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CSA C802.5:16

National Standard of Canada

(reaffirmed 2020)

Guideline for evaluating the efficiency of dry-type transformers under non-linear loading

Standards Council of Canada
Conseil canadien des normes

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Preface

This is the first edition of CSA C802.5, *Guideline for evaluating the efficiency of dry-type transformers under non-linear loading*.

CSA Group acknowledges that the development of this Guideline was made possible, in part, by the financial support of Natural Resources Canada, BC Hydro, Manitoba Hydro, Hydro Québec, Canadian Electricity Association, Nova Scotia Department of Energy, and Efficiency One.

This Guideline was prepared by the Subcommittee on Guideline for Selection of Dry-Type Transformers and Harmonics, under the jurisdiction of the Technical Committee on Energy Efficiency 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.*
2) *Although the intended primary application of this Guideline is stated in its Scope, it is important to note that it remains the responsibility of the users of the Guideline to judge its suitability for their particular purpose.*
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   c) *wording of the proposed change; and*
   d) *rationale for the change.*

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Guideline for evaluating the efficiency of dry-type transformers under non-linear loading

0 Introduction

General purpose older transformers in service typically were designed for linear load conditions. With increasing use of modern equipment that draws non-linear loads, there has been a concern of increased losses and reduction in transformer efficiency. The efficiency of such general purpose transformers is reduced with non-linear loads.

There have been many publications outlining the increase in losses with non-linear loads. However, these publications tend not be user friendly for users who do not have all the required data to estimate the losses. This Guideline and accompanying calculator have been developed to help in estimating energy cost savings of replacement transformers for non-linear load profile applications. Although this Guideline has been prepared for dry-type low-voltage distribution transformers, it may be used for other transformers if appropriate data are available.

1 Scope

1.1

This Guideline applies to three-phase dry-type transformers subjected to harmonics current up to the 49th harmonic.

1.2

This Guideline covers transformers, self-contained units or components of larger assemblies, 60 Hz, ANN, rated 15 to 500 kVA three-phase, two winding low voltage distribution transformers with maximum winding voltage of 1.1 kV.

1.3

The principles covered in this Guideline may be applied to other transformers, not covered in this Guideline, with due consideration of any special situation or application.

1.4

This Guideline contains no requirements. In this Guideline, “should” is used to express a recommendation or that which is advised and “may” is used to express an option or that which is permissible within the limits of the Guideline.