

STN	Priemyselné komunikačné siete. Profily. Časť 2: Doplňkové profily prevádzkových zberníc pre siete v reálnom čase založené na ISO/IEC 8802-3.	STN EN 61784-2 18 4020
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Industrial communication networks - Profiles - Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 03/15

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EN 61784-2

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Supersedes EN 61784-2:2010

English Version

**Industrial communication networks - Profiles - Part 2: Additional
fieldbus profiles for real-time networks based on ISO/IEC 8802-3
(IEC 61784-2:2014)**

Réseaux de communication industriels - Profils - Partie 2:
Profils de bus de terrain supplémentaires pour les réseaux
en temps réel basés sur l'ISO/CEI 8802-3
(CEI 61784-2:2014)

Industrielle Kommunikationsnetze - Profile - Teil 2:
Zusätzliche Feldbusprofile für Echtzeitnetzwerke basierend
auf ISO/IEC 8802-3
(IEC 61784-2:2014)

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Foreword

The text of document 65C/761/FDIS, future edition 3 of IEC 61784-2, prepared by SC 65C "Industrial networks" of IEC/TC 65 "Industrial-process measurement, control and automation" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61784-2:2014.

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) 2015-05-21
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-08-21

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Annex ZA

(normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61010	series	Safety requirements for electrical equipment for measurement, control and laboratory use	EN 61010	series
IEC 61131-2	-	Programmable controllers - Part 2: Equipment requirements and tests	EN 61131-2	-
IEC 61158	series	Industrial communication networks - Fieldbus specifications	EN 61158	series
IEC 61158-1	2014	Industrial communication networks - Fieldbus specifications - Part 1: Overview and guidance for the IEC 61158 and IEC 61784 series	EN 61158-1	2014
IEC 61158-2	2014	Industrial communication networks - Fieldbus specifications - Part 2: Physical layer specification and service definition	EN 61158-2	2014
IEC 61158-3-2	2014	Industrial communication networks - Fieldbus specifications - Part 3-2: Data-link layer service definition - Type 2 elements	EN 61158-3-2	2014
IEC 61158-3-4	2014	Industrial communication networks - Fieldbus specifications - Part 3-4: Data-link layer service definition - Type 4 elements	EN 61158-3-4	2014
IEC 61158-3-11	2007	Industrial communication networks - Fieldbus specifications - Part 3-11: Data-link layer service definition - Type 11 elements	EN 61158-3-11	2008
IEC 61158-3-12	2014	Industrial communication networks - Fieldbus specifications - Part 3-12: Data-link layer service definition - Type 12 elements	EN 61158-3-12	2014

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61158-3-13	2014	Industrial communication networks - Fieldbus specifications - Part 3-13: Data link layer service definition - Type 13 elements	EN 61158-3-13	2014
IEC 61158-3-14	2014	Industrial communication networks - Fieldbus specifications - Part 3-14: Data-link layer service definition - Type 14 elements	EN 61158-3-14	2014
IEC 61158-3-17	2007	Industrial communication networks - Fieldbus specifications - Part 3-17: Data-link layer service definition - Type 17 elements	EN 61158-3-17	2008
IEC 61158-3-19	2014	Industrial communication networks - Fieldbus specifications - Part 3-19: Data-link layer service definition - Type 19 elements	EN 61158-3-19	2014
IEC 61158-3-21	2010	Industrial communication networks - Fieldbus specifications - Part 3-21: Data-link layer service definition - Type 21 elements	EN 61158-3-21	2012
IEC 61158-3-22	2014	Industrial communication networks - Fieldbus specifications - Part 3-22: Data-link layer service definition - Type 22 elements	EN 61158-3-22	2014
IEC 61158-4-2	2014	Industrial communication networks - Fieldbus specifications - Part 4-2: Data-link layer protocol specification - Type 2 elements	EN 61158-4-2	¹⁾
IEC 61158-4-4	2014	Industrial communication networks - Fieldbus specifications - Part 4-4: Data-link layer protocol specification - Type 4 elements	EN 61158-4-4	¹⁾
IEC 61158-4-11	2014	Industrial communication networks - Fieldbus specifications - Part 4-11: Data-link layer protocol specification - Type 11 elements	EN 61158-4-11	¹⁾
IEC 61158-4-12	2014	Industrial communication networks - Fieldbus specifications - Part 4-12: Data-link layer protocol specification - Type 12 elements	EN 61158-4-12	¹⁾
IEC 61158-4-13	2014	Industrial communication networks - Fieldbus specifications - Part 4-13: Data-link layer protocol specification - Type 13 elements	EN 61158-4-13	¹⁾
IEC 61158-4-14	2014	Industrial communication networks - Fieldbus specifications - Part 4-14: Data-link layer protocol specification - Type 14 elements	EN 61158-4-14	¹⁾

1) To be published.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61158-4-17	2007	Industrial communication networks - Fieldbus specifications - Part 4-17: Data-link layer protocol specification - Type 17 elements	EN 61158-4-17	2008
IEC 61158-4-19	2014	Industrial communication networks - Fieldbus specifications - Part 4-19: Data-link layer protocol specification - Type 19 elements	EN 61158-4-19	1)
IEC 61158-4-21	2010	Industrial communication networks - Fieldbus specifications - Part 4-21: Data-link layer protocol specification - Type 21 elements	EN 61158-4-21	2012
IEC 61158-4-22	2014	Industrial communication networks - Fieldbus specifications - Part 4-22: Data-link layer protocol specification - Type 22 elements	EN 61158-4-22	1)
IEC 61158-5-2	2014	Industrial communication networks - Fieldbus specifications - Part 5-2: Application layer service definition - Type 2 elements	EN 61158-5-2	2014
IEC 61158-5-4	2014	Industrial communication networks - Fieldbus specifications - Part 5-4: Application layer service definition - Type 4 elements	EN 61158-5-4	2014
IEC 61158-5-10	2014	Industrial communication networks - Fieldbus specifications - Part 5-10: Application layer service definition - Type 10 elements	EN 61158-5-10	2014
IEC 61158-5-11	2007	Industrial communication networks - Fieldbus specifications - Part 5-11: Application layer service definition - Type 11 elements	EN 61158-5-11	2008
IEC 61158-5-12	2014	Industrial communication networks - Fieldbus specifications - Part 5-12: Application layer service definition - Type 12 elements	EN 61158-5-12	2014
IEC 61158-5-13	2014	Industrial communication networks - Fieldbus specifications - Part 5-13: Application layer service definition - Type 13 elements	EN 61158-5-13	2014
IEC 61158-5-14	2014	Industrial communication networks - Fieldbus specifications - Part 5-14: Application layer service definition - Type 14 elements	EN 61158-5-14	2014
IEC 61158-5-15	2010	Industrial communication networks - Fieldbus specifications - Part 5-15: Application layer service definition - Type 15 elements	EN 61158-5-15	2012
IEC 61158-5-17	2007	Industrial communication networks - Fieldbus specifications - Part 5-17: Application layer service definition - Type 17 elements	EN 61158-5-17	2008

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61158-5-19	2014	Industrial communication networks - Fieldbus specifications - Part 5-19: Application layer service definition - Type 19 elements	EN 61158-5-19	2014
IEC 61158-5-21	2010	Industrial communication networks - Fieldbus specifications - Part 5-21: Application layer service definition - Type 21 elements	EN 61158-5-21	2012
IEC 61158-5-22	2014	Industrial communication networks - Fieldbus specifications - Part 5-22: Application layer service definition - Type 22 elements	EN 61158-5-22	2014
IEC 61158-5-23	2014	Industrial communication networks - Fieldbus specifications - Part 5-23: Application layer service definition - Type 23 elements	EN 61158-5-23	2014
IEC 61158-6-2	2014	Industrial communication networks - Fieldbus specifications - Part 6-2: Application layer protocol specification - Type 2 elements	EN 61158-6-2	1)
IEC 61158-6-4	2014	Industrial communication networks - Fieldbus specifications - Part 6-4: Application layer protocol specification - Type 4 elements	EN 61158-6-4	1)
IEC 61158-6-10	2014	Industrial communication networks - Fieldbus specifications - Part 6-10: Application layer protocol specification - Type 10 elements	EN 61158-6-10	1)
IEC 61158-6-11	2007	Industrial communication networks - Fieldbus specifications - Part 6-11: Application layer protocol specification - Type 11 elements	EN 61158-6-11	2008
IEC 61158-6-12	2014	Industrial communication networks - Fieldbus specifications - Part 6-12: Application layer protocol specification - Type 12 elements	EN 61158-6-12	1)
IEC 61158-6-13	2014	Industrial communication networks - Fieldbus specifications - Part 6-13: Application layer protocol specification - Type 13 elements	EN 61158-6-13	1)
IEC 61158-6-14	2014	Industrial communication networks - Fieldbus specifications - Part 6-14: Application layer protocol specification - Type 14 elements	EN 61158-6-14	1)
IEC 61158-6-15	2010	Industrial communication networks - Fieldbus specifications - Part 6-15: Application layer protocol specification - Type 15 elements	EN 61158-6-15	2012
IEC 61158-6-17	2007	Industrial communication networks - Fieldbus specifications - Part 6-17: Application layer protocol specification - Type 17 elements	EN 61158-6-17	2008

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61158-6-19	2014	Industrial communication networks - Fieldbus specifications - Part 6-19: Application layer protocol specification - Type 19 elements	EN 61158-6-19	¹⁾
IEC 61158-6-21	2010	Industrial communication networks - Fieldbus specifications - Part 6-21: Application layer protocol specification - Type 21 elements	EN 61158-6-21	2012
IEC 61158-6-22	2014	Industrial communication networks - Fieldbus specifications - Part 6-22: Application layer protocol specification - Type 22 elements	EN 61158-6-22	¹⁾
IEC 61158-6-23	2014	Industrial communication networks - Fieldbus specifications - Part 6-23: Application layer protocol specification - Type 23 elements	EN 61158-6-23	¹⁾
IEC 61588	2009	Precision clock synchronization protocol for networked measurement and control systems	-	-
IEC 61784-1	2014	Industrial communication networks - Profiles - Part 1: Fieldbus profiles	EN 61784-1	¹⁾
IEC 61784-5-2	2013	Industrial communication networks - Profiles - Part 5-2: Installation of fieldbuses - Installation profiles for CPF 2	EN 61784-5-2	2013
IEC 61784-5-3	2013	Industrial communication networks - Profiles - Part 5-3: Installation of fieldbuses - Installation profiles for CPF 3	EN 61784-5-3	2013
IEC 61784-5-6	2013	Industrial communication networks - Profiles - Part 5-6: Installation of fieldbuses - Installation profiles for CPF 6	EN 61784-5-6	2013
IEC 61784-5-8	2013	Industrial communication networks - Profiles - Part 5-8: Installation of fieldbuses - Installation profiles for CPF 8	EN 61784-5-8	2013
IEC 61784-5-11	2013	Industrial communication networks - Profiles - Part 5-11: Installation of fieldbuses - Installation profiles for CPF 11	EN 61784-5-11	2013
IEC 61800	series	Adjustable speed electrical power drive systems	EN 61800	series
IEC 61918 (mod) -	2013 -	Industrial communication networks - Installation of communication networks in industrial premises	EN 61918 + AC	2013 2014
ISO/IEC 2382-16	1996	Information technology - Vocabulary - Part 16: Information theory	-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO/IEC 7498-1	-	Information technology - Open Systems Interconnection - Basic Reference Model: The Basic Model	-	-
ISO/IEC 8802-2	-	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 2: Logical link control	-	-
ISO/IEC 8802-3	2000	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications	-	-
ISO/IEC/IEEE 8802-11	-	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 11: Wireless LAN medium access control (MAC) and physical layer (PHY) specifications	-	-
ISO/IEC 11801 + A1 + A2	2002 2008 2010	Information technology - Generic cabling for customer premises	- - -	- - -
ISO 15745-3	-	Industrial automation systems and integration - Open systems application integration framework - Part 3: Reference description for IEC 61158 based control systems	-	-
ISO 15745-4 + A1	2003 2006	Industrial automation systems and integration - Open systems application integration framework - Part 4: Reference description for Ethernet-based control systems	- -	- -
IEEE Std 802	2001	IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture	-	-
IEEE 802.1AB	-	IEEE Standard for Local and Metropolitan Area Networks - Station and Media Access Control Connectivity Discovery	-	-
IEEE 802.1AS	2011	IEEE Standard for Local and Metropolitan Area Networks - Timing and Synchronization for Time-Sensitive Applications in Bridged Local Area Networks	-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEEE 802.1D	2004	IEEE Standard for Local and Metropolitan Area Networks - Media Access Control (MAC) Bridges	-	-
IEEE 802.1Q	2011	IEEE Standard for Local and metropolitan area networks - Media Access Control (MAC) Bridges and Virtual Bridged Local Area Networks	-	-
IEEE 802.3	2008	IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications	-	-
IEEE 802.11	2007	IEEE Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications	-	-
IEEE Std 802.15.1	-	IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements. - Part 15.1: Wireless medium access control (MAC) and physical layer (PHY) specifications for wireless personal area networks (WPANs)	-	-
IETF RFC 768	-	User Datagram Protocol	-	-
IETF RFC 791	-	Internet Protocol	-	-
IETF RFC 792	-	Internet Control Message Protocol	-	-
IETF RFC 793	-	Transmission Control Protocol	-	-
IETF RFC 826	-	Ethernet Address Resolution Protocol - or - Converting Network Protocol Addresses to 48.bit Ethernet Address for Transmission on Ethernet Hardware	-	-
IETF RFC 894	-	A Standard for the Transmission of IP Datagrams over Ethernet Networks	-	-
IETF RFC 1034	-	Domain names - concepts and facilities	-	-
IETF RFC 1112	-	Host Extensions for IP Multicasting	-	-
IETF RFC 1122	-	Requirements for Internet Hosts - Communication Layers	-	-
IETF RFC 1123	-	Requirements for Internet Hosts - Application and Support	-	-
IETF RFC 1127	-	Perspective on the Host Requirements RFCs	-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IETF RFC 1157	-	Simple Network Management Protocol (SNMP)	-	-
IETF RFC 1213	-	Management Information Base for Network Management of TCP/IP-based Internets: MIB-II	-	-
IETF RFC 1305	-	Network Time Protocol (Version 3) Specification, Implementation and Analysis	-	-
IETF RFC 2131	-	Dynamic Host Configuration Protocol	-	-
IETF RFC 2236	-	Internet Group Management Protocol, Version 2	-	-
IETF RFC 2544	-	Benchmarking Methodology for Network Interconnect Devices	-	-
IETF RFC 2988	-	Computing TCP's Retransmission Timer	-	-
IETF RFC 4836	-	Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)	-	-
OSF CAE Specification C706	-	Technical Standard DCE1.1: Remote Procedure Call	-	-



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INTERNATIONAL STANDARD

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INTERNATIONAL STANDARD

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**Industrial communication networks – Profiles –
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Partie 2: Profils de bus de terrain supplémentaires pour les réseaux en temps
réel basés sur l'ISO/CEI 8802-3**

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IETF RFC 793, *Transmission Control Protocol*, available at <<http://www.ietf.org>>

INDUSTRIAL COMMUNICATION NETWORKS –

PROFILES, -a

Part 2: Additional fields for profiles for real-time networks based on ISO/IEC 8802-3

Equipment and facilities

IEC TR 61132-1 **Host Extensions for IP Multimedia Subsystem** available at <http://www.iec.org> comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To IEC TR 61132-2 **Requirements for Internet Protocol Core Network Elements** available at <http://www.iec.org> Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations may also participate, on condition that any agreement that may be reached with IEC TR 61132-3 **Requirements for Internet Protocol Core Network Elements** available at <http://www.iec.org> the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

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51 IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity
 52 assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any
 53 services carried out by independent certification bodies.

67 All users should ensure that they have the latest edition of this publication. at <<http://www.ietf.org>>

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ETC REC 3544 **Benchmarking Methodology for Network Interconnect Devices** available at <http://www.electrionline.com> correct application of this publication.

9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IETF and IAB shall not be held responsible for identifying any or all such patent rights.

Attention is drawn to the fact that the use of some of the associated protocol types is restricted by their intellectual property rights holders. In all cases, the commitment to limited Medium Attachment Units (MAUs) available at <http://www.ietf.org> or those rights permits a layer protocol type to be used with other layer protocols of the same type, or in other type combinations, except where prohibited by the IETF Specification of the DCE property right Procedure Call, available at <http://www.opengroup.org/onlinepubs/9629399/toc.htm>?

NOTE: Combinations of protocol types are specified in IEC 61784-1 and IEC 61784-2.

International Standard IEC 61784-2 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

This third edition cancels and replaces the second edition published in 2010. This edition constitutes a technical revision.

The following changes with respect to the above mentioned references are listed below:

• Update of the dated references to the IEC 61158 series, to IEC 61784-1, to the IEC 61784-3 series, to the IEC 61784-5 series and to IEC 61918 throughout the document;

• Update of selection tables for CPF 3, available at <<http://www.ietf.org>>

- update of the requirements for all conformance classes;

• IETF RFC 826, *Ethernet Address Resolution Protocol*, available at <<http://www.ietf.org>>

– added precise timing requirements for IP;

• IETF RFC 894, *A standard for the Transmission of IP Datagrams over Ethernet Networks*, available at <<http://www.ietf.org>>

- increasing the amount of synchronized devices in line;

• IETF RFC 1034, *Domain names – concepts and facilities*; available at <<http://www.ietf.org>>

- added consistent set of parameters;

– added application classes;

• IETF RFC 1112, *Host Extensions for IP Multicasting*, available at <<http://www.ietf.org>>

- integrating the fast startup as additional feature.

• IETF RFC 1122, *Requirements for Internet Hosts – Communication Layers*, available at <<http://www.ietf.org>>

- update of selection tables for CPF 19 and CPF 14;
- addition of a new profile CP 11/3 in 12.4;

• IETF RFC 1123, *Requirements for Internet Hosts – Application and Support*, available at <<http://www.ietf.org>>

- addition of a new Communication Profile Family – CPF 8 in Clause 20.

The text of the standard is based on the following documents, available at <<http://www.ietf.org>>

	FDIS	Report on voting
IETF RFC 1157, <i>Simple Network Management Protocol (SNMP)</i> , available at < http://www.ietf.org >	65C/761/FDIS	65C/771/RVD

• IETF RFC 1213, *Management Information Base for the Simple Network Management Protocol*, available at <<http://www.ietf.org>>

• IETF RFC 1305, *Network Time Protocol Version 3, draft 13C-Directives, Part 2*

• IETF RFC 2134, *Dynamic Host Configuration Protocol*, available at <<http://www.ietf.org>>

• IETF RFC 2236, *Internet Group Management Protocol, Version 2*, available at <<http://www.ietf.org>>

• IETF RFC 2544, *Benchmarking Methodology for Network Interconnect Devices*, available at <<http://www.ietf.org>>

• IETF RFC 2988, *Computing TCP's Retransmission Timer*, available at <<http://www.ietf.org>>

• IETF RFC 4836, *Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)*, available at <<http://www.ietf.org>>

• Open Software Foundation (OSF): C706, *CAE Specification DCE1.1: Remote Procedure Call*, available at <<http://www.opengroup.org/onlinepubs/9629399/toc.htm>>

The IEC website, *Internet Protocol*, available at <<http://www.ietf.org>> 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

- reconfirmed,
IETF RFC 793, *Transmission Control Protocol*, available at <<http://www.ietf.org>>
- withdrawn,

• IETF RFC 826, *Ethernet Address Resolution Protocol*, available at <<http://www.ietf.org>>

- amended.
IETF RFC 894, *A standard for the Transmission of IP Datagrams over Ethernet Networks*, available at <<http://www.ietf.org>>

IMPORTANT! The colour inside logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

IETF RFC 1034, *Domain names - concepts and facilities*, available at <<http://www.ietf.org>>

IETF RFC 1122, *Requirements for Internet Hosts – Communication Layers*, available at <<http://www.ietf.org>>

IETF RFC 1123, *Requirements for Internet Hosts – Application and Support*, available at <<http://www.ietf.org>>

IETF RFC 1127, *A Perspective on the Host Requirements RFCs*, available at <<http://www.ietf.org>>

IETF RFC 1157, *Simple Network Management Protocol (SNMP)*, available at <<http://www.ietf.org>>

IETF RFC 1213, *Management Information Base for Network Management of TCP/IP-based internets: MIB-II*, available at <<http://www.ietf.org>>

IETF RFC 1305, *Network Time Protocol (Version 3)*, available at <<http://www.ietf.org>>

IETF RFC 2131, *Dynamic Host Configuration Protocol*, available at <<http://www.ietf.org>>

IETF RFC 2236, *Internet Group Management Protocol, Version 2*, available at <<http://www.ietf.org>>

IETF RFC 2544, *Benchmarking Methodology for Network Interconnect Devices*, available at <<http://www.ietf.org>>

IETF RFC 2988, *Computing TCP's Retransmission Timer*, available at <<http://www.ietf.org>>

IETF RFC 4836, *Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)*, available at <<http://www.ietf.org>>

Open Software Foundation (OSF): C706, *CAE Specification DCE1.1: Remote Procedure Call*, available at <<http://www.opengroup.org/onlinepubs/9629399/toc.htm>>

IETF RFC 791, *Internet Protocol*, available at <<http://www.ietf.org>>

INTRODUCTION

This part of IEC 61784 provides additional Communication Profiles (CP) to the existing Communication Profile Families (CPF) of IEC 61784-1 and additional CPFs with one or more CPs. These profiles meet the Industrial automation market objective of identifying Real-Time Ethernet (RTE) communication networks coexisting with ISO/IEC 8802-3 or IEEE 802.3 – commonly known as Ethernet. These RTE communication networks use provision from IETF RFC 826, *Ethernet Address Resolution Protocol*, available at <<http://www.ietf.org>> for the lower communication stack layers and additionally provide more predictable and reliable real-time data transfer and means for support of precise synchronization of automation equipment.

More specifically, these profiles help to correctly state the compliance of RTE communication networks with ISO/IEC 8802-3 or IEEE 802.3, and to avoid the spreading of divergent implementations.

IETF RFC 1122, *Host Extensions for IP Multicasting*, available at <<http://www.ietf.org>>

Adoption of Ethernet technology for industrial communication between controllers and even field devices promotes use of Internet technologies, the availability of which should be unacceptable if it causes the loss of features required in the field area for industrial communication automation networks, such as:

IETF RFC 1123, *Requirements for Internet Hosts – Application and Support*, available at <<http://www.ietf.org>>

- synchronized actions between field devices like drives,

IETF RFC 1127, *A Perspective on the Host Requirements RFCs*, available at <<http://www.ietf.org>>

These new RTE profiles may take advantage of the improvements of Ethernet networks in terms of transmission speed, wide area network management Protocol (SNMP), available at <<http://www.ietf.org>>

Another implicit but essential requirement is that the typical Ethernet communication capabilities, used in the office world as fully retained, manage the software involved in basic applications, available at <<http://www.ietf.org>>

IETF RFC 305, *Network Time Protocol version 3*, available at <<http://www.ietf.org>>

RTE performance indicators (see Clause 5), which values will be provided with RTE devices based on communication profiles specified in this part of IEC 61784, enable the user to match network devices with application dependant performance requirements of an RTE network.

IETF RFC 2236, *Internet Group Management Protocol, Version 2*, available at <<http://www.ietf.org>>

Subclause 5.1 specifies basic principles of performance indicators required to express RTE performance of a CP. Subclause 5.2 describes the view of application requirements. An application dependant class could be used to find out a suitable CP. Clause 4 specifies how conformance of a device to the CPF or CP should be stated.

IETF RFC 2988, *Computing TCP's Retransmission Timer*, available at <<http://www.ietf.org>>

IETF RFC 4836, *Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)*, available at <<http://www.ietf.org>>

Open Software Foundation (OSF): C706, *CAE Specification DCE1.1: Remote Procedure Call*, available at <<http://www.opengroup.org/onlinepubs/9629399/toc.htm>>

1 IETF RFC 791, *Internet Protocol*, available at <<http://www.ietf.org>>
**INDUSTRIAL COMMUNICATION NETWORKS –
 PROFILES –**

1 IETF RFC 792, *Internet Control Message Protocol*, available at <<http://www.ietf.org>>

**Part 2: Additional fieldbus profiles for real-time
 networks based on ISO/IEC 8802-3**
 1 IETF RFC 793, *Transmission Control Protocol*, available at <<http://www.ietf.org>>

1 IETF RFC 826, *Ethernet Address Resolution Protocol*, available at <<http://www.ietf.org>>

1 IETF RFC 894, *A standard for the Transmission of IP Datagrams over Ethernet Networks*, available at <<http://www.ietf.org>>

1 IETF RFC 1034, *Domain names – concepts and facilities*; available at <<http://www.ietf.org>>
 This part of IEC 61784 specifies

1 IETF RFC 1122, *Host Extensions for IP Multicasting*, available at <<http://www.ietf.org>>
 requirements;

1 IETF RFC 1122, *Requirements for Internet Hosts – Communication Sublayers*, available at <<http://www.ietf.org>>
 profiles and related network components based on ISO/IEC 8802-3 or IEEE 802.3, IEC 61558-1, and IEC 61784-1;

• RTE solutions that are able to run in parallel with ISO/IEC 8802-3 or IEEE 802.3 based applications;
 1 IETF RFC 1123, *Requirements for Internet Hosts – Application and Support*, available at <<http://www.ietf.org>>

These communication profiles are called Real-Time Ethernet communication profiles.

1 IETF RFC 1127, *A Perspective on the Host Requirements RFCs*, available at <<http://www.ietf.org>>
 These communication profiles use ISO/IEC 8802-3 or IEEE 802.3 communication networks and its related network components or IEC 61558 and may in some cases amend those standards to obtain RTE features.

1 IETF RFC 1157, *Simple Network Management Protocol (SNMP)*, available at <<http://www.ietf.org>>
2 Normative references

The following documents are the information base normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

1 IETF RFC 1305, *Network Time Protocol (Version 3)*, available at <<http://www.ietf.org>>

NOTE All parts of the IEC 61158 series, as well as IEC 61784-1 and IEC 61784-2 are maintained simultaneously. Cross-references to these documents within the text therefore refer to the editions as stated in this list of normative references.

1 IETF RFC 2236, *Internet Group Management Protocol, Version 2*, available at <<http://www.ietf.org>>
 IEC 61010 (all parts), *Safety requirements for electrical equipment for measurement, control, and laboratory use*

1 IETF RFC 2544, *Benchmarking Methodology for Network Interconnect Devices*, available at <<http://www.ietf.org>>
 IEC 61131-2, *Programmable controllers – Part 2: Equipment requirements and tests*

1 IEC 61158 (all parts), *Industrial communication networks – Fieldbus specifications*
 1 IETF RFC 2988, *Computing TCP's Retransmission Timer*, available at <<http://www.ietf.org>>

1 IEC 61158-1:2014, *Industrial communication networks – Fieldbus specifications – Part 1: Overview and guidance for the IEC 61158 and IEC 61784 series*
 1 IETF RFC 4836, *Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)*, available at <<http://www.ietf.org>>

1 IEC 61158-2:2014, *Industrial communication networks – Fieldbus specifications – Part 2: Physical layer specification and service definition*
 Open Software Foundation (OSF), C706, *CAE Specification DCE1.4: Remote Procedure Call*, available at <<http://www.opengroup.org/onlinepubs/9629399/toc.htm>>

1 IEC 61158-3-2:2014, *Industrial communication networks – Fieldbus specifications – Part 3-2: Data-link layer service definition – Type 2 elements*

1 IEC 61158-3-4:2014, *Industrial communication networks – Fieldbus specifications – Part 3-4: Data-link layer service definition – Type 4 elements*

1 IEC 61158-3-11:2007, *Industrial communication networks – Fieldbus specifications – Part 3-11: Data-link layer service definition – Type 11 elements*

- IEC 61158-3-12:2014, *Industrial communication networks – Fieldbus specifications – Part 3-12: Data-link layer service definition – Type 12 elements* – available at <<http://www.iec.ch>>
- IETF RFC 792, *Internet Control Message Protocol*, available at <<http://www.ietf.org>>
- IEC 61158-3-13:2014, *Industrial communication networks – Fieldbus specifications – Part 3-13: Data-link layer service definition – Type 13 elements* – available at <<http://www.iec.ch>>
- IETF RFC 793, *Transmission Control Protocol*, available at <<http://www.ietf.org>>
- IEC 61158-3-14:2014, *Industrial communication networks – Fieldbus specifications – Part 3-14: Data-link layer service definition – Type 14 elements* – available at <<http://www.iec.ch>>
- IETF RFC 826, *Ethernet Address Resolution Protocol*, available at <<http://www.ietf.org>>
- IEC 61158-3-17:2007, *Industrial communication networks – Fieldbus specifications – Part 3-17: Data-link layer service definition – Type 17 elements* – available at <<http://www.iec.ch>>
- IETF RFC 894, *A standard for the Transmission of IP Datagrams over Ethernet Networks*, available at <<http://www.ietf.org>>
- IEC 61158-3-19:2014, *Industrial communication networks – Fieldbus specifications – Part 3-19: Data-link layer service definition – Type 19 elements* – available at <<http://www.iec.ch>>
- IETF RFC 1034, *Domain names – concepts and facilities*, available at <<http://www.ietf.org>>
- IEC 61158-3-21:2010, *Industrial communication networks – Fieldbus specifications – Part 3-21: Data-link layer service definition – Type 21 elements* – available at <<http://www.iec.ch>>
- IETF RFC 1127, *Requirements for Internet Hosts – Communication Layers*, available at <<http://www.ietf.org>>
- IEC 61158-3-22:2014, *Industrial communication networks – Fieldbus specifications – Part 3-22: Data-link layer service definition – Type 22 elements* – available at <<http://www.iec.ch>>
- IETF RFC 1127, *Requirements for Internet Hosts – Application and Support*, available at <<http://www.ietf.org>>
- IEC 61158-4-2:2014, *Industrial communication networks – Fieldbus specifications – Part 4-2: Data-link layer protocol specification – Type 2 elements* – available at <<http://www.iec.ch>>
- IETF RFC 1127, *A Perspective on the Host Requirements RFCs*, available at <<http://www.ietf.org>>
- IEC 61158-4-4:2014, *Industrial communication networks – Fieldbus specifications – Part 4-4: Data-link layer protocol specification – Type 4 elements* – available at <<http://www.iec.ch>>
- IETF RFC 1157, *Simple Network Management Protocol (SNMP)*, available at <<http://www.ietf.org>>
- IEC 61158-4-11:2014, *Industrial communication networks – Fieldbus specifications – Part 4-11: Data-link layer protocol specification – Type 11 elements* – available at <<http://www.iec.ch>>
- IETF RFC 1513, *Management Information Base for Network Management of TCP/IP-based internets: MIB-II*, available at <<http://www.ietf.org>>
- IEC 61158-4-12:2014, *Industrial communication networks – Fieldbus specifications – Part 4-12: Data-link layer protocol specification – Type 12 elements* – available at <<http://www.iec.ch>>
- IETF RFC 1305, *Network Time Protocol (Version 3)*, available at <<http://www.ietf.org>>
- IEC 61158-4-13:2014, *Industrial communication networks – Fieldbus specifications – Part 4-13: Data-link layer protocol specification – Type 13 elements* – available at <<http://www.iec.ch>>
- IETF RFC 2131, *Dynamic Host Configuration Protocol*, available at <<http://www.ietf.org>>
- IEC 61158-4-14:2014, *Industrial communication networks – Fieldbus specifications – Part 4-14: Data-link layer protocol specification – Type 14 elements* – available at <<http://www.iec.ch>>
- IETF RFC 2236, *Internet Group Management Protocol, Version 2*, available at <<http://www.ietf.org>>
- IEC 61158-4-17:2007, *Industrial communication networks – Fieldbus specifications – Part 4-17: Data-link layer protocol specification – Type 17 elements* – available at <<http://www.iec.ch>>
- IETF RFC 2544, *Benchmarking Methodology for Network Interconnect Devices*, available at <<http://www.ietf.org>>
- IEC 61158-4-19:2014, *Industrial communication networks – Fieldbus specifications – Part 4-19: Data-link layer protocol specification – Type 19 elements* – available at <<http://www.iec.ch>>
- IETF RFC 2988, *Computing TCP's Retransmission Timer*, available at <<http://www.ietf.org>>
- IEC 61158-4-21:2010, *Industrial communication networks – Fieldbus specifications – Part 4-21: Data-link layer protocol specification – Type 21 elements* – available at <<http://www.iec.ch>>
- IEC 61158-4-22:2014, *Industrial communication networks – Fieldbus specifications – Part 4-22: Data-link layer protocol specification – Type 22 elements* – available at <<http://www.iec.ch>>
- IETF RFC 4836, *Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)*, available at <<http://www.ietf.org>>
- IEC 61158-5-2:2014, *Industrial communication networks – Fieldbus specifications – Part 5-2: Application layer service definition – Type 2 elements* – available at <<http://www.iec.ch>>
- IEC 61158-5-4:2014, *Industrial communication networks – Fieldbus specifications – Part 5-4: Application layer service definition – Type 4 elements* – available at <<http://www.iec.ch>>

IEC 61158-5-10:2014, *Industrial communication networks – Fieldbus specifications – Part 5-10: Application layer service definition – Type 10 elements*

IETF RFC 792, *Internet Control Message Protocol*, available at <<http://www.ietf.org>>

IEC 61158-5-11:2007, *Industrial communication networks – Fieldbus specifications – Part 5-11: Application layer service definition – Type 11 elements*

IETF RFC 793, *Transmission Control Protocol*, available at <<http://www.ietf.org>>

IEC 61158-5-12:2014, *Industrial communication networks – Fieldbus specifications – Part 5-12: Application layer service definition – Type 12 elements*

IETF RFC 826, *Ethernet Address Resolution Protocol*, available at <<http://www.ietf.org>>

IEC 61158-5-13:2014, *Industrial communication networks – Fieldbus specifications – Part 5-13: Application layer service definition – Type 13 elements*

IETF RFC 894, *A standard for the Transmission of IP Datagrams over Ethernet Networks*, available at <<http://www.ietf.org>>

IEC 61158-5-14:2014, *Industrial communication networks – Fieldbus specifications – Part 5-14: Application layer service definition – Type 14 elements*

IETF RFC 1034, *Domain names – concepts and facilities*, available at <<http://www.ietf.org>>

IEC 61158-5-15:2010, *Industrial communication networks – Fieldbus specifications – Part 5-15: Application layer service definition – Type 15 elements*

IETF RFC 1122, *Requirements for Internet Hosts – Communication Layers*, available at <<http://www.ietf.org>>

IEC 61158-5-17:2007, *Industrial communication networks – Fieldbus specifications – Part 5-17: Application layer service definition – Type 17 elements*

IETF RFC 1123, *Requirements for Internet Hosts – Application and Support*, available at <<http://www.ietf.org>>

IEC 61158-5-19:2014, *Industrial communication networks – Fieldbus specifications – Part 5-19: Application layer service definition – Type 19 elements*

IETF RFC 1123, *A perspective on the Host Requirements RFCs*, available at <<http://www.ietf.org>>

IEC 61158-5-21:2010, *Industrial communication networks – Fieldbus specifications – Part 5-21: Application layer service definition – Type 21 elements*

IETF RFC 1157, *Simple Network Management Protocol (SNMP)*, available at <<http://www.ietf.org>>

IEC 61158-5-22:2014, *Industrial communication networks – Fieldbus specifications – Part 5-22: Application layer service definition – Type 22 elements*

IETF RFC 1215, *Management Information Base for Network Management of TCP/IP-based internets: MIB-II*, available at <<http://www.ietf.org>>

IEC 61158-5-23:2014, *Industrial communication networks – Fieldbus specifications – Part 5-23: Application layer service definition – Type 23 elements*

IETF RFC 1305, *Network Time Protocol (Version 3)*, available at <<http://www.ietf.org>>

IEC 61158-6-2:2014, *Industrial communication networks – Fieldbus specifications – Part 6-2: Application layer protocol specification – Type 2 elements*

IETF RFC 2236, *Internet Group Management Protocol, Version 2*, available at <<http://www.ietf.org>>

IEC 61158-6-4:2014, *Industrial communication networks – Fieldbus specifications – Part 6-4: Application layer protocol specification – Type 4 elements*

IETF RFC 2544, *Benchmarking Methodology for Network Interconnect Devices*, available at <<http://www.ietf.org>>

IEC 61158-6-10:2014, *Industrial communication networks – Fieldbus specifications – Part 6-10: Application layer protocol specification – Type 10 elements*

IETF RFC 2988, *Computing TCP's Retransmission Timer*, available at <<http://www.ietf.org>>

IEC 61158-6-11:2007, *Industrial communication networks – Fieldbus specifications – Part 6-11: Application layer protocol specification – Type 11 elements*

IETF RFC 4836, *Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)*, available at <<http://www.ietf.org>>

IEC 61158-6-12:2014, *Industrial communication networks – Fieldbus specifications – Part 6-12: Application layer protocol specification – Type 12 elements*

Open Software Foundation (OSF) OSF Specification of Remote Procedure Call, available at <<http://www.opengroup.org/onlinepubs/9629399/toc.htm>>

IEC 61158-6-13:2014, *Industrial communication networks – Fieldbus specifications – Part 6-13: Application layer protocol specification – Type 13 elements*

IEC 61158-6-14:2014, *Industrial communication networks – Fieldbus specifications – Part 6-14: Application layer protocol specification – Type 14 elements*

IEC 61158-6-15:2010, *Industrial communication networks – Fieldbus specifications – Part 6-15: Application layer protocol specification – Type 15 elements*

IEC 61158-6-17:2014, *Industrial communication networks – Fieldbus specifications – Part 6-17: Application layer protocol specification – Type 17 elements* – available at <<http://www.iec.ch>>

IETF RFC 792, *Internet Control Message Protocol*, available at <<http://www.ietf.org>>

IEC 61158-6-19:2014, *Industrial communication networks – Fieldbus specifications – Part 6-19: Application layer protocol specification – Type 19 elements* – available at <<http://www.iec.ch>>

IETF RFC 793, *Transmission Control Protocol*, available at <<http://www.ietf.org>>

IEC 61158-6-21:2010, *Industrial communication networks – Fieldbus specifications – Part 6-21: Application layer protocol specification – Type 21 elements* – available at <<http://www.iec.ch>>

IETF RFC 894, *A standard for the Transmission of IP Datagrams over Ethernet Networks*, available at <<http://www.ietf.org>>

IEC 61158-6-22:2014, *Industrial communication networks – Fieldbus specifications – Part 6-22: Application layer protocol specification – Type 22 elements* – available at <<http://www.iec.ch>>

IETF RFC 1034, *Domain names – concepts and facilities*, available at <<http://www.ietf.org>>

IEC 61588:2009, *Precision clock synchronization protocol for networked measurement and control systems*; IETF RFC 1122, *Requirements for Internet Hosts – Communication Layers*, available at <<http://www.ietf.org>>

IEC 61784-1:2014, *Industrial communication networks – Profiles – Part 1: Fieldbus profiles* – available at <<http://www.iec.ch>>

IETF RFC 1123, *Requirements for Internet Hosts – Application and Support*, available at <<http://www.ietf.org>>

IEC 61784-5-2:2013, *Industrial communication networks – Profiles – Part 5-2: Installation of fieldbuses – Installation profiles for CPF 2*

IETF RFC 1127, *A Perspective on the Host Requirements RFCs*, available at <<http://www.ietf.org>>

IEC 61784-5-3:2013, *Industrial communication networks – Profiles – Part 5-3: Installation of fieldbuses – Installation profiles for CPF 3*

IETF RFC 1157, *Simple Network Management Protocol (SNMP)*, available at <<http://www.ietf.org>>

IEC 61784-5-6:2013, *Industrial communication networks – Profiles – Part 5-6: Installation of fieldbuses – Installation profiles for CPF 6*

IETF RFC 1213, *Management Information Base for Network Management of TCP/IP-based internets: MIB-II*, available at <<http://www.ietf.org>>

IEC 61784-5-8:2013, *Industrial communication networks – Profiles – Part 5-8: Installation of fieldbuses – Installation profiles for CPF 8*

IETF RFC 1305, *Network Time Protocol (Version 3)*, available at <<http://www.ietf.org>>

IEC 61784-5-11:2013, *Industrial communication networks – Profiles – Part 5-11: Installation of fieldbuses – Installation profiles for CPF 11*

IETF RFC 2236, *Internet Group Management Protocol, Version 2*, available at <<http://www.ietf.org>>

IEC 61800-1:2013, *Adjustable speed electrical power drive systems* – available at <<http://www.iec.ch>>

IETF RFC 2544, *Benchmarking Methodology for Network Interconnect Devices*, available at <<http://www.ietf.org>>

ISO/IEC 2382-16:1996, *Information technology – Vocabulary – Part 16: Information theory* – available at <<http://www.iso.org>>

IETF RFC 2988, *Computing TCP's Retransmission Timer*, available at <<http://www.ietf.org>>

ISO/IEC 7498-1, *Information technology – Open Systems Interconnection – Basic Reference Model – The Basic Model* – available at <<http://www.iec.ch>>

IETF RFC 4836, *Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)*, available at <<http://www.ietf.org>>

ISO/IEC 8802-2, *Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 2: Logical link control* – available at <<http://www.iso.org>>

Open Software Foundation (OSF), C706, *CAE Specification DCE1.1: Remote Procedure Call* – available at <<http://www.opengroup.org/onlinepubs/9629399/toc.htm>>

Corrigendum 1

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NOTE Compliance with future editions of this standard will need checking.
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koniec náhľadu – text ďalej pokračuje v platenej verzii STN