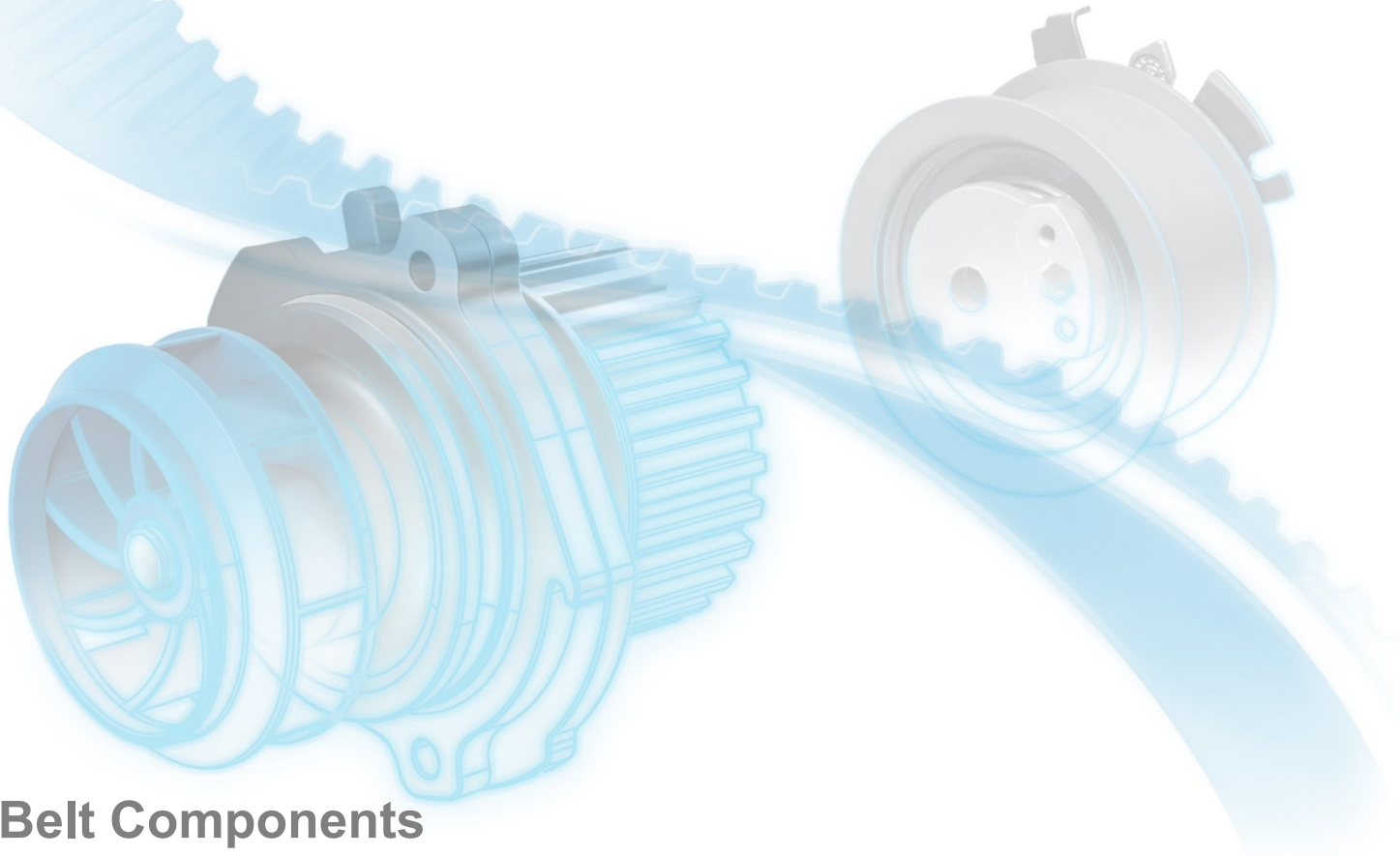




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Timing Belt Components

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**TECHKNOW** SERIES  
by DAYCO<sup>SM</sup>



## The Forgotten Belt

Because the timing belt cannot be seen when opening the hood and its location makes it difficult to inspect, the average consumer may forget or not even realize the importance of timing belt maintenance. It is often referred to as “The Forgotten Belt”.

- **Locating the Timing Belt** - The common belt that can be seen upon opening a vehicle's hood is the serpentine belt. The first step is to remove the serpentine belt and related components. There will be a cover that is designed to keep out contaminants. This is located behind the accessory drive system and must be removed to reach the timing drive.





## Timing Belt Maintenance is Critical

Timing belts break most often at engine startup and shutdown when the maximum amount of tension is placed on the belt. **If the timing belt is changed on schedule, there's little risk of a problem.** But if it's not changed according to the OEM guidelines, it can cause severe damage depending on engine type.

**Interference Engine:** Allows for a higher compression ratio, which means more power out of the same engine. The pistons and the valves share the same space in the cylinder but move at different times. One or more valves may open into an area where the pistons travel.

- **If the timing belt breaks on an interference engine and a piston makes contact with the valve(s), it can severely damage the engine.** The amount of damage varies depending on engine speed at the time of failure.

**Non-Interference Engine:** An engine where an open valve never enters into an area where the piston travels.

- If you have a non-interference engine, **a broken belt will not damage the engine, however the vehicle will not function until the belt is replaced.** Replace the belt, and any other worn components, and the vehicle is back on the road.



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## Replacement Intervals

Manufacturers publish the OE replacement intervals for all timing belt applications. The recommendations can be found in the vehicle's owner's manual. It can range drastically by vehicle make and model so be proactive as customers will not typically specify or ask for this type of repair or inspection.

- Replace if the vehicle is past its recommended replacement interval (one owner vehicle).
- Replace if the OE belt is found on the application and the mileage is beyond the recommended change interval.



**70%**  
of motorists miss  
timing belt  
maintenance.



**2/3**

of vehicles with interference engines miss maintenance. This is a recipe for disaster: broken belts will cause bent valves, cylinder head or camshaft damage, and possibly even piston and cylinder wall damage.



## Systems Approach is Key

**When replacing the timing belt, it's important that the tensioner, idler pulleys and water pump are also **INSPECTED** and **REPLACED** since these components wear at a similar rate.**

Replacing the entire system at once is inexpensive when compared to future labor costs. If the technician has to access the timing drive more than once, the labor rates could more than double and the timing belt itself will decrease in life. Manufacturers recommend replacing the timing components when replacing the timing belt.







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## Replacing all Worn Components

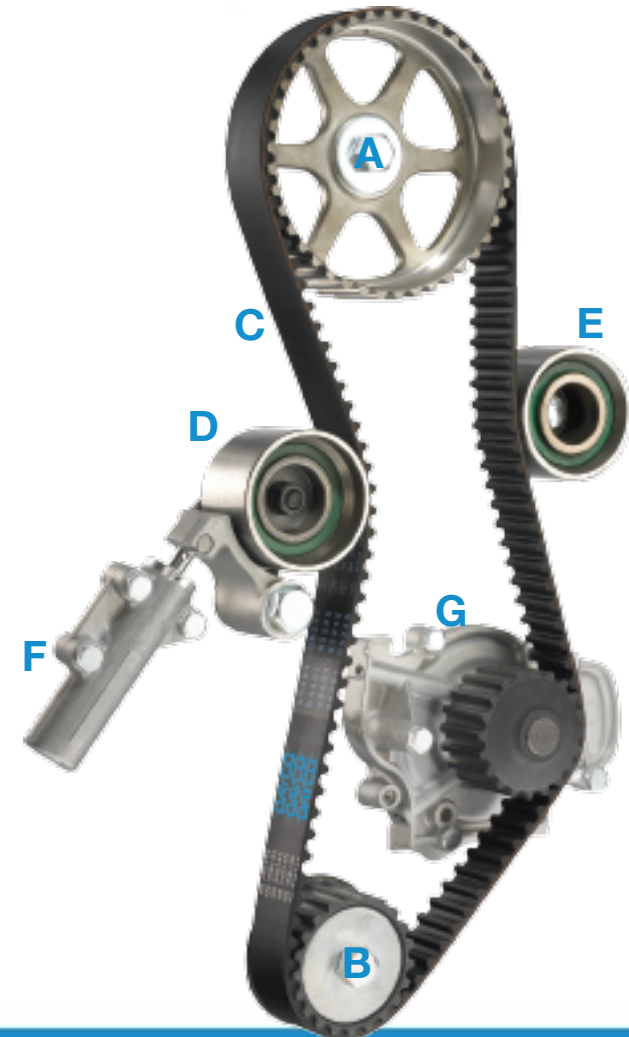
**A. & B. Cam and Crank Shaft Seals** - Leaking or worn seals will contaminate the timing belt causing premature belt failure, leading to major engine damage.

**C. Timing Belt** - Must be replaced within the recommended OE replacement interval. When a timing belt breaks, severe engine damage can occur and the engine will no longer run.

**D & E. Tensioner & Idler Pulleys** - One of the most common causes of timing belt failures is worn tensioner or idler pulleys. Additional labor costs are minimal when changing a timing belt.

**F. Hydraulic Timing Belt Tensioner** - Hydraulic timing belt tensioners help set or maintain constant tension on the system. Loss of timing belt tension may lead to major engine damage.

**G. Water Pump** - Water pumps driven by a timing belt should be replaced when changing the timing belt. Engine coolant from a worn leaking water pump can contaminate and destroy a new timing belt.





## Helping the Customer Understand

Educating a customer on belt maintenance and what can happen if they miss the replacement interval will actually help save them time and costs in the long-run.

- **When should you replace your timing belt?**

Your vehicle manufacturer normally has a published mileage replacement interval. Check the owners' manual or OE service information.

- **What other parts should you inspect when replacing a timing belt?**

Pulleys and tensioners are used to route the timing belt. These components wear and should be replaced at the change interval.

Many vehicles manufactured with a timing belt also use the timing belt to drive the water pump. It is considered good practice to clean and flush the cooling system and replace timing belt driven water pumps when performing timing belt maintenance.



# 30%

**of vehicles on  
the road have a  
timing belt that  
may need  
maintenance.**

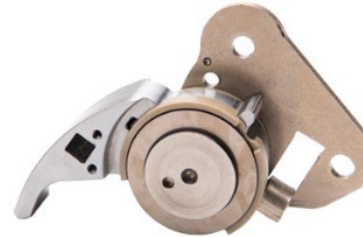


## Tips for Late Model Tensioners

**Manual Tensioner** - Needs to be set manually with the **use of a belt tension indication tool or Belt Tension Meter**. They may also require a special tool for adjustment. Follow OE service instructions for proper tension, rotate engine several times to check belt tension.



**Mechanical Tensioner** - Always follow OE instructions on how to properly tension this part. Rotate engine 3-4 times to recheck belt tension.



**Automatic Tensioner** - Must be set initially according to OE instructions. Set the tensioner correctly, then rotate the engine 3-4 times to recheck belt tension.







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## Hydraulic Actuators/Tensioners Tips

- Hydraulic actuators work like shock absorbers. They dynamically control the tension of the system, ensuring constant tension of the belt.
- The arm, under the action of a calibrated spring, will move towards the pulley while the damping effect – operated by the fluid – is active when the belt is in motion.
- The safety/lock pin keeps the arm in the proper position and should be removed just after installation. If you are reusing the hydraulic tensioner, it must be very slowly compressed in a bench vise and then a pin inserted to hold it in place during installation. Once the pin is removed, the plunger will extend. After that, the engine should be rotated several times to check belt tension.

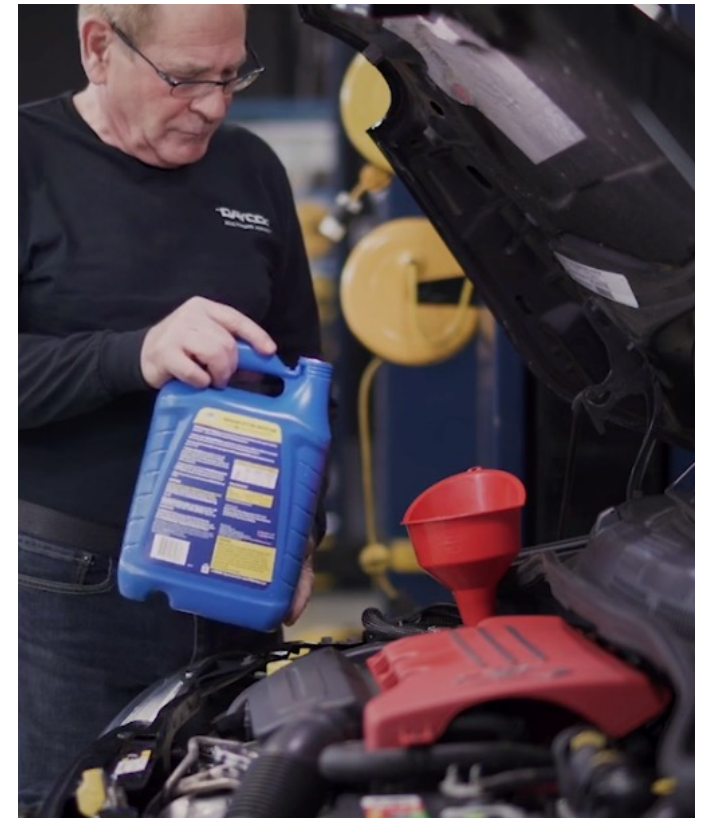




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## Installation

- **Clean and flush cooling system** if the water pump is being replaced
- **Line up the engine timing marks** at zero
- **Use yellow paint** to highlight all timing marks after timing cover is removed and be sure to **mark cam sprockets and crank sprockets**
- Using the Dayco tool, **lock cam sprockets** into place
- Once the belt is installed, **follow correct OE instructions** on installing and setting up timing tensioner
- The new **belt should not be bent or twisted** into any shape smaller than the camshaft pulley and it must be **kept clean** and free of dirt and contamination
- Always **rotate the engine several times** to recheck timing mark alignment and belt tension
- **Use a torque wrench** where needed
- Always **use a crank holding tool and torque wrench** when reinstalling the harmonic balancer

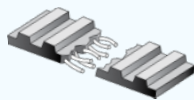




## Signs of Wear or Belt Failure

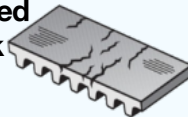
Over 80% of all belt failures and replacements occur after the vehicle passes 85,000 miles or 137,000 kilometers. The fact is, peak belt replacements occur between 90,000-100,000 miles or 145,000-160,000 kilometers on vehicles that are seven to 10 years old.

### Tensile (cord) Failure



- Belt crimped
- Foreign body in drive
- Excessive tension
- Moisture or antifreeze getting on belt and invading the cord

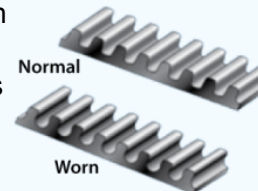
### Worn and Cracked Timing Belt Back



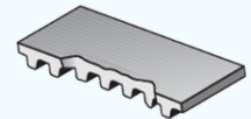
- Operating at excessively high or low temperatures
- Locking of a transmission component
- Worn pulleys

### Worn Land Area

- Excessive tension
- Worn pulleys

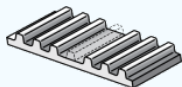


### Side Wear



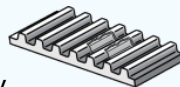
- Misalignment of the tensioner or one of the transmission components

### Loose Teeth



- Low working tension of the belt
- Loss of tension in the belt
- Penetration of foreign materials in the transmission

### Worn Timing Belt Teeth



- Irregular tension
- Pulleys with worn teeth
- Incompatibility with pulley

### Contamination

- Timing belt cover or seal damage
- Improper installation
- Water, gas or oil line leaks
- Rubber deposits from wobbling belts or misalignment



### Noisy Timing Belt

- Timing belt cover or seal damage
- Improper installation
- Rubber deposits from wobbling belts or misalignment
- Water, gasoline or oil line leaks





## Meeting All OEM Requirements

Manufactured with tough, wear-resistant fabric, high tensile strength cord and molded tooth surface that meet all OEM criteria, Dayco's timing belts are recognized by the automotive industry as world leading. They feature a molded cog design which runs quieter and is more economical.

### Tooth Cover Fabric

The belt teeth are protected with a layer of PTFE – Poly Tetra Fluoro Etilene (Dayco patented) for increased wear and load resistance.

### Fiberglass Cord

New generation of fiberglass that delivers precise length stability to keep the engine running smoothly over the life of the belt.

### Polymer Compound

Dayco's advanced polymers with good resistance to loading, high temperatures and aging.





## Finding the Right Part, the First Time



**Use the Dayco Parts app or website to search for the right part:**

- VIN lookup
- License plate parts lookup
- Product specifications
- Interchange search
  - Competitors
  - OEM





## Test Your Knowledge



1. **What type of engine would cause the most damage if a timing belt failed?**
  - a) Interference
  - b) Non-Interference
  
2. **One of the main reasons a timing belt fails is due to \_\_\_\_\_.**
  - a) Belt tensioners
  - b) Idler and tensioner pulleys
  - c) Water pump
  
3. **Over what % of timing belts fail after the vehicle reaches 85,000 miles?**
  - a) 30%
  - b) 75%
  - c) 80%

Go to the next page for the correct answers.

## Test Your Knowledge Answer Key



**Question 1 -** a) Interference

**Question 2 -** b) Idler and tensioner pulleys

**Question 3 -** c) 80%



**Thank you**

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**800-848-7902**