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Loadless full load temperature rise test for three phase induction motors

Hamid M.B. Metwally *

Department of Electrical Power Engineering, Faculty of Engineering, Zagazig University, Zagazig, Egypt

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Abstract

This paper introduces a new method for measuring the full load temperature rise of three phase induction motors. The method is very simple, cheap and reliable. It does not require a mechanical load to be coupled to the motor shaft, as in the conventional method. Also, it does not need any auxiliary machines or special power electronics to generate the two frequency supplies, as needed by the dual frequency method. The method is simply to run the motor at no load without any thing coupled to the shaft but with the supply voltage slightly higher than the rated voltage of the motor. This causes the motor to draw from the supply a no load power higher than that drawn at rated voltage. The value of this power can be controlled by changing the applied voltage to simulate the full load conditions on the motor. The results obtained in this study showed that an input voltage of about 120% of the rated voltage of the motor is a suitable value to cause the full load losses to occur in the motor body, and hence, the full load temperature rise is obtained. © 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Induction motor performance; Induction motor testing; Induction motor temperature rise

1. Introduction

To test three phase induction motors for temperature rise, the full load losses must be dissipated in the motor body while the motor is running at rated speed. This means that a mechanical load of at least the same power rating of the motor must be coupled to the motor shaft. Then, the system must be left to run at full load for about three hours till the steady state temperature rise is reached. The initial cost of building this test rig is quite high. This also necessitates a dissipation of energy equal to the power rating of the motor multiplied by the time of the test. So, the running

* Tel.: +20-55-622-411; fax: +20-55-324-987.

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