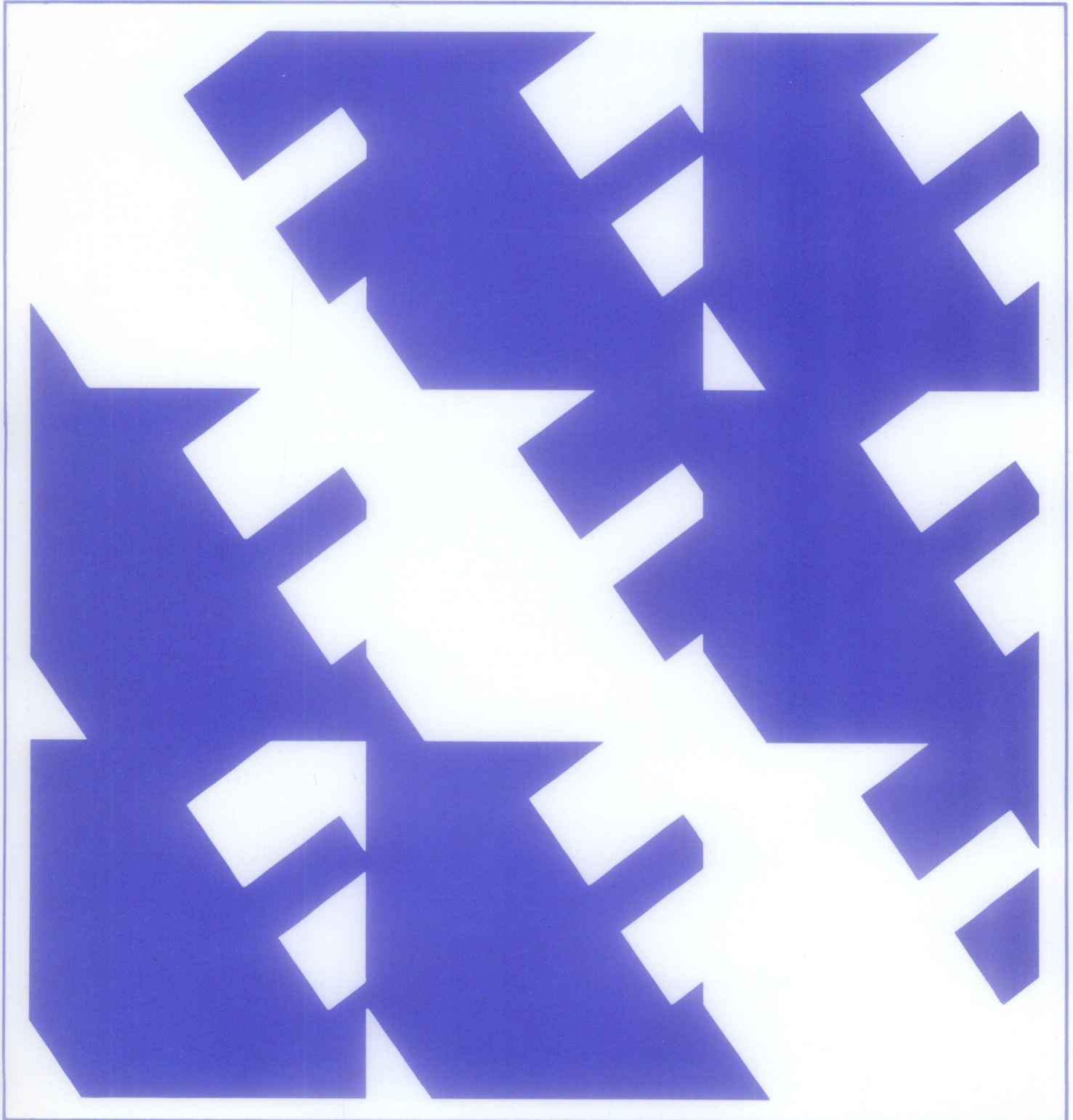


IEEE Guide for Selecting and Testing Jackets for Cables



IEEE Std 532-1982



Published by The Institute of Electrical and Electronics Engineers, Inc 345 East 47th Street, New York, NY 10017, USA
March 18, 1982

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SH08201

IEEE Guide for Selecting and Testing Jackets for Cables

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Insulated Conductors Committee
of the
IEEE Power Engineering Society

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Foreword

(This Foreword is not a part of IEEE Std 532-1982, IEEE Guide for Selecting and Testing Jackets for Cables.)

This guide is concerned with jackets as defined by ANSI/IEEE Std 100-1977, IEEE Standard Dictionary of Electrical and Electronic Terms, "A thermoplastic or thermoset (cross-linked) covering, sometimes fabric reinforced, applied over the insulation, core, metallic sheath or armor of a cable." Users should note that this guide makes reference to standards developed by the Insulated Power Cable Engineers' Association (IPCEA) which became Insulated Cable Engineers' Association (ICEA) in 1979, and Association of Edison Illuminating Companies (AEIC), etc.

This guide is written for the many persons with responsibilities for optimizing underground cable installations. The purpose of the guide is to present a reasonably complete picture of the role of jackets so that the subject can be approached in an orderly and organized manner.

An effort has been made to shun the highly technical language and theory commonly used by electrical engineers, corrosion engineers, and chemists to discuss the more detailed application of jackets. This implies that the various topics covered in this presentation are not necessarily exhaustive in every respect.

The users of this guide are cautioned that all data contained herein are presented for information purposes only. Where deemed necessary, additional, as well as more detailed information, should be obtained by consultation with the cable manufacturer and other experts in the field.

This guide represents the work of the Sheaths and Coverings Subcommittee No 6 of the IEEE Insulated Conductors Committee. Grateful acknowledgement is given to the many individuals who prepared material for this guide, and in particular the members of task Group 6-3.

At the time it approved this guide, the IEEE Sheaths and Covering Subcommittee, SC-6, of the Insulated Conductors Committee, of the IEEE Power Engineering Society had the following membership:

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This guide was prepared by a working group of the IEEE Sheaths and Covering Subcommittee. The work of the task force was shared by the following members:

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IEEE Guide for Selecting and Testing Jackets for Cables

1. General Requirements for Jackets

1.1 Introduction. Jackets furnish mechanical protection for cables during installation and heat cycling. Jackets retard the ingress of water and earth chemicals into the underlying core. Jackets over metallic shields, sheaths and concentric neutral wires also provide protection against corrosion.

1.2 Jacket Characteristics. Jackets can be designed by the addition of fillers, plasticizers, activators, inhibitors, etc, to emphasize one or more but not all of the following physical characteristics:

1.2.1 Toughness, tear and abrasion resistance.

1.2.2 Sufficient flexibility to facilitate cable installation.

1.2.3 Flexibility at abnormally low temperatures.

1.2.4 Physical stability over a range of temperatures from the minimum installation temperature to the emergency and short circuit temperatures. Excessive shrink back of the jacket (at cable ends) can lead to physical instability of a cable splice or terminal.

1.2.5 Resistance to heat aging for the operating conditions of the cable.

1.2.6 Resistance to deformation for operating conditions of the cable.

1.2.7 Sufficient insulating value to prevent excessive surface leakage at conductor terminations of low voltage power and control cables.

1.2.8 Sufficient insulating value to isolate the metallic shield from ground. This will facilitate single point grounding and special bonding systems to minimize shield circulating current losses.

1.2.9 Electrical conductivity when required to function as an insulation shield or as a jacket on a shielded cable buried in the earth and required to be grounded along its entire length.

1.2.10 Resistance to electrical discharge likely to be experienced on unshielded power cables.

1.2.11 Adequate dielectric strength to withstand voltage surges caused by power line switching and power system faults and induced surges from similar transients.

1.2.12 Resistance to abnormal concentrations of inorganic chemicals especially those which promote corrosion, sulfiding and oxidation of cable shielding materials.

1.2.13 Resistance to abnormal concentrations of organic chemicals which is important for conductive shields and jackets.

1.2.14 Resistance to ozone concentrations higher than normally encountered in the atmosphere.

1.2.15 Low moisture absorption.

1.2.16 Flame resistance.

1.2.17 Oil resistance.

1.2.18 Resistance to sunlight and weather.

1.2.19 Reliability for extra heavy-duty service such as required of portable power cables.

2. References

2.1 References

[1] AEIC No 1-68, Solid-Type Impregnated-Paper-Insulated Lead-Covered Cable Specifications, (tenth edition).¹

[2] AEIC No CS4-79, Specifications for Impregnated-Paper-Insulated Low and Medium Pressure Self Contained Fluid Filled Cable, (seventh edition).

[3] ANSI/ASTM D 1248-78, Specifications for Polyethylene Plastics Molding and Extrusion Materials.²

¹ AEIC documents are available from the Publication Department of the Association of Edison Illuminating Companies, 51 East 42nd Street, New York, NY 10017.

² ANSI documents are available from the Sales Department of American National Standards Institute, 1430 Broadway, New York, NY 10018.