

Abstract

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Conventional and Insulated Pulse Diesel Engines Performance and Combustion

Internal combustion engines are most commonly used for mobile propulsion in vehicles and portable machinery. In mobile equipment, internal combustion is advantageous since it can provide high power-to-weight ratios together with excellent fuel energy density. Diesel engines and HCCI (Homogeneous Charge Compression Ignition) engines rely solely on heat and pressure created by the engine in its compression process for ignition. The compression level that occurs is usually twice more than a gasoline engine. Diesel engines take in air only and shortly before peak compression, spray a small quantity of diesel fuel into the cylinder via a fuel injector that allows the fuel to instantly ignite. HCCI type engines take in both air and fuel, but continue to rely on an unaided auto-combustion process, due to higher pressures and heat. This is also why diesel and HCCI engines are more susceptible to cold-starting issues, although they run just as well in cold weather once started. Light duty diesel engines with indirect injection in automobiles and light trucks employ glow plugs that pre-heat the combustion chamber just before starting to reduce no-start conditions in cold weather.