

IEEE Guide for Tank Rupture Mitigation of Liquid-Immersed Power Transformers and Reactors

IEEE Power and Energy Society

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Abstract: Measures that may be taken to help mitigate tank rupture of energized liquid-immersed power transformers and reactors due to internal electrical faults are described in this guide. The release of insulating fluid or insulating fluid mist due to failure of the following components are not covered in this guide: load tap changer compartments, bushings and their turrets, conservator tank, piping, valves, pumps, and radiators.

Keywords: IEEE C57.156™, mitigation, tank

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Introduction

This introduction is not part of IEEE Std C57.156-2016, IEEE Guide for Tank Rupture Mitigation of Liquid-Immersed Power Transformers and Reactors.

This document is intended as a guide for specifying, performing design reviews, and monitoring the manufacturing and shipping processes for the purpose of preventing or mitigating ruptures of the tanks caused by internal electrical faults.

This document serves only as a guide for the end user to understand many of the considerations and actions performed during the design, manufacturing, and shipping of power transformers and reactors that relate to the mitigation of tank ruptures. The use of this guide will provide the user with a better appreciation and understanding of the dynamics of internal faults and technologies and design techniques appropriate to lessen their effects.

Continuous attention, communication, and cooperation should be maintained between all involved parties during the design, manufacture, and installation of power transformers and reactors in order to improve the effective mitigation of tank rupture.

This guide was prepared by the Transformers Committee of the IEEE Power and Energy Society.

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1. Overview

1.1 Scope

This guide describes measures that may be taken to help mitigate tank rupture of energized liquid-immersed power transformers and reactors due to internal electrical faults. This guide does not cover the release of insulating fluid or insulating fluid mist due to failure of the following components: load tap changer compartments, bushings and their turrets, conservator tank, piping, valves, pumps, and radiators.

1.2 Purpose

This guide describes the current state of knowledge of the relationship between tank rupture and such variables as arc energy level, hydraulic pressures, and tank pressure withstand. Also described are various measures that transformer users and manufacturers may take in system design, product design, monitoring devices, signaling devices, and insulating fluid choices that can help mitigate tank rupture.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

IEEE Std C57.12.10™, IEEE Standard Requirements for Liquid-Immersed Transformers.^{1,2}

3. Definitions

For the purposes of this document, the following terms and definitions apply. The *IEEE Standards Dictionary Online* should be consulted for terms not defined in this clause.³

mitigation: Reduction of issue (tank rupture) and/or of consequences of same.

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