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IEEE Guide for Acceptance and Maintenance of Insulating Mineral Oil in Electrical Equipment

IEEE Power and Energy Society

Sponsored by the
Transformers Committee

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Abstract: Recommendations regarding mineral oil tests and evaluation procedures are made in this guide; references are made to methods of reconditioning and reclaiming conventional petroleum (mineral) dielectric insulating liquids; the levels at which these methods become necessary; and the routines for restoring oxidation resistance, where required, by the addition of oxidation inhibitors. The intent is to assist the power equipment operator in evaluating the serviceability of mineral oil received in equipment, oil as received from the supplier for filling new equipment at the installation site, and oil as processed into such equipment; and to assist the operator in maintaining mineral oil in serviceable condition. The mineral oil covered is used in transformers, reactors, load tap changers, and voltage regulators.

Keywords: IEEE C57.106™, insulation testing, load tap changers, mineral oil insulation, power distribution maintenance, power transformer insulation, reactors, transformers, voltage regulator

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Introduction

This introduction is not part of IEEE Std C57.106™-2015, IEEE Guide for Acceptance and Maintenance of Insulating Mineral Oil in Electrical Equipment.

IEEE Std C57.106™ was last revised in 2006. There were several noteworthy changes to this guide in the 2015 revision. The overall outline common to many guides, including this one, was not altered; but subclauses were arranged to improve the flow of information. An example is the movement of the in-service oil subclause to just after the new oil subclause.

In this revision, discussions addressing moisture in the solid insulation/paper insulation were removed. In addition, information on oil circuit breakers was removed and accepted by the switchgear C37.20 series.

In general, terms were aligned to recommended nomenclature. The guide was made responsive to consistent terms for the oils, e.g., using the name "mineral oil" as opposed to several others. When necessary or practical, the references to a specific agency, title, era, or geographic specific rule were substituted with wording such as "the local, state, and national regulations."

Contents

IEEE Guide for Acceptance and Maintenance of Insulating Mineral Oil in Electrical Equipment

1. Overview

The reliable performance of oil in insulation systems depends on the basic characteristics of the oil that can affect overall apparatus characteristics. These oil characteristics are integral parts of the equipment design of the manufacturer. Certain properties of mineral insulating oil have been determined as important for proper electrical equipment performance. A description of these properties and their recommended value ranges for new oil and for continued use of in-service oils are included in this guide.

Mineral insulating oil that is received in electrical equipment could exhibit different characteristics from new oil received in bulk, which has not been in contact with apparatus construction materials.

Oil in service may contain dissolved gases that are useful in assessing the continued serviceability of certain types of transformers. It is not the intent of this guide to cover this subject, as that information is available in IEEE Std C57.104™.

Should instructions or product standards given by the manufacturer differ from recommendations made in this guide, the instructions of the manufacturer are to be given preference.

1.1 Scope

This guide applies to mineral oil used in transformers, load tap changers, voltage regulators, and reactors. The guide discusses the following: