

The "Variable Inertia Test" for Full Load Temperature Rise Testing of Induction Machines

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Abstract: Full load temperature-rise testing of induction machines can be done in various ways including the "back to back test", the "phantom-loading test" and various forms of what is generally called the "mixed frequency test". This paper proposes a new method of testing called the variable inertia test. The proposed test is purely mechanical in nature, it does not require any electrical connection of the test machine to any other machine it can be very efficient in terms of space and it may therefore be attractive to manufacturers of large electrical machines. A simulation of this test indicates that full-load losses can be achieved relatively simply.

LIST OF SYMBOLS

ω_1 and ω_2	= angular speeds of the shaft on the two sides of the gearbox
R, R_0, R_1	= speed ratios of the gearbox
J_L, J_{act}	= total load inertia and external free running inertia
T_e, T	= airgap torque and shaft torque
θ	= angle of the rotor
R_s, R_r	= stator and rotor resistances
L_{ss}, L_{rr}	= stator and rotor inductances
M_{sr}	= mutual inductance between stator and rotor
J	= motor inertia