



Portable Generator Hazards

A Factsheet on Portable Generator Safety

Portable generators are useful when temporary or remote electric power is needed, but they can be hazardous. The primary hazards to avoid when using them are carbon monoxide poisoning, electric shock or electrocution, and fire.

The U. S. Fire Administration (USFA) would like you to know that there are simple steps you can take to prevent the loss of life and property resulting from improper use of portable generators.

TO AVOID CARBON MONOXIDE HAZARDS:

- Always use generators outdoors, away from doors, windows and vents.
- NEVER use generators in homes, garages, basements, crawl spaces, or other enclosed or partially enclosed areas, even with ventilation.
- Follow manufacturer's instructions.
- Install battery-operated or plug-in (with battery backup) carbon monoxide (CO) alarms in your home, following manufacturer's instructions.
- Test CO alarms often and replace batteries when needed.

TO AVOID ELECTRICAL HAZARDS:

- Keep the generator dry. Operate on a dry surface under an open, canopy-like structure.
- Dry your hands before touching the generator.
- Plug appliances directly into generator or use a heavy-duty outdoor-rated extension cord. Make sure entire extension cord is free of cuts or tears and the plug has all 3 prongs, especially a grounding pin.
- NEVER plug the generator into a wall outlet. This practice, known as backfeeding, can cause an electrocution risk to utility workers and others served by the same utility transformer.
- If necessary to connect generator to house wiring to power appliances, have a qualified electrician install appropriate equipment. Or, your utility company may be able to install an appropriate transfer switch.

TO AVOID FIRE HAZARDS:

- Before refueling the generator, turn it off and let it cool. Fuel spilled on hot engine parts could ignite.
- Always store fuel outside of living areas in properly labeled, non-glass containers.
- Store fuel away from any fuel-burning appliance.



For more information contact:

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Generator Safety and Use

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A generator can help restore life to normal during emergencies, but its safe use requires care and planning. For example:

- Always thoroughly read the manufacturer's instructions. This can help avoid dangerous shortcuts and assist you in ensuring safe operation of your generator.
- Keep generators away from all open windows – including neighbors' windows – so deadly exhaust does not enter the home or business.
- Be a good neighbor. If the power is out, your neighbors are probably sleeping with their windows open. Consider that the sound of your generator may not be music to everyone's ears!

Tip: You can't trust your senses for protection from carbon monoxide; this deadly gas is invisible and odorless. When buying a generator, also buy a battery-operated carbon-monoxide alarm. It works like a smoke alarm, sounding an alert if carbon-monoxide levels become dangerous.

Here are some additional guidelines and more specific tips for those using portable generators and for those using stationary generators.

Portable generators

Gasoline-powered generators produce deadly carbon-monoxide fumes.

- Always run portable generators outside the house.
- Never run generators inside, or in a garage.
- Keep generators well away from open windows – including neighbors' windows – so deadly exhaust does not enter the home.

Never connect a generator directly to your home's wiring. Power from a generator connected to a home's wiring will "back feed" into utility lines, potentially injuring severely or killing a neighbor or utility crew working to restore service. Either:

- Plug appliances directly into the generator's outlet.
- Use a heavy-duty extension cord rated for outdoor use to keep the generator safely outdoors. If the appliance has a three-prong plug, always use a three-prong extension cord.
- Follow the manufacturer's recommendations for grounding the generator.

Or:

- Hire a licensed electrician to connect the generator to your house wiring using a "listed" transfer switch, which means it meets nationally recognized safety standards as indicated by the UL Listing Mark on the product. Having an electrician install the listed transfer switch will safely prevent your generator from back feeding utility lines, thus avoiding a safety hazard to you, your family, neighbors and utility workers, and preventing possible damage to your generator when utility power is restored.

What will a small generator run?

- A small generator of about 3,000 watts can run a few lights, fans and a refrigerator. If used to start and run only one item at a time, it can run a half-horsepower pump, or a small window air conditioner of about 5,000 BTUs.
- Each generator has a rated wattage, which provides a limit on the appliances it will safely power.
- Follow the manufacturer's recommendations for proper use and capacity. Overloading the generator can result in damage to appliances it is powering.

Tip: You don't need to run everything at the same time; rotating larger items allows the use of a smaller generator, which costs less to buy and is easier to move.

Getting ready for storm season

In early spring, remove your generator from storage, drain the gasoline from the tank and dispose of it properly. Inspect the fuel line for cracks and replace if necessary. Refill the tank with fresh gasoline and run the generator. Add some appliances, e.g., a trouble light, hair dryer, etc., to make sure the generator is operating properly.

After the generator has warmed up (about 15 minutes of running), turn off the fuel valve and run the fuel line dry. After the engine stalls, turn off the run switch, change the oil, add fuel stabilizer to the gasoline, drain the carburetor float bowl (and sediment bowl, if installed) and put the generator back in storage. While you are testing the generator, inspect your extension cords to make sure they're in good condition. Replace any cord that has damage.

If you had any trouble with the generator during this test, take it to a repair shop so that it can be put in good running order before the hurricane rush.

Getting started

- Never refuel a hot generator or one that is running; hot engine parts or exhaust can ignite gasoline.
- Turn off all connected appliances before starting your generator.
- Turn connected appliances on one at a time, never exceeding the generator's rated wattage.

Get the most from your generator

- Save gas by using appliances only as needed. If no appliances are running, shut the generator off.
- If you're just running a few lights, using other sources may cost less than running the generator.
- Don't leave a running generator unattended; turn it off at night and when away from home.

Tip: Refrigerators may only need to run a few hours a day to preserve food. Using a refrigerator thermometer, aim to maintain 40 degrees in the refrigerator compartment and 0 degrees in the freezer.

After storm season

When storm season is over, properly store your generator so it will be ready to go next season when you need it.

To store a generator until next season:

- Fill the tank with fresh gasoline.
- Add the proper amount of fuel stabilizer.
- Drain the carburetor float bowl.
- Drain the sediment cup (if one is installed).
- Change the engine oil if needed.

Stationary generators

Stationary generators rely on an automatic transfer switch that senses when power has been interrupted and automatically starts the generator. Conversely, when power has been restored, the generator powers off.

Exercising – Stationary (permanently installed) generators should be exercised at least twice each month for 15 to 20 minutes at a time. It's best to exercise the generator with at least 40 to 60 percent of its maximum load. If the testing is less rigorous than this, then it should be operated annually on a load bank for an extended period (see below).

Load bank testing – This is usually done at the same time as the oil change, if the generator is not tested at least twice per month with the manufacturer's recommended minimum load. It is recommended to load test the generator once per year. The following are the recommended test lengths.

Generator output	Length of 100% load bank test
100 kW and less	1 hour
100 to 200 kW	2 hours
200 kW and larger	4 hours

Fuel

Diesel fuel will deteriorate with age. Under normal conditions, diesel fuel will last approximately two years. For this reason, the storage tank should be sized so that normal maintenance and testing will use up the fuel within that period. If fuel is stored for longer periods, or in high-moisture areas, a fuel

additive can be used to extend fuel life. The additive is a microbicide that will slow the growth of fuel microbes that can plug fuel filters and damage engines.

LPG (liquefied petroleum gas) – This type of gas requires on-site storage. It can be stored indefinitely. The frequency stability of spark-ignited engines is not as good as diesel. This may be a consideration when using the generator to serve loads that are frequency sensitive such as uninterruptible power supplies.

Natural Gas – Natural gas does not require on-site storage. It does have the same frequency stability problems that LPG has.

Service – Stationary generators should be looked at and, if necessary, serviced twice each year. One visit should include a thorough inspection, including system diagnostics. The other visit should include a thorough inspection, including system diagnostics, an oil change and the replacement of both the oil and fuel filters.

Stationary generators work in tandem with your electric supply in a virtually seamless operation. As convenient as these generators are, a prudent course of action is to always be prepared in the event of an emergency, particularly an extended power outage.

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