



IEEE Guide for the Evaluation of Solvents Used for Cleaning Electrical Cables and Accessories

IEEE Power Engineering Society

Sponsored by the
Insulated Conductors Committee

1493TM

IEEE
3 Park Avenue
New York, NY 10016-5997, USA
6 June 2007

IEEE Std 1493TM-2006

IEEE Guide for the Evaluation of Solvents Used for Cleaning Electrical Cables and Accessories

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Approved 6 December 2006
IEEE-SA Standards Board

Abstract: Test procedures for evaluating the physical characteristics of cable cleaning solvents and their compatibility with extruded dielectric cable components and cable accessories (joints and terminations) are provided in this guide. Compatibility is established by placing component samples in contact with the cleaning solvent for a short period and then measuring the physical or electrical properties of the component. The measured values are compared with values for samples that have not been in contact with the cleaner. Suggested performance values are provided. This guide also provides suggested procedures for evaluating the cleaning effectiveness of cable cleaning solvents. These comparative test procedures do not provide absolute performance values.

Keywords: cable accessories, cleaning effectiveness, compatibility, extruded dielectric cable

The Institute of Electrical and Electronics Engineers, Inc.
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Print: ISBN 0-7381-5312-5 SH95612
PDF: ISBN 0-7381-5313-3 SS95612

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Introduction

This introduction is not part of IEEE Std 1493-2006, IEEE Guide for the Evaluation of Solvents Used for Cleaning Electrical Cables and Accessories.

This guide provides test methods and general evaluation criteria used to judge the efficacy of electrical cable cleaning solvents proposed as replacements for environmentally harmful and soon to be unavailable chlorinated hydrocarbons such as trichloroethane. The conformance of a product to the proposed requirements for replacement solvents suggests the product should be acceptable for use as an electrical cable cleaning solvent.

Solvents have been used by the electrical industry for numerous applications for many years. Most applications require the solvent meet special requirements such as fast evaporation rate, high dielectric strength, and compatibility with semiconductive polymeric materials. For several decades, one family of solvents has been universally used by the electric industry for nearly all of its applications. This family of chemicals is referred to as chlorofluorocarbons (CFCs), which are a unique class of compounds. One CFC compound, trichloroethane, proved to be ideal for electrical cable cleaning by the electric industry because it has a very high flash point, high dielectric strength, evaporates quickly, and cleans effectively.

Trichloroethane and most other members of the CFC family have been slated for a production and use phase-out because of concern over the depletion of the ozone layer in the upper atmosphere. Production of trichloroethane in the United States was halted on January 1, 1996. It has been heavily studied and well documented that CFCs rise to the upper atmosphere and react with upper level ozone, which causes the concentration of ozone to be substantially reduced. Reduced levels of upper level ozone are projected to allow higher levels of ultraviolet radiation to reach the earth's surface, which is theorized to cause higher incidence of skin cancer in humans and reduced crop yields.

Because of the phase-out of trichloroethane, the electric industry has been put in the situation of seeking substitute materials to meet its solvent needs. Trichloroethane had reached the status of a cleaning solvent that "just worked" as confirmed over the many years that it was used. However, industry-wide specification or evaluation criteria were never written for this product and the many applications where it was used.

This guide provides evaluation categories, test methods, and reasonable acceptance criteria that can be used by the electric industry to evaluate the numerous and diverse lot of chemicals being proposed as replacements for trichloroethane for use as electrical cable and accessory cleaning solvents.

The work of preparing this guide was carried out by Working Group B9W of the Accessories Subcommittee of the Insulated Conductors Committee of the IEEE Power Engineering Society. The original chair of this Working Group, Mr. Gene Weitz, was responsible for the development of this guide. Before the guide could be finalized, both Mr. Weitz and the vice chair, Mr. Peterson, resigned from the Working Group due to changes in their business focus. Unfortunately, the names of the Working Group members were lost during that transition.

The current chair and vice chair assisted with the development of this guide but are careful to note that much credit for pushing the guide through the rigorous development process belongs to Mr. Weitz and Mr. Peterson.

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Participants

At the time this guide was completed, the B9W Working Group had the following membership:

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Michael Bayer
Vern Buchholz
John Cancelosi
John Fee
Bob Fulcomer

Robert Keefe
Glenn Luzzi
Joseph McAuliffe
Tim Robeson
Frank Stepniak

Bill Taylor
Milan Uzelac
Jim Washburn
Carl Wenzel
Carl Zuidema

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

Kenneth Bow
Kraig Bader
A. James Braun
Kent Brown
John Cancelosi
John Cooper
Matthew Davis
John Densley
Guru Dutt Dhingra
Gary Engmann
Marcel Fortin
Robert Fulcomer

Ajit Gwal
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John Hans
Jeffrey Hartenberger
Edward Horgan Jr.
Stan Howell
Robert Keefe
Gael R Kennedy
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Eric Marsden
John Merando

Gary Michel
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Michelle Turner
IEEE Standards Program Manager, Document Development

Matthew J. Ceglia
IEEE Standards Program Manager, Technical Program Development IEEE Standards Project Editor

Contents

1. Scope	1
2. Normative references.....	2
3. Definitions, acronyms, and abbreviations	3
3.1 Definitions	3
3.2 Acronyms and abbreviations	3
4. General	3
5. Safety.....	3
6. Regulatory status	4
6.1 Flash point	5
6.2 Evaporation rate.....	6
6.3 Dielectric strength.....	8
6.4 Percent nonvolatile residue.....	8
7. Compatibility tests.....	8
7.1 Insulation compatibility, tensile, and elongation	10
7.2 Insulation compatibility, volume swell.....	11
7.3 Cable insulation shield compatibility, volume resistivity	12
7.4 Cable accessory compatibility, insulation shield resistance	13
8. Electrical test	15
8.1 Sample preparation	15
8.2 Test procedure	15
9. Cleaning effectiveness.....	15
9.1 Qualitative method	16
9.2 Quantitative method	16
10. Conclusion.....	18