

TYPES OF ROCKET ENGINES AND PROPELLANTS

rocket or **rocket vehicle** is a missile, spacecraft, aircraft or other vehicle which obtains thrust from a rocket engine. In all rockets, the exhaust is formed entirely from propellants carried within the rocket before use. Rocket engines work by action and reaction. Rocket engines push rockets forwards simply by throwing their exhaust backwards extremely fast.

Rockets for military and recreational uses date back to the 13th century.^[2] Significant scientific, interplanetary and industrial use did not occur until the 20th century, when rocketry was the enabling technology of the Space Age, including setting foot on the moon.

Rockets are used for fireworks, weaponry, ejection seats, launch vehicles for artificial satellites, human spaceflight and exploration of other planets. While comparatively inefficient for low speed use, they are very lightweight and powerful, capable of generating large accelerations and of attaining extremely high speeds with reasonable efficiency.

Chemical rockets are the most common type of rocket and they typically create their exhaust by the combustion of rocket propellant. Chemical rockets store a large amount of energy in an easily released form, and can be very dangerous. However, careful design, testing, construction and use minimizes risks.

Rocket vehicles are often constructed in the archetypal tall thin "rocket" shape that takes off vertically, but there are actually many different types of rockets including.^{[58][59]}

- tiny models such as balloon rockets, water rockets, skyrockets or small solid rockets that can be purchased at a hobby store
- missiles
- space rockets such as the enormous Saturn V used for the Apollo program
- rocket cars
- rocket bike
- rocket powered aircraft (including rocket assisted takeoff of conventional aircraft- JATO)
- rocket sleds
- rocket trains
- rocket torpedos
- rocket powered jet packs

- rapid escape systems such as ejection seats and launch escape systems
- space probes

Propellants: A **propellant** is a material that is used to move ("propel") an object. The material is usually expelled by gas pressure through a nozzle. The pressure may be from a compressed gas, or a gas produced by a chemical reaction. The exhaust material may be a gas, liquid, plasma, or, before the chemical reaction, a solid, liquid or gelled. Common chemical propellants consist of a fuel; like gasoline, jet fuel, rocket fuel, and an oxidizer.

Propellant used for propulsion

Technically, the word **propellant** is the general name for chemicals used to create thrust. For vehicles, the term propellant refers only to chemicals that are stored within the vehicle prior to use, and excludes atmospheric gas or other material that may be collected in operation.

Amongst the English-speaking laymen, used to having fuels propel vehicles on Earth, the word **fuel** is inappropriately^[dubious – discuss] used. In Germany, the word *Treibstoff*—literally "drive-stuff"—is used; in France, the word *ergols* is used; it has the same Greek roots as hypergolic, a term used in English for propellants which combine spontaneously and do not have to be set ablaze by auxiliary ignition system.

In rockets, the most common combinations are *bipropellants*, which use two chemicals, a fuel and an oxidiser. There is the possibility of a tripropellant combination, which takes advantage of the ability of substances with smaller atoms to attain a greater exhaust velocity, and hence propulsive efficiency, at a given temperature.

Although not used in practice, the most developed tripropellant systems involves adding a third propellant tank containing liquid hydrogen to do this.

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