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STUDY OF THE INFLUENCE OF REFRIGERANT MASS ON THE PERFORMANCE OF
AUTOMOTIVE AIR CONDITIONING SYSTEMS ⁷

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Abstract: *The performance of automotive air conditioning (A/C) systems is strongly influenced by the amount of refrigerant circulating within the system. This study investigates the effect of varying refrigerant charge on the thermodynamic performance, cooling capacity, and energy efficiency of an automotive A/C system operating under controlled conditions. Experimental tests were conducted using different refrigerant masses, ranging from undercharged to overcharged states, while monitoring system parameters. The results demonstrate that there exists an optimal refrigerant charge that maximizes cooling efficiency and minimizes energy consumption. The findings highlight the importance of precise refrigerant charging during maintenance and system design, contributing to improved energy efficiency, reduced emissions, and enhanced passenger comfort in automotive applications.*

Keywords: *Automotive Air Conditioning, Refrigerant Charge, Coefficient of Performance (Cop), Compressor Load, Thermal Management.*

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