

# IEEE Guide for Methods of Power-Factor Measurement for Low-Voltage (1000 V AC or lower) Inductive Test Circuits

IEEE Power and Energy Society

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# **IEEE Guide for Methods of Power-Factor Measurement for Low-Voltage (1000 V AC or lower) Inductive Test Circuits**

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**Switchgear Committee**  
of the  
**IEEE Power and Energy Society**

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**Abstract:** Methods for determining the value of the power factor for inductive low-voltage (1000 V ac and lower) test circuits are provided. These methods are used in determining the power factor during short-circuit current tests in high-power laboratories. It is preferred that these methods be used during short-circuit current testing. Alternatively, other methods (including use of computerized or digital techniques) may be used, but the method used shall have been validated as producing results equivalent to those obtained using the methods in this guide. The methods described are intended for use in low-voltage test circuits (under 1000 V ac) but may also be used for higher voltages.

**Keywords:** IEEE C37.26™, inductive test circuits, power factor

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## Introduction

This introduction is not part of IEEE Std C37.26™-2014, IEEE Guide for Methods of Power-Factor Measurement for Low-Voltage (1000 V AC or lower) Inductive Test Circuits.

This guide covers methods used to measure the power factor in low-voltage test circuits. Because the power-factor measurement for high-capacity test circuits is particularly difficult and different methods may yield different results, the methods that are least likely to yield error are recommended in this guide for any particular circuit condition.

This low-voltage guide was originally created and issued in 1972 as a compatible companion to the high-voltage American National Standards Institute (ANSI) C37.05-1964 (R1969), American National Standard Methods for Determining the Values of a Sinusoidal Current Wave and a Normal-Frequency Recovery Voltage for AC High-Voltage Circuit Breakers, and ANSI C37.5-1969, American National Standard Methods for Determining Values of a Sinusoidal Current Wave, Normal-Frequency Recovery Voltage, and a Guide for Calculation of Fault Currents for Application of AC High-Voltage Circuit Breakers Rated on a Total Current Basis.

The original guide served for many years, as use of the methods in this guide over several decades demonstrated the validity of the methods. It was revised in 2003 with few, if any, fundamental changes. This revision again makes only minor changes, as the underlying physics have not changed. Where possible, references have been changed to undated references (so that the latest version always applies); to coordinate with this change, references to specific clauses or tables in other standards have been changed to refer to the subject instead of the precise clause number. Changes have also been made in selected word usage.

It is recognized that laboratories may utilize computer-based data acquisition and analysis programs that may calculate values of the test power factor. Such programs should be validated to assure that the results obtained are consistent with values obtained using the methods in this guide.

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## 1. Overview

### 1.1 Scope

This guide describes three methods used in the measurement of the power factor of inductive low-voltage (1000 V and lower) test circuits. These methods may be used at any frequency; however, the values in the tables are specifically for 60-Hz test circuits. These methods are as follows:

- a) Ratio method
- b) DC decrement method
- c) Phase relationship method

Table 1 lists the preferred methods to be used for different levels of test currents and for different levels of power factor. While this guide is primarily intended for use on low-voltage test circuits, the methods discussed are also usable at higher voltages.