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Power systems management and associated information exchange - Data and communications security - Part 4: Profiles including MMS and derivatives

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December 2018

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English Version

Power systems management and associated information exchange - Data and communications security - Part 4: Profiles including MMS and derivatives (IEC 62351-4:2018)

Gestion des systèmes de puissance et échanges d'informations associés - Sécurité des communications et des données - Partie 4 : Profils comprenant MMS (IEC 62351-4:2018)

Energiemanagementsysteme und zugehöriger Datenaustausch - IT-Sicherheit für Daten und Kommunikation - Teil 4: Profile einschließlich MMS und Ableitungen (IEC 62351-4:2018)

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European foreword

The text of document 57/2032/FDIS, future edition 1 of IEC 62351-4, prepared by IEC/TC 57 "Power systems management and associated information exchange" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62351-4:2018.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-09-20
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2021-12-20

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60870-6-503:2014	NOTE	Harmonized as EN 60870-6-503:2014 (not modified)
IEC 60870-6-702:2014	NOTE	Harmonized as EN 60870-6-702:2014 (not modified)
IEC 60870-6-802:2014	NOTE	Harmonized as EN 60870-6-802:2014 (not modified)

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC/TS 62351-1	-	Power systems management and associated information exchange - Data and communications security - Part 1: Communication network and system security - Introduction to security issues	-	-
IEC/TS 62351-2	-	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 including TCP/IP	EN 62351-3	2014
+A1	2018		+A1	2018
IEC/TS 62351-8	2011	Power systems management and associated information exchange - Data and communications security - Part 8: Role-based access control	-	-
IEC 62351-9	2017	Power systems management and associated information exchange - Data and communications security - Part 9: Cyber security key management for power system equipment	EN 62351-9	2017
ISO/IEC 8073	1997	Information technology - Open Systems Interconnection - Protocol for providing the connection-mode transport service	-	-
ISO/IEC 8823-1	1994	Information technology - Open Systems Interconnection - Connection-oriented presentation protocol: Protocol specification	-	-
ISO/IEC 8824-1	-	Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation	-	-

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ISO/IEC 8825-1	-	Information technology - ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)	-	-
ISO/IEC 8825-4	-	Information technology - ASN.1 encoding rules: XML Encoding Rules (XER)	-	-
ISO 8601	2004	Data elements and interchange formats - Information interchange - Representation of dates and times	-	-
ISO 9506-2	2003	Industrial automation systems - Manufacturing Message Specification - Part 2: Protocol specification	-	-
ISO/IEC 9594-8	-	Information technology - Open Systems Interconnection - The Directory - Part 8: Public-key and attribute certificate frameworks	-	-
ITU-T Recommendation X.227	-	Information technology - Open Systems Interconnection - Connection-oriented protocol for the Association Control Service Element: Protocol specification	-	-
+ A1	-		-	-
IETF RFC 1006	1987	ISO Transport Service on top of the TCP, Version: 3	-	-
IETF RFC 2104	1997	HMAC: Keyed-Hashing for Message Authentication	-	-
IETF RFC 3526	2003	More Modular Exponential (MODP) Diffie-Hellman groups for Internet Key Exchange (IKE)	-	-
IETF RFC 5114	2003	Additional Diffie-Hellman Groups for Use with IETF Standards	-	-
IETF RFC 5246	2008	The Transport Layer Security (TLS) Protocol Version 1.2	-	-
IETF RFC 5480	2009	Elliptic Curve Cryptography Subject Public Key Information	-	-
IETF RFC 5639	2010	Elliptic Curve Cryptography (ECC) Brainpool Standard Curves and Curve Generation	-	-
IETF RFC 5869	2010	HMAC-based Extract-and-Expand Key Derivation Function	-	-
IETF RFC 6120	2011	Extensible Messaging and Presence Protocol (XMPP): Core	-	-
IETF RFC 6122	2011	Extensible Messaging and Presence Protocol (XMPP): Address Format	-	-

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 4: Profiles including MMS and derivatives

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International Standard IEC 62351-4 has been prepared by IEC technical committee 57: Power systems management and associated exchange.

The text of this standard is based on the following documents:

FDIS	Report on voting
57/2032/FDIS	57/2053/RVD

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

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

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– Abstract Syntax Notation One (ASN.1) and W3C XML Schema Definition (W3C XSD) notions are presented in **bold Courier New** typeface; and

– when ASN.1 types and values are referenced in normal text, they are differentiated from normal text by presenting them in **bold Courier New** typeface.

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

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

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

Part 4: Profiles including MMS and derivatives

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1 Scope

1.1 General

This part of IEC 62351 extends the scope of IEC TS 62351-4:2007 [1][1] by specifying a compatibility mode that provides interoperation with implementation based on IEC TS 62351-4:2007 and by specifying extended capabilities referred to as native mode.

This part of IEC 62351 specifies security requirements both at the transport layer and at the application layer. While IEC TS 62351-4:2007 primarily provided some limited support at the application layer for authentication during handshake for the Manufacturing Message Specification (MMS) based applications, this document also provides support for extended integrity and authentication both for the handshake phase and for the data transfer phase. It provides for shared key management and data transfer encryption at the application layer and it provides security end-to-end (E2E) with zero or more intermediate entities. While IEC TS 62351-4:2007 only provides support for systems based on the MMS, i.e. systems using an Open Systems Interworking (OSI) protocol stack, this document also provides support for application protocols using other protocol stacks, e.g. an Internet protocol suite (see 4.1). This support is extended to protect application protocols using XML encoding. This extended security at the application layer is referred to as E2E-security.

In addition to E2E security, this part of IEC 62351 also provides mapping to environmental protocols carrying the security related information. Only OSI and XMPP environments are currently considered.

It is intended that this part of IEC 62351 be referenced as a normative part of standards that have a need for using application protocols, e.g., MMS, in a secure manner.

It is anticipated that there are implementations, in particular Inter-Control Centre Communications Protocol (ICCP) implementations that are dependent on the IEC TS 62351-4:2007 specifications of the T-profile and the A-security-profile. The specifications from IEC TS 62351-4:2007 are therefore included in this part of IEC 62351. Implementations supporting these specifications will interwork with implementation based on IEC TS 62351-4:2007.

NOTE The A-security-profile is in the strict sense not a profile, but the term is here kept for historical reasons.

This document represents a set of mandatory and optional security specifications to be implemented to protect application protocols.

The initial audience for this document is the members of the working groups developing or making use of protocols. For the measures described in this part of IEC 62351 to take effect, they shall be accepted and referenced by the specifications for the protocols themselves.

The subsequent audience for this document is the developers of products that implement these protocols and the end user that want to specify requirements for its own environment.

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1 Numbers in square brackets refer to the bibliography.