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CSA C391:15
National Standard of Canada
(reaffirmed 2020)

Testing of three-phase synchronous machines during refurbishment

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Preface

This is the first edition of CSA C391, *Testing of three-phase synchronous machines during refurbishment*.

CSA acknowledges that the development of this Standard was made possible, in part, by the financial support of BC Hydro, Canadian Electrical Association, Efficiency Nova Scotia, Hydro Québec, Manitoba Hydro, Natural Resources Canada (NRCan), Ontario Power Authority and Saskatchewan Power.

This Standard is considered suitable for use for conformity assessment within the stated scope of the Standard.

This Standard was prepared by the Subcommittee on Motor Refurbishment, under the jurisdiction of the Technical Committee on Industrial Equipment and the Strategic Steering Committee on Performance, Energy Efficiency, and Renewables, and has been formally approved by the Technical Committee.

This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

Notes:

1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
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   b) *relevant clause, table, and/or figure number;*
   c) *wording of the proposed change; and*
   d) *rationale for the change.*

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Testing of three-phase synchronous machines during refurbishment

0 Introduction

This comprehensive Standard provides guidance to electric machine service centres to assist in verifying that the refurbishing process has maintained or enhanced the synchronous machine efficiency. It is also intended to provide a reliable evaluation of any changes to the condition of a machine, with respect to its efficiency, that could have resulted from its failure. It is not mandatory that all of the tests presented in this Standard be performed on every machine that is refurbished by the service centre. The application of these tests will depend on the type of work performed and the need to confirm that no change in efficiency has occurred as a result of damage to the machine and its repair. It is acknowledged that the machine efficiency could be depreciated by the damage caused during the motor operation or failure mode. In cases where the test results exceed the prescribed pass/fail criteria, it is not the intent of this Standard to require that the machine be removed from service nor scrapped. However, the test results might assist in future repair/replace decisions and future energy conservation planning.

The prescribed tests and pass/fail criteria are well known and employed throughout the machine service centre industry in North America. Clause 2 provides reference materials that may be accessed for further details on the various tests prescribed by this Standard.

It should be pointed out that there are many additional test and inspection procedures employed when refurbishing machines that are not part of this Standard because they are not directly related to the motor efficiency. Some of the more common ones are available in the materials referenced in Clause 12. Not all of these prescribed tests can or should be administered on every machine that is to be refurbished. It is the responsibility of the machine service centre to determine which inspection and tests options are applicable.

Load testing is not required by this Standard because such equipment is not readily available throughout the machine service industry. In some cases it will not be practical to run the machine because of the lack of components

1 Scope

1.1

This Standard covers three-phase, alternating current, salient pole synchronous machines 150 kW and up, 200 through 13,800 volts, 60 and 50 Hertz and will assist in verifying the machine efficiency has been maintained.

Note: *This Standard can be useful and applied with discretion to products outside the scope of this Standard.*

1.2

Large 2-pole and 4-pole solid cylindrical rotor machines, typically used as generators for utility and large industrial applications, are excluded from this Standard.

Note: *See Annex E for information on generators*

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