

HOW TO CHOOSE

Many drivers know their car or truck requires coolant – per recommendations in the owner’s manual – but they’re not always sure why.

“Today’s engines are often nestled in some tight engine compartments under a sleek hood that’s low, (the radiator is) pretty obstructed, the front end (of the car) for style reasons could be closed and (there’s) not much good air flow,” says Valvoline™ Technical Director David Turcotte. “So in modern cars, they would overheat in a matter of minutes if they didn’t have an active functional cooling system.”

Much like oil, coolant starts with the basic function of heat transfer and adds antifreeze protection. Then, depending upon the type of vehicle (car or truck), it may require specialized additives that are intended specifically for the needs of the manufacturer’s vehicle you have (particularly for imports), or for the type of mileage on your ride.

Coolant serves these primary purposes:

- Coolant transfers heat and keeps the engine operating. Its action prevents engine damage from freezing and boiling by keeping the liquid from forming a solid or a gas. In order for heat to be effectively transferred, you need a liquid in the cooling system. If coolant freezes, it expands – and with that expansion comes breaking and cracking, which can lead to engine failure and damage.
- If coolant boils, the gas/vapor formed does not transfer heat well, so metal could actually melt in the engine if you don’t keep liquid in contact with it in some places that need to stay cool. “That’s related primarily to the engine head,” says Turcotte.
- Coolant also protects metals and non-metallic elastomers (rubber parts and plastic parts in the engine and the cooling circuit).

According to Turcotte, “If you were just to use water and not operate the engine at all in the winter, as soon as it cools below freezing, the water will expand about 10 percent on freezing and makes a big old ice cube. That may fracture the cylinder heads, the block, and split open the radiator seams.”

COOLANT PREVENTS
THE ENGINE FROM
FREEZING & BOILING,
AND KEEPS OIL FROM
FORMING A SOLID
OR A GAS.



So, how do you choose a coolant? To begin with, always consult your vehicle’s owner’s manual for compatibility and warranty information. There are also several factors to keep in mind.

“When it comes to buying coolant, consumers oftentimes make their decisions based upon price rather than product performance,” says Turcotte. “When you go to retail outlets and find universal coolants, they’re like tube socks for anti-freeze, one size fits all – but it doesn’t work like that,” says Turcotte.

While many people simply want the cheapest form of coolant to maintain heat transfer and prevent freezing, it’s not that simple. Rather, coolants are formulated for specific vehicles, specific manufacturers and specific types of engines.

Think about this: In most cases, a car or truck is a major investment. Coolant is not an area to skimp. Trying to save small money may ultimately wind up costing big money in the end if your coolant or cooling system fails because the wrong type of coolant was used. Also, using undiluted coolant, pure water, a product that was not made specifically for vehicles, or a product that wasn’t recommended by the Original Equipment Manufacturer (OEM) can cause trouble.

That’s why the owner’s manual is so important to have as a reference, because it recommends the best coolant in order to keep the vehicle operating efficiently.

“Often times, people don’t think about the longer-term effects of corrosion and component damage,” says Turcotte. “Those can be latent: it can take six months to a year to get enough corrosion damage, deposits and plugging to create an issue from using the wrong coolant to have a visible problem. And by the time you get that problem, people have forgotten that they used the wrong coolant and think the radiator has simply failed as a part. In reality, the radiator can be badly corroded and full of plugging internal deposits. And then they have to buy a new one (radiator).”



UNIVERSAL COOLANTS
ARE LIKE TUBE SOCKS
FOR ANTI-FREEZE,
One Size
FITS ALL

But if the right coolant is chosen, there’s far less chance of problems occurring.

“The coolant-related problems are inside the motor,” says Turcotte, “People don’t look in the motor, they don’t look at the cooling passages and the internal heat-transfer surfaces of the engine, so they have no idea of what a mess they can be making.”

Evolution of coolant has made significant gains over the past few decades. As Turcotte explained, two decades ago coolant was changed every couple of years. Then, about 10 years ago, the timeline extended to changing coolant every five years.

In many of today’s vehicles, coolant is designed to go 10 years, or up to 200,000 miles. Some vehicles are filled for life.

Valvoline develops coolants that last longer, can help reduce the cost of ownership and improve the lifespan of a vehicle, and protect crucial parts like gaskets and elastomers.

“Different engines have different materials of construction, different operating environments, variable flow rates, different peak temperatures and pressures, different elastomers, non-metallics and gaskets – and it all has to be protected,” says Turcotte.

“When choosing a coolant, be sure to pick the right one for each vehicle. The OEM does extensive testing and specifies what fluids, including coolants, should be used.”

Prior to using or installing any of these products always consult your vehicle’s owner’s manual for compatibility and warranty information.

Always take appropriate safety precautions when working on or operating your vehicle. Take the necessary steps to help prevent injuries; always use protective gear like helmets, safety goggles, and gloves.

READ THE LABELS

Okay, you're ready to change the coolant in a vehicle. To begin with, always consult your vehicle's owner's manual for compatibility and warranty information and Original Equipment Manufacturer (OEM) recommended coolant. Here are some tips to better determine the right coolant.

Selection depends greatly on the type of vehicle. In general, if it's a new car, there may really be no need to change the coolant for a long time – in some cases 10 years or 200,000 miles, according to Valvoline™ coolant experts. But you still need to keep the system topped off and check its freeze protection regularly.

In older cars there are various types of coolant that, in many instances, are made precisely for your mode of transportation as recommended by the OEM.

Surprisingly, even with technology heavily evolving since the first car was built over 100 years ago, powerful engines can still be inefficient – particularly when it comes to generating and dispersing heat.

"When you burn fuel in an engine, about one-third of the energy produced actually goes into propelling the vehicle," says Valvoline Technical Director David Turcotte. "About a third of it is dissipated through the exhaust as heat, and the other third is removed by the cooling system to keep the engine running without overheating."

APPROXIMATELY 90 PERCENT OF CONCENTRATED COOLANT'S MAKEUP IS ETHYLENE GLYCOL ALONG WITH A BALANCE OF ADDITIVES SUCH AS CORROSION INHIBITORS, PH MODIFIERS, SCALE INHIBITORS, BUFFERS, DYE, DEFOAMERS, AND BITTERING AGENTS.

ETHYLENE GLYCOL



— 90%

ADDITIVES



— 10%

According to Turcotte, "The point is the combustion process is inefficient and generates significant excess heat. So, some of it can just freely blow out the exhaust, but some of it we have to actively capture and remove with the liquid (coolant) and cooling system."

Approximately 90 percent of concentrated coolant's makeup is ethylene glycol – the industry standard for more than 70 years – along with a balance of additives such as corrosion inhibitors, pH modifiers, scale inhibitors, buffers, dye, defoamers, and bittering agents.

How to Read the Labels

One of the best additives used in coolant is silicate.

"Silicate is a wonderful corrosion inhibitor," Turcotte said. "It's great on aluminum, which most engines and cooling systems are made of today. But it helps with all the metals of the cooling system, so it's a great inhibitor. A lot of manufacturers use it in their anti-freeze."

Interestingly, where cars are manufactured sometimes plays a role in whether or not the coolant contains silicate. While European OEMs mostly use silicate-containing coolants, those in Asia – primarily in Japan – use silicate-free coolant.

Another key Valvoline additive is Alugard®, a compatibility agent that helps when mixing coolants for broader application.

That's why, in addition to Zerex™, Valvoline makes MaxLife™ Antifreeze/Coolant, a convenient high mileage coolant that contains Alugard, with an ability to work in a variety of different vehicles across the board.

There's also Dex-Cool™, which is formulated specifically for General Motors vehicles, but can also be used in Ford and Chrysler products.

Coolant comes in a variety of colors, often keyed to the level and type of protection it offers – from basic (typically green in color) to more advanced- including hues of red, orange, purple, green, yellow, or blue, all designed to keep your vehicle operating optimally and from overheating.

However, Turcotte offers a warning. If your car is still under warranty, do not replace, say, a violet-colored coolant with yellow Universal or another different colored coolant.

As coolant has evolved, so have the recommendations on what type of coolant/water mixture should be used. Previously coolant manufacturers recommended a mixture of 50 percent coolant and 50 percent water be put into vehicle radiators.

Now that mixture can vary from 40 to 70 percent coolant. At the top end is 70 percent coolant (with 30 percent water), which protects radiators and coolant systems all the way to -84 degrees Fahrenheit. However, excepting geographies with extreme cold temperature, you can go as light as 40 percent coolant (60 percent water) in temperate climates. Or, if you prefer to go back to the tried-and-true 50-50 coolant/water mix, you can be covered all the way down to -34 degrees Fahrenheit.

Choosing Between Valvoline Coolants

This leads us to Valvoline coolant products and the purposes they serve:

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Zerex™ is our primary coolant brand and is used for factory fill by many vehicle manufacturers.

* Zerex Asian Vehicle Antifreeze™, a silicate-free blend made specifically for vehicles manufactured in Asia, particularly Japanese vehicles.

* Zerex ZXEL1 Dex-Cool™ which is used primarily for GM vehicles, but may also be used in Fords and Chryslers.

* MaxLife Antifreeze/Coolant is a multi-use product that offers convenience to be used in a wide variety of vehicles, as well as specifically for older vehicles, typically those over 75,000 miles.

Much like picking which clothes to wear to match the weather, pick wisely when choosing coolant. Your car will stay cool and operate at peak efficiency.

THE VALVOLINE

Coolant Guide



ZEREX™

Our primary coolant that is either identical to what a vehicle manufacturer requires, or through chemistry has attained a level of long life application.

ZEREX ASIAN VEHICLE ANTIFREEZE™

An anti-silicate blend made specifically for vehicles manufactured in Asia, particularly Japanese vehicles

ZEREX ZXEL1 DEX-COOL™

Used primarily for GM vehicles, but can also be used in Fords and Chryslers

MAXLIFE ANTIFREEZE/COOLANT™

is a multi-use product that offers convenience to be used in a wide variety of vehicles, as well as specifically for older vehicles, typically those over 75,000 miles.