



**ANSI/ICEA S-107-704-2021
STANDARD FOR BROADBAND BURIED
SERVICE WIRE, FILLED, POLYOLEFIN
INSULATED, COPPER CONDUCTOR**

©2021 by INSULATED CABLE ENGINEERS ASSOCIATION, Inc.



**Approved as an American National Standard
ANSI Approval Date: 7/27/2021**

ANSI/ICEA S-107-704-2021

*STANDARD FOR BROADBAND BURIED SERVICE WIRE,
FILLED, POLYOLEFIN INSULATED, COPPER CONDUCTOR*

Approved 3/2/2021 by

INSULATED CABLE ENGINEERS ASSOCIATION, Inc.
www.icea.net

Approved 7/27/2021 by

American National Standards Institute

© 2021 by ICEA. Contents may not be reproduced in any form without permission of the INSULATED CABLE ENGINEERS ASSOCIATION, Inc

NOTICE AND DISCLAIMER

The information in this publication was considered technically sound by the consensus of persons engaged in the development and approval of the document at the time it was developed. Consensus does not necessarily mean that there is unanimous agreement among every person participating in the development of this document.

The Insulated Cable Engineers Association, Inc. (ICEA) standards and guideline publications, of which the document contained herein is one, are developed through a voluntary consensus standards development process. This process brings together persons who have an interest in the topic covered by this publication. While ICEA administers the process and establishes rules to promote fairness in the development of consensus, it does not independently test, evaluate, or verify the accuracy or completeness of any information or the soundness of any judgements contained in its standards and guideline publications.

ICEA disclaims liability for personal injury, property, or other damages of any nature whatsoever, whether special, indirect, consequential, or compensatory, directly or indirectly resulting from the publication, use of, application, or reliance on this document. ICEA disclaims and makes no guaranty or warranty, expressed or implied, as to the accuracy or completeness of any information published herein, and disclaims and makes no warranty that the information in this document will fulfill any of your particular purposes or needs. ICEA does not undertake to guarantee the performance of any individual manufacturer or seller's products or services by virtue of this standard or guide.

In publishing and making this document available, ICEA is not undertaking to render professional or other services for or on behalf of any person or entity, nor is ICEA undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgement or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances. Information and other standards on the topic covered by this publication may be available from other sources, which the user may wish to consult for additional views or information not covered by this publication.

ICEA has no power, nor does it undertake to police or enforce compliance with the contents of this document. ICEA does not certify, test, or inspect products, designs, or installations for safety or health purposes. Any certification or other statement of compliance with any health or safety-related information in this document shall not be attributable to ICEA and is solely the responsibility of the certifier or maker of the statement.

CONTENTS

		Page
Section 1	GENERAL	8
1.1	PURPOSE	8
1.2	SCOPE	8
1.3	Acronyms, Abbreviations And Symbols.....	8
1.4	OPTIONS AND INFORMATION.....	10
1.5	UNITS AND TOLERANCES	11
1.6	REFERENCES	11
1.7	QUALITY ASSURANCE	11
1.8	SAFETY CONSIDERATIONS	11
Section 2	CONDUCTORS	13
2.1	REQUIREMENTS.....	13
2.2	FACTORY JOINTS.....	13
Section 3	CONDUCTOR INSULATION	14
3.1	INSULATION MATERIAL	14
3.2	INSULATION TYPE.....	14
3.3	INSULATION DIMENSIONS, COLORS, AND SPLICES	14
3.4	INSULATION PHYSICAL REQUIREMENTS	15
3.5	TWIST LENGTH AND COLOR CODING	16
Section 4	CORE CONSTRUCTION	17
4.1	CORE LAYUP	17
4.2	CORE WRAP	17
4.3	BINDERS.....	17
4.4	FILLING COMPOUND.....	17
4.5	FLOODING COMPOUND	18
4.6	WATER SWELLABLE MATERIALS.....	18
4.7	RIPCORD(S)	18
Section 5	SHIELDS	19
5.1	SHIELDING SYSTEM	19
5.2	SHIELD MATERIALS	19
5.3	SHIELD APPLICATION.....	20
5.4	SHIELD CORRUGATION.....	20
5.5	SHIELD OVERLAP.....	20
5.6	SHIELD SPLICES	20
Section 6	JACKET	22
6.1	INNER JACKET.....	22
6.2	OUTER JACKET	22

6.3	ARMORING SYSTEMS.....	24
6.4	ARMOR APPLICATION	24
6.5	ARMOR CORRUGATION	25
6.6	ARMOR OVERLAP	25
6.7	ARMOR SPLICES.....	25
Section 7	ELECTRICAL REQUIREMENTS.....	26
7.1	REQUIREMENTS.....	26
7.2	MEASUREMENT PRECAUTION	26
7.3	DC RESISTANCE	26
7.4	DC RESISTANCE UNBALANCE	26
7.5	MUTUAL CAPACITANCE	26
7.6	PAIR-TO-PAIR CAPACITANCE UNBALANCE.....	26
7.7	INSULATION RESISTANCE	27
7.8	CONDUCTOR-TO-CONDUCTOR DC PROOF TEST	27
7.9	CORE-TO-SHIELD DC PROOF TEST.....	27
7.10	SHIELD RESISTANCE.....	27
7.11	SHIELD HEATING TEST	27
7.12	FUSING COORDINATION TEST.....	27
7.13	CONTINUITY OF METALLIC WIRE ELEMENTS	28
7.14	PROPAGATION DELAY	28
7.15	BACKBONE CABLE TRANSMISSION REQUIREMENTS	28
Section 8	MECHANICAL REQUIREMENTS	30
8.1	COMPOUND FLOW.....	30
8.2	MOISTURE RESISTANCE.....	30
8.3	WIRE BENDING TEST.....	30
8.4	IMPACT TEST.....	30
8.5	BREAKING FORCE	31
8.6	FLAMMABILITY.....	31
8.7	SHEATH ADHERENCE – UNBONDED.....	31
Section 9	GENERAL REQUIREMENTS	33
9.1	IDENTIFICATION AND MARKING.....	33
9.2	Jacket Marking	33
9.3	Length Marking.....	34
9.4	Communications Cable Identifier.....	34
9.5	END-SEALING	34
9.6	PACKAGING	34
Appendices		
Appendix A	Specifications Referenced in this Standard (Informative).....	35
Appendix B	Jacket Ripcord Test (Normative).....	37
Appendix C	Metallic Tape Splice Breaking Strength, Percent Retention (Normative).....	38

Appendix D	Absorption Coefficient Test for PVC	39
Appendix E	Fusing Coordination Test.....	41
Appendix F	Water Resistance Test.....	43

List of Tables

Table 2-1	Nominal Conductor Diameter	13
Table 2-2	Minimum Conductor Elongation.....	13
Table 3-1	Insulation Colors	14
Table 3-2	Minimum Compressive Strength.....	15
Table 3-3	Color Coding.....	16
Table 5-1	Tape Thickness	20
Table 6-1	Minimum Jacket Thickness.....	23
Table 6-2	Completed Wire Material Requirements.....	23
Table 6-3	Steel Composition.....	24
Table 7-1	DC Resistance.....	26
Table 7-2	DC Proof Test.....	27
Table 7-3	Attenuation Coefficients.....	28
Table 7-4	Attenuation.....	29
Table 9-1	Year of Manufacture Marker	33

List of Figures

Figure 8-1	Sheath Adherence Sample Preparation	32
Figure E-1	Fusing Coordination Test Configuration	42
Figure F-1	Pressure Cell For Water Resistance	44

FOREWORD

ICEA standards are published in the public interest and are intended to promote product uniformity and quality throughout the industry. Existence of this publication does not in any respect preclude the manufacture or use of products not conforming to the standard.

The user of this standard is cautioned to observe any applicable health or safety regulations and rules relative to the manufacture and use of cable made in conformity with this standard. This standard hereafter assumes that manufacture, testing, installation, and maintenance of cables defined by this standard will be performed only by properly trained personnel using suitable equipment and employing appropriate safety precautions.

Requests for interpretation of this ICEA standard must be submitted in writing to the Secretary of the Insulated Cable Engineers Association, Inc. The mailing address of ICEA Headquarters and a Contact link are provided on the ICEA web site - www.icea.net

An official written interpretation shall be provided. Suggestions for improvements in this standard are welcomed by the association.

This standard was developed by the ICEA Communications Division Working Group - 704. It was approved by ICEA on 3/2/2021. The members of the ICEA Communications Cable Division, WG - 704, who participated in this project, were:

WG Chairman: Ron Stanko

G.L. Dorna

J. Pavlicek

D. Fausz

T. Stevens

T. Hayes

(This page intentionally left blank)

Section 1 GENERAL

1.1 PURPOSE

The purpose of this Standard is to establish generic technical requirements that may be referenced by individual telecommunications wire specifications covering products intended to connect the broadband outside plant to the individual customer premises. The parameters covered provide material, construction, and performance requirements.

Because this Standard does not cover all details of individual wire design, it cannot be used as a single document for procurement of product. It is intended to be used in conjunction with an individual product specification that provides complete design details for the specific wire type and designates the applicable performance requirements. Such individual wire specifications may be prepared either by the user or the manufacturer. The specification designated for procurement is at the option of the user.

The manufacturer and user of these wires should consider the selection and availability of appropriate hardware in the installation of these products

1.2 SCOPE

This Standard covers material, mechanical and electrical requirements for Broadband Buried Service Wire (BB-BSW) of ≤ 6 pair, intended for use principally in extending a circuit from a broadband cable terminal to a subscriber's network interface device (NID).

1.3 ACRONYMS, ABBREVIATIONS AND SYMBOLS

%	Percent
α	Attenuation
AC	alternating current
ACRF	Attenuation-to-Crosstalk Ratio, Far-End (formerly ELFEXT)
ANSI	American National Standards Institute
ASQC	American Society for Quality Control
ASTM	American Society for Testing and Materials
ATG	absorbent thixotropic gel
AWG	American Wire Gauge
BB-BSW	broadband buried service wire
CAS	Chemical Abstract Service
Cg	ground component of mutual capacitance
CM	UL Listing designation for General Purpose Communication Cable
CMG	UL Listing designation for General Purpose Communication Cable
CMP	UL Listing designation for Plenum Communication Cable
CMR	UL Listing designation for Riser Communication Cable
CMX	UL Listing designation for Limited Use Communication Cable
CUPP	capacitance unbalance pair to pair
dB	decibel
DC	Direct Current