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KEEPING YOUR CURRENT CAR ALIVE: A DEFENSIVE MAINTENANCE GUIDE

*If You Cannot Replace Your Vehicle, Here
Is How to Protect What You Have*

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This guide is reference material, not professional advice. Local conditions, regulatory environments, and individual mechanical skill vary. Verify against your state and county requirements before purchasing or modifying any vehicle. Always consult a qualified mechanic for procedures beyond your skill level.

KEEPING YOUR CURRENT CAR ALIVE: A DEFENSIVE MAINTENANCE GUIDE

If You Cannot Replace Your Vehicle, Here Is How to Protect What You Have

This guide is for people whose primary vehicle was built between roughly 2001 and 2018, who cannot afford to buy a different vehicle right now, and who want their current car to last as long as possible.

It covers four things: where to find better fuel, what to add to ordinary fuel, what to keep on hand for repair, and what to limit in the data your car shares.

It is a reference document. Always consult your owner's manual and a qualified mechanic before performing any procedure.

1. Why this matters now

The fuel sold at most retail stations in the United States now contains ten to fifteen percent ethanol. Vehicles built before 2001 were not specified for ethanol blends and are damaged measurably by them. Vehicles built between 2001 and 2014 are generally rated for E10 but may experience accelerated wear on E15. Most major manufacturers do not warrant E15 use in vehicles older than 2012.

In addition, vehicles built after roughly 2012 increasingly include cellular telematics that report driving behavior, location, and vehicle status to the manufacturer, insurance providers, and in some cases law enforcement. Many of these systems can be limited or disabled depending on the vehicle.

The defensive maintenance practices below address both the fuel issue and the data issue.

2. Where to find ethanol-free gasoline

Pure-gas.org

The single best resource for locating ethanol-free gasoline is pure-gas.org. The site maintains a user-updated database of stations in the United States and Canada that sell ethanol-free fuel. Search by state or zip code.

Most ethanol-free stations sell premium grade (typically 91 or 92 octane) at a price premium of fifty cents to one dollar per gallon over standard premium. Some stations require certification of off-road, marine, or small-engine use.

Where to look in your area

Categories of stations most likely to sell ethanol-free fuel:

- **Marinas and boat fueling docks:** marine engines are damaged by ethanol; ethanol-free is common at marinas.
- **Small airports:** aviation gasoline (avgas) is ethanol-free; some small airports sell it for ground use.
- **Independent rural stations:** farms and small engine equipment users often demand ethanol-free; rural independents often stock it.
- **Specialty fuel suppliers:** racing fuel suppliers (Sunoco Race Fuels, VP Racing) sell ethanol-free product.
- **Costco** in some regions: a small number of Costco stations sell ethanol-free fuel; verify locally.

A note on California

California state law restricts ethanol-free gasoline to off-road and specialty applications. In practice, the on-road restriction is rarely enforced at the pump. Some stations require buyers to sign or attest that the fuel is for off-road use. Be aware of the legal status before relying on ethanol-free fuel as a regular supply.

Confirming what you are buying

Pump labels are not always accurate. To verify ethanol content in a sample of fuel:

- **Ethanol test kits:** sold on Amazon and at automotive parts stores for \$10 to \$20. Use a graduated cylinder, add fuel and water in measured proportions, shake, and read the separation. Indicates ethanol percentage in the fuel.
- **Carry the test kit on long trips.** Some stations mislabel.

When ethanol-free is not available

Use the highest-octane gasoline you can afford. Top-tier branded gasoline (Chevron, Shell, ExxonMobil, BP) contains higher detergent additive packages than minimum-spec generic gasoline. The detergent helps remove deposits left by ethanol fuel. Costco gas is also a top-tier formulation. The detergent benefit is real and inexpensive.

3. Fuel additives: what each does and which to use

Fuel additives cannot reverse damage that has already occurred. They can slow further damage, manage water absorbed by ethanol fuel, restore lubricity to fuel that has lost it, and clean accumulated deposits from injectors and intake components.

Categories of additive

Stabilizers prevent fuel degradation during storage. Use if a vehicle sits for more than thirty days.

Water emulsifiers chemically bind water carried by ethanol so it passes harmlessly through the engine rather than separating in the tank. Critical for vehicles in humid climates and for any vehicle that sits.

Lubricity additives restore the lubrication properties that ethanol-blended and low-sulfur fuels have lost compared to older formulations. Helps fuel pump and injector longevity.

Detergent additives remove deposits from injectors, intake valves, and combustion chambers. Use periodically (every five to ten thousand miles).

Octane boosters raise octane rating. Useful for older high-compression engines or in regions where only low-octane fuel is available. Less commonly needed.

Specific products

For routine use in any gasoline vehicle on ethanol fuel:

- **Star Tron Enzyme Fuel Treatment:** enzyme-based water emulsifier and stabilizer. Treats up to 1,920 gallons per 32 ounce bottle. Cost approximately \$20. Marine-developed, widely respected.
- **Sea Foam:** combination cleaner, lubricator, and water emulsifier. \$10 to \$15 per 16 ounce bottle. Adds to fuel tank, vacuum line, or crankcase. The most universal additive on the market.
- **Sta-Bil 360 Marine** (blue label): water emulsifier and stabilizer specifically formulated for ethanol fuels. \$10 to \$20.
- **Sta-Bil Storage** (red label): for vehicles sitting more than thirty days. \$5 to \$15.

For periodic deep cleaning (every five to ten thousand miles):

- **Chevron Techron Concentrate Plus:** detergent additive that cleans injectors, intake valves, and combustion chambers. \$10 to \$15 per bottle.
- **BG 44K:** professional-grade fuel system cleaner. Stronger than Techron. \$25 to \$40 per can.
- **Lucas Deep Clean Fuel System Cleaner:** broad cleaner. \$10 to \$15.

For lubricity (particularly diesel and older gasoline):

- **Lucas Upper Cylinder Lubricant:** gasoline upper cylinder lubrication. \$10 to \$15.
- **Stanadyne Performance Formula** (diesel only): combination cleaner, stabilizer, and lubricity additive. The reference diesel additive.
- **Power Service Diesel Kleen** (diesel only, gray bottle): cleaner and cetane booster. Common at truck stops.

Suggested routine

For a typical vehicle running E10 or E15 fuel:

- Add Star Tron or Sta-Bil 360 Marine to every fill-up. Cost: approximately \$0.10 to \$0.20 per gallon treated.
- Add Sea Foam to the fuel tank every three to four thousand miles.
- Add Chevron Techron or BG 44K to a near-empty tank every five to ten thousand miles, then run on premium gasoline for that tank.
- For diesel: add Stanadyne Performance Formula or Power Service Diesel Kleen to every fill-up.

What does not work

- **Marvel Mystery Oil** is harmless but its claims are largely unverified. Will not damage anything; will not measurably help fuel system condition.
 - **Octane boosters** marketed as performance enhancers are typically too dilute to make a meaningful difference at street use levels.
 - **Generic "fuel system cleaners"** at gas station counters are often too weak to perform their stated function. Buy from automotive parts stores or online.
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4. Maintenance practices that slow ethanol damage

Fuel system

- **Replace the fuel filter every twenty thousand miles** instead of the manufacturer's longer interval. Ethanol-related deposits clog filters faster than older fuel formulations.
- **Drain water from the tank if your vehicle has a drain plug** (most modern cars do not; older vehicles often do).
- **Keep the tank above one-quarter full.** Less air space means less water absorbed from atmosphere.
- **Replace fuel cap gaskets every five years.** Air leaks at the cap accelerate water absorption.
- **Inspect rubber fuel lines visually every oil change.** Look for swelling, cracking, weeping, or surface deterioration. Replace at the first sign of damage with SAE J30 R9 or R10 specification (ethanol-resistant) line.
- **Drive the vehicle regularly.** Stationary fuel separates faster. A vehicle driven weekly is healthier than one driven monthly.

Engine

- **Use a higher-octane fuel one tank in five.** The added detergent and slightly cleaner burn helps remove deposits.
- **Run the vehicle to full operating temperature regularly.** Short trips that never warm the engine accumulate moisture and deposits. Take a thirty-minute highway run weekly if your driving is otherwise mostly short.
- **Change oil more frequently** than the manufacturer's longest interval. Five thousand miles is a defensible standard regardless of what the dashboard says. Three thousand miles for severe service or short-trip-dominant driving.

Cooling and electrical

- **Test the battery annually.** Most parts stores will do this free.
- **Replace the battery every four to five years** rather than waiting for failure.
- **Inspect belts and hoses every oil change.** Replace at first sign of cracking, glazing, or swelling.
- **Flush coolant every five years or 60,000 miles.** Old coolant becomes acidic and corrodes the engine internally.

Tires

- **Check tire pressure monthly.** Underinflation costs fuel economy and accelerates wear.
 - **Rotate tires every five thousand miles.**
 - **Replace tires before the tread reaches 4/32 inch.** The "legal" minimum of 2/32 is unsafe in wet conditions.
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5. Telematics: what your car is sending and how to limit it

Most vehicles built after 2012 include some form of cellular telematics. The specific capabilities vary by manufacturer, model, and trim level. The general categories of data shared:

- **Location and movement:** GPS tracking, route history, speed.
- **Driving behavior:** braking events, acceleration, cornering, time of day driving patterns.
- **Vehicle status:** mileage, fuel level, diagnostic codes, maintenance status.
- **Cabin data** (some vehicles): microphone activation, voice command logs, entertainment usage.

What to check on your specific vehicle

1. **Read the privacy policy** for your manufacturer's connected services. This is typically available at the manufacturer's website. Mozilla Foundation's "Privacy Not Included" project at foundation.mozilla.org maintains evaluations of major automaker privacy practices.
2. **Check your in-vehicle settings** for connected services, navigation, and entertainment. Most vehicles allow opt-out of some data sharing through dashboard menus. The opt-out controls vary by manufacturer; the manufacturer's app is often where the meaningful controls live.
3. **Review your insurance policy** for telematics-based discounts or programs you may have enrolled in. These typically share more data than the standard manufacturer connection.
4. **Check whether your vehicle uses an aftermarket telematics device.** Insurance company plug-in devices (Progressive Snapshot dongle, State Farm Drive Safe and Save) plug into the OBD-II port. These can be physically removed.

Steps to reduce data sharing

For most vehicles:

- **Cancel any optional connected services subscription** (OnStar, FordPass Connect, Hyundai Bluelink, etc.). This typically reduces but does not eliminate the cellular connection. The cellular modem may continue operating for safety features (automatic crash notification, emergency call) even after subscription cancellation.
- **Opt out of data sharing** in the manufacturer's app and in-vehicle settings.
- **Decline the privacy agreement updates** that periodically appear on the dashboard.
- **Disable WiFi hotspot features** that you do not use.
- **Disable Bluetooth pairing of devices you do not actively use.**

Steps that require more commitment

- **Physically disconnect the cellular antenna or modem.** This eliminates cellular data sharing. The location of the cellular antenna varies by manufacturer; it is typically a small antenna on the roof, often combined with the satellite radio antenna. Disconnecting may disable some safety features (automatic crash notification, in particular). Consult model-specific forums (such as the Reddit subreddit for your specific vehicle) for procedures.
- **Remove the telematics control unit (TCU).** This is more invasive and may trigger dashboard warnings or disable some functions. Discussed in detail on platform-specific forums.
- **Use a Faraday bag for your key fob** when not driving. This prevents passive scanning of the fob and the relay attacks that have become common. Bags are \$10 to \$30 on Amazon.

What you cannot easily prevent

- **OBD-II diagnostic data** is logged locally on the vehicle and accessible to anyone with a scan tool. Mechanics, dealers, insurance investigators, and law enforcement can read this data on-site.
- **Event Data Recorder (EDR) information.** Required by federal regulation since 2014. Records crash-related information (speed, throttle, brake, seatbelt status) for several seconds before and after a crash event.
- **License plate readers and roadside cameras** are external to your vehicle and unaffected by anything you do to the car itself.

6. Parts to keep on hand

For an everyday driver vehicle in regular use, a basic spare parts kit reduces downtime and extends the practical life of the vehicle.

Tier 1: keep these in the vehicle or garage at all times

- One set of windshield wiper blades.
- One air filter.
- One cabin air filter (if your vehicle uses one).
- One serpentine belt.
- One radiator hose set (upper and lower).
- Two quarts of oil (correct grade).
- One gallon of pre-mixed coolant (correct type).
- One quart of brake fluid.
- One quart of automatic transmission fluid (if applicable).
- One spare fuel filter.
- One quart of power steering fluid (if applicable).
- Two bottles of fuel additive (Star Tron, Sea Foam, or Sta-Bil 360).
- A roll of paper towels and a small bottle of disposable shop rags.

Tier 2: keep at home

- Spark plugs (one full set).
- One fuel pump (if your vehicle has electric in-tank fuel pump, consider stocking).
- One alternator (used or refurbished is acceptable).
- One starter motor (used or refurbished is acceptable).
- Two batteries (rotate; the older one becomes the reserve).
- One thermostat.
- Brake pads (front and rear sets).
- One set of brake rotors (front).
- Headlight bulbs (two of each type your vehicle uses).
- Tail light and brake light bulbs.
- Fuses (a complete kit covering all sizes used in your vehicle).

Where to buy

- **RockAuto.com:** broadest selection, competitive pricing, online only.
 - **NAPA, AutoZone, O'Reilly, Advance Auto:** local pickup, helpful counter staff for older vehicles.
 - **Walmart and Amazon:** fluids, filters, basic parts.
 - **eBay:** OE-surplus parts, particularly useful for vehicles ten or more years old.
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7. Tools to own

A basic homeowner toolkit covers most maintenance and many repairs.

Hand tools (one-time purchase, \$200 to \$500 for the full set)

- A 1/4 inch and 3/8 inch socket set with metric and SAE sockets.
- A combination wrench set, metric and SAE.
- A Phillips, slotted, and Torx screwdriver set.
- Pliers: combination, needle nose, channel lock, locking pliers.
- A claw hammer and a rubber mallet.
- A utility knife.
- A wire stripper and crimper.
- A digital multimeter (Klein, Fluke, or similar).
- A torque wrench, 1/2 inch drive, in foot-pounds.

Lifting equipment (\$100 to \$250)

- A floor jack rated for your vehicle's weight (3-ton minimum for most vehicles).
- Four jack stands rated for your vehicle's weight.
- Wheel chocks.

Specialty tools (acquire as needed)

- An OBD-II code reader (entry-level \$40, professional \$200+). The free Carista or BlueDriver Bluetooth scanners with phone app are excellent choices.
- A compression tester for spark plug cylinders (\$30 to \$60).
- A brake bleeder kit (\$20 to \$40).
- A coolant tester (\$10).
- A battery tester (\$20).
- A tire pressure gauge (digital recommended, \$10 to \$30).

Where to buy

- **Harbor Freight Tools:** entry-level tools at low cost. Adequate for occasional home use.
 - **Lowe's, Home Depot:** Husky and Kobalt brand tools, lifetime warranty, mid-range quality.
 - **NAPA, AutoZone, O'Reilly:** automotive-specific tools, often with loaner programs for specialty items.
 - **Snap-on, Matco, Mac Tools:** professional-grade, expensive, lifetime warranty. Worth it for tools you use weekly.
 - **eBay:** used pro tools at significant discounts.
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8. Skills worth learning at home

In rough order of utility:

1. **Oil and filter change.** The single most-performed maintenance procedure. Roughly \$40 in parts. YouTube has hundreds of model-specific walkthroughs.
2. **Air filter and cabin air filter replacement.** Both typically take less than fifteen minutes. Save \$30 to \$80 per service.
3. **Battery replacement and terminal cleaning.** Save \$30 to \$50 in installation fees.
4. **Wiper blade replacement.** Save \$10 to \$20 per service.
5. **Spark plug replacement.** Save \$100 to \$300 per service depending on engine accessibility.
6. **Brake pad replacement.** Save \$200 to \$500 per service. Front pads are typically straightforward; rear pads with electric parking brakes can require additional steps.
7. **Tire rotation.** Many shops do this free with oil changes; if not, a simple home procedure with floor jack and lug wrench.
8. **Coolant flush.** Save \$100 to \$250 per service. Verify your vehicle's correct procedure; some modern vehicles have specific bleed sequences.
9. **Fuel filter replacement** (where accessible). Some modern vehicles place the fuel filter inside the tank, requiring tank drop. Older vehicles typically have the filter in an accessible underbody location.
10. **Diagnosing common warning lights.** An OBD-II scanner reads the code; YouTube and platform-specific forums tell you what the code means and what the typical fix is.

Resources

- **YouTube channels:** ChrisFix, Eric the Car Guy, South Main Auto, Rainman Ray's Repairs, ScannerDanner.
- **Forums:** find the forum specific to your vehicle's make and model. Most have dedicated DIY sections and member-written guides.
- **Books:** *Auto Repair for Dummies* (Deanna Sclar) for general fundamentals. *Haynes* and *Chilton* manuals for vehicle-specific procedures.
- **Community college automotive programs:** night classes are widely available at local colleges. Hands-on access to lifts and tools.

9. The vehicle "go bag"

A kit kept in the vehicle for breakdown response, weather emergencies, and routine annoyances.

Essential

- Jumper cables or a portable jump-starter (NOCO Boost or similar, \$80 to \$150).
- A flashlight with spare batteries.
- A reflective triangle or roadside flares.
- A reflective safety vest.
- A small fire extinguisher (rated for automotive use).
- A first aid kit.
- A multi-tool or basic toolkit.
- A small bottle of motor oil.
- A small bottle of coolant or jug of water.
- A tire pressure gauge.
- A small can of tire sealant or a tire plug kit.
- A roll of duct tape.
- A roll of paper towels.
- A pair of work gloves.
- A blanket (wool or fleece).
- An emergency rain poncho.
- A bottle of water and a few non-perishable snacks.
- A printed map of your region (cell coverage fails).
- A printed list of emergency contacts.

Climate-specific additions

For cold climates: - A small folding shovel. - An ice scraper and snow brush. - Cat litter or sand for traction. - Hand warmers. - A heavier blanket or sleeping bag. - Extra winter gloves and a hat.

For hot climates: - Extra water (one gallon minimum). - A reflective sunshade for the windshield. - Electrolyte packets or sports drinks.

For longer trips or rural driving

- A fuel can (empty; fill only when needed).
 - A length of tow strap.
 - Spare fuses for your specific vehicle.
 - A spare serpentine belt.
 - A small selection of bolts, screws, and zip ties.
 - Bailing wire.
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10. Insurance considerations

If your car has telematics, your insurance provider may already have access to driving data through manufacturer partnerships, regardless of whether you have signed up for a usage-based discount program.

To limit insurance-related data sharing:

- **Read your insurance policy's privacy section.** Some insurers explicitly state they purchase or receive vehicle telematics data from automakers. Others do not.
 - **Decline usage-based discount programs unless you understand what they monitor.** Programs such as Progressive Snapshot, State Farm Drive Safe and Save, Allstate Drivewise, Root, and Metromile use either a plug-in device or a smartphone app to track driving behavior. The discounts are real (typically five to thirty percent) but the data collection is comprehensive.
 - **If you've already enrolled, you can usually unenroll.** Call your insurer and explicitly opt out. Verify in writing.
 - **Compare quotes annually.** Insurance pricing has become aggressive and the discount structure changes. Loyalty does not pay; shopping does.
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11. Resources

Online tools

- **pure-gas.org**: ethanol-free gas station map.
- **gasbuddy.com**: real-time gas pricing.
- **fuelconomy.gov**: federal fuel economy data, including ethanol-related range estimates.
- **nhtsa.gov/recalls**: check whether your vehicle has open recalls.
- **mozilla.org/internet-health/privacy-not-included**: vehicle privacy ratings.

Apps

- **GasBuddy**: find the cheapest gas in your area.
- **Carista or BlueDriver**: OBD-II scanning with smartphone interface.
- **Fuelio or Drivvo**: track fuel economy, costs, and maintenance.

Local

- **NAPA, AutoZone, O'Reilly, Advance Auto**: counter staff and free diagnostic services (battery testing, code reading, and so on).
- **Local independent mechanics**: ask in your community for a recommended general-purpose mechanic. A good independent shop is the most valuable resource you can have.
- **Community college automotive programs**: night classes for skill development.

This guide is maintained by the Dissidents Network. Corrections and additions can be submitted through the network.