	1.94	2.05	2.15	2.25	2.36	2.46	2.56	2.66	2.77	2.87	2.97	3.07	3.18	3.28	3.38	3.48	3.78					
233	1.62	1.98	2.10	2.22	2.34	2.45	2.57	2.69	2.81	2.93	3.05	3.16	3.28	3.40	3.52	3.63	3.75	3.87	3.98	4.33					
300	2.01	2.46	2.61	2.76	2.91	3.06	3.21	3.36	3.51	3.66	3.81	3.96	4.10	4.25	4.40	4.55	4.69	4.84	4.99	5.43					
350	2.29	2.82	2.99	3.16	3.34	3.51	3.68	3.85	4.02	4.20	4.37	4.54	4.71	4.88	5.05	5.22	5.39	5.55	5.72	6.23					
400	2.57	3.17	3.36	3.56	3.75	3.95	4.14	4.34	4.53	4.72	4.92	5.11	5.30	5.49	5.69	5.88	6.07	6.26	6.45	7.02					
500	3.12	3.85	4.09	4.33	4.57	4.81	5.05	5.29	5.53	5.76	6.00	6.24	6.47	6.71	6.95	7.18	7.41	7.65	7.88	8.58					
575	3.53	4.35	4.63	4.90	5.17	5.44	5.72	5.99	6.26	6.53	6.80	7.07	7.34	7.60	7.87	8.14	8.41	8.67	8.94	9.73					
600	3.66	4.52	4.80	5.09	5.37	5.65	5.94	6.22	6.50	6.78	7.06	7.34	7.62	7.90	8.18	8.46	8.73	9.01	9.29	10.1					
690	4.13	5.11	5.43	5.76	6.08	6.40	6.72	7.04	7.36	7.68	8.00	8.32	8.64	8.95	9.27	9.59	9.90	10.2	10.5	11.5					
700	4.18	5.17	5.50	5.83	6.16	6.48	6.81	7.14	7.46	7.78	8.11	8.43	8.75	9.07	9.39	9.71	10.0	10.4	10.7	11.6					
800	4.70	5.82	6.19	6.56	6.93	7.30	7.67	8.04	8.40	8.77	9.14	9.50	9.86	10.2	10.6	11.0	11.3	11.7	12.0	13.1					
870	5.05	6.26	6.67	7.07	7.47	7.86	8.27	8.66	9.06	9.45	9.85	10.2	10.6	11.0	11.4	11.8	12.2	12.6	13.0	14.1					
900	5.20	6.45	6.87	7.28	7.69	8.11	8.52	8.93	9.34	9.74	10.2	10.6	11.0	11.4	11.8	12.2	12.6	13.0	13.4	14.6					
1000	5.70	7.08	7.54	7.99	8.45	8.90	9.36	9.81	10.3	10.7	11.2	11.6	12.1	12.5	12.9	13.4	13.8	14.3	14.7	16.0					
1160	6.49	8.07	8.59	9.12	9.64	10.2	10.7	11.2	11.7	12.2	12.7	13.3	13.8	14.3	14.8	15.3	15.8	16.3	16.8	18.3					
1750	9.27	11.6	12.3	13.1	13.9	14.6	15.4	16.1	16.9	17.7	18.4	19.2	19.9	20.7	21.4	22.1	22.9	23.6	24.4	26.6					
2000	10.4	13.0	13.9	14.7	15.6	16.5	17.3	18.2	19.0	19.9	20.7	21.6	22.4	23.3	24.1	25.0	25.8	26.6	27.5	29.9					
3000	14.7	18.5	19.8	21.0	22.3	23.5	24.8	26.0	27.2	28.5	29.7	30.9	32.1	33.4	34.6	35.8	37.0	38.2	39.4	43.0					
3450	16.6	20.9	22.3	23.8	25.2	26.6	28.0	29.4	30.8	32.2	33.6	35.0	36.3	37.7	39.1	40.5	41.8	43.2	44.5	48.6					
4000	18.8	23.7	25.4	27.0	28.6	30.2	31.8	33.4	35.0	36.6	38.2	39.8	41.4	42.9	44.5	46.0	47.6	49.1	50.7	55.2					
4500	20.8	26.3	28.1	29.9	31.7	33.5	35.2	37.0	38.8	40.5	42.3	44.0	45.8	47.5	49.2	50.9	52.7	54.4	56.1	61.1					
5000	22.7	28.7	30.7	32.7	34.6	36.6	38.6	40.5	42.4	44.4	46.3	48.2	50.1	52.0	53.9	55.7	57.6	59.4	61.3	66.8					
5500	24.6	31.1	33.3	35.4	37.5	39.7	41.8	43.9	46.0	48.1	50.2	52.2	54.3	56.3	58.4	60.4	62.4	64.4	66.4	72.2					

Drives in this area should be designed using Design Flex® Pro. Please consult [www.gates.com/drivedesign](http://www.gates.com/drivedesign) for details.

Use this sprocket only if required to obtain speed ratio or to meet diameter limitations. See Engineering Section for details.

Poly Chain® GT® Carbon® Belt Length Correction Factor Table											
Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor
8MGT-248	31	0.42	8MGT-800	100	0.87	8MGT-1600	200	1.14	8MGT-2800	350	1.35
8MGT-288	36	0.48	8MGT-896	112	0.91	8MGT-1760	220	1.17	8MGT-2840	355	1.36
8MGT-352	44	0.56	8MGT-960	120	0.94	8MGT-1792	224	1.18	8MGT-3048	381	1.38
8MGT-416	52	0.62	8MGT-1000	125	0.96	8MGT-2000	250	1.22	8MGT-3200	400	1.40
8MGT-456	57	0.66	8MGT-1040	130	0.97	8MGT-2200	275	1.26	8MGT-3280	410	1.41
8MGT-480	60	0.68	8MGT-1120	140	1.00	8MGT-2240	280	1.26	8MGT-3600	450	1.45
8MGT-544	68	0.72	8MGT-1200	150	1.03	8MGT-2400	300	1.29	8MGT-4000	500	1.49
8MGT-608	76	0.77	8MGT-1224	153	1.03	8MGT-2520	315	1.31	8MGT-4400	550	1.52
8MGT-640	80	0.79	8MGT-1280	160	1.05	8MGT-2600	325	1.32	8MGT-4480	560	1.53
8MGT-720	90	0.83	8MGT-1440	180	1.10						



# Horsepower Rating for 12mm Wide

## 8mm Pitch Poly Chain® GT® Carbon® Belts

Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)										Additional Horsepower per belt for Speed Ratio of Speed-Down Drives						RPM OF FASTER SHAFT				
48 4.812	50 5.013	53 5.314	56 5.614	60 6.015	63 6.316	67 6.717	71 7.118	75 7.519	80 8.020	1.00 to 1.02	1.03 to 1.05	1.06 to 1.10	1.11 to 1.15	1.16 to 1.21	1.22 to 1.30		1.31 to 1.43	1.44 to 1.64	1.65 to 2.15	2.16 to Over
Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.										Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.						10				
2.00	2.09	2.24	2.38	2.57	2.72	2.91	3.10	3.29	3.52	0.00	0.01	0.01	0.02	0.03	0.04	0.04	0.05	0.06	0.06	70
2.23	2.34	2.50	2.66	2.87	3.03	3.25	3.46	3.67	3.93	0.00	0.01	0.02	0.02	0.03	0.04	0.05	0.06	0.06	0.07	88
2.55	2.68	2.86	3.05	3.29	3.48	3.72	3.97	4.21	4.51	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.07	0.08	100
3.63	3.81	4.07	4.34	4.69	4.96	5.31	5.66	6.00	6.44	0.00	0.01	0.03	0.04	0.06	0.07	0.08	0.10	0.11	0.13	117
4.08	4.29	4.59	4.89	5.28	5.58	5.98	6.37	6.76	7.25	0.00	0.02	0.03	0.05	0.06	0.08	0.10	0.11	0.13	0.14	175
4.68	4.91	5.25	5.60	6.05	6.40	6.85	7.30	7.75	8.31	0.00	0.02	0.04	0.06	0.07	0.09	0.11	0.13	0.15	0.17	200
5.86	6.15	6.59	7.02	7.59	8.02	8.59	9.16	9.73	10.4	0.00	0.02	0.05	0.07	0.10	0.12	0.14	0.17	0.19	0.21	233
6.73	7.07	7.57	8.06	8.72	9.22	9.87	10.5	11.2	12.0	0.00	0.03	0.06	0.08	0.11	0.14	0.17	0.19	0.22	0.25	300
7.59	7.97	8.53	9.09	9.84	10.4	11.1	11.9	12.6	13.5	0.00	0.04	0.06	0.10	0.13	0.16	0.19	0.22	0.25	0.29	350
9.28	9.74	10.4	11.1	12.0	12.7	13.6	14.5	15.4	16.6	0.00	0.04	0.08	0.12	0.16	0.20	0.24	0.28	0.32	0.36	400
10.5	11.1	11.8	12.6	13.7	14.4	15.5	16.5	17.5	18.8	0.00	0.05	0.09	0.14	0.18	0.23	0.27	0.32	0.37	0.41	500
10.9	11.5	12.3	13.1	14.2	15.0	16.1	17.2	18.2	19.5	0.00	0.05	0.10	0.14	0.19	0.24	0.29	0.33	0.38	0.43	575
12.4	13.0	14.0	14.9	16.1	17.0	18.3	19.5	20.7	22.2	0.00	0.06	0.11	0.16	0.22	0.27	0.33	0.38	0.44	0.49	600
12.6	13.2	14.1	15.1	16.3	17.3	18.5	19.7	21.0	22.5	0.00	0.06	0.11	0.17	0.22	0.28	0.33	0.39	0.45	0.50	690
14.2	14.9	16.0	17.0	18.4	19.5	20.9	22.3	23.7	25.4	0.00	0.06	0.13	0.19	0.25	0.32	0.38	0.45	0.51	0.57	800
15.3	16.1	17.2	18.4	19.9	21.0	22.5	24.0	25.5	27.4	0.00	0.07	0.14	0.21	0.28	0.35	0.42	0.48	0.55	0.62	870
15.8	16.6	17.8	18.9	20.5	21.7	23.2	24.8	26.3	28.2	0.00	0.07	0.14	0.22	0.29	0.36	0.43	0.50	0.57	0.64	900
17.4	18.2	19.5	20.8	22.6	23.9	25.6	27.3	29.0	31.1	0.00	0.08	0.16	0.24	0.32	0.40	0.48	0.56	0.64	0.72	1000
19.9	20.9	22.4	23.8	25.8	27.3	29.3	31.2	33.1	35.6	0.00	0.09	0.18	0.28	0.37	0.46	0.55	0.65	0.74	0.83	1160
28.8	30.2	32.4	34.6	37.4	39.6	42.4	45.2	48.0	51.5	0.00	0.14	0.28	0.42	0.56	0.70	0.84	0.97	1.11	1.25	1750
32.4	34.1	36.5	39.0	42.2	44.6	47.8	51.0	54.1	58.0	0.00	0.16	0.32	0.48	0.64	0.80	0.95	1.11	1.27	1.43	2000
46.5	48.9	52.4	55.8	60.4	63.8	68.3	72.7	77.1	82.5	0.00	0.24	0.48	0.72	0.95	1.19	1.43	1.67	1.91	2.15	3000
52.6	55.2	59.2	63.0	68.2	72.0	77.0	81.9			0.00	0.28	0.55	0.82	1.10	1.37	1.65	1.92	2.20	2.47	3450
59.8	62.7	67.2	71.6	77.3						0.00	0.32	0.64	0.96	1.27	1.59	1.91	2.23	2.55	2.86	4000
66.1	69.3	74.2								0.00	0.36	0.72	1.08	1.43	1.79	2.15	2.51	2.87	3.22	4500
72.1	75.7									0.00	0.40	0.79	1.19	1.59	1.99	2.39	2.78	3.18	3.58	5000
										0.00	0.44	0.87	1.31	1.75	2.19	2.63	3.06	3.50	3.94	5500

### Poly Chain® GT® Carbon® Belt Length Correction Factor Table

Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor
8MGT-248	31	0.42	8MGT-1600	200	1.14
8MGT-288	36	0.48	8MGT-1760	220	1.17
8MGT-352	44	0.56	8MGT-1792	224	1.18
8MGT-416	52	0.62	8MGT-2000	250	1.22
8MGT-456	57	0.66	8MGT-2200	275	1.26
8MGT-480	60	0.68	8MGT-2240	280	1.26
8MGT-544	68	0.72	8MGT-2400	300	1.29
8MGT-608	76	0.77	8MGT-1224	153	1.03
8MGT-640	80	0.79	8MGT-1280	160	1.05
8MGT-720	90	0.83	8MGT-1440	180	1.10
			8MGT-1600	200	1.14
			8MGT-1760	220	1.17
			8MGT-1792	224	1.18
			8MGT-2000	250	1.22
			8MGT-2200	275	1.26
			8MGT-2240	280	1.26
			8MGT-2400	300	1.29
			8MGT-2520	315	1.31
			8MGT-2600	325	1.32
			8MGT-2800	350	1.35
			8MGT-2840	355	1.36
			8MGT-3048	381	1.38
			8MGT-3200	400	1.40
			8MGT-3280	410	1.41
			8MGT-3600	450	1.45
			8MGT-4000	500	1.49
			8MGT-4400	550	1.52
			8MGT-4480	560	1.53

# Horsepower Rating for 21mm Wide 8mm Pitch Poly Chain® GT® Carbon® Belts

RPM OF FASTER SHAFT	Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)																			
	22	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	45
10	2.206	2.506	2.607	2.707	2.807	2.907	3.008	3.108	3.208	3.308	3.409	3.509	3.609	3.709	3.810	3.910	4.010	4.110	4.211	4.511
20																				
35																				
44																				
58																				
70																				
88	1.25	1.52	1.60	1.69	1.78	1.86	1.95	2.04	2.13	2.21	2.30	2.38	2.47	2.56	2.64	2.73	2.81	2.90	2.98	3.24
100	1.39	1.69	1.78	1.88	1.98	2.08	2.17	2.27	2.37	2.46	2.56	2.66	2.75	2.85	2.95	3.04	3.14	3.23	3.33	3.61
117	1.58	1.92	2.04	2.15	2.26	2.37	2.48	2.59	2.71	2.82	2.93	3.04	3.15	3.26	3.37	3.48	3.59	3.70	3.81	4.14
175	2.22	2.71	2.87	3.03	3.19	3.35	3.51	3.67	3.83	3.99	4.15	4.31	4.47	4.62	4.78	4.94	5.10	5.26	5.41	5.88
200	2.49	3.03	3.22	3.40	3.58	3.76	3.94	4.12	4.30	4.48	4.66	4.84	5.02	5.20	5.38	5.56	5.73	5.91	6.09	6.62
233	2.83	3.46	3.67	3.88	4.09	4.30	4.51	4.71	4.92	5.13	5.33	5.54	5.74	5.95	6.15	6.36	6.56	6.77	6.97	7.58
300	3.52	4.31	4.58	4.84	5.10	5.36	5.62	5.89	6.15	6.40	6.67	6.93	7.18	7.44	7.70	7.96	8.21	8.47	8.73	9.49
350	4.02	4.93	5.24	5.54	5.84	6.14	6.44	6.74	7.04	7.34	7.64	7.94	8.24	8.54	8.83	9.13	9.43	9.72	10.0	10.9
400	4.51	5.54	5.89	6.23	6.57	6.91	7.25	7.59	7.93	8.27	8.61	8.94	9.28	9.62	9.95	10.3	10.6	11.0	11.3	12.3
500	5.47	6.74	7.16	7.58	8.00	8.42	8.84	9.25	9.67	10.1	10.5	10.9	11.3	11.7	12.2	12.6	13.0	13.4	13.8	15.0
575	6.17	7.61	8.10	8.58	9.05	9.53	10.0	10.5	11.0	11.4	11.9	12.4	12.8	13.3	13.8	14.2	14.7	15.2	15.6	17.0
600	6.40	7.90	8.41	8.90	9.40	9.89	10.4	10.9	11.4	11.9	12.4	12.8	13.3	13.8	14.3	14.8	15.3	15.8	16.3	17.7
690	7.23	8.94	9.51	10.1	10.6	11.2	11.8	12.3	12.9	13.4	14.0	14.6	15.1	15.7	16.2	16.8	17.3	17.9	18.4	20.1
700	7.32	9.05	9.63	10.2	10.8	11.3	11.9	12.5	13.1	13.6	14.2	14.8	15.3	15.9	16.4	17.0	17.6	18.1	18.7	20.3
800	8.22	10.2	10.8	11.5	12.1	12.8	13.4	14.1	14.7	15.3	16.0	16.6	17.3	17.9	18.5	19.2	19.8	20.4	21.1	22.9
870	8.84	11.0	11.7	12.4	13.1	13.8	14.5	15.2	15.9	16.5	17.2	17.9	18.6	19.3	20.0	20.7	21.4	22.0	22.7	24.8
900	9.11	11.3	12.0	12.7	13.5	14.2	14.9	15.6	16.3	17.1	17.8	18.5	19.2	19.9	20.6	21.3	22.0	22.7	23.4	25.5
1000	9.98	12.4	13.2	14.0	14.8	15.6	16.4	17.2	18.0	18.7	19.5	20.3	21.1	21.9	22.7	23.4	24.2	25.0	25.8	28.1
1160	11.4	14.1	15.0	16.0	16.9	17.8	18.7	19.6	20.5	21.4	22.3	23.2	24.1	25.0	25.9	26.8	27.7	28.6	29.5	32.1
1750	16.2	20.3	21.6	22.9	24.3	25.6	26.9	28.3	29.6	30.9	32.2	33.5	34.8	36.1	37.5	38.7	40.0	41.3	42.6	46.5
2000	18.2	22.8	24.3	25.8	27.3	28.8	30.3	31.8	33.3	34.8	36.3	37.8	39.2	40.7	42.2	43.7	45.1	46.6	48.1	52.4
3000	25.8	32.4	34.6	36.8	39.0	41.2	43.4	45.5	47.7	49.8	52.0	54.1	56.3	58.4	60.5	62.6	64.7	66.8	68.9	75.2
3450	29.1	36.6	39.1	41.6	44.1	46.5	49.0	51.5	53.9	56.3	58.8	61.2	63.6	66.0	68.4	70.8	73.2	75.6	78.0	85.0
4000	32.9	41.5	44.4	47.3	50.1	52.9	55.7	58.5	61.3	64.1	66.9	69.6	72.4	75.1	77.8	80.6	83.3	86.0	88.7	96.6
4500	36.4	45.9	49.1	52.3	55.4	58.5	61.7	64.8	67.9	70.9	74.0	77.1	80.1	83.1	86.2	89.2	92.1	95.1	98.1	106.9
5000	39.7	50.2	53.7	57.2	60.6	64.1	67.5	70.9	74.3	77.6	81.0	84.3	87.6	90.9	94.3	97.5	100.8	104.0	107.3	116.8
5500	43.0	54.4	58.2	62.0	65.7	69.4	73.2	76.8	80.5	84.1	87.8	91.4	95.0	98.5	102.1	105.6	109.1	112.6	116.1	126.4

Drives in this area should be designed using Design Flex® Pro.  
Please consult [www.gates.com/drivedesign](http://www.gates.com/drivedesign) for details.

Use this sprocket only if required to obtain speed ratio or to meet diameter limitations. See Engineering Section for details.

Poly Chain® GT® Carbon® Belt Length Correction Factor Table									
Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor	Number of teeth
8MGT-248	31	0.42	8MGT-800	100	0.87	8MGT-1600	200	1.14	8MGT-2800
8MGT-288	36	0.48	8MGT-896	112	0.91	8MGT-1760	220	1.17	8MGT-2840
8MGT-352	44	0.56	8MGT-960	120	0.94	8MGT-1792	224	1.18	8MGT-3048
8MGT-416	52	0.62	8MGT-1000	125	0.96	8MGT-2000	250	1.22	8MGT-3200
8MGT-456	57	0.66	8MGT-1040	130	0.97	8MGT-2200	275	1.26	8MGT-3280
8MGT-480	60	0.68	8MGT-1120	140	1.00	8MGT-2240	280	1.26	8MGT-3600
8MGT-544	68	0.72	8MGT-1200	150	1.03	8MGT-2400	300	1.29	8MGT-4000
8MGT-608	76	0.77	8MGT-1224	153	1.03	8MGT-2520	315	1.31	8MGT-4400
8MGT-640	80	0.79	8MGT-1280	160	1.05	8MGT-2600	325	1.32	8MGT-4480
8MGT-720	90	0.83	8MGT-1440	180	1.10				

# Horsepower Rating for 21mm Wide

## 8mm Pitch Poly Chain® GT® Carbon® Belts

Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)										Additional Horsepower per belt for Speed Ratio of Speed-Down Drives										RPM OF FASTER SHAFT		
48 4.812	50 5.013	53 5.314	56 5.614	60 6.015	63 6.316	67 6.717	71 7.118	75 7.519	80 8.020	1.00 to 1.02	1.03 to 1.05	1.06 to 1.10	1.11 to 1.15	1.16 to 1.21	1.22 to 1.30	1.31 to 1.43	1.44 to 1.64	1.65 to 2.15	2.16 and Over			
Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.											Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.											10
3.49	3.66	3.92	4.17	4.50	4.75	5.09	5.42	5.75	6.16	0.00	0.01	0.02	0.04	0.05	0.06	0.07	0.09	0.10	0.11	70		
3.90	4.09	4.37	4.65	5.03	5.31	5.68	6.05	6.42	6.88	0.00	0.01	0.03	0.04	0.06	0.07	0.08	0.10	0.11	0.13	88		
4.46	4.68	5.01	5.33	5.76	6.08	6.51	6.94	7.36	7.89	0.00	0.02	0.03	0.05	0.07	0.08	0.10	0.11	0.13	0.15	100		
6.35	6.66	7.13	7.59	8.21	8.67	9.29	9.90	10.5	11.3	0.00	0.02	0.05	0.07	0.10	0.12	0.15	0.17	0.19	0.22	117		
7.15	7.50	8.03	8.55	9.25	9.77	10.5	11.1	11.8	12.7	0.00	0.03	0.06	0.08	0.11	0.14	0.17	0.19	0.22	0.25	175		
8.19	8.59	9.20	9.80	10.6	11.2	12.0	12.8	13.6	14.5	0.00	0.03	0.06	0.10	0.13	0.16	0.19	0.23	0.26	0.29	200		
10.3	10.8	11.5	12.3	13.3	14.0	15.0	16.0	17.0	18.3	0.00	0.04	0.08	0.13	0.17	0.21	0.25	0.29	0.33	0.38	233		
11.8	12.4	13.2	14.1	15.3	16.1	17.3	18.4	19.6	21.0	0.00	0.05	0.10	0.15	0.19	0.24	0.29	0.34	0.39	0.44	300		
13.3	13.9	14.9	15.9	17.2	18.2	19.5	20.8	22.1	23.7	0.00	0.06	0.11	0.17	0.22	0.28	0.33	0.39	0.45	0.50	350		
16.2	17.0	18.3	19.5	21.1	22.3	23.9	25.4	27.0	29.0	0.00	0.07	0.14	0.21	0.28	0.35	0.42	0.49	0.56	0.63	400		
18.4	19.3	20.7	22.1	23.9	25.3	27.1	28.9	30.7	32.9	0.00	0.08	0.16	0.24	0.32	0.40	0.48	0.56	0.64	0.72	500		
19.1	20.1	21.5	23.0	24.9	26.3	28.1	30.0	31.9	34.2	0.00	0.08	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	575		
21.7	22.8	24.4	26.1	28.2	29.8	32.0	34.1	36.2	38.8	0.00	0.10	0.19	0.29	0.38	0.48	0.58	0.67	0.78	0.86	600		
22.0	23.1	24.8	26.4	28.6	30.2	32.4	34.5	36.7	39.3	0.00	0.10	0.19	0.29	0.39	0.49	0.58	0.68	0.78	0.88	690		
24.8	26.1	27.9	29.8	32.3	34.1	36.5	39.0	41.4	44.4	0.00	0.11	0.22	0.33	0.45	0.56	0.67	0.78	0.89	1.00	700		
26.8	28.1	30.1	32.2	34.8	36.8	39.4	42.1	44.7	47.9	0.00	0.12	0.24	0.36	0.48	0.61	0.73	0.85	0.97	1.09	800		
27.6	29.0	31.1	33.2	35.9	38.0	40.7	43.4	46.1	49.4	0.00	0.13	0.25	0.38	0.50	0.63	0.75	0.88	1.00	1.13	870		
30.4	31.9	34.2	36.5	39.5	41.8	44.8	47.7	50.7	54.4	0.00	0.14	0.28	0.42	0.56	0.70	0.84	0.97	1.11	1.25	900		
34.7	36.5	39.1	41.7	45.2	47.8	51.2	54.6	58.0	62.2	0.00	0.16	0.32	0.49	0.65	0.81	0.97	1.13	1.29	1.45	1000		
50.3	52.9	56.7	60.5	65.5	69.2	74.2	79.1	84.0	90.1	0.00	0.24	0.49	0.73	0.97	1.22	1.46	1.71	1.95	2.19	1160		
56.7	59.6	63.9	68.2	73.8	78.1	83.6	89.2	94.7	101.5	0.00	0.28	0.56	0.84	1.11	1.39	1.67	1.95	2.23	2.51	1750		
81.4	85.5	91.6	97.7	105.7	111.7	119.5	127.3	135.0	144.4	0.00	0.42	0.83	1.25	1.67	2.09	2.51	2.92	3.34	3.76	2000		
92.0	96.6	103.5	110.3	119.3	126.0	134.7	143.4			0.00	0.48	0.96	1.44	1.92	2.40	2.88	3.36	3.84	4.32	3000		
104.6	109.8	117.6	125.2	135.3						0.00	0.56	1.11	1.67	2.23	2.79	3.34	3.90	4.46	5.01	3450		
115.6	121.4	129.9								0.00	0.63	1.25	1.88	2.51	3.13	3.76	4.39	5.01	5.64	4000		
126.3	132.5									0.00	0.70	1.39	2.09	2.78	3.48	4.18	4.87	5.57	6.27	4500		
										0.00	0.77	1.53	2.30	3.06	3.83	4.60	5.36	6.13	6.89	5000		
																				5500		

## Poly Chain® GT® Carbon®

Belt Length Correction Factor Table											
Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor
8MGT-248	31	0.42	8MGT-800	100	0.87	8MGT-1600	200	1.14	8MGT-2800	350	1.35
8MGT-288	36	0.48	8MGT-896	112	0.91	8MGT-1760	220	1.17	8MGT-2840	355	1.36
8MGT-352	44	0.56	8MGT-960	120	0.94	8MGT-1792	224	1.18	8MGT-3048	381	1.38
8MGT-416	52	0.62	8MGT-1000	125	0.96	8MGT-2000	250	1.22	8MGT-3200	400	1.40
8MGT-456	57	0.66	8MGT-1040	130	0.97	8MGT-2200	275	1.26	8MGT-3280	410	1.41
8MGT-480	60	0.68	8MGT-1120	140	1.00	8MGT-2240	280	1.26	8MGT-3600	450	1.45
8MGT-544	68	0.72	8MGT-1200	150	1.03	8MGT-2400	300	1.29	8MGT-4000	500	1.49
8MGT-608	76	0.77	8MGT-1224	153	1.03	8MGT-2520	315	1.31	8MGT-4400	550	1.52
8MGT-640	80	0.79	8MGT-1280	160	1.05	8MGT-2600	325	1.32	8MGT-4480	560	1.53
8MGT-720	90	0.83	8MGT-1440	180	1.10						



# Horsepower Rating for 36mm Wide 8mm Pitch Poly Chain® GT® Carbon® Belts

RPM OF FASTER SHAFT	Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)																	
	22	25	28	30	32	33	34	35	36	37	38	39	40	41	42	45	48	50
10	2.206	2.506	2.807	3.008	3.208	3.308	3.409	3.509	3.609	3.709	3.810	3.910	4.010	4.110	4.211	4.511	4.812	5.013
20	Drives in this area should be designed using Design Flex® Pro. Please consult <a href="http://www.gates.com/drivedesign">www.gates.com/drivedesign</a> for details.																	
35																		
44																		
58																		
70																		
88																		
100																		
117																		
175																		
200																		
233	2.60	2.89	3.05	3.35	3.64	3.79	3.94	4.09	4.23	4.38	4.53	4.68	4.82	4.97	5.12	5.55	5.99	6.28
300	2.15	2.38	2.60	2.89	3.05	3.35	3.64	4.09	4.23	4.38	4.53	4.68	4.82	4.97	5.12	5.55	5.99	6.28
350	2.38	2.60	2.89	3.05	3.35	3.64	4.09	4.23	4.38	4.53	4.68	4.82	4.97	5.12	5.55	5.99	6.28	7.01
400	2.71	3.29	3.87	4.26	4.64	4.83	5.02	5.21	5.40	5.59	5.78	5.97	6.15	6.34	6.53	7.09	7.65	8.03
450	3.80	4.64	5.47	6.02	6.57	6.84	7.11	7.38	7.66	7.93	8.20	8.47	8.74	9.01	9.28	10.1	10.9	11.4
500	4.26	5.20	6.14	6.76	7.38	7.68	7.99	8.30	8.61	8.91	9.22	9.53	9.83	10.1	10.4	11.3	12.3	12.9
550	4.85	5.93	7.01	7.72	8.43	8.79	9.14	9.49	9.85	10.2	10.6	10.9	11.2	11.6	12.0	13.0	14.0	14.7
600	6.03	7.39	8.74	9.64	10.5	11.0	11.4	11.9	12.3	12.8	13.2	13.6	14.1	14.5	15.0	16.3	17.6	18.5
650	6.88	8.45	10.0	11.0	12.1	12.6	13.1	13.6	14.1	14.6	15.1	15.7	16.2	16.7	17.2	18.7	20.2	21.2
700	7.72	9.50	11.3	12.4	13.6	14.2	14.8	15.3	15.9	16.5	17.1	17.6	18.2	18.8	19.4	21.1	22.8	23.9
800	11.5	13.7	15.5	17.2	18.8	19.6	20.4	21.2	22.0	22.8	23.6	24.4	25.2	26.0	26.8	29.2	31.6	33.2
870	13.1	15.5	17.2	18.8	19.6	20.4	21.2	22.0	22.9	23.7	24.5	25.4	26.2	27.0	27.9	30.3	32.8	34.5
900	13.5	16.1	17.8	19.5	20.3	21.2	22.0	22.9	23.7	24.5	25.4	26.2	27.0	27.9	30.3	34.4	37.2	39.1
950	15.3	18.2	20.2	22.1	23.0	23.9	24.0	25.0	25.9	26.9	27.8	28.8	29.7	30.7	31.6	34.9	37.7	39.6
1000	15.5	18.5	20.4	22.4	23.3	24.3	24.3	25.3	26.3	27.2	28.2	29.1	30.1	31.1	32.0	34.9	37.7	39.6
1160	17.5	20.8	23.0	25.2	26.3	27.4	28.5	29.6	30.7	31.8	32.9	33.9	35.0	36.1	36.1	39.3	42.6	44.7
1200	18.8	22.4	24.8	27.2	28.4	29.6	30.7	31.9	33.1	34.3	35.4	36.6	37.8	39.0	42.4	45.9	48.2	50.7
1300	19.4	23.1	25.6	28.0	29.2	30.5	31.7	32.9	34.1	35.3	36.5	37.7	38.9	40.2	43.8	47.3	49.7	52.1
1400	21.2	25.3	28.1	30.8	32.1	33.5	34.8	36.2	37.5	38.8	40.2	41.5	42.8	44.2	48.1	52.1	54.7	57.2
1500	24.2	28.9	32.0	35.1	36.7	38.2	39.8	41.3	42.8	44.4	45.9	47.4	49.0	50.5	55.0	59.6	62.6	65.6
1750	34.7	41.6	46.2	50.7	53.0	55.2	57.5	59.7	61.9	64.2	66.4	68.6	70.9	73.1	79.7	86.3	90.7	95.1
2000	31.2	39.0	46.8	52.0	57.1	59.6	62.2	64.8	67.3	69.8	72.3	74.9	77.4	79.9	82.4	89.8	97.3	102.2
3000	44.2	55.6	66.9	74.3	81.7	85.4	89.1	92.8	96.4	100.1	103.7	107.4	111.0	114.6	118.2	128.9	139.5	146.6
3450	49.8	62.7	75.5	84.0	92.4	96.6	100.8	104.9	109.0	113.2	117.3	121.4	125.5	129.5	133.6	145.7	157.7	165.7
4000	56.5	71.2	85.9	95.5	105.1	109.8	114.6	119.3	124.0	128.7	133.4	138.1	142.7	147.3	152.0	165.7	179.3	188.2
4500	62.3	78.7	95.0	105.7	116.3	121.6	126.9	132.1	137.3	142.5	147.7	152.8	158.0	163.0	168.2	183.2	198.2	208.0
5000	68.1	86.1	103.9	115.7	127.3	133.1	138.9	144.6	150.2	155.9	161.6	167.2	172.8	178.3	183.9	200.3	216.4	227.1
5500	73.7	93.3	112.6	125.4	138.0	144.2	150.5	156.7	162.8	168.9	175.1	181.1	187.1	193.1	199.1	216.7	233.8	247.1

Use this sprocket only if required to obtain speed ratio or to meet diameter limitations. See Engineering Section for details.

Poly Chain® GT® Carbon® Belt Length Correction Factor Table											
Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor	Correction Factor		
8MGT-248	31	0.42	8MGT-800	100	0.87	8MGT-1600	200	1.14	8MGT-2800	350	1.35
8MGT-288	36	0.48	8MGT-896	112	0.91	8MGT-1760	220	1.17	8MGT-2840	355	1.36
8MGT-352	44	0.56	8MGT-960	120	0.94	8MGT-1792	224	1.18	8MGT-3048	381	1.38
8MGT-416	52	0.62	8MGT-1000	125	0.96	8MGT-2000	250	1.22	8MGT-3200	400	1.40
8MGT-456	57	0.66	8MGT-1040	130	0.97	8MGT-2200	275	1.26	8MGT-3280	410	1.41
8MGT-480	60	0.68	8MGT-1120	140	1.00	8MGT-2240	280	1.26	8MGT-3600	450	1.45
8MGT-544	68	0.72	8MGT-1200	150	1.03	8MGT-2400	300	1.29	8MGT-4000	500	1.49
8MGT-608	76	0.77	8MGT-1224	153	1.03	8MGT-2520	315	1.31	8MGT-4400	550	1.52
8MGT-640	80	0.79	8MGT-1280	160	1.05	8MGT-2600	325	1.32	8MGT-4480	560	1.53
8MGT-720	90	0.83	8MGT-1440	180	1.10						



# Horsepower Rating for 36mm Wide 8mm Pitch Poly Chain® GT® Carbon® Belts

Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)										Additional Horsepower per belt for Speed Ratio of Speed-Down Drives										RPM OF FASTER SHAFT		
53 5.314	56 5.614	60 6.015	63 6.316	67 6.717	71 7.118	75 7.519	80 8.020	1.00 to 1.02	1.03 to 1.05	1.06 to 1.10	1.11 to 1.15	1.16 to 1.21	1.22 to 1.30	1.31 to 1.43	1.44 to 1.64	1.65 to 2.15	2.16 to Over					
Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.											Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.											10
6.71	7.14	7.72	8.15	8.72	9.29	9.86	10.6	0.00	0.02	0.04	0.06	0.08	0.11	0.13	0.15	0.17	0.19	70				
7.49	7.98	8.62	9.10	9.74	10.4	11.0	11.8	0.00	0.02	0.05	0.07	0.10	0.12	0.14	0.17	0.19	0.21	88				
8.59	9.14	9.88	10.4	11.2	11.9	12.6	13.5	0.00	0.03	0.06	0.08	0.11	0.14	0.17	0.20	0.22	0.25	100				
12.2	13.0	14.1	14.9	15.9	17.0	18.0	19.3	0.00	0.04	0.08	0.13	0.17	0.21	0.25	0.29	0.33	0.38	117				
13.8	14.7	15.8	16.7	17.9	19.1	20.3	21.7	0.00	0.05	0.10	0.14	0.19	0.24	0.29	0.33	0.38	0.43	175				
15.8	16.8	18.2	19.2	20.5	21.9	23.3	24.9	0.00	0.06	0.11	0.17	0.22	0.28	0.33	0.39	0.45	0.50	200				
19.8	21.1	22.8	24.1	25.8	27.5	29.2	31.3	0.00	0.07	0.14	0.22	0.29	0.36	0.43	0.50	0.57	0.64	233				
22.7	24.2	26.2	27.7	29.6	31.6	33.5	36.0	0.00	0.08	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	300				
25.6	27.3	29.5	31.2	33.4	35.6	37.8	40.6	0.00	0.10	0.19	0.29	0.38	0.48	0.57	0.67	0.76	0.86	350				
31.3	33.4	36.1	38.2	40.9	43.6	46.3	49.7	0.00	0.12	0.24	0.36	0.48	0.60	0.72	0.84	0.96	1.07	400				
35.5	37.9	41.0	43.3	46.4	49.5	52.6	56.4	0.00	0.14	0.27	0.41	0.55	0.69	0.82	0.96	1.10	1.24	500				
39.4	42.6	46.0	48.3	51.5	54.7	58.6	62.1	0.00	0.16	0.29	0.43	0.57	0.72	0.86	1.00	1.15	1.29	575				
41.9	44.7	48.4	51.1	54.8	58.4	62.1	66.6	0.00	0.17	0.33	0.49	0.66	0.82	0.99	1.15	1.32	1.48	600				
42.4	45.3	49.0	51.8	55.5	59.2	62.9	67.4	0.00	0.17	0.33	0.50	0.67	0.84	1.00	1.17	1.34	1.50	690				
47.9	51.1	55.3	58.5	62.7	66.8	71.0	76.1	0.00	0.19	0.38	0.57	0.76	0.95	1.15	1.34	1.53	1.72	700				
51.7	55.1	59.7	63.1	67.6	72.1	76.6	82.2	0.00	0.21	0.41	0.62	0.83	1.04	1.25	1.45	1.66	1.87	800				
53.3	56.8	61.5	65.1	69.7	74.4	79.0	84.7	0.00	0.22	0.43	0.65	0.86	1.07	1.29	1.50	1.72	1.93	870				
58.6	62.5	67.7	71.6	76.7	81.8	86.9	93.2	0.00	0.24	0.48	0.72	0.95	1.19	1.43	1.67	1.91	2.15	900				
67.1	71.5	77.5	81.9	87.8	93.6	99.4	106.7	0.00	0.28	0.55	0.83	1.11	1.38	1.66	1.94	2.22	2.49	1000				
97.2	103.7	112.3	118.7	127.2	135.7	144.0	154.5	0.00	0.42	0.83	1.25	1.67	2.09	2.51	2.92	3.34	3.76	1160				
109.6	116.9	126.6	133.8	143.4	152.9	162.3	174.0	0.00	0.48	0.95	1.43	1.91	2.39	2.86	3.34	3.82	4.30	1750				
157.1	167.5	181.2	191.4	204.9	218.2	231.4	247.6	0.00	0.72	1.43	2.15	2.86	3.58	4.30	5.01	5.73	6.44	2000				
177.5	189.1	204.5	216.0	231.0	245.8			0.00	0.83	1.65	2.47	3.29	4.12	4.94	5.76	6.59	7.41	3000				
201.5	214.7	231.9						0.00	0.96	1.91	2.87	3.82	4.77	5.73	6.68	7.64	8.59	3450				
222.6								0.00	1.08	2.15	3.23	4.30	5.37	6.45	7.52	8.60	9.67	4000				
								0.00	1.20	2.38	3.58	4.77	5.97	7.16	8.35	9.55	10.7	4500				
								0.00	1.32	2.62	3.94	5.25	6.56	7.88	9.19	10.5	11.8	5000				
																		5500				

Poly Chain® GT® Carbon® Belt Length Correction Factor Table											
Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor
8MGT-248	31	0.42	8MGT-800	100	0.87	8MGT-1600	200	1.14	8MGT-2800	350	1.35
8MGT-288	36	0.48	8MGT-896	112	0.91	8MGT-1760	220	1.17	8MGT-2840	355	1.36
8MGT-352	44	0.56	8MGT-960	120	0.94	8MGT-1792	224	1.18	8MGT-3048	381	1.38
8MGT-416	52	0.62	8MGT-1000	125	0.96	8MGT-2000	250	1.22	8MGT-3200	400	1.40
8MGT-456	57	0.66	8MGT-1040	130	0.97	8MGT-2200	275	1.26	8MGT-3280	410	1.41
8MGT-480	60	0.68	8MGT-1120	140	1.00	8MGT-2240	280	1.26	8MGT-3600	450	1.45
8MGT-544	68	0.72	8MGT-1200	150	1.03	8MGT-2400	300	1.29	8MGT-4000	500	1.49
8MGT-608	76	0.77	8MGT-1224	153	1.03	8MGT-2520	315	1.31	8MGT-4400	550	1.52
8MGT-640	80	0.79	8MGT-1280	160	1.05	8MGT-2600	325	1.32	8MGT-4480	560	1.53
8MGT-720	90	0.83	8MGT-1440	180	1.10						

# Horsepower Rating for 62mm Wide 8mm Pitch Poly Chain® GT® Carbon® Belts

RPM OF FASTER SHAFT	Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)																
	22	25	28	30	32	34	36	38	40	42	45	48	50	53	56		
10	2.206	2.506	2.807	3.008	3.208	3.409	3.609	3.810	4.010	4.211	4.511	4.812	5.013	5.314	5.614		
20																	
35																	
44																	
58																	
70																	
88	3.70	4.48	5.25	5.76	6.27	6.79	7.29	7.80	8.30	8.81	9.56	10.3	10.8	11.6	12.3		
100	4.11	4.98	5.84	6.42	6.99	7.56	8.13	8.70	9.26	9.83	10.7	11.5	12.1	12.9	13.7		
117	4.68	5.67	6.67	7.33	7.99	8.65	9.30	9.95	10.6	11.2	12.2	13.2	13.8	14.8	15.7		
175	6.55	7.99	9.42	10.4	11.3	12.3	13.2	14.1	15.1	16.0	17.4	18.8	19.7	21.1	22.4		
200	7.34	8.96	10.6	11.6	12.7	13.8	14.8	15.9	16.9	18.0	19.5	21.1	22.1	23.7	25.2		
233	8.36	10.2	12.1	13.3	14.5	15.7	17.0	18.2	19.4	20.6	22.4	24.2	25.4	27.1	28.9		
300	10.4	12.7	15.1	16.6	18.1	19.7	21.2	22.7	24.3	25.8	28.0	30.3	31.8	34.0	36.3		
350	11.9	14.6	17.2	19.0	20.8	22.6	24.3	26.1	27.8	29.6	32.2	34.8	36.5	39.1	41.7		
400	13.3	16.4	19.4	21.4	23.4	25.4	27.4	29.4	31.4	33.3	36.3	39.2	41.2	44.1	47.0		
500	16.1	19.9	23.6	26.1	28.5	31.0	33.4	35.9	38.3	40.7	44.3	47.9	50.3	53.9	57.5		
575	18.2	22.5	26.7	29.5	32.3	35.1	37.9	40.7	43.4	46.2	50.3	54.4	57.1	61.2	65.2		
600	18.9	23.3	27.8	30.7	33.6	36.5	39.4	42.3	45.1	48.0	52.3	56.5	59.4	63.6	67.8		
690	21.3	26.4	31.4	34.7	38.0	41.4	44.6	47.9	51.2	54.4	59.3	64.1	67.3	72.2	76.9		
700	21.6	26.7	31.8	35.2	38.5	41.9	45.2	48.5	51.8	55.1	60.1	65.0	68.2	73.1	77.9		
800	24.3	30.1	35.8	39.6	43.4	47.2	51.0	54.7	58.5	62.2	67.8	73.3	77.0	82.5	88.0		
870	26.1	32.4	38.6	42.7	46.8	50.9	55.0	59.0	63.0	67.1	73.1	79.1	83.1	89.0	94.9		
900	26.9	33.3	39.8	44.0	48.2	52.5	56.7	60.8	65.0	69.2	75.4	81.5	85.7	91.8	97.9		
1000	29.5	36.6	43.7	48.3	53.0	57.7	62.3	66.9	71.5	76.1	82.9	89.7	94.2	101.0	107.7		
1160	33.5	41.7	49.8	55.2	60.5	65.9	71.1	76.4	81.7	87.0	94.8	102.6	107.8	115.5	123.2		
1750	47.9	59.8	71.7	79.5	87.3	95.1	102.8	110.6	118.2	125.9	137.3	148.6	156.2	167.4	178.6		
2000	53.7	67.2	80.6	89.5	98.3	107.2	115.9	124.6	133.2	141.9	154.7	167.6	176.1	188.7	201.3		
3000	76.1	95.7	115.2	128.0	140.8	153.5	166.1	178.7	191.1	203.6	222.0	240.3	252.5	270.6	288.5		
3450	85.8	108.0	130.1	144.7	159.1	173.6	187.8	202.0	216.1	230.2	251.0	271.6	285.3	305.7	325.8		
4000	97.2	122.7	147.9	164.5	181.0	197.4	213.7	229.8	245.8	261.8	285.3	308.7	324.2	347.1	369.7		
4500	107.4	135.6	163.6	182.1	200.4	218.6	236.5	254.4	272.1	289.6	315.6	341.3	358.3	383.4			
5000	117.3	148.3	179.0	199.3	219.3	239.2	258.8	278.3	297.5	316.7	344.9	372.8	391.1				
5500	126.9	160.6	194.0	216.0	237.7	259.2	280.4	301.5	322.3	342.9	373.2						

Drives in this area should be designed using Design Flex® Pro.  
Please consult [www.gates.com/drivedesign](http://www.gates.com/drivedesign) for details.

Use this sprocket only if required to obtain speed ratio or to meet diameter limitations. See Engineering Section for details.



# Horsepower Rating for 62mm Wide 8mm Pitch Poly Chain® GT® Carbon® Belts

Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)										Additional Horsepower per belt for Speed Ratio of Speed-Down Drives										RPM OF FASTER SHAFT		
60 6.015	63 6.316	67 6.717	71 7.118	75 7.519	80 8.020	1.00 to 1.02	1.03 to 1.05	1.06 to 1.10	1.11 to 1.15	1.16 to 1.21	1.22 to 1.30	1.31 to 1.43	1.44 to 1.64	1.65 to 2.15	2.16 to Over							
Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.											Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.											10
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Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.											Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.											70
13.3	14.0	15.0	16.0	17.0	18.2	0.00	0.04	0.07	0.11	0.14	0.18	0.22	0.25	0.29	0.33	88						
14.8	15.7	16.8	17.9	19.0	20.3	0.00	0.04	0.08	0.12	0.16	0.21	0.25	0.29	0.33	0.37	100						
17.0	18.0	19.2	20.5	21.7	23.3	0.00	0.05	0.10	0.14	0.19	0.24	0.29	0.34	0.38	0.43	117						
24.2	25.6	27.4	29.2	31.0	33.3	0.00	0.07	0.16	0.22	0.29	0.36	0.43	0.50	0.58	0.65	175						
27.3	28.8	30.9	32.9	34.9	37.5	0.00	0.08	0.16	0.25	0.33	0.41	0.49	0.58	0.66	0.74	200						
31.3	33.0	35.4	37.7	40.0	42.9	0.00	0.10	0.19	0.29	0.38	0.48	0.57	0.67	0.77	0.86	233						
39.2	41.5	44.4	47.3	50.3	53.9	0.00	0.12	0.25	0.37	0.49	0.62	0.74	0.86	0.99	1.11	300						
45.1	47.6	51.0	54.4	57.8	62.0	0.00	0.14	0.29	0.43	0.58	0.72	0.86	1.01	1.15	1.29	350						
50.8	53.7	57.6	61.4	65.2	69.9	0.00	0.16	0.33	0.49	0.66	0.82	0.99	1.15	1.32	1.48	400						
62.2	65.7	70.4	75.1	79.8	85.6	0.00	0.21	0.41	0.62	0.82	1.03	1.23	1.44	1.64	1.85	500						
70.6	74.6	80.0	85.3	90.6	97.2	0.00	0.24	0.47	0.71	0.95	1.18	1.42	1.65	1.89	2.13	575						
73.4	77.6	83.1	88.6	94.1	101.0	0.00	0.25	0.49	0.74	0.99	1.23	1.48	1.73	1.97	2.22	600						
83.3	88.0	94.3	100.6	106.9	114.7	0.00	0.28	0.57	0.85	1.13	1.42	1.70	1.99	2.27	2.55	690						
84.4	89.2	95.6	101.9	108.3	116.2	0.00	0.29	0.57	0.86	1.15	1.44	1.73	2.01	2.30	2.59	700						
95.2	100.7	107.9	115.1	122.3	131.2	0.00	0.33	0.66	0.99	1.32	1.64	1.97	2.30	2.63	2.96	800						
102.8	108.7	116.4	124.2	131.9	141.5	0.00	0.36	0.71	1.07	1.43	1.79	2.15	2.50	2.86	3.22	870						
106.0	112.0	120.1	128.1	136.1	146.0	0.00	0.37	0.74	1.11	1.48	1.85	2.22	2.59	2.96	3.33	900						
116.6	123.3	132.1	140.9	149.7	160.6	0.00	0.41	0.82	1.23	1.64	2.06	2.47	2.88	3.29	3.70	1000						
133.4	141.0	151.2	161.2	171.3	183.7	0.00	0.48	0.95	1.43	1.91	2.38	2.86	3.34	3.82	4.29	1160						
193.4	204.4	219.1	233.6	248.1	266.0	0.00	0.72	1.44	2.16	2.88	3.60	4.32	5.04	5.76	6.47	1750						
218.0	230.4	246.9	263.3	279.5	299.6	0.00	0.82	1.64	2.47	3.29	4.11	4.93	5.75	6.58	7.40	2000						
312.1	329.7	352.9	375.8	398.5	426.4	0.00	1.24	2.46	3.70	4.93	6.17	7.40	8.63	9.87	11.1	3000						
352.3	372.0	397.8	423.3			0.00	1.42	2.83	4.26	5.67	7.09	8.51	9.93	11.3	12.8	3450						
399.5						0.00	1.65	3.29	4.94	6.58	8.22	9.87	11.5	13.2	14.8	4000						
						0.00	1.85	3.70	5.56	7.40	9.25	11.1	12.9	14.8	16.6	4500						
						0.00	2.06	4.11	6.17	8.22	10.3	12.3	14.4	16.4	18.5	5000						
						0.00	2.27	4.52	6.79	9.04	11.3	13.6	15.8	18.1	20.3	5500						

Poly Chain® GT® Carbon® Belt Length Correction Factor Table											
Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor
8MGT-248	31	0.42	8MGT-800	100	0.87	8MGT-1600	200	1.14	8MGT-2800	350	1.35
8MGT-288	36	0.48	8MGT-896	112	0.91	8MGT-1760	220	1.17	8MGT-2840	355	1.36
8MGT-352	44	0.56	8MGT-960	120	0.94	8MGT-1792	224	1.18	8MGT-3048	381	1.38
8MGT-416	52	0.62	8MGT-1000	125	0.96	8MGT-2000	250	1.22	8MGT-3200	400	1.40
8MGT-456	57	0.66	8MGT-1040	130	0.97	8MGT-2200	275	1.26	8MGT-3280	410	1.41
8MGT-480	60	0.68	8MGT-1120	140	1.00	8MGT-2240	280	1.26	8MGT-3600	450	1.45
8MGT-544	68	0.72	8MGT-1200	150	1.03	8MGT-2400	300	1.29	8MGT-4000	500	1.49
8MGT-608	76	0.77	8MGT-1224	153	1.03	8MGT-2520	315	1.31	8MGT-4400	550	1.52
8MGT-640	80	0.79	8MGT-1280	160	1.05	8MGT-2600	325	1.32	8MGT-4480	560	1.53
8MGT-720	90	0.83	8MGT-1440	180	1.10						

# Horsepower Rating for 20mm Wide 14mm Pitch Poly Chain® GT® Carbon® Belts

RPM OF FASTER SHAFT	Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)																
	28	29	30	31	32	33	34	35	36	37	38	39	40	43	45	48	50
10	4.912	5.088	5.263	5.439	5.614	5.790	5.965	6.141	6.316	6.492	6.667	6.842	7.018	7.544	7.895	8.421	8.772
20	Drives in this area should be designed using Design Flex® Pro. Please consult <a href="http://www.gates.com/drivedesign">www.gates.com/drivedesign</a> for details.																
35																	
44																	
58																	
70																	
88	5.72	5.96	6.20	6.44	6.68	6.92	7.15	7.39	7.63	7.87	8.10	8.34	8.57	9.27	9.74	10.4	10.9
100	6.35	6.62	6.88	7.15	7.42	7.68	7.95	8.22	8.48	8.74	9.01	9.27	9.53	10.3	10.8	11.6	12.1
117	7.23	7.54	7.84	8.15	8.45	8.76	9.06	9.36	9.66	9.97	10.3	10.6	10.9	11.8	12.4	13.2	13.8
175	10.1	10.6	11.0	11.4	11.9	12.3	12.7	13.1	13.6	14.0	14.4	14.8	15.3	16.5	17.4	18.6	19.5
200	11.3	11.8	12.3	12.8	13.3	13.8	14.2	14.7	15.2	15.7	16.2	16.6	17.1	18.5	19.5	20.9	21.8
233	12.9	13.5	14.0	14.6	15.1	15.7	16.2	16.8	17.3	17.9	18.4	19.0	19.5	21.1	22.2	23.8	24.9
300	16.0	16.7	17.4	18.1	18.8	19.5	20.1	20.8	21.5	22.2	22.9	23.6	24.2	26.3	27.6	29.6	30.9
350	18.2	19.0	19.8	20.6	21.4	22.2	23.0	23.8	24.6	25.4	26.1	26.9	27.7	30.0	31.5	33.8	35.3
400	20.5	21.4	22.2	23.1	24.0	24.9	25.8	26.7	27.6	28.4	29.3	30.2	31.1	33.7	35.4	38.0	39.7
500	24.8	25.9	26.9	28.0	29.1	30.2	31.3	32.4	33.4	34.5	35.6	36.6	37.7	40.8	42.9	46.1	48.1
575	27.9	29.2	30.4	31.6	32.8	34.1	35.3	36.5	37.7	38.9	40.1	41.3	42.5	46.1	48.5	52.0	54.3
600	29.0	30.2	31.5	32.8	34.1	35.3	36.6	37.9	39.1	40.4	41.6	42.9	44.1	47.8	50.3	53.9	56.4
690	32.6	34.1	35.5	37.0	38.4	39.9	41.3	42.7	44.1	45.6	47.0	48.4	49.8	54.0	56.7	60.9	63.6
700	33.0	34.5	36.0	37.4	38.9	40.4	41.8	43.3	44.7	46.1	47.6	49.0	50.4	54.6	57.5	61.7	64.4
800	37.0	38.7	40.4	42.0	43.6	45.3	46.9	48.5	50.1	51.8	53.4	55.0	56.6	61.3	64.5	69.2	72.3
870	39.8	41.6	43.4	45.1	46.9	48.7	50.4	52.2	53.9	55.6	57.4	59.1	60.8	65.9	69.3	74.4	77.8
900	41.0	42.8	44.6	46.5	48.3	50.1	51.9	53.7	55.5	57.3	59.1	60.8	62.6	67.9	71.4	76.6	80.1
1000	44.8	46.9	48.9	50.9	52.9	54.8	56.8	58.8	60.8	62.7	64.7	66.6	68.6	74.4	78.2	83.9	87.7
1160	50.9	53.2	55.5	57.8	60.0	62.3	64.5	66.8	69.0	71.3	73.5	75.7	77.9	84.5	88.8	95.3	99.6
1750	72.1	75.4	78.6	81.9	85.1	88.4	91.6	94.8	97.9	101.1	104.3	107.4	110.5	119.8	126.0	135.1	141.1
2000	80.6	84.3	88.0	91.6	95.2	98.8	102.4	106.0	109.6	113.1	116.6	120.1	123.6	134.0	140.8	150.9	157.6
3000	112.6	117.8	122.9	127.9	133.0	138.0	142.9	147.9	152.8	157.6	162.5	167.2	172.0	186.1	195.3		
3450	126.0	131.7	137.4	143.0	148.6	154.2	159.7	165.2	170.6	175.9	181.2	186.5	191.7				
4000	141.4	147.9	154.2	160.5	166.7	172.8	178.9	185.0	190.9								

Poly Chain® GT® Carbon® Belt Length Correction Factor Table					
Pitch/Length Designation	Number of teeth	Correction Factor	Pitch/Length Designation	Number of teeth	Correction Factor
14MGT-994	71	0.68	14MGT-2450	175	1.02
14MGT-1120	80	0.73	14MGT-2520	180	1.03
14MGT-1190	85	0.75	14MGT-2590	185	1.04
14MGT-1260	90	0.77	14MGT-2660	190	1.05
14MGT-1400	100	0.81	14MGT-2800	200	1.07
14MGT-1568	112	0.85	14MGT-3136	224	1.12
14MGT-1610	115	0.86	14MGT-3304	236	1.14
14MGT-1750	125	0.89	14MGT-3360	240	1.14
14MGT-1890	135	0.92	14MGT-3500	250	1.16
14MGT-1960	140	0.94	14MGT-3850	275	1.19
14MGT-2100	150	0.96	14MGT-3920	280	1.20
14MGT-2240	160	0.99	14MGT-4326	309	1.24
14MGT-2310	165	1.00	14MGT-4410	315	1.25
14MGT-2380	170	1.01			





# Horsepower Rating for 20mm Wide 14mm Pitch Poly Chain® GT® Carbon® Belts

Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)										Additional Horsepower per belt for Speed Ratio of Speed-Down Drives						RPM OF FASTER SHAFT	
53 9,299	56 9,825	60 10,527	63 11,053	67 11,755	71 12,457	75 13,158	80 14,036	1.00 to 1.03	1.04 to 1.10	1.11 to 1.19	1.20 to 1.30	1.31 to 1.45	1.46 to 1.67	1.68 to 2.02	2.03 to 2.69		2.70 to 4.64
Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.										Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.						10	
11.6	12.3	13.2	13.9	14.8	15.7	16.6	17.7	0.00	0.04	0.09	0.13	0.18	0.22	0.27	0.31	0.36	0.40
12.9	13.7	14.7	15.4	16.4	17.4	18.4	19.7	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.36	0.41	0.46
14.7	15.6	16.7	17.6	18.8	19.9	21.0	22.5	0.00	0.06	0.12	0.18	0.24	0.30	0.36	0.42	0.47	0.53
20.7	21.9	23.6	24.8	26.4	28.0	29.6	31.6	0.00	0.09	0.18	0.27	0.36	0.44	0.53	0.62	0.71	0.80
23.2	24.6	26.4	27.8	29.6	31.4	33.2	35.5	0.00	0.10	0.20	0.30	0.41	0.51	0.61	0.71	0.81	0.91
26.5	28.0	30.1	31.7	33.8	35.8	37.9	40.4	0.00	0.12	0.24	0.35	0.47	0.59	0.71	0.83	0.95	1.06
32.9	34.9	37.5	39.4	42.0	44.6	47.1	50.3	0.00	0.15	0.30	0.46	0.61	0.76	0.91	1.07	1.22	1.37
37.6	39.9	42.8	45.1	48.0	51.0	53.9	57.5	0.00	0.18	0.36	0.53	0.71	0.89	1.07	1.24	1.42	1.60
42.2	44.7	48.1	50.6	53.9	57.2	60.5	64.6	0.00	0.20	0.41	0.61	0.81	1.02	1.22	1.42	1.62	1.83
51.2	54.3	58.4	61.4	65.4	69.4	73.4	78.3	0.00	0.25	0.51	0.76	1.02	1.27	1.52	1.78	2.03	2.28
57.8	61.3	65.9	69.3	73.9	78.4	82.8	88.4	0.00	0.29	0.58	0.88	1.17	1.46	1.75	2.04	2.33	2.63
60.0	63.6	68.4	71.9	76.6	81.3	86.0	91.7	0.00	0.30	0.61	0.91	1.22	1.52	1.83	2.13	2.44	2.74
67.7	71.8	77.2	81.2	86.5	91.8	97.0	103.5	0.00	0.35	0.70	1.05	1.40	1.75	2.10	2.45	2.80	3.15
68.6	72.7	78.2	82.2	87.6	92.9	98.2	104.8	0.00	0.36	0.71	1.07	1.42	1.78	2.13	2.49	2.84	3.20
77.0	81.6	87.7	92.3	98.3	104.3	110.2	117.5	0.00	0.41	0.81	1.22	1.62	2.03	2.44	2.84	3.25	3.65
82.8	87.7	94.3	99.2	105.7	112.1	118.4	126.3	0.00	0.44	0.88	1.32	1.77	2.21	2.65	3.09	3.53	3.97
85.2	90.3	97.1	102.1	108.8	115.4	121.9	130.0	0.00	0.46	0.91	1.37	1.83	2.28	2.74	3.20	3.65	4.11
93.3	98.9	106.3	111.8	119.1	126.3	133.4	142.2	0.00	0.51	1.01	1.52	2.03	2.54	3.04	3.55	4.06	4.57
106.0	112.3	120.7	126.9	135.1	143.2	151.3	161.2	0.00	0.59	1.18	1.77	2.35	2.94	3.53	4.12	4.71	5.30
150.0	158.9	170.5	179.1	190.3	201.4	212.3	225.7	0.00	0.89	1.78	2.66	3.55	4.44	5.33	6.22	7.10	7.99
167.5	177.3	190.1	199.5	211.9	224.0			0.00	1.02	2.03	3.04	4.06	5.08	6.09	7.10	8.12	9.13
								0.00	1.52	3.04	4.57	6.09	7.61	9.13	10.7	12.2	13.7
								0.00	1.75	3.50	5.25	7.00	8.75	10.5	12.3	14.0	15.8
								0.00	2.03	4.06	6.09	8.12	10.2	12.2	14.2	16.2	18.3

Poly Chain® GT® Carbon® Belt Length Correction Factor Table					
Pitch/Length Designation	Number of Teeth	Correction Factor	Pitch/Length Designation	Number of Teeth	Correction Factor
14MGT-1120	80	0.73	14MGT-2520	180	1.03
14MGT-1190	85	0.75	14MGT-2590	185	1.04
14MGT-1260	90	0.77	14MGT-2660	190	1.05
14MGT-1400	100	0.81	14MGT-2800	200	1.07
14MGT-1568	112	0.85	14MGT-3136	224	1.12
14MGT-1610	115	0.86	14MGT-3304	256	1.14
14MGT-1750	125	0.89	14MGT-3360	240	1.14
14MGT-1680	135	0.92	14MGT-3600	250	1.16
14MGT-1960	140	0.94	14MGT-3650	275	1.19
14MGT-2100	150	0.96	14MGT-3920	280	1.20
14MGT-2240	160	0.99	14MGT-4326	309	1.24
14MGT-2310	165	1.00	14MGT-4410	315	1.25
14MGT-2380	170	1.01			



# 14mm Pitch Poly Chain® GT® Carbon® Belts

## Horsepower Rating for 37mm Wide

RPM OF FASTER SHAFT	Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)																		
	28	29	30	31	32	33	34	35	36	37	38	39	40	43	45	48	50		
10	4,912	5,088	5,263	5,439	5,614	5,790	5,965	6,141	6,316	6,492	6,667	6,842	7,018	7,544	7,895	8,421	8,772		
10.6	11.0	11.5	11.9	12.4	12.8	13.2	13.7	14.1	14.6	15.0	15.4	15.9	17.2	18.0	19.3	20.2			
88	12.2	12.7	13.2	13.7	14.2	14.7	15.2	15.7	16.2	16.7	17.1	17.6	19.1	20.0	21.5	22.4			
100	13.9	14.5	15.1	15.6	16.2	16.8	17.3	17.9	18.4	19.0	19.5	20.1	21.8	22.9	24.5	25.6			
117	18.7	19.5	20.3	21.1	21.9	22.7	23.5	24.3	25.1	25.9	26.7	27.5	28.2	30.6	32.1	34.5			
175	21.0	21.9	22.8	23.7	24.6	25.5	26.3	27.2	28.1	29.0	29.9	30.8	31.7	34.3	36.0	40.3			
200	23.9	24.9	25.9	27.0	28.0	29.0	30.0	31.0	32.0	33.1	34.1	35.1	36.1	39.1	41.1	46.0			
233	30.9	32.2	33.5	34.7	36.0	37.3	38.5	39.8	41.1	42.3	43.6	44.8	48.6	51.0	54.7	57.2			
300	33.8	35.2	36.7	38.2	39.6	41.1	42.6	44.0	45.4	46.9	48.3	49.8	51.2	55.5	58.3	65.4			
350	37.8	39.5	41.2	42.8	44.5	46.1	47.7	49.4	51.0	52.6	54.2	55.8	57.5	62.3	65.5	73.4			
400	45.8	47.8	49.9	51.9	53.9	55.9	57.9	59.9	61.8	63.8	65.8	67.7	69.7	75.5	79.4	89.0			
500	51.6	53.9	56.2	58.5	60.8	63.0	65.3	67.5	69.8	72.0	74.2	76.4	78.7	85.3	89.6	100.5			
575	53.6	55.9	58.3	60.7	63.0	65.4	67.7	70.0	72.4	74.7	77.0	79.3	81.6	88.5	93.0	104.3			
600	60.4	63.1	65.8	68.4	71.1	73.7	76.4	79.0	81.6	84.3	86.9	89.5	92.1	105.0	112.6	117.7			
700	61.1	63.9	66.6	69.3	72.0	74.7	77.3	80.0	82.7	85.3	88.0	90.6	93.2	101.1	106.3	114.1			
800	68.5	71.6	74.7	77.7	80.7	83.8	86.8	89.8	92.8	95.8	98.7	101.7	104.7	113.5	119.3	128.0			
870	73.6	76.9	80.2	83.5	86.8	90.0	93.2	96.5	99.7	102.9	106.1	109.3	112.5	122.0	128.3	137.6			
900	75.8	79.2	82.6	86.0	89.3	92.7	96.0	99.4	102.7	106.0	109.3	112.6	115.8	125.6	132.1	141.7			
1000	82.9	86.7	90.4	94.1	97.8	101.5	105.1	108.8	112.4	116.0	119.7	123.2	126.8	137.6	144.7	155.2			
1160	94.1	98.4	102.6	106.8	111.0	115.2	119.4	123.5	127.7	131.8	135.9	140.0	144.1	156.3	164.3	176.3			
1750	133.4	139.4	145.5	151.5	157.5	163.5	169.4	175.3	181.2	187.0	192.9	198.7	204.5	221.7	233.0	249.9			
2000	149.2	156.0	162.7	169.5	176.2	182.9	189.5	196.1	202.7	209.2	215.7	222.2	228.7	247.9	260.5	279.2			
3000	208.3	217.9	227.3	236.7	246.0	255.3	264.4	273.6	282.6	291.6	300.5	309.4	318.2	344.2	361.2				
3450	233.0	243.7	254.2	264.6	275.0	285.3	295.4	305.5	315.5	325.5	335.3	345.0							
4000	261.7	273.5	285.2	296.9	308.3	319.8	331.0	342.2	353.2										

Drives in this area should be designed using Design Flex® Pro. Please consult [www.gates.com/drivedesign](http://www.gates.com/drivedesign) for details.

Poly Chain® GT® Carbon® Belt Length Correction Factor Table					
Pitch/Length Designation	Number of Teeth	Correction Factor	Pitch/Length Designation	Number of Teeth	Correction Factor
14MGT-994	71	0.68	14MGT-2450	175	1.02
14MGT-1120	80	0.73	14MGT-2520	180	1.03
14MGT-1190	85	0.75	14MGT-2590	185	1.04
14MGT-1260	90	0.77	14MGT-2660	190	1.05
14MGT-1400	100	0.81	14MGT-2800	200	1.07
14MGT-1568	112	0.85	14MGT-3136	224	1.12
14MGT-1610	115	0.86	14MGT-3304	236	1.14
14MGT-1750	125	0.89	14MGT-3360	240	1.14
14MGT-1890	135	0.92	14MGT-3500	250	1.16
14MGT-1960	140	0.94	14MGT-3850	275	1.19
14MGT-2100	150	0.96	14MGT-3920	280	1.20
14MGT-2240	160	0.99	14MGT-4326	309	1.24
14MGT-2310	165	1.00	14MGT-4410	315	1.25
14MGT-2380	170	1.01			





# Horsepower Rating for 37mm Wide 14mm Pitch Poly Chain® GT® Carbon® Belts

Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)										Additional Horsepower per belt for Speed Ratio of Speed-Down Drives						RPM OF FASTER SHAFT		
Pitch/Length Designation	56	60	63	67	71	75	80	1.00 to 1.03	1.04 to 1.10	1.11 to 1.19	1.20 to 1.30	1.31 to 1.45	1.46 to 1.67	1.68 to 2.02	2.03 to 2.69		2.70 to 4.64	4.65 to and Over
53 9.299	9.825	10.527	11.053	11.755	12.457	13.158	14.036											10
Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.																		
21.4	22.7	24.4	25.7	27.3	29.0	30.7	32.7	0.00	0.08	0.17	0.25	0.33	0.41	0.50	0.58	0.66	0.74	70
23.9	25.3	27.2	28.6	30.4	32.3	34.1	36.4	0.00	0.09	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.84	88
27.2	28.8	31.0	32.6	34.7	36.8	38.9	41.6	0.00	0.11	0.22	0.33	0.44	0.55	0.66	0.77	0.88	0.99	100
38.3	40.6	43.6	45.9	48.9	51.8	54.8	58.5	0.00	0.16	0.33	0.49	0.66	0.82	0.99	1.15	1.31	1.48	117
42.9	45.5	48.9	51.4	54.8	58.1	61.5	65.6	0.00	0.19	0.38	0.56	0.75	0.94	1.13	1.31	1.50	1.69	175
48.9	51.9	55.7	58.6	62.5	66.3	70.1	74.8	0.00	0.22	0.44	0.66	0.88	1.09	1.31	1.53	1.75	1.97	200
60.9	64.5	69.3	72.9	77.7	82.5	87.2	93.1	0.00	0.28	0.56	0.84	1.13	1.41	1.69	1.97	2.25	2.53	233
69.6	73.7	79.2	83.4	88.8	94.3	99.7	106.4	0.00	0.33	0.66	0.99	1.31	1.64	1.97	2.30	2.63	2.96	300
78.1	82.8	89.0	93.6	99.7	105.8	111.9	119.4	0.00	0.38	0.75	1.13	1.50	1.88	2.25	2.63	3.00	3.38	350
94.8	100.5	108.0	113.6	121.0	128.4	135.8	144.9	0.00	0.47	0.94	1.41	1.88	2.35	2.82	3.29	3.75	4.22	400
107.0	113.4	121.9	128.3	136.7	145.0	153.3	163.6	0.00	0.54	1.08	1.62	2.16	2.70	3.24	3.78	4.32	4.86	500
111.0	117.7	126.5	133.1	141.8	150.4	159.0	169.7	0.00	0.56	1.13	1.69	2.25	2.82	3.38	3.94	4.51	5.07	575
125.3	132.8	142.8	150.2	160.0	169.8	179.4	191.5	0.00	0.65	1.30	1.94	2.59	3.24	3.89	4.53	5.18	5.83	600
126.9	134.5	144.6	152.1	162.0	171.9	181.7	193.8	0.00	0.66	1.31	1.97	2.63	3.29	3.94	4.60	5.26	5.91	690
142.4	151.0	162.3	170.7	181.8	192.9	203.8	217.5	0.00	0.75	1.50	2.25	3.00	3.76	4.51	5.26	6.01	6.76	700
153.1	162.3	174.5	183.5	195.5	207.3	219.1	233.6	0.00	0.82	1.63	2.45	3.27	4.08	4.90	5.72	6.53	7.35	800
157.7	167.1	179.6	188.9	201.2	213.4	225.5	240.5	0.00	0.85	1.69	2.53	3.38	4.23	5.07	5.91	6.76	7.60	900
172.6	183.0	196.7	206.8	220.3	233.6	246.8	263.1	0.00	0.94	1.88	2.82	3.76	4.69	5.63	6.57	7.51	8.45	1000
196.1	207.8	223.3	234.8	250.0	265.0	279.8	298.2	0.00	1.09	2.18	3.27	4.36	5.45	6.53	7.62	8.71	9.80	1160
277.6	293.9	315.4	331.3	352.1	372.6	392.8	417.5	0.00	1.64	3.29	4.93	6.57	8.22	9.85	11.5	13.1	14.8	1750
309.9	328.0	351.7	369.1	392.0	414.4			0.00	1.88	3.76	5.63	7.51	9.39	11.3	13.1	15.0	16.9	2000
								0.00	2.82	5.63	8.45	11.3	14.1	16.9	19.7	22.5	25.3	3000
								0.00	3.24	6.48	9.71	13.0	16.2	19.4	22.7	25.9	29.1	3450
								0.00	3.76	7.51	11.3	15.0	18.8	22.5	26.3	30.0	33.8	4000

Poly Chain® GT® Carbon® Belt Length Correction Factor Table					
Pitch/Length Designation	Number of Teeth	Correction Factor	Pitch/Length Designation	Number of Teeth	Correction Factor
14MGT-1120	80	0.73	14MGT-2520	180	1.03
14MGT-1190	85	0.75	14MGT-2590	185	1.04
14MGT-1260	90	0.77	14MGT-2660	190	1.05
14MGT-1400	100	0.81	14MGT-2800	200	1.07
14MGT-1568	112	0.85	14MGT-3136	224	1.12
14MGT-1610	115	0.86	14MGT-3304	256	1.14
14MGT-1750	125	0.89	14MGT-3360	240	1.14
14MGT-1680	135	0.92	14MGT-3600	250	1.16
14MGT-1960	140	0.94	14MGT-3650	275	1.19
14MGT-2100	150	0.96	14MGT-3920	280	1.20
14MGT-2240	160	0.99	14MGT-4326	309	1.24
14MGT-2310	165	1.00	14MGT-4410	315	1.25
14MGT-2380	170	1.01			

# Horsepower Rating for 68mm Wide 14mm Pitch Poly Chain® GT® Carbon® Belts

RPM OF FASTER SHAFT	Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)																		
	28	29	30	31	32	33	34	35	36	37	38	39	40	43	45	48	50		
10	4.912	5.088	5.263	5.439	5.614	5.790	5.965	6.141	6.316	6.492	6.667	6.842	7.018	7.544	7.895	8.421	8.772		
20																			
30																			
35																			
44																			
58																			
70																			
88	19.4	20.3	21.1	21.9	22.7	23.5	24.3	25.1	25.9	26.7	27.5	28.3	29.1	31.5	33.1	35.5	37.1		
100	21.6	22.5	23.4	24.3	25.2	26.1	27.0	27.9	28.8	29.7	30.6	31.5	32.4	35.1	36.8	39.5	41.2		
117	24.6	25.6	26.7	27.7	28.7	29.8	30.8	31.8	32.9	33.9	34.9	35.9	36.9	40.0	42.0	45.0	47.0		
175	34.4	35.9	37.4	38.8	40.3	41.8	43.2	44.7	46.1	47.6	49.0	50.5	51.9	56.2	59.1	63.3	66.1		
200	38.5	40.2	41.8	43.5	45.1	46.8	48.4	50.1	51.7	53.3	54.9	56.6	58.2	63.0	66.2	71.0	74.1		
233	43.9	45.8	47.6	49.5	51.4	53.3	55.2	57.0	58.9	60.8	62.6	64.4	66.3	71.8	75.5	80.9	84.5		
300	54.4	56.8	59.1	61.5	63.8	66.2	68.5	70.8	73.2	75.5	77.8	80.1	82.4	89.3	93.8	100.6	105.1		
350	62.0	64.8	67.5	70.2	72.8	75.5	78.2	80.9	83.5	86.2	88.8	91.5	94.1	102.0	107.2	115.0	120.1		
400	69.5	72.6	75.6	78.7	81.7	84.7	87.7	90.7	93.7	96.7	99.7	102.6	105.6	114.4	120.3	129.0	134.8		
500	84.2	87.9	91.6	95.3	99.0	102.7	106.3	110.0	113.6	117.3	120.9	124.5	128.1	138.8	146.0	156.6	163.6		
575	94.9	99.1	103.3	107.5	111.7	115.8	120.0	124.1	128.2	132.3	136.4	140.5	144.6	156.7	164.8	176.8	184.7		
600	98.4	102.8	107.2	111.5	115.8	120.2	124.4	128.7	133.0	137.3	141.5	145.7	150.0	162.6	171.0	183.4	191.7		
690	111.0	115.9	120.8	125.8	130.6	135.5	140.4	145.2	150.1	154.9	159.7	164.5	169.3	183.5	192.9	207.0	216.4		
700	112.4	117.4	122.3	127.3	132.3	137.2	142.1	147.1	151.9	156.8	161.7	166.5	171.4	185.8	195.4	209.6	219.1		
800	126.0	131.6	137.2	142.8	148.4	153.9	159.5	165.0	170.5	176.0	181.4	186.9	192.3	208.5	219.3	235.3	245.9		
870	135.3	141.4	147.4	153.5	159.5	165.5	171.4	177.4	183.3	189.2	195.1	200.9	206.8	224.2	235.8	253.0	264.4		
900	139.3	145.6	151.8	158.0	164.2	170.3	176.5	182.6	188.7	194.8	200.8	206.9	212.9	230.9	242.8	260.5	272.2		
1000	152.4	159.3	166.1	172.9	179.7	186.5	193.2	199.9	206.6	213.3	219.9	226.5	233.1	252.8	265.8	285.2	298.1		
1160	173.0	180.8	188.6	196.4	204.1	211.8	219.4	227.1	234.7	242.3	249.8	257.3	264.8	287.2	302.0	324.0	338.6		
1750	245.1	256.3	267.4	278.4	289.4	300.4	311.3	322.2	333.0	343.8	354.5	365.1	375.8	407.4	428.3	459.3	479.7		
2000	274.1	286.7	299.1	311.5	323.8	336.1	348.2	360.4	372.5	384.5	396.5	408.4	420.3	455.5	478.8	513.2	535.9		
3000	382.9	400.4	417.7	435.0	452.1	469.2	486.0	502.8	519.4	536.0	552.4	568.6	584.8	632.6	663.9				
3450	428.3	447.8	467.1	486.4	505.3	524.3	542.9	561.6	579.9	598.2	616.2	634.1	651.9						
4000	480.9	502.7	524.2	545.6	566.7	587.7	608.3	628.9	649.1										

Drives in this area should be designed using Design Flex® Pro.  
Please consult [www.gates.com/drivedesign](http://www.gates.com/drivedesign) for details.

Poly Chain® GT® Carbon® Belt Length Correction Factor Table					
Pitch/Length Designation	Number of Teeth	Correction Factor	Pitch/Length Designation	Number of Teeth	Correction Factor
14MGT-994	71	0.68	14MGT-2450	175	1.02
14MGT-1120	80	0.73	14MGT-2520	180	1.03
14MGT-1190	85	0.75	14MGT-2590	185	1.04
14MGT-1260	90	0.77	14MGT-2660	190	1.05
14MGT-1400	100	0.81	14MGT-2800	200	1.07
14MGT-1568	112	0.85	14MGT-3136	224	1.12
14MGT-1610	115	0.86	14MGT-3304	236	1.14
14MGT-1750	125	0.89	14MGT-3360	240	1.14
14MGT-1890	135	0.92	14MGT-3500	250	1.16
14MGT-1960	140	0.94	14MGT-3850	275	1.19
14MGT-2100	150	0.96	14MGT-3920	280	1.20
14MGT-2240	160	0.99	14MGT-4326	309	1.24
14MGT-2310	165	1.00	14MGT-4410	315	1.25
14MGT-2380	170	1.01			





# Horsepower Rating for 68mm Wide 14mm Pitch Poly Chain® GT® Carbon® Belts

Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)						Additional Horsepower per belt for Speed Ratio of Speed-Down Drives								RPM OF FASTER SHAFT				
53 9.299	56 9.825	60 10.527	63 11.053	67 11.755	71 12.457	75 13.158	80 14.036	1.00 to 1.03	1.04 to 1.10	1.11 to 1.19	1.20 to 1.30	1.31 to 1.45	1.46 to 1.67		1.68 to 2.02	2.03 to 2.69	2.70 to 4.64	4.65 to Over
Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.						Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.												10
39.4	41.8	44.9	47.2	50.3	53.3	56.4	60.2	0.00	0.15	0.30	0.46	0.61	0.76	0.91	1.06	1.21	1.37	88
43.8	46.4	49.9	52.5	55.9	59.3	62.7	66.9	0.00	0.17	0.35	0.52	0.69	0.86	1.03	1.21	1.38	1.55	100
50.0	53.0	56.9	59.9	63.8	67.7	71.5	76.4	0.00	0.20	0.40	0.61	0.81	1.01	1.21	1.41	1.61	1.82	117
70.4	74.6	80.1	84.3	89.8	95.3	100.7	107.5	0.00	0.30	0.60	0.91	1.21	1.51	1.81	2.11	2.42	2.72	175
78.9	83.6	89.8	94.5	100.7	106.8	113.0	120.6	0.00	0.35	0.69	1.03	1.38	1.73	2.07	2.42	2.76	3.11	200
90.0	95.3	102.5	107.8	114.8	121.9	128.8	137.5	0.00	0.40	0.80	1.21	1.61	2.01	2.41	2.81	3.22	3.62	233
111.9	118.6	127.4	134.1	142.9	151.6	160.3	171.1	0.00	0.52	1.04	1.55	2.07	2.59	3.10	3.62	4.14	4.66	300
127.8	135.5	145.6	153.2	163.3	173.2	183.2	195.5	0.00	0.60	1.21	1.81	2.42	3.02	3.62	4.23	4.83	5.43	350
143.5	152.1	163.5	172.0	183.3	194.5	205.6	219.5	0.00	0.69	1.38	2.07	2.76	3.45	4.14	4.83	5.52	6.21	400
174.2	184.6	198.5	208.8	222.5	236.1	249.5	266.3	0.00	0.86	1.73	2.59	3.45	4.31	5.17	6.04	6.90	7.76	500
196.6	208.4	224.1	235.7	251.1	266.5	281.7	300.6	0.00	0.99	1.98	2.98	3.97	4.96	5.95	6.94	7.94	8.93	575
204.0	216.3	232.5	244.6	260.6	276.5	292.3	311.9	0.00	1.04	2.07	3.10	4.14	5.18	6.21	7.25	8.28	9.32	600
230.3	244.1	262.4	276.0	294.1	312.0	329.8	351.9	0.00	1.19	2.38	3.57	4.76	5.95	7.14	8.33	9.52	10.7	690
233.2	247.2	265.7	279.5	297.8	315.9	333.9	356.3	0.00	1.21	2.42	3.62	4.83	6.04	7.24	8.45	9.66	10.9	700
261.7	277.4	298.2	313.7	334.2	354.5	374.6	399.6	0.00	1.38	2.76	4.14	5.52	6.90	8.28	9.66	11.0	12.4	800
281.4	298.3	320.6	337.2	359.2	381.0	402.6	429.4	0.00	1.50	3.00	4.50	6.00	7.51	9.00	10.5	12.0	13.5	870
289.8	307.1	330.1	347.2	369.8	392.3	414.5	442.0	0.00	1.55	3.11	4.66	6.21	7.76	9.31	10.9	12.4	14.0	900
317.3	336.3	360.1	380.1	404.8	429.3	453.5	483.5	0.00	1.73	3.45	5.17	6.90	8.63	10.3	12.1	13.8	15.5	1000
360.4	381.9	410.4	431.5	459.4	487.0	514.3	548.1	0.00	2.00	4.00	6.00	8.01	10.0	12.0	14.0	16.0	18.0	1160
510.2	540.2	579.6	608.8	647.2	684.9	721.8	767.3	0.00	3.02	6.04	9.05	12.1	15.1	18.1	21.1	24.2	27.2	1750
569.6	602.8	646.3	678.4	720.4	761.6			0.00	3.45	6.90	10.3	13.8	17.3	20.7	24.2	27.6	31.1	2000
								0.00	5.18	10.4	15.5	20.7	25.9	31.0	36.2	41.4	46.6	3000
								0.00	5.96	11.9	17.9	23.8	29.8	35.7	41.7	47.6	53.6	3450
								0.00	6.91	13.8	20.7	27.6	34.5	41.4	48.3	55.2	62.1	4000

Poly Chain® GT® Carbon® Belt Length Correction Factor Table						
Pitch/Length Designation	Number of Teeth	Correction Factor		Pitch/Length Designation	Number of Teeth	Correction Factor
14MGT-994	71		0.68	14MGT-2450	175	1.02
14MGT-1120	80	0.73		14MGT-2520	180	1.03
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14MGT-1260	90	0.77		14MGT-2660	190	1.05
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14MGT-1610	115	0.86		14MGT-3304	256	1.14
14MGT-1750	125	0.89		14MGT-3360	240	1.14
14MGT-1680	135	0.92		14MGT-3600	250	1.16
14MGT-1960	140	0.94		14MGT-3650	275	1.19
14MGT-2100	150	0.96		14MGT-3920	280	1.20
14MGT-2240	160	0.99		14MGT-4326	309	1.24
14MGT-2310	165	1.00		14MGT-4410	315	1.25
14MGT-2380	170	1.01				

# 14mm Pitch Poly Chain® GT® Carbon® Belts

## Horsepower Rating for 90mm Wide

RPM OF FASTER SHAFT	Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)																
	28	29	30	31	32	33	34	35	36	37	38	39	40	43	45	48	50
10	4.912	5.088	5.263	5.439	5.614	5.790	5.965	6.141	6.316	6.492	6.667	6.842	7.018	7.544	7.895	8.421	8.772
20																	
30																	
35																	
44																	
58																	
70																	
88	25.7	26.8	27.9	29.0	30.0	31.1	32.2	33.3	34.3	35.4	36.5	37.5	38.6	41.7	43.8	47.0	49.0
100	28.6	29.8	31.0	32.2	33.4	34.6	35.8	37.0	38.2	39.3	40.5	41.7	42.9	46.4	48.7	52.2	54.6
117	32.5	33.9	35.3	36.7	38.0	39.4	40.8	42.1	43.5	44.8	46.2	47.5	48.9	52.9	55.6	59.6	62.2
175	45.6	47.5	49.5	51.4	53.3	55.3	57.2	59.1	61.1	63.0	64.9	66.8	68.7	74.4	78.2	83.8	87.5
200	51.0	53.2	55.4	57.6	59.7	61.9	64.1	66.3	68.4	70.6	72.7	74.9	77.0	83.4	87.6	93.9	98.1
233	58.0	60.6	63.1	65.6	68.0	70.5	73.0	75.5	77.9	80.4	82.9	85.3	87.8	95.0	99.9	107.1	111.9
300	72.0	75.1	78.2	81.4	84.5	87.6	90.7	93.8	96.8	99.9	102.9	106.0	109.0	118.1	124.2	133.2	139.1
350	82.1	85.7	89.3	92.9	96.4	100.0	103.5	107.0	110.6	114.1	117.6	121.1	124.6	135.0	141.9	152.1	159.0
400	92.0	96.1	100.1	104.1	108.1	112.1	116.1	120.1	124.0	128.0	131.9	135.8	139.8	151.5	159.2	170.8	178.5
500	111.4	116.4	121.3	126.2	131.0	135.9	140.7	145.6	150.4	155.2	160.0	164.8	169.5	183.8	193.2	207.3	216.6
575	125.6	131.2	136.7	142.3	147.8	153.3	158.8	164.2	169.7	175.1	180.5	185.9	191.3	207.4	218.1	234.0	244.5
600	130.3	136.1	141.8	147.6	153.3	159.0	164.7	170.4	176.0	181.7	187.3	192.9	198.5	215.2	226.3	242.7	253.7
690	146.9	153.4	159.9	166.5	172.9	179.4	185.8	192.2	198.6	205.0	211.3	217.7	224.0	242.9	255.4	274.0	286.4
700	148.7	155.3	161.9	168.5	175.1	181.6	188.1	194.6	201.1	207.6	214.0	220.4	226.8	245.9	258.6	277.4	289.9
800	166.7	174.2	181.6	189.0	196.4	203.7	211.1	218.4	225.6	232.9	240.1	247.3	254.6	276.0	290.2	311.4	325.5
870	179.1	187.2	195.1	203.1	211.1	219.0	226.9	234.7	242.6	250.4	258.2	265.9	273.7	296.8	312.1	334.8	349.9
900	184.4	192.7	200.9	209.1	217.3	225.5	233.6	241.7	249.7	257.8	265.8	273.8	281.8	305.6	321.3	344.8	360.3
1000	201.8	210.9	219.9	228.9	237.8	246.8	255.7	264.6	273.4	282.3	291.1	299.8	308.6	334.6	351.9	377.5	394.6
1160	229.0	239.4	249.6	259.9	270.1	280.3	290.4	300.5	310.6	320.6	330.6	340.6	350.5	380.1	399.7	428.9	448.2
1750	324.4	339.2	353.9	368.5	383.1	397.6	412.0	426.4	440.7	455.0	469.1	483.2	497.3	539.2	566.8	607.9	634.9
2000	362.8	379.4	395.8	412.3	428.5	444.8	460.9	477.0	493.0	509.0	524.8	540.5	556.3	602.9	633.7	679.2	709.3
3000	506.8	530.0	552.9	575.8	598.4	620.9	643.2	665.5	687.5	709.4	731.1	752.6	774.0	837.3	878.6		
3450	566.8	592.7	618.3	643.7	668.9	693.9	718.6	743.2	767.5	791.8	815.6	839.3	862.9				
4000	636.5	665.4	693.8	722.2	750.1	777.8	805.1	832.3	859.1								

Drives in this area should be designed using Design Flex® Pro.  
Please consult [www.gates.com/drivedesign](http://www.gates.com/drivedesign) for details.

Poly Chain® GT® Carbon® Belt Length Correction Factor Table					
Pitch/Length Designation	Number of Teeth	Correction Factor	Pitch/Length Designation	Number of Teeth	Correction Factor
14MGT-994	71	0.68	14MGT-2450	175	1.02
14MGT-1120	80	0.73	14MGT-2520	180	1.03
14MGT-1190	85	0.75	14MGT-2590	185	1.04
14MGT-1260	90	0.77	14MGT-2660	190	1.05
14MGT-1400	100	0.81	14MGT-2800	200	1.07
14MGT-1568	112	0.85	14MGT-3136	224	1.12
14MGT-1610	115	0.86	14MGT-3304	236	1.14
14MGT-1750	125	0.89	14MGT-3360	240	1.14
14MGT-1890	135	0.92	14MGT-3500	250	1.16
14MGT-1960	140	0.94	14MGT-3850	275	1.19
14MGT-2100	150	0.96	14MGT-3920	280	1.20
14MGT-2240	160	0.99	14MGT-4326	309	1.24
14MGT-2310	165	1.00	14MGT-4410	315	1.25
14MGT-2380	170	1.01			





## Horsepower Rating for 90mm Wide 14mm Pitch Poly Chain® GT® Carbon® Belts

Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)										Additional Horsepower per belt for Speed Ratio of Speed-Down Drives										RPM OF FASTER SHAFT
Pitch/Length Designation	56	60	63	67	71	75	80	1.00 to 1.03	1.04 to 1.10	1.11 to 1.19	1.20 to 1.30	1.46 to 1.67	1.68 to 2.02	2.03 to 2.69	2.70 to 4.64	4.65 to Over				
53 9.299	56 9.825	60 10.527	63 11.053	67 11.755	71 12.457	75 13.158	80 14.036	0.00 1.00	0.20 1.03	0.40 1.10	0.60 1.30	1.00 1.67	1.21 2.02	1.41 2.69	1.61 4.64	1.81 Over	10			
Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.																				
52.2	55.3	59.4	62.4	66.5	70.6	74.6	79.6	0.00	0.20	0.40	0.60	1.00	1.21	1.41	1.61	1.81	70			
58.0	61.5	66.0	69.5	74.0	78.5	83.0	88.6	0.00	0.23	0.46	0.68	1.14	1.37	1.60	1.83	2.05	88			
66.2	70.1	75.3	79.2	84.4	89.6	94.7	101.1	0.00	0.27	0.53	0.80	1.34	1.60	1.87	2.14	2.40	100			
93.1	98.7	106.1	111.6	118.9	126.1	133.3	142.3	0.00	0.40	0.80	1.20	2.00	2.40	2.80	3.20	3.60	175			
104.4	110.6	118.9	125.1	133.3	141.4	149.5	159.6	0.00	0.46	0.91	1.37	2.28	2.74	3.20	3.65	4.11	200			
119.1	126.2	135.6	142.6	152.0	161.3	170.5	182.0	0.00	0.53	1.06	1.60	2.66	3.19	3.72	4.26	4.79	233			
148.1	156.9	168.7	177.4	189.1	200.6	212.1	226.4	0.00	0.69	1.37	2.05	3.43	4.11	4.79	5.48	6.16	300			
169.2	179.3	192.8	202.8	216.1	229.3	242.4	258.7	0.00	0.80	1.60	2.40	4.00	4.79	5.59	6.39	7.19	350			
190.0	201.3	216.4	227.7	242.6	257.4	272.2	290.5	0.00	0.91	1.83	2.74	4.57	5.48	6.39	7.31	8.22	400			
230.5	244.4	262.7	276.3	294.4	312.4	330.3	352.5	0.00	1.14	2.28	3.42	5.71	6.85	7.99	9.13	10.3	500			
260.2	275.9	296.6	312.0	332.4	352.7	372.8	397.8	0.00	1.31	2.63	3.94	5.25	6.57	7.88	9.19	10.5	575			
270.0	286.2	307.7	323.7	344.9	365.9	386.8	412.8	0.00	1.37	2.74	4.11	5.48	6.85	8.22	9.59	11.0	600			
304.8	323.1	347.3	365.4	389.3	413.0	436.5	465.7	0.00	1.58	3.15	4.73	6.30	7.88	9.45	11.0	12.6	690			
308.6	327.1	351.7	369.9	394.1	418.2	442.0	471.5	0.00	1.60	3.20	4.79	6.39	7.99	9.59	11.2	12.8	700			
346.4	367.2	394.7	415.2	442.3	469.2	495.8	528.9	0.00	1.83	3.65	5.48	7.31	9.14	11.0	12.8	14.6	800			
372.5	394.8	424.4	446.3	475.4	504.3	532.9	568.3	0.00	1.99	3.97	5.96	7.95	9.93	11.9	13.9	15.9	870			
383.5	406.5	436.9	459.6	489.5	519.2	548.6	585.1	0.00	2.06	4.11	6.16	8.22	10.3	12.3	14.4	16.4	900			
419.9	445.1	478.4	503.1	535.8	568.2	600.2	640.0	0.00	2.29	4.57	6.85	9.13	11.4	13.7	16.0	18.3	1000			
477.0	505.5	543.1	571.1	608.0	644.6	680.7	725.4	0.00	2.65	5.30	7.94	10.6	13.2	15.9	18.5	21.2	1160			
675.2	714.9	767.2	805.8	856.5	906.4	955.4	1016	0.00	4.00	7.99	12.0	16.0	20.0	24.0	28.0	32.0	1750			
753.9	797.8	855.4	897.9	953.5	1008			0.00	4.57	9.13	13.7	18.3	22.8	27.4	32.0	36.5	2000			
								0.00	6.86	13.7	20.5	27.4	34.3	41.1	47.9	54.8	3000			
								0.00	7.88	15.8	23.6	31.5	39.4	47.3	55.1	63.0	3450			
								0.00	9.14	18.3	27.4	36.5	45.7	54.8	63.9	73.1	4000			

### Poly Chain® GT® Carbon® Belt Length Correction Factor Table

Pitch/Length Designation	Number of Teeth	Correction Factor		Pitch/Length Designation	Number of Teeth	Correction Factor
		Number of Teeth	Correction Factor			
14MGT-994	71	0.68		14MGT-2450	175	1.02
14MGT-1120	80	0.73		14MGT-2520	180	1.03
14MGT-1190	85	0.75		14MGT-2590	185	1.04
14MGT-1260	90	0.77		14MGT-2660	190	1.05
14MGT-1400	100	0.81		14MGT-2800	200	1.07
14MGT-1568	112	0.85		14MGT-3136	224	1.12
14MGT-1610	115	0.86		14MGT-3304	256	1.14
14MGT-1750	125	0.89		14MGT-3360	240	1.14
14MGT-1680	135	0.92		14MGT-3600	250	1.16
14MGT-1960	140	0.94		14MGT-3650	275	1.19
14MGT-2100	150	0.96		14MGT-3920	280	1.20
14MGT-2240	160	0.99		14MGT-4326	309	1.24
14MGT-2310	165	1.00		14MGT-4410	315	1.25
14MGT-2380	170	1.01				

# Horsepower Rating for 125mm Wide 14mm Pitch Poly Chain® GT® Carbon® Belts

RPM OF FASTER SHAFT	Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)																			
	28	29	30	31	32	33	34	35	36	37	38	39	40	43	45	48	50			
10	4.912	5.088	5.263	5.439	5.614	5.790	5.965	6.141	6.316	6.492	6.667	6.842	7.018	7.544	7.895	8.421	8.772			
20																				
35																				
44																				
58																				
70																				
88	35.7	37.2	38.7	40.2	41.7	43.2	44.7	46.2	47.7	49.2	50.6	52.1	53.6	58.0	60.9	65.2	68.1			
100	39.7	41.4	43.0	44.7	46.4	48.0	49.7	51.3	53.0	54.6	56.3	57.9	59.6	64.5	67.7	72.5	75.8			
117	45.2	47.1	49.0	50.9	52.8	54.7	56.6	58.5	60.4	62.3	64.2	66.0	67.9	73.5	77.2	82.7	86.4			
175	63.3	66.0	68.7	71.4	74.1	76.8	79.5	82.1	84.8	87.5	90.1	92.8	95.4	103.3	108.6	116.4	121.6			
200	70.8	73.9	76.9	80.0	83.0	86.0	89.0	92.0	95.0	98.0	101.0	104.0	106.9	115.8	121.7	130.5	136.3			
233	80.6	84.1	87.6	91.1	94.5	98.0	101.4	104.8	108.3	111.7	115.1	118.5	121.9	132.0	138.7	148.7	155.4			
300	100.0	104.3	108.7	113.0	117.3	121.6	125.9	130.2	134.5	138.7	143.0	147.2	151.5	164.1	172.5	184.9	193.2			
350	114.0	119.0	124.0	129.0	133.9	138.9	143.8	148.7	153.5	158.4	163.3	168.1	173.0	187.4	197.0	211.3	220.8			
400	127.8	133.5	139.1	144.6	150.2	155.8	161.3	166.8	172.3	177.8	183.2	188.7	194.1	210.4	221.2	237.2	247.9			
500	154.8	161.6	168.4	175.2	182.0	188.8	195.5	202.2	208.9	215.6	222.2	228.8	235.5	255.2	268.3	287.8	300.8			
575	174.5	182.2	189.9	197.6	205.3	212.9	220.5	228.1	235.7	243.2	250.7	258.2	265.7	288.1	302.9	324.9	339.6			
600	181.0	189.0	197.0	205.0	212.9	220.9	228.8	236.7	244.5	252.3	260.1	267.9	275.7	298.9	314.2	337.1	352.3			
690	204.0	213.1	222.1	231.2	240.2	249.1	258.1	267.0	275.8	284.7	293.5	302.3	311.1	337.3	354.7	380.6	397.7			
700	206.5	215.8	224.9	234.1	243.1	252.2	261.3	270.3	279.3	288.3	297.2	306.1	315.0	341.5	359.1	385.3	402.7			
800	231.6	241.9	252.2	262.5	272.7	283.0	293.1	303.3	313.4	323.5	333.5	343.5	353.6	383.4	403.1	432.5	452.0			
870	248.8	260.0	271.0	282.1	293.1	304.2	315.1	326.0	336.9	347.8	358.6	369.3	380.1	412.2	433.4	465.0	486.0			
900	256.1	267.6	279.0	290.5	301.8	313.1	324.4	335.7	346.9	358.1	369.2	380.3	391.4	424.4	446.3	478.8	500.4			
1000	280.2	292.9	305.4	317.9	330.3	342.8	355.1	367.5	379.8	392.1	404.2	416.4	428.6	464.7	488.7	524.4	548.0			
1160	318.0	332.4	346.7	361.0	375.1	389.3	403.3	417.4	431.3	445.3	459.2	473.0	486.8	527.9	555.2	595.6	622.5			
1750	450.5	471.1	491.5	511.8	532.0	552.2	572.2	592.2	612.1	631.9	651.6	671.1	690.6	748.9	787.3	844.2	881.9			
2000	503.9	527.0	549.8	572.6	595.2	617.8	640.2	662.5	684.7	706.9	728.8	750.7	772.6	837.3	880.1	943.4	985.1			
3000	703.8	736.1	767.9	799.7	831.1	862.4	893.4	924.3	954.8	985.3	1015	1045	1075	1163	1220					
3450	787.3	823.2	858.7	894.1	928.9	963.7	998.1	1032	1066	1100	1133	1166	1198							
4000	884.0	924.1	963.7	1003	1042	1080	1118	1156	1193											

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14MGT-1260	90	0.77	14MGT-2660	190	1.05
14MGT-1400	100	0.81	14MGT-2800	200	1.07
14MGT-1568	112	0.85	14MGT-3136	224	1.12
14MGT-1610	115	0.86	14MGT-3304	236	1.14
14MGT-1750	125	0.89	14MGT-3360	240	1.14
14MGT-1890	135	0.92	14MGT-3500	250	1.16
14MGT-1960	140	0.94	14MGT-3850	275	1.19
14MGT-2100	150	0.96	14MGT-3920	280	1.20
14MGT-2240	160	0.99	14MGT-4326	309	1.24
14MGT-2310	165	1.00	14MGT-4410	315	1.25
14MGT-2380	170	1.01			





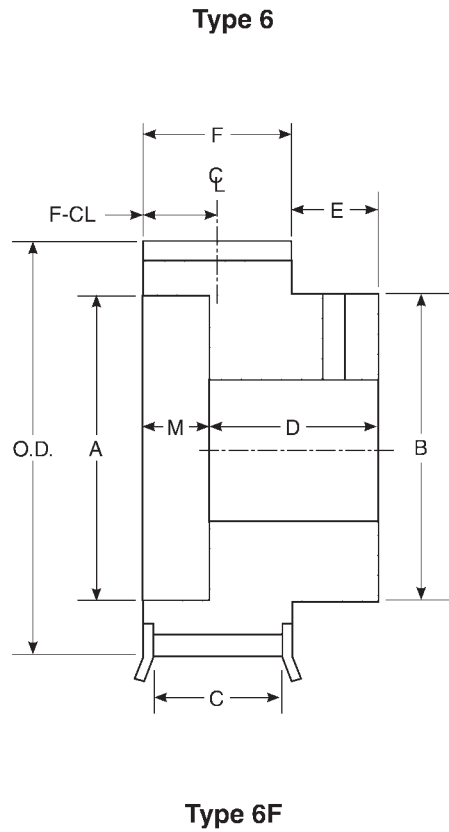
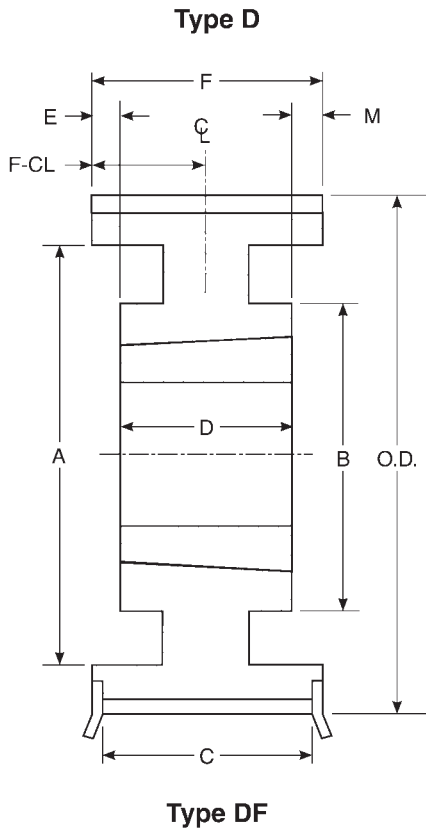
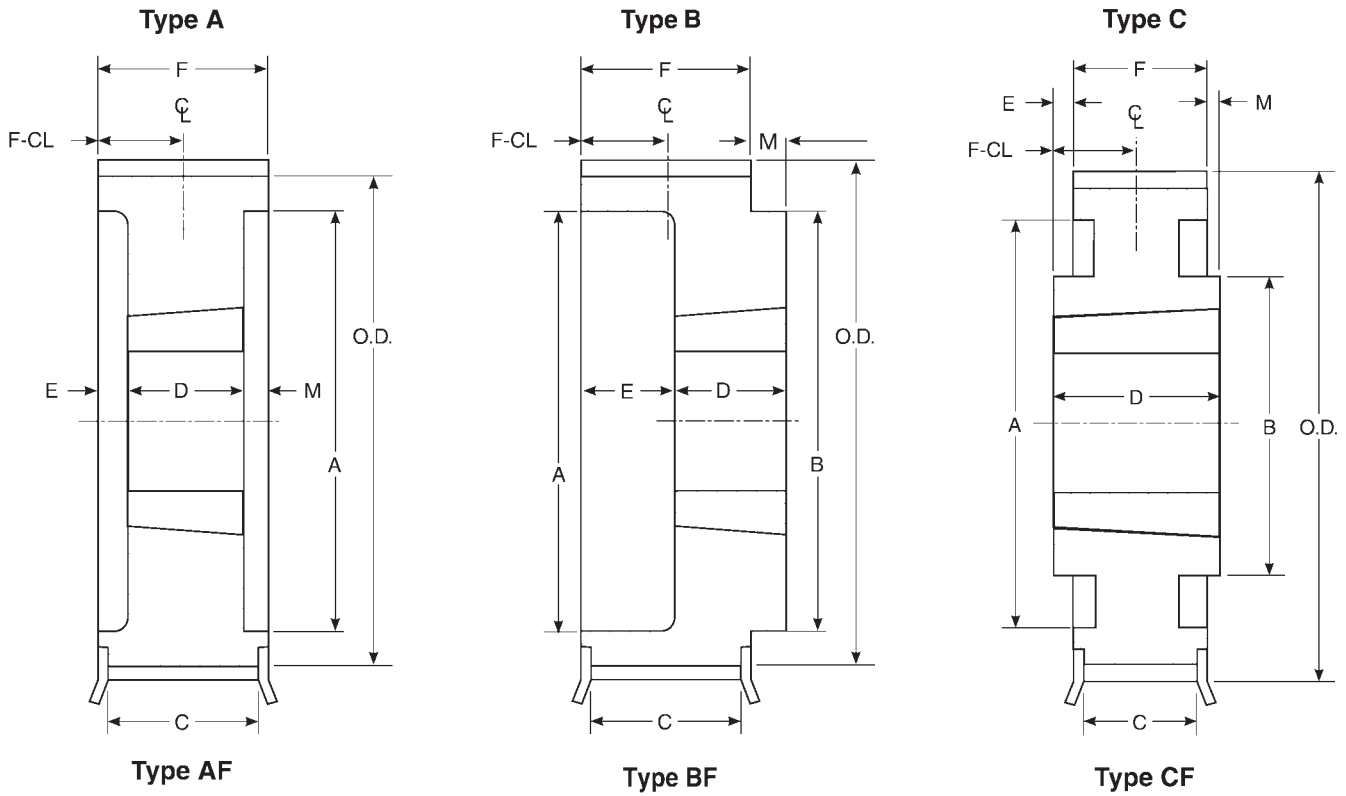


# Horsepower Rating for 125mm Wide 14mm Pitch Poly Chain® GT® Carbon® Belts

Rated Horsepower for Small Sprocket (Number of Grooves and Pitch Diameter, Inches)										Additional Horsepower per belt for Speed Ratio of Speed-Down Drives							RPM OF FASTER SHAFT	
53 9.299	56 9.825	60 10.527	63 11.053	67 11.755	71 12.457	75 13.158	80 14.036	1.00 to 1.03	1.04 to 1.10	1.11 to 1.19	1.20 to 1.30	1.31 to 1.45	1.46 to 1.67	1.68 to 2.02	2.03 to 2.69	2.70 to 4.64		4.65 to Over
Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.									Drives in this area should be designed using Design Flex® Pro. Please consult www.gates.com/drivedesign for details.									10
72.4	76.7	82.5	86.7	92.4	98.0	103.6	110.6	0.00	0.28	0.56	0.84	1.12	1.40	1.67	1.95	2.23	2.51	70
80.6	85.4	91.7	96.5	102.8	109.0	115.3	123.0	0.00	0.32	0.63	0.95	1.27	1.59	1.90	2.22	2.54	2.85	88
91.9	97.4	104.6	110.1	117.2	124.4	131.5	140.4	0.00	0.37	0.74	1.11	1.48	1.86	2.23	2.60	2.97	3.34	100
129.4	137.1	147.3	154.9	165.1	175.2	185.2	197.7	0.00	0.56	1.11	1.66	2.22	2.78	3.33	3.88	4.44	4.99	117
145.0	153.7	165.2	173.7	185.1	196.4	207.6	221.6	0.00	0.63	1.27	1.90	2.54	3.17	3.81	4.44	5.07	5.71	175
165.4	175.2	188.3	198.1	211.1	224.0	236.8	252.8	0.00	0.74	1.48	2.22	2.96	3.70	4.43	5.17	5.91	6.65	200
205.6	217.9	234.3	246.4	262.6	278.7	294.6	314.4	0.00	0.95	1.90	2.85	3.81	4.76	5.71	6.66	7.61	8.56	233
235.0	249.1	267.7	281.6	300.1	318.5	336.7	359.4	0.00	1.11	2.22	3.33	4.44	5.55	6.66	7.77	8.88	9.99	300
263.8	279.6	300.6	316.2	337.0	357.6	378.0	403.5	0.00	1.27	2.54	3.80	5.08	6.34	7.61	8.88	10.1	11.4	350
320.2	339.4	364.8	383.8	409.0	433.9	458.7	489.6	0.00	1.59	3.17	4.76	6.34	7.93	9.51	11.1	12.7	14.3	400
361.4	383.1	411.9	433.3	461.7	489.8	517.8	552.6	0.00	1.82	3.65	5.47	7.30	9.12	10.9	12.8	14.6	16.4	500
375.0	397.5	427.4	449.6	479.0	508.2	537.2	573.3	0.00	1.90	3.81	5.71	7.61	9.52	11.4	13.3	15.2	17.1	575
423.3	448.7	482.4	507.4	540.6	573.6	606.2	646.8	0.00	2.19	4.38	6.56	8.75	10.9	13.1	15.3	17.5	19.7	600
428.6	454.4	488.4	513.8	547.4	580.8	613.8	654.9	0.00	2.22	4.44	6.66	8.88	11.1	13.3	15.5	17.8	20.0	690
481.2	510.0	548.2	576.7	614.3	651.7	688.7	734.6	0.00	2.54	5.07	7.61	10.2	12.7	15.2	17.8	20.3	22.8	700
517.3	548.3	589.4	619.9	660.3	700.4	740.1	789.4	0.00	2.76	5.52	8.28	11.0	13.8	16.6	19.3	22.1	24.8	800
532.7	564.6	606.9	638.3	679.9	721.1	761.9	812.6	0.00	2.86	5.71	8.56	11.4	14.3	17.1	20.0	22.8	25.7	900
583.3	618.2	664.4	698.7	744.1	789.1	833.7	888.8	0.00	3.17	6.34	9.51	12.7	15.9	19.0	22.2	25.4	28.5	1000
662.4	702.0	754.3	793.1	844.5	895.2	945.4	1008	0.00	3.68	7.36	11.0	14.7	18.4	22.1	25.8	29.4	33.1	1160
937.8	992.9	1066	1119	1190	1259	1327	1410	0.00	5.55	11.1	16.6	22.2	27.8	33.3	38.8	44.4	49.9	1750
1047	1108	1188	1247	1324	1400			0.00	6.35	12.7	19.0	25.4	31.7	38.1	44.4	50.7	57.1	2000
								0.00	9.52	19.0	28.5	38.1	47.6	57.1	66.6	76.1	85.6	3000
								0.00	10.9	21.9	32.8	43.8	54.7	65.6	76.6	87.5	98.5	3450
								0.00	12.7	25.4	38.0	50.8	63.4	76.1	88.8	101.5	114.2	4000

Poly Chain® GT® Carbon® Belt Length Correction Factor Table						
Pitch/Length Designation	Number of Teeth	Correction Factor	Pitch/Length Designation	Number of Teeth	Correction Factor	Correction Factor
14MGT-1120	80	0.73	14MGT-2520	180	1.03	
14MGT-1190	85	0.75	14MGT-2590	185	1.04	
14MGT-1260	90	0.77	14MGT-2660	190	1.05	
14MGT-1400	100	0.81	14MGT-2800	200	1.07	
14MGT-1568	112	0.85	14MGT-3136	224	1.12	
14MGT-1610	115	0.86	14MGT-3304	256	1.14	
14MGT-1750	125	0.89	14MGT-3360	240	1.14	
14MGT-1680	135	0.92	14MGT-3600	250	1.16	
14MGT-1960	140	0.94	14MGT-3650	275	1.19	
14MGT-2100	150	0.96	14MGT-3920	280	1.20	
14MGT-2240	160	0.99	14MGT-4326	309	1.24	
14MGT-2310	165	1.00	14MGT-4410	315	1.25	
14MGT-2380	170	1.01				

# Gates Poly Chain® GT®2 Sprocket Specifications



2D and 3D Sprocket Drawings are available at [www.gates.com/designview](http://www.gates.com/designview)

# Stock 8mm Gates Poly Chain® GT<sup>®</sup>2 Sprocket Specifications

Sprocket Number	Number of Teeth	Diameters (in)		Design Type	Dimensions (in)										Approx Wt. (lb)	Approx WR <sup>2</sup>	Matl. Spec		
		Pitch	O.D.		Flange Ref.	A	B	C	D	E	F	M	F-CL	Bushing Size				Bore Sizes Min	Bore Sizes Max
8MX-22S-12	22	2.206	2.143	2.610	AF-1	0.00	—	0.60	0.88	—	0.88	0.01	0.44	1008	0.500	1.000	0.4	0.002	DI
FB8MX-22S-12	22	2.206	2.143	2.610	6F-1	—	1.79	0.57	1.31	0.46	0.85	0	0.43	MPB	0.500	1.188	1.0	0.004	DI
8MX-25S-12	25	2.506	2.443	2.910	AF-1	0.00	—	0.60	0.88	—	0.88	0.01	0.44	1108	0.500	1.125	0.6	0.004	GI
FB8MX-25S-12	25	2.506	2.443	2.910	6F-1	—	2.08	0.57	1.31	0.46	0.85	0	0.43	MPB	0.500	1.500	1.4	0.006	DI
8MX-26S-12	26	2.607	2.544	2.906	AF-1	—	—	0.60	0.88	—	0.88	0	0.44	1108	0.500	1.125	0.60	0.005	GI
8MX-27S-12	27	2.707	2.644	3.207	AF-1	—	—	0.60	0.88	—	0.88	0	0.44	1108	0.500	1.125	0.70	0.006	GI
8MX-28S-12	28	2.807	2.744	3.210	AF-1	0.00	—	0.60	0.88	—	0.88	0.01	0.44	1108	0.500	1.125	0.9	0.007	GI, SS
FB8MX-28S-12	28	2.807	2.744	3.210	6F-1	—	2.34	0.57	1.31	0.46	0.85	0	0.43	MPB	0.500	1.750	1.8	0.011	DI, SS
8MX-29S-12	29	2.907	2.844	3.090	AF-1	—	—	0.60	0.88	—	0.88	0	0.44	1108	0.500	1.125	1.10	0.008	GI, SS
8MX-30S-12	30	3.008	2.945	3.410	AF-1	0.00	—	0.60	0.88	—	0.88	0.01	0.44	1108	0.500	1.125	1.1	0.009	GI, SS
FB8MX-30S-12	30	3.008	2.945	3.410	6F-1	—	2.54	0.57	1.42	0.57	0.85	0	0.43	MPB	0.500	1.813	2.2	0.015	DI, SS
8MX-31S-12	31	3.108	3.045	3.328	AF-1	—	—	0.80	1.00	—	1.00	0	0.50	1210	0.500	1.250	1.10	0.012	GI
8MX-32S-12	32	3.208	3.145	3.610	AF-1	—	—	0.72	1.00	—	1.00	0	0.50	1210	0.500	1.250	1.2	0.012	DI, SS
FB8MX-32S-12	32	3.208	3.145	3.610	6F-1	—	2.73	0.57	1.42	0.57	0.85	0	0.43	MPB	0.500	2.000	2.5	0.020	DI, SS
8MX-33S-12	33	3.308	3.245	3.566	AF-1	—	—	0.80	1.00	—	1.00	0	0.50	1610	0.500	1.688	1.10	0.014	DI
8MX-34S-12	34	3.409	3.346	3.810	AF-1	—	—	0.80	1.00	—	1.00	0	0.50	1610	0.500	1.688	1.1	0.014	DI, SS
8MX-35S-12	35	3.509	3.446	3.805	AF-1	—	—	0.80	1.00	—	1.00	0	0.50	1610	0.500	1.688	1.30	0.019	GI
8MX-36S-12	36	3.609	3.546	4.010	AF-1	—	—	0.72	1.00	—	1.00	0	0.50	1610	0.500	1.688	1.4	0.019	GI, SS
8MX-37S-12	37	3.709	3.646	4.044	AF-1	—	—	0.80	1.00	—	1.00	0	0.50	1610	0.500	1.688	1.60	0.024	GI
8MX-38S-12	38	3.810	3.747	4.210	AF-1	—	—	0.72	1.00	—	1.00	0	0.50	1610	0.500	1.688	1.7	0.025	GI, SS
8MX-39S-12	39	3.910	3.847	4.410	AF-1	—	—	0.72	1.00	—	1.00	0	0.50	1610	0.500	1.688	1.90	0.032	GI
8MX-40S-12	40	4.010	3.947	4.410	BF-1	—	3.56	0.57	1.25	—	0.85	0.40	0.43	2012	0.500	2.125	1.7	0.031	DI, SS
8MX-41S-12	41	4.110	4.047	4.520	BF-1	—	3.645	0.65	1.25	—	0.85	0.40	0.43	2012	0.500	2.125	2.30	0.038	DI
8MX-42S-12	42	4.211	4.148	4.910	BF-1	—	3.76	0.57	1.25	—	0.85	0.40	0.43	2012	0.500	2.125	2.1	0.042	GI, SS
8MX-46S-12	46	4.511	4.448	4.910	BF-1	—	3.76	0.57	1.25	—	0.85	0.40	0.43	2012	0.500	2.125	2.6	0.055	GI, SS
8MX-46S-12	48	4.812	4.749	5.210	BF-1	—	3.76	0.57	1.25	—	0.85	0.40	0.43	2012	0.500	2.125	3.4	0.081	GI, SS
8MX-50S-12	50	5.013	4.950	5.410	BF-1	—	3.76	0.57	1.25	—	0.85	0.40	0.43	2012	0.500	2.125	3.7	0.094	GI, SS
8MX-53S-12	53	5.314	5.251	5.500	BF-1	—	3.76	0.57	1.25	—	0.85	0.40	0.43	2012	0.500	2.125	4.7	0.132	GI, SS
8MX-56S-12	56	5.614	5.551	6.010	BF-1	—	3.76	0.57	1.25	—	0.85	0.40	0.43	2012	0.500	2.125	5.4	0.165	GI, SS
8MX-60S-12	60	6.015	5.952	6.410	BF-1	—	3.76	0.57	1.25	—	0.85	0.40	0.43	2012	0.500	2.125	6.3	0.217	GI, SS
8MX-66S-12	66	6.316	6.253	6.720	CF-1	5.71	4.00	0.57	1.25	—	0.85	0.40	0.43	2012	0.500	2.125	4.1	0.140	GI
8MX-67S-12	67	6.717	6.654	6.870	CF-1	6.14	4.00	0.57	1.25	—	0.85	0.40	0.43	2012	0.500	2.125	4.3	0.164	GI
8MX-71S-12	71	7.118	7.055	7.500	CF-1	6.51	4.00	0.57	1.25	—	0.85	0.40	0.43	2012	0.500	2.125	4.7	0.199	GI
8MX-75S-12	75	7.519	7.456	7.920	CF-1	6.90	4.00	0.57	1.25	—	0.85	0.40	0.43	2012	0.500	2.125	5.1	0.239	GI
8MX-80S-12	80	8.020	7.957	8.420	CF-1	7.23	4.00	0.57	1.25	—	0.85	0.40	0.43	2012	0.500	2.125	5.8	0.323	GI
8MX-90S-12	90	9.023	8.960	—	C-2	8.05	4.00	—	1.25	—	0.85	0.40	0.43	2012	0.500	2.125	8.0	0.563	GI
8MX-112S-12	112	11.229	11.166	—	C-2	10.25	4.00	—	1.25	—	0.85	0.40	0.43	2012	0.500	2.125	12.0	1.405	GI
8MX-140S-12	140	14.036	13.973	—	C-3	11.96	4.38	—	1.25	—	0.85	0.40	0.43	2012	0.500	2.125	17.0	3.176	GI
8MX-180S-12	180	18.046	17.983	—	C-3	15.80	4.88	—	1.75	—	0.85	0.90	0.43	2517	0.500	2.688	26.6	8.146	GI
8MX-224S-12	224	22.457	22.394	—	C-3	20.17	4.88	—	1.75	—	0.85	0.90	0.43	2517	0.500	2.688	37.0	17.98	GI

Material Spec : GI - Grey Iron DI - Ductile Iron SS - Stainless Steel Design Type Suffix: 1 - Solid 2 - Web 3 - Arms

Note: 2D and 3D sprocket drawings are available at [www.gates.com/pt/catalog](http://www.gates.com/pt/catalog)

NOTE: •Weights for Minimum Plain Bore (MPB) Sprockets are with minimum bore. •Weights and WR<sup>2</sup> for Bushed Sprockets do not include bushings. •WR<sup>2</sup> values have lb-ft<sup>2</sup> units.

**Details shown which do not affect drive function may be changed without notification.**

# Stock 8mm Gates Poly Chain® GT®2 Sprocket Specifications—continued

Sprocket Number	Number of Teeth	Diameters (in)			Design Type	Dimensions (in)											Approx. Wt. (lb)	Approx. WRF <sup>2</sup>	Mater. Spec
		Pitch	O.D.	Flange Ref.		A	B	C	D	E	F	M	F-CL	Bushing Size	Bore Sizes	Min			
8MX-22S-21	22	2.206	2.143	2.610	AF-1	1.63	—	0.92	0.88	—	1.20	0.33	0.60	1008	0.500	1.000	0.6	0.002	DI, NP
PB8MX-22S-21	22	2.206	2.143	2.610	6F-1	—	1.79	0.92	1.65	0.45	1.20	0	0.60	MPB	0.500	1.188	1.3	0.005	DI
8MX-25S-21	25	2.506	2.443	2.910	AF-1	1.92	—	0.92	0.88	—	1.20	0.33	0.60	1108	0.500	1.125	0.8	0.005	GI, NP
PB8MX-25S-21	25	2.506	2.443	2.910	6F-1	—	2.08	0.92	1.65	0.45	1.20	0	0.60	MPB	0.500	1.500	1.8	0.009	DI
8MX-26S-21	26	2.607	2.544	2.906	AF	1.85	—	0.92	0.88	—	1.2	0.32	0.6	1108	0.500	1.125	0.80	0.006	GI, NP
8MX-27S-21	27	2.707	2.644	3.207	AF	1.95	—	0.92	0.88	—	1.2	0.32	0.6	1108	0.500	1.125	0.90	0.007	GI, NP
8MX-28S-21	28	2.807	2.744	3.210	AF-1	2.18	—	0.92	0.88	—	1.20	0.33	0.60	1108	0.500	1.125	1.0	0.008	G, SS, NP
PB8MX-28S-21	28	2.807	2.744	3.210	6F-1	—	2.24	0.92	1.65	0.45	1.20	0	0.60	MPB	0.500	1.750	2.3	0.014	DI, SS
8MX-29S-21	29	2.907	2.844	3.09	AF	2.15	—	0.92	0.88	—	1.2	0.32	0.6	1108	0.500	1.125	1.00	0.010	GI, SS, NP
8MX-30S-21	30	3.008	2.945	3.410	AF-1	2.38	—	0.92	0.88	—	1.20	0.33	0.60	1108	0.500	1.125	1.3	0.011	GI, SS, NP
PB8MX-30S-21	30	3.008	2.945	3.410	6F-1	—	2.54	0.92	1.77	0.57	1.20	0	0.60	MPB	0.500	1.813	2.8	0.020	DI, SS
8MX-31S-21	31	3.108	3.045	3.328	AF	2.35	—	0.92	1	—	1.2	0.2	0.6	1210	0.500	1.250	1.10	0.013	GI, NP
8MX-32S-21	32	3.208	3.145	3.610	AF-1	2.58	—	0.92	1.00	—	1.20	0.20	0.60	1210	0.500	1.250	1.4	0.015	DI, SS, NP
PB8MX-32S-21	32	3.208	3.145	3.610	6F-1	—	2.73	0.92	1.77	0.57	1.20	0	0.60	MPB	0.500	2.000	3.2	0.026	DI, SS
8MX-33S-21	33	3.308	3.245	3.566	AF	2.6	—	0.92	1	—	1.2	0.2	0.6	1610	0.500	1.688	1.10	0.016	DI, NP
8MX-34S-21	34	3.409	3.346	3.810	AF-1	2.66	—	0.92	1.00	—	1.20	0.20	0.60	1610	0.500	1.688	1.4	0.018	DI, SS, NP
8MX-35S-21	35	3.509	3.446	3.805	AF	2.75	—	0.92	1	—	1.2	0.2	0.6	1610	0.500	1.688	1.30	0.021	GI, NP
8MX-36S-21	36	3.609	3.546	4.010	AF-1	2.96	—	0.92	1.00	—	1.20	0.20	0.60	1610	0.500	1.688	1.66	0.023	DI, SS, NP
8MX-37S-21	37	3.709	3.646	4.044	AF	2.95	—	0.92	1	—	1.2	0.2	0.6	1610	0.500	1.688	1.60	0.028	GI, NP
8MX-38S-21	38	3.810	3.747	4.210	AF-1	3.15	—	0.92	1.00	—	1.20	0.20	0.60	1610	0.500	1.688	1.9	0.030	DI, SS, NP
8MX-39S-21	39	3.910	3.847	4.41	AF	3.14	—	0.92	1	—	1.2	0.2	0.6	1610	0.500	1.688	1.90	0.035	GI, NP
8MX-40S-21	40	4.010	3.947	4.410	AF-1	—	—	0.97	1.25	—	1.25	0	0.63	2012	0.500	2.125	2.0	0.037	DI, SS, NP
8MX-41S-21	41	4.110	4.047	4.52	BF	—	3.4	1	—	1.25	1.2	0.05	0.6	2012	0.500	2.125	2.30	0.043	DI, NP
8MX-42S-21	42	4.211	4.148	4.910	AF-1	—	—	0.97	1.25	—	1.25	0	0.63	2012	0.500	2.125	2.4	0.048	GI, SS, NP
8MX-45S-21	45	4.511	4.448	4.910	AF-1	—	—	0.97	1.25	—	1.25	0	0.63	2012	0.500	2.125	3.0	0.067	GI, SS, NP
8MX-48S-21	48	4.812	4.749	5.210	AF-1	—	—	0.97	1.25	—	1.25	0	0.63	2012	0.500	2.125	3.7	0.092	GI, SS, NP
8MX-50S-21	50	5.013	4.950	5.410	AF-1	—	—	0.97	1.25	—	1.25	0	0.63	2012	0.500	2.125	4.2	0.111	GI, SS, NP
8MX-53S-21	53	5.314	5.251	5.500	AF-1	—	—	0.97	1.25	—	1.25	0	0.63	2012	0.500	2.125	5.0	0.145	GI, SS, NP
8MX-56S-21	56	5.614	5.551	6.010	AF-1	—	—	0.97	1.25	—	1.25	0	0.63	2012	0.500	2.125	5.8	0.184	GI, SS, NP
8MX-60S-21	60	6.015	5.952	6.420	AF-1	—	—	0.97	1.25	—	1.25	0	0.63	2012	0.500	2.125	6.9	0.247	GI, SS, NP
8MX-63S-21	63	6.316	6.253	6.720	CF-1	5.71	3.76	0.92	1.25	—	1.20	0.05	0.60	2012	0.500	2.125	4.1	0.154	GI, NP
8MX-67S-21	67	6.717	6.654	6.880	CF-1	6.14	4.50	0.92	1.75	—	1.20	0.55	0.60	2517	0.500	2.688	5.7	0.232	GI, NP
8MX-71S-21	71	7.118	7.055	7.500	CF-1	6.51	4.50	0.92	1.75	—	1.20	0.55	0.60	2517	0.500	2.688	6.1	0.275	GI, NP
8MX-75S-21	75	7.519	7.456	7.920	CF-1	6.90	4.50	0.92	1.75	—	1.20	0.55	0.60	2517	0.500	2.688	6.5	0.323	GI, NP
8MX-80S-21	80	8.020	7.957	8.420	CF-1	7.23	4.50	0.92	1.75	—	1.20	0.55	0.60	2517	0.500	2.688	7.5	0.432	GI, NP
8MX-90S-21	90	9.023	8.960	—	C-2	7.78	4.50	—	—	—	1.20	0.55	0.60	2517	0.500	2.688	11.0	0.825	GI, NP
8MX-112S-21	112	11.229	11.166	—	C-2	10.00	4.50	—	—	—	1.20	0.55	0.60	2517	0.500	2.688	16.0	1.892	GI, NP
8MX-140S-21	140	14.036	13.973	—	C-3	11.74	4.88	—	—	—	1.20	0.55	0.60	2517	0.500	2.688	24.1	4.707	GI, NP
8MX-180S-21	180	18.046	17.983	—	C-3	15.49	6.25	—	—	—	1.20	0.80	0.60	3020	0.875	3.250	39.0	12.02	GI, NP
8MX-224S-21	224	22.457	22.394	—	C-3	19.86	6.25	—	—	—	1.20	0.80	0.60	3020	0.875	3.250	53.4	26.34	GI, NP

Material Spec : GI - Grey Iron DI - Ductile Iron SS - Stainless Steel

Note: 2D and 3D sprocket drawings are available at [www.gates.com/p/catalog](http://www.gates.com/p/catalog)

NOTE: •Weights for Minimum Plain Bore (MPB) Sprockets are with minimum bore. •Weights and WRF<sup>2</sup> for Bushed Sprockets do not include bushings. •WRF<sup>2</sup> values have lb-ft<sup>2</sup> units.

Design Type Suffix: 1 - Solid 2 - Web 3 - Arms

**Details shown which do not affect drive function may be changed without notification.**

# Stock 8mm Gates Poly Chain® GT®2 Sprocket Specifications—continued

Sprocket Number	Number of Teeth	Diameters (in)			Design Type	Dimensions (in)											Approx. Wt. (lb)	Approx. WRR	Matl. Spec
		Pitch	O.D.	Flange Ref.		A	B	C	D	E	F	M	F-CL	Bushing Size	Min	Max			
PB8MX-22S-36	22	2.206	2.143	2.610	6F-1	—	1.79	1.58	2.44	0.58	1.86	0	0.93	MPB	0.500	1.188	2.0	0.008	DI
PB8MX-25S-36	25	2.506	2.443	2.910	6F-1	—	2.08	1.58	2.44	0.58	1.86	0	0.93	MPB	0.500	1.500	2.7	0.013	DI
PB8MX-28S-36	28	2.807	2.744	3.210	6F-1	—	2.34	1.58	2.44	0.58	1.86	0	0.93	MPB	0.500	1.750	3.4	0.021	DI
PB8MX-30S-36	30	3.008	2.945	3.410	6F-1	—	2.54	1.58	2.44	0.58	1.86	0	0.93	MPB	0.500	1.813	3.9	0.029	DI
8MX-32S-36	32	3.208	3.145	3.610	AF-1	2.58	—	1.58	1.00	—	1.86	0.86	0.93	1210	0.500	1.250	1.7	0.02	DI
PB8MX-32S-36	32	3.208	3.145	3.610	6F-1	—	2.73	1.58	2.44	0.58	1.86	0	0.93	MPB	0.500	2.000	4.5	0.038	DI
8MX-33S-36	33	3.308	3.245	3.566	AF	2.56	—	1.66	1	—	1.86	0.86	0.93	1610	0.500	1.688	3.31	0.022	DI
8MX-34S-36	34	3.409	3.346	3.810	AF-1	2.66	—	1.58	1.00	—	1.86	0.86	0.93	1610	0.500	1.688	1.8	0.026	DI
PB8MX-34S-36	34	3.409	3.346	3.810	6F-1	—	2.82	1.58	2.45	0.59	1.86	0	0.93	MPB	0.500	2.125	5.1	0.047	DI
8MX-35S-36	35	3.509	3.446	3.805	AF	2.76	—	1.66	1	—	1.86	0.86	0.93	1610	0.500	1.688	3.51	0.029	DI
8MX-36S-36	36	3.609	3.546	4.010	AF-1	2.96	—	1.58	1.00	—	1.86	0.86	0.93	1610	0.500	1.688	2.1	0.032	DI
PB8MX-36S-36	36	3.609	3.546	4.010	6F-1	—	3.13	1.58	2.51	0.65	1.86	0	0.93	MPB	0.500	2.313	5.9	0.063	DI
8MX-37S-36	37	3.709	3.646	4.044	AF	2.9	—	1.66	1	—	1.86	0.86	0.93	1610	0.500	1.688	3.78	0.039	GI
8MX-38S-36	38	3.810	3.747	4.210	AF-1	3.15	—	1.58	1.00	—	1.86	0.86	0.93	1610	0.500	1.688	2.4	0.04	DI
PB8MX-38S-36	38	3.810	3.747	4.210	6F-1	—	3.32	1.58	2.51	0.65	1.86	0	0.93	MPB	0.500	2.438	6.7	0.079	DI
8MX-39S-36	39	3.910	3.847	4.41	AF	3.1	—	1.58	1	—	1.86	0.86	0.93	1610	0.500	1.688	3.91	0.048	GI
8MX-40S-36	40	4.010	3.947	4.410	AF-1	3.35	—	1.58	1.25	—	1.86	0.61	0.93	2012	0.500	2.125	2.5	0.049	DI
8MX-41S-36	41	4.110	4.047	4.52	AF	3.36	—	1.66	1	—	1.86	0.51	0.93	2012	0.500	2.125	4.11	0.057	DI
8MX-42S-36	42	4.211	4.148	4.910	AF-1	3.62	—	1.58	1.25	—	1.86	0.61	0.93	2012	0.500	2.125	2.8	0.061	DI
8MX-45S-36	45	4.511	4.448	4.910	AF-1	3.62	—	1.58	1.25	—	1.86	0.61	0.93	2012	0.500	2.125	3.8	0.09	GI
8MX-48S-36	48	4.812	4.749	5.210	AF-1	4.14	—	1.58	1.25	—	1.86	0.61	0.93	2012	0.500	2.125	4.3	0.114	GI
8MX-50S-36	50	5.013	4.950	5.410	AF-1	4.13	—	1.58	1.25	—	1.86	0.61	0.93	2012	0.500	2.125	5.1	0.143	GI
8MX-53S-36	53	5.314	5.251	5.500	AF-1	4.76	—	1.58	1.25	—	1.86	0.61	0.93	2012	0.500	2.125	5.5	0.169	GI
8MX-56S-36	56	5.614	5.551	6.010	AF-1	4.92	—	1.58	1.25	—	1.86	0.61	0.93	2012	0.500	2.125	6.5	0.221	GI
8MX-60S-36	60	6.015	5.952	6.420	AF-1	5.13	—	1.58	1.75	—	1.86	0.11	0.93	2517	0.500	2.688	8.9	0.352	GI
8MX-63S-36	63	6.316	6.253	6.720	AF-1	5.71	—	1.58	1.75	—	1.86	0.11	0.93	2517	0.500	2.688	10.4	0.556	GI
8MX-67S-36	67	6.717	6.654	6.880	DF-1	5.98	4.25	1.58	1.75	—	1.86	0.11	0.93	2517	0.500	2.688	6.5	0.307	GI
8MX-71S-36	71	7.118	7.055	7.500	DF-1	6.39	4.25	1.58	1.75	—	1.86	0.11	0.93	2517	0.500	2.688	7.0	0.365	GI
8MX-75S-36	75	7.519	7.456	7.920	DF-1	6.79	4.25	1.58	1.75	—	1.86	0.11	0.93	2517	0.500	2.688	7.3	0.423	GI
8MX-80S-36	80	8.020	7.957	8.420	BF-1	—	5.75	1.58	2.00	—	1.86	0.14	0.93	3020	0.875	3.250	17.9	1.202	GI
8MX-90S-36	90	9.023	8.960	—	B-1	—	5.75	—	2.00	—	1.86	0.14	0.93	3020	0.875	3.250	24.2	1.982	GI
8MX-112S-36	112	11.229	11.166	—	C-2	9.80	5.75	—	2.00	—	1.86	0.14	0.93	3020	0.875	3.250	22.7	2.768	GI
8MX-140S-36	140	14.036	13.973	—	C-3	11.72	6.25	—	2.00	—	1.86	0.14	0.93	3020	0.875	3.250	36.2	7.29	GI
8MX-180S-36	180	18.046	17.983	—	C-3	15.31	6.25	—	2.00	—	1.86	0.14	0.93	3020	0.875	3.250	54.4	18.67	GI
8MX-224S-36	224	22.457	22.394	—	C-3	19.62	8.75	—	2.50	—	1.86	0.64	0.93	3525	1.188	3.938	91.1	42.40	GI

Material Spec : GI - Grey Iron DI - Ductile Iron SS - Stainless Steel Design Type Suffix: 1 - Solid 2 - Web 3 - Arms

Note: 2D and 3D sprocket drawings are available at [www.gates.com/ptcatalog](http://www.gates.com/ptcatalog)

NOTE: •Weights for Minimum Plain Bore (MPB) Sprockets are with minimum bore. •Weights and WRR<sup>2</sup> for Bushed Sprockets do not include bushings. •WRR<sup>2</sup> values have lb-ft<sup>2</sup> units.

**Details shown which do not affect drive function may be changed without notification.**

# Stock 8mm Gates Poly Chain® GT<sup>®</sup>2 Sprocket Specifications—continued

Sprocket Number	Number of Teeth		Diameters (in)		Design Type	Dimensions (in)										Approx Wt. (lb)	Approx Wt <sup>2</sup>	Mtrl. Spec	
	Pitch	O.D.	Flange Ref.			A	B	C	D	E	F	M	F-CL	Bushing Size	Bore Sizes Min				Bore Sizes Max
PB8MX-22S-62	22	2.206	2.143	2.610	6F-1	—	1.79	2.63	3.56	0.65	2.91	0	1.46	MPB	1.000	1.188	2.4	0.011	DI
PB8MX-25S-62	25	2.506	2.443	2.910	6F-1	—	2.08	2.63	3.56	0.65	2.91	0	1.46	MPB	1.000	1.500	3.4	0.019	DI
PB8MX-28S-62	28	2.807	2.744	3.210	6F-1	—	2.34	2.63	3.56	0.65	2.91	0	1.46	MPB	1.000	1.750	4.5	0.032	DI
PB8MX-30S-62	30	3.008	2.945	3.410	6F-1	—	2.54	2.63	3.50	0.68	2.92	0	1.46	MPB	1.000	1.813	5.2	0.042	DI
PB8MX-32S-62	32	3.208	3.145	3.610	6F-1	—	2.73	2.63	3.50	0.69	2.91	0	1.46	MPB	1.000	2.000	6.1	0.055	DI
8MX-34S-62	34	3.409	3.346	3.810	AF-1	2.66	—	2.63	1.00	—	2.91	1.91	1.46	1610	0.500	1.688	2.6	0.038	DI
PB8MX-34S-62	34	3.409	3.346	3.810	6F-1	—	2.82	2.63	3.50	0.69	2.91	0	1.46	MPB	1.000	2.125	6.9	0.070	DI
8MX-36S-62	36	3.609	3.546	4.010	AF-1	2.96	—	2.63	1.00	—	2.91	1.91	1.46	1610	0.500	1.688	2.8	0.045	DI
PB8MX-36S-62	36	3.609	3.546	4.010	6F-1	—	3.13	2.63	3.56	0.65	2.91	0	1.46	MPB	1.000	2.313	8.0	0.092	DI
8MX-38S-62	38	3.810	3.747	4.210	AF-1	3.15	—	2.63	1.00	—	2.91	1.91	1.46	1610	0.500	1.688	3.1	0.056	DI
PB8MX-38S-62	38	3.810	3.747	4.210	6F-1	—	3.32	2.63	3.56	0.65	2.91	0	1.46	MPB	1.000	2.438	9.1	0.115	DI
8MX-40S-62	40	4.010	3.947	4.410	AF-1	3.35	—	2.63	1.25	—	2.91	1.66	1.46	2012	0.500	2.125	3.3	0.067	DI
PB8MX-40S-62	40	4.010	3.947	4.410	6F-1	—	3.52	2.63	3.63	0.72	2.91	0	1.46	MPB	1.000	2.563	10.3	0.144	DI
8MX-42S-62	42	4.211	4.148	4.910	AF-1	3.62	—	2.63	1.25	—	2.91	1.66	1.46	2012	0.500	2.125	3.6	0.079	DI
PB8MX-42S-62	42	4.211	4.148	4.910	6F-1	—	3.79	2.63	3.63	0.72	2.91	0	1.46	MPB	1.000	2.750	11.6	0.178	DI
8MX-45S-62	45	4.511	4.448	4.910	AF-1	3.62	—	2.63	1.25	—	2.91	1.66	1.46	2012	0.500	2.125	5.1	0.126	DI
PB8MX-45S-62	45	4.511	4.448	4.910	6F-1	—	3.79	2.63	3.63	0.72	2.91	0	1.46	MPB	1.000	2.750	13.1	0.227	DI
8MX-48S-62	48	4.812	4.749	5.210	AF-1	4.14	—	2.63	1.75	—	2.91	1.16	1.46	2517	0.500	2.688	5.1	0.15	GI
8MX-50S-62	50	5.013	4.950	5.410	AF-1	4.13	—	2.63	1.75	—	2.91	1.16	1.46	2517	0.500	2.688	6.3	0.196	GI
8MX-53S-62	53	5.314	5.251	5.500	AF-1	4.76	—	2.63	1.75	—	2.91	1.16	1.46	2517	0.500	2.688	6.7	0.229	GI
8MX-56S-62	56	5.614	5.551	6.010	AF-1	4.92	—	2.63	1.75	—	2.91	1.16	1.46	2517	0.500	2.688	8.3	0.307	GI
8MX-60S-62	60	6.015	5.952	6.420	AF-1	5.13	—	2.63	2.00	—	2.91	0.91	1.46	3020	0.875	3.250	8.9	0.407	GI
8MX-63S-62	63	6.316	6.253	6.720	AF-1	5.71	—	2.63	2.00	—	2.91	0.91	1.46	3020	0.875	3.250	9.9	0.483	GI
8MX-67S-62	67	6.717	6.654	6.880	AF-1	6.14	—	2.63	2.00	—	2.91	0.91	1.46	3020	0.875	3.250	12.0	0.64	GI
8MX-71S-62	71	7.118	7.055	7.500	AF-1	6.51	—	2.63	2.00	—	2.91	0.91	1.46	3020	0.875	3.250	14.4	0.837	GI
8MX-75S-62	75	7.519	7.456	7.920	AF-1	6.90	—	2.63	2.00	—	2.91	0.91	1.46	3020	0.875	3.250	16.8	1.067	GI
8MX-80S-62	80	8.020	7.957	8.420	AF-1	7.23	—	2.63	2.00	—	2.91	0.91	1.46	3020	0.875	3.250	20.5	1.45	GI
8MX-90S-62	90	9.023	8.960	—	D-1	7.39	5.42	—	2.00	—	2.91	0.91	1.46	3020	0.875	3.250	30.1	2.631	GI
8MX-112S-62	112	11.229	11.166	—	D-2	9.60	5.42	—	2.00	—	2.91	0.91	1.46	3020	0.875	3.250	31.0	4.255	GI
8MX-140S-62	140	14.036	13.973	—	D-2	12.40	8.75	—	2.50	—	2.91	0.41	1.46	3525	1.188	3.938	62.8	10.91	GI
8MX-180S-62	180	18.046	17.983	—	D-3	15.33	8.75	—	2.50	—	2.91	0.41	1.46	3525	1.188	3.938	91.6	29.51	GI
8MX-224S-62	224	22.457	22.394	—	D-3	19.38	8.75	—	2.50	—	2.91	0.41	1.46	3525	1.188	3.938	127.1	67.42	GI

Material Spec : GI - Grey Iron DI - Ductile Iron SS - Stainless Steel

Design Type Suffix: 1 - Solid 2 - Web 3 - Arms

Note: 2D and 3D sprocket drawings are available at [www.gates.com/ptcatalog](http://www.gates.com/ptcatalog)

NOTE: •Weights for Minimum Plain Bore (MPB) Sprockets are with minimum bore. •Weights and WR<sup>2</sup> for Bushed Sprockets do not include bushings. •WR<sup>2</sup> values have lb-ft<sup>2</sup> units.

**Details shown which do not affect drive function may be changed without notification.**

# Stock 14mm Gates Poly Chain® GT®2 Sprocket Specifications

Sprocket Number	Number of Teeth	Diameters (in)		Design Type	Dimensions (in)										Approx. Wt. (lb)	Approx. WR <sup>2</sup>	Matl. Spec		
		Pitch	O.D.		Flange Ref.	A	B	C	D	E	F	M	F-CL	Bushing Size				Min	Max
14MX-28S-20	28	4.912	4.802	5.400	A1-F	3.61	—	1.04	1.25	—	1.36	0.11	0.68	2012	0.500	2.125	3.9	0.105	GI, NP
14MX-29S-20	29	5.088	4.978	5.760	A1-F	3.99	—	1.04	1.25	—	1.36	0.11	0.68	2012	0.500	2.125	4.3	0.122	GI, NP
14MX-30S-20	30	5.263	5.153	5.760	A1-F	3.99	—	1.04	1.25	—	1.36	0.11	0.68	2012	0.500	2.125	4.8	0.143	GI, NP
14MX-31S-20	31	5.439	5.329	6.110	A1-F	4.22	—	1.04	1.25	—	1.36	0.11	0.68	2012	0.500	2.125	5.3	0.165	GI, NP
14MX-32S-20	32	5.614	5.504	6.110	A1-F	4.22	—	1.04	1.25	—	1.36	0.11	0.68	2012	0.500	2.125	5.8	0.191	GI, NP
14MX-33S-20	33	5.790	5.680	6.460	A1-F	4.53	—	1.04	1.25	—	1.36	0.11	0.68	2012	0.500	2.125	6.3	0.217	GI, NP
14MX-34S-20	34	5.965	5.855	6.460	A1-F	4.53	—	1.04	1.25	—	1.36	0.11	0.68	2012	0.500	2.125	6.8	0.248	GI, NP
14MX-35S-20	35	6.141	6.031	6.820	A1-F	4.95	—	1.04	1.25	—	1.36	0.11	0.68	2012	0.500	2.125	7.3	0.279	GI, NP
14MX-36S-20	36	6.316	6.206	6.820	BF-1	—	4.25	1.04	1.75	—	1.36	0.39	0.68	2517	0.500	2.688	8.4	0.346	GI, NP
14MX-37S-20	37	6.492	6.382	7.170	BF-1	—	4.25	1.04	1.75	—	1.36	0.39	0.68	2517	0.500	2.688	9.3	0.398	GI, NP
14MX-38S-20	38	6.667	6.557	7.520	BF-1	—	4.25	1.04	1.75	—	1.36	0.39	0.68	2517	0.500	2.688	9.9	0.443	GI, NP
14MX-39S-20	39	6.842	6.732	7.520	BF-1	—	4.25	1.04	1.75	—	1.36	0.39	0.68	2517	0.500	2.688	10.7	0.502	GI, NP
14MX-40S-20	40	7.018	6.908	7.520	BF-1	—	4.25	1.04	1.75	—	1.36	0.39	0.68	2517	0.500	2.688	11.4	0.554	GI, NP
14MX-43S-20	43	7.544	7.434	8.040	BF-1	—	4.25	1.04	1.75	—	1.36	0.39	0.68	2517	0.500	2.688	14.0	0.770	GI, NP
14MX-45S-20	45	7.895	7.785	8.400	BF-1	—	5.41	1.04	2.00	—	1.36	0.64	0.68	3020	0.875	3.250	15.0	0.948	GI, NP
14MX-46S-20	46	8.421	8.311	8.940	BF-1	—	5.75	1.04	2.00	—	1.36	0.64	0.68	3020	0.875	3.250	18.2	1.277	GI, NP
14MX-50S-20	50	8.772	8.662	9.290	BF-1	—	5.75	1.04	2.00	—	1.36	0.64	0.68	3020	0.875	3.250	20.8	1.561	GI, NP
14MX-53S-20	53	9.299	9.189	9.690	BF-1	—	5.75	1.04	2.00	—	1.36	0.64	0.68	3020	0.875	3.250	24.1	1.992	GI, NP
14MX-56S-20	56	9.825	9.715	10.360	BF-1	—	8.70	1.04	2.50	—	1.36	1.14	0.68	3525	1.188	3.938	30.2	2.834	GI, NP
14MX-60S-20	60	10.527	10.417	11.070	BF-1	—	8.75	1.04	2.50	—	1.36	1.14	0.68	3525	1.188	3.938	36.9	3.888	GI, NP
14MX-63S-20	63	11.053	10.943	11.590	BF-1	—	8.75	1.04	2.50	—	1.36	1.14	0.68	3525	1.188	3.938	42.3	4.837	GI, NP
14MX-67S-20	67	11.755	11.645	12.500	BF-1	—	8.75	1.04	2.50	—	1.36	1.14	0.68	3525	1.188	3.938	50.3	6.428	GI, NP
14MX-71S-20	71	12.457	12.347	13.070	CF-1	11.05	8.75	1.04	2.50	—	1.36	1.14	0.68	3525	1.188	3.938	40.6	4.832	GI, NP
14MX-75S-20	75	13.158	13.048	13.730	CF-1	11.68	8.75	1.04	2.50	—	1.36	1.14	0.68	3525	1.188	3.938	42.3	5.260	GI, NP
14MX-80S-20	80	14.036	13.926	14.620	CF-2	12.56	8.75	1.04	2.50	—	1.36	1.14	0.68	3525	1.188	3.938	48.0	6.573	GI, NP
14MX-90S-20	90	15.790	15.680	—	C-2	14.26	8.75	—	2.50	—	1.36	1.14	0.68	3525	1.188	3.938	53.8	9.215	GI, NP
14MX-112S-20	112	19.650	19.540	—	C-3	16.47	8.75	—	2.50	—	1.36	1.14	0.68	3525	1.188	3.938	70.1	21.11	GI, NP
14MX-140S-20	140	24.562	24.452	—	C-3	21.04	8.75	—	2.50	—	1.36	1.14	0.68	3525	1.188	3.938	94.8	48.06	GI, NP
14MX-168S-20	168	29.475	29.365	—	C-3	25.90	8.75	—	2.50	—	1.36	1.14	0.68	3525	1.188	3.938	120.8	91.40	GI, NP
14MX-180S-20	180	31.580	31.470	—	C-3	27.99	8.75	—	2.50	—	1.36	1.14	0.68	3525	1.188	3.938	134.6	118.6	GI, NP
14MX-200S-20	200	35.089	34.979	—	C-3	31.46	8.75	—	2.50	—	1.36	1.14	0.68	3525	1.188	3.938	158.1	176.5	GI, NP
14MX-224S-20	224	39.300	39.190	—	C-3	35.63	10.00	—	3.00	—	1.36	1.64	0.68	4030	1.438	4.438	201.1	271.7	GI, NP

Material Spec : GI - Grey Iron DI - Ductile Iron SS - Stainless Steel Design Type Suffix: 1 - Solid 2 - Web 3 - Arms

Note: 2D and 3D sprocket drawings are available at [www.gates.com/pt/catalog](http://www.gates.com/pt/catalog)

NOTE: •Weights for Minimum Plain Bore (MPP) Sprockets are with minimum bore. •Weights and WR<sup>2</sup> for Bushed Sprockets do not include bushings. •WR<sup>2</sup> values have lb-ft<sup>2</sup> units.

**Details shown which do not affect drive function may be changed without notification.**

# Stock 14mm Gates Poly Chain® GT®2 Sprocket Specifications—continued

Sprocket Number	Number of Teeth	Diameters (in)		Design Type	Dimensions (in)									Approx Wt. (lb)	Approx Wt <sup>2</sup>	Matl. Spec			
		Pitch	O.D.		Flange Ref.	A	B	C	D	E	F	M	F-CL				Bushing Size	Bore Sizes	Max
14MX-28S-37	28	4.912	4.802	5.400	6F-1	—	3.97	1.74	2.86	0.80	2.06	0	1.03	MPB	1.000	2.938	11.7	0.228	DI
14MX-28S-37	28	4.912	4.802	5.400	AF-1	3.61	—	1.74	1.25	—	2.06	0.81	1.03	2012	0.500	2.125	5.2	0.145	GI
14MX-29S-37	29	5.088	4.978	5.760	AF-1	3.99	—	1.74	1.75	—	2.06	0.31	1.03	2517	0.500	2.688	5.1	0.16	GI
14MX-30S-37	30	5.263	5.153	5.760	AF-1	3.99	—	1.74	1.75	—	2.06	0.31	1.03	2517	0.500	2.688	5.8	0.192	GI
14MX-31S-37	31	5.439	5.329	6.110	AF-1	4.22	—	1.74	1.75	—	2.06	0.31	1.03	2517	0.500	2.688	6.4	0.223	GI
14MX-32S-37	32	5.614	5.504	6.110	AF-1	4.22	—	1.74	1.75	—	2.06	0.31	1.03	2517	0.500	2.688	7.2	0.262	GI
14MX-33S-37	33	5.790	5.680	6.460	AF-1	4.53	—	1.74	1.75	—	2.06	0.31	1.03	2517	0.500	2.688	7.8	0.299	GI
14MX-34S-37	34	5.965	5.855	6.460	AF-1	4.53	—	1.74	1.75	—	2.06	0.31	1.03	2517	0.500	2.688	8.7	0.346	GI
14MX-35S-37	35	6.141	6.031	6.820	AF-1	4.95	—	1.74	1.75	—	2.06	0.31	1.03	2517	0.500	2.688	9.3	0.388	GI
14MX-36S-37	36	6.316	6.206	6.820	AF-1	4.95	—	1.74	1.75	—	2.06	0.31	1.03	2517	0.500	2.688	10.2	0.444	GI
14MX-37S-37	37	6.492	6.382	7.170	AF-1	5.27	—	1.74	1.75	—	2.06	0.31	1.03	2517	0.500	2.688	10.8	0.496	GI
14MX-38S-37	38	6.667	6.557	7.170	AF-1	5.27	—	1.74	2.00	—	2.06	0.06	1.03	3020	0.875	3.250	10.3	0.687	GI
14MX-39S-37	39	6.842	6.732	7.520	AF-1	5.54	—	1.74	2.00	—	2.06	0.06	1.03	3020	0.875	3.250	11.3	0.757	GI
14MX-40S-37	40	7.018	6.908	7.520	AF-1	5.54	—	1.74	2.00	—	2.06	0.06	1.03	3020	0.875	3.250	12.3	0.862	GI
14MX-43S-37	43	7.544	7.434	8.040	AF-1	6.16	—	1.74	2.00	—	2.06	0.06	1.03	3020	0.875	3.250	15.6	1.148	GI
14MX-45S-37	45	7.895	7.785	8.400	AF-1	6.42	—	1.74	2.00	—	2.06	0.06	1.03	3020	0.875	3.250	18.0	1.394	GI
14MX-48S-37	48	8.421	8.311	8.940	AF-1	6.96	—	1.74	2.00	—	2.06	0.06	1.03	3020	0.875	3.250	21.5	1.802	GI
14MX-50S-37	50	8.772	8.662	9.280	AF-1	7.44	—	1.74	2.00	—	2.06	0.06	1.03	3020	0.875	3.250	24.1	2.102	GI
14MX-53S-37	53	9.299	9.189	9.690	AF-1	7.84	—	1.74	2.00	—	2.06	0.06	1.03	3020	0.875	3.250	28.3	2.694	GI
14MX-56S-37	56	9.825	9.715	10.360	BF-1	—	8.70	1.74	2.50	—	2.06	0.44	1.03	3525	1.188	3.938	33.0	3.247	GI
14MX-60S-37	60	10.527	10.417	11.070	BF-1	—	8.75	1.74	2.50	—	2.06	0.44	1.03	3525	1.188	3.938	40.6	4.499	GI
14MX-63S-37	63	11.063	10.943	11.590	BF-1	—	8.75	1.74	2.50	—	2.06	0.44	1.03	3525	1.188	3.938	46.7	5.631	GI
14MX-67S-37	67	11.755	11.645	12.500	BF-1	—	8.75	1.74	2.50	—	2.06	0.44	1.03	3525	1.188	3.938	55.6	7.476	GI
14MX-71S-37	71	12.457	12.347	13.070	BF-1	—	8.75	1.74	2.50	—	2.06	0.44	1.03	3525	1.188	3.938	61.2	8.443	GI
14MX-75S-37	75	13.158	13.048	13.730	CF-1	11.68	8.75	1.74	2.50	—	2.06	0.44	1.03	3525	1.188	3.938	46.9	6.468	GI
14MX-80S-37	80	14.036	13.926	14.620	CF-2	12.56	8.75	1.74	2.50	—	2.06	0.44	1.03	3525	1.188	3.938	52.5	7.891	GI
14MX-90S-37	90	15.790	15.680	—	C-2	14.26	8.75	—	2.50	—	2.06	0.44	1.03	3525	1.188	3.938	61.5	11.78	GI
14MX-112S-37	112	19.650	19.540	—	C-3	16.39	8.75	—	2.50	—	2.06	0.44	1.03	3525	1.188	3.938	89.1	30.71	GI

Material Spec : GI - Grey Iron DI - Ductile Iron SS - Stainless Steel

Design Type Suffix: 1 - Solid 2 - Web 3 - Arms

Note: 2D and 3D sprocket drawings are available at [www.gates.com/ptcatalog](http://www.gates.com/ptcatalog)

NOTE: •Weights for Minimum Plain Bore (MPB) Sprockets are with minimum bore. •Weights and WR<sup>2</sup> for Bushed Sprockets do not include bushings. •WR<sup>2</sup> values have lb-ft<sup>2</sup> units.

**Details shown which do not affect drive function may be changed without notification.**





# Stock 14mm Gates Poly Chain® GT®2 Sprocket Specifications—continued

Sprocket Number	Number of Teeth	Diameters (in)		Design Type	Dimensions (in)										Approx. Wt. (lb)	Approx. Wt. (lb)	Mati. Spec		
		Pitch	O.D.		Flange Ref.	A	B	C	D	E	F	M	F-CL	Bushing Size				Bore Size Min	Bore Size Max
PB14MX-28S-68	28	4.912	4.802	5.400	6F-1	—	3.97	3.01	4.13	0.80	3.33	0	1.67	MPB	1.000	2.938	17.4	0.348	DI
14MX-29S-68	29	5.088	4.978	5.760	AF-1	3.99	—	3.01	1.75	—	3.33	1.58	1.67	2517	0.500	2.688	7.0	0.23	GI
PB14MX-29S-68	29	5.088	4.978	5.760	6F-1	—	4.35	3.01	4.13	0.80	3.33	0	1.67	MPB	1.000	3.188	19.1	0.412	DI
14MX-30S-68	30	5.263	5.153	5.760	AF-1	3.99	—	3.01	1.75	—	3.33	1.58	1.67	2517	0.500	2.688	8.2	0.281	GI
PB14MX-30S-68	30	5.263	5.153	5.760	6F-1	—	4.35	3.01	4.13	0.80	3.33	0	1.67	MPB	1.000	3.188	20.3	0.466	DI
14MX-31S-68	31	5.439	5.329	6.110	AF-1	4.22	—	3.01	1.75	—	3.33	1.58	1.67	2517	0.500	2.688	8.8	0.32	GI
PB14MX-31S-68	31	5.439	5.329	6.110	6F-1	—	4.57	3.01	4.13	0.80	3.33	0	1.67	MPB	1.000	3.438	21.9	0.537	DI
14MX-32S-68	32	5.614	5.504	6.110	AF-1	4.22	—	3.01	1.75	—	3.33	1.58	1.67	2517	0.500	2.688	10.0	0.383	GI
PB14MX-32S-68	32	5.614	5.504	6.110	6F-1	—	4.57	3.01	4.13	0.80	3.33	0	1.67	MPB	1.000	3.438	23.2	0.603	DI
14MX-33S-68	33	5.790	5.680	6.460	AF-1	4.53	—	3.01	1.75	—	3.33	1.58	1.67	2517	0.500	2.688	10.5	0.422	GI
PB14MX-33S-68	33	5.790	5.680	6.470	6F-1	—	4.89	3.01	4.33	1.00	3.33	0	1.67	MPB	1.000	3.500	25.9	0.714	DI
14MX-34S-68	34	5.965	5.855	6.460	AF-1	4.53	—	3.01	1.75	—	3.33	1.58	1.67	2517	0.500	2.688	11.8	0.488	GI
PB14MX-34S-68	34	5.965	5.855	6.470	6F-1	—	4.89	3.01	4.33	1.00	3.33	0	1.67	MPB	1.000	3.500	27.3	0.794	DI
14MX-35S-68	35	6.141	6.031	6.820	AF-1	4.95	—	3.01	2.00	—	3.33	1.33	1.67	3020	0.875	3.250	10.3	0.498	DI
14MX-36S-68	36	6.316	6.206	6.820	AF-1	4.95	—	3.01	2.00	—	3.33	1.33	1.67	3020	0.875	3.250	11.7	0.589	DI
14MX-37S-68	37	6.492	6.382	7.170	AF-1	5.27	—	3.01	2.00	—	3.33	1.33	1.67	3020	0.875	3.250	12.3	0.646	GI
14MX-38S-68	38	6.667	6.557	7.170	AF-1	5.27	—	3.01	2.00	—	3.33	1.33	1.67	3020	0.875	3.250	13.8	0.754	GI
14MX-39S-68	39	6.842	6.732	7.520	AF-1	5.54	—	3.01	2.00	—	3.33	1.33	1.67	3020	0.875	3.250	14.6	0.881	GI
14MX-40S-68	40	7.018	6.908	7.520	AF-1	5.54	—	3.01	2.00	—	3.33	1.33	1.67	3020	0.875	3.250	16.2	0.957	GI
14MX-43S-68	43	7.544	7.434	8.040	AF-1	6.16	—	3.01	2.00	—	3.33	1.33	1.67	3020	0.875	3.250	18.4	1.22	GI
14MX-45S-68	45	7.895	7.785	8.390	AF-1	6.42	—	3.01	2.00	—	3.33	1.33	1.67	3020	0.875	3.250	21.9	1.571	GI
14MX-48S-68	48	8.421	8.311	8.940	AF-1	6.96	—	3.01	2.50	—	3.33	0.83	1.67	3525	1.188	3.938	25.7	2.123	DI
14MX-50S-68	50	8.772	8.662	9.290	AF-1	7.44	—	3.01	2.50	—	3.33	0.83	1.67	3525	1.188	3.938	28.5	2.506	DI
14MX-53S-68	53	9.299	9.189	9.690	AF-1	7.84	—	3.01	2.50	—	3.33	0.83	1.67	3525	1.188	3.938	33.7	3.26	GI
14MX-56S-68	56	9.825	9.715	10.360	AF-1	8.35	—	3.01	2.50	—	3.33	0.83	1.67	3525	1.188	3.938	39.0	4.119	GI
14MX-60S-68	60	10.527	10.417	11.070	AF-1	9.06	—	3.01	2.50	—	3.33	0.83	1.67	3525	1.188	3.938	46.4	5.489	GI
14MX-63S-68	63	11.063	10.943	11.590	AF-1	9.59	—	3.01	2.50	—	3.33	0.83	1.67	3525	1.188	3.938	52.3	6.713	GI
14MX-67S-68	67	11.755	11.645	12.500	DF-1	10.36	8.75	3.01	2.50	—	3.33	0.83	1.67	3525	1.188	3.938	56.4	7.462	GI
14MX-71S-68	71	12.457	12.347	13.070	DF-1	11.05	8.75	3.01	2.50	—	3.33	0.83	1.67	3525	1.188	3.938	64.1	9.377	GI
14MX-75S-68	75	13.158	13.048	13.730	DF-1	11.68	8.75	3.01	2.50	—	3.33	0.83	1.67	3525	1.188	3.938	66.9	8.983	GI
14MX-80S-68	80	14.036	13.926	14.620	DF-2	12.56	8.75	3.01	2.50	—	3.33	0.83	1.67	3525	1.188	3.938	62.1	10.39	GI
14MX-90S-68	90	15.790	15.680	—	D-2	14.26	10.00	3.01	3.00	—	3.33	0.33	1.67	4030	1.438	4.438	86.2	17.66	GI
14MX-112S-68	112	19.650	19.540	—	D-3	16.35	10.00	3.01	3.00	—	3.33	0.33	1.67	4030	1.438	4.438	135.1	49.62	GI
14MX-140S-68	140	24.562	24.452	—	D-3	20.78	10.00	3.01	3.00	—	3.33	0.33	1.67	4030	1.438	4.438	189.0	115.1	GI
14MX-166S-68	166	29.475	29.365	—	C-3	25.23	10.50	3.01	3.50	—	3.33	0.17	1.67	4535	1.938	4.938	259.5	228.9	GI
14MX-180S-68	180	31.580	31.470	—	C-3	27.16	10.50	3.01	3.50	—	3.33	0.17	1.67	4535	1.938	4.938	288.6	295.5	GI
14MX-200S-68	200	35.089	34.979	—	C-3	30.65	10.50	3.01	3.50	—	3.33	0.17	1.67	4535	1.938	4.938	331.9	422.1	GI
14MX-224S-68	224	39.300	39.190	—	C-3	34.82	11.00	3.01	4.00	—	3.33	0.67	1.67	5040	2.438	5.000	404.3	644.5	GI

Material Spec : GI - Grey Iron DI - Ductile Iron SS - Stainless Steel Design Type Suffix: 1 - Solid 2 - Web 3 - Arms

Note: 2D and 3D sprocket drawings are available at [www.gates.com/pt/catalog](http://www.gates.com/pt/catalog)

NOTE: •Weights for Minimum Plain Bore (MPB) Sprockets are with minimum bore. •Weights and WR<sup>2</sup> for Bushed Sprockets do not include bushings. •WR<sup>2</sup> values have lb-ft<sup>2</sup> units.

**Details shown which do not affect drive function may be changed without notification.**



# Stock 14mm Gates Poly Chain® GT®2 Sprocket Specifications—continued

Sprocket Number	Number of Teeth		Diameters (in)		Design Type	Dimensions (in)										Approx Wt. (lb)	Approx Wt. (kg)	Mati. Spec	
	Pitch	O.D.	Flange Ref.	Flange Ref.		A	B	C	D	E	F	M	F-CL	Bushing Size	Bore Sizes Min				Bore Sizes Max
PB14MX-28S-90	28	4.912	4.802	5.400	6F-1	—	3.97	3.88	5.14	0.94	4.20	0	2.10	MPB	1.500	2.938	20.4	0.432	D
PB14MX-29S-90	29	5.088	4.978	5.760	6F-1	—	4.35	3.88	5.00	0.80	4.20	0	2.10	MPB	1.500	3.188	22.0	0.503	D
PB14MX-30S-90	30	5.263	5.153	5.760	6F-1	—	4.35	3.88	5.00	0.80	4.20	0	2.10	MPB	1.500	3.188	23.6	0.571	D
PB14MX-31S-90	31	5.439	5.329	6.110	6F-1	—	4.57	3.88	5.00	0.80	4.20	0	2.10	MPB	1.500	3.438	25.5	0.668	D
PB14MX-32S-90	32	5.614	5.504	6.110	6F-1	—	4.57	3.88	5.00	0.80	4.20	0	2.10	MPB	1.500	3.438	27.1	0.741	D
PB14MX-33S-90	33	5.790	5.680	6.470	6F-1	—	4.89	3.88	5.20	1.00	4.20	0	2.10	MPB	1.500	3.500	30.2	0.871	D
PB14MX-34S-90	34	5.965	5.855	6.470	6F-1	—	4.89	3.88	5.20	1.00	4.20	0	2.10	MPB	1.500	3.500	31.9	0.971	D
14MX-35S-90	35	6.141	6.031	6.820	AF-1	4.95	—	3.88	2.00	—	4.20	2.20	2.10	3020	0.875	3.250	12.1	0.602	D
PB14MX-35S-90	35	6.141	6.031	6.820	6F-1	—	5.30	3.88	5.20	1.00	4.20	0	2.10	MPB	1.500	3.813	34.6	1.120	D
14MX-36S-90	36	6.316	6.206	6.820	AF-1	4.95	—	3.88	2.00	—	4.20	2.20	2.10	3020	0.875	3.250	13.9	0.717	D
PB14MX-36S-90	36	6.316	6.206	6.820	6F-1	—	5.30	3.88	5.20	1.00	4.20	0	2.10	MPB	1.500	3.813	36.4	1.240	D
14MX-37S-90	37	6.492	6.382	7.170	AF-1	5.27	—	3.88	2.00	—	4.20	2.20	2.10	3020	0.875	3.250	14.2	0.773	G
PB14MX-37S-90	37	6.492	6.382	7.170	6F-1	—	5.63	3.88	5.20	1.00	4.20	0	2.10	MPB	1.500	4.125	39.0	1.408	D
14MX-38S-90	38	6.667	6.557	7.170	AF-1	5.27	—	3.88	2.00	—	4.20	2.20	2.10	3020	0.875	3.250	16.1	0.909	G
PB14MX-38S-90	38	6.667	6.557	7.170	6F-1	—	5.63	3.88	5.20	1.00	4.20	0	2.10	MPB	1.500	4.125	41.0	1.549	D
14MX-39S-90	39	6.842	6.732	7.520	AF-1	5.54	—	3.88	2.00	—	4.20	2.20	2.10	3020	0.875	3.250	16.8	0.992	G
PB14MX-39S-90	39	6.842	6.732	7.520	6F-1	—	5.89	3.88	5.20	1.00	4.20	0	2.10	MPB	1.500	4.375	43.6	1.737	D
14MX-40S-90	40	7.018	6.908	7.520	AF-1	5.54	—	3.88	2.00	—	4.20	2.20	2.10	3020	0.875	3.250	18.8	1.152	G
PB14MX-40S-90	40	7.018	6.908	7.520	6F-1	—	5.89	3.88	5.20	1.00	4.20	0	2.10	MPB	1.500	4.375	45.6	1.903	D
14MX-43S-90	43	7.544	7.434	8.040	AF-1	6.16	—	3.88	2.50	—	4.20	1.70	2.10	3525	1.188	3.938	20.9	1.51	D
14MX-45S-90	45	7.895	7.785	8.390	AF-1	6.42	—	3.88	2.50	—	4.20	1.70	2.10	3525	1.188	3.938	24.3	1.878	D
14MX-48S-90	48	8.421	8.311	8.940	AF-1	6.96	—	3.88	2.50	—	4.20	1.70	2.10	3525	1.188	3.938	28.9	2.477	D
14MX-50S-90	50	8.772	8.662	9.290	AF-1	7.44	—	3.88	2.50	—	4.20	1.70	2.10	3525	1.188	3.938	31.5	2.877	D
14MX-53S-90	53	9.299	9.189	9.690	AF-1	7.83	—	3.88	2.50	—	4.20	1.70	2.10	3525	1.188	3.938	37.4	3.753	G
14MX-56S-90	56	9.825	9.715	10.360	AF-1	8.35	—	3.88	3.00	—	4.20	1.20	2.10	4030	1.438	4.438	43.2	4.893	G
14MX-60S-90	60	10.527	10.417	11.070	AF-1	9.06	—	3.88	3.00	—	4.20	1.20	2.10	4030	1.438	4.438	52.2	6.574	G
14MX-63S-90	63	11.053	10.943	11.590	AF-1	9.59	—	3.88	3.00	—	4.20	1.20	2.10	4030	1.438	4.438	59.3	8.076	G
14MX-67S-90	67	11.755	11.645	12.500	AF-1	9.88	—	3.88	3.00	—	4.20	1.20	2.10	4030	1.438	4.438	71.3	10.79	G
14MX-71S-90	71	12.457	12.347	13.070	AF-1	10.67	—	3.88	3.00	—	4.20	1.20	2.10	4030	1.438	4.438	81.6	13.58	G
14MX-75S-90	75	13.158	13.048	13.730	AF-1	11.63	—	3.88	3.00	—	4.20	1.20	2.10	4030	1.438	4.438	95.9	16.50	G
14MX-80S-90	80	14.036	13.926	14.620	DF-1	12.56	10.00	3.88	3.00	—	4.20	1.20	2.10	4030	1.438	4.438	94.1	17.78	G
14MX-90S-90	90	15.790	15.680	—	D-2	14.26	10.00	—	3.00	—	4.20	1.20	2.10	4030	1.438	4.438	94.5	20.17	G
14MX-112S-90	112	19.650	19.540	—	D-2	16.35	10.50	—	3.50	—	4.20	0.70	2.10	4535	1.938	4.938	173.7	64.28	G
14MX-140S-90	140	24.562	24.452	—	D-3	20.74	11.00	—	4.00	—	4.20	0.20	2.10	5040	2.438	5.000	245.3	149.3	G
14MX-168S-90	168	29.475	29.365	—	C-3	25.11	15.50	—	5.00	—	4.20	0.80	2.10	6050	4.438	6.000	395.1	321.7	G
14MX-180S-90	180	31.580	31.470	—	C-3	27.06	15.50	—	5.00	—	4.20	0.80	2.10	6050	4.438	6.000	429.4	405.5	G
14MX-200S-90	200	35.089	34.979	—	C-3	30.29	15.50	—	5.00	—	4.20	0.80	2.10	6050	4.438	6.000	483.0	586.1	G
14MX-224S-90	224	39.300	39.190	—	C-3	34.46	15.50	—	5.00	—	4.20	0.80	2.10	6050	4.438	6.000	562.6	849.9	G

Material Spec : GI - Grey Iron DI - Ductile Iron SS - Stainless Steel Design Type Suffix: 1 - Solid 2 - Web 3 - Arms

Note: 2D and 3D sprocket drawings are available at [www.gates.com/ptcatalog](http://www.gates.com/ptcatalog)

NOTE: •Weights for Minimum Plain Bore (MPB) Sprockets are with minimum bore. •Weights and WR<sup>2</sup> for Bushed Sprockets do not include bushings. •WR<sup>2</sup> values have lb-ft<sup>2</sup> units.

**Details shown which do not affect drive function may be changed without notification.**





# Stock 14mm Gates Poly Chain® GT®2 Sprocket Specifications—continued

Sprocket Number	Number of Teeth	Diameters (in)			Design Type	Dimensions (in)										Approx. Wt. (lb)	Approx. WR <sup>2</sup>	Mati. Spec	
		Pitch	O.D.	Flange Ref.		A	B	C	D	E	F	M	F-CL	Bushing Size	Bore Sizes Min				Bore Sizes Max
PB14MX-28S-125	28	4.912	4.802	5.400	6F-1	—	3.97	5.29	6.50	0.89	5.61	0	2.81	MPB	1.500	2.938	24.8	0.562	DI
PB14MX-29S-125	29	5.088	4.978	5.760	6F-1	—	4.35	5.29	6.50	0.89	5.61	0	2.81	MPB	1.500	3.188	27.2	0.661	DI
PB14MX-30S-125	30	5.263	5.153	5.760	6F-1	—	4.35	5.29	6.50	0.89	5.61	0	2.81	MPB	1.500	3.188	29.2	0.762	DI
PB14MX-31S-125	31	5.439	5.329	6.110	6F-1	—	4.57	5.29	6.50	0.89	5.61	0	2.81	MPB	1.500	3.438	31.6	0.865	DI
PB14MX-32S-125	32	5.614	5.504	6.110	6F-1	—	4.57	5.29	6.50	0.89	5.61	0	2.81	MPB	1.500	3.438	33.8	0.976	DI
PB14MX-33S-125	33	5.790	5.680	6.470	6F-1	—	4.89	5.29	6.69	1.08	5.61	0	2.81	MPB	1.500	3.500	37.3	1.138	DI
PB14MX-34S-125	34	5.965	5.855	6.470	6F-1	—	4.89	5.29	6.69	1.08	5.61	0	2.81	MPB	1.500	3.500	39.6	1.272	DI
PB14MX-35S-125	35	6.141	6.031	6.820	6F-1	—	5.30	5.29	6.69	1.08	5.61	0	2.81	MPB	1.500	3.813	42.9	1.461	DI
PB14MX-36S-125	36	6.316	6.206	6.820	6F-1	—	5.30	5.29	6.69	1.08	5.61	0	2.81	MPB	1.500	3.813	45.3	1.621	DI
PB14MX-37S-125	37	6.492	6.382	7.170	6F-1	—	5.63	5.29	6.69	1.08	5.61	0	2.81	MPB	1.500	4.125	48.5	1.835	DI
PB14MX-38S-125	38	6.667	6.557	7.170	6F-1	—	5.63	5.29	6.69	1.08	5.61	0	2.81	MPB	1.500	4.125	51.1	2.024	DI
PB14MX-39S-125	39	6.842	6.732	7.520	6F-1	—	5.89	5.29	6.69	1.08	5.61	0	2.81	MPB	1.500	4.375	54.3	2.267	DI
PB14MX-40S-125	40	7.018	6.908	7.520	6F-1	—	5.89	5.29	6.69	1.08	5.61	0	2.81	MPB	1.500	4.375	57.0	2.488	DI
PB14MX-43S-125	43	7.544	7.434	8.040	6F-1	—	6.51	5.29	6.81	1.20	5.61	0	2.81	MPB	1.500	4.813	68.2	3.413	DI
PB14MX-45S-125	45	7.895	7.785	8.400	6F-1	—	6.76	5.29	6.81	1.20	5.61	0	2.81	MPB	1.500	5.000	75.0	4.082	DI
PB14MX-48S-125	48	8.421	8.311	8.940	6F-1	—	7.29	5.29	6.81	1.20	5.61	0	2.81	MPB	1.500	5.625	86.3	5.340	DI
14MX-50S-125	50	8.772	8.662	9.290	AF-1	7.44	—	5.29	3.50	—	5.61	2.11	2.81	4535	1.938	4.938	38.0	3.54	DI
14MX-53S-125	53	9.299	9.189	9.680	AF-1	7.83	—	5.29	3.50	—	5.61	2.11	2.81	4535	1.938	4.938	46.0	4.705	DI
14MX-56S-125	56	9.825	9.715	10.360	AF-1	8.35	—	5.29	3.50	—	5.61	2.11	2.81	4535	1.938	4.938	53.6	5.983	DI
14MX-60S-125	60	10.527	10.417	11.070	AF-1	9.06	—	5.29	3.50	—	5.61	2.11	2.81	4535	1.938	4.938	64.3	8.015	GI
14MX-63S-125	63	11.053	10.943	11.590	AF-1	9.59	—	5.29	3.50	—	5.61	2.11	2.81	4535	1.938	4.938	72.8	9.827	GI
14MX-67S-125	67	11.755	11.645	12.500	AF-1	9.88	—	5.29	3.50	—	5.61	2.11	2.81	4535	1.938	4.938	88.2	13.3	GI
14MX-71S-125	71	12.457	12.347	13.070	AF-1	10.67	—	5.29	4.00	—	5.61	1.61	2.81	5040	2.438	5.000	103.0	17.41	GI
14MX-75S-125	75	13.158	13.048	13.730	AF-1	11.63	—	5.29	4.00	—	5.61	1.61	2.81	5040	2.438	5.000	117.0	21.43	GI
14MX-80S-125	80	14.036	13.926	14.620	AF-1	12.59	—	5.29	4.00	—	5.61	1.61	2.81	5040	2.438	5.000	136.0	27.78	GI
14MX-90S-125	90	15.790	15.680	—	D-1	14.26	11.00	—	4.00	—	5.61	1.61	2.81	5040	2.438	5.000	135.0	32.49	GI
14MX-112S-125	112	19.650	19.540	—	A-1	16.35	—	—	5.00	—	5.61	0.61	2.81	6050	4.438	6.000	317.0	127.5	GI
14MX-140S-125	140	24.562	24.452	—	D-3	20.74	15.50	—	5.00	—	5.61	0.61	2.81	6050	4.438	6.000	373.0	225.4	GI
14MX-168S-125	168	29.475	29.365	—	C-3	25.11	17.00	—	6.00	—	5.61	0.39	2.81	7060	4.938	7.000	524.0	419.5	GI
14MX-180S-125	180	31.550	31.470	—	C-3	27.06	17.00	—	6.00	—	5.61	0.39	2.81	7060	4.938	7.000	567.0	525.2	GI
14MX-200S-125	200	35.089	34.979	—	C-3	30.29	17.00	—	6.00	—	5.61	0.39	2.81	7060	4.938	7.000	648.0	753.8	GI
14MX-224S-125	224	39.300	39.190	—	C-3	34.21	17.00	—	6.00	—	5.61	0.39	2.81	7060	4.938	7.000	753.0	1122.	GI

Material Spec : GI - Grey Iron DI - Ductile Iron SS - Stainless Steel

Note: 2D and 3D sprocket drawings are available at [www.gates.com/ptcatalog](http://www.gates.com/ptcatalog)

NOTE: •Weights for Minimum Plain Bore (MPB) Sprockets are with minimum bore. •Weights and WR<sup>2</sup> for Bushed Sprockets do not include bushings. •WR<sup>2</sup> values have lb-ft<sup>2</sup> units.

Design Type Suffix: 1 - Solid 2 - Web 3 - Arms

**Details shown which do not affect drive function may be changed without notification.**

# Sprocket Specifications

## Sprocket Tolerance Specifications

Poly Chain® GT®2 sprockets are made to close tolerances. Modifications such as reboring may result in unsatisfactory drive performance. Strict adherence to the standard tolerances (as shown in table below) is highly recommended.

**Table 6 - Sprocket Outside Diameter and Pitch**

Outside Diameter Range (in)	Outside Diameter Tolerance (in)	Pitch To Pitch Tolerance (in)	
		Adjacent Grooves	Accumulative Over 90 Degrees
Over 2.000 to and including 4.000	+ 0.004 -0.000	±0.001	±0.0045
Over 4.000 to and including 7.000	+ 0.005 -0.000	±0.001	±0.005
Over 7.000 to and including 12.000	+ 0.006 -0.000	±0.001	±0.006
Over 12.000 to and including 20.000	+ 0.007 -0.000	±0.001	±0.0065
Over 20.000	+ 0.008 -0.000	±0.001	±0.0075

**Table 7 - Sprocket Runout  
Radial Runout\***

Outside Diameter (in)	Outside Diameter (mm)	Total Eccentricity Total Indicator Reading	
		(in)	(mm)
Over 2 to 4	50 100	0.003	0.08
Over 4 to 8	100 200	0.004	0.10
Over 8	200	0.0005 per inch O.D. over 8"	0.0005 per mm O.D. over 200mm (may not exceed face diameter tolerance)

\* Total Indicator Reading

### Axial Runout\*

For each inch of outside diameter up through 10.0 inches, add 0.001 inches

For each additional inch of outside diameter over 10.0 inches, add 0.0005 inches

\* Total Indicator Reading

**Table 8 - Sprocket and Bushing Keyseat**

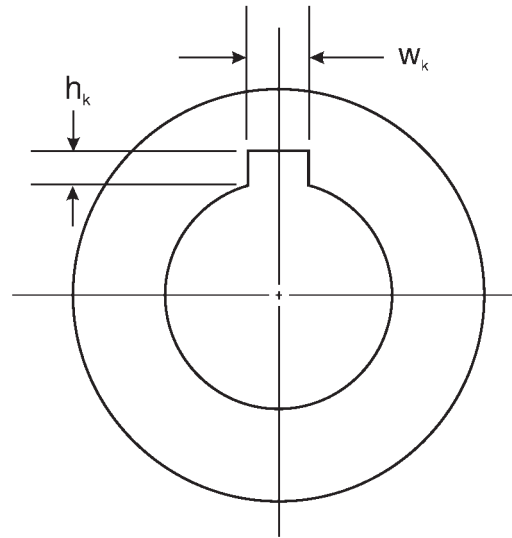
Shaft Diameter (in)	Width $W_k$ † (in)	Depth, $h_k$ (in) + 0.015 - 0.000
Up through 7/16 (0.44)	3/32 (0.0938)	3/64 (0.047)
Over 7/16 (0.44) to and incl. 9/16 (0.56)	1/8 (0.125)	1/16 (0.062)
Over 9/16 (0.56) to and incl. 7/8 (0.88)	3/16 (0.1875)	3/32 (0.094)
Over 7/8 (0.88) to and incl. 1 1/4 (1.25)	1/4 (0.250)	1/8 (0.125)
Over 1 1/4 (1.25) to and incl. 1 3/8 (1.38)	5/16 (0.3125)	5/32 (0.156)
Over 1 3/8 (1.38) to and incl. 1 3/4 (1.75)	3/8 (0.375)	3/16 (0.188)
Over 1 3/4 (1.75) to and incl. 2 1/4 (2.25)	1/2 (0.500)	1/4 (0.250)
Over 2 1/4 (2.25) to and incl. 2 3/4 (2.75)	5/8 (0.625)	5/16 (0.312)
Over 2 3/4 (2.75) to and incl. 3 1/4 (3.25)	3/4 (0.750)	3/8 (0.375)
Over 3 1/4 (3.25) to and incl. 3 3/4 (3.75)	7/8 (0.875)	7/16 (0.438)
Over 3 3/4 (3.75) to and incl. 4 1/2 (4.50)	1 (1.000)	1/2 (0.500)
Over 4 1/2 (4.50) to and incl. 5 1/2 (5.50)	1 1/4 (1.250)	5/8 (0.625)

† Tolerance on width,  $W_k$

For width up through 1/2 (0.500) . . . . . + 0.002, 0.000 inches

For width over 1/2 (0.500) up through 1 (1.000) . . . + 0.003, 0.000 inches

For width over 1 (1.000). . . . . + 0.004, 0.000 inches



### Balancing

Stock Sprockets are statically balanced per MPTA (Mechanical Power Transmission Association) Standard Practice for Pulley Balancing SPB-86 using the weight based on the following two criteria:

1. Balance limit (ounces) = Sprocket Weight (lb) x 0.016; or
2. 0.176 ounce (5 grams), whichever is greater.

Caution: Stock sprockets should not be used on drives where rim surface speeds exceed 6,500 fpm. Sprocket construction and materials will determine the dynamic balancing requirements of the sprocket(s) where rim surface speeds exceed 6,500 fpm.

### Sprocket Tooth Profile and Surface Quality

The Poly Chain GT2 sprocket tooth profile was designed and developed exclusively by Gates Corporation to operate with the Gates Poly Chain GT Carbon Belt. See Engineering Section II-3, Tooth Profile, on page 101 for a complete discussion of the performance characteristics of this new tooth profile. The tooth surface should be free of any surface defects and should be 80 microinches finish or better.

### Sprocket Blanks

Sprocket blanks can be grooved by Gates for specially designed, made-to-order sprockets. If those sprockets are supplied in blank form, Gates can perform the "grooving" operation. The blank diameter must be 0.050" larger than the finished sprocket O.D. Contact your local Gates Representative for additional details.

# Poly Chain® GT2 Bored-To-Size Sprocket Bore Range Listing

## 8mm Pitch Sprockets

Sprocket Size	Minimum Bore (In)	Full Keyway Bore Range (In)	Shallow Keyway Bore Range (In)
8MX-22S-12	0.500	0.500 - 1.063	1.125 - 1.188
8MX-22S-21	0.500	0.500 - 1.063	1.125 - 1.188
8MX-22S-36	0.500	0.500 - 1.063	1.125 - 1.188
8MX-25S-12	0.500	0.500 - 1.313	1.375 - 1.500
8MX-25S-21	0.500	0.500 - 1.313	1.375 - 1.500
8MX-25S-36	0.500	0.500 - 1.313	1.375 - 1.500
8MX-25S-62	1.000	1.000 - 1.313	1.375 - 1.500
8MX-28S-12	0.500	0.500 - 1.500	1.563 - 1.750
8MX-28S-21	0.500	0.500 - 1.500	1.563 - 1.750
8MX-28S-36	0.500	0.500 - 1.500	1.563 - 1.750
8MX-28S-62	1.000	1.000 - 1.500	1.563 - 1.750
8MX-30S-12	0.500	0.500 - 1.563	1.625 - 1.813
8MX-30S-21	0.500	0.500 - 1.563	1.625 - 1.813
8MX-30S-36	0.500	0.500 - 1.563	1.625 - 1.813
8MX-30S-62	1.000	1.000 - 1.563	1.625 - 1.813
8MX-32S-12	0.500	0.500 - 1.750	1.813 - 2.000
8MX-32S-21	0.500	0.500 - 1.750	1.813 - 2.000
8MX-32S-36	0.500	0.500 - 1.750	1.813 - 2.000
8MX-32S-62	1.000	1.000 - 1.750	1.813 - 2.000
8MX-34S-36	0.500	0.500 - 1.750	1.813 - 2.125
8MX-34S-62	1.000	1.000 - 1.750	1.813 - 2.125
8MX-36S-36	0.500	0.500 - 1.938	2.000 - 2.313
8MX-36S-62	1.000	1.000 - 1.938	2.000 - 2.313
8MX-38S-36	0.500	0.500 - 2.125	2.188 - 2.438
8MX-38S-62	1.000	1.000 - 2.125	2.188 - 2.438
8MX-40S-62	1.000	1.000 - 2.188	2.250 - 2.563
8MX-42S-62	1.000	1.000 - 2.375	2.438 - 2.750
8MX-45S-62	1.000	1.000 - 2.375	2.438 - 2.750

All bored-to-size Sprockets are available through Gates rebore center. Check with your local Gates representative or Customer Service for a quote and delivery.

## 14mm Pitch Sprockets

Sprocket Size	Minimum Bore (In)	Full Keyway Bore Range (In)	Shallow Keyway Bore Range (In)
14MX-28S-37	1.000	1.000 - 2.500	2.563 - 2.938
14MX-28S-68	1.000	1.000 - 2.500	2.563 - 2.938
14MX-28S-90	1.500	1.500 - 2.500	2.563 - 2.938
14MX-28S-125	1.500	1.500 - 2.500	2.563 - 2.938
14MX-29S-68	1.000	1.000 - 2.750	2.813 - 3.188
14MX-29S-90	1.500	1.500 - 2.750	2.813 - 3.188
14MX-29S-125	1.500	1.500 - 2.750	2.813 - 3.188
14MX-30S-68	1.000	1.000 - 2.750	2.813 - 3.188
14MX-30S-90	1.500	1.500 - 2.750	2.813 - 3.188
14MX-30S-125	1.500	1.500 - 2.750	2.813 - 3.188
14MX-31S-68	1.000	1.000 - 2.875	2.938 - 3.438
14MX-31S-90	1.500	1.500 - 2.875	2.938 - 3.438
14MX-31S-125	1.500	1.500 - 2.875	2.938 - 3.438
14MX-32S-68	1.000	1.000 - 2.875	2.938 - 3.438
14MX-32S-90	1.500	1.500 - 2.875	2.938 - 3.438
14MX-32S-125	1.500	1.500 - 2.875	2.938 - 3.438
14MX-33S-68	1.000	1.000 - 2.938	3.000 - 3.500
14MX-33S-90	1.500	1.500 - 2.938	3.000 - 3.500
14MX-33S-125	1.500	1.500 - 2.938	3.000 - 3.500
14MX-34S-37	1.000	1.000 - 2.938	3.000 - 3.500
14MX-34S-68	1.000	1.000 - 2.938	3.000 - 3.500
14MX-34S-90	1.500	1.500 - 2.938	3.000 - 3.500
14MX-34S-125	1.500	1.500 - 2.938	3.000 - 3.500
14MX-35S-90	1.500	1.500 - 3.250	3.313 - 3.813
14MX-35S-125	1.500	1.500 - 3.250	3.313 - 3.813
14MX-36S-90	1.500	1.500 - 3.250	3.313 - 3.813
14MX-36S-125	1.500	1.500 - 3.250	3.313 - 3.813
14MX-37S-90	1.500	1.500 - 3.563	3.625 - 4.125
14MX-37S-125	1.500	1.500 - 3.563	3.625 - 4.125
14MX-38S-90	1.500	1.500 - 3.563	3.625 - 4.125
14MX-38S-125	1.500	1.500 - 3.563	3.625 - 4.125
14MX-39S-90	1.500	1.500 - 3.750	3.182 - 4.375
14MX-39S-125	1.500	1.500 - 3.750	3.182 - 4.375
14MX-40S-90	1.500	1.500 - 3.750	3.182 - 4.375
14MX-40S-125	1.500	1.500 - 3.750	3.182 - 4.375
14MX-43S-125	1.500	1.500 - 4.125	4.188 - 4.813
14MX-45S-125	1.500	1.500 - 4.375	4.438 - 5.000
14MX-48S-125	1.500	1.500 - 4.688	4.750 - 5.625

All bored-to-size Sprockets are available through Gates rebore center. Check with your local Gates representative or Customer Service for a quote and delivery.

# Recommended Re-bore Specifications and Instructions

## For Minimum Plain Bore (MPB) Sprockets

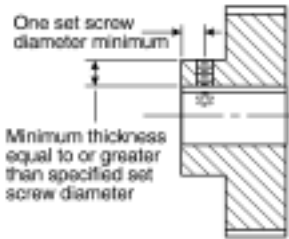
When using MPB Poly Chain® GT2 sprockets in power transmission systems, important guidelines should be followed for proper product finishing and application. Due to the high load carrying capacity and high operating tensions often found in Poly Chain GT Carbon belt drive systems, it is imperative to use and adhere to industry standard practices.

When finishing MPB sprockets for high performance belt drive systems, care should be taken to ensure proper functionality and performance. General re-bore instructions and specifications are as follows:

1. Materials used in Poly Chain GT2 sprockets are steel, gray iron, stainless steel and ductile iron. The materials used may vary with the size of the sprocket. See the Sprocket Specification Tables, pages 66 thru 75 for specific materials.
2. The maximum bore diameter specified by the manufacturer for each sprocket size should **NOT** be exceeded, or a keyway used which reduces the hub thickness to less than its minimum allowable value. See the Sprocket Specification Tables for a listing of recommended bore ranges by sprocket size. Bores exceeding the maximum recommended value for a particular sprocket size can adversely affect the structural integrity, thereby reducing their load-carrying capability.

The minimum metal thickness between the keyway and hub O.D. should be no less than the set screw diameter specified for the corresponding sprocket size. See Figure 1. A listing of minimum set screw diameters is included below.

8M-22S thru 28S – 1/4	14M-28S – 7/16
8M-30S thru 34S – 5/16	14M-29S thru 32S – 1/2
8M-36S thru 38S – 3/8	14M-33S thru 40S – 5/8
8M-40S thru 45S – 7/16	14M-43S thru 48S – 3/4



**Figure 1 — Minimum Hub Thickness and Set Screw Placement Guidelines**

3. The fit between a finished sprocket bore and its mating shaft in a power transmission system must not allow relative movement between the bore and the shaft when the drive is subjected to belt tension and torque loads. This is accomplished, in the case of plain bore sprockets, with the use of set screws and keys and by controlling the fit or clearance between the sprocket bore and its mating shaft. Cyclical, pulsating, or reversing loads may wear the sprocket bore and/or keyway due to the relative movement between the contacting surfaces of the shaft and the bore. The resulting wear may increase the clearance further, if an interference fit is not used.

In order to maximize the performance of high capacity belt drives using plain bore style sprockets, the following recommendations presented in Table 8 should be followed:

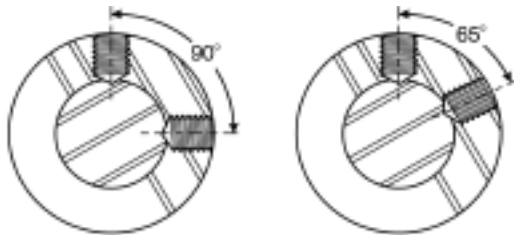
**Class 1 Clearance Fits** should be used when the transmitted load is smooth in nature. **Interference Fits** should be used for Poly Chain GT Carbon curvilinear drives transmitting cyclical, pulsating, or reversing loads.

**Table 9 - Recommended Shaft / Bore Fits (Inches)**

Nominal Bore Range Over - To (Incl.)	Shaft Tol. (minus)	Clearance Fits		Interference Fits			
		Class 1 - Smooth Load		Cyclical, Pulsating, Reversing Load			
		Bore Tol. (Plus)	Fit Tol. (Plus)	Bore Range (Minus) Tolerance		Fit Tolerance Range (Minus)	
0.4375 - 0.5626	0.0005	0.0010	0.0015	0.0005	0.0010	0.0000	0.0010
0.5625 - 0.8750	0.0005	0.0010	0.0015	0.0005	0.0010	0.0000	0.0010
0.8750 - 1.2500	0.0005	0.0010	0.0015	0.0005	0.0010	0.0000	0.0010
1.2500 - 1.3750	0.0005	0.0010	0.0015	0.0005	0.0010	0.0000	0.0010
1.3750 - 1.500	0.0005	0.0010	0.0015	0.0005	0.0010	0.0000	0.0010
1.5000 - 1.7500	0.0010	0.0010	0.0020	0.0010	0.0020	0.0000	0.0020
1.7500 - 2.0000	0.0010	0.0010	0.0020	0.0010	0.0020	0.0000	0.0020
2.0000 - 2.2500	0.0010	0.0015	0.0025	0.0010	0.0020	0.0000	0.0020
2.2500 - 2.7500	0.0010	0.0015	0.0025	0.0010	0.0020	0.0000	0.0020
2.7500 - 3.0000	0.0010	0.0015	0.0025	0.0010	0.0020	0.0000	0.0020
3.0000 - 3.2500	0.0010	0.0015	0.0025	0.0015	0.0030	0.0005	0.0030
3.2500 - 3.7500	0.0010	0.0015	0.0025	0.0015	0.0030	0.0005	0.0030
3.7500 - 4.0000	0.0010	0.0015	0.0025	0.0015	0.0030	0.0005	0.0030
4.0000 - 4.5000	0.0010	0.0015	0.0025	0.0020	0.0035	0.0010	0.0035
4.5000 - 5.0000	0.0010	0.0015	0.0025	0.0020	0.0035	0.0010	0.0035
5.0000 - 5.5000	0.0010	0.0015	0.0025	0.0025	0.0040	0.0015	0.0040
5.5000 - 6.5000	0.0010	0.0015	0.0025	0.0025	0.0040	0.0015	0.0040

Table 8 was extracted in part from AGMA Standard for Bores and Keyways for Flexible Couplings (Inch Series) AGMA 9002-A86 Table.

4. DO NOT chuck or center the sprocket on guide flanges. Soft jaws should be used when chucking on the sprocket teeth. Center (indicate) the sprocket using the sprocket tooth O.D. If chucked on the Rim I.D. or Hub O.D., the sprocket should be centered with respect to the sprocket tooth O.D. Guide flanges are permanently mounted and should not be removed. If original flanges must be removed, they should be replaced with NEW flanges. New guide flanges should be attached securely with care using mechanical fasteners such as screws. Note: Improper guide flange reassembly may cause serious personal injury and/or mechanical damage.
5. Set screw holes in the sprocket hub must be placed properly for maximum holding strength. For both standard and shallow keyseats, two (2) set screws should be used as illustrated in Figure 2. The total holding strength of the set screws is dependent upon their placement and design. Generally, one screw should be placed directly over the keyway, and the other screw at ninety degrees (90°) from the keyway, or at sixty-five degrees (65°) from the keyway – a more recent practice that improves holding power. Sometimes four set screws (or two pair) are used for increased holding strength.



**Figure 2 — Set Screw Angles**

Each set screw should be placed axially – a minimum of one set screw diameter from the end of the sprocket hub extension. See Figure 1. For recommended set screw tightening torque values see Table 9.

6. After re-boring, the sprocket may require rebalancing. Vibration, noise, reduced bearing life, and undue stresses on the mechanical components in the system could result if improper rebalancing practices are used. See Sprocket Specifications, page 74, for recommended sprocket balancing specifications.

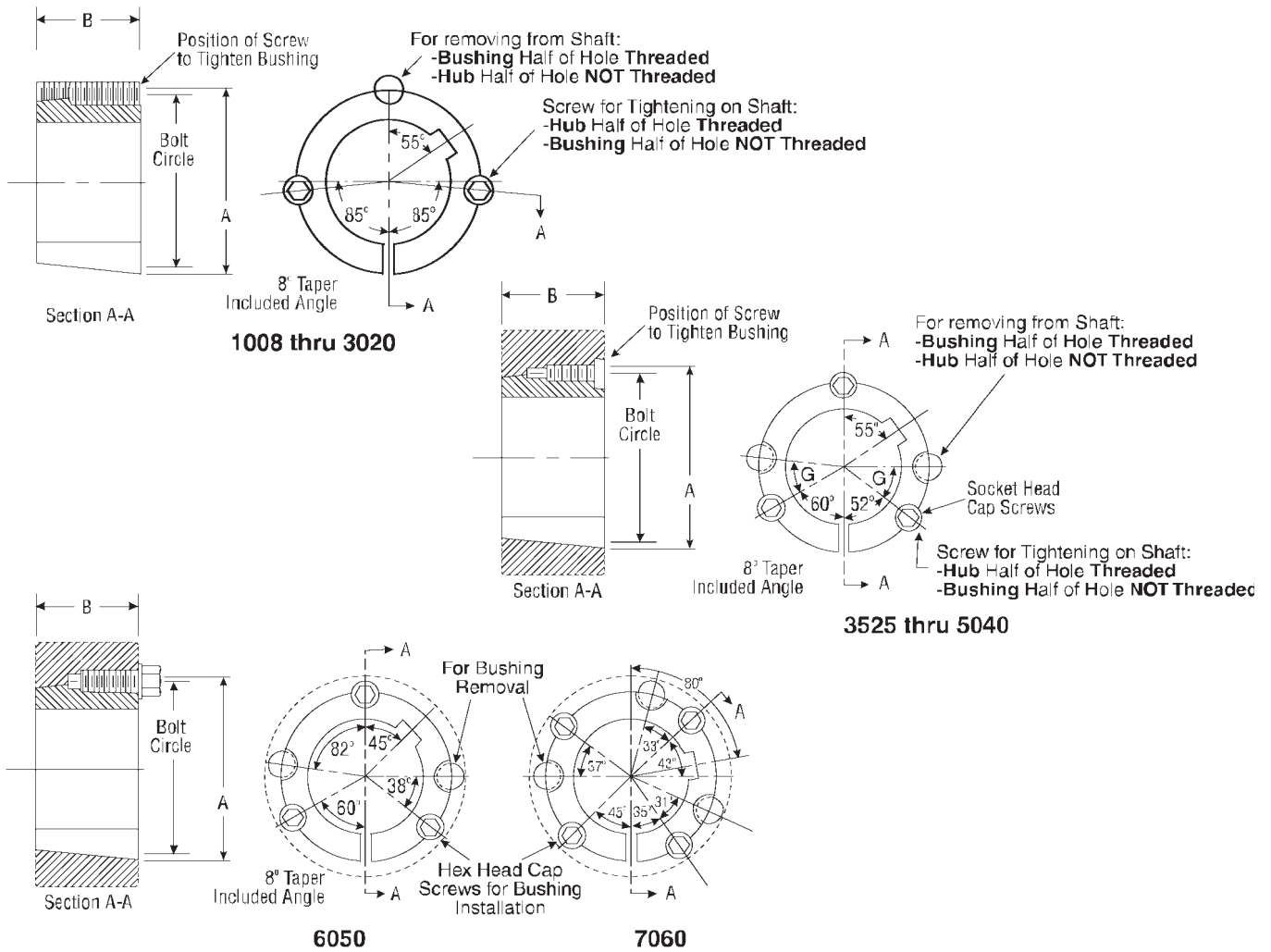
**Table 10 — Recommended Tightening Torque Values For Set Screws**

Set Screw Size	Hex Key Size (In)	Approximate Installation Torque Values (lb-in)
1/4	1/8	80
5/16	5/32	160
3/8	3/16	275
7/16	7/32	430
1/2	1/4	615
5/8	5/16	1315
3/4	3/8	2150
7/8	1/2	5130

7. Standard square or rectangular keys should be used. See page 78 and 79 for standard key dimensions.

Specifications and tolerances for sprocket eccentricity, parallelism, and balancing, etc. are all presented on page 74.

# Stock Bushings for Sprockets



## TAPER-LOCK® BUSHINGS

Bushing Size	Torque Capacity (lb-in)	Dimensions		Bolt Circle (in)	Mounting Screws			Bore Range (in)			Weight Range	
		A	B		Qty.	Size	G (deg)	Min. Bore	Max Bore		Max Bore	Min. Bore
									Standard Keyseat***	Shallow Keyseat**		
1008	1,200	1.386	0.875	1.328	2	1/4x1/2	—	0.500	0.875	1.000	0.2	0.3
1108****	1,300	1.511	0.875	1.453	2	1/4x1/2	—	0.500	1.000	1.125	0.1	0.3
1210****	3,600	1.875	1.000	1.750	2	3/8x5/8	—	0.500	1.250	—	0.4	0.6
1610****	4,300	2.250	1.000	2.125	2	3/8x5/8	—	0.500	1.500	1.688	0.5	0.9
1615	4,300	2.25	1.500	2.125	2	3/8x5/8	—	0.500	1.500	1.688	0.6	1.3
2012****	7,150	2.750	1.250	2.625	2	7/16x7/8	—	0.500	1.875	2.125	0.9	1.7
2517	11,600	3.375	1.750	3.250	2	1/2x1	—	0.500	2.250	2.688	1.8	3.7
3020	24,000	4.250	2.000	4.000	2	5/8x1 1/4	—	0.875	2.750	3.250	3.3	6.5
3525	44,800	5.000	2.500	4.830	3	1/2x1 1/2	39	1.188	3.250	3.938	3.7	10.9
3535	44,800	5.000	3.500	4.830	3	1/2x1 1/2	39	1.188	3.250	3.938	5.0	14.8
4030	77,300	5.750	3.000	5.540	3	5/8x1 3/4	40	1.438	3.625	4.438	6.4	17.3
4040	77,300	5.750	4.000	5.540	3	5/8x1 3/4	40	1.438	3.625	4.438	8.2	22.1
4535	110,000	6.375	3.500	6.130	3	3/4x2	40	1.938	4.250	4.938	8.8	23.7
4545	110,000	6.375	4.500	6.130	3	3/4x2	40	1.938	4.250	4.938	11.2	30.3
5040	126,000	7.000	4.000	6.720	3	7/8x2 1/4	37	2.438	4.500	5.000	15.9	31.5
6050	282,000	9.250	5.000	9.000	3	1 1/4x 3 1/2	—	4.438	6.000	—	45.0	57.0
7060	416,000	10.250	6.000	10.000	4	1 1/4x31/2	—	4.938	7.000	—	66.0	87.0

\*Taper-Lock® is a trademark of Reliance Electric  
 \*\*Key is furnished with each bushing having a shallow keyseat.  
 \*\*\*Keys are not furnished with bushings having standard keyseats.  
 \*\*\*\*1108, 1210, 1610, 2012 bushings are also available in stainless steel.

# Bushing Bore and Keyseat Information

Taper-Lock® Bushings are available from stock with all popular bores within the bore range of each size bushing.

The Taper-Lock Keyseat Dimension charts below list the bore range for each bushing and the appropriate keyseat dimensions.

Where standard keyseats are indicated, refer to the Standard Keyseat Dimensions chart. Where bores do not permit standard depth keyseats, a flat key of the proper dimension is furnished with the bushing.

## Taper-Lock Bushing Keyseat Dimensions

Bushing	Bores (in)	Keyseat
1008	0.500 - 0.875 0.938 - 1.000	Standard 1/4 x 1/16
1108	0.500 - 1.000 1.062 - 1.125	Standard 1/4 x 1/16
1210	0.500 - 1.250	Standard
1610	0.500 - 1.500 1.563 - 1.688	Standard 3/8 x 1/8
1615	0.500 - 1.500 1.563 - 1.688	Standard 3/8 x 1/8
2012	0.500 - 1.875 1.938 - 2.125	Standard 1/2 x 3/16
2517	0.500 - 2.250 2.313 - 2.688	Standard 5/8 x 3/16
3020	0.875 - 2.750 2.813 - 3.000 3.125 - 3.250	Standard 3/4 x 1/8 3/4 x 1/4
3525	1.188 - 3.250 3.313 3.375 - 3.500 3.625 3.688 - 3.750 3.875 - 3.938	Standard 7/8 x 1/8 7/8 x 3/16 7/8 x 1/4 7/8 x 3/16 1 x 1/4
3535	1.188 - 3.250 3.313 3.375 - 3.500 3.625 3.688 - 3.750 3.875 - 3.938	Standard 7/8 x 1/8 7/8 x 3/16 7/8 x 1/4 7/8 x 3/16 1 x 1/4
4030	1.438 - 3.625 3.688 - 3.750 3.875 - 4.438	Standard 7/8 x 3/16 1 x 1/4
4040	1.438 - 3.625 3.688 - 3.750 3.875 - 4.438	Standard 7/8 x 3/16 1 x 1/4
4535	1.938 - 4.250 4.375 - 4.500 4.750 - 4.938	Standard 1 x 1/4 1 1/4 x 1/4
4545	1.938 - 4.250 4.375 - 4.500 4.750 - 4.938	Standard 1 x 1/4 1 1/4 x 1/4
5040	2.438 - 4.500 4.875 - 5.000	Standard 1 1/4 x 7/16
6050	4.438 - 6.000	Standard
7060	4.938 - 7.000	Standard

## Standard Keyseat Dimensions

Shaft Diameter (in)	Keyseat (in)		Key (in)	
	Width	Depth	Width	Depth
0.313 - 0.438	3/32	3/64	3/32	3/32
0.500 - 0.563	1/8	1/16	1/8	1/8
0.625 - 0.875	3/16	3/32	3/16	3/16
0.938 - 1.250	1/4	1/8	1/4	1/4
1.313 - 1.375	5/16	5/32	5/16	5/16
1.438 - 1.750	3/8	3/16	3/8	3/8
1.813 - 2.250	1/2	1/4	1/2	1/2
2.313 - 2.750	5/8	5/16	5/8	5/8
2.813 - 3.250	3/4	3/8	3/4	3/4
3.313 - 3.750	7/8	7/16	7/8	7/8
3.813 - 4.500	1	1/2	1	1
4.563 - 5.500	1 1/4	5/8	1 1/4	1 1/4
5.563 - 6.500	1 1/2	3/4	1 1/2	1 1/2
6.563 - 7.500	1 3/4	3/4	1 3/4	1 1/2
7.563 - 9.000	2 3/4	2	1	1/2

\*Taper-Lock® is a trademark of Reliance Electric



# Bushing Bore and Keyseat Information

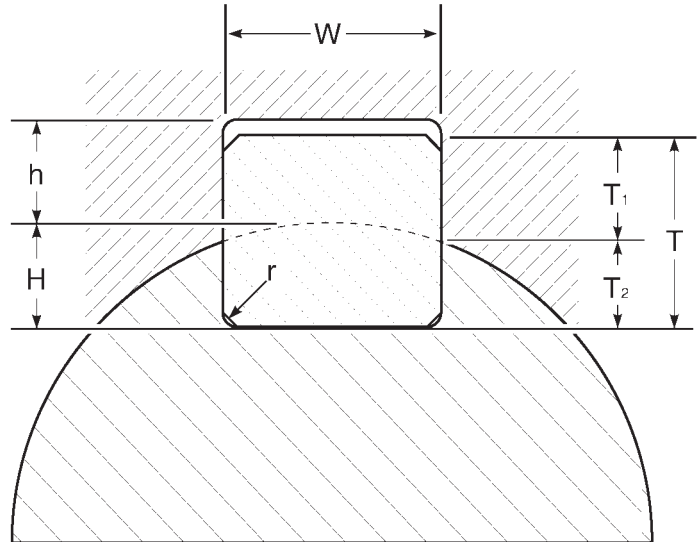
## Specifying English and Metric Keyways

Dimensioning and specifying metric keys and keyways varies significantly from the English system. In the English system, it is the standard practice to dimension the keyway, while in the metric system it is common practice to specify the key size. In the English system, the keyway in the hub is dimensioned by the width and depth at the side, but in the metric system the keyway is dimensioned by the width and the depth measured from the radius of the shaft to the center of the keyway. One of the following methods should be used to specify keyways:

<b>English:</b>	<b>Metric:</b>
W x T <sub>1</sub> Keyway	W x T Key
W x T Key	W x h Keyway

Unless otherwise noted, the keyway in the shaft is assumed to be standard. Also, T<sub>1</sub> and T<sub>2</sub> are not necessarily equal. The metric system does not refer to keyseat or keyway dimensions as does the English system. Instead, dimensions are given for the key itself which is rectangular in shape, not square, as in the English system. The correct terminology when ordering metric bored bushings with millimeter keyways will be either of the following:

1. Specify "standard keyway"
2. Customer to specify keysize (keyseat to be standard size in shaft)



## Metric Bore and Key Dimensions for Taper-Lock® Bushings

Bushing	Bore (mm)	Keyway (WxT) (mm)	Key Size (ref.) (mm)
1008	14,16,	5 X 2.3	5 X 5
	18,19,20, 22,	6 X 2.8	6 X 6
	24	8 X 3.3	8 X 7
1108	14*,16,	5 X 2.3	5 X 5
	18,19,20, 22,	6 X 2.8	6 X 6
	24, 25	8 X 3.3	8 X 7
1210	14, 16	5 X 2.3	5 X 5
	18, 19, 20, 22*,	6 X 2.8	6 X 6
	24, 25, 28, 30	8 X 3.3	8 X 7
1610	14*, 16*	5 X 2.3	5 X 5
	18*,19, 20, 22	6 X 2.8	6 X 6
	24, 25, 28, 30,	8 X 3.3	8 X 7
	32, 35, 38,	10 X 3.3	10 X 8
	40	12 X 3.3	12 X 8
2012	14,16	5 X 2.3	5 X 5
	18,19, 20, 22	6 X 2.8	6 X 6
	24, 25, 28, 30	8 X 3.3	8 X 7
	32, 35, 38	10 X 3.3	10 X 8
	40, 42	12 X 3.3	12 X 8
	45, 48*	14 X 3.8	14 X 9
2517	14,16	5 X 2.3	5 X 5
	18,19*,20,22	6 X 2.8	6 X 6
	24,25,28,30	8 X 3.3	8 X 7
	32,35,38	10 X 3.3	10 X 8
	40,42	12 X 3.3	12 X 8
	45,48,50	14 X 3.8	14 X 9
	55,	16 X 4.3	16 X 10
	60, 65*	18 X 4.4	18 X 11
3020	24,25,28,30*	8 X 3.3	8 X 7
	24,25,28	10 X 3.3	10 X 8
	40,42*	12 X 3.3	12 X 8
	45,48,50	14 X 3.8	14 X 9
	55	16 X 4.3	16 X 10
	60, 65,	18 X 4.4	18 X 11
	70*,75*	20 X 4.9	20 X 12

\*\*Taper-Lock® is a trademark of Reliance Electric

\*Non-stock, made to order bushing

# Taper-Lock® Type Sprocket Installation and Removal



## To Install TAPER-LOCK Type Bushings

1. Clean the shaft, bore of bushing, outside of bushing and the sprocket hub bore of all oil, paint and dirt. File away any burrs. **Note:** The use of lubricants can cause sprocket breakage. USE NO LUBRICANTS IN THIS INSTALLATION.
2. Insert the bushing into the sprocket hub. Match the hole pattern, not threaded holes (each complete hole will be threaded on one side only).
3. LIGHTLY oil the set screws and thread them into those half-threaded holes indicated by on the diagram above. Note: Do not lubricate the bushing taper, hub taper, bushing bore, or the shaft. Doing so could result in sprocket breakage.
4. With the key in the shaft keyway, position the assembly onto the shaft allowing for small axial movement of the sprocket which will occur during the tightening process. **Note:** When mounting sprockets on a vertical shaft, precautions must be taken to positively prevent the sprocket and/or bushing from falling during installation.
5. Alternately torque the set screws until the sprocket and bushing tapers are completely seated together (at approximately half of the recommended torque; see table below). **Note:** Do not use worn hex key wrenches. Doing so may result in a loose assembly or may damage screws.
6. Check the alignment and sprocket axial runout (wobble), and correct as necessary.
7. Continue alternate tightening of the cap screws to the recommended torque values specified in the table below.
8. To increase the bushing gripping force, hammer the face of the bushing using a drift or sleeve (do not hit the bushing directly with the hammer).
9. Re-torque the bushing screws after hammering.
10. Recheck all screw torque values after the initial drive run-in, and periodically thereafter. Repeat steps 5 through 9 if loose.

## To Remove

1. Loosen and remove all mounting screws.
2. Insert screws into all jack screw holes indicated by • (see figure above).
3. Loosen the bushing by alternately tightening the screws in small but equal increments until the tapered sprocket and bushing surfaces disengage.

## Sprocket Installation

Bushing Style	Bolts		Torque Wrench	
	Qty.	Size	lb-ft	lb-in
1008	2	1/4-20 x 1/2	4.6	55
1108	2	1/4-20 x 1/2	4.6	55
1210	2	3/8-16 x 5/8	14.6	175
1610	2	3/8-16 x 5/8	14.6	175
1615	2	3/8-16 x 5/8	14.6	175
2012	2	7/16-14 x 7/8	23.3	280
2517	2	1/2-13 x 1	35.8	430
3020	2	5/8-11 x 1 1/4	66.7	800
3525	3	1/2-13 x 1 1/2	83.3	1000
3535	3	1/2-13 x 1 1/2	83.3	1000
4030	3	5/8-11 x 1 3/4	141.7	1700
4040	3	5/8-11 x 1 3/4	141.7	1700
4535	3	3/4-10 x 2	204.2	2450
4545	3	3/4-10 x 2	204.2	2450
5040	3	7/8-9 x 2 1/4	258.3	3100
6050	3	1 1/4-7 x 3 1/2	651.7	7820
7060	4	1 1/4-7 x 3 1/2	651.7	7820

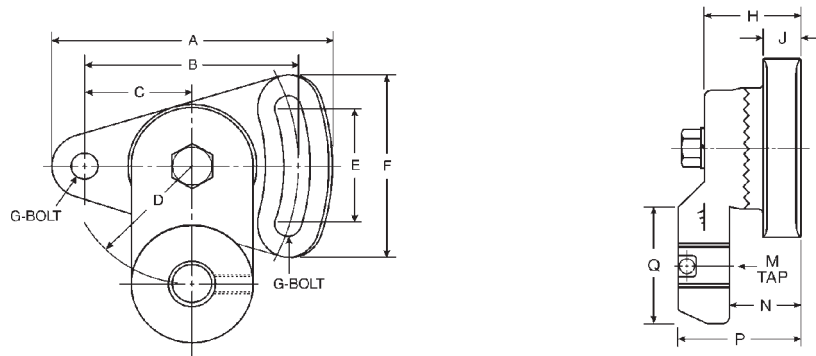
Caution: Excessive bolt torque can cause sprocket and/or bushing breakage.

Note: To insure proper bushing/sprocket performance, full bushing contact on the shaft is recommended.

\*Taper-Lock® is a trademark of Reliance Electric

# Belt Drive Tensioners

(Double Adjustable)



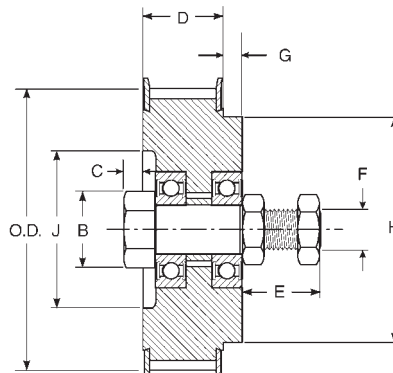
## Idler Bracket Specifications

Part No.	Tensioner Part No.	Use With	A (In)	B (In)	C (In)	D (In)	E (In)	F (In)	G (In)	H (In)	J (In)	M (Threads)	N (In)	P (In)	Q (In)	Weight (lb)
05-IDL-BRAK	7720-1005	1610-IDL-BUSH	4.62	3.50	1.75	2.00	2.06	3.06	0.38	1.40	0.62	5/8-18	0.90	1.77	1.94	2.80
10-IDL-BRAK	7720-1010	8mm Pitch Idler Sprockets, 2012-IDL-BUSH, 2517-IDL-BUSH, 20-IDL-BUSH (SK),	4.63	3.50	1.75	2.00	2.06	3.06	0.38	1.50	0.63	3/4-16	1.00	1.88	1.75	3.4
20-IDL-BRAK	7720-1020	14mm Pitch Idler Sprockets, 30-IDL-BUSH (SF), 40-IDL-BUSH (E)	6.94	5.25	2.63	5.00	3.00	4.56	0.63	2.38	1.00	1-14	1.63	2.94	2.75	11.2

## Nickel Plated Idler Bracket Specifications

Part No.	Tensioner Part No.	Use With	A (In)	B (In)	C (In)	D (In)	E (In)	F (In)	G (In)	H (In)	J (In)	M (Threads)	N (In)	P (In)	Q (In)	Weight (lb)
NP-10-IDL-BRAK	7720-1011	8mm Pitch Idler Sprockets, 2012-IDL-BUSH, 2517-IDL-BUSH, 20-IDL-BUSH (SK)	4.63	3.50	1.75	2.00	2.06	3.06	0.38	1.50	0.56	3/4-16	1.00	1.88	1.75	3.4
NP-20-IDL-BRAK	7720-1061	14mm Pitch Idler Sprockets, 30-IDL-BUSH (SF), 40-IDL-BUSH (E)	6.94	5.25	2.63	5.00	3.00	4.56	0.63	2.38	1.00	1-14	1.63	2.94	2.75	11.2

# Idler Sprockets



## Poly Chain® GT2 Idler Dimensions

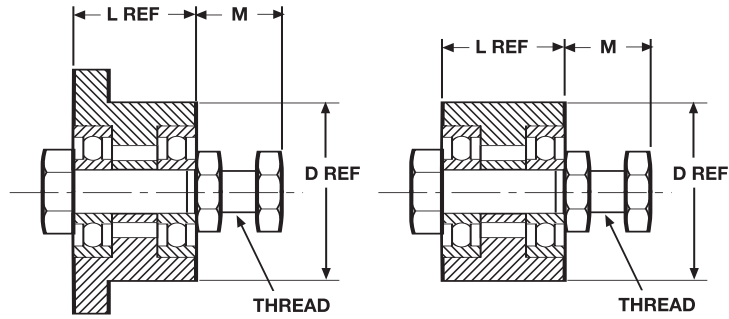
Part No.	Product No.	Use With	Size Designation	Belt Width (mm)	No. of Teeth	O.D. (In)	B Ref. (In)	C (In)	D (In)	E Ref. (In)	F (Threads) (In)	G Ref. (In)	H (In)	J (In)	Weight (lb)
12-IDL-SPRK	7720-1500	8mm Pitch Poly Chain GT Carbon	8MX-32S-12	12	32	3.145	1.25	0.50	0.85	1.56	3/4-16	0.94	2.75	-	1.0
21-IDL-SPRK	7720-1510		8MX-32S-21	21	32	3.145	1.25	0.50	1.24	1.56	3/4-16	0.56	2.75	-	1.1
36-IDL-SPRK	7720-1520		8MX-36S-36	36	36	3.546	1.91	0.75	1.86	1.63	3/4-16	-	-	-	2.0
62-IDL-SPRK	7720-1530		8MX-36S-62	62	36	3.546	1.91	0.75	2.91	1.69	3/4-16	0.69	3.13	-	2.1
20-IDL-SPRK	7720-1600	14mm Pitch Poly Chain GT Carbon	14MX-30S-20	20	30	5.153	2.55	1.00	1.36	2.25	1-14	1.00	4.38	-	9.0
37-IDL-SPRK	7720-1610		14MX-30S-37	37	30	5.153	2.55	1.00	2.06	2.25	1-14	0.25	4.38	-	12.0
68-IDL-SPRK	7720-1620		14MX-34S-68	68	34	5.855	3.38	0.56	3.33	2.25	1-14	1.00	4.88	4.34	15.6
90-IDL-SPRK	7720-1640		14MX-34S-90	90	34	5.855	3.38	0.31	4.20	2.25	1-14	1.00	4.88	4.34	16.7
125-IDL-SPRK	7720-1630		14MX-34S-125	125	34	5.855	3.38	0.19	5.63	2.25	1-14	1.09	4.88	4.34	23.1

## Nickel Plated Poly Chain GT2 Idler Dimensions

Part No.	Product No.	Use With	Size Designation	Belt Width (mm)	No. of Teeth	O.D. (In)	B Ref. (In)	C (In)	D (In)	E Ref. (In)	F (Threads) (In)	G Ref. (In)	H (In)	J (In)	Weight (lb)
NP-12-IDL-SPRK	7720-1501	8mm Pitch Poly Chain GT Carbon	8MX-32S-12	12	32	3.145	1.25	0.50	0.85	1.56	3/4-16	0.94	2.75	-	1.0
NP-21-IDL-SPRK	7720-1511	8mm Pitch Poly Chain GT Carbon	8MX-32S-21	21	32	3.145	1.25	0.50	1.24	1.56	3/4-16	0.56	2.75	-	1.1

# Belt Drive Tensioners

## Idler Bushings



**Idler Bushings (Integral Shaft Included)**

Product No.	Part No.	Use with Bracket	D (in)	L (in)	M (in)	Threads	Weight (lb)
7720-2610	1610-IDL-BUSH	05-IDL-BRAK	2.25	1.00	1.38	5/8-18	1.30
7720-2012	2012-IDL-BUSH	10-IDL-BRAK	2.75	1.25	1.56	3/4-16	2.30
7720-2517	2517-IDL-BUSH	10-IDL-BRAK	3.38	1.75	1.56	3/4-16	3.90
7720-1120	20-IDL-BUSH	(SK)10-IDL-BRAK	2.81	1.94	1.44	3/4-16	4.10
7720-1130	30-IDL-BUSH	(SF)20-IDL-BRAK	3.13	2.08	2.13	1-14	6.40
7720-1140	40-IDL-BUSH	(E)20-IDL-BRAK	3.83	2.75	2.19	1-14	8.60

# Poly Chain® GT®2 Sprocket Diameter Table

## 8mm Pitch Sprocket Diameters

No. of Grooves	Diameters <small>mm In</small>		No. of Grooves	Diameters <small>mm In</small>		No. of Grooves	Diameters <small>mm In</small>		No. of Grooves	Diameters <small>mm In</small>		No. of Grooves	Diameters <small>mm In</small>	
	PD	OD		PD	OD		PD	OD		PD	OD		PD	OD
22	56.02 2.206	54.42 2.143	51	129.87 5.113	128.27 5.050	80	203.72 8.020	202.12 7.957	109	277.57 10.928	275.97 10.865	138	351.41 13.835	349.81 13.772
23	58.57 2.306	56.97 2.243	52	132.42 5.213	130.82 5.150	81	206.26 8.121	204.66 8.058	110	280.11 11.028	278.51 10.965	139	353.96 13.935	352.36 13.872
24	61.12 2.406	59.52 2.343	53	134.96 5.314	133.36 5.251	82	208.81 8.221	207.21 8.158	111	282.66 11.128	281.06 11.065	140	356.51 14.036	354.91 13.973
25	63.66 2.506	62.06 2.443	54	137.51 5.414	135.91 5.351	83	211.36 8.321	209.76 8.258	112	285.21 11.229	283.61 11.166	141	359.05 14.136	357.45 14.073
26	66.21 2.607	64.61 2.544	55	140.06 5.514	138.46 5.451	84	213.90 8.421	212.30 8.358	113	287.75 11.329	286.15 11.266	142	361.60 14.236	360.00 14.173
27	68.75 2.707	67.15 2.644	56	142.60 5.614	141.00 5.551	85	216.45 8.522	214.85 8.459	114	290.30 11.429	288.70 11.366	143	364.15 14.336	362.55 14.273
28	71.30 2.807	69.70 2.744	57	145.15 5.715	143.55 5.652	86	219.00 8.622	217.40 8.559	115	292.85 11.529	291.25 11.466	144	366.69 14.437	365.09 14.374
29	73.85 2.907	72.25 2.844	58	147.70 5.815	146.10 5.752	87	221.54 8.722	219.94 8.659	116	295.39 11.630	293.79 11.567	145	369.24 14.537	367.64 14.474
30	76.39 3.008	74.79 2.945	59	150.24 5.915	148.64 5.852	88	224.09 8.822	222.49 8.759	117	297.94 11.730	296.34 11.667	146	371.79 14.637	370.19 14.574
31	78.94 3.108	77.34 3.045	60	152.79 6.015	151.19 5.952	89	226.64 8.923	225.04 8.860	118	300.48 11.830	298.88 11.767	147	374.33 14.737	372.73 14.674
32	81.49 3.208	79.89 3.145	61	155.34 6.116	153.74 6.053	90	229.18 9.023	227.58 8.960	119	303.03 11.930	301.43 11.867	148	376.88 14.838	375.28 14.775
33	84.03 3.308	82.43 3.245	62	157.88 6.216	156.28 6.153	91	231.73 9.123	230.13 9.060	120	305.58 12.031	303.98 11.968	149	379.43 14.938	377.83 14.875
34	86.58 3.409	84.98 3.346	63	160.43 6.316	158.83 6.253	92	234.28 9.223	232.68 9.160	121	308.12 12.131	306.52 12.068	150	381.97 15.038	380.37 14.975
35	89.13 3.509	87.53 3.446	64	162.97 6.416	161.37 6.353	93	236.82 9.324	235.22 9.261	122	310.67 12.231	309.07 12.168	151	384.52 15.139	382.92 15.076
36	91.67 3.609	90.07 3.546	65	165.52 6.517	163.92 6.454	94	239.37 9.424	237.77 9.361	123	313.22 12.331	311.62 12.268	152	387.06 15.239	385.46 15.176
37	94.22 3.709	92.62 3.646	66	168.07 6.617	166.47 6.554	95	241.92 9.524	240.32 9.461	124	315.76 12.432	314.16 12.369	153	389.61 15.339	388.0 15.276
38	96.77 3.810	95.17 3.747	67	170.61 6.717	169.01 6.654	96	244.46 9.624	242.86 9.561	125	318.31 12.532	316.71 12.469	154	392.16 15.439	390.56 15.376
39	99.31 3.910	97.71 3.847	68	173.16 6.817	171.56 6.754	97	247.01 9.725	245.41 9.662	126	320.86 12.632	319.26 12.569	155	394.70 15.540	393.10 15.477
40	101.86 4.010	100.26 3.947	69	175.71 6.918	174.11 6.855	98	249.55 9.825	247.95 9.762	127	323.40 12.732	321.80 12.669	156	397.25 15.640	395.65 15.577
41	104.41 4.110	102.81 4.047	70	178.25 7.018	176.65 6.955	99	252.10 9.925	250.50 9.862	128	325.95 12.833	324.35 12.770	157	399.80 15.740	398.20 15.677
42	106.95 4.211	105.35 4.148	71	180.80 7.118	179.20 7.055	100	254.65 10.026	253.05 9.963	129	328.50 12.933	326.90 12.870	158	402.34 15.840	400.74 15.777
43	109.50 4.311	107.90 4.248	72	183.35 7.218	181.75 7.155	101	257.19 10.126	255.59 10.063	130	331.04 13.033	329.44 12.970	159	404.89 15.941	403.29 15.878
44	112.05 4.411	110.45 4.348	73	185.89 7.319	184.29 7.256	102	259.74 10.226	258.14 10.163	131	333.59 13.133	331.99 13.070	160	407.44 16.041	405.84 15.978
45	114.59 4.511	112.99 4.448	74	188.44 7.419	186.84 7.356	103	262.29 10.326	260.69 10.263	132	336.14 13.234	334.54 13.171	161	409.98 16.141	408.38 16.078
46	117.14 4.612	115.54 4.549	75	190.99 7.519	189.39 7.456	104	264.83 10.427	263.23 10.364	133	338.68 13.334	337.08 13.271	162	412.53 16.241	410.93 16.178
47	119.68 4.712	118.08 4.649	76	193.53 7.619	191.93 7.556	105	267.38 10.527	265.78 10.464	134	341.23 13.434	339.63 13.371	163	415.08 16.342	413.48 16.279
48	122.23 4.812	120.63 4.749	77	196.08 7.720	194.48 7.657	106	269.93 10.627	268.33 10.564	135	343.77 13.534	342.17 13.471	164	417.62 16.442	416.02 16.379
49	124.78 4.912	123.18 4.849	78	198.63 7.820	197.03 7.757	107	272.47 10.727	270.87 10.664	136	346.32 13.635	344.72 13.572	165	420.17 16.542	418.57 16.479
50	127.32 5.013	125.72 4.950	79	201.17 7.920	199.57 7.857	108	275.02 10.828	273.42 10.765	137	348.87 13.735	347.27 13.672	166	422.72 16.642	421.12 16.579

\* Dimensions are given in inches and millimeters. Inches are shown in black in bold face type.

Millimeters are shown in blue in light face type.

Stock sprockets are shown shaded.

# Poly Chain® GT®2 Sprocket Diameter Table

## 8mm Pitch Sprocket Diameters

No. of Grooves	Diameters <small>mm</small> <small>in</small>		No. of Grooves	Diameters <small>mm</small> <small>in</small>		No. of Grooves	Diameters <small>mm</small> <small>in</small>		No. of Grooves	Diameters <small>mm</small> <small>in</small>		No. of Grooves	Diameters <small>mm</small> <small>in</small>	
	PD	OD		PD	OD		PD	OD		PD	OD		PD	OD
167	425.26 16.743	454.22 16.680	179	455.82 17.946	454.22 17.883	191	486.38 19.149	484.78 19.086	203	516.94 20.352	515.34 20.289	215	547.49 21.555	545.89 21.492
168	427.81 16.843	426.21 16.780	180	458.37 18.046	456.77 17.983	192	488.92 19.249	487.32 19.186	204	519.48 20.452	517.88 20.389	216	550.04 21.655	548.44 21.592
169	430.35 16.943	428.75 16.880	181	460.91 18.146	459.31 18.083	193	491.47 19.349	489.87 19.286	205	522.03 20.552	520.43 20.489	217	552.59 21.755	550.99 21.692
170	432.90 17.043	431.30 16.980	182	463.46 18.246	461.86 18.183	194	494.02 19.449	492.42 19.386	206	524.57 20.653	522.97 20.590	218	555.13 21.856	553.53 21.793
171	435.45 17.144	433.85 17.081	183	466.01 18.347	464.41 18.284	195	496.56 19.550	494.96 19.487	207	527.12 20.753	525.52 20.690	219	557.68 21.956	556.08 21.893
172	437.99 17.244	436.39 17.181	184	468.55 18.447	466.95 18.384	196	499.11 19.650	497.51 19.587	208	529.67 20.853	528.07 20.790	220	560.23 22.056	558.63 21.993
173	440.54 17.344	438.94 17.281	185	471.10 18.547	469.50 18.484	197	501.66 19.750	500.06 19.687	209	532.21 20.953	530.61 20.890	221	562.77 22.156	561.17 22.093
174	443.09 17.444	441.49 17.381	186	473.65 18.647	472.05 18.584	198	504.20 19.851	502.60 19.788	210	534.76 21.054	533.16 20.991	222	565.32 22.257	563.72 22.194
175	445.63 17.545	444.03 17.482	187	476.19 18.748	474.59 18.685	199	506.75 19.951	505.15 19.888	211	537.31 21.154	535.71 21.091	223	567.86 22.357	566.26 22.294
176	448.18 17.645	446.58 17.582	188	478.74 18.848	477.14 18.785	200	509.30 20.051	507.70 19.988	212	539.85 21.254	538.25 21.191	224	570.41 22.457	568.81 22.394
177	450.73 17.745	449.13 17.682	189	481.28 18.948	479.68 18.885	201	511.84 20.151	510.24 20.088	213	542.40 21.354	540.80 21.291			
178	453.27 17.845	451.67 17.782	190	483.83 19.048	482.23 18.985	202	514.39 20.252	512.79 20.189	214	544.95 21.455	543.35 21.392			

## 14mm Pitch Sprocket Diameters

No. of Grooves	Diameters <small>mm</small> <small>in</small>		No. of Grooves	Diameters <small>mm</small> <small>in</small>		No. of Grooves	Diameters <small>mm</small> <small>in</small>		No. of Grooves	Diameters <small>mm</small> <small>in</small>		No. of Grooves	Diameters <small>mm</small> <small>in</small>	
	PD	OD		PD	OD		PD	OD		PD	OD		PD	OD
28	124.78 4.912	121.98 4.802	40	178.25 7.018	175.45 6.908	52	231.73 9.123	228.93 9.013	64	285.21 11.229	282.41 11.119	76	338.68 13.334	335.88 13.224
29	129.23 5.088	126.43 4.978	41	182.71 7.193	179.91 7.0831	53	236.19 9.299	233.39 9.189	65	289.66 11.404	286.86 11.294	77	343.14 13.509	340.34 13.399
30	133.69 5.263	130.89 5.153	42	187.17 7.369	184.371 7.259	54	240.64 9.474	237.84 9.364	66	294.12 11.579	291.32 11.469	78	347.59 13.685	344.79 13.575
31	138.15 5.439	135.35 5.329	43	191.62 7.544	188.82 7.434	55	245.10 9.650	242.30 9.540	67	298.57 11.755	295.77 11.645	79	352.05 13.860	349.25 13.750
32	142.60 5.614	139.80 5.504	44	196.08 7.720	193.28 7.610	56	249.55 9.825	246.75 9.715	68	303.03 11.930	300.23 11.820	80	356.51 14.036	353.71 13.926
33	147.06 5.790	144.26 5.680	45	200.54 7.895	197.74 7.785	57	254.01 10.000	251.21 9.890	69	307.49 12.106	304.69 11.996	81	360.96 14.211	358.16 14.101
34	151.52 5.965	148.72 5.855	46	204.99 8.071	202.19 7.961	58	258.47 10.176	255.67 10.066	70	311.94 12.281	309.14 12.171	82	365.42 14.387	362.62 14.277
35	155.97 6.141	153.17 6.031	47	209.45 8.246	206.65 8.136	59	262.92 10.351	260.12 10.241	71	316.40 12.457	313.60 12.347	83	369.88 14.562	367.08 14.452
35	160.43 6.316	157.63 6.206	48	213.90 8.421	211.10 8.311	60	267.38 10.527	264.58 10.417	72	320.86 12.632	318.06 12.522	84	374.33 14.737	371.53 14.627
37	164.88 6.492	162.08 6.382	49	218.36 8.597	215.56 8.487	61	271.84 10.702	269.04 10.592	73	325.31 12.808	322.51 12.698	85	378.79 14.913	375.99 14.803
38	169.34 6.667	166.54 6.557	50	222.82 8.772	220.02 8.662	62	276.29 10.878	273.49 10.768	74	329.77 12.983	326.97 12.873	86	383.25 15.088	380.45 14.978
39	173.80 6.842	171.00 6.732	51	227.27 8.948	224.47 8.838	63	280.75 11.053	277.95 10.943	75	334.23 13.158	331.43 13.048	87	387.70 15.264	384.90 15.154

\* Dimensions are given in inches and millimeters. Inches are shown in black in bold face type. Millimeters are shown in blue in light face type. Stock sprockets are shown shaded.

# Poly Chain® GT®2 Sprocket Diameter Table

## 14mm Pitch Sprocket Diameters

No. of Grooves	Diameters <small>mm In</small>		No. of Grooves	Diameters <small>mm In</small>		No. of Grooves	Diameters <small>mm In</small>		No. of Grooves	Diameters <small>mm In</small>		No. of Grooves	Diameters <small>mm In</small>	
	PD	OD		PD	OD		PD	OD		PD	OD		PD	OD
88	392.16 15.439	389.36 15.329	116	516.94 20.352	514.14 20.242	144	641.71 25.264	638.91 25.154	172	766.49 30.177	763.69 30.067	200	891.27 35.089	888.47 34.979
89	396.61 15.615	393.81 15.505	117	521.39 20.527	518.59 20.417	145	646.17 25.440	643.37 25.330	173	770.95 30.352	768.15 30.242	201	895.72 35.265	892.92 35.155
90	401.07 15.790	398.27 15.680	118	525.85 20.703	523.05 20.593	146	650.63 25.615	647.83 25.505	174	775.40 30.528	772.60 30.418	202	900.18 35.440	897.38 35.330
91	405.53 15.966	402.73 15.856	119	530.30 25.791	527.50 25.681	147	655.08 30.703	652.28 30.593	175	779.86 35.616	777.06 35.506	203	904.64 35.616	901.84 35.506
92	409.98 16.141	407.18 16.031	120	534.76 21.054	531.96 20.944	148	659.54 25.966	656.74 25.856	176	784.32 30.879	781.52 30.769	204	909.09 35.791	906.29 35.681
93	414.44 16.317	411.64 16.207	121	539.22 21.229	536.42 21.119	149	663.99 26.142	661.19 26.032	177	788.77 31.054	785.97 30.944	205	913.55 35.967	910.75 35.857
94	418.90 16.492	416.10 16.382	122	543.67 21.404	540.87 21.294	150	668.45 26.317	665.65 26.207	178	793.23 31.229	790.43 31.119	206	918.01 36.142	915.21 36.032
95	423.35 16.667	420.55 16.557	123	548.13 21.580	545.33 21.470	151	672.91 26.492	670.11 26.382	179	797.68 31.405	794.88 31.295	207	922.46 36.317	919.66 36.207
96	427.81 16.843	425.01 16.733	124	552.59 21.755	549.79 21.645	152	677.36 26.668	674.56 26.558	180	802.14 31.580	799.34 31.470	208	926.92 36.493	924.12 36.383
97	432.26 17.018	429.46 16.908	125	557.04 21.931	554.24 21.821	153	681.82 26.843	679.02 26.733	181	806.60 31.756	803.80 31.646	209	931.37 36.668	928.57 36.558
98	436.72 17.194	433.92 17.084	126	561.50 22.106	558.70 21.996	154	686.28 27.019	683.48 26.909	182	811.05 31.931	808.25 31.821	210	935.83 36.844	933.03 36.734
99	441.18 17.369	438.38 17.259	127	565.95 22.282	563.15 22.172	155	690.73 27.194	687.93 27.084	183	815.51 32.107	812.71 31.997	211	940.29 37.019	937.49 36.909
100	445.63 17.545	442.83 17.435	128	570.41 22.457	567.61 22.347	156	695.19 27.370	692.39 27.260	184	819.97 32.282	817.17 32.172	212	944.74 37.195	941.94 37.085
101	450.09 17.720	447.29 17.610	129	574.87 22.633	572.07 22.523	157	699.65 27.545	696.85 27.435	185	824.42 32.458	821.62 32.348	213	949.20 37.370	946.40 37.260
102	454.55 17.896	451.75 17.786	130	579.32 22.808	576.52 22.698	158	704.10 27.721	701.30 27.611	186	828.88 32.633	826.08 32.523	214	953.66 37.546	950.86 37.436
103	459.00 18.071	456.20 17.961	131	583.78 22.983	580.98 22.873	159	708.56 27.896	705.76 27.786	187	833.34 32.808	830.54 32.698	215	958.11 37.721	955.31 37.611
104	463.46 18.246	460.66 18.136	132	588.24 23.159	585.44 23.049	160	713.01 28.071	710.21 27.961	188	837.79 32.984	834.99 32.874	216	962.57 37.896	959.77 37.786
105	467.92 18.422	465.12 18.312	133	592.69 23.334	589.89 23.224	161	717.47 28.247	714.67 28.137	189	842.25 33.159	839.45 33.049	217	967.03 38.072	964.23 37.962
106	472.37 18.597	469.57 18.487	134	597.15 23.510	594.35 23.400	162	721.93 28.422	719.13 28.312	190	846.70 33.335	843.90 33.225	218	971.48 38.247	968.68 38.137
107	476.83 18.773	474.03 18.663	135	601.61 7.018	598.81 6.955	163	726.38 28.598	723.58 28.488	191	851.16 33.510	848.36 33.400	219	975.94 38.423	973.14 38.313
108	481.28 18.948	478.48 18.838	136	606.06 23.861	603.26 23.751	164	730.84 28.773	728.04 28.663	192	855.62 33.686	852.82 33.576	220	980.39 38.598	977.59 38.488
109	485.74 19.124	482.94 19.014	137	610.52 24.036	607.72 23.926	165	735.30 28.949	732.50 28.839	193	860.07 33.861	857.27 33.751	221	984.85 38.774	982.05 38.664
110	490.20 19.299	487.40 19.189	138	614.97 24.212	612.17 24.102	166	739.75 29.124	736.95 29.014	194	864.53 34.037	861.73 33.927	222	989.31 38.949	986.51 38.839
111	494.65 19.475	491.85 19.365	139	619.43 24.387	616.63 24.277	167	744.21 29.300	741.41 29.190	195	868.99 34.212	866.19 34.102	223	993.76 39.125	990.96 39.015
112	499.11 19.650	496.31 19.540	140	623.89 24.562	621.09 24.452	168	748.66 29.475	745.86 29.365	196	873.44 34.387	870.64 34.277	224	998.22 39.300	995.42 39.190
113	503.57 19.825	500.77 19.715	141	628.34 24.738	625.54 24.628	169	753.12 29.650	750.32 29.540	197	877.90 34.563	875.10 34.453			
114	508.02 20.001	505.22 19.891	142	632.80 24.913	630.00 24.803	170	757.58 29.826	754.78 29.716	198	882.36 34.738	879.56 34.628			
115	512.48 20.176	509.68 20.066	143	637.26 25.089	634.46 24.979	171	762.03 30.001	759.23 29.891	199	886.81 34.914	884.01 34.804			

\* Dimensions are given in inches and millimeters. Inches are shown in black in bold face type.

Millimeters are shown in blue in light face type.

Stock sprockets are shown shaded.

# Long Length Belting

## Introduction

Long Length synchronous belting is a cost effective, low maintenance drive alternative that is especially suited for linear movement and positioning applications. Long Length belting is available in a wide variety of belt pitches and constructions. Applications as diverse as automated door openers, product conveying systems, positioning devices, and office equipment are possible using the different pitches and constructions available.

## Long Length Belting Designations

PolyChain® GT® Carbon® long length belting is specified using width and pitch codes, a LL prefix, and omits the length code. For example, 8mm pitch PolyChain GT Carbon belting, 36mm wide, would be designated LL8MGT036.

## Long Length Belting Product Listing

Standard Long Length belting is available in 8mm and 14mm pitch Poly Chain GT Carbon; 2mm, 3mm, 5mm, and 8mm PowerGrip GT2; 3mm, 5mm, 8mm, and 14mm PowerGrip® HTD®; MXL, XL, L, and H PowerGrip® Timing; and T5, T10, AT5, and AT10 Synchro-Power Urethane. Available standard Poly Chain GT Carbon Long Length belting is listed below.

Additional Urethane long length belting is also available.  
Refer to Industrial Power Transmission Systems  
Catalog #19993 for available sizes.

## Poly Chain® GT® Carbon® Long Length Belting

8mm—14mm Pitch			
Part No.	Product No.	Width (mm)	Net wt./ft (lb)
LL8MGT012	9302-1000	12	0.03
LL8MGT021	9302-1100	21	0.06
LL8MGT036	9302-1200	36	0.11
LL14MGT020	9302-1300	20	0.10
LL14MGT037	9302-1400	37	0.19



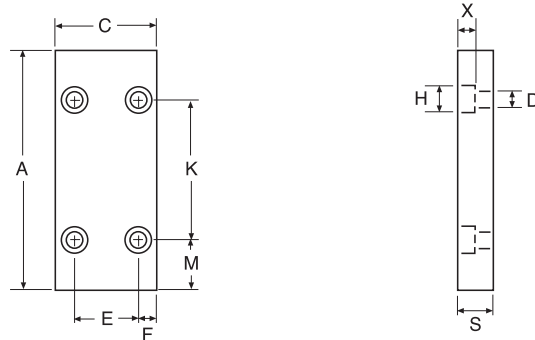
# Long Length Belting

## Drive Selection

Due to the unique nature of long length applications, special drive design procedures must be followed. Rather than designing a drive based on a single load at a continuous speed, long length application designs typically consider acceleration/deceleration loads generated by the mass being moved and placed, as well as the orientation of the drive (vertical or horizontal). Maximum dynamic drive tensions are then compared to allowable working tensions ( $T_a$ ) for proper belt width selection. Considering the drive design procedures unique to Long Length belting applications, it is suggested that designers contact Gates Power Transmission Product Application for a drive system analysis.

## Belt Clamping Fixtures

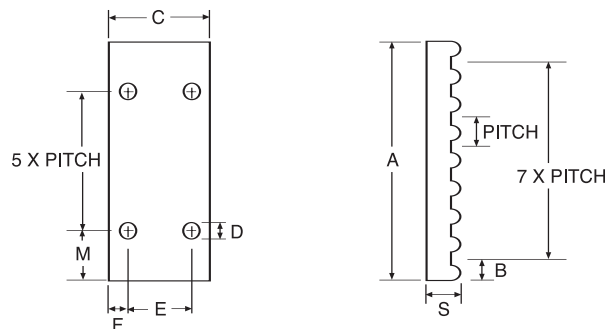
Long length applications typically require that the ends of the belt be mechanically fastened to the component being positioned. A common means of attachment is to use a belt clamping fixture, which clamps the ends of the belt between a grooved plate and a flat plate. Belt clamping fixtures can have a variety of configurations, depending on belt pitch, belt tooth profile, and system attachment requirements. Contact Gates Power Transmission Product Application for groove dimensions that are suitable for use with clamping fixtures. A minimum of six belt teeth should be engaged in the belt clamping fixture to achieve optimum performance. The plates shown have 8 complete belt teeth engaged. Grooved clamp plates should end on the center of the belt tooth tip. As shown below, mechanical fasteners should be placed beyond the belt's top width in order to maintain belt integrity.



## POLY CHAIN® GT®2 FLAT PLATES

PITCH: 8MGT												
Belt width (mm)	A (mm)	C (mm)	d (mm)	E (mm)	F (mm)	H (mm)	K (mm)	M (mm)	S (mm)	X (mm)	Weight (kg)	Part Number
12	72	42.5	9	22.5	10	15	40	16	16	8	0.13	CFP8MGT12
21	72	51.5	9	31.5	10	15	40	16	16	8	0.16	CFP8MGT21
36	72	67	9	47	10	15	40	16	16	8	0.20	CFP8MGT36
PITCH: 14MGT												
20	126	55.5	11	32.5	11.5	18	70	28	20	10	0.37	CFP14MGT20
37	126	73	11	50	11.5	18	70	28	20	10	0.49	CFP14MGT37

Note: Flat plates are 6061T6 aluminum.



## POLY CHAIN® GT®2 GROOVED PLATES

PITCH: 8MGT										
Belt width (mm)	A (mm)	B (mm)	C (mm)	d (mm)	E (mm)	F (mm)	M (mm)	S (mm)	Weight (kg)	Part Number
12	72	8	42.5	9	22.5	10	16	15	0.10	CGP8MGT12
21	72	8	51.5	9	31.5	10	16	15	0.13	CGP8MGT21
36	72	8	67	9	47	10	16	15	0.17	CGP8MGT36
PITCH: 14MGT										
20	126	14	55.5	11	32.5	11.5	28	22	0.34	CGP14MGT20
37	126	14	73	11	50	11.5	28	22	0.45	CGP14MGT37

Note: Grooved plates are 6061T6 aluminum.

# Gates Short-Length Poly Chain® GT® Carbon® Belt Drive Systems

For especially small and compact drive systems that demand utmost robustness, Poly Chain GT Carbon belts are available in a series of short lengths. These unique belts are available in 8mm pitch only, and in standard 12mm, 21mm, and 36mm widths.



Short-Length Poly Chain GT Carbon belts utilize the same construction as conventional Poly Chain GT Carbon belts, that have proven themselves over and over in industry. Because of their unique manufacturing process, these short belts have a smooth back instead of the ribbed back used with conventional Poly Chain GT Carbon belts. They are also fully compatible with standard and Poly Chain GT2 sprockets.

## Typical Applications

Short-Length Poly Chain GT Carbon belts should be considered in any application requiring heavy torque loads or rugged durability in a very compact area. Drives utilizing sprockets as small as 2.5" P.D. with a center distance of 3" are rated for loads in excess of 12 hp at 1800 rpm.

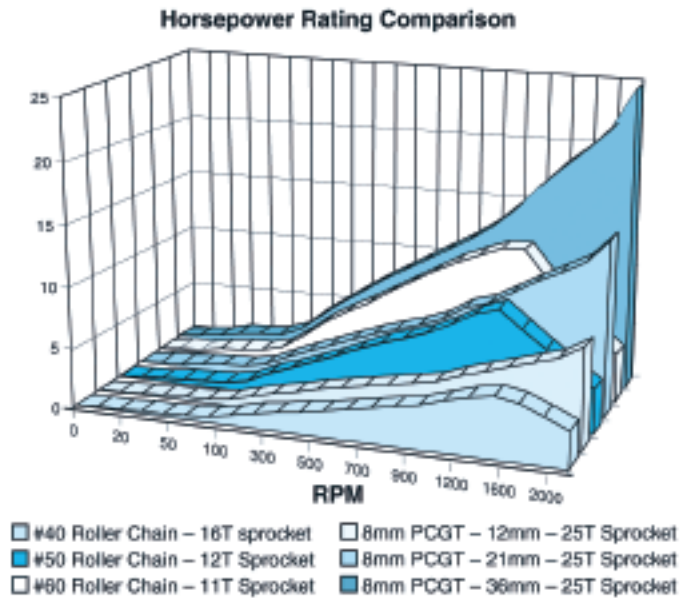
Live roller conveyers are a natural application for Short-Length Poly Chain GT Carbon belt drive systems. Live roller conveyers are used for controlled movement of a great variety of both regular and irregular shaped commodities, from light and fragile to heavy and rugged loading.

In the "Roll-to-Roll" conveying arrangement, two sprockets are attached to each roller, and individual loops of roller chain or belts connect pairs of rollers in a staggered pattern along the length of the conveyor. This design is ideal for handling heavy loads and for applications requiring frequent stopping or reversing service. Idler rollers without sprockets are sometimes inserted between the driven rollers. A typical "Roll-to-Roll" conveyor system is illustrated in the photo at left.

Positive driven live roller conveyors are better suited than V-belt or round belt driven units on applications where heat, dirt, oil, water and other contaminants are present.

## Comparison To Roller Chain

Short-Length Poly Chain GT Carbon belts compete well on a width to width basis with roller chain on both low and high speed applications. The following chart compares 8mm Poly Chain GT with #40 and #50 roller chain.



# Short-Length 8mm Poly Chain® GT® Carbon® Belt System Specifications

## 8mm Pitch Lengths

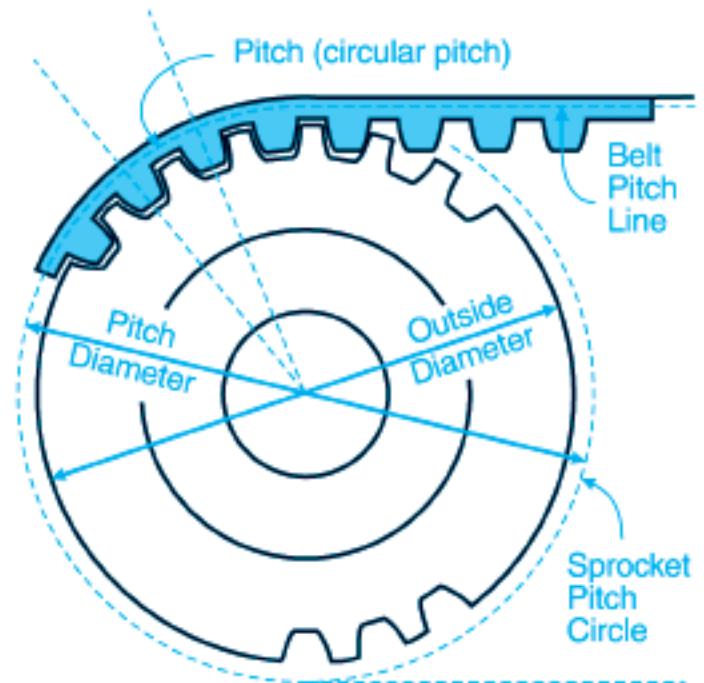
Designations	No. of Teeth	Length mm In
8M-352	44	352 13.858
8M-416	52	416 16.378
8M-456	57	456 17.953
8M-480	60	480 18.898
8M-544	68	544 21.417
8M-608	76	608 23.937

## 8mm Widths

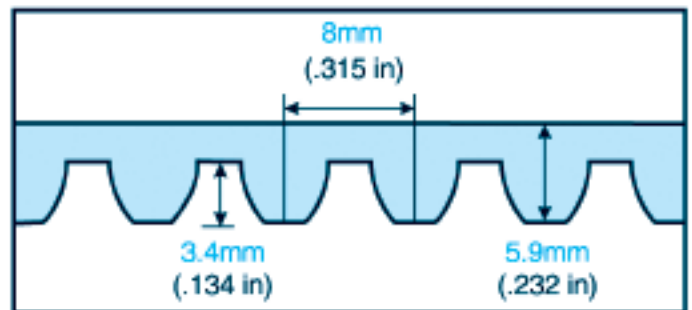
12mm .47"	21mm .83"	36mm 1.42"
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Dimensions are given in inches and millimeters. Inches are shown in black type. Millimeters are shown in blue type.

Gates Short-Length Poly Chain GT Carbon belts are designed to run in Gates Poly Chain GT2 sprockets. See the Sprocket Specification Tables on pages 66-68 for a listing of available sizes, pertinent dimensions, applicable bushing sizes, bore ranges, etc. See page 2 for an explanation for the sprocket code symbol used for Poly Chain GT2 sprockets. When designing Short-Length Poly Chain GT Carbon drives refer to either the Drive Design Procedure on pages 10-13, but substitute tables on pages 90-93 for belt length and center distance selections.



## 8mm Pitch — Reference Dimensions



Sprocket Combinations				Speed Ratio	Center Distance, Inches						Speed Ratio	Sprocket Combinations			
DriveR		DriveN			8M-382 P.L. 13.66 44 Teeth	8M-416 P.L. 16.38 62 Teeth	8M-456 P.L. 17.96 57 Teeth	8M-480 P.L. 18.90 60 Teeth	8M-544 P.L. 21.42 68 Teeth	8M-608 P.L. 23.94 76 Teeth		DriveR	DriveN		
Number of Grooves	Pitch Diameter (Inches)	Number of Grooves	Pitch Diameter (Inches)									Number of Grooves	Number of Grooves		
22	2.206	22	2.206	1.000	3.46	4.72	5.51	5.98	7.24	8.50	1.000	22	22		
25	2.506	25	2.506	1.000	2.99	4.25	5.04	5.51	6.77	8.03	1.000	25	25		
26	2.607	26	2.607	1.000		4.09	4.88	5.35	6.61	7.87	1.000	26	26		
27	2.707	27	2.707	1.000		3.94	4.72	5.20	6.46	7.72	1.000	27	27		
28	2.807	28	2.807	1.000		3.78	4.57	5.04	6.30	7.56	1.000	28	28		
29	2.907	29	2.907	1.000		3.62	4.41	4.88	6.14	7.40	1.000	29	29		
30	3.008	30	3.008	1.000			4.25	4.73	5.99	7.25	1.000	30	30		
31	3.108	31	3.108	1.000			4.09	4.57	5.83	7.09	1.000	31	31		
32	3.208	32	3.208	1.000			3.94	4.41	5.67	6.93	1.000	32	32		
33	3.308	33	3.308	1.000				4.25	5.51	6.77	1.000	33	33		
34	3.409	34	3.409	1.000				4.10	5.36	6.62	1.000	34	34		
35	3.509	35	3.509	1.000					5.20	6.46	1.000	35	35		
36	3.609	36	3.609	1.000					5.04	6.30	1.000	36	36		
37	3.709	37	3.709	1.000					4.88	6.14	1.000	37	37		
38	3.810	38	3.810	1.000					4.73	5.99	1.000	38	38		
39	3.910	39	3.910	1.000					4.57	5.83	1.000	39	39		
40	4.010	40	4.010	1.000						5.67	1.000	40	40		
41	4.110	41	4.110	1.000						5.51	1.000	41	41		
42	4.211	42	4.211	1.000						5.36	1.000	42	42		
41	4.110	42	4.211	1.024						5.43	1.024	41	42		
40	4.010	41	4.110	1.025						5.59	1.025	40	41		
38	3.810	39	3.910	1.026					4.65	5.91	1.026	38	39		
39	3.910	40	4.010	1.026					4.49	5.75	1.026	39	40		
37	3.709	38	3.810	1.027					4.80	6.06	1.027	37	38		
36	3.609	37	3.709	1.028					4.96	6.22	1.028	36	37		
34	3.409	35	3.509	1.029				4.02	5.28	6.54	1.029	34	35		
35	3.509	36	3.609	1.029					5.12	6.38	1.029	35	36		
33	3.308	34	3.409	1.030				4.17	5.43	6.69	1.030	33	34		
32	3.208	33	3.308	1.031			3.86	4.33	5.59	6.85	1.031	32	33		
31	3.108	32	3.208	1.032			4.01	4.49	5.75	7.01	1.032	31	32		
30	3.008	31	3.108	1.033			4.17	4.65	5.91	7.17	1.033	30	31		
29	2.907	30	3.008	1.034				3.54	4.33	4.80	6.06	7.32	29	30	
28	2.807	29	2.907	1.036			3.70	4.49	4.96	6.22	7.48	1.036	28	29	
27	2.707	28	2.807	1.037			3.86	4.64	5.12	6.38	7.64	1.037	27	28	
26	2.607	27	2.707	1.038			4.02	4.80	5.28	6.54	7.80	1.038	26	27	
25	2.506	26	2.607	1.040			4.17	4.96	5.43	6.69	7.95	1.040	25	26	
40	4.010	42	4.211	1.050							5.51	1.050	40	42	
39	3.910	41	4.110	1.051							5.67	1.051	39	41	
38	3.810	40	4.010	1.053						4.57	5.83	1.053	38	40	
37	3.709	39	3.910	1.054						4.72	5.99	1.054	37	39	
36	3.609	38	3.810	1.056						4.88	6.14	1.056	36	38	
35	3.509	37	3.709	1.057						5.04	6.30	1.057	35	37	
34	3.409	36	3.609	1.059						5.20	6.46	1.059	34	36	
33	3.308	35	3.509	1.061					4.09	5.35	6.62	1.061	33	35	
32	3.208	34	3.409	1.063					4.25	5.51	6.77	1.063	32	34	
31	3.108	33	3.308	1.065			3.93	4.41	5.67	6.93	1.065	31	33		
30	3.008	32	3.208	1.067			4.09	4.57	5.83	7.09	1.067	30	32		
29	2.907	31	3.108	1.069			4.25	4.72	5.98	7.25	1.069	29	31		
28	2.807	30	3.008	1.071				3.62	4.41	4.88	6.14	7.40	1.071	28	30
42	4.211	45	4.511	1.071							5.12	1.071	42	45	
27	2.707	29	2.907	1.074			3.78	4.56	5.04	6.30	7.56	1.074	27	29	
26	2.607	28	2.807	1.077			3.94	4.72	5.20	6.46	7.72	1.077	26	28	
39	3.910	42	4.211	1.077							5.59	1.077	39	42	
38	3.810	41	4.110	1.079						4.49	5.75	1.079	38	41	
25	2.506	27	2.707	1.080			4.09	4.88	5.35	6.61	7.88	1.080	25	27	
37	3.709	40	4.010	1.081						4.65	5.91	1.081	37	40	
36	3.609	39	3.910	1.083						4.80	6.06	1.083	36	39	
35	3.509	38	3.810	1.086						4.96	6.22	1.086	35	38	
34	3.409	37	3.709	1.088						5.12	6.38	1.088	34	37	
33	3.308	36	3.609	1.091					4.01	5.28	6.54	1.091	33	36	
32	3.208	35	3.509	1.094					4.17	5.43	6.69	1.094	32	35	
31	3.108	34	3.409	1.097				3.85	4.33	5.59	6.85	1.097	31	34	
41	4.110	45	4.511	1.098							5.20	1.098	41	45	
30	3.008	33	3.308	1.100			4.01	4.49	5.75	7.01	1.100	30	33		
29	2.907	32	3.208	1.103			4.17	4.64	5.91	7.17	1.103	29	32		
38	3.810	42	4.211	1.105						5.67	1.105	38	42		
28	2.807	31	3.108	1.107			3.54	4.33	4.80	6.06	7.32	1.107	28	31	
37	3.709	41	4.110	1.108						4.56	5.83	1.108	37	41	
Length Factor*					0.65	0.70	0.73	0.74	0.78	0.81	Length Factor*				

\*This length factor must be used to determine the proper belt width.



# 8mm Pitch Poly Chain® GT® Carbon® Belts

# Drive Selection Table

Sprocket Combinations				Speed Ratio	Center Distance, Inches						Speed Ratio	Sprocket Combinations	
DriveR		DriveN			8M-352 P.L. 13.98 44 Teeth	8M-416 P.L. 16.36 52 Teeth	8M-456 P.L. 17.95 57 Teeth	8M-480 P.L. 18.50 60 Teeth	8M-544 P.L. 21.42 68 Teeth	8M-608 P.L. 23.94 76 Teeth		DriveR	DriveN
Number of Grooves	Pitch Diameter (Inches)	Number of Grooves	Pitch Diameter (Inches)									Number of Grooves	Number of Grooves
27	2.707	30	3.008	1.111		3.70	4.48	4.96	6.22	7.48	1.111	27	30
36	3.609	40	4.010	1.111					4.72	5.98	1.111	36	40
35	3.509	39	3.910	1.114					4.88	6.14	1.114	35	39
26	2.607	29	2.907	1.115		3.86	4.64	5.12	6.38	7.64	1.115	26	29
34	3.409	38	3.810	1.118					5.04	6.30	1.118	34	38
25	2.506	28	2.807	1.120		4.01	4.80	5.28	6.54	7.80	1.120	25	28
33	3.308	37	3.709	1.121					5.19	6.46	1.121	33	37
32	3.208	36	3.609	1.125				4.09	5.35	6.61	1.125	32	36
40	4.010	45	4.511	1.125						5.27	1.125	40	45
31	3.108	35	3.509	1.129				4.25	5.51	6.77	1.129	31	35
30	3.008	34	3.409	1.133			3.93	4.41	5.67	6.93	1.133	30	34
37	3.709	42	4.211	1.135					4.48	5.74	1.135	37	42
22	2.206	25	2.506	1.136	3.23	4.49	5.27	5.75	7.01	8.27	1.136	22	25
29	2.907	33	3.308	1.138			4.09	4.56	5.83	7.09	1.138	29	33
36	3.609	41	4.110	1.139					4.64	5.90	1.139	36	41
28	2.807	32	3.208	1.143			4.25	4.72	5.98	7.24	1.143	28	32
35	3.509	40	4.010	1.143					4.80	6.06	1.143	35	40
42	4.211	48	4.812	1.143						4.87	1.143	42	48
34	3.409	39	3.910	1.147					4.96	6.22	1.147	34	39
27	2.707	31	3.108	1.148		3.62	4.40	4.88	6.14	7.40	1.148	27	31
33	3.308	38	3.810	1.152					5.11	6.37	1.152	33	38
26	2.607	30	3.008	1.154		3.77	4.56	5.04	6.30	7.56	1.154	26	30
39	3.910	45	4.511	1.154						5.35	1.154	39	45
32	3.208	37	3.709	1.156				4.01	5.27	6.53	1.156	32	37
25	2.506	29	2.907	1.160		3.93	4.72	5.19	6.46	7.72	1.160	25	29
31	3.108	36	3.609	1.161				4.17	5.43	6.69	1.161	31	36
30	3.008	35	3.509	1.167			3.85	4.32	5.59	6.85	1.167	30	35
36	3.609	42	4.211	1.167					4.56	5.82	1.167	36	42
35	3.509	41	4.110	1.171					4.72	5.98	1.171	35	41
41	4.110	48	4.812	1.171						4.95	1.171	41	48
29	2.907	34	3.409	1.172			4.01	4.48	5.74	7.00	1.172	29	34
34	3.409	40	4.010	1.176					4.87	6.14	1.176	34	40
28	2.807	33	3.308	1.179			4.16	4.64	5.90	7.16	1.179	28	33
22	2.206	26	2.607	1.182	3.14	4.41	5.19	5.67	6.93	8.19	1.182	22	26
33	3.308	39	3.910	1.182					5.03	6.29	1.182	33	39
38	3.810	45	4.511	1.184						5.42	1.184	38	45
27	2.707	32	3.208	1.185		3.54	4.32	4.80	6.06	7.32	1.185	27	32
32	3.208	38	3.810	1.188					5.19	6.45	1.188	32	38
26	2.607	31	3.108	1.192		3.69	4.48	4.96	6.22	7.48	1.192	26	31
31	3.108	37	3.709	1.194				4.08	5.35	6.61	1.194	31	37
25	2.506	30	3.008	1.200		3.85	4.64	5.11	6.37	7.64	1.200	25	30
30	3.008	36	3.609	1.200				4.24	5.50	6.77	1.200	30	36
35	3.509	42	4.211	1.200					4.63	5.90	1.200	35	42
40	4.010	48	4.812	1.200						5.03	1.200	40	48
34	3.409	41	4.110	1.206					4.79	6.05	1.206	34	41
29	2.907	35	3.509	1.207			3.92	4.40	5.66	6.92	1.207	29	35
33	3.308	40	4.010	1.212					4.95	6.21	1.212	33	40
28	2.807	34	3.409	1.214			4.08	4.56	5.82	7.08	1.214	28	34
37	3.709	45	4.511	1.216						5.50	1.216	37	45
32	3.208	39	3.910	1.219					5.11	6.37	1.219	32	39
27	2.707	33	3.308	1.222			4.24	4.72	5.98	7.24	1.222	27	33
31	3.108	38	3.810	1.226				4.00	5.26	6.53	1.226	31	38
22	2.206	27	2.707	1.227	3.06	4.32	5.11	5.59	6.85	8.11	1.227	22	27
26	2.607	32	3.208	1.231		3.61	4.40	4.87	6.14	7.40	1.231	26	32
39	3.910	48	4.812	1.231						5.10	1.231	39	48
30	3.008	37	3.709	1.233				4.16	5.42	6.69	1.233	30	37
34	3.409	42	4.211	1.235					4.71	5.97	1.235	34	42
25	2.506	31	3.108	1.240		3.77	4.56	5.03	6.29	7.55	1.240	25	31
29	2.907	36	3.609	1.241			3.84	4.32	5.58	6.84	1.241	29	36
33	3.308	41	4.110	1.242					4.87	6.13	1.242	33	41
28	2.807	35	3.509	1.250			4.00	4.48	5.74	7.00	1.250	28	35
32	3.208	40	4.010	1.250					5.02	6.29	1.250	32	40
36	3.609	45	4.511	1.250					4.31	5.57	1.250	36	45
40	4.010	50	5.013	1.250						4.86	1.250	40	50
31	3.108	39	3.910	1.258					5.18	6.45	1.258	31	39
27	2.707	34	3.409	1.259			4.16	4.63	5.90	7.16	1.259	27	34
38	3.810	48	4.812	1.263						5.17	1.263	38	48
30	3.008	38	3.810	1.267				4.08	5.34	6.60	1.267	30	38
26	2.607	33	3.308	1.269		3.53	4.32		6.05	7.32	1.269	26	33
Length Factor*					0.65	0.70	0.73	0.74	0.78	0.81		Length Factor*	

# 8mm Pitch Poly Chain® GT® Carbon® Belts

# Drive Selection Table

Sprocket Combinations				Speed Ratio	Center Distance, Inches						Speed Ratio	Sprocket Combinations	
DriveR		DriveN			8M- 352 P.L. 13.86 44 teeth	8M- 416 P.L. 16.38 52 teeth	8M- 456 P.L. 17.95 57 teeth	8M- 480 P.L. 18.90 60 teeth	8M- 544 P.L. 21.42 66 teeth	8M- 608 P.L. 23.94 76 teeth		DriveR	DriveN
Number of Grooves	Pitch Diameter (Inches)	Number of Grooves	Pitch Diameter (Inches)									Number of Grooves	Number of Grooves
22	2.206	28	2.807	1.273		4.24	5.03	5.50	6.77	8.03	1.273	22	28
33	3.308	42	4.211	1.273					4.78	6.05	1.273	33	42
29	2.907	37	3.709	1.276				4.23	5.50	6.76	1.276	29	37
25	2.506	32	3.208	1.280		3.69	4.47	4.95	6.21	7.47	1.280	25	32
32	3.208	41	4.110	1.281					4.94	6.21	1.281	32	41
39	3.910	50	5.013	1.282					4.93	6.21	1.282	39	50
28	2.807	36	3.609	1.286			3.92	4.39	5.66	6.92	1.286	28	36
35	3.509	45	4.511	1.286					4.38	5.65	1.286	35	45
31	3.108	40	4.010	1.290					5.10	6.36	1.290	31	40
27	2.707	35	3.509	1.296			4.07	4.55	5.81	7.08	1.296	27	35
37	3.709	48	4.812	1.297						5.25	1.297	37	48
30	3.008	39	3.910	1.300				3.99	5.26	6.52	1.300	30	39
26	2.607	34	3.409	1.308			4.23	4.71	5.97	7.23	1.308	26	34
29	2.907	38	3.810	1.310				4.15	5.42	6.68	1.310	29	38
32	3.208	42	4.211	1.313					4.86	6.12	1.313	32	42
38	3.810	50	5.013	1.316						5.00	1.316	38	50
22	2.206	29	2.907	1.318		4.16	4.95	5.42	6.69	7.95	1.318	22	29
25	2.506	33	3.308	1.320		3.60	4.39	4.87	6.13	7.39	1.320	25	33
28	2.807	37	3.709	1.321			3.83	4.31	5.57	6.84	1.321	28	37
31	3.108	41	4.110	1.323					5.02	6.28	1.323	31	41
34	3.409	45	4.511	1.324					4.46	5.72	1.324	34	45
27	2.707	36	3.609	1.333			3.99	4.47	5.73	6.99	1.333	27	36
30	3.008	40	4.010	1.333					5.17	6.44	1.333	30	40
36	3.609	48	4.812	1.333						5.32	1.333	36	48
29	2.907	39	3.910	1.345				4.06	5.33	6.60	1.345	29	39
26	2.607	35	3.509	1.346			4.15	4.62	5.89	7.15	1.346	26	35
37	3.709	50	5.013	1.351						5.08	1.351	37	50
31	3.108	42	4.211	1.355					4.93	6.20	1.355	31	42
28	2.807	38	3.810	1.357				4.22	5.49	6.75	1.357	28	38
25	2.506	34	3.409	1.360		3.52	4.31	4.78	6.05	7.31	1.360	25	34
22	2.206	30	3.008	1.364		4.08	4.86	5.34	6.60	7.86	1.364	22	30
33	3.308	45	4.511	1.364					4.53	5.80	1.364	33	45
30	3.008	41	4.110	1.367					5.09	6.36	1.367	30	41
27	2.707	37	3.709	1.370			3.90	4.38	5.65	6.91	1.370	27	37
35	3.509	48	4.812	1.371						5.40	1.371	35	48
29	2.907	40	4.010	1.379				3.98	5.25	6.51	1.379	29	40
26	2.607	36	3.609	1.385			4.06	4.54	5.81	7.07	1.385	26	36
36	3.609	50	5.013	1.389						5.15	1.389	36	50
28	2.807	39	3.910	1.393				4.14	5.41	6.67	1.393	28	39
25	2.506	35	3.509	1.400			4.22	4.70	5.96	7.23	1.400	25	35
30	3.008	42	4.211	1.400					5.00	6.27	1.400	30	42
32	3.208	45	4.511	1.406					4.60	5.87	1.406	32	45
27	2.707	38	3.810	1.407			3.82	4.30	5.56	6.83	1.407	27	38
22	2.206	31	3.108	1.409		3.99	4.78	5.26	6.52	7.78	1.409	22	31
34	3.409	48	4.812	1.412						5.47	1.412	34	48
29	2.907	41	4.110	1.414					5.16	6.43	1.414	29	41
26	2.607	37	3.709	1.423			3.98	4.46	5.72	6.99	1.423	26	37
28	2.807	40	4.010	1.429				4.05	5.32	6.59	1.429	28	40
35	3.509	50	5.013	1.429						5.22	1.429	35	50
37	3.709	53	5.314	1.432						4.82	1.432	37	53
25	2.506	36	3.609	1.440			4.14	4.61	5.88	7.15	1.440	25	36
27	2.707	39	3.910	1.444				4.21	5.48	6.75	1.444	27	39
29	2.907	42	4.211	1.448					5.08	6.35	1.448	29	42
31	3.108	45	4.511	1.452					4.67	5.94	1.452	31	45
22	2.206	32	3.208	1.455		3.91	4.70	5.17	6.44	7.70	1.455	22	32
33	3.308	48	4.812	1.455						5.54	1.455	33	48
26	2.607	38	3.810	1.462			3.89	4.37	5.64	6.90	1.462	26	38
28	2.807	41	4.110	1.464				3.96	5.24	6.50	1.464	28	41
34	3.409	50	5.013	1.471						5.29	1.471	34	50
36	3.609	53	5.314	1.472						4.89	1.472	36	53
25	2.506	37	3.709	1.480			4.05	4.53	5.80	7.06	1.480	25	37
27	2.707	40	4.010	1.481				4.12	5.40	6.66	1.481	27	40
22	2.206	33	3.308	1.500		3.82	4.61	5.09	6.36	7.62	1.500	22	33
26	2.607	39	3.910	1.500			3.80	4.28	5.55	6.82	1.500	26	39
28	2.807	42	4.211	1.500					5.15	6.42	1.500	28	42
30	3.008	45	4.511	1.500					4.74	6.02	1.500	30	45
32	3.208	48	4.812	1.500					4.34	5.61	1.500	32	48
35	3.509	53	5.314	1.514						4.96	1.514	35	53
33	3.308	50	5.013	1.515						5.37	1.515	33	50
Length Factor*					0.65	0.70	0.73	0.74	0.78	0.81		Length Factor*	

# 8mm Pitch Poly Chain® GT® Carbon® Belts

# Drive Selection Table

Sprocket Combinations				Speed Ratio	Center Distance, Inches						Speed Ratio	Sprocket Combinations	
DriveR		DriveN			8M- 322 P.L. 13.96 44 Teeth	8M- 416 P.L. 16.38 52 Teeth	8M- 456 P.L. 17.95 57 Teeth	8M- 480 P.L. 18.90 60 Teeth	8M- 544 P.L. 21.42 68 Teeth	8M- 608 P.L. 23.94 76 Teeth		DriveR	DriveN
Number of Grooves	Pitch Diameter (Inches)	Number of Grooves	Pitch Diameter (Inches)									Number of Grooves	Number of Grooves
27	2.707	41	4.110	1.519				4.03	5.31	6.58	1.519	27	41
25	2.506	38	3.810	1.520			3.96	4.44	5.71	6.98	1.520	25	38
26	2.607	40	4.010	1.538				4.19	5.47	6.74	1.538	26	40
22	2.206	34	3.409	1.545		3.73	4.52	5.00	6.27	7.54	1.545	22	34
31	3.108	48	4.812	1.548					4.41	5.69	1.548	31	48
29	2.907	45	4.511	1.552					4.82	6.09	1.552	29	45
27	2.707	42	4.211	1.556				3.94	5.22	6.49	1.556	27	42
34	3.409	53	5.314	1.559						5.03	1.559	34	53
25	2.506	39	3.910	1.560			3.87	4.35	5.63	6.90	1.560	25	39
32	3.208	50	5.013	1.563						5.44	1.563	32	50
26	2.607	41	4.110	1.577				4.11	5.38	6.65	1.577	26	41
22	2.206	35	3.509	1.591		3.64	4.44	4.92	6.19	7.45	1.591	22	35
25	2.506	40	4.010	1.600			3.78	4.27	5.54	6.81	1.600	25	40
30	3.008	48	4.812	1.600					4.48	5.76	1.600	30	48
33	3.308	53	5.314	1.606						5.10	1.606	33	53
28	2.807	45	4.511	1.607					4.89	6.16	1.607	28	45
31	3.108	50	5.013	1.613						5.51	1.613	31	50
26	2.607	42	4.211	1.615				4.01	5.29	6.57	1.615	26	42
22	2.206	36	3.609	1.636		3.55	4.35	4.83	6.10	7.37	1.636	22	36
25	2.506	41	4.110	1.640				4.18	5.45	6.73	1.640	25	41
29	2.907	48	4.812	1.655					4.55	5.83	1.655	29	48
32	3.208	53	5.314	1.656						5.17	1.656	32	53
27	2.707	45	4.511	1.667					4.96	6.24	1.667	27	45
30	3.008	50	5.013	1.667					4.29	5.58	1.667	30	50
25	2.506	42	4.211	1.680				4.09	5.37	6.64	1.680	25	42
22	2.206	37	3.709	1.682		3.46	4.26	4.74	6.02	7.29	1.682	22	37
33	3.308	56	5.614	1.697						4.82	1.697	33	56
31	3.108	53	5.314	1.710						5.24	1.710	31	53
28	2.807	48	4.812	1.714					4.62	5.90	1.714	28	48
29	2.907	50	5.013	1.724					4.36	5.65	1.724	29	50
22	2.206	38	3.810	1.727			4.17	4.66	5.93	7.20	1.727	22	38
26	2.607	45	4.511	1.731					5.03	6.31	1.731	26	45
32	3.208	56	5.614	1.750						4.89	1.750	32	56
30	3.008	53	5.314	1.767						5.31	1.767	30	53
22	2.206	39	3.910	1.773			4.08	4.57	5.84	7.12	1.773	22	39
27	2.707	48	4.812	1.778					4.69	5.97	1.778	27	48
28	2.807	50	5.013	1.786					4.43	5.72	1.786	28	50
25	2.506	45	4.511	1.800				3.81	5.10	6.38	1.800	25	45
31	3.108	56	5.614	1.806						4.96	1.806	31	56
22	2.206	40	4.010	1.818			3.99	4.48	5.76	7.03	1.818	22	40
29	2.907	53	5.314	1.828						5.38	1.828	29	53
26	2.607	48	4.812	1.846					4.75	6.04	1.846	26	48
27	2.707	50	5.013	1.852					4.50	5.79	1.852	27	50
22	2.206	41	4.110	1.864			3.90	4.39	5.67	6.94	1.864	22	41
30	3.008	56	5.614	1.867						5.03	1.867	30	56
28	2.807	53	5.314	1.893						5.45	1.893	28	53
22	2.206	42	4.211	1.909			3.80	4.29	5.58	6.86	1.909	22	42
25	2.506	48	4.812	1.920					4.82	6.11	1.920	25	48
26	2.607	50	5.013	1.923					4.57	5.86	1.923	26	50
29	2.907	56	5.614	1.931						5.10	1.931	29	56
27	2.707	53	5.314	1.963						5.52	1.963	27	53
25	2.506	50	5.013	2.000					4.63	5.93	2.000	25	50
28	2.807	56	5.614	2.000						5.16	2.000	28	56
26	2.607	53	5.314	2.038					4.27	5.58	2.038	26	53
22	2.206	45	4.511	2.045				4.01	5.31	6.59	2.045	22	45
27	2.707	56	5.614	2.074						5.23	2.074	27	56
25	2.506	53	5.314	2.120					4.34	5.65	2.120	25	53
28	2.807	60	6.015	2.143						4.77	2.143	28	60
26	2.607	56	5.614	2.154					5.30	6.32	2.154	26	56
22	2.206	48	4.812	2.182					5.03	6.32	2.182	22	48
27	2.707	60	6.015	2.222						4.83	2.222	27	60
25	2.506	56	5.614	2.240						5.37	2.240	25	56
22	2.206	50	5.013	2.273					4.84	6.14	2.273	22	50
26	2.607	60	6.015	2.308						4.90	2.308	26	60
25	2.506	60	6.015	2.400						4.96	2.400	25	60
22	2.206	53	5.314	2.409					4.53	5.86	2.409	22	53
22	2.206	56	5.614	2.545				4.22	5.57	6.57	2.545	22	56
22	2.206	60	6.015	2.727						5.16	2.727	22	60
22	2.206	63	6.316	2.864						4.83	2.864	22	63
Length Factor*					0.65	0.70	0.73	0.74	0.78	0.81	Length Factor*		

# ENGINEERING DATA

NOTE: This engineering section provides general engineering information for synchronous belts and sprockets (or pulleys) which are useful in general drive design work. If you need additional information, contact Gates Power Transmission Product Application.

When designing synchronous drives, there are several special circumstances that may require additional consideration:

## Section I Application Design Considerations

When designing synchronous drives, there are several special circumstances that may require additional consideration:

1. Gear Motors/Speed Reducer Drives
2. Electric Motor Frame Dimensions
3. Minimum Sprocket Diameter Recommendations for Electric Motors
4. High-Driven Inertia
5. Air Moving Drives
6. Linear Motion Drives
7. High Performance Applications
8. Belt Drive Registration
9. Belt Drive Noise
10. Use of Flanged Sprockets
11. Fixed (Nonadjustable) Center Distance
12. Use of Idlers
13. Specifying Shaft Locations in Multipoint Drive Layouts
14. Minimum Belt Wrap and Tooth Engagement
15. Adverse Operating Environments

Each of these circumstances and special considerations are reviewed below.

### 1. Gear Motors/Speed Reducer Drives

When designing a belt drive system to transfer power from the output shaft of a speed reducer to the final driven shaft, the designer must make certain that the belt drive does not exert shaft loads greater than the speed reducing device is rated to carry. Failure to do so can result in premature shaft/bearing failures whether the belt drive has been designed with the appropriate power capacity or not.

This concept is similar to the National Electric Motor Association (NEMA) establishing minimum acceptable sprocket diameters for each of their standardized motor frames. Abiding by these minimum recommended diameters, when designing a belt drive system, prevents the motor bearings from failing prematurely due to excessive shaft loads exerted by the belt drive.

Overhung load is generally defined as a force exerted by a belt or chain drive, that is perpendicular to a speed reducer shaft, and applied beyond its outermost bearing. Calculated overhung load values are intended to serve as an indication of how heavily loaded the shaft and outermost bearing of a speed reducer actually is.

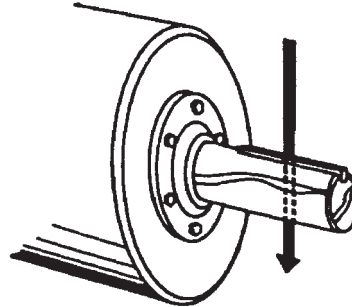


Figure 3 -Overhung Load

Overhung load calculations are generally assumed to apply to the slower output shaft of a speed reducer. It is important to note that these calculations apply to higher speed input shafts as well. Most speed reducer manufacturers publish allowable overhung load values for every model in their product line. This value represents the maximum load that the shaft and bearings can support without negatively impacting the durability of the speed reducer. When the actual overhung load exceeds the published allowable value, premature shaft or bearing failure may occur. In extreme cases, catastrophic failures can occur.

A general formula used to calculate overhung load (OHL) is as follows:

#### Formula 8

$$\text{OHL} = \frac{126,000 \times \text{HP} \times \text{kLCF} \times \text{KSF} \times \text{KLLF}}{\text{PD} \times \text{RPM}}$$

Where:

- HP = Actual horsepower being transmitted at the gear motor/reducer output shaft with no service factor applied
- KLCF = Overhung load connection factor (1.3 for all synchronous belt drives)
- KSF = Service factor for the speed reducer (available from the manufacturer)
- KLLF = Load location factor for the speed reducer (available from the manufacturer)
- PD = Pitch diameter of the speed reducer output shaft sprocket
- RPM = RPM of the speed reducer output shaft

Speed reducer manufacturers each publish their own specific formula and constants to calculate overhung load. They also publish specific overhung load ratings for each speed reducer product that they produce. It is very important to use the correct overhung load calculation procedure in conjunction with the manufacturer's accompanying overhung load rating.



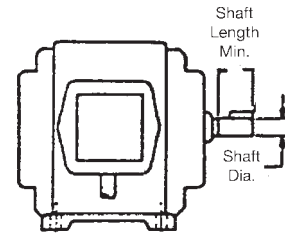
If the calculated overhung load for a particular belt drive system does exceed the speed reducer manufacturer's maximum recommended value, consider altering the belt drive design. In order to reduce the calculated overhung load, consider:

- Increasing sprocket diameters
- Reducing belt width
- Mounting the sprocket closer to the speed reducer outboard bearing

Increasing the sprocket diameter not only reduces calculated overhung load, it also potentially reduces the required belt width. Reducing the belt width and mounting the sprocket as close as possible to the outermost bearing of the speed reducer both move the center of the belt load closer to the speed reducer. This also reduces the calculated overhung load. Alterations to the belt drive design should be made until the calculated overhung load is within the speed reducer manufacturer's recommendations.

## 2. Electric Motor Frame Dimensions

Motor dimensions can be important considerations depending on the application and its requirements. If motor shaft length, motor shaft diameter, or clearance issues are a concern, refer to the motor dimension table on this page. The table lists common general purpose electric motors by frame size.



Frame Size	Shaft Dia. (In)	Shaft Length Min. (In)	Key (In)
48	1/2	—	3/64 Flat
56	5/8	—	3/16 x 3/16 x 1-3/8
143T	7/8	2	3/16 x 3/16 x 1-3/8
145T	7/8	2	3/16 x 3/16 x 1-3/8
182	7/8	2	3/16 x 3/16 x 1-3/8
182T	1-1/8	2-1/2	1/4 x 1/4 x 1-3/4
182	7/8	2	3/16 x 3/16 x 1-3/8
182T	1-1/8	2-1/2	1/4 x 1/4 x 1-3/4
213	1-1/8	2-3/4	1/4 x 1/4 x 2
213T	1-3/8	3-1/8	5/16 x 5/16 x 2-3/8
215	1-1/8	2-3/4	1/4 x 1/4 x 2
215T	1-3/8	3-1/8	5/16 x 5/16 x 2-3/8
254U	1-3/8	3-1/2	5/16 x 5/16 x 2-3/4
254T	1-5/8	3-3/4	3/8 x 3/8 x 2-7/8
256U	1-3/8	3-1/2	5/16 x 5/16 x 3-3/4
256T	1-5/8	3-3/4	3/8 x 3/8 x 2-7/8
284U	1-5/8	4-5/8	3/8 x 3/8 x 3-3/4
284T	1-7/8	4-3/8	1/2 x 1/2 x 3-1/4
284TS	1-5/8	3	3/8 x 3/8 x 1-7/8
286U	1-5/8	4-5/8	3/8 x 3/8 x 3-3/4
286T	1-7/8	4-3/8	1/2 x 1/2 x 3-1/4
286TS	1-5/8	3	3/8 x 3/8 x 1-7/8
324U	1-7/8	5-3/8	1/2 x 1/2 x 4-1/4
324T	2-1/8	5	1/2 x 1/2 x 3-7/8
324TS	1-7/8	3-1/2	1/2 x 1/2 x 2
326U	1-7/8	5-3/8	1/2 x 1/2 x 4-1/4
326T	2-1/8	5	1/2 x 1/2 x 3-7/8
326TS	1-7/8	3-1/2	1/2 x 1/2 x 2
364U	2-1/8	6-1/8	1/2 x 1/2 x 5
364US	1-7/8	3-1/2	1/2 x 1/2 x 2
364T	2-3/8	5-5/8	5/8 x 5/8 x 4-1/4
364TS	1-7/8	3-1/2	1/2 x 1/2 x 2
365U	2-1/8	6-1/8	1/2 x 1/2 x 5
365US	1-7/8	3-1/2	1/2 x 1/2 x 2
365T	2-3/8	5-5/8	5/8 x 5/8 x 4-1/4
365TS	1-7/8	3-1/2	1/2 x 1/2 x 2
404U	2-3/8	6-7/8	5/8 x 5/8 x 5-1/2
404US	2-1/8	4	1/2 x 4 x 2-3/4
404T	2-7/8	7	3/4 x 3/4 x 5-5/8
404TS	2-1/8	4	1/2 x 1/2 x 2-3/4
405U	2-3/8	6-7/8	5/8 x 5/8 x 5-1/2
405US	2-1/8	4	1/2 x 1/2 x 2-3/4
405T	2-7/8	7	3/4 x 3/4 x 5-5/8
405TS	2-1/8	4	1/2 x 1/2 x 2-3/4
444U	2-7/8	8-3/8	3/4 x 3/4 x 7
444US	2-1/8	4	1/2 x 1/2 x 2-3/4
444T	3-3/8	8-1/4	7/8 x 7/8 x 6-7/8
444TS	2-3/8	4-1/2	5/8 x 5/8 x 3
445U	2-7/8	8-3/8	3/4 x 3/4 x 7
445US	2-1/8	4	1/2 x 1/2 x 2-3/4
445T	3-3/8	8-1/4	7/8 x 7/8 x 6-7/8
445TS	2-3/8	4-1/2	5/8 x 5/8 x 3
447T	3-3/8	8-1/4	7/8 x 7/8 x 6-7/8
447TS	2-3/8	4-1/2	5/8 x 5/8 x 3
449T	3-3/8	8-1/4	7/8 x 7/8 x 6-7/8
449TS	2-3/8	4-1/2	5/8 x 5/8 x 3

### 3. Minimum Sprocket Diameter Recommendations for Electric Motors

#### Minimum Recommended Sprocket /Sheave Diameters

NEMA (The National Electric Manufacturers Association) publishes recommendations for the minimum diameter of sprockets and sheaves to be used on General Purpose Electric Motors. The purpose of these recommendations is to prevent the use of excessively small sprockets or sheaves. This can result in motor shaft or bearing damage since belt pull increases as the diameter is reduced.

Table data has been compiled from NEMA Standard MG-1-14-42; 11/78, MG-1-14-43; 1/68, and a composite of electric motor manufacturers data. Values are generally conservative, and specific motors may permit the use of a smaller sprocket or sheave. Consult the motor manufacturer.

**Motor Frames and Minimum Diameters  
for 60 Cycle Electric Motors**

Motor Frame Code	Shaft Dia.(in)	Horsepower at Synchronous Speed (rpm)				Synchronous Belts
		3600 (3450)	1800 (1750)	1200 (1160)	900 (870)	Min. Pitch Dia. (in)
143T	0.875	1-1/2	1	3/4	1/2	2.0
145T	0.875	2—3	1-1/2—2	1	3/4	2.2
182T	1.125	3	3	1-1/2	1	2.2
182T	1.125	5	—	—	—	2.4
184T	1.125	—	—	2	1-1/2	2.2
184T	1.125	5	—	—	—2.2	2.2
184T	1.125	7-1/2	5	—	—2.7	2.7
213T	1.375	7-1/2—10	7-1/2	3	2	2.7
215T	1.375	10	—	5	3	2.7
215T	1.375	15	10	—	—	3.4
254T	1.625	15	—	7-1/2	5	3.4
254T	1.625	20	15	—	—	4.0
256T	1.625	20—25	—	10	7-1/2	4.0
256T	1.625	—	20	—	—	4.0
284T	1.875	—	—	15	10	4.0
284T	1.875	—	25	—	—	4.0
286T	1.875	—	30	20	15	4.7
324T	2.125	—	40	25	20	5.4
236T	2.125	—	50	30	25	6.1
364T	2.375	—	—	40	30	6.1
364T	2.375	—	60	—	—	6.7
365T	2.375	—	—	50	40	7.4
365T	2.375	—	75	—	—	7.7
404T	2.875	—	—	60	—	7.2
404T	2.875	—	—	—	50	7.6
404T	2.875	—	100	—	—	7.7
405T	2.875	—	—	75	60	9.0
405T	2.875	—	100	—	—	7.7
405T	2.875	—	125	—	—	9.5
444T	3.375	—	—	100	—	9.0
444T	3.375	—	—	—	75	8.6
444T	3.375	—	125	—	—	9.5
444T	3.375	—	150	—	—	9.5
445T	3.375	—	—	125	—	10.8
445T	3.375	—	—	—	100	10.8
445T	3.375	—	150	—	—	9.5
445T	3.375	—	200	—	—	11.9

### 4. High-Driven Inertia

Many drives, such as piston compressors, punch presses and crushers, depend on the driveN pulley acting as a flywheel. This flywheel effect, or WR<sup>2</sup> is used to help moderate or smooth out fluctuations in driven load and speed. Failure to compensate for this during a redesign can result in premature damage to the prime mover or early belt failures. This can be a consideration when replacing older belt drives with new, higher capacity belts.

When replacing large pulleys or sheaves with sprockets, be careful not to remove a designed-in flywheel effect. Ask questions of the user to make sure there is not a concern for a high WR<sup>2</sup>. If there is a concern, you may have to use a wider sprocket, a larger diameter, or a special made-to-order sprocket designed with added weight and WR<sup>2</sup>.

Drives which have a high driveN inertia and are subjected to high acceleration or emergency stop conditions require additional design expertise. Contact Gates Power Transmission Product Application for further engineering assistance.

### 5. Air Moving Drives

#### HVAC Equipment Inspection

Many air handling drives have structures that are not particularly rigid, which can create belt tension and drive alignment problems resulting in unusual and premature belt wear. Synchronous belts are sensitive to fluctuations in center distance that can be caused by inadequate bracketry. Under start up conditions, an AC motor can be required to provide 150% to 200% of its rated capacity. Synchronous belts cannot slip, and must transmit the higher start-up torque. Under these conditions, the drive center distance may collapse if the structure is not sufficiently rigid.

With the drive shut off and safely locked out, a simple method to use when inspecting potential drive conversions is to grab the two belt spans and push them together while observing the motor. If any significant relative change in center distance or motor position is noticed, the drive's structural strength is most likely insufficient for a simple conversion. The structure would need to be reinforced to obtain optimum performance from a synchronous belt drive. The best conversion candidates have motors that are mounted solidly on support bracketry that is part of the fan's structural system. When possible, select synchronous drives with diameters similar to existing V-belt sheave diameters. This will maintain similar belt pulls and loads on the shafts and structure.

#### Air Handling Unit Start-Up Characteristics

##### Full Load Start Up

Start up loads can be a concern when evaluating potential drives for conversion to synchronous belts. Synchronous belts will transmit all of the start-up torque, where V-belts may slip if the load is excessive. Due to the inertia of the fan, start up loads can potentially be 150% to 200% of the normal operating load. It is important that the start up load be considered by selecting appropriate service factors when designing a belt drive system.

##### Controlled Start Up

An air handling drive with soft start or variable frequency controller (AC Inverter) is ideal for conversion to synchronous belts. The fan will be ramped up to speed slowly, with a corresponding increase in load as the speed increases. Structural flexing is typically not a concern when designing synchronous belt drives on systems using soft starts or variable frequency controllers.

##### Fan Speed

The volume of air being transmitted and the required horsepower are both sensitive to changes in the driveN fan speed. If designing a synchronous belt drive for energy savings, it is important that the synchronous belt drive be designed to operate at the proper driveN fan speed. All conversions from existing V-belt drives should have the synchronous belt drive speed ratio based on a measured driveN shaft RPM, and not calculated from the theoretical V-belt speed ratio. This measurement can be made by either using a mechanical contact tachometer or a strobe tachometer.

The horsepower requirement for fans varies with the cube of the fan speed. A small change in the fan speed makes a much larger difference in the actual horsepower and energy required.

#### Formula 9

$$HP_1 / HP_2 = (RPM_1 / RPM_2)^3$$

Where:  $HP_1$  = Initial Horsepower  
 $HP_2$  = New Horsepower @ New Fan RPM  
 $RPM_1$  = Initial Fan RPM  
 $RPM_2$  = New Fan RPM

### Air-Cooled Heat Exchanger (ACHE) Applications

Air-cooled heat exchangers are used in Petrochemical, Oil and Gas Production, Power Generation, and Petroleum Refining Industries where process heat must be removed. Electric motors as large as 60 hp commonly drive the cooling fans with either large ratio V-belt or Synchronous belt drives.

According to the American Petroleum Institute (**API 661** - Air-Cooled Heat Exchangers for General Refinery Service), a safety factor of 1.8 must be used in the belt drive design process. Synchronous belt drives typically have higher horsepower capacities than V-belt drives with an equivalent width. This increased capacity results in narrower belt drives and lighter drive hardware. Synchronous belt drive systems are especially beneficial on higher horsepower heat exchanger units, and they are commonly used on new or redesigned units. V-belt drive systems are commonly used on low to medium HP fans because of their relatively low cost and good availability.

Surface rust on sheaves and sprockets is very abrasive, and rapidly wears belts. Sprockets on wet heat exchanger applications (water drawn through heat exchanger coils by fan) such as Cooling Towers, often rust and require the use of electroless nickel plating to prevent excessive corrosion. Cooling Towers are commonly used to cool large buildings (HVAC; Heating-Ventilating-Air Conditioning Systems). Misalignment is a common cause of premature belt failures on ACHE drive systems. Care should be taken to ensure proper sheave/sprocket alignment when installing the belt drive system.

See **Gates Belt Drive Preventative Maintenance and Safety Manual** for detailed information about proper belt drive alignment. Proper belt tension is necessary to obtain optimum belt performance. This is particularly true for the high inertia start up loads seen in ACHE applications. If belt installation tension is too low, V-belts will be prone to slippage and synchronous belts will be prone to tooth jump or ratcheting. Motor controllers are sometimes used to bring the fan up to speed slowly (soft start), decreasing the chance of synchronous belt ratcheting.

### 6. Linear Motion Drives

In linear motion drives, such as a rack and pinion application, the belt is not transmitting a load in the conventional rotational manner. The two cut ends of the belt are connected to clamping fixtures and the belt travels back and forth a specified distance while rotating over a sprocket. Because of these characteristics, the drive design process will typically not follow standard catalog design procedures.

The designer will most likely have available a maximum belt load or pull which will need to be related to the belt's allowable working tension. Reasonably sized sprocket diameters are still required to prevent excessive stress fatigue in the belt. In these applications, the designer may either use endless belts and cut them, or use standard long length belting when available. Gates Power Transmission Product Application may be consulted for design assistance.

### 7. High Performance Vehicle Applications

For special high performance applications, such as motorcycles or race car and boat supercharger drives, the design loads will typically exceed published data. Because of the extremely high loads and speeds (as much as 500 HP and belt speeds exceeding 10,000 fpm), it is necessary for the designer to contact Gates Power Transmission Product Application for additional assistance.

Although special considerations may be involved, it is important to remember that reasonable drive recommendations can be provided to the designer in most cases.

### 8. Belt Drive Registration

The three primary factors contributing to belt drive registration (or positioning) errors are belt elongation, backlash, and tooth deflection. When evaluating the potential registration capabilities of a synchronous belt drive, the system must first be determined to be either static or dynamic in terms of its registration function and requirements.

**Static Registration:** A static registration system moves from its initial static position to a secondary static position. During the process the designer is concerned only with how accurately and consistently the drive arrives at its secondary position. Potential registration errors that occur during transport are not considered. Therefore, the primary factor contributing to registration error in a static registration system is backlash. The effects of belt elongation and tooth deflection do not have any influence on the registration accuracy of this type of system.

**Dynamic Registration:** A dynamic registration system is required to perform a registering function while in motion with torque loads varying as the system operates. In this case, the designer is concerned with the rotational position of the drive sprockets with respect to each other at every point in time. Therefore, belt elongation, backlash, and tooth deflection will all contribute to registration inaccuracies.

Further discussion about each of the factors contributing to registration error is as follows:

**Belt Elongation:** Belt elongation, or stretch, occurs naturally when a belt is placed under tension. The total tension exerted within a belt results from installation as well as working loads. The amount of belt elongation is a function of the belt tensile modulus, which is influenced by the type of tensile cord and the belt construction. The standard tensile cord used in rubber synchronous belts is fiberglass. Fiberglass has a high tensile modulus, is dimensionally stable, and has excellent flex-fatigue characteristics. If a higher tensile modulus is needed in a rubber synchronous belt, aramid tensile cords can be considered, although they are generally used to provide resistance to harsh shock and impulse loads. Aramid tensile cords used in rubber synchronous belts generally have only a marginally higher tensile modulus in comparison to fiberglass. When needed, belt tensile modulus data is available from Gates Power Transmission Product Application.

**Backlash:** Backlash in a synchronous belt drive results from clearance between the belt teeth and the sprocket grooves. This clearance is needed to allow the belt teeth to enter and exit the grooves smoothly with a minimum of interference. The amount of clearance necessary depends upon the belt tooth profile. PowerGrip® Timing Belt Drives are known for having relatively little backlash. PowerGrip® HTD® Drives have improved torque carrying capability and resist ratcheting, but have a significant amount of backlash. PowerGrip® GT\*2 and Poly Chain® GT\*Carbon® Drives have considerably improved torque carrying capability, and backlash characteristics in between that of PowerGrip HTD and PowerGrip Timing Drives. In special cases, alterations can be made to drive systems to further decrease backlash. These alterations often result in increased belt wear, increased drive noise and shorter drive life. For additional information contact Gates Power Transmission Product Application.

**Tooth Deflection:** Tooth deformation in a synchronous belt drive occurs as a torque load is applied to the system, and individual belt teeth are loaded. The amount of belt tooth deformation depends upon the amount of torque loading, sprocket size, installation tension and belt type. Of the three primary contributors to registration error, tooth deflection is the most difficult to quantify. Experimentation with a prototype drive system is the best means of obtaining realistic estimations of belt tooth deflection. Additional guidelines that may be useful in designing registration critical drive systems are as follows:

- Design with large sprockets with more teeth in mesh.
- Keep belts tight, and control tension closely.
- Design frame/shafting to be rigid under load.
- Use high quality machined sprockets to minimize radial run out and lateral wobble.

## 9. Belt Drive Noise

V-belt, synchronous belt, roller chain, and gear drives will all generate noise while transmitting power. Each type of system has its own characteristic sound. V-belt drives tend to be the quietest and synchronous belt drives are much quieter than roller chain drives. When noise is an issue, there are several design and maintenance tips that should be followed to minimize belt drive noise.

### Noise: Decibel and Frequency

Noise is an unwanted or unpleasant sound that can be described with two criteria – frequency and decibel (dB) levels. Frequency is measured in Hertz. A perfect human ear is capable of distinguishing frequencies typically from 20 to 20,000 Hertz. The human ear does not generally perceive frequencies higher than 20,000 Hertz. The sound pressure level or intensity of noise is measured in terms of decibels (dB). The decibel has become the basic unit of measure since it is an objective measurement that approximately corresponds to the subjective measurement made by the human ear. Since sound is composed of several distinct and measurable parts and the human ear doesn't differentiate between these parts, measuring scales that approximate the human ear's reaction have been adopted. Three scales – A, B, and C – are used to duplicate the ear's response over the scale's ranges. The A scale is most commonly used in industry because of its adoption as the standard in OSHA regulations. Noise described in decibels (dBA - "A" weighting for the human ear) is generally perceived as the loudness or intensity of the noise.

While the human ear can distinguish frequencies over a broad range, the ear is most sensitive in the range of normal speech – 500 to 2000 Hertz.. As a consequence, this is the range most commonly of concern for noise control ("A" weighting gives more weight or emphasis to sounds in the 500 to 2000 Hz range). Frequency is most closely related to what the ear hears as pitch. High frequency sounds are perceived as whining or piercing, while low frequency sounds are perceived as rumbling. The combination of sound pressure level (dB) and frequency describes the overall level of loudness perceived by the human ear. One without the other does not adequately describe the loudness potential of the noise. For example, an 85 dBA noise at 3000 Hertz is going to be perceived as being much louder than an 85 dBA noise at 500 Hertz.

### Reducing Noise

Following proper installation and maintenance procedures, as well as some simple design alternatives can reduce belt drive noise.

### Belt Drive Tension and Alignment

Properly tensioning and aligning a belt drive will allow the belt drive to perform at its quietest level. Improper tension in synchronous belt drives can affect how the belt fits in the sprocket grooves. Proper tension minimizes tooth to groove interference, and thereby reduces belt noise.

Misaligned synchronous belt drives tend to be much noisier than properly aligned drives due to the amount of interference that is created between the belt teeth and the sprocket grooves. Misaligned synchronous belt drives also may cause belt tracking that forces the edge of the belt to ride hard against a sprocket flange. Misalignment causing belt contact with a flange will generate noise that is easily detected.

### Noise Barriers and Absorbers

Sometimes, even properly aligned and tensioned belt drives may be too noisy for a work environment. When this occurs, steps can be taken to modify the drive guard to reduce the noise level.

Noise barriers are used to block and reflect noise. Noise barriers do not absorb or deaden the noise; they block the noise and generally reflect most of the noise back towards its point of origin. Good noise barriers are dense, and should not vibrate. A sheet metal belt guard is a noise barrier. The more complete the enclosure is, the more effective it is as a noise barrier. Noise barrier belt guards can be as sophisticated as a completely enclosed case, or as simple as sheet metal covering the front of the guard to prevent direct sound transmission.

Noise absorbers are used to reduce noise reflections and to dissipate noise energy. Noise absorbers should be used in combination with a noise barrier. Noise absorbers are commonly referred to as acoustic insulation. Acoustic insulation (the noise absorber) is used inside of belt guards (the noise barrier) where necessary. A large variety of acoustic insulation manufacturers are available to provide different products for the appropriate situation.

A combination of noise barrier (solid belt guard) and noise absorber (acoustic insulation) will provide the largest reduction in belt drive noise. While the noise reduction cannot be predicted, field experience has shown that noise levels have been reduced by 10 to 20 dBA when using complete belt guards with acoustic insulation.

## 10. Use of Flanged Sprockets

Guide flanges are needed in order to keep the belt on the sprocket. Due to tracking characteristics, even on the best aligned drives, belts will ride off the edge of the sprockets. Flanges will prevent this belt ride-off.

On all drives using stock or made-to-order sprockets, the following conditions should be considered when selecting flanged sprockets:

1. On all two-sprocket drives, the minimum flanging requirements are two flanges on one sprocket or one flange on each sprocket on opposite sides.
2. On drives where the center distance is more than eight times the diameter of the small sprocket, both sprockets should be flanged on both sides. (See Engineering Section II, Drive Alignment and Belt Installation on Pages 105 and 106.)
3. On vertical shaft drives, one sprocket should be flanged on both sides, and all the other sprockets in the system should be flanged on the bottom side only.
4. On drives with more than two sprockets, the minimum flanging requirements are two flanges on every other sprocket or one flange on every sprocket —on alternating sides around the system.

On made-to-order sprockets, flanges must be securely fastened, such as using mechanical fasteners, welding, shrink-fit or other equivalent methods.

## 11. Fixed (Nonadjustable) Center Distance

Designers sometimes attempt to design synchronous belt drive systems without any means of belt adjustment or take up. This type of system is called a Fixed Center Drive. While this approach is often viewed as being economical, and is simple for assemblers, it often results in troublesome reliability and performance problems in the long run.

The primary pitfall in a fixed center design approach is failure to consider the affects of system tolerance accumulation. Belts and sprockets are manufactured with industry accepted production tolerances. There are limits to the accuracy that the center distance can be maintained on a production basis as well. The potential effects of this tolerance accumulation is as follows:

### Low Tension:

*Long Belt with Small Sprockets on a Short Center Distance*

### High Tension:

*Short Belt with Large Sprockets on a Long Center Distance*

Belt tension in these two cases can vary by a factor of 3 or more with a standard fiberglass tensile cord, and even more with an aramid tensile cord. This potential variation is great enough to overload bearings and shafting, as well as the belts themselves. The probability of these extremes occurring is a matter of statistics, but however remote the chances seem, they will occur in a production setting. In power transmission drives, the appearance of either extreme is very likely to impact drive system performance in a negative manner.

The most detrimental aspect of fixed center drives is generally the potentially high tension condition. This condition can be avoided by adjusting the design center distance. A common approach in these designs is to reduce the center distance from the exact calculated value by some small fraction. This results in a drive system that is inherently loose, but one that has much less probability of yielding excessively high shaft loads. **NOTE:** This approach should not be used for power transmission drives since the potentially loose operating conditions could result in accelerated wear and belt ratcheting, even under nominal loading.

There are times when fixed center drive designs can't be avoided. In these cases, the following recommendations will maximize the probability of success.

1. Do not use a fixed center design for power transmission drives. Consider using a fixed center design only for lightly loaded or motion transfer applications.
2. Do not use a fixed center design for drives requiring high motion quality or registration precision.
3. When considering a fixed center design, the center distance must be held as accurately as possible, typically within 0.002" — 0.003" (0.05mm — 0.08mm). This accuracy often requires the use of stamped steel framework.
4. Sprockets for fixed center systems should be produced with a machining process for accuracy. Molding and sintering processes are generally not capable of holding the finished O.D. sufficiently accurate for these systems.
5. The performance capabilities of the drive system should be verified by testing belts produced over their full length tolerance range on drive systems representing the full potential center-distance variation. Contact Gates Power Transmission Product Application for further details.
6. Contact Gates Power Transmission Product Application for design center distance recommendations and application assistance.

## 12. Use of Idlers

Use of idlers should be restricted to those cases in which they are functionally necessary. Idlers are often used as a means of applying tension when the center distance is not adjustable.

Idlers should be located on the slack side span of the belt drive. General size recommendations are listed for inside grooved, inside flat, and backside idlers. In some cases, such as high capacity drives utilizing large sprockets, idlers as large as the smallest loaded sprocket in the system may be more appropriate.

### Idler Size Recommendations

Belt	Minimum Inside Idler	Minimum Inside Flat Idler	Minimum Backside Idler
8M Poly Chain® GT® Carbon®	25 grooves	4.00" O.D.	3.00" O.D.
14M Poly Chain GT Carbon	28 grooves	7.00" O.D.	6.50" O.D.

Outside or backside idlers should be flat and uncrowned; flanges may or may not be necessary. Drives with flat inside idlers should be tested, as noise and belt wear may occur.

Idler arc of contact should be held to a minimum. All idlers should be rigidly mounted in place to minimize movement or deflection during drive start-up and operation.

## 13. Specifying Shaft Locations in Multipoint Drive Layouts

When collecting geometrical layout data for multiple sprocket drive layouts, it is important to use a standard approach that is readily understood and usable for drive design calculations. This is of particular importance when the data will be provided to Gates Power Transmission Product Application for analysis. Drive design software that allows designers to design multipoint drives can also be downloaded at [www.gates.com/drivedesign](http://www.gates.com/drivedesign).

## Multipoint Drive

When working with a drive system having more than three shafts, the geometrical layout data must be collected in terms of X-Y coordinates for analysis. For those unfamiliar with X-Y coordinates, the X-Y cartesian coordinate system is commonly used in mathematical and engineering calculations and utilizes a horizontal and vertical axis as illustrated in Fig. 4.

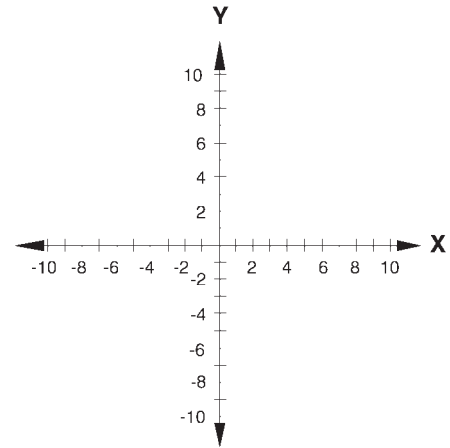


Figure 4

The axes cross at the zero point, or origin. Along the horizontal, or "X" axis, all values to the right of the zero point are positive, and all values to the left of the zero point are negative. Along the vertical, or "Y" axis, all values above the zero point are positive, and all values below the zero point are negative. This is also illustrated in Figure 4. When identifying a shaft center location, each X-Y coordinate is specified with a measurement in the "X" as well as the "Y" direction. This requires a horizontal and vertical measurement for each shaft center in order to establish a complete coordinate. Either English or Metric units of measurement may be used.

A complete coordinate is specified as follows:

(X,Y) where X = measurement along X-axis (horizontal)  
Y = measurement along Y-axis (vertical)

In specifying X-Y coordinates for each shaft center, the origin (zero point) must first be chosen as a reference. The driveR shaft most often serves this purpose, but any shaft center can be used. Measurements for all remaining shaft centers must be taken from this origin or reference point. The origin is specified as (0,0).

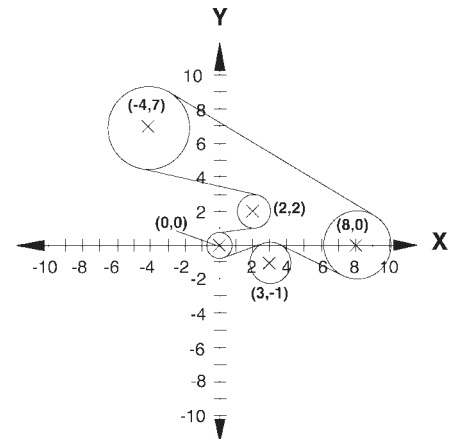


Figure 5

An example layout of a 5-point drive system is illustrated in Figure 5. Here each of the five shaft centers are located and identified on the X-Y coordinate grid. When specifying parameters for the moveable or adjustable shaft (for belt installation and tensioning), the following approaches are generally used:

**Fixed Location:** Specify the nominal shaft location coordinate with a movement direction.

**Slotted Location:** Specify a location coordinate for the beginning of the slot, and a location coordinate for the end of the slot along its path of linear movement.

**Pivoted Location:** Specify the initial shaft location coordinate along with a pivot point location coordinate and the pivot radius.

Performing belt length and idler movement/positioning calculations by hand can be quite difficult and time consuming. With a complete geometrical drive description, we can make the drive design and layout process quite simple for you. Contact Gates Power Transmission Product Application for computer-aided assistance.

## 14. Minimum Belt Wrap and Tooth Engagement

Horsepower ratings listed in this catalog are based on a minimum of six teeth in mesh between the belt and the sprocket. The ratings must be corrected for excessive tooth loading if there are less than six teeth in mesh. For non-stock drives not listed in the Drive Selection Tables, the teeth in mesh may be calculated by using this formula:

$$\text{Teeth in Mesh} = \left[ 0.5 - \left( \frac{D - d}{6C} \right) \right] N_g$$

Where: D = pitch diameter, large sprocket, inches  
d = pitch diameter, small sprocket, inches  
C = center distance between shafts, inches  
Ng = number of grooves in small sprocket

In cases where fewer than six teeth are in full contact, 20% of the horsepower rating must be subtracted for each tooth less than six not in full contact. After computing the teeth in mesh, the belt rating should be multiplied by the appropriate  $K_{TM}$  factor shown in the following table.

**Teeth In Mesh Correction Factor**

Teeth in Mesh	Factor $K_{TM}$
6 or more	1.00
5	0.80
4	0.60
3	0.40
2	0.20

In addition to the number of teeth in mesh, some drives with more than two shafts may have a greater potential for the belts to ratchet where loaded sprockets have six teeth in mesh, but a small arc of contact. In order to minimize this condition, each loaded sprocket in the drive system should have an arc of contact or belt wrap angle of at least 60 degrees. Non-loaded idler sprockets do not have tooth meshing or wrap angle requirements.

## 15. Adverse Operating Environments

### Debris

Be very careful when using synchronous drives in high debris environments. Debris can be more damaging to the positive belt drive than a V-belt drive, which has a tendency to remove debris from the sheave grooves through drive operation. Entrapment of debris in synchronous drives is a major concern. Debris can be packed into sprocket grooves causing improper belt tooth engagement, reducing belt life and accelerating belt and sprocket wear. Care must be taken to provide adequate shielding to drives in environments where debris is likely. Completely enclosing a synchronous belt drive may be acceptable. Since synchronous belts generate minimal heat during drive operation, air circulation is not critical except where extremely high temperatures already are present. Depending on the type and abrasive characteristics of the debris, excessive wear can be generated on both belt and sprockets.

### Temperature

Belt performance is generally unaffected in ambient temperature environments between -65° and 185°F (-54° and 85°C). Temperature extremes beyond these limits should be reviewed by Gates Power Transmission Product Application.

### High Humidity/Corrosive Environments

Many industrial applications face problems associated with rusting parts. Numerous applications in the food and beverage industry are located in areas that require periodic washdown. Unless a drive is completely shielded and protected from wash down, rust and corrosion will be rapidly apparent in these types of environments. This is equally true of sprockets when used in very wet or humid environments, such as seen with air moving drives on cooling towers or wood kilns. The constant effects of the wet air surrounding the belt drive can cause excessive rust.

Corrosion attacks sprocket grooves, building up rust deposits. The corrosion will increase over time, building up in the sprocket grooves and non-driving surfaces (flanges, sprocket faces, bushing face). Sprockets with corrosion in the grooves will rapidly wear the belt's teeth and wear through the abrasion resistant tooth fabric, resulting in tooth shear and premature belt failure.

When an application is in a corrosive environment, the designer may elect to use special sprockets and bushings to prevent premature failures. Using special stainless steel sprockets and bushings or electroless nickel-plated sprockets can help eliminate corrosion as a cause of failure on belt drives located in these damaging environments.

## Section II Engineering Design Considerations

All synchronous belt drives require proper installation procedures for optimum performance. In addition, topics such as tooth profile advantages, sprocket rim speed limitations, efficiency, and tolerances are common to all Gates synchronous belt drives.

1. Belt Storage and Handling
2. Center Distance and Belt Length
3. Tooth Profiles
4. Static Conductivity
5. Sprocket Diameter-Speed
6. Efficiency
7. Belt Tolerances
8. Belt Installation Tension
9. Center Distance Allowances for Installation and Tensioning
10. Drive Alignment
11. Belt Installation
12. Belt Pull Calculations
13. Bearing/Shaft Load Calculations
14. Self-Generated Tension

Each of these circumstances and special considerations are reviewed below.

## 1. Belt Storage and Handling

### Storage Recommendations

In order to retain their serviceability and dimensions, proper storage procedures must be followed for synchronous belts. Quite often premature belt failures can be traced to improper belt storage procedures that damaged the belt before it was installed on the drive. By following a few guidelines, these types of belt failures can be avoided.

#### Recommended

Belts should be stored in a cool and dry environment with no direct sunlight. Ideally, belts should be stored at less than 85°F and with lower than 70% relative humidity.

**Belts should be stored in original packaging.**

#### Not Recommended

Belts should not be stored near windows, which may expose the belts to direct sunlight or moisture.

Belts should not be stored near heaters, radiators, or in the direct airflow of heating devices.

Belts should not be stored near any devices that generate ozone such as transformers and electric motors.

Belts should not be stored where they are exposed to solvents or chemicals in the atmosphere.

Do not store belts on the floor unless they are in a protective container. Floor locations are exposed to traffic that may damage the belts.

Do not crimp belts during handling or while being stored. To avoid this, belts must not be bent to diameters smaller than what is recommended (minimum recommended sprocket diameter for inside bends and 1.3 times the minimum recommended sprocket diameter for back side bends). Do not use ties or tape to pull belt spans tightly together near the end of the belt. Do not hang on a small diameter pin that suspends all of the belt weight and bends the belt to a diameter smaller than the minimum recommended sprocket diameter. Improper storage will damage the tensile cord and the belt will fail prematurely. Handle belts carefully when removing from storage and moving to the application.

#### Storage Effects

Belts may be stored up to six years if properly stored at temperatures less than 85°F and relative humidity less than 70%.

For every 15°F increase in storage temperature above 85°F, the time the belt can be stored without reduced performance decreases by one-half. Belts should never be stored at temperatures above 115°F.

At relative humidity levels above 70%, fungus or mildew may form on stored belts. This has minimal affect on belt performance, but should be avoided if possible. When equipment is stored for prolonged periods of time (over six months), the belt tension should be relaxed so that the belt does not take a set, and the storage environment should meet the 85°F and 70% or less relative humidity condition. If this is not possible, belts should be removed and stored separately in a proper environment.

## 2. Center Distance and Belt Length

The approximate relationship between a center distance and belt pitch length is given by the following formula:

### Formula 11

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

Where:  $L_p$  = belt pitch length, inches  
 $D$  = diameter of large sprocket, inches  
 $d$  = diameter of small sprocket, inches  
 $C$  = center distance, inches

A more precise formula is given below:

### Formula 12

$$L_p = 2C \cos \varphi + \frac{\pi (D + d)}{2} + \frac{\pi \varphi (D - d)}{180}$$

Where:  $L_p$  = belt pitch length, inches  
 $C$  = center distance, inches  
 $D$  = pitch diameter of large sprocket, inches  
 $d$  = pitch diameter of small sprocket, inches

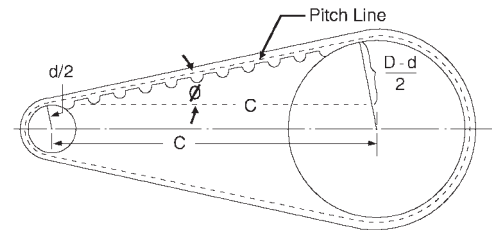
The approximate center distance can be found by this formula:

$$\varphi = \sin^{-1} \left( \frac{D - d}{2C} \right) \text{ degrees}$$

### Formula 13

$$C = \frac{K + \sqrt{K^2 - 32(D - d)^2}}{16}$$

Where:  $K = 4 L_p - 6.28 (D + d)$



The exact center distance can be calculated using an iterative process between the center distance (Formula 13) and belt length (Formula 12) equations. The exact center distance has been found when the two equations converge. The pitch length increment of a synchronous belt is equal to a multiple of the belt pitch.

## 3. Tooth Profiles

Conventional trapezoidal belts (MXL, XL, etc.) were the earliest developments of positive drive belts. In more recent years, new curvilinear profiles have entered the market. The most predominant of these profiles is the HTD® system (5mm, 8mm, etc.). While these curvilinear profiles provide many advantages, they also can provide significant disadvantages.

With the development of the Gates GT® tooth profile, the combined advantages of the various curvilinear profiles have now been optimized. Characteristics such as ratcheting resistance, improved load/life and noise reduction were prime factors in the design of the Gates GT profile. Additionally, it allowed optimization in incorporating premium materials into its superior construction.

The GT tooth profile is based on the tractrix mathematical function. Engineering handbooks describe this function as a "frictionless" system. This early development by Schiele is described as an involute form of a catenary. With this system, the belt and sprocket teeth move substantially tangentially during entry and exit, thus improving significantly the belts' performance characteristics. This is illustrated in Fig. 6. For information on belt/ sprocket interchangeability between various Gates products as well as interchange with other manufacturers, consult Gates Belt/Sprocket Interchange Guide (12998-B) or contact Power Transmission Product Application.



Figure 6

#### 4. Static Conductivity

Static discharge can pose a hazard on belt drives that operate in potentially explosive environments. Static discharge can also interfere with radios, electronic instruments, or controls used in a facility. While uncommon, static discharge can also cause bearing pitting if the discharge occurs through the bearing. Static conductivity is a required belt characteristic in these cases in order to prevent static discharge.

The **Rubber Manufacturer's Association (RMA)** has published **Bulletin IP 3-3** for static conductivity. Static conductivity testing involves using an ohmmeter to pass an electrical current with a nominal open circuit 500 volt potential through a belt. The test should be performed with the belt off of the belt drive. The belt's resistance is measured by placing electrodes 8.5 inches apart on the clean driving surface of the belt. A resistance reading of six (6) megohms or more constitutes a test failure. Belts that measure a resistance of 6 megohms or more are considered to be non-conductive. Belts that measure a resistance of less than 6 megohms are considered to be static conductive. A static conductive belt with a resistance of 6 megohms or less has sufficient conductivity to prevent measurable static voltage buildup, thus preventing a static discharge.

When a belt is used in a hazardous environment, additional protection must be employed to assure that there are no accidental static spark discharges. The portion of the belt that contacts the sprocket must be conductive to ensure that static charge is conducted into the drive hardware. Synchronous belts must have a static conductive tooth surface in contact with conductive sprocket grooves. Unusual or excessive debris or contaminant on the belt contact surface or sprocket grooves should be cleaned and removed.

Any belt drive system that operates in a potentially hazardous environment must be properly grounded. A continuous conductive path to ground is necessary to bleed off the static charge. This path includes a static conductive belt, a conductive sprocket, a conductive bushing, a conductive shaft, conductive bearings, and the ground. As an additional measure of protection, a static-conductive brush or similar device should be employed to bleed off any residual static buildup that might remain around the belt. The user must ensure that belt drives operating in potentially hazardous or explosive environments are designed and installed in accordance with existing building codes, OSHA requirements, and/or recognized safety-related organizations.

#### 5. Sprocket Diameter —Speed



Drives shaded in the Belt Width Selection Tables use sprocket diameters that may reduce belt life. The amount of reduction will depend on speed — the higher the speed, the greater the reduction. The drives are included for use where speed ratio or space requirements must be met. Blanks in the lower right-hand portions of the Belt Width Selection Tables occur because sprocket rim speed exceeds 6,500 feet per minute. Centrifugal forces developed beyond this speed may prohibit the use of stock gray cast iron sprockets. For rim speeds above 6,500 feet per minute, contact Gates Power Transmission Product Application for other alternatives.

Sprockets Recommended
For maximum performance, use Gates sprockets

#### 6. Efficiency

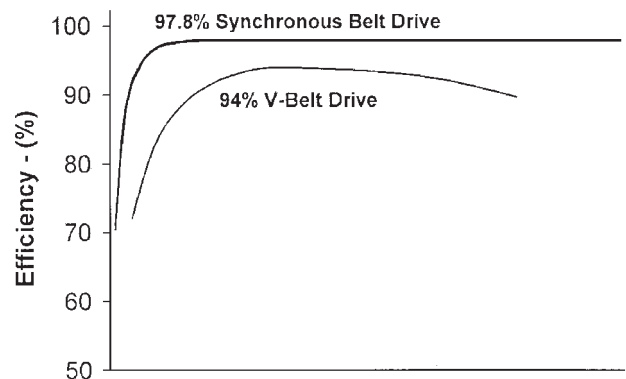
When properly designed and applied, PolyChain® GT® Carbon® belt drive efficiency will be as high as 98%. This high efficiency is primarily due to the positive, no slip characteristic of synchronous belts. Since the belt has a thin profile, it flexes easily, thus resulting in low hysteresis losses as evidenced by low heat buildup in the belt.

Gates synchronous belts are uniquely constructed because they use high performance materials. Optimization of these high-technology features provide maximum performance and efficiency. Synchronous belt drive efficiency can be simply defined as shown in the following equation:

$$\text{Efficiency, percent} = \frac{\text{dN RPM} \times \text{dN Torque}}{\text{dR RPM} \times \text{dR Torque}} \times 100$$

When examining the loss of energy, it is necessary to consider belt losses in terms of shaft torque and shaft speed. Torque losses result from bending stress and friction. Chain drives running unlubricated may generate significant heat build up due to increased friction in the roller joints. Even properly lubricated chains running at higher speeds tend to throw off the oil due to centrifugal forces, making it difficult to maintain proper lubrication at the load bearing surfaces. Consequently, chain drives are typically only 92-98% efficient.

Speed losses result from belt slip and creep. Unlike V-belts, slip is not a factor with synchronous belts. Well maintained V-belt drives are typically in the range of 95-98% efficient. However, on a poorly designed or maintained drive, the efficiency may drop as much as 5% or more. If proper maintenance cannot be scheduled for a V-belt drive or it is located in an inaccessible area, a positive belt drive system should be considered.



#### Increasing DriveN Torque

The belt drive is only part of the total system. Motors should be properly sized for the application. They must have sufficient capacity to meet the power needs, yet over designed motors will lead to electrical inefficiencies. DriveN machines also may have inherent inefficiencies which may contribute to overall system efficiency.



## 7. Belt Tolerances

These tolerances are for reference only. For fixed center drive applications and special tolerances, contact Gates Power Transmission Product Application.

Stock Belt Center Distance Tolerances			
Belt Length	(mm) (in)	Center Distance Tolerance	(mm) (in)
over 127 <b>5</b>	to 254 <b>10</b>	± 0.20 <b>.008</b>	
over 254 <b>10</b>	to 381 <b>15</b>	± 0.23 <b>.009</b>	
over 381 <b>15</b>	to 508 <b>20</b>	± 0.25 <b>.010</b>	
over 508 <b>20</b>	to 762 <b>30</b>	± 0.30 <b>.012</b>	
over 762 <b>30</b>	to 1016 <b>40</b>	± 0.33 <b>.013</b>	
over 1016 <b>40</b>	to 1270 <b>50</b>	± 0.38 <b>.015</b>	
over 1270 <b>50</b>	to 1524 <b>60</b>	± 0.41 <b>.016</b>	
over 1524 <b>60</b>	to 1778 <b>70</b>	± 0.43 <b>.017</b>	
over 1778 <b>70</b>	to 2032 <b>80</b>	± 0.46 <b>.018</b>	
over 2032 <b>80</b>	to 2286 <b>90</b>	± 0.49 <b>.019</b>	
over 2286 <b>90</b>	to 2540 <b>100</b>	± 0.52 <b>.020</b>	
over 2540 <b>100</b>	to 2794 <b>110</b>	± 0.54 <b>.021</b>	
over 2794 <b>110</b>	to 3048 <b>120</b>	± 0.56 <b>.022</b>	
over 3048 <b>120</b>	to 3302 <b>130</b>	± 0.58 <b>.023</b>	
over 3302 <b>130</b>	to 3556 <b>140</b>	± 0.60 <b>.024</b>	
over 3556 <b>140</b>	to 3810 <b>150</b>	± 0.63 <b>.025</b>	
over 3810 <b>150</b>	to 4064 <b>160</b>	± 0.66 <b>.026</b>	
over 4064 <b>160</b>	to 4318 <b>170</b>	± 0.69 <b>.027</b>	
over 4318 <b>170</b>	to 4572 <b>180</b>	± 0.72 <b>.028</b>	
over 4572 <b>180</b>		add ± .03 every 254 <b>10</b> increment	

Stock Belt Width Tolerances			
Belt Pitch	Standard Belt Width	(mm) (in)	Tolerances (mm) (in)
8mm	12		± 0.36 <b>.014</b>
	<b>0.47</b>		
	21		± 0.63 <b>.025</b>
	<b>.083</b>		
	36		± 1.08 <b>.043</b>
14mm	<b>1.42</b>		
	62		± 1.86 <b>.073</b>
	<b>2.44</b>		
	20		± .060 <b>.024</b>
	<b>0.79</b>		
	37		± 1.11 <b>.044</b>
	<b>1.46</b>		
68		± 2.04 <b>.080</b>	
<b>2.68</b>			
90		± 2.70 <b>.106</b>	
<b>3.54</b>			
125		± 3.75 <b>.148</b>	
<b>4.92</b>			

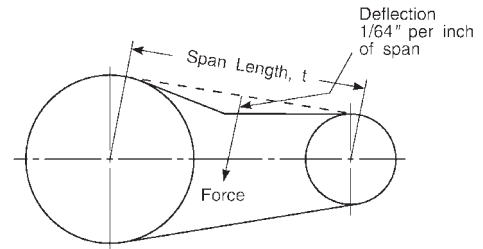
## 8. Belt Installation Tension

### Standard Belt Tensioning Procedure

When installing a Gates belt:

- Be sure it is tensioned adequately to prevent tooth jumping (ratcheting) under the most severe load conditions which the drive will encounter during operation.
- Avoid extremely high tension which can reduce belt life and possibly damage bearings, shafts and other drive components.

The proper way to check belt tension is to use a tension tester. Gates has a variety of tension testers, ranging from the simple spring scale type tester to the sophisticated Sonic Tension Meter. The spring scale type tester is used by measuring how much force is required to deflect the belt at the center of its span by a specified distance (force deflection method), as shown in the sketch below.



The Sonic Tension Meter measures the vibration of the belt span and instantly converts the vibration frequency into belt static tension (span vibration method).

When you wish to use a numerical method for calculating recommended belt installation tension values, the following procedure may be used.

### STEP 1: Calculate the required base static installation tension.

Use Formula 14 to calculate the required base static installation tension.

#### Formula 14

$$T_{st} = \frac{20HP}{S} + mS^2$$

Where:  $T_{st}$  = base static installation tension, pounds

HP = Horsepower

$$S = \frac{PD \times RPM}{3820}$$

M = Value from Table 11

PD = Sprocket Pitch Diameter, inches

RPM = Revolutions per minute of same sprocket

Table 11

Pitch	Belt Width	M	Y	Minimum $T_{st}$ (lb) per span
8mm	12mm	0.33	65	28
	21mm	0.57	113	49
	36mm	0.97	194	84
	62mm	1.68	335	145
14mm	20mm	0.92	230	119
	37mm	1.69	426	220
	68mm	3.11	782	405
	90mm	4.12	1035	536
	125mm	5.72	1438	744

Because of the high performance capabilities of Poly Chain® GT® Carbon® belts, it is possible to design drives that have significantly greater load than are necessary to carry the actual design load. Consequently, Formula 14 can provide T<sub>st</sub> values less than are necessary for the belt to operate properly, resulting in poor belt performance and reduced service life. If a more appropriately sized drive cannot be designed, minimum recommended T<sub>st</sub> values are provided in Table 10 to assure that the belts function properly when lightly loaded.

Always use the greater T<sub>st</sub> value; i.e., from T<sub>st</sub> Formula 14 or Table 11.

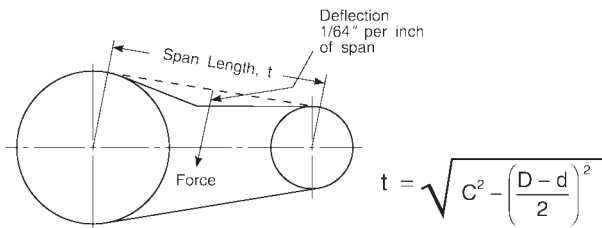
**NOTE:** When applying static belt tension values directly, multiply the required base static installation tension (T<sub>st</sub>) calculated in Formula 14 by the following factors:

For New Belts:

Minimum Static Tension = Base Static Tension X 1.1  
Maximum Static Tension = Base Static Tension X 1.2

For Used Belts:

Minimum Static Tension = Base Static Tension X 0.8  
Maximum Static Tension = Base Static Tension X 0.9



## STEP 2: Calculate the minimum and maximum recommended deflection forces.

- Measure the span length of your drive (see sketch).
- New belt minimum recommended force:

### Formula 15

$$\text{deflection force, Min} = \frac{1.1 T_{st} + \left(\frac{t}{L}\right) Y}{16}, \text{ lb}_f$$

- New belt maximum recommended force:

### Formula 16

$$\text{deflection force, Max.} = \frac{1.2 T_{st} + \left(\frac{t}{L}\right) Y}{16}, \text{ lb}_f$$

Where:

T<sub>st</sub> = Base Static tension, lbf  
t = span length, inches  
L = belt pitch length, inches  
Y = constant from Table 11

**USED BELT NOTE:** For re-installation of a used belt, a recommended tension of 0.8 T<sub>st</sub> to 0.9 T<sub>st</sub> value should be used in calculating the deflection forces, instead of the 1.1 T<sub>st</sub> to 1.2 T<sub>st</sub> shown for new belts.

## STEP 3: Applying the tension.

### Force deflection tension method

- At the center of the span (t) apply a force perpendicular to the span large enough to deflect the belt on the drive 1/64 inch per inch of span length from its normal position. One sprocket should be free to rotate. Be sure the force is applied evenly across the entire belt width. If the belt is a wide synchronous belt, place a piece of steel or angle iron across the belt width and deflect the entire width of the belt evenly.
- Compare this deflection force with the range of forces calculated in Step 2.
  - If it is less than the minimum recommended deflection force, the belt should be tightened.
  - If it is greater than the maximum recommended deflection force, the belt should be loosened.

### Span vibration tension method

The Sonic Tension Meter detects the vibration frequency in the belt span, and converts that measurement into the actual static tension in the belt. To use the Sonic Tension Meter, begin by entering the belt unit weight, belt width, and the span length. To measure the span vibration, press the "Measure" button on the meter, tap the belt span, and hold the microphone approximately 1/4" away from the back of the belt. The Sonic Tension Meter will display the static tension, and can also display the span vibration frequency.

The belt unit weights for use with the Gates Sonic Tension Meter are shown in the following table.

Belt Product Family	Belt Cross section	Adjusted Belt Weight (grams/meter)
Poly Chain GT Carbon	8mm	4.7
	14mm	7.9

## 9. Center Distance Allowances for Installation and Tensioning

Since fixed center drives are not recommended, center distance allowances for a Gates Poly Chain® GT® Carbon® belt drive are necessary to assure that the belt can be installed without damage and then tensioned correctly. The standard installation allowance is the minimum decrease in center distance required to install a belt when flanged sprockets are removed from their shafts for belt installation. This is shown in the first column of Table 12. This table also lists the minimum increase in center distance required to assure that a belt can be properly tensioned over its normal lifetime. If a belt is to be installed over flanged sprockets without removing them, the additional center distance allowance for installation shown in the second table below must be added to the first table data.

**Table 12**  
Center Distance Allowance For Installation and Tensioning

Length Belt	(mm) (in)	Standard Installation Allowance (Flanged Sprockets Removed For Installation)	(mm) (in)	Tension Allowance (All Drives)	(mm) (in)
Up to	125 5	0.5 0.02		0.5 0.02	
Over	125 to 250 5 to 10	0.8 0.03		0.8 0.03	
Over	250 to 500 10 to 20	1.0 0.04		0.8 0.03	
Over	500 to 1000 20 to 40	1.8 0.07		0.8 0.03	
Over	1000 to 1780 40 to 70	2.8 0.10		0.8 0.04	
Over	1780 to 2540 70 to 100	3.3 0.13		1.0 0.04	
Over	2540 to 3300 100 to 130	4.1 0.16		1.3 0.05	
Over	3300 to 4600 130 to 180	4.8 0.19		1.3 0.05	
Over	4600 to 6900 180 to 270	5.6 0.22		1.3 0.05	

**Additional Center Distance Allowance For Installation Over Flanged Sprockets\***  
(Add to Installation Allowance in Table No.12)

Pitch	One Sprocket Flanged	(mm) (in)	Both Sprockets Flanged	(mm) (in)
8mm	21.8 0.86		33.3 1.31	
14mm	31.2 1.23		50.0 1.97	

\*For drives that require installation of the belt over one sprocket at a time, use the value for "Both Sprockets Flanged"

## 10. Drive Alignment

Provision should be made for center distance adjustment, according to the two tables on this page, or to change the idler position so the belt can be slipped easily onto the drive. When installing a belt, never force it over the flange. This will cause internal damage to the belt tensile member.

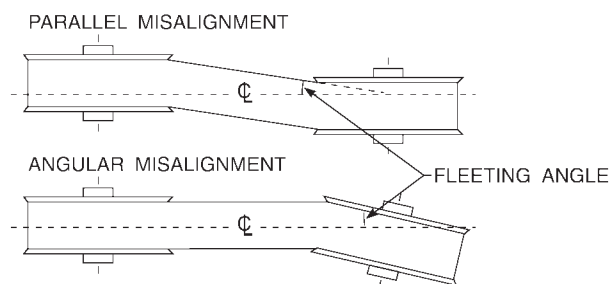
Synchronous belts typically are made with high modulus tensile members which provide length stability over the belt life. Consequently, misalignment does not allow equal load distribution across the entire belt top width. In a misaligned drive, the load is being carried by only a small portion of the belt top width, resulting in uneven belt wear and premature tensile failure.

There are two types of misalignment: parallel and angular (See Fig.7). Parallel misalignment is where the driveR and driveN shafts are parallel, but the two sprockets lie in different planes. When the two shafts are not parallel, the drive is angularly misaligned.

A fleeting angle is the angle at which the belt enters and exits the sprocket, and equals the sum of the parallel and angular misalignments.

Any degree of sprocket misalignment will result in some reduction of belt life, which is not accounted for in the normal drive design procedure. Misalignment of all synchronous belt drives should not exceed 1/4° or 1/16" per foot of linear distance. Misalignment should be checked with a good straight edge or by using a laser alignment tool. The straight edge tool should be applied from driveR to driveN, and then from driveN to driveR so that the total effect of parallel and angular misalignment is made visible.

**Figure 7**



Drive misalignment can also cause belt tracking problems. However, light flange contact by the belt is normal and won't affect performance.

For those drives in which the center distance is greater than eight times the small sprocket diameter, belt tracking can be a problem. In these cases, the parallel position of the two sprockets may need to be adjusted until only one flange guides the belt in the system and the belt tracks fully on all sprockets. Regardless of the drive center distance, the optimum drive performance will occur with the belt lightly contacting one flange in the system. The worst case is for the belt to contact flanges on opposite sides of the system. This traps the belt between opposite flanges and can force the belt into undesirable parallel misalignment.

Improper installation of the bushing can result in the bushing/sprocket assembly being “cocked” on the shaft. This leads to angular misalignment and sprocket wobble. Be sure to follow the instructions provided with the bushings.

## 11. Belt Installation

During the belt installation process, it is very important the belt be fully seated in the sprocket grooves before applying final tension. Serpentine drives with multiple sprockets and drives with large sprockets are particularly vulnerable to belt tensioning problems resulting from the belt teeth being only partially engaged in the sprockets during installation. In order to prevent these problems, the belt installation tension should be evenly distributed to all belt spans by rotating the system by hand. After confirming that belt teeth are fully engaged in the sprocket grooves, belt tension should be rechecked and verified. Failure to do this may result in an undertensioned condition with the potential for belt ratcheting.

## 12. Belt Pull Calculations

When the machine designer requests shaft load calculations from the drive designer, the following procedure can be applied:

### A. Calculate Belt Span Tensions

Belt pull is the vector sum of  $T_T$  and  $T_S$ , the tightside and slackside tensions.  $T_T$  and  $T_S$  may be calculated using the following formulas:

$$\text{Formula 17} \\ T_T = \frac{144,067 \text{ HP}}{(PD)(RPM)}$$

$$\text{Formula 18} \\ T_S = \frac{18,008 \text{ HP}}{(PD)(RPM)}$$

Where: HP = Horsepower  
 PD = Sprocket Pitch Diameter (in)  
 RPM = Sprocket Speed (rev/min)

### B. Solution For Both Magnitude and Direction

The vector sum of  $T_T$  and  $T_S$  can be found so that the direction of belt pull, as well as magnitude, is known. This is necessary if belt pull is to be vectorially added to sprocket weight, shaft weight, etc., to find true bearing loads. In this case, the easiest method of finding the belt pull vector is by graphical addition of  $T_T$  and  $T_S$ . If only the magnitude of belt pull is needed, numerical methods for vector additions are faster to use.

If both direction and magnitude of belt pull are required, the vector sum of  $T_T$  and  $T_S$  can be found by graphical vector addition as shown in Fig. 8.  $T_T$  and  $T_S$  vectors are drawn to a convenient scale and parallel to the tightside and slackside, respectively. Fig. 8 shows vector addition for belt pull on the motor shaft. The same procedures can be used for finding belt pull on the driveN shaft. This method may be used for drives using three or more sprockets or idlers.

For two-sprocket drives, belt pull on the driveR and driveN shafts is equal but opposite in direction. For drives using idlers, both magnitude and direction may be different.

### C. Solution For Magnitude Only

If only the magnitude of belt pull is needed, follow the steps below. Use this method for drives with two sprockets. Use the graphical method shown if the drive uses idlers.

1. Add  $T_T$  and  $T_S$
2. Using the value of  $\frac{D-d}{C}$  for the drive, find the vector sum correction factor using Fig. 9, where:
  - D = large diameter
  - d = small diameter
  - C = center distance

Or, use the arc of contact on the small sprocket if known.

3. Multiply the sum of  $T_T$  plus  $T_S$  by the vector sum correction factor to find the vector sum of  $T_T$  plus  $T_S$ .

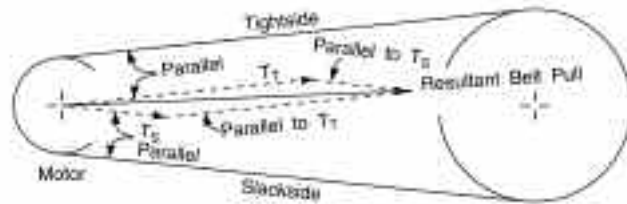


Figure 8

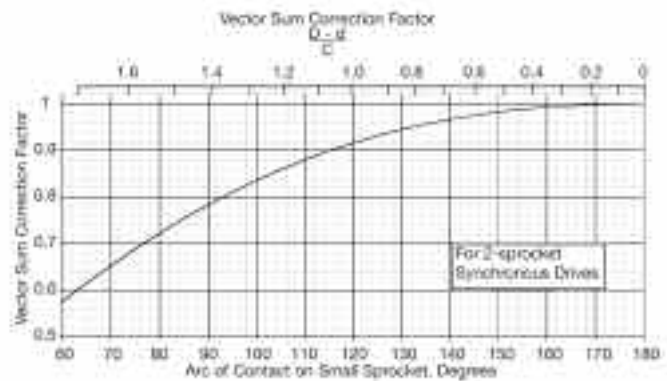


Figure 9

## 13. Bearing/Shaft Load Calculations

### A. Shaft Load Calculations

If true side load on the shaft, including sprocket weight, is desired, the sprocket weight can be added to the belt pull using the same graphical method shown in Fig. 8. The sprocket weight vector is vertical toward the ground. Weights for standard sprockets are shown in the sprocket specification tables.

## B. Bearing Load Calculations

In order to find actual bearing loads, it is necessary to know weights of machine components and the value of all other forces contributing to the load. However, it is sometimes desirable to know the bearing load contributed by the synchronous drive alone. Bearing loads resulting from a synchronous belt drive can be calculated knowing bearing placement with respect to the sprocket center and the shaft load as previously calculated. For rough estimates, machine designers sometimes use belt pull alone, ignoring sprocket weight. If accuracy is desired, or if the sprocket is unusually heavy, actual shaft load values including sprocket weight should be used.

## C. Overhung Sprocket

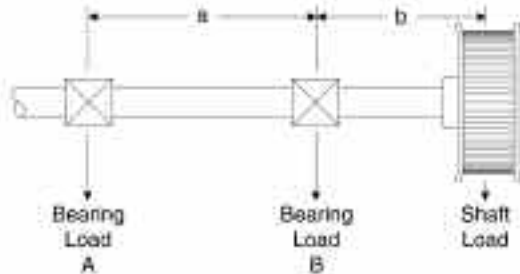


Figure 10

### Formula 19

$$\text{Load at B, (lb)} = \frac{\text{Shaft Load} \times (a + b)}{a}$$

### Formula 20

$$\text{Load at A, (lb)} = \text{Shaft Load} \times \frac{b}{a}$$

Where: a and b = spacing, (in), per Fig. 10

## D. Sprocket Between Bearings

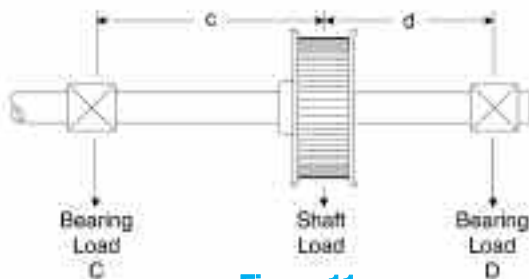


Figure 11

### Formula 21

$$\text{Load at D (lb)} = \frac{\text{Shaft Load} \times c}{(c + d)}$$

### Formula 22

$$\text{Load at C (lb)} = \frac{\text{Shaft Load} \times d}{(c + d)}$$

Where: c and d = spacing (in), per Fig. 11

## 14. Self-Generated Tension

All synchronous belt drives exhibit a self-generating or self-tightening characteristic when transmitting a load. Laboratory testing has shown this characteristic to be similar with all tooth profiles. The designer/user should be aware that self-tensioning can result in increased bearing and shaft loads and reduced drive performance; i.e., short belt life. This can be avoided by following proper tensioning procedures.

While belt overtensioning can impose higher bearing and shaft loads and lead to reduced belt life, undertensioning can result in self-tensioning. Properly designed and tensioned drives will not be significantly affected by self-generated tension.

When a belt is too loose for the design load, the self-tensioning characteristic results in the belt teeth climbing out of the sprocket grooves, leading to increased stresses on the belt teeth, accelerated tooth wear and reduced belt life. When a belt is severely undertensioned, this self-tensioning characteristic can result in the belt ratcheting (jumping teeth). When this occurs, significant shaft separation forces are instantaneously developed in the drive, resulting in damage to bearings, shafts, and other drive components including the belt.

**NOTE:** This is true for all synchronous belts.

Maximum drive performance and belt life are achieved when the belt is properly tensioned for the design load and maintained.

# Troubleshooting

Symptom	Diagnosis	Possible Remedy
Unusual noise	<ul style="list-style-type: none"> <li>Misaligned drive</li> <li>Too low or high belt tension</li> <li>Backside idler</li> <li>Worn sprocket</li> <li>Bent guide flange</li> <li>Belt speed too high</li> <li>Incorrect belt profile for the sprocket (i.e., HTD® etc.)</li> <li>Subminimal diameter</li> <li>Excess load</li> </ul>	<ul style="list-style-type: none"> <li>Correct alignment</li> <li>Adjust tension to recommended value</li> <li>Use inside idler</li> <li>Replace sprocket</li> <li>Replace sprocket/flange</li> <li>Redesign drive</li> <li>Use proper Gates Poly Chain® GT® Carbon® belt/sprocket</li> <li>Redesign drive using larger diameters</li> <li>Redesign drive for increased capacity</li> </ul>
Tension loss	<ul style="list-style-type: none"> <li>Weak support structure</li> <li>Excessive sprocket wear</li> <li>Fixed (nonadjustable) centers</li> <li>Excessive debris</li> <li>Excessive load</li> <li>Subminimal diameter</li> <li>Belt, sprockets or shafts running too hot</li> <li>Unusual belt degradation, such as softening or melting</li> </ul>	<ul style="list-style-type: none"> <li>Reinforce the structure</li> <li>Use alternate sprocket material</li> <li>Use inside idler for belt adjustment</li> <li>Protect drive</li> <li>Redesign drive for increased capacity</li> <li>Redesign drive using larger diameters</li> <li>Check for conductive heat transfer from prime mover</li> <li>Reduce ambient drive temperature to 180°F maximum</li> </ul>
Belt tracking	<ul style="list-style-type: none"> <li>Belt running partly off unflanged sprocket</li> <li>Centers exceed 8 times small sprocket</li> <li>Excessive belt edge wear</li> </ul>	<ul style="list-style-type: none"> <li>Correct alignment</li> <li>Correct parallel alignment to set belt to track on both sprockets</li> <li>Correct alignment</li> </ul>
Flange failure	<ul style="list-style-type: none"> <li>Belt forcing flanges off</li> </ul>	<ul style="list-style-type: none"> <li>Correct alignment or properly secure flange to sprocket</li> </ul>
Excessive belt edge wear	<ul style="list-style-type: none"> <li>Damage due to handling</li> <li>Flange damage</li> <li>Belt too wide</li> <li>Belt tension too low</li> <li>Rough flange surface finish</li> <li>Improper tracking</li> <li>Belt hitting drive guard or bracketry</li> </ul>	<ul style="list-style-type: none"> <li>Follow proper handling instructions</li> <li>Repair flange or replace sprocket</li> <li>Use proper width sprocket</li> <li>Adjust tension to recommended value</li> <li>Replace or repair flange (to eliminate abrasive surface)</li> <li>Correct alignment</li> <li>Remove obstruction or use inside idler</li> </ul>
Premature tooth wear	<ul style="list-style-type: none"> <li>Too low or high belt tension</li> <li>Belt running partly off unflanged sprocket</li> <li>Misaligned drive</li> <li>Incorrect belt profile for the sprocket (i.e., HTD, etc.)</li> <li>Worn sprocket</li> <li>Rough sprocket teeth</li> <li>Damaged sprocket</li> <li>Sprocket not to dimensional specification</li> <li>Belt hitting drive bracketry or other structure</li> <li>Excessive load</li> <li>Insufficient hardness of sprocket material</li> <li>Excessive debris</li> <li>Cocked bushing/sprocket assembly</li> </ul>	<ul style="list-style-type: none"> <li>Adjust tension to recommended value</li> <li>Correct alignment</li> <li>Correct alignment</li> <li>Use proper Gates Poly Chain® GT® Carbon® belt/sprocket</li> <li>Replace sprocket</li> <li>Replace sprocket</li> <li>Replace sprocket</li> <li>Replace sprocket</li> <li>Remove obstruction or use inside idler</li> <li>Redesign drive for increased capacity</li> <li>Use a more wear-resistant material</li> <li>Protect belt</li> <li>Install bushing per instructions</li> </ul>

# Troubleshooting

Symptom	Diagnosis	Possible Remedy
Tooth shear	<ul style="list-style-type: none"> <li>Excessive shock loads</li> <li>Less than 6 teeth-in-mesh</li> <li>Extreme sprocket runout</li> <li>Worn sprocket</li> <li>Backside idler</li> <li>Incorrect belt profile for the sprocket (i.e., HTD®, etc.)</li> <li>Misaligned drive</li> <li>Belt undertensioned</li> </ul>	<ul style="list-style-type: none"> <li>Redesign drive for increased capacity</li> <li>Redesign drive</li> <li>Replace sprocket</li> <li>Replace sprocket</li> <li>Use inside idler</li> <li>Use proper Gates Poly Chain® GT® Carbon® belt/sprocket</li> <li>Correct alignment</li> <li>Adjust tension to recommended value</li> </ul>
Tensile break	<ul style="list-style-type: none"> <li>Excessive shock load</li> <li>Subminimal diameter</li> <li>Improper belt handling and storage prior to installation</li> <li>Debris or foreign object in drive</li> <li>Extreme sprocket runout</li> <li>Sprocket has too little wear resistance (i.e., plastic, aluminum, softer metals)</li> </ul>	<ul style="list-style-type: none"> <li>Redesign drive for increased capacity</li> <li>Redesign drive using larger diameters</li> <li>Follow proper handling and storage procedures</li> <li>Protect drive</li> <li>Replace sprocket</li> <li>Use alternate sprocket material</li> </ul>
Belt cracking	<ul style="list-style-type: none"> <li>Backside idler</li> <li>Extreme low temperature startup</li> <li>Extended exposure to harsh chemicals</li> <li>Cocked bushing/sprocket assembly</li> <li>Misaligned drive</li> <li>Too low or too high belt tension</li> </ul>	<ul style="list-style-type: none"> <li>Use inside idler</li> <li>Preheat drive environment</li> <li>Protect drive</li> <li>Install bushing per instructions</li> <li>Correct alignment</li> <li>Adjust tension to recommended value</li> </ul>
Excessive temperature (belt, bearing, housing, shafts, etc.)	<ul style="list-style-type: none"> <li>Incorrect belt profile (i.e. HTD, etc.)</li> <li>Incorrect belt profile for the sprocket (i.e. HTD, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Use proper Gates Poly Chain® GT® Carbon® belt/sprocket</li> <li>Use proper Gates Poly Chain® GT® Carbon® belt/sprocket</li> </ul>
Vibration	<ul style="list-style-type: none"> <li>Too low or too high belt tension</li> <li>Bushing or key loose</li> </ul>	<ul style="list-style-type: none"> <li>Adjust tension to recommended value</li> <li>Check and reinstall per instructions</li> </ul>

# Standard Calculations

Required	Given	Formula
Speed ratio (R)	Shaft speeds (rpm)	$R = \frac{\text{rpm (faster shaft speed)}}{\text{rpm (slower shaft speed)}}$
	Pulley diameter (D & d)	$R = \frac{D \text{ (larger pulley diameter)}}{d \text{ (smaller pulley diameter)}}$
	Number of pulley grooves (N & n)	$R = \frac{N \text{ (larger pulley groove no. )}}{n \text{ (smaller pulley groove no. )}}$
Horsepower (hp) (33,000 lb-ft/min)	Torque (T) in lb-in Shaft speed (rpm)	$hp = \frac{T \times \text{rpm}}{63,025}$
	Effective tension (Te) in lb. Shaft speed (rpm)	$hp = \frac{Te \times V}{33,000}$
Design horsepower (Dhp)	Rated horsepower (hp) Service factor (SF)	$Dhp = hp \times SF$
Power (kw)	Horsepower (hp)	$kw = .7457 \times hp$
Torque (T) in lb-in	Shaft horsepower (hp) Shaft speed (rpm)	$T = \frac{63,025 \times hp}{\text{rpm}}$
	Effective tension (Te) in lb. Pulley radius (R) in inches	$T = Te \times R$
Torque (T) in N-mm	Torque (T) in lb-inches	$T = 112.98 \times T$
Belt velocity in ft/min	Pulley pd in inches Pulley speed in rpm	$V = \frac{pd \times \text{rpm}}{3.82}$
Belt velocity in m/s	Pulley pd in mm Pulley speed in rpm	$V = .0000524 \times pd \times \text{rpm}$
Belt pitch length (PL) in inches (approximate)	Center distance (C) in inches Pulley diameters (D & d) in inches	$PL = 2C + [1.57 \times (D + d)] + \frac{(D - d)^2}{(4C)}$
Arc of contact on smaller pulley (A/Cs)	Pulley diameters (D & d) in inches Center distance (C) in inches	$A/Cs = 180 - \left[ \frac{(D - d) \times 60}{(4C)} \right]$
Torque (T) due to flywheel effect (WR <sup>2</sup> ) in lb-ft <sup>2</sup> (accel. and/or decel.)	Final speed (RPM) Initial speed (rpm) Flywheel effect (WR <sup>2</sup> ) in lb-ft <sup>2</sup> Time (t) in seconds	$T = \frac{.039 \times (\text{RPM} - \text{rpm}) \times WR^2}{t}$
Flywheel effect (WR <sup>2</sup> ) in lb-ft <sup>2</sup>	Face width of rim (F) in inches Material density (Z) in lbs/in <sup>3</sup> Outside rim diameter (D) in inches Inside rim diameter (d) in inches	$WR^2 = \frac{F \times Z \times (D^4 - d^4)}{1467}$



# Useful Formulas and Calculations

## Power Transmission Conversions

### FORCE CONVERSION CONSTANTS

#### Metric to U.S.

Newtons x 3.5969 = Ounces<sub>f</sub>  
Newtons x 0.2248 = Pounds<sub>f</sub>  
Kilograms<sub>f</sub> x 2.2046 = Pounds<sub>f</sub>

#### U.S. to Metric

Ounces<sub>f</sub> x 0.2780 = Newtons  
Pounds<sub>f</sub> x 4.4482 = Newtons  
Pounds<sub>f</sub> x 0.4536 = Kilograms<sub>f</sub>

#### Metric to Metric

Kilograms<sub>f</sub> x 9.8067 = Newtons  
Newtons x 0.1020 = Kilograms<sub>f</sub>

### TORQUE CONVERSION CONSTANTS

#### Metric to U.S.

Newton Meters x 141.6119 = Ounce<sub>f</sub>Inches  
Newton Meters x 8.8508 = Pound<sub>f</sub>Inches  
Newton Meters x 0.7376 = Pound<sub>f</sub>Feet

#### U.S. to Metric

Ounce<sub>f</sub>Inches x 0.0071 = Newton Meters  
Pound<sub>f</sub>Inches x 0.1130 = Newton Meters  
Pound<sub>f</sub>Feet x 1.3558 = Newton Meters

#### Metric to Metric

Newton Meters x 10.1972 = Kilogram<sub>f</sub>Centimeters  
Kilogram<sub>f</sub>Centimeters x 0.0981 = Newton Meters  
Newton Meters x 0.1020 = Kilogram<sub>f</sub>Meters  
Kilogram<sub>f</sub>Meters x 9.8067 = Newton Meters

### POWER CONVERSION CONSTANTS

#### Metric to U.S.

Kilowatt x 1.3410 = Horsepower  
Watt x 0.0013 = Horsepower

#### U.S. to Metric

Horsepower x 745.6999 = Watt  
Horsepower x 0.7457 = Kilowatt

### LINEAR BELT SPEED CONVERSION CONSTANTS

#### Metric to U.S.

Meters per second x 196.8504 = Feet per Minute

#### U.S. to U.S.

Feet per Second x 60.00 = Feet per Minute  
Feet per Minute x 0.0167 = Feet per Second

#### U.S. to Metric

Feet per Minute x 0.005080 = Meters per Second  
Square Miles x 2.5900 = Square Kilometers

## Other Conversions

### LENGTH CONVERSION CONSTANTS

#### Metric to U.S.

Millimeters x 0.0394 = Inches  
Meters x 39.3701 = Inches  
Meters x 3.2808 = Feet  
Meters x 1.0936 = Yards  
Kilometers x 3280.84 = Feet  
Kilometers x 0.6214 = Statute Miles  
Kilometers x 0.5396 = Nautical Miles

#### U.S. to Metric

Inches x 25.4000 = Millimeters  
Inches x 0.0254 = Meters  
Feet x 0.3048 = Meters  
Yards x 0.9144 = Meters  
Feet x 0.0003048 = Kilometers  
Statute Miles x 1.6093 = Kilometers  
Nautical Miles x 1.8532 = Kilometers

### AREA CONVERSION CONSTANTS

#### Metric to U.S.

Square Millimeters x 0.0016 = Square Inches  
Square Centimeters x 0.1550 = Square Inches  
Square Meters x 10.7639 = Square Feet  
Square Meters x 1.1960 = Square Yards  
Hectares x 2.4711 = Acres  
Square Kilometers x 247.105 = Acres  
Square Kilometers x 0.3861 = Square Miles

#### U.S. to Metric

Square Inches x 645.160 = Square Millimeters  
Square Inches x 6.4516 = Square Centimeters  
Square Feet x 0.0929 = Square Meters  
Square Yards x 0.8361 = Square Meters  
Acres x 0.4047 = Hectares  
Acres x 0.004047 = Square Kilometers  
Square Miles x 2.5900 = Square Kilometers

# Useful Formulas and Calculations

## Other Conversions —continued

### WEIGHT CONVERSION CONSTANTS

#### Metric to U.S.

Grams x 15.4324 = Grains  
 Grams x 0.0353 = Ounces (Avd.)  
 Grams x 0.0338 = Fluid Ounces (water)  
 Kilograms x 35.2740 = Ounces (Avd.)  
 Kilograms x 2.2046 = Pounds (Avd.)  
 Metric Tons (1000 Kg) x 1.1023 = Net Ton (2000 lbs.)  
 Metric Tons (1000 Kg) x 0.9842 = Gross Ton (2240 lbs.)

#### U.S. to Metric

Grains x 0.0648 = Grams  
 Ounces (Avd.) x 28.3495 = Grams  
 Fluid Ounces (water) x 29.5735 = Grams  
 Ounces (Avd.) x 0.0283 = Kilograms  
 Pounds (Avd.) x 0.4536 = Kilograms  
 Net Ton (2000 lbs.) x 0.9072 = Metric Tons (1000 Kg)  
 Gross Ton (2240 lbs.) x 1.0160 = Metric Tons (1000 Kg)

### DECIMAL AND MILLIMETER EQUIVALENTS OF FRACTIONS

Inches			Inches		
Fractions	Decimals	Millimeters	Fractions	Decimals	Millimeters
1/64	.015625	.397	33/64	.515625	13.097
1/32	.03125	.794	17/32	.53125	13.494
3/64	.046875	1.1911	35/64	.546875	13.89
1/16	.0625	1.588	9/16	.5625	14.288
5/64	.078125	1.984	37/64	.578125	14.684
3/32	.09375	2.3811	19/32	.59375	15.08
7/64	.109375	2.778	39/64	.609375	15.478
1/8	.125	3.175	5/8	.625	15.875
9/64	.140625	3.572	41/64	.640625	16.272
5/32	.15625	3.969	21/32	.65625	16.669
11/64	.171875	4.366	43/64	.671875	17.066
3/16	.1875	4.763	11/16	.6875	17.463
13/64	.203125	5.159	45/64	.703125	17.859
7/32	.21875	5.556	23/32	.71875	18.256
15/64	.234375	5.953	47/64	.734375	18.653
1/4	.250	6.350	3/4	.750	19.050
17/64	.265625	6.7477	49/64	.765625	19.44
9/32	.28125	7.144	25/32	.78125	19.844
19/64	.296875	7.5411	51/64	.796875	20.24
5/16	.3125	7.938	13/16	.8125	20.638
21/64	.328125	8.334	53/64	.828125	21.034
11/32	.34375	8.731	27/32	.84375	21.431
23/64	.359375	9.128	55/64	.859375	21.828
3/8	.375	9.525	7/8	.875	22.225
25/64	.390625	9.922	57/64	.890625	22.622
13/32	.40625	10.319	29/32	.90625	23.019
27/64	.421875	10.716	59/64	.921875	23.416
7/16	.4375	11.113	15/16	.9375	23.813
29/64	.453125	11.509	61/64	.953125	24.209
15/32	.46875	11.906	31/32	.96875	24.606
31/64	.484375	12.303	63/64	.984375	25.003
1/2	.500	12.700	1	1.000	25.400

# Synchronous Belt Product Design Catalogs

Gates Synchronous Belt Products	Pitch	For Design Information Refer to:
Poly Chain® GT® Carbon®	8mm, 14mm	Poly Chain® GT® Carbon® Belt Drive Design Manual Catalog 17595
PowerGrip® GT®2	5mm, 8mm, 14mm, 20mm	PowerGrip® GT2® Belt Drive Design Manual 17195
PowerGrip® GT®2	2mm, 3mm	Light Power & Precision Drives Design Manual Catalog 17183
PowerGrip® HTD®	3mm, 5mm	Light Power & Precision Drives Design Manual Catalog 17183
PowerGrip® Timing	XL, L, H	PowerGrip GT2 Belt Drive Design Manual 17195
PowerGrip® Timing	MXL, XL	Light Power & Precision Drives Design Manual Catalog 17183
Poly Chain® GT2® Long Length Belting	8mm, 14mm	Poly Chain GT Carbon Belt Drive Design Manual 17595
PowerGrip® Timing Long Length Belting	MXL, XL, L, H	PowerGrip GT2 Belt Drive Design Manual 17195
PowerGrip® HTD Long Length Belting	3mm, 5mm, 8mm, 14mm	PowerGrip GT2 Belt Drive Design Manual 17195
PowerGrip® GT® Long Length Belting	2mm, 3mm, 5mm, 8mm	PowerGrip GT2 Belt Drive Design Manual 17195
Twin Power®	XL, L, H PowerGrip Timing, 8mm, 14mm	PowerGrip GT2 Belt Drive Design Manual 17195

## DRIVE DESIGN SOFTWARE

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