

WP0297

**Dodge® mechanical drives: when to replace**

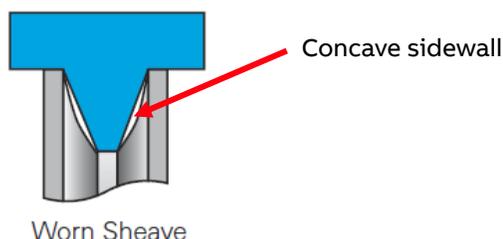
Dodge Customer/Order Engineering

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There are different types of drives available to connect driver and driven shafts. The three most widely used are: v-belt drives, synchronous belt drives, and roller chain drives. This paper discusses when drive hardware should be replaced.

In v-belt drives, wedging action of the belt in the groove(s), transmits horsepower (HP) from the driver shaft to the driven shaft. The groove profile of the sheave is machined per industry standards based on the diameter of the sheave and the belt being used. Over time, friction between the sheave and the belt will begin to wear down the sidewalls of the groove, causing the sidewall to take on a concave shape as shown in **Figure 1**. This leads to less contact between the belt and sheave, increasing belt slippage and reducing horsepower capacity and efficiency.



**Figure 1. Worn Sheave**

A heavily worn groove can be seen with the naked eye or felt by running the tip of a ball point pen across the sidewall of the sheave. This is extreme wear and the sheave should be replaced immediately. However, there are less obvious levels of wear where a sheave should also be replaced. For a v-belt drive to run as efficiently as possible, the sheave should be replaced if the groove sidewall has worn by 1/32 in or more. This amount of wear typically happens after five to seven belt changes, but can easily be checked using a v-belt groove gauge as shown in **Figure 2**.



**Figure 2. Inspecting sidewall wear with a v-belt groove gauge**

Unlike v-belt drives, where horsepower (HP) is transmitted through wedging action, synchronous belt drives transmit HP by positive engagement of the belt teeth with the teeth on the sprocket. However, like v-belt drives, friction

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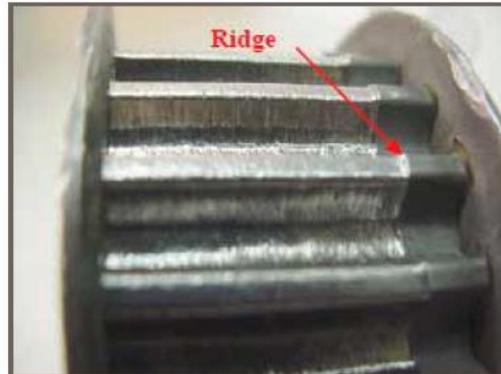
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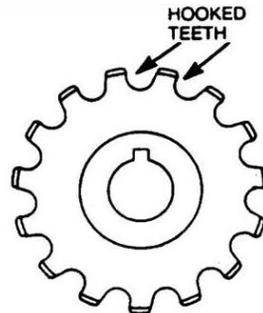
between the belt and sprocket will eventually lead to wear. Unfortunately, there are currently no gauges available to check sprocket teeth.

The best way to inspect the sprocket teeth is to run a fingernail down the length of the tooth. If your fingernail catches on the edge where the belt has been running, then the sprocket should be replaced (**Figure 3**). This typically occurs after 3-5 belt changes.



**Figure 3.** Sprocket tooth wear

Similar to synchronous belt drives, chain drives transmit HP by positive engagement of the mating teeth on the chain and sprocket. And while chain drives are lubricated to reduce friction, wear still occurs on both the chain and sprocket. The roller on the chain will begin to wear down the sides of the sprocket tooth, giving it a “hooked” appearance (**Figure 4**). When the side of the tooth has worn to the point that it is hooked, the sprocket should be re-placed.



**Figure 4.** Chain sprocket tooth wear

For any questions on mechanical drives, or any other mechanical power transmission products, please call us at 864-284-5700 or e-mail us at [DodgeEngineering@abb.com](mailto:DodgeEngineering@abb.com)