

Abstract

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Cooling enhancement of electric motors

A new arrangement for the stator laminations of electric motors is presented which improves machine cooling. The arrangement is illustrated with static and dynamic comparisons between the new and the old arrangements of a 4-phase switched reluctance motor. The stator laminations, all of one design, are designed to provide either radially axially oriented external cooling fins when stacked. The effective increase in heat dissipative surface area increases the full load output capacity, for a given copper winding temperature rise above ambient. The static test, with the rotor held stationary and a DC current fed to all phases, shows that for the same temperature increase of the copper parts above the ambient, the RMS phase current can be increased. When the motor is mechanically loaded, keeping the speed constant such that windage and friction losses are fixed, an improvement in the efficiency has been obtained for a given copper temperature rise.