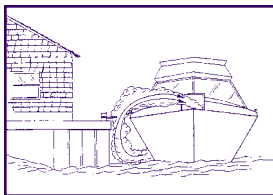
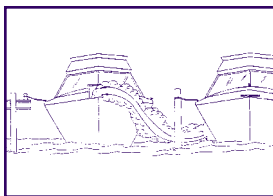


WARNING!

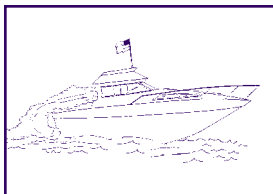
These Conditions May Cause Carbon Monoxide to Accumulate:



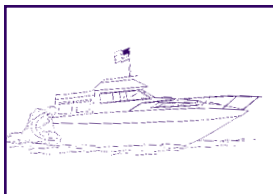
Blockage of exhaust outlets can cause carbon monoxide to accumulate in the cabin and cockpit area — even when the hatches, windows, portholes and doors are closed.



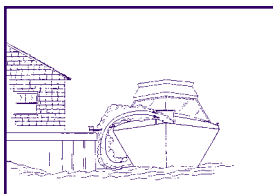
Exhaust from another vessel that is docked or anchored alongside your boat can emit poisonous carbon monoxide gas into the cabin and cockpit of your boat.



The station wagon effect, or backdrafting, can cause carbon monoxide to accumulate inside the cabin, cockpit and bridge when operating the boat at a high bow angle or with improper or heavy loading.



The station wagon effect, or backdrafting, can also cause carbon monoxide to accumulate inside the cabin, cockpit and bridge when the boat is underway using protective weather coverings.



Slow speeds or having boat stopped (idling) in the water can cause carbon monoxide gas to accumulate in the cabin, cockpit and bridge. A tail wind (force of wind entering from aft section of yacht) can also increase accumulation.

Illustrations courtesy of ABYC

INFORMATION

To find out more about making boating safer — including how you can prevent carbon monoxide poisoning on recreational boats — contact:

National Marine Manufacturers Association

200 E. Randolph Dr.
Suite 5100
Chicago, IL 60601-6528
www.nmma.org
312.946.6200

United States Coast Guard Office of Boating Safety

CG Headquarters G-OPB-3
2100 Second Street SW
Washington, DC 20593
www.uscgboating.org
202.267.0984

American Boat & Yacht Council, Inc.

3069 Solomon's Island Road
Edgewater, MD 21037-1416
www.abycinc.org
410.956.1050

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Carbon Monoxide Poisoning

Know More About It!



BOATING SAFETY
AWARENESS SERIES

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Marine Manufacturers Association

WARNING

THE FACTS

Each year, boaters are injured or killed by carbon monoxide. Most poisonings occur on older boats and within the cabin or other enclosed areas. Virtually all of them are preventable.

Carbon monoxide is a potentially deadly gas produced any time a carbon-based fuel, such as gasoline, propane, charcoal or oil, burns. Sources on your boat include gasoline engines and generators, cooking ranges, space heaters and water heaters. Cold or poorly tuned engines produce more carbon monoxide than warm, properly tuned engines.

Carbon monoxide is colorless, odorless and tasteless and mixes evenly with the air. It enters your blood stream through the lungs and displaces the oxygen your body needs. Early symptoms of carbon monoxide poisoning — irritated eyes, headache, nausea, weakness and dizziness — are often confused with sea sickness. Prolonged exposure can lead to death.

Carbon monoxide can collect within a boat in a variety of ways. Exhaust leaks, the leading cause of death by carbon monoxide, can allow carbon monoxide to migrate throughout the boat and into enclosed areas. Even properly vented exhaust can re-enter a boat if it's moored too close to a dock or another boat, or if the exhaust is pushed back by prevailing winds. Exhaust can also re-enter boats when cruising under certain conditions — the *station wagon effect* — especially with canvas enclosures in place.

Carbon monoxide awareness and regular & proper boat maintenance and operation are your best defenses against injury from carbon monoxide.

WHAT TO DO

- 1** Schedule regular engine and exhaust system maintenance inspections by experienced and trained technicians.
- 2** Be aware that dangerous concentrations of carbon monoxide can accumulate when a boat, generator or other fueled device is operated while the boat is at a dock or seawall or alongside another boat. Do not run the boat or equipment for an extended time under these conditions or without continuous monitoring. Even if your boat is diesel powered, CO can accumulate from proximity to other boats.
- 3** Keep forward-facing hatches open, even in inclement weather, to allow fresh air circulation in accommodation spaces. When possible, run the boat so that the prevailing winds will help dissipate the exhaust.
- 4** Do not confuse carbon monoxide poisoning with seasickness or intoxication. If someone on board complains of irritated eyes, headache, nausea, weakness or dizziness, immediately move the person to fresh air, investigate the cause and take corrective action. Seek medical attention, if necessary.
- 5** Do not let people swim in the areas near engine or generator exhaust.
- 6** Install a carbon monoxide detector in each accommodation space on your boat. Check the detectors periodically for proper functioning.

CHECKLIST

EACH TRIP:

- Make sure all exhaust clamps are in place and secure.
- Look for exhaust leaking from the exhaust system components, indicated by rust and/or black streaking, water leaks, or corroded or cracked fittings.
- Inspect rubber exhaust hoses for burned or cracked sections. All rubber hoses should be pliable and free of kinks.
- Confirm that water flows from the exhaust outlet when the engines and generator are started.
- Listen for any change in exhaust sound that could indicate an exhaust component failure.
- Test the operation of each carbon monoxide detector by pressing the test button.

Do not operate the vessel if any of these problems exist!

AT LEAST ANNUALLY:

(performed by a qualified marine technician)

- Replace exhaust hoses if any evidence of cracking, charring or deterioration is found.
- Replace each water pump impeller and inspect the condition of the water pump housing. Replace if worn. (Refer to the engine and generator manuals for further information.)
- Inspect each of the metallic exhaust components for cracking, rusting, leaking or looseness. Pay particular attention to the cylinder head, exhaust manifold, water injection elbow, and the threaded adapter nipple between the manifold and the elbow.
- Clean, inspect and confirm the proper operation of the generator cooling water anti-siphon valve (if equipped).