

WD-40 Formula

The recipe for this superlube has long been a closely guarded trade secret—until now. Wired sent a can to the lab and got the ingredients.

Mineral Oil Seriously. WD-40 is mostly a mix of baby oil, Vaseline, and the goop inside homemade lava lamps.

Decane WD-40 contains an abundance of alkanes—hydrocarbons that match the formula C_xH_{2x+2} , usually in a long, zigzagging chain. This one, $C_{10}H_{22}$, which is also a common ingredient of gasoline, helps WD-40 remain a liquid at cold temperatures. Decane doesn't freeze until around -21 degrees Fahrenheit.

Nonane Another alkane. One reason these molecules are so handy here: Their hydrogen atoms don't hold a charge, so they can't connect to the hydrogen or oxygen in water, which makes alkanes water-repellent. WD-40, after all, stands for "water displacement, 40th attempt."

Tridecane and **Undecane** Freeze-resistant? Check. Water-repellent? Check. Contains an alkane that is the major product of the red-banded stinkbug's scent gland? Check! Many alkanes are naturally produced by living creatures. Undecane, part of the pheromone trail left by cockroaches and ants, is present.

Tetradecane Another alkane! Zzzzzz. **Dimethyl Naphthalene** Here's the thing: This stuff ($C_{12}H_{12}$) comes in 10 forms, called isomers. One of them is a harmless hormone given off by potatoes. Another is used in high-performance engineering plastics. Our analysis can't determine which ones are present here, but if you're using it as a solvent, as is likely the case with WD-40, they all work just fine.

Cyclohexane That cyclo prefix means that unlike standard alkanes, which come in chains, this one's a ring. The shape gives cycloalkanes a higher melting point. And huffing them will knock you out cold. (Or so we're told.)

Carbon Dioxide The WD-40 company claims that by using this gas as a propellant, it avoids using smaller gaseous alkanes (possibly butane and propane), which can be hazardous to the environment. As if CO_2 isn't

WD-40's formula is a [trade secret](#). The product is not patented to avoid completely disclosing its ingredients.

WD-40's main ingredients, according to U.S. [Material Safety Data Sheet](#) information, are:

51% [Stoddard solvent](#) also known as White Spirit #1 or Mineral Spirit #1

25% [liquefied petroleum gas](#) (presumably as a propellant; carbon dioxide is now used instead to reduce WD-40's considerable flammability)

15+% [mineral oil](#) (light lubricating oil)

10-% inert ingredients

It further lists flammability and effects to the human skin when repeatedly exposed to WD-40 as risks when using WD-40.

[Nitrile rubber gloves](#) and safety glasses should be used. Water is unsuitable for extinguishing burning WD-40.

