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# IEEE Guide for the Functional Specification of Fixed-Series Capacitor Banks for Transmission System Applications

IEEE Power and Energy Society

Sponsored by the
Transmission and Distribution Committee

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IEEE Std 1726™-2013

# IEEE Guide for the Functional Specification of Fixed-Series Capacitor Banks for Transmission System Applications

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**Transmission and Distribution Committee**
of the
**IEEE Power and Energy Society**

Approved 11 December 2013

**IEEE-SA Standards Board**

**Abstract:** General guidelines toward the preparations of a functional specification of transmission fixed-series capacitor (FSC) banks using overvoltage protection based on three technologies are provided. The three technologies are:

— metal oxide varistors

— metal oxide varistors with a forced-triggered bypass gaps, and thyristor protected series capacitors

— thyristor protected series capacitor

This guide does not apply comprehensively to thyristor-controlled series capacitors.

**Keywords:** bypass gap, capacitor bank, capacitor segment, discharge reactor, IEEE 1726™, metal-oxide varistor, protective level, reactive compensation, series capacitor, series compensation, subsynchronous resonance risk (SSR), trigger circuit, triggered gap, varistor

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PDF: ISBN 978-0-7381-8769-3 STD98464
Print: ISBN 978-0-7381-8770-9 STDPD98464

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## Dedication

This document is dedicated to memory of Stan Miske, our friend and colleague.

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## Introduction

This introduction is not part of IEEE Std 1726™-2013, IEEE Guide for the Functional Specification of Fixed-Series Capacitor Banks for Transmission System Applications.

The purpose of this guide is to provide general guidelines toward the preparation of a functional specification of transmission fixed-series capacitor banks (FSC) using overvoltage protection based on three technologies: metal oxide varistors, metal oxide varistors with a forced bypass gap, and thyristor valve bypass.

## Contents

# IEEE Guide for the Functional Specification of Fixed-Series Capacitor Banks for Transmission System Applications



## 1. Overview

### 1.1 Scope

This guide provides general guidelines toward the preparations of a functional specification of transmission fixed-series capacitor (FSC) banks using overvoltage protection based on three technologies:

- metal oxide varistors
- metal oxide varistors with a forced-triggered bypass gaps
- thyristor valve bypass

The commercial aspects of the specification for a particular project are outside the scope of this guide.

This guide does not apply comprehensively to thyristor-controlled series capacitors. A more complete reference is IEEE Std 1534™-2002.[1] The standard for fixed-series capacitors is IEEE Std 824™-2004.

[1] Information on references can be found in Clause 2.