Boat Engine Types

Several types of boat motors and engines are available for boating enthusiasts. They are typically defined by their power source and placement on the boat. Certain engine types are beneficial for use with certain boats, depending on the size of the boat, intended use and desired performance as well as safe recommended standards.

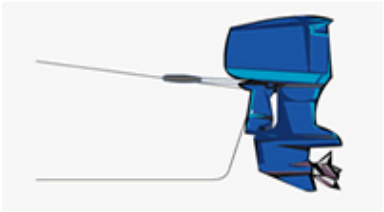
Customers can choose from two-stroke motors and four-stroke engines, outboards, inboards, diesel powerplants, electric motors, sterndrives and jet drives. Here is a rundown of various boat engine types to help your new hires power through the learning curve.

Outboard Motors

An outboard motor is mounted on the boat's transom outside of the hull at the stern, or back of the vessel. During operation, an outboard's gearcase and propeller is submerged but can be tilted out of the water when not in use. They are ideal for salt or freshwater use because this design prevents unnecessary corrosion or marine growth. To steer an outboard, the engine is pivoted on its mount, directing the propeller's thrust. Outboard motors of today range in horsepower from 2.5 HP to more than 350 HP per engine. But a few are now available with over 500 horsepower.

Older outboards were typically conventional two-stroke engines, but manufacturers have since switched to environmentally friendly low-emission engines which include direct fuel injection (DFI) two-stroke and four-stroke designs. Conventional two-stroke engines required oil to be mixed with gasoline to lubricate the engine, while DFI two-stroke engines and four-stroke engines separate oil and gasoline. Modern low-emission marine outboard engines, in addition to running quieter and smoother, are more environmentally friendly, as they emit a virtually smokeless exhaust compared to conventional two-strokes.

Modern outboards meet stringent new EPA emissions regulations that also improves fuel efficiency compared to earlier outboards. Some manufacturers use a four-stroke engine design and others use a modern two-stroke design with DFI. Four-strokes are much like your auto engine and have an oil reservoir and a dipstick to check the levels.



Two-stroke engines use targeted injection that draws oil from a reservoir to oil critical parts of the engine during operation. The oil is consumed with the fuel leaving no residue.

Direct Fuel injection Outboards

Fuel is injected directly into the combustion chamber and ignited by the spark plug. The fuel spray from the fuel injector is highly atomized and quickly lowers the temperature of the combustion chamber, allowing for increased engine power, low fuel consumption and low emissions. DFI results in no fuel priming, quick engine starting and precision engine speed and performance across the engine's operating range. Many of today's most sophisticated automotive engines use a combination of DFI and four-stroke designs.

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Electronic Fuel Injection (EFI)
Fuel is injected into the incoming air for each cylinder, just prior to the intake valve of the engine. The fuel spray from the injector contacts the hot intake valve, cooling the valve and increases the vaporization of the fuel prior to being introduced into the combustion chamber. A spark plug then ignites the fuel air mixture. EFI results in no fuel priming, quick engine starting, low emissions and fuel consumption and robust engine performance across the operating range of the engine.

Carbureted Fuel Induction
A carburetor is the most basic type of fuel induction system and is a cost effective way to control the fuel delivery to the engine. However, some modern four-stroke outboard engines outfitted with carburetors are calibrated to meet all applicable exhaust emission standards and offer greatly improved fuel economy over older carbureted four-stroke engines.

Automobile Engine Onboard
Marine gas engines are automotive engines modified for use on the water. Gasoline stern drive and inboard engines range from 135 HP to more than 1000 HP per engine and are used in a variety of boats.

Inboard Engines
Inboard engines have the engine and transmission mounted within the hull of the boat, under the deck. A drive shaft extends through the hull and a propeller is mounted on it to drive the engine. A rudder is used for steering.

Gas Sterndrive Engines
Sterndrives combine the gearcase of an outboard with the engine of an inboard. In fact, history indicates the sterndrive engine was inspired by outboard designs. A sterndrive's gearcase extends through the transom at the back of the boat and a series of gears redirect the drive shaft below the water. The result is a propeller perfectly aligned with the boat's direction of travel. Moving the propeller from left to right steers the boat. The drive unit can also be tilted up for trailer travel. Sterndrives are often the choice of power on smaller boats when outboard motors are not installed.

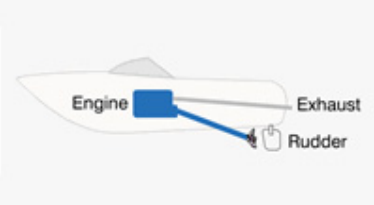
Pod Drive Engines
Since 2004, engine makers have been building a new form of marine propulsion called Pod Drives. These feature inboard engines — usually diesel — with a transmission inside the hull behind the engine. The transmission uses a downward oriented shaft that goes through the pod housing into the water to the gear case tucked up in front of the transom. The pod drive pivots to direct thrust. These engine systems offer more thrust per horsepower because they are perfectly aligned to the keel of the boat, making all force go in line with the boat's motion. By contrast, inboard boats have a shaft that goes through the hull at an angle that turns the propeller downward by several degrees. This downward orientation reduces some thrust.

Pod drives incorporate special steering and throttle systems that are entirely electronic. They are integrated with onboard GPS systems and auto pilots for easy course plotting. Station keeping is a feature that allows the boat to maintain its position — say while you fit fenders and lines to moor the boat — until you return to the helm. The engine systems are more

expensive, but save considerable space onboard, adding the possibility of an additional cabin or entertainment room. They are designed to shear off on impact in a grounding, sparing much damage to the hull and making getting back underway easier.

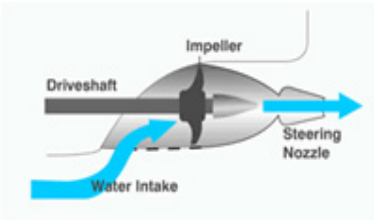
Diesel Inboard Engines

Diesel engines rely on compression to ignite the fuel and power the engine. Diesel engines are widely used in other parts of the world but in the United States, they are typically only found in boats longer than 35 feet due to their improved fuel efficiency weighed against an initial higher cost. In recent years, fuel and emissions regulations from the EPA and EU have revolutionized the diesel engine creating more efficient and cleaner engines.



Jet Boat and Personal Watercraft Engines and Propulsion

A marine jet drive system is much different than an outboard or sterndrive or inboard which uses a propeller in the water. A jet boat and personal watercraft draws water from under the boat into an internal pump and then expels it through a steering nozzle at the stern. Jet boats and personal watercraft offer quick acceleration, excellent maneuverability and can safely operate in shallow water due to their lack of an exposed propeller.



Electric Motors

Electric motors offer quiet, clean propulsion with no exhaust fumes, noise or vibration. Advances in electric motor technology also mean boaters have more powerful options with longer-lasting batteries. Many types of boats, including pontoons, fishing boats, towboats, sailboats and day cruisers can be outfitted with electric motors.

Power in electric motors is measured by kilowatts (kW) not horsepower. Electric motors require minimal maintenance. A yearly tune-up by a qualified technician will keep an electric motor running at peak efficiency.

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