Not All Belts Fit the Same Sprocket: Belt/Sprocket Interchange Guide
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- PowerGrip HTD®
- Eliminator™

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**AIRCRAFT POLICY**

**WARNING! BE SAFE**  Do not use Gates belts, pulleys or sprockets on aircraft propeller or rotor drive systems or in-flight accessory drives. Gates products are not designed or intended for aircraft use.
Foreword

This brochure can assist you in determining the proper belt/sprocket combinations for original drive designs as well as replacement for existing drive components. Knowing which synchronous belt is compatible with which synchronous sprocket is critical for optimum drive performance.

When system compatibility recommendations are followed, both the life of the belt and sprockets are maximized. In addition, safety issues may arise when high performance synchronous belt ratings are used to design new drives and sprockets are used that are not compatible or recommended.

- A PowerGrip® GT®2 belt should only be used in an HTD® sprocket as a replacement for an existing HTD® belt. For new designs, PowerGrip® GT®2 belts should only be used with PowerGrip® GT®2 Sprockets.
- A Poly Chain® GT®2 belt should only be used in a Poly Chain® GT® sprocket as a replacement for an existing Poly Chain® GT® belt. For new designs, Poly Chain® GT®2 belts should only be used with Poly Chain® GT®2 Sprockets.

Explanation of Recommendations

**Recommended—Original Design:** This combination is designed to be used together. Note: For new drive designs, belts should only be used with the intended sprockets (see warnings). Published belt ratings apply only to belts used with the sprockets they were intended for.

**Replacement Only:** This combination is recommended only for replacement and widths should be adjusted as indicated. Replacement combinations should not be used in new designs (see warnings).

**Not Recommended:** This combination is not recommended due to potentially reduced service life of either the belt, the sprockets, or both. Also, a combination may not be recommended if another product line from the same manufacturer is more appropriate.

**No Compatibility:** This combination is not compatible, either because the belt does not wrap the sprockets well or because the belt tooth is too large to fit the sprocket grooves.

**NOTES**
1. Sprocket groove drawings are all based upon 38-40 grooves. Ideal form with no variation from manufacturing tolerance was assumed.
2. Belt tooth drawings represent ideal form with no manufacturing variation.
**WARNING:**
When Designing belt drives for **New Applications** with PowerGrip® GT®2 Power Ratings: DO NOT USE HTD® SPROCKET SYSTEMS. HTD® SPROCKETS/BUSHINGS MAY NOT HANDLE THE INCREASED TORQUE LOADS AND DAMAGE TO THE SPROCKET AND/OR BUSHING MAY OCCUR. ONLY USE POWERGRIPTM GT®2 SPROCKETS FOR NEW DESIGNS.

- **5M/8M/14M HTD® Belts**
  - **Recommended – Original Design**
    - Large robust belt tooth design
    - Significant backlash
  - **5M PowerGrip® GT®2 Belts**
  - **Not Recommended**
    - Reduced performance
    - The sprocket/bushing capacity may be too low for new designs
  - **8M PowerGrip® GT®2 Belts**
  - **Replacement Only**
    - Quieter operation/increased backlash
    - The sprocket/bushing capacity may be too low for new designs
    - When replacing HTD® belts – the belt width may be reduced one size

- **14M PowerGrip® GT®2 Belts**
  - **Replacement Only**
    - Quieter operation/increased backlash
    - The sprocket/bushing capacity may be too low for new designs
    - When replacing HTD® belts – the belt width may be reduced one size
  - **5M Poly Chain® GT® Belts**
  - **Not Recommended**
    - Reduced performance
    - The sprocket/bushing capacity may be too low for new designs
HTD® Sprockets (continued)

8M Poly Chain® GT®2 Belts

No Compatibility
• The belt will not fully wrap the sprocket
• The belt tooth is deeper than the sprocket groove

14M Poly Chain® GT®2 Belts

Not Recommended
• Increased noise and belt wear
• The belt tooth is deeper than the sprocket groove
• The sprocket/ bushing capacity may be too low for new designs

8M/14M Eliminator™ Belts

Not Recommended
• Belt Widths do not match sprocket widths
• PowerGrip® GT®2 belt line is preferred for replacement

5M RPP+Plus® Belts

Not Recommended
• The sprocket/ bushing capacity may be too low for new designs
• Increased backlash
PowerGrip® GT®2 Sprockets

**5M PowerGrip® GT®2 Belts**
*Recommended – Original Design*
- Excellent pitch fit
- Very low backlash

**8M PowerGrip® GT®2 Belts**
*Recommended – Original Design*
- Excellent pitch fit
- Very low backlash

**14M PowerGrip® GT®2 Belts**
*Recommended – Original Design*
- Excellent pitch fit
- Very low backlash

**5M/8M HTD® Belts**
*No Compatibility*
- The belt tooth is too large to fully seat in the sprocket groove

**14M HTD® Belts**
*No Compatibility*
- The belt tooth is too large to fully seat in the sprocket groove
PowerGrip® GT®2 Sprockets (continued)

**5M Poly Chain® GT® Belts**

**Recommended - Original Design**
- Excellent pitch fit
- Very low backlash

**8M Poly Chain® GT®2 Belts**

**No Compatibility**
- The belt will not fully wrap the sprocket

**14M Poly Chain® GT®2 Belts**

**Not Recommended**
- The sprocket/bushing capacity may be too low for new designs
- Belt widths do not match sprocket widths

**8M Eliminator™ Belts**

**Not Recommended**
- Belt widths do not match sprocket widths
- Use with PowerGrip® GT®2 belts (Original design)

**14M Eliminator™ Belts**

**Not Recommended**
- Belt widths do not match sprocket widths
- Use with PowerGrip® GT®2 belts (Original design)
PowerGrip® GT®2 Sprockets (continued)

5M RPP+Plus® Belts

No Compatibility
• Reduced performance
• The belt tooth is too large to fully seat in the sprocket groove

8M RPP+Plus®/WhiteHawk Pd™ Belts

No Compatibility
• Reduced performance
• The belt tooth is too large to fully seat in the sprocket groove

14M RPP+Plus®/WhiteHawk Pd™ Belts

No Compatibility
• Reduced performance
• The belt tooth is too wide to fully seat in the sprocket groove

8M Panther®/QT Powerchain®/BlackHawk Pd™ Belts

No Compatibility
• Reduced performance
• The belt tooth is too large to fully seat in the sprocket groove
• Belt widths do not match sprocket widths
• The sprocket capacity may be too low for new designs

14M Panther®/QT Powerchain®/BlackHawk Pd™ Belts

No Compatibility
• Reduced performance
• The belt tooth is too wide to fully seat in the sprocket groove
• Belt widths do not match sprocket widths
• The sprocket capacity may be too low for new designs
**WARNING:**
When Designing Belt Drives for New Applications with Poly Chain® GT®2 Power Ratings: DO NOT USE POLY CHAIN® GT® SPROCKET SYSTEMS. POLY CHAIN® GT® SPROCKETS/BUSHINGS MAY NOT HANDLE THE INCREASED TORQUE LOADS AND DAMAGE TO THE SPROCKET AND/OR BUSHING MAY OCCUR. ONLY USE POLYCHAIN® GT®2 SPROCKETS FOR NEW DESIGNS.

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**8M/14M Poly Chain® GT®2 Belts**

**Recommended - Original Design**
- Thirty percent increase in belt capacity over Poly Chain® GT® belts

**No Compatibility**
- The belt will not fully wrap the sprocket
- The belt tooth is too large to fully seat in the sprocket groove

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**8M HTD® Belts**

**No Compatibility**
- The belt tooth is too large to fully seat in the sprocket groove

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**14M HTD® Belts**

**No Compatibility**
- The belt will not fully wrap the sprocket
- The belt tooth is too large to fully seat in the sprocket groove

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**8M PowerGrip® GT®2 Belts**

**No Compatibility**
- The belt will not fully wrap the sprocket
- The belt tooth is too large to fully seat in the sprocket groove

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**14M PowerGrip® GT®2 Belts**

**Not Recommended**
- Greatly reduced performance (if drive originally designed with Poly Chain® GT®2)
- Belt widths do not match sprocket widths
- Excellent pitch fit

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**Note:**
Poly Chain® GT®2 belts may be used to replace Poly Chain® GT® belts on GT® sprockets. In most cases, the belt width may be reduced when replacing a GT® belt with a GT®2 belt. Contact Gates Product Application Help line at 303-744-5800 for more information.
No Compatibility
• The belt will not fully wrap the sprocket
• Belt widths do not match sprocket widths

8M Eliminator™ Belts

Not Recommended
• Majority of belt widths do not match sprocket widths
• Greatly reduced performance
• Use with Poly Chain® GT®2 belts (Original design)

14M Eliminator™ Belts

No Compatibility
• The belt tooth is too wide to fully seat in the sprocket groove
• Greatly reduced performance
• Belt widths do not match sprocket widths

8M Panther®/QT Powerchain®/BlackHawk Pd™ Belts

No Compatibility
• The belt will not fully wrap the sprocket
• Belt widths do not match sprocket widths

14M Panther®/QT Powerchain®/BlackHawk Pd™ Belts

No Compatibility
• The belt tooth is too wide to fully seat in the sprocket groove
• Greatly reduced performance
• Belt widths do not match sprocket widths

8M RPP+Plus®/WhiteHawk Pd™ Belts

No Compatibility
• The belt will not fully wrap the sprocket
• Belt widths do not match sprocket widths

14M RPP+Plus®/WhiteHawk Pd™ Belts
RPP®/RPP+Plus® Sprockets

5M HTD® Belts

No Compatibility
• The belt tooth is too large to fully seat in the sprocket groove

5M PowerGrip® GT®2 Belts

Replacement Only
• The sprocket/ bushing capacity may be too low for new designs

8M PowerGrip® GT®2 Belts

Replacement Only
• The sprocket/bushing capacity may be too low for new designs
• Eliminator™ belt line is a premium replacement option

14M PowerGrip® GT®2 Belts

Replacement Only
• The sprocket/bushing capacity may be too low for new designs
• For replacement of RPP®/ RPP+Plus® belts, the belt width may be reduced one size
• Fairly good pitch fit
• Improved performance over RPP+Plus®
• Eliminator™ belt line is a premium replacement option

5M Poly Chain® GT® Belts

Replacement Only
• The sprocket/bushing capacity may be too low for new designs
**8M Poly Chain® GT®2 Belts**

*No Compatibility*
- The belt will not fully wrap the sprocket
- Belt widths do not match sprocket widths

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**14M Poly Chain® GT®2 Belts**

*Not Recommended*
- Belt widths do not match sprocket widths
- Fairly good pitch fit
- The sprocket/bushing capacity may be too low for new designs

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**8M/14M Eliminator™ Belts**

*Replacement Only*
- Belt widths do not match sprocket widths
- For replacement of RPP®/RPP+ Plus® belts, use the next smaller width
- Good pitch fit
- Greatly improved performance over RPP+ Plus®
**Panther®/QT Powerchain® Sprockets**

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### 8M PowerGrip® GT®2 Belts

**Not Recommended**
- Reduced performance
- Belt widths do not match sprocket widths
- Eliminator™ belt line is preferred for replacement

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### 14M PowerGrip® GT®2 Belts

**Not Recommended**
- Reduced performance
- Fairly good pitch fit
- Belt widths do not match sprocket widths
- Eliminator™ belt line is preferred for replacement

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### 8M Poly Chain® GT®2 Belts

**No Compatibility**
- The belt will not fully wrap the sprocket
- Belt widths do not match sprocket widths

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### 14M Poly Chain® GT®2 Belts

**Not Recommended**
- Belt widths do not match sprocket widths
- Fairly good pitch fit
- The sprocket/ bushing capacity may be too low for new designs

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### 8M/14M Eliminator™ Belts

**Replacement Only**
- Good pitch fit
- Improved performance compared to Panther® Ultra® and BlackHawk PD™
# Interchange Matrix

## Belt Replacement with PowerGrip® GT²

8 & 14mm belts can be used to replace other non-Gates curvilinear belts in the same width.

<table>
<thead>
<tr>
<th>Company</th>
<th>Product Trade Name</th>
<th>Profile</th>
<th>Nomenclature</th>
<th>Belt-Pitch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bando</td>
<td>Synchro-Link® HT</td>
<td>H*</td>
<td>1600-8M-20 H</td>
<td></td>
</tr>
<tr>
<td>Bando</td>
<td>Synchro-Link® XP</td>
<td>H*</td>
<td>1600-8M-20 XP</td>
<td></td>
</tr>
<tr>
<td>Dodge</td>
<td>HT150</td>
<td>GT®</td>
<td>1600-8M-20 HT150</td>
<td></td>
</tr>
<tr>
<td>Dodge</td>
<td>HT200</td>
<td>GT®</td>
<td>1600-8M-20 HT200</td>
<td></td>
</tr>
<tr>
<td>Gates</td>
<td>HTD®</td>
<td>HTD®</td>
<td>1600-8M-20</td>
<td></td>
</tr>
<tr>
<td>Jason</td>
<td>HTB®</td>
<td>H*</td>
<td>1600-8M-20</td>
<td></td>
</tr>
<tr>
<td>Maska</td>
<td>Curvilinear Synchronous Belts</td>
<td>H*</td>
<td>1600-8M-20</td>
<td></td>
</tr>
<tr>
<td>Browning</td>
<td>HPT®</td>
<td>RPP®</td>
<td>B16008M20</td>
<td></td>
</tr>
<tr>
<td>Carlisle</td>
<td>RPP®</td>
<td>RPP®</td>
<td>1600-8M-20</td>
<td></td>
</tr>
<tr>
<td>Goodyear</td>
<td>HPPD™</td>
<td>RPP®</td>
<td>1600-8M-20</td>
<td></td>
</tr>
<tr>
<td>Goodyear</td>
<td>WhiteHawk PD™</td>
<td>RPP®</td>
<td>1600 8M WH 20</td>
<td></td>
</tr>
<tr>
<td>T.B. Wood’s</td>
<td>Synchronous Plus</td>
<td>RPP®</td>
<td>16008M20</td>
<td></td>
</tr>
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</table>

### Competitors Width

<table>
<thead>
<tr>
<th>Competitors Width</th>
<th>PowerGrip® GT² - Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>8MM - Pitch</td>
<td>20</td>
</tr>
<tr>
<td>8MM - Pitch</td>
<td>40</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Competitors Width</th>
<th>PowerGrip® GT² - Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>14MM - Pitch</td>
<td>85</td>
</tr>
<tr>
<td>14MM - Pitch</td>
<td>115</td>
</tr>
</tbody>
</table>


## Belt Replacement with Eliminator™

8 & 14mm belts can be used to replace other non-Gates curvilinear belts in the same width.

<table>
<thead>
<tr>
<th>Company</th>
<th>Product Trade Name</th>
<th>Profile</th>
<th>Nomenclature</th>
<th>Belt-Pitch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Browning</td>
<td>Panther®</td>
<td>RPP®</td>
<td>1600PHT8M-12</td>
<td>8 &amp; 14 MM</td>
</tr>
<tr>
<td>Carlisle</td>
<td>Panther® Ultra®</td>
<td>RPP®</td>
<td>1600PHT8M-12</td>
<td></td>
</tr>
<tr>
<td>Goodyear</td>
<td>BlackHawk PD™</td>
<td>RPP®</td>
<td>1600 8M BH 12</td>
<td></td>
</tr>
<tr>
<td>T.B. Wood’s</td>
<td>QT Powerchain®</td>
<td>RPP®</td>
<td>1600 8M 12W</td>
<td></td>
</tr>
</tbody>
</table>

### Competitors Width

<table>
<thead>
<tr>
<th>Competitors Width</th>
<th>Eliminator™ - Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>8MM - Pitch</td>
<td>12</td>
</tr>
<tr>
<td>8MM - Pitch</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Competitors Width</th>
<th>Eliminator™ - Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>14MM - Pitch</td>
<td>20</td>
</tr>
<tr>
<td>14MM - Pitch</td>
<td>12</td>
</tr>
</tbody>
</table>
Today's belt market contains a variety of similar, yet distinct Timing belt/pulley profiles. Even though some of the profiles appear visually similar, they cannot be interchanged. For example, the belt pitch measurements for XL, T5, and AT5 are similar. However, a closer look at additional tooth dimensions reveals that the belts cannot be interchanged due to variations in belt tooth/pulley groove shape, depth, and angle.

Care should be taken to distinguish between various Timing profiles and to ensure that a particular type of Timing belt is only used with its intended mating pulley.

Please reference the chart below for nominal Timing belt dimensions.
For more information on any of the Gates Industrial Power Transmission Products, programs or services, contact your local Gates representative, call the Product Application Help Line at 303.744.5800 or visit us at www.gates.com