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IEEE Guide for the Design of Cable Raceway Systems for Electric Generating Facilities

IEEE Power and Energy Society

Sponsored by the
Energy Development and Power Generation Committee
and
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IEEE
3 Park Avenue
New York, NY 10016-5997
USA

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IEEE Guide for the Design of Cable Raceway Systems for Electric Generating Facilities

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Abstract: Guidance for the design and installation of cable raceway systems for all types of electric generating facilities is provided. Recommendations, methods, and best engineering practices for the design of cable raceway systems including selection of equipment, materials, and the configuration of raceway are described.
Keywords: cable, conduit, electrical design, generating facility, IEEE 422, raceway configurations, raceway design, raceway installation, tray

The Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York, NY 10016-5997, USA

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*Deceased

The following members of the individual balloting committee voted on this guide. Balloters may have voted for approval, disapproval, or abstention.

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Introduction

This introduction is not part of IEEE Std 422-2012, IEEE Guide for the Design of Cable Raceway Systems for Electric Generating Facilities.

IEEE Std 422™ was originally issued in 1977 and revised in 1986, but was administratively withdrawn by IEEE in the mid 1990s as a result of not being re-affirmed or revised in the interim. This document was originally developed as a guide for the design and installation of wire and cable systems in generating stations with the objective of minimizing failures and their consequences. It was not intended for use in the design of wire and cable systems in switchyards or substations, which is covered in IEEE Std 525™. The guide was originally written to apply to both nuclear and non-nuclear electric power generating stations except for the special requirements of wire and cable installations in Class 1E systems of nuclear stations for which the user was referred to IEEE Std 690™. Most of the existing nuclear plants make reference to IEEE Std 422-1986 in their governing documents and use the guidance of IEEE Std 422-1986 in their designs, especially for non-nuclear applications, such as water treatment, cooling towers, administrative, and warehouse structures, etc. It is not the intent of this revision to change what was done in the past, or require any new design changes to existing operating nuclear plants, or to prohibit the use of the guidance in this document when it is referenced in nuclear plant governing documents. The intent of this revision is to clarify the applicability of this document to future nuclear plant designs.

The general practice at many existing nuclear facilities was to use one cable raceway design criteria within the vital areas rather than having one criterion apply to the non-safety systems, and another criterion apply to the structures and components of the safety related systems. Thus having two documents, IEEE Std 422 and IEEE Std 690, apply to the vital areas within nuclear plants allows for the possibility of two sets of overlapping or conflicting requirements to govern the design of cable raceway systems, especially considering that safety related and non-safety related cables are often routed in same room and may even go to the same end device. Therefore, the user is advised to verify the applicability of this document when doing nuclear plant cable raceway design work to prevent using it in situations where IEEE Std 690 applies.

Therefore, a revision to IEEE Std 422 has been undertaken to remove those design requirements (such as associated circuits) that are specific to only nuclear power generating stations with the understanding that a similar revision to IEEE Std 690 is in progress to capture any nuclear design requirements (such as associated circuits) which apply to nuclear plants but do not apply to non-nuclear generating stations. In addition, it should be noted that the 1986 version of IEEE Std 422 contained some information regarding cable installation practices which has now been incorporated into IEEE Std 1185™-2010, and therefore has been removed from this revision of IEEE Std 422. For additional guidance on raceway design and installation requirements for nuclear facilities, also see IEEE Std 628™.

In addition to fossil fueled generating stations, this document applies to hydroelectric, solar, photovoltaic, wind, ocean, geothermal, and other renewable power generating stations but not to residential, commercial facilities, or emergency standby generators that serve their own facilities. This document may be of benefit for the proper design of cable raceway systems in industrial, commercial, governmental, and public facilities when similar cable raceway systems are used.

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IEEE Guide for the Design of Cable Raceway Systems for Electric Generating Facilities

1. Overview

1.1 Scope

This document provides guidance for the design and installation of cable raceway systems for all types of electric generating facilities.

1.2 Purpose

The guide provides recommendations, methods, and best engineering practices for the design of cable raceway systems including selection of equipment, materials, and the configuration of raceway.

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.