

YOUR FREE READER'S COMPANION

The Small Engine Field Pack

A companion to The DIY Small Engine Repair Bible · by Wes Tucker

Thanks for picking up the book. This is the companion you tape to the garage wall: the 30-second triage for an engine that won't start, the fuel rules that prevent most repairs in the first place, how to read a spark plug like a gauge, the 2-stroke mix you can't get wrong, and the off-season storage routine that means it fires on the first pull next spring. Print it, fold it, keep it by the bench.

The engine is almost never the problem. It was the fuel — stale, gummed, or the wrong mix. Learn to suspect the fuel first and you've solved most of what's ever going to roll into your garage. — Wes

The 30-Second Won't-Start Triage

An engine needs four things, in this order. Don't guess, don't throw parts at it — check them one at a time and stop at the first one that's missing.

Check	How to test in seconds	If it fails
1. Fuel	Is there fresh gas? Open the cap, look and smell — sour/varnish smell = stale	Drain old gas, refill with fresh; suspect the carburetor
2. Spark	Pull the plug, ground it against the head, pull the rope — look for a blue spark	Check the plug, the gap, the kill switch, then the coil
3. Air	Pull the air filter — can you see daylight through it?	Clean or replace; a choked filter floods or starves it
4. Compression	Pull the rope slowly — you should feel a firm "push back"	Soft/no resistance = valve, ring, or gasket — bench job

Change one thing at a time and try to start it before changing the next. The fastest way to chase your tail is to clean the carb, swap the plug, and adjust the choke all at once — now you don't know which one fixed it, or made it worse.

Fuel — The #1 Killer (and how to never deal with it)

Ethanol gas pulls water out of the air and turns to varnish in weeks. This single fact explains most "dead" engines.

- The 30-Day Rule: gas older than 30 days in a small engine is suspect. Older than 90, just drain it.
- Stabilizer in every fill-up if the machine sits between uses. Cheap insurance.
- Run it dry or drain the carb bowl before any storage over a few weeks — fuel left in the bowl is what gums the jets.
- Buy small, buy fresh. A 2-gallon can you finish in a month beats a 5-gallon can that goes stale.
- Ethanol-free gas (often sold for marine/power equipment) is worth the extra cost for a machine you store.

Carburetor — Clean It or Replace It?

Situation	Do this
Sat with stale gas, but ran fine before	Clean: pull the bowl, spray the jets, blow out with compressed air
Tiny varnish, surging at idle	Clean + a fresh bowl gasket
Pitted, corroded, or you've cleaned it twice	Replace — a generic carb is often \$12-\$20 and faster than fighting it
Diaphragm-style (most 2-stroke saws/trimmers)	Rebuild kit (diaphragm + gaskets) — the diaphragm hardens with age

The honest math: an hour of your time fighting a \$15 part you can swap in twenty minutes is a bad trade. Clean once. If it doesn't take, replace it.

Read the Spark Plug Like a Gauge

Pull the plug after it's run — its color tells you what the engine is doing.

Plug looks like	It means	Do
Light tan / gray	Running right	Gap it, reinstall
Black and sooty (dry)	Running rich / choke stuck / dirty air filter	Check choke + air filter
Black and oily (wet)	Oil getting in — worn rings, or 2-stroke over-oiled	Check mix ratio / compression
White / blistered	Running too lean / overheating	Check for air leaks, lean carb
Wet with gas	Flooded — no spark, or too much choke	Dry it, check spark, ease the choke

Standard gap is usually .030" — check your manual. Re-gap a plug that looks good before buying a new one.

The 2-Stroke Mix You Can't Get Wrong

Straight gas in a 2-stroke seizes the engine — fast and permanent. The oil is the lubrication.

Ratio	Gas : Oil	Oil per gallon
50:1 (most modern saws/trimmers)	50 parts gas	2.6 oz
40:1 (some equipment)	40 parts gas	3.2 oz
32:1 (older / heavy duty)	32 parts gas	4.0 oz

Check the cap or the manual for your machine's ratio. Mix only what you'll use in a few weeks, label the can, and never pour straight gas in a 2-stroke "just this once."

Off-Season Storage — The Routine That Prevents Repairs

Ten minutes in the fall is the difference between a first-pull start in spring and a trip to the shop.

1. Stabilize and run, or drain. Add stabilizer and run 5 minutes to pull it through the carb, OR shut off the fuel and run it until it dies.
2. Drain the carb bowl if it has a drain screw — that's where varnish forms.
3. Change the oil (4-stroke) — old oil is acidic and sits on your bearings all winter.
4. Pull the plug, add a teaspoon of oil in the cylinder, pull the rope a few times to coat it, reinstall.
5. Clean the air filter and clear grass/debris off the cooling fins.
6. Sharpen/clean blades, check belts, grease where the manual says.
7. Store dry, off the concrete, battery on a tender if it has one.

Symptom to Cause — Quick Reference

Symptom	First suspect
Won't start, has spark	Fuel: stale gas or gummed carb
Starts, runs 10 sec, dies	Carb not getting steady fuel — clogged jet or cap vent
Surging / hunting at idle	Lean carb — clean jets, check for air leak
Runs only with choke on	Carb starved — partial clog, needs cleaning
White/blue smoke (4-stroke)	Oil burning — overfill or worn rings
White/blue smoke (2-stroke)	Too much oil in the mix — recheck ratio
Pulls hard, no compression	Valve / ring / gasket — bench job
Click, no crank (electric start)	Battery or starter solenoid, not the engine

That's the pack. The one habit worth more than every tool on the bench: when something won't run right, suspect the fuel first. Stabilize what you store, mix your 2-stroke right, and read the plug before you spend a dime. When you've brought your first "dead" machine back to life on your own bench, I'd love to hear about it — and in a couple of emails I'll tell you how a quick word from you helps this book reach the next person standing over a mower that won't start.

Suspect the fuel first,

Wes Tucker