

Hydrogen Internal Combustion Engines

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Abstract

Over 100 years of development maturity, dual fuel capability and insensitivity to fuel purity distinguish the internal combustion engine as an interesting concept for direct conversion of hydrogen into useful mechanical work – particularly as a bridging technology while an H₂ infrastructure could be constructed. Within this chapter the state of the art in hydrogen engines is presented by example of vehicles from different manufacturers. The physical properties of hydrogen make it an excellently suitable fuel for use in internal combustion engines and lead to a broad range of possible mixture preparation concepts. A brief introduction of these concepts is given together with a theoretical comparison of their respective potentials, advantages and challenges. Consequently, aside from existing vehicle solutions extensive theoretical work is going on at universities and research facilities, yielding to increase power output and engine efficiency. A few results and examples intend to give a brief overview of the recent hydrogen combustion system development for the ICE.

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