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Standard for

Installing and Maintaining Liquid-Filled Transformers



Published by
National Electrical
Contractors Association



NECA 410-2005

Standard for
Installing and Maintaining
Liquid-Filled Transformers

**An American
National Standard**



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National Electrical
Contractors Association



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(This foreword is not a part of the standard)

Foreword

National Electrical Installation Standards™ are designed to improve communication among specifiers, purchasers, and suppliers of electrical construction services. They define a minimum baseline of quality and workmanship for installing electrical products and systems. *NEIS™* are intended to be referenced in contract documents for electrical construction projects. The following language is recommended:

Liquid-filled transformers should be installed in accordance with NECA 410-2005, *Standard for Installing and Maintaining Liquid-Filled Transformers* (ANSI).

Use of *NEIS™* is voluntary, and the National Electrical Contractors Association assumes no obligation or liability to users of this publication. Existence of a standard shall not preclude any member or nonmember of NECA from specifying or using alternate construction methods permitted by applicable regulations.

This publication is intended to comply with the edition of the National Electrical Code® (NEC) in effect at the time of publication. Because they are quality standards, *NEIS* may in some cases go beyond the minimum safety requirements of the NEC. It is the responsibility of users of this publication to comply with state and local electrical codes when installing electrical products and systems.

Suggestions for revisions and improvements to this standard are welcome. They should be addressed to:

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1. Scope

1.1 Products and Applications Included

This recommended practice describes installation procedures for pad-mounted, sealed, self-cooled, compartmental, single- and three-phase liquid-filled distribution and power transformers with primary windings rated from 2400 Volts to 35 kV AC, nominal, and rated from 75 kVA through 5000 kVA, and associated accessories, designed for outdoor installation at grade level with underground entrance of primary and secondary conductors, and used for supplying power, heating and lighting loads for commercial, institutional, and industrial use in nonhazardous locations.

It also covers periodic routine maintenance procedures for transformers, and special procedures used after adverse operating conditions such as a short-circuit, ground-fault, or immersion in water.

1.2 Products and Applications Excluded

This publication does not apply to the following:

1. Dry-type transformers,
2. Specialty transformers such as control, industrial control, instrument, current, potential, metering, buck-boost transformers, or lighting and ballast transformers,
3. Autotransformers,
4. Cast coil transformers,

5. Arc furnace transformers,
6. Rectifier transformers,
7. Network transformers,
8. Unit substation transformers, or
9. Transformers with more than two sets of windings.

1.3 Regulatory and Other Requirements

All information in this publication is intended to conform to the National Electrical Code (ANSI/NFPA 70). Installers should always follow the NEC, applicable state and local codes, manufacturer's instructions, and contract documents when installing liquid-filled transformers.

Only qualified persons familiar with the construction and installation of liquid-filled transformers should perform the work described in this publication.

General requirements for installing electrical products and systems are described in the latest version of NECA 1, *Standard Practices for Good Workmanship in Electrical Contracting* (ANSI). Other *National Electrical Installation Standards* provide additional guidance for installing particular types of electrical products and systems. A complete list of *NEIS* is provided in Annex B.