TRIP CHECKLIST FOR CARBON MONOXIDE

☐ Make sure you know where exhaust outlets are located on your vessel.
☐ Educate all passengers about the symptoms of CO poisoning and where CO may accumulate.
☐ When docked, or rafted with another boat or boats, be aware of exhaust emissions from the other boat(s).
☐ Confirm that water flows from the exhaust outlet when the engines and generator are started.
☐ Listen for any change in exhaust sound, which could indicate an exhaust component failure.
☐ Test the operation of each CO detector by pressing the test button.

BOATER’S MONTHLY MAINTENANCE CHECKLIST

☐ Make sure all exhaust clamps are in place and secure.
☐ Look for exhaust leaking from exhaust system components. Signs include rust and/or black streaking, water leaks, or corroded or cracked fittings.
☐ Inspect rubber exhaust hoses for burned, cracked, or deteriorated sections. All rubber hoses should be pliable and free of kinks.

ANNUAL CHECKLIST

HAVE A QUALIFIED MARINE TECHNICIAN:

☐ Replace exhaust hoses if cracking, charring, or deterioration is found.
☐ Ensure that your engines and generators are properly tuned, and well maintained.
☐ Inspect each water pump impeller and the water pump housing. Replace if worn. Make sure cooling systems are in working condition.
☐ Inspect all metallic exhaust components, including the cylinder head gasket, exhaust manifold, water injection elbow, and the threaded adapter nipple between the manifold and the elbow, for cracking, rusting, leaking, or loosening.
☐ Clean, inspect, and confirm proper operation of the generator cooling water anti-siphon valve (if so equipped).

For more information about how you can prevent carbon monoxide poisoning on recreational boats and other boating safety information, contact:

United States Coast Guard
Boating Safety Division (CG-BSX-2)
2703 Martin Luther King Jr Ave, SE
Washington, DC 20593-7501
www.uscgboating.org

National Marine Manufacturers Association
231 S. LaSalle Street, Suite 2050
Chicago, IL 60604
www.nmma.org
312-946-6200

American Boat & Yacht Council, Inc.
613 Third Street, Suite 10
Annapolis, MD 21403
www.abycinc.org
410-990-4460

For information on how to get a free VESSEL SAFETY CHECK, visit www.vesselsafetycheck.org or contact your local U.S. Coast Guard Auxiliary or United States Power Squadrons®.

Produced by the U.S. Coast Guard Boating Safety Div
Updated 2015
Where can CO accumulate?

**ANYWHERE** in or around your boat.

### How can CO accumulate?

- Inadequately ventilated canvas enclosures.
- Exhaust gas trapped in enclosed places.
- Blocked exhaust outlets.
- Another vessel’s exhaust.
- CO from the boat positioned next to you can be just as deadly.
- “Station wagon effect” or back drafting.
- At slow speeds, while idling, or stopped.
- Be aware that CO can remain in or around your boat at dangerous levels even if your engine or the other boat’s engine is no longer running!

### The U.S. Coast Guard wants you to know...

- CO can harm and even kill you inside or outside your boat.
- CO symptoms are similar to seasickness or alcohol intoxication.
- CO can affect you whether you’re underway, moored, or anchored.
- You cannot see, smell, or taste CO, but if you smell exhaust fumes, CO is present.
- CO can make you sick in seconds. In high enough concentrations, even a few breaths can be fatal.

...CO poisonings are preventable!!

### How can you protect others and yourself?

- Know where and how CO may accumulate in and around your boat.
- If you can smell engine exhaust, you are inhaling CO.
- Follow all warnings and instructions for canvas, engine operations, etc.
- Maintain fresh air circulation throughout the boat at all times.
- Know where your engine and generator exhaust outlets are located and keep everyone away from these areas.
- Stay off the back deck and the swim platforms while the engines are running.
- Never enter areas under swim platforms where exhaust outlets are located unless the area has been properly ventilated.
- Although CO can be present without the smell of exhaust fumes, if exhaust fumes are detected on the boat, take immediate action to ventilate these fumes.
- Treat symptoms of seasickness as possible CO poisoning. Get the person into fresh air immediately. Seek medical attention—unless you’re sure it’s not CO.
- Install and maintain marine grade approved CO detectors.
  - Every alarm requires immediate action.
  - Replace detectors as recommended by the manufacturer.
- If CO is suspected, open all hatches, windows and ports to ventilate.
  - Changing course and speed to place boat heading into the wind can improve ventilation.
- Maintain your engine in accordance with manufacturers’ recommendations. Engines that are not tuned properly produce more CO.
- Follow the checklists provided in this pamphlet.
- Get a Vessel Safety Check.

**What is Carbon Monoxide?**

Carbon monoxide (CO) is a colorless, odorless, and tasteless gas. It is produced when a carbon-based fuel—such as gasoline, propane, charcoal, or oil—burns. Sources on your boat may include engines, gas generators, cooking ranges, space and water heaters.

**Why is it so dangerous?**

Carbon monoxide (CO) enters your bloodstream through the lungs, blocking the oxygen your body needs. Prolonged exposure to low concentrations or very quick exposure to high concentrations can kill you.

Early symptoms of CO poisoning include irritated eyes, headache, nausea, weakness, and dizziness. These symptoms are often confused with seasickness or intoxication, so those affected may not receive the medical attention they need.
IF YOU COULD SEE CARBON MONOXIDE, IT MIGHT LOOK LIKE THIS

BUT YOU CAN’T SEE, SMELL, OR TASTE IT.
Whether inside or outside your boat, CO accumulation may harm you.

LEARN MORE ABOUT IT!
Call 1.800.368.5647 or visit www.uscgboating.org for more information on how to prevent Carbon Monoxide poisoning.

Brought to you by the U.S. Coast Guard.
WARNING

Carbon monoxide (CO) can cause brain damage or death.
Engine and generator exhaust contains odorless and colorless carbon monoxide gas.
Signs of carbon monoxide poisoning include nausea, headache, dizziness, drowsiness, and lack of consciousness.
Get fresh air if anyone shows signs of carbon monoxide poisoning.
See Owner’s Manual for information regarding carbon monoxide poisoning.
Carbon monoxide (CO) can cause brain damage or death.

Carbon monoxide can be present in the cabin.

Signs of carbon monoxide poisoning include nausea, headache, dizziness, drowsiness, and lack of consciousness.

Get fresh air if anyone shows signs of carbon monoxide poisoning.

Get fresh air if carbon monoxide detector alarm sounds.

Carbon monoxide detector must be functioning at all times.
Carbon monoxide (CO) can cause brain damage or death.

Engine and generator exhaust contains odorless and colorless carbon monoxide gas.

Carbon monoxide will be around the back of the boat when engines or generators are running.

Move to fresh air, if you feel nausea, headache, dizziness, or drowsiness.
CARBON MONOXIDE

Exposure to carbon monoxide (CO) in large amounts or even small amounts for a long duration often results in death. CO is an odorless, colorless and tasteless gas in the exhaust produced in gasoline engines. Boats release CO through the exhaust ports of vessels that are either idling or underway or running generators. When inhaled, CO rapidly replaces oxygen in tissues. People are surprised they can get CO poisoning when their activity is outdoors but it is a silent killer.

What are the symptoms of CO poisoning?
Symptoms of CO poisoning may include nausea, dizziness, confusion, headache and fainting; however, people often mistakenly attribute these symptoms to too much alcohol, sun, and noise, or to motion sickness from the water or exhaustion.

How are people exposed to CO in a marine environment?
Traditionally, CO poisonings have occurred on houseboats, vessels with overhead canopies or other vessels that have poor ventilation. CO also accumulates onboard a vessel through a process known as the 'station wagon effect.' This occurs as air moves around a boat and forms a low pressure area immediately behind the broad, flat transom. CO from the exhaust system enters the low-pressure area and is fed back into the cockpit and into the cabin.

Many cases of CO inhalation have involved a recreational activity known as ‘teak surfing.’ ‘Teak surfing’ involves holding onto the swim platform or transom of an underway vessel to bodysurf on the wake of the vessel. This is illegal now in many jurisdictions.

How common is CO poisoning in a marine environment?
Nationwide, between 1990 and 2015, there were 832 reported boating-related CO poisonings, including 174 deaths (U.S. Coast Guard Recreational Boating Statistics). CO poisoning is only recently receiving attention – it is likely that many other deaths have been attributed to drowning or heart attack in years past that may have been caused by CO poisoning.

How can I protect from CO poisoning?
- Use a marine carbon monoxide detector
- Ensure proper ventilation
- Inspect exhaust system regularly
- Avoid the transom/no ‘teak surfing’
- Educate children
- Avoid other idling vessels, especially in coves or rafting (several boats tied together)

More Information

NIOSH Engineering Reports on Carbon Monoxide

The Center for Disease Control
Updated: February 2017