

Design and construction of a Turbo-cooler to increase volumetric efficiency in spark ignition engines with high compression ratio

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Abstract:

In this report the simulation of energy recovery from waste exhaust of a convention SI engine spark ignition (with a high compression ratio) in other to increase the volumetric efficiency and thermal efficiency is presented. Action to achieve the above goal a power turbine can be used to restrain waste exhaust gases power and transmitted this power to the compressor of car air conditioning system by a planetary gear box and this combination of them named Turbo-cooler. Using the Turbo-cooler, volumetric efficiency of operation and finally the engine thermal efficiency will increase. In the simulation of combustion processes, combustion of the actual model is simulated by Woshni approximation model and through the successive approximation method. In this study all the thermodynamic properties of air, fuel type, duration and ignition spark timing, cylinder temperature and the heat transfer and etc, were considered. Also mechanical properties of lubrications, piston skirt and rings friction take in to account here.

Key words: Modeling, SI Engines, high compression ratio, volumetric efficiency, thermal efficiency, Turbo-cooler.