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NEMA HV 2-2019

Standard for Suspension and Post Type Insulators for Electric Power Overhead Lines General Use Information

National Electrical Manufacturers Association

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Suspension and Post Type Insulators for
Electric Power Overhead Lines
General Use Information

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Foreword

This document is intended to provide guidelines for the proper use of insulators and to suggest precautions to be taken against improper usage that may not be readily apparent to the user. However, it is stressed that these are only guidelines and direct consultation between the user and the manufacturer is recommended.

This edition of the document is a revision of NEMA HV 2-2014. The need for this guide was indicated by the knowledge of customers' experiences, which manufacturers of suspension insulators gained over many years. Your comments are welcomed and should be submitted to:

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1 Introduction

High-voltage line insulators, of essentially the same basic designs as those made today, have been providing reliable service for many years. An even greater level of reliability can be attained by recognizing that insulators are both structural members and electrical apparatus, and it is equally important that they are properly handled, stored, installed, and maintained.

Suspension and post type insulators for electric power overhead lines are described and defined in the voluntary C29 series of American National Standards [1-9]. The sole purpose of these product Standards is to define dimensions and tests as required to ensure the interchangeability in service of one manufacturer's insulator with that of another for the same type and class insulator. Conformance of a given insulator to the mechanical and electrical requirements of a particular Standard, when subjected to tests as described in the standard, is intended to assist users in selecting their insulators.

High-voltage insulators are one component of overhead electric lines, and users are assumed competent in integrating them into their systems. Not all conditions can be anticipated in a general discussion, and the proper use of information offered here is the responsibility of the user.

2 Materials

2.1 General

Insulators, as described in the C29 series of Standards, are of two types:

a. *Ceramic* insulators consist of wet-process porcelain or toughened glass dielectric materials assembled together with their associated metal components using cement. Ceramic materials are hard and non-ductile [2-4].

b. *Composite* insulators consist of reinforced fiberglass resin matrix core rods, elastomeric outer-housings, and their associated metal components. The core rod provides mechanical and electrical strength, and the elastomeric housing and weathersheds protect the core rod [6-9].

For both types of insulators, ferrous metal components are protected with a hot-dip zinc coating.

The normal operating temperature range for ceramic and composite type high-voltage insulators is −40°F to +150°F. If application outside this range is contemplated, the manufacturer should be consulted for guidance.

2.2 Chipping/Breakage/Tearing

Ceramic insulators have high-impact strength, but the dielectric material can be broken unless care is exercised in handling. When any section of the porcelain shell has been broken off, or the toughened glass is shattered, the user should discard the insulator.

Composite insulator weathersheds can be torn or cut unless care is taken in handling. Insulators with minor tears in the perimeter of the weathersheds can be used, providing that no tear is present in the sheath protecting the fiberglass core rod.

2.3 Abrasion

Excessive abrasion, causing roughening of the ceramic insulator surface, will reduce the ability of the insulator to shed pollutants. Abrasion of the surface of a composite insulator, exposing the core rod, can result in a loss of strength and should be considered as a cause for the user to remove the insulator from service.