

TB3000-1

MXL (T80 or 0.080") PITCH TIMING BELT: 60° vs. 40° TOOTH PROFILE

The tooth angle of a timing belt is an important design consideration when evaluating the dynamic characteristics of a power transmission system. The standard tooth angle for the MXL pitch trapezoidal profile established by the Rubber Manufacturers Association (RMA) is 40°. This standard has been adopted by most polyurethane manufacturers. The standard tooth angle for the same MXL pitch as developed by Chemi-flex is 60°. The 60° tooth profile was designed by Chemi-Flex to minimize belt backlash in precision applications. The differences between the two tooth profiles are illustrated in Figures 1 and 2 below:

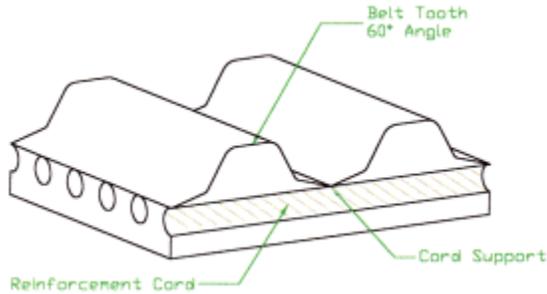


Figure 1: Chemi-Flex 60° Tooth Profile

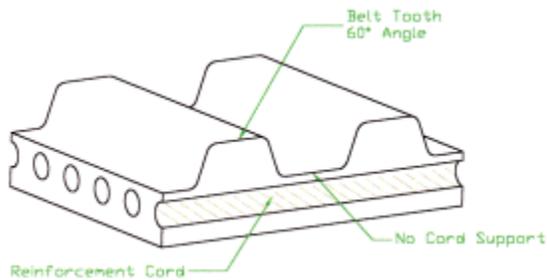


Figure 2: RMA 40° Tooth Profile

Drive Pulley Considerations

The belt 60° tooth profile was designed considering its use with the standard RMA pulley 40° tooth profile; therefore, existing MXL pulleys can be utilized with Chemi-Flex MXL 60° profile belts. This combination has been proven by laboratory testing and years of field experience. This unique design eliminates the need for costly pulley changes, while incorporating the advantages of an anti-backlash drive system.

Drive System Design

For additional technical information or product testing, please don't hesitate to contact the Chemi-Flex Engineering Department at (630) 627-9650.

Chemi-Flex believes the information presented is accurate at the time of publication and is intended for comparison purposes only. It is the end users responsibility to test products to insure they meet requirements for each application. Reference to products not manufactured by Chemi-Flex is neither an endorsement nor unsuitability of similar products.

Backlash Control

Since MXL profile belts are used primarily in light load positioning applications, smooth and efficient power transfer is required. For this reason, it is critical that backlash in the power transmission system be minimized. As shown on Figure 4 on Page 2, the belt 40° tooth profile can result in significant backlash. Due to the gap between the pulley and tooth, an initial stepping action can result in releasing the belt backward approximately 0.007" per belt tooth. Considering the accumulated backlash over all teeth engaged, this differential may be unacceptable for many precision applications.

As shown in Figure 3 on Page 2, the belt 60° tooth profile limits the backlash factor to a maximum of approximately 0.003" per tooth engaged, and substantially reduces the backlash accumulation factor. This is accomplished by having a single point of contact on either side of the tooth form. In addition, the installation and operating tension of the belt tends to deform the belt tooth down into the pulley tooth. This additional benefit essentially eliminates backlash completely (degree of backlash will change in proportion to tension).

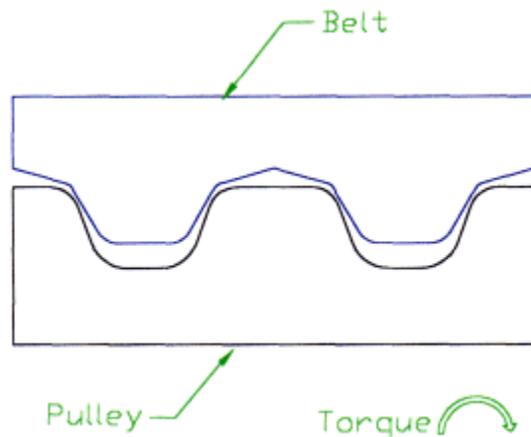


Figure 3: 60° Belt Tooth and Pulley Engagement

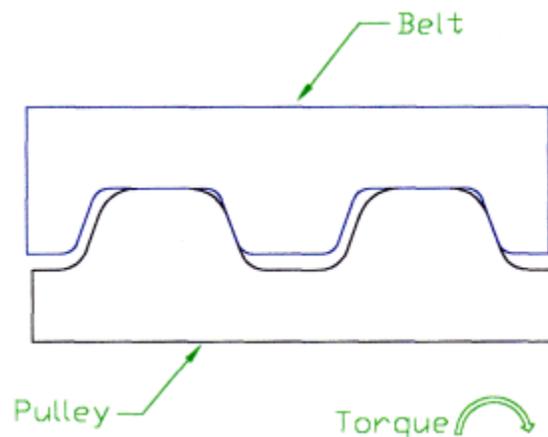


Figure 4: RMA 40° Belt Tooth and Pulley Engagement