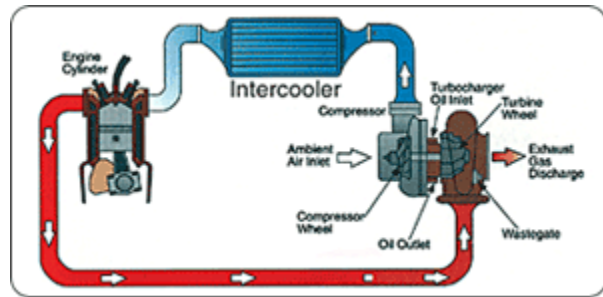


Fundamentals

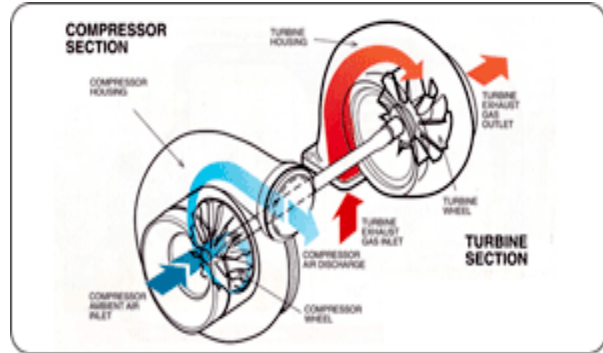
Introduction

A turbo is a high precision 'air pump', used to supply more air into the engine by harnessing on the usually wasted energy in the engine exhaust.



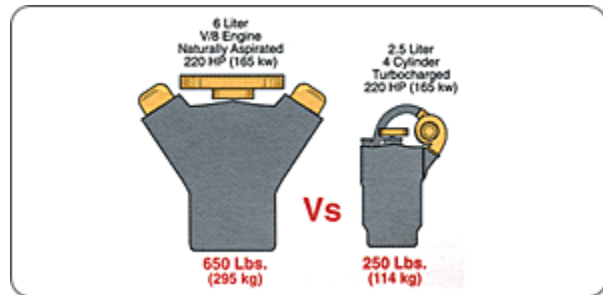
Principles of Turbocharging

The exhaust gases (dark red arrow) drive the turbine wheel and shaft, which is coupled to the compressor wheel. When the compressor wheel rotates, fresh air (dark blue arrow) is forced-fed at high pressure into the combustion chamber (light blue arrow). With a high concentration of oxygen per cubic volume and optimum air-fuel ratio, combustion is now cleaner and more complete.



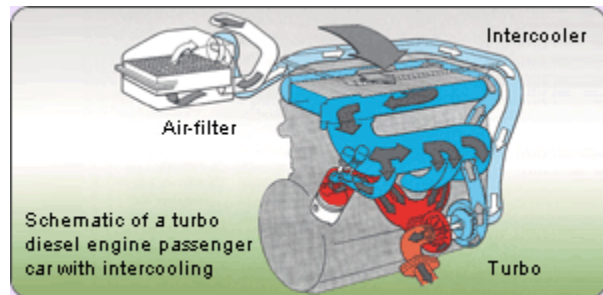
Benefit of Turbocharging

- Increases engine output and torque
- Lowers diesel fuel consumption
- Reduces harmful engine emission
- Uses more compact and lighter engines



What is Intercooling

Intercooling is a process whereby an air cooler, called the intercooler, reduces the temperature of the compressed air intake, making it denser with a higher concentration of oxygen per cubic air volume. Coupled with turbocharging, an even higher level of combustion is achieved, thereby releasing an additional 15% engine power.



What is a wastegate

A bypass valve (wastegate/regulator) allows the turbo system to develop peak charge-air pressure for maximum engine boost response while eliminating the chance of excessive manifold pressure (overboost) at high speed. The wastegate is precisely calibrated and opens to direct some exhaust gas flow around the turbine wheel. This limits shaft speed which in turn control boost pressure.

