

Cooling is Critical

The cooling system is a key factor in engine efficiency and durability. To properly protect the metals and other materials of the system, the correct coolant and additives must be used.



The heart of any vehicle is the engine. It's what makes it go. Anything that jeopardizes the operation of the engine can have disastrous effects and result in extensive repairs. If the engine is the heart of the vehicle, then surely the cooling system is the "circulatory system" that keeps the engine operating at optimum temperatures. If it doesn't, bad things are going to happen.

Subaru engines are modern masterpieces of technology and precision. Manufactured of multi-alloy metals and exotic materials, these engines contain more components, weigh less, produce more power and torque and are more durable than the old iron engines of 40 years ago. However, even these high-tech engines can be damaged or destroyed by excessively high internal temperatures.

Though more energy efficient than ever before, the combustion of fuel and

air in the cylinders that produces the power that propels the vehicle still creates an enormous amount of waste heat. This is carried away from the cylinders either by venting it out through the exhaust system or via the cooling system. If either of these systems fail to keep the engine at normal operating temperatures, an overheating condition occurs. Of the two, the cooling system is most vulnerable.

The cooling system can easily be contaminated or compromised by anyone putting the wrong products into the radiator or reservoir. Often, customers or service facilities that are not aware of the specific needs of the vehicle will put incorrect chemicals into the system. In fact, according to figures published by the U. S. Department of Transportation, coolant-related problems are the primary cause of mechanical breakdowns on the highway. Many of these breakdowns

could have been avoided by the use of proper coolant and the right additives.

The Results of Overheating

When the engine overheats, a number of dangerous problems can arise that drastically affect engine operation:

- Knocking and pinging develop from the detonation of overheated fuel.
- Hot spots can develop in the combustion chamber and cause the air/fuel mixture to ignite before spark occurs, and possibly far before TDC. This "pre-ignition" results in loss of power as the cylinders fight each other and the smooth rotation of the crankshaft becomes erratic. On OBD II vehicles, this may result in an illuminated MIL and a misfire DTC.

- › Valves and guides may be damaged from the high temperatures.
- › Camshafts can seize or break from the expansion of metal components.
- › Pistons may be damaged from heat expansion or burn through. Piston swell can ruin the cylinder wall.
- › Head gaskets may be damaged or burn through. Any coolant entering the crankcase can damage the crank bearings.
- › The radiator can split under excessive expansion of the coolant vaporizing and turning to steam.
- › Hoses can split or burst under increased pressure.

In severe cases of overheating, the entire engine can be badly damaged or destroyed.



› These pistons were damaged by an overheated engine. Extensive repairs were required to put the vehicle back on the road.

Coolant

Engine coolant serves three important functions: to avoid overheating of the engine; to avoid freezing of the system and to avoid internal corrosion. Each is critical to engine operation and durability. Let's take a look at each function individually:

First, the coolant keeps the engine from overheating, which can destroy gaskets and other non-metallic materials; create warping and damage to metallic components and cause improper combustion problems. When used correctly, the latest coolant compounds will protect today's high-revving engines against higher



➤ These used to be pistons. When the gaskets blew, so did the entire engine.

Genuine Subaru Long Life Coolant

When adding or replacing coolant, or servicing the cooling system, always use Genuine Subaru Long Life Coolant (P/N SOA868V9210). It's a phosphate (non-amine) type and is specially formulated for all Subaru vehicles, which are equipped with aluminum engines and radiators. Coolant of other types may not provide the proper protection against corrosion of aluminum parts.

Subaru approved this coolant for optimum performance because it outperforms other types. Subaru Long Life Coolant never allows silicate gel to form, causing radiator plugging and, therefore, overheating. It's available in one-gallon bottles, meets all OEM specifications and is required for warranty service.

As always, refer to the Owners Handbook and the Subaru service manual for each specific year and model. Information regarding all Subaru models is available on the Subaru Technical Information System website at <http://techinfo.subaru.com>.

other components it causes – we generally refer to the liquid in the cooling system as “coolant.” Again, modern technology has created coolants that protect against freezing better and longer.

Lastly – and equally important – coolant protects the internal metal components of the cooling system against corrosion and rust. It also protects the rubber, synthetic and fiber-based components against distortion and damage.

➤ Genuine Subaru Cooling System Conditioner must be used whenever the coolant is changed.



➤ Genuine Subaru Long Life Coolant is formulated for use in all Subaru vehicles.

temperatures than ever before – and for longer periods before they begin to break down and need to be replaced.

Secondly, the coolant avoids freezing of the cooling system. We used to call coolant “antifreeze,” because in earlier days, it served just that purpose. Now, because coolant does more than just protect against freezing – and the cracked engine blocks and damage to



Cooling System Conditioner

Whenever the coolant is changed, you must add Genuine Subaru Cooling System Conditioner, (P/N SOA635071). It's been tested and approved for Subaru aluminum engines and radiators. Do not use aftermarket coolant reinforcement agents, sealers and/or flushing agents as those chemicals could corrode aluminum parts, or cause clogging.

Genuine Subaru Cooling System Conditioner improves the efficiency of the cooling system and includes anti-corrosive properties. When used as directed, it remains suspended in the radiator until the engine is started and thermostat fully opens.

Once the conditioner begins to circulate throughout the cooling system, it is attracted to any suspected leakage area in the vehicle's cooling system. The heat generated by the engine acts as an activation agent and hardens the cooling system conditioner to help seal the area. Subaru of America, Inc. has determined that this product is safe for use in all Subaru vehicles.

› Remember to pour a bottle of Genuine Subaru Cooling System Conditioner into the system every time you change the coolant.





➤ Using Genuine Subaru Long Life Coolant and Cooling System Conditioner is a “can’t-miss” proposition for your customer’s Subaru vehicle.

Genuine Subaru Cooling System Conditioner must be completely used, once the bottle is opened. Exposure to

air can compromise its effectiveness. If you find the seal on a bottle removed, opened or damaged when the cap is removed, do not use that bottle of conditioner.

Note: *Thoroughly inspect the cooling system before adding the conditioner. Conditioner does not remedy concerns where coolant is found in the combustion chamber, loose heater hose clamps, or cracked coolant reservoir tanks. Be sure to properly diagnose the cooling system before deciding to use this product.*

Avoid the Use of Coolant Flushing Machines

Subaru does not recommend the use of any flushing machine or flushing agent under any circumstances. If a flushing machine has been used to service other brand vehicles with copper

radiators, a chemical reaction between copper ions and Genuine Subaru Coolant may occur. This could also cause future clogging of the radiator.

If a flushing machine is dedicated to only Subaru vehicles, it is still not recommended as there is no way to know that the coolants being removed and processed through the machine during servicing are or were exclusively Genuine Subaru Long Life Coolant.

If flushing is required, only use fresh tap water. Do not use hard water as it will create calcium build-up, which will clog the radiator.

It’s as simple as this: always use only Genuine Subaru Long Life Coolant and Cooling System Conditioner. Following these guidelines for protecting the cooling system in your customer’s Subaru vehicle will help ensure the longest life for the engine and a satisfied customer.

New Subaru Long Life Super Coolant

All 2008 Impreza WRX STI vehicles are factory-filled with the new blue-colored Subaru Long Life Super Coolant. The first replacement interval for Subaru Long Life Super Coolant is 11 years/137,500 miles. After that, the replacement interval is 6 years/75,000 miles.

During the 2008 production run, all other Impreza, Forester, Legacy, Outback and Tribeca models will be transitioned from the older green Subaru Long Life Coolant to the new blue Subaru Long Life Super Coolant.

Some of these 2008 models may be filled with the new blue coolant, some

may be filled with the older green coolant and some may be filled with a mixture of the two. The regular replacement interval for these 2008 models (except STI) remains at 30 months/30,000 miles.

All 2009 Subaru vehicles will be factory-filled with the blue Subaru Long Life Super Coolant and the longer replacement intervals will apply.

Subaru Long Life Super Coolant may be mixed with the green Subaru Long Life Coolant. However, when mixed, the replacement interval for Subaru Long Life Coolant of 30 months/30,000 miles must then be followed. It comes as a 50/50 pre-diluted mixture and should not be further diluted with water. <

> All 2008 Impreza WRX STI vehicles have been filled with new Subaru Long Life Super Coolant at the factory.

