



# TECHNICAL BULLETIN 039

20/12/2010

## MULTIPLE / ACCESSORY DRIVE / TORSIONAL VIBRATION DAMPER (TVD)

Engine cycle speed fluctuations are typical for all firing engines, and always existed. On actual engines these speed vibrations are emphasized due to higher performances asked from smaller engines equipped with lightweight parts, especially on diesel engines (to make them compliant with Euro 4, 5, 6). These torsional vibrations could lead to excessive bearing wear, accessory belt wear/noise and even to crankshaft breakage.

It is important to dampen these excessive vibrations. To protect the gearbox and drivetrain a dual mass flywheel is often used. The Front-End Accessory Drive is protected by the Torsional Vibration Damper (TVD). A TVD is a crankshaft pulley in which a rubber element connects the 2 main metal parts (Fig. 1).

This connecting rubber functions as the damping element. Because of its material (rubber) and its purpose (damping vibrations), it wears out and will need replacement after a certain time (Fig. 2).



### BULLETIN

**GATES REFERENCE:**  
ALL TVD.

**MAKE:**  
Various.

**MODEL:**  
Various.

**MOTOR:**  
Various.

**MOTOR CODE:**  
Various.



FIG. 1

Rubber element



FIG. 2

Cracked rubber



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Open type

Closed type

FIG. 3



Equilibration hole

FIG. 4



Missing rubber

FIG. 5



Damaged slotted hole

FIG. 6

There are 2 main types of TVD's. The "open" type for petrol engines mainly, and the "fully closed" type for diesel engines mainly (Fig. 3).

The drilled hole(s) which can be found in a TVD are made to equilibrate the TVD (Fig. 4).

A worn/out of order TVD will lead to vibrations, belt noise and excessive wear of all drive components; it can lead to failure of the overrunning alternator pulley.

Visual check:

In order to check the condition of the TVD, different options are open.

The following symptoms indicate a TVD should be replaced:

1. Cracks in the rubber (Fig. 2)
2. Parts of rubber missing (Fig. 5).
3. Clear contact marks from metal "indicator" in slotted holes (Fig. 6)
4. Some TVD's will show rust particles on the outside as an early warning
5. A Micro-V® belt running out of the pulley (Fig. 7) could be the result of a faulty TVD



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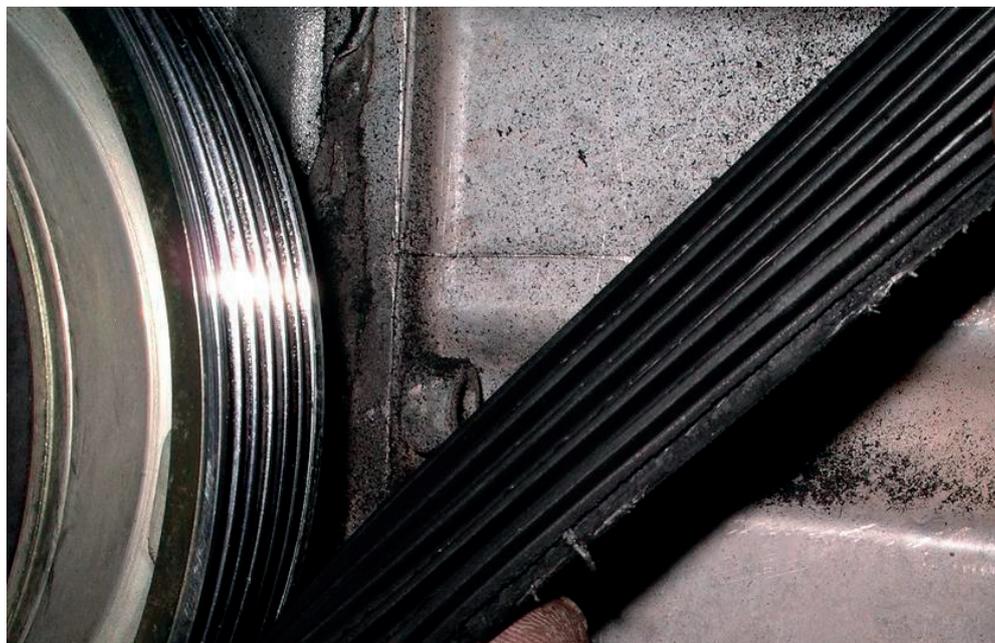


FIG. 7

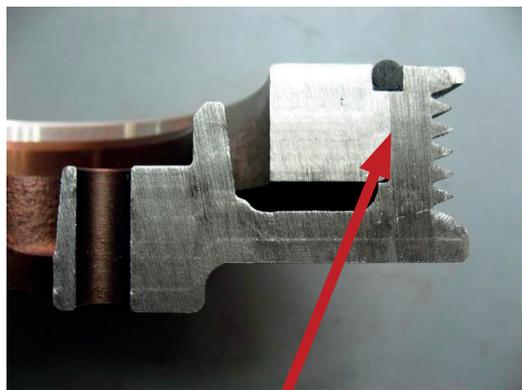
#### Recommendations:

- The TVD should be replaced when the ABDS belt and tensioner are replaced. We recommend to change it no matter what after 100.000KM
- At each service after 30.000 km, especially after a car crash, the TVD has to be carefully checked for signs of wear or damage. In most cases wear/damage is visible on the backside of the pulley sooner than on the front side.
- The wear will not always show, but TVD or belt noise is proof of a problem.
- In order to guarantee the optimum performance of the TVD, it should be installed according to the manufacturer's recommendations.
- Many TVD's are bolted on the engine with stretch / elastic bolt(s), which need to be replaced after removal, **fitted to the correct torque (incl. angle if instructed)!**

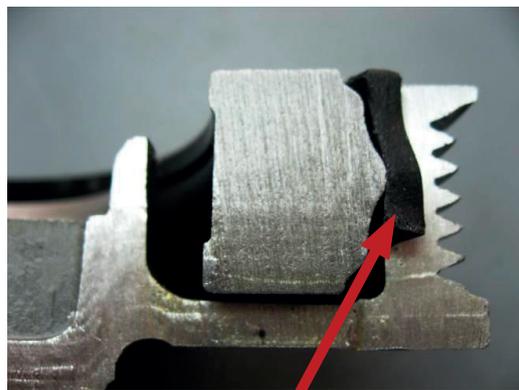


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No damping rubber, only outside O-ring



Rubber damping element

FIG. 8

Remarks:

- 1) Idling speed as well as sporty driving is the worst conditions for TVD's and other drive components.
- 2) TVD's should not be used without an accessory belt installed!!!
- 3) Watch out for fake TVDs (Fig.8)! These cheap pulleys are not having any damping function at all, as there is no rubber element inside; only a rubber O-ring on the outside.