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Guide for Determining Energy Efficiency for Distribution Transformers

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Contents

Foreword

This standard has been developed by the Transformer Section and has been approved for publication by the National Electrical Manufacturers Association. It is available for use by the electrical industry to promote the use of high efficiency transformers and to assist users in the selection of such transformers.

This standard consists of two parts, Sections 2 and 3, that offer a simplified methodology for the user to apply to determine the equivalent first cost of core and load losses. This information will permit the manufacturer to tailor the transformer design to the unique situation of each user. Section 4 defines the minimum efficiency, based on kVA and voltage considerations, that is recommended if the user elects not to follow the suggested methodology. It must be clearly understood that certain design criteria or conditions of use may preclude the application of this standard. These exceptions are detailed in the body of this document.

User needs and safety have been considered throughout the development of this document. This publication is periodically reviewed by the Transformer Section of NEMA for any revisions necessary to keep it up to date with advancing technology. Proposed or recommended revisions should be submitted to:

NEMA Technical and Industry Affairs Department
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This technical publication was developed by the Transformer Section of the National Electrical Manufacturers Association. At the time it was approved, the Transformer Section had the following members:

ABB Inc.	Cary, NC
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Schneider Electric	Boston, MA
Siemens Industry	Alpharetta, GA
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Section 1
General

1.1 Scope

This standard is intended for use as a basis for determining the energy-efficiency performance of the equipment covered and to assist in the proper selection of such equipment.

This standard covers single-phase and three-phase dry-type and liquid-immersed distribution transformers as defined in the following table:

Voltage Class	Primary Voltage Secondary Voltage	34.5 kV and Below 600 Volts and Below
Liquid Rating	Single Phase	10–833 kVA
	Three Phase	15–2500 kVA
Dry Rating	Single Phase	15–833 kVA
	Three Phase	15–2500 kVA

Note: Includes all products at 1.2 kV and below.

Products excluded from this standard include:

a. Liquid-immersed transformers below 10 kVA
b. Dry-type transformers below 15 kVA
c. Drive transformers, both AC and DC
d. All rectifier transformers and transformers designed for high harmonics
e. Autotransformers
f. Non-distribution transformers, such as UPS transformers
g. Special impedance, regulation, and harmonic transformers
h. Regulating transformers
i. Sealed and non-ventilated transformers
j. Retrofit transformers
k. Machine tool transformers
l. Welding transformers
m. Transformers with tap ranges greater than 15%
n. Transformers with frequency other than 60 Hz
o. Grounding transformers
p. Testing transformers