

## ENGINE NOISES

### Normal Characteristic or a Catastrophic Event?

Identifying noises that should be considered a normal characteristic or a mechanical defect can be a challenge, even for the most experienced technician. Some engines, systems and components come with their own noise characteristics that we would once consider a defect, but now are considered a normal characteristic. Some mechanical failures may not receive immediate attention, as the technician may put them into a normal characteristic category. Consider the following when diagnosing an engine noise complaint or when a visual observation identifies a condition that reflects a mechanical failure, often before performance symptoms are evident:

#### NEEDLE BEARINGS IN THE OIL PAN

A simple oil and filter change results in the technician recommending some major engine repairs. While performing a lube service the technician observes needle bearings attached to the magnetic oil drain plug (see Fig.1). This is not a location that we would expect to find needle bearings.



Fig. 1

Removing the needle bearings and continuing with the oil change is not an option. The customer should be notified immediately, as the removal of some engine components will be necessary to retrieve additional needle bearings and possibly prevent engine damage.

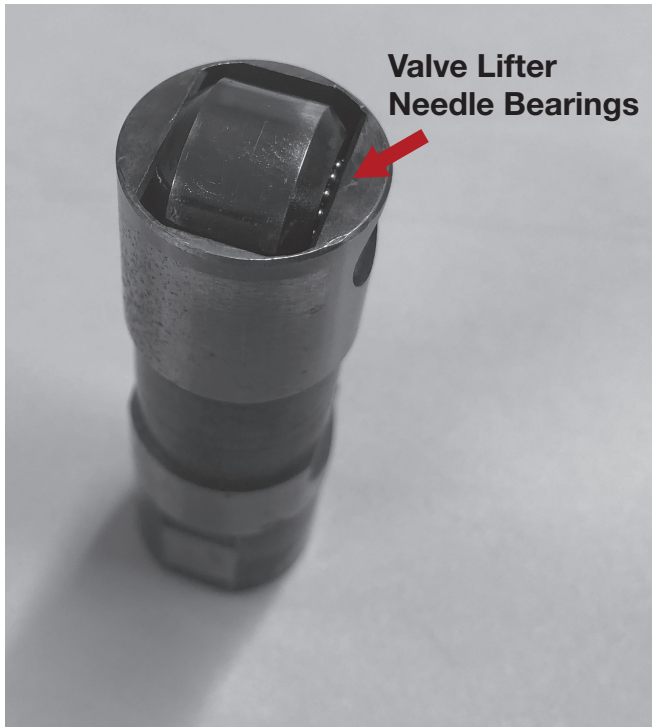
Needle bearings in the oil pan has become a frequent occurrence on GM applications with push rod engines equipped with roller rocker arms and roller valve lifters. Vehicles affected include V6 and V8 engines produced from 2000 to 2021.

While the needle bearings are usually first observed in the oil pan, they may also be found in the cylinder head oil return ports, making a visual inspection of that area mandatory. GM states that the needle bearings are larger than the mesh screen on the oil pump pickup; therefore they cannot be pulled into the oil pump. However, a concern is the small fragments of metal that may be ground up during the rocker arm failure could be an issue resulting in engine damage. Many of the needle bearings attached to the oil drain plug are only fragments of the bearings. Each rocker arm contains 66 needle bearings (33 per side). The needle bearings are approximately 1/4 inch in length (see Fig.2). When needle bearings are present, a thorough inspection of all rocker arms should be performed.



Fig. 2

Needle bearings that measure approximately ½ inch in length have also been reported attached to the oil drain plug when performing a lube service. Needle bearings of this length could only originate from the valve lifter rollers (see Fig.3).



**Fig. 3**

Needle bearings found in the oil pan or cylinder head oil return ports could only originate from the two mentioned locations. Any evidence of these bearings should warrant a full inspection of the rocker arms and/or valve lifter rollers. The needle bearing length should determine which component is at fault, assuming the needle bearing is fully intact and not ground into fragments.

### **SQUEALS, SQUEAKS AND TICKING NOISES**

Worn camshaft lobes or lifter rollers are also common on these applications. When these conditions occur, the symptoms usually involve a squeal, squeaks, a ticking noise or a constant chirping sound. The noise occurs at camshaft speed and misfire codes PO300-PO308 are often stored in memory. A misfire symptom may not be evident. The condition may occur at idle or only be present at high RPMs.

Camshaft lobes and lifter rollers may encounter gouging, flat spots, or grooves. A worn camshaft lobe may be difficult to identify when viewing through the lifter bore. While a bore scope can be a valuable diagnostic aid, worn camshaft lobes may not be evident until the camshaft is removed for a thorough evaluation.

A collapsed lifter on engines equipped with Active Fuel Management (AFM) may result in a misfire or a ticking noise. The condition may be the result of an AFM lifter that unlocks as soon as the engine is started, or a lifter that has mechanically collapsed. The ticking noise is more prevalent on a lifter that is collapsed or stuck. Misfire codes are usually associated with a lifter that unlocks as soon as the engine is started.

Broken valve springs are also a concern when diagnosing a ticking noise or a misfire condition with the AFM system. The symptoms may be intermittent or consistent at a specific RPM. A broken valve spring can be difficult to identify, as the two pieces of the spring may remain stacked together making a visual identification difficult without disassembly.

### **NORMAL CHARACTERISTIC NOISES**

Vehicles equipped with Direct Injection will display noises that should be considered a normal characteristic for the system.

The high-pressure fuel system may emit a clicking or ticking noise from the high-pressure fuel pump. The sounds are more pronounced at idle, following a cold start, or when the vehicle is driven through a drive-thru or next to a building.

The fuel injectors may produce a ticking sound due to pulsing under high pressure.

These sounds are to be considered a normal characteristic with no service recommendations.

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