

IEEE Guide for Dry-Type Transformer Through-Fault Current Duration

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of the
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of the
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Foreword

(This Foreword is not a part of IEEE C57.12.59-1989, IEEE Guide for Dry-Type Transformer Through-Fault Current Duration.)

This guide provides recommendations for the application of overcurrent protective devices to limit the exposure time of dry-type transformers to short circuits. It must not be confused with ANSI C57.109-1985, "Guide for Transformer Through-Fault Current Duration," which applies only to liquid-filled transformers.

Dry-type transformers differ significantly from liquid-filled types in several respects:

- (1) There are six different temperature ratings for dry-type transformers: 60 °C, 80 °C, 100 °C, 115 °C, 125 °C, and 150 °C; whereas, there are only two liquid-type ratings: 55 °C and 65 °C, which are sometimes used in dual ratings.
- (2) There are significant variations in dry-type winding constructions, including conventional varnish-impregnated layered windings, vertically stacked varnish-impregnated disk windings, and solid cast resin windings and combinations thereof, all of which have different transient heating characteristics during time intervals greater than about 100 s.
- (3) The transient heating of liquid-filled transformer windings are considerably buffered by the liquid in which they are immersed, providing a relatively long thermal time constant as compared to dry-type transformers.

Because of the foregoing, the through-fault protection curves for dry-type transformers are limited to overload time intervals of 100 s or less. No one curve for longer time intervals would characterize the thermal performance of all the different dry-type transformer constructions and temperature ratings. Moreover, such curves are not known or, at least, not available. Consequently, the curves in this guide pertain to the temperature rise of the windings during time intervals less than 100 s, wherein nearly all the heat generated is stored in the conductors. For longer time intervals, it is recommended that reference be made to ANSI/IEEE C57.96-1989, "IEEE Guide for Loading Dry-Type Distribution and Power Transformers."

As short-circuit time intervals become progressively less than 100 s, mechanical considerations become more important than thermal characteristics.

Short-circuit characteristic information is contained in ANSI/IEEE C57.12.01-1979, "IEEE Standard General Requirements for Dry-Type Distribution and Power Transformers." This guide supplements that information, but in no way supersedes it.

At the time this guide was approved by the Transformers Committee, the following were the members of the working group:

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