

## COMMON CAUSES OF ENGINE OVERHEATING AND SUGGESTED REPAIR PROCEDURES

*AFA is pleased to add another bulletin to our expanding library of Technical Bulletins to help you service and repair diesel and natural gas engines.*

### Overheating

If an engine overheats, it can cause head gasket failures and cracked cylinder heads. Generally, the operating temperature of an engine should be between 190-220 degrees. Temperatures in excess of this will put stresses on the cylinder head, cylinder liners and engine block. The stresses from overheating cause these parts to expand beyond the engines tolerances. This will lead to a blown head gasket and/or a warped or cracked cylinder head.

### Common Causes of Overheating

**Low coolant level or coolant loss** - Always maintain your coolant level per the manufacturers recommendation. Continued loss of coolant may indicate external leaks around hoses, gaskets, radiator, water pump, thermostat, heater or freeze plugs. A cracked cylinder head will also cause coolant loss and is sometimes indicated by white, puffy smoke coming out of the exhaust.

**Air Pockets in the Cooling System** - Occasionally coolant is drained from the engine to make repairs or as part of your engine's general maintenance. Air pockets may form when coolant is refilled. If the air pockets are not bled out of the cooling system prior to startup, the air pockets will cause the engine to overheat. Always follow the manufacturer's procedures when refilling your cooling system. Many vehicles have bleeder holes or valves that allow you to remove the air pockets.

**Faulty Thermostat** - If the thermostat is not opening and closing at the correct temperature, it will cause your engine to overheat. The radiator, water pump and clutch fan should be maintained per the manufacturer's specification to avoid overheating.

### Pre-Ignition/Detonation

This occurs when temperatures inside the combustion chamber get so hot that the fuel will ignite. Pre-ignition will cause the vehicle to misfire, run poorly and eventually burn the valves. Common causes of Pre-ignition are improperly operating EGR, mistimed engine, wrong fuel/air mixture and vacuum leaks.

Air trapped in the lines of your cooling system can make a perfectly healthy system run as though it's malfunctioning. These air pockets accumulate over time and can cause overheating by impeding the flow of coolant through the system. They also make the coolant level appear to be high when in fact it is just air pushing the coolant level up. Below are perhaps the best ways to bleed air from your cooling system and make insure your radiator is functioning properly.

If you have had any parts replaced on your engine's cooling system (radiator, water pump, new hoses, etc.), there is a chance that your cooling system has air trapped in it and this could make your cooling system operate poorly, or in worst cases mimic the symptoms of a cracked head.

## The best way to bleed air from your cooling system

### Step 1 - Mix Water and Antifreeze

Make a mixture of one part water and one part antifreeze. Pour it into the radiator, filling it up to the rim. Be sure to fill both the coolant or overflow reservoir with the same water and antifreeze mixture.

### Step 2 - Start the Engine

Leave the radiator cap off, turn on your engine, and let it run until the radiator bleeds out air. It may take between 15 and 20 minutes for the engine to heat to the proper temperature and begin cycling coolant through. You'll observe the coolant level drop as the air is cycled out, and see air bubbles escaping from the radiator, and perhaps hear it gurgle.

### Step 3 - Observe the Temperature

Observe the temperature gauge as this is happening. The gauge should decrease to normal or close to normal. This process helps the radiator feed the coolant more evenly, helping the system cool the engine like it's supposed to. It's no longer circulating air in your radiator instead of coolant.

### Step 4 - Refill the Radiator

Completely refill the radiator and the coolant reservoir again. They will be as much as half empty, since earlier it was simply air that made it seem full.

## Step 5 - Replace the Radiator Cap

Seal the radiator with the cap. This will keep most of the air out of the system. Your car's temperature gauge should be back to normal, and your engine should no longer have problems overheating unless there is a different issue causing it

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### Other Methods

There are two other methods available for bleeding air from your cooling system. Some vehicles actually have bleeder valves specifically for this problem, located at the top or in front of the radiator. Open the valve and bleed the air trapped in the upper portion of the radiator.

You can also jack up your vehicle from the front to bleed the air from the cooling system. This puts your radiator higher than the rest of the cooling system and helps force the air pockets closed. Keep the radiator cap loose to help the air move out during this process.

*The above recommendations are general guidelines and not intended to replace the OE manufacturer's specific instructions for servicing or repairing their respective cooling systems.*

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Consult the OE manufacturer's service manual for your particular engine's service requirements.

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