ANSI C119.4-2011

American National Standard

for Electric Connectors—

Connectors for Use Between Aluminum-to-Aluminum and Aluminum-to-Copper Conductors Designed for Normal Operation at or Below 93°C and Copper-to-Copper Conductors Designed for Normal Operation at or Below 100°C

Secretariat:

National Electrical Manufacturers Association

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American National Standards Institute, Inc.

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Foreword (Neither this foreword nor any of the informative annexes is a part of American National Standard C119.4-2011)

This standard describes electrical and mechanical tests used to establish performance characteristics of connectors used to join aluminum-to-aluminum, aluminum-to-copper, or copper-to-copper bare and insulated conductors.

It is the responsibility of the user to determine the proper connector for any particular application. The user may request the manufacturer to perform any additional desired testing beyond that required by the C119.4-2011 standard performance tests.

Substantive changes to the standard have been made in the C119.4-2011 version of the standard. A substantive change is one that directly and materially affects performance of a product and which requires testing or retesting to meet the current edition of a standard. The substantive changes to the standard are as follows:

1. Test requirements for copper connectors.
2. Test requirements for copper system stability, which were not part of earlier editions.
3. Requirement for retesting performance of a product if there have been substantive changes made to the product.

This revision includes the addition of spreadsheet files in Annex A that can be used to collect current cycle test data, calculate connector stability, generate graphs of the data, and print data to provide test results as part of the test report. The spreadsheets are provided to give a standardized format to collect, calculate, and report test data and test results. These spreadsheets were not part of earlier editions.

This revision includes the addition of two optional tests: Optional Fault Current Test (Annex D) and Optional Corrosion Test (Annex E). These optional tests are not a part of the required C119.4-2011 standard performance tests. The subcommittee has provided these optional performance tests as references in response to users who have requested guidance for these types of additional performance tests. The user may request that the manufacturer perform any additional tests that are not a part of the required C119.4-2011 standard performance tests.

This standard includes an additional current cycle test method (CCT) utilizing elevated temperature testing for an extra heavy duty connector category, Class AA. The intent of elevated test temperature in Class AA testing is to provide a better performing connector. There is also a new class of tensile strength—Class 1A, Normal Tension.

This standard includes an alternate, accelerated current cycle test method, henceforth referred to as the current cycle submersion test (CCST). The CCST method differs from the traditional current cycle test (CCT) in that test conductors are rapidly cooled by immersion in chilled water at the beginning of the "current-OFF" cycle, and the test requires fewer total current-ON and current-OFF cycles. Comparative testing has demonstrated that the CCST method will provide essentially the same performance test results as the traditional current cycle test (CCT) in fewer test cycles. The current cycle test remains the preferred test method recommended for qualification of a connector.

This standard was initially developed under the direction of the Transmission and Distribution Committee of the Edison Electric Institute (EEI). Tentative performance-type specifications for electrical characteristics were issued in joint report form in 1958 by a steering committee of EEI and an advisory committee of manufacturers on the aluminum conductor research project (EEI Pub. No. 59-70 *Tentative Specifications for Connectors for Aluminum Conductors*).

Experience gained from extensive trial use further confirmed the performance criteria and test conditions of the tentative specifications and led to the development of Standard TDJ 162 in October 1962 by a joint committee of EEI and the National Electrical Manufacturers Association (NEMA). TDJ 162 was subsequently superseded by this document.

The C119.4 Subcommittee of the Accredited Standards Committee on Connectors for Electric Utility applications, C119, in its constant review of the publication, continues to seek out the views of responsible users that will contribute to the development of better standards. Suggestions for improvement of this standard will be welcome. They should be sent to the National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1752, Rosslyn, Virginia 22209.

This standard was processed and approved for submittal to ANSI by the Accredited Standards Committee on Connectors for Electrical Utility Applications, C119. Committee approval of this standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the C119 Committee had the following members:

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The C119.4 Subcommittee on Connectors for Use Between Aluminum-to-Aluminum and Aluminum-to-Copper Conductors Designed for Normal Operation at or Below 93°C and Copper-to-Copper Conductors Designed for Normal Operation at or Below 100°C, which developed the revisions of this standard, had the following members at the time of its approval:

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For Electric Connectors—

Connectors for Use Between Aluminum-to-Aluminum and Aluminum-to-Copper Conductors Designed for Normal Operation at or Below 93°C and Copper-to-Copper Conductors Designed for Normal Operation at or Below 100°C

1 Scope and Purpose

1.1 Scope

This standard covers connectors used for making electrical connections between aluminum-to-aluminum or aluminum-to-copper or copper-to-copper conductors used on distribution and transmission lines for electric utilities.

This standard establishes the electrical and mechanical test requirements for electrical connectors. This standard is not intended to recommend operating conditions or temperatures.

1.2 Purpose

The purpose of this standard is to give reasonable assurance to the user that connectors meeting the requirements of this standard will perform in a satisfactory manner, provided they have been properly selected for the intended application and are installed in accordance with the manufacturer's recommendations. The service operating conditions and the selection of the connector class is the responsibility of the user.