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WINTERIZING IN GENERAL

Winterizing a marine engine is the single most important maintenance duty a boater, in colder climates, can perform. If it's done right, very little work needs to be done in preparing a boat for sea the following Spring. More to the point, winterizing greatly extends the life of the power train by protecting all of its varied components from the ravages of corrosion, freezing and dormancy.

Without coating the cylinders with a protective coating, severe rust occurs. Without flushing the cooling system, salt crystals corrode cooling passages all winter long. If you neglect to drain the gear oil case, trapped water can freeze, expand and destroy the expensive housing. If you don't drain and refill the gearcase oil, acids trapped in the oil can eat away the gears and bearings.

To help you prepare for winter storage, here's a guide for the winterizing of sterndrives and inboards, and outboards. Your biggest investment will be your time. Depending on how comfortable you are with tools, and on whether you have a twin- or single-engine installation, figure on spending anywhere from three to six hours to get the job done right.

Use the following procedure to properly prepare for extended periods of non-use. Refer to your engine's owner's manual for complete and detailed procedures.

NOTE - When running a motor on a flushing attachment, always remove the engine's propeller before starting engine to prevent accidental contact with the moving propeller. This will also allow clean the propeller shaft and lubricate it. While the propeller is off, check the prop shaft seal for damage and any fishing line as it can damage the seal (outboards and I/O).

Fuel System

Gasoline's life span is finite. Left untreated for several months over the winter, it deteriorates into gum and varnish that can completely clog carburetor passages or fuel injectors. When that happens, an engine is difficult to start, if it will start at all. If the condition is serious, a complete rebuild of the carburetor or cleaning of fuel injectors becomes necessary. To avoid that kind of grief, do the following. First, the fuel must be treated with an additive called a stabilizer. The amount of stabilizer required depends on two variables: the length of time the fuel is to be protected and the number of gallons of gasoline in the tank. With that being said, add fuel stabilizer to the remaining gas, prior to motor preparation. Add 1 ounce of stabilizer for every 3 to 5 gallons (see stabilizer manufacturers recommendations) of gas that the tank will hold. This is because in a later step you will fill the tank up. You may wish to premix the stabilizer with a small amount of gas (a quart) to promote mixing. Clean or change all fuel filters / water separating filters. Next, fill up your gas tanks to prevent condensation from forming. Run engine for approximately 10 minutes to ensure that the additives reach the gasoline in your fuel lines and the carburetors. This can be done in combination with other steps.

Gearcase

With a sterndrive or outboard, the gearcase should be drained and refilled after the first 20 hours of operation. Check the level and condition of the lubricant after the next 30 hours of operation. Add lubricant if necessary. There after, check level and condition of lubricant every 50 hours. Replace lubricant every 100 hours of operation or once each off season, whichever occurs first. Otherwise corrosion will attack the gear set and bearings. Even worse than rusty gears and bearing races, is water trapped inside the lower unit, which can freeze and damage the casting. Drain and refill the gearcase lubricant. Most gearcases are similar, but check your manual for exact specifications. Remove the drain/fill plug and upper vent plug from the side of the gearcase and completely drain gearcase of old lube. Examine drained lube for water, metal filings, milky appearance, or black color with burnt odor. If old lube has any of those characteristics, see your mechanic. If drained lube is in good condition, continue. Place the tube of lube in the drain/fill lower hole and fill until oil appears at the upper vent hole. See your engine manual for specifications for gearcase capacity. Once the oil comes out the upper vent hole, install the upper vent plug before removing the lube tube from the lower fill hole. Once the upper vent plug is installed and tightened, remove the fill tube and quickly install the lower drain/fill plug into lower hole. Securely tighten both plugs.

Crankcase and Transmission

With a sterndrive or inboard, the crankcase and transmission should be drained and refilled with appropriate viscosity oil. Also you will want to replace the oil filter on the crankcase.

Grease

Grease all appropriate fittings visible on engine and drive. If the steering cable has grease fittings, lubricate them with grease from a hand operated grease gun while the steering cable is fully retracted into the cable housing. Retract the cable by having someone turn the steering wheel while watching the cable. Lubricate all steering system and throttle/shift system pivot points. Be sure not to forget gimbal bearing and engine couplers on sterndrives.

Engine Cylinder Lay up

During extended periods of lay-up (winter), unprotected cylinder walls and piston rings will rust, thereby shortening engine life. In severe cases, the parts rust solid, locking-up the engine so that it won't even turn over. When that happens, the only possible fix is to disassemble the power plant. There are two schools of thought on these methods of engine protection. One is much more complex than the other, and is more like mothballing. We use the complex method. Which you use is up to you.

The simple technique is known as fogging, or coating the cylinder walls with sticky preservative oil that won't easily slide off an engine's polished surfaces. Fogging oil is available in aerosol cans or in straight liquid form by the quart. As this may involve spraying fogging oil into special fittings, directly into the carburetor, or in to the cylinders directly, refer to your engine's manual for specifics on this procedure. This should be done with the engine run out of water while attached to a set of flushing ears or other fresh water connection fed from a water supply with good pressure, to promote zero exhaust back pressure.

We use a more complex method, but this will probably be beyond most consumers' desires to do. It is listed here for reference only. The more complex method is to prepare a mixture

(by volume) of:

50% gasoline

35% 2 cycle oil

5% fuel stabilizer

5% alcohol or drygas

5% fuel system cleaner (fuel injector cleaner is fine)

We make this up in batches and have valved stainless steel pressurized containers to inject it from.

Warm up the engine while attached to a set of flushing ears or other fresh water connection fed from a water supply with good pressure. Shut engine off. Break fuel line before the fuel pump. Attach pressurized mixture line to fuel line going towards engine. Restart engine; raise throttle to 2500 rpm and inject mixture. Continue to inject until engine stalls. If engine stalls prematurely, (before visible smoke is seen from exhaust), restart. Reconnect fuel system.

Engine Block Lay up

First run the engine while attached to a set of flushing ears or other fresh water connection fed from a water supply with good pressure, to purge out any contaminants. Shut engine off. Drain the fluid from your engine block and manifolds, water pumps, and coolers. Frozen water will expand and crack your engine. Consult your engine manual for the location of drain plugs. If after removing the drain plugs, fluid does not seem to drain, poke in the hole with a small screwdriver to be sure it is not blocked. Depending on your recycling capabilities you may wish to use environmentally safe antifreeze. This is typically not automotive type radiator antifreeze. Polypropylene Glycol type antifreeze (automotive) is poisonous. Most antifreeze protects the system to -50° F and adds color to the water to indicate its presence. Although this type of antifreeze is nontoxic, DO NOT drink the solution. If you need to "cut" the antifreeze with something to dilute it, use windshield washer solvent. Fill block, manifold, risers, raw water pump, and circulating pump with antifreeze. This is typically done by disconnecting the hoses at the risers, and back filling the system, until you are certain the system is purged of water. On outboards, pull the thermostat housing and backfill from this point. Once full, either by key or by hand if your motor is not equipped with electric start (small outboards), rotate flywheel in a clockwise (typical) direction to help distribute the antifreeze. The system must be thoroughly drained and flushed to remove all traces of the color of the antifreeze when the boat is recommissioned.

Tilt N Trim

Tilt the motor up and engage the tilt support. (refer to owner's manual operation section, Tilting or Tilt Support). Remove filler cap and check fluid level. If necessary, add enough Tilt/trim or power steering fluid to bring the fluid level even with the bottom of the fill cap hole when the unit is at full tilt. Return motor tilt to the normal run position. This is especially important for Sterndrives to prevent strain on the exhaust elbows and universal joint bellows.

Zinc Anodes

Inspect the sacrificial anodes located on the shafting, underwater gear, outdrive or lower unit. Over the season, they have been attacked by galvanic action and eaten away little by little. If any anode is less than 60% of its original size, replace it. Regardless of whether or not the anode needs replacing, remove it and make sure there is good metal-to-metal contact between the anode and the housing it protects. Otherwise, it's worthless. Before replacing it,

coat the bolts with anticorrosion lubricant. This stops in-place corrosion, which if ignored, could make them nearly impossible to remove later. Remember that unchecked galvanic action can severely damage or even eat away aluminum gear housings and other underwater metal.

Corrosion Issues

Sometimes saltwater spray penetrates the engine compartment through the air-intake ports, or directly through the cowling on outboards. If you see salt residue on the engine, wipe it off. If the engine is really grimy, coat the affected surfaces with engine-cleaning solvent. Give it time to work, then wipe it off. Spray entire block with a light oil like WD-40 or CRC.

Hose down the drive unit to wash away any dirt and salt spray that may have accumulated there. If sand has scoured paint off the unit, wash the surface in soap and water, scrub with a bristle brush, then rinse. Prime, then paint exposed metal on the drive leg to protect it from corrosion. Depending on your area, you may need to apply antifouling paint.

NOTE - When touching-up outdrive surfaces with a paint can, it's good practice to mask off the sacrificial anodes so over-spraying doesn't insulate these important components from electrolytic activity and thereby render them useless as corrosion inhibitors.

Gearcase speedometer pickup, if equipped

On motors that have the speedometer pickup in the gearcase you must disconnect the speedometer hose at the upper connection. With air pressure no more than 25psi (167 kPa) blow all water from the gearcase speedometer pickup system. Reconnect speedometer pickup after all water has been removed.

General "Rule of Thumb" Issues

1. Check and tighten all screws, bolts, and nuts.
2. Inspect belts and hoses.
3. Check for any damaged or deteriorated parts.
4. Check for any corrosion on the electrical wiring. This includes the starter solenoid terminal boot and all connectors.
5. Remove battery and store in safe, dry place. Check fluid levels. Note - Battery electrolyte can cause severe eye damage and burns to the skin. Wear goggles, rubber gloves and a protective apron when working with battery. If spillage occurs, immediately wash area with a solution of baking soda and water.
6. Remove interior cushions and jumpseats and store in a cool, dry place. Otherwise, place cushions on end to allow sufficient ventilation.
7. Drain porta-potti and fresh water system. Add freshwater antifreeze to water tank and porta-potti. Pump antifreeze into the supply lines using the faucets and transom shower.
8. Store boat in a garage or other facility if available. If not, cover the boat with a mooring cover after the interior has been allowed to dry out. The canvas will breathe and allow for sufficient ventilation of the interiors. Moisture and poor air circulation are the main reasons for rot and mildew. This can occur at any time of the year.
9. If your boat is to be stored on a trailer, you should:
Leave the drain plug out and cant the bow higher than the stern so rainwater does not accumulate in the bilge where substantial weight could snap the trailer's axle.
Block the trailer wheels so the tires are off the ground. This reduces tire deterioration.

(This is also a good time to replace wheel bearings and touch up trailer paint.)

Loosen tie-down straps to reduce stress on the hull.

- 10. If the boat has a refrigerator, make sure it is shut down, wipe the interior clean with a disinfectant and prop the door open to allow air to circulate.**

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