PD IEC TS 62351-100-3:2020

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Power systems management and associated information exchange — Data and communications security

Part 100-3: Conformance test cases for the IEC 62351-3, the secure communication extension for profiles including TCP/IP

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National foreword

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Part 100-3: Conformance test cases for IEC 62351-3, the secure communication extension for profiles including TCP/IP

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POWER SYSTEMS MANAGEMENT AND ASSOCIATED INFORMATION EXCHANGE – DATA AND COMMUNICATIONS SECURITY –

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Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 62351-100-3, which is a technical specification, has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

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The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
57/2090/DTS	57/2130/RVDTS

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

This document is to be read in conjunction with IEC 62351-3:2014, IEC 62351-3/AMD1:2018 and IEC62351-3/AMD2:2019.

A list of all parts in the IEC 62351 series, published under the general title *Power systems management and associated information exchange – Data and communications security*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

This technical specification describes test cases for conformance testing of telecontrol equipment or systems integrating the IEC 62351-3 security extension for profiles including TCP/IP.

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POWER SYSTEMS MANAGEMENT AND ASSOCIATED INFORMATION EXCHANGE – DATA AND COMMUNICATIONS SECURITY –

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1 Scope

This part of IEC 62351, which is a technical specification, describes test cases of data and communication security for telecontrol equipment, Substation Automation Systems [SAS] and telecontrol systems, including front-end functions of SCADA.

The goal of this document is to enable interoperability by providing a standard method of testing protocol implementations to verify that a device fulfils the requirement of IEC 62351-3. Note that conformity to IEC 62351-3 does not guarantee interoperability between devices using different implementations. It is expected that using this specification during testing will minimize the risk of non-interoperability. A basic condition for this interoperability is a passed conformance test of both devices.

The scope of this document is the specification of common available procedures and definitions for conformance and/or interoperability testing to ensure conformity to IEC 62351-3. The conformance test cases defined here are focused to verify the conformant integration of the underlying authentication/encryption protocol (TLS), as specified in IEC 62351-3, to protect TCP/IP based communications.

This document is not intended to test the underlying authentication/encryption protocol required by IEC 62351-3 to be implemented over TCP/IP (TLS). The conformance testing of the authentication/encryption protocol over TCP/IP is outside the scope of this document.

This document deals with data and communication security conformance testing; therefore, other requirements, such as safety or EMC are not covered. These requirements are covered by other standards (if applicable) and the proof of compliance for these topics is done according to these standards.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.[1]

IEC TS 62351-2:2008, *Power systems management and associated information exchange - Data and communications security - Part 2: Glossary of terms*

IEC 62351-3:2014, *Power systems management and associated information exchange – Data and communications security – Part 3: Communication network and system security – Profiles*

[1] The base standard always takes precedence. In case of ambiguity between this technical specification and the base standards (IEC 62351-3), this part of IEC 62351 needs to be clarified or amended.

When testing, negative behavior is not described in the base standard, the behavior described in this document prevails and should be observed. The conformance statement produced after testing indicates any lack of conformance to either the test plan or the base standard.

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including TCP/IP
IEC 62351-3:2014/AMD1:2018, IEC 62351-3:2014/AMD2:2019

3 Terms, definitions and abbreviated terms

For the purposes of this document, the terms and definitions given in IEC TS 62351-2 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1 Terms and definitions

3.1.1
client
device receiving or requesting services or information from server devices

Note 1 to entry: In some specifications, a device is commonly called "controlling station" or "master" or "master station".

3.1.2
interoperability
ability of two or more telecontrol devices from the same vendor, or different vendors, to exchange information and use that information for correct cooperation

3.1.3
Message Authentication Code (MAC)
calculated value used by a receiving station to authenticate and check the integrity of an information

3.1.4
normal procedure tests
set of test cases to verify that the device fulfils the requirements of IEC 62351-3 in the expected (normal) conditions

3.1.5
Protocol Implementation Conformance Statement (PICS)
summary of the referencing standard capabilities of the system to be tested

3.1.6
Protocol Implementation Document (PID)
document which describes complete functionalities and system specific information

Note 1 to entry: The PID consists of the PICS and the PIXIT.

3.1.7
protocol Implementation eXtra Information for Testing (PIXIT)
system specific information contained in the PIXIT document regarding the capabilities of the system to be tested, which specifies which items are optional

3.1.8
resiliency tests
set of test cases to verify that the device fulfils the requirements of IEC 62351-3 in reacting to the unexpected (error) conditions

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3.1.9
server
device that provides information or services to client devices

Note 1 to entry: In some specifications, a server is commonly called "controlled station" or "outstation" or "slave".

3.1.10
test equipment
all tools and instruments which simulate and verify the communication traffic, inputs and/or outputs of the system under test

3.1.11
test initiator
party initiating a conformance test of a device that is executed by a test facility

3.1.12
test facility
supplier-independent organization which is able to provide appropriate test equipment and trained staff for conformance testing

3.2 Abbreviated terms

Refer to IEC 62351-2 for a list of applicable abbreviated terms. The abbreviations listed below are included here because they are specific to IEC 62351-3 and they may be useful for reading this document as an independent document.

CRL	Certificate Revocation List
DUT	Device Under Test
IP	Inter-Networking Protocol
MAC	Message Authentication Code
OCSP	Online Certificate Status Protocol
PICS	Protocol Implementation Conformance Statement
PID	Protocol Implementation Document (=PICS + PIXIT)
PIXIT	Protocol Implementation eXtra Information for Testing
SAS	Substation Automation System
SCADA	Supervisory Control And Data Acquisition
TCP	Transport Control Protocol

4 General

4.1 Normatives covered by this document

This document defines the conformance test cases for the requirements defined in IEC 62351-3:2014, IEC 62351-3:2014/AMD1:2018, IEC 62351-3:2014/AMD2:2019 and the parts of the series requiring conformance to IEC 62351-3.

In addition to the test cases described in this document there are further test cases necessary for TLS base protocol RFC as well as test cases depending on the content provided in the certificates. An example may be the RBAC extension specified in IEC 62351-8 or certificate profiles defined in IEC 62351-9.

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