IEC 61784-1-1

Edition 1.0 2023-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Industrial networks – Profiles – Part 1-1: Fieldbus profiles – Communication Profile Family 1

Réseaux industriels – Profils – Partie 1-1: Profils de bus de terrain – Famille de profils de communication 1



IEC 61784-1-1:2023-03(en-fr)



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2023 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, …). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC - webstore.iec.ch/advsearchform
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, …). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org
Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

IEC 61784-1-1

Edition 1.0 2023-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Industrial networks – Profiles – Part 1-1: Fieldbus profiles – Communication Profile Family 1

Réseaux industriels – Profils – Partie 1-1: Profils de bus de terrain – Famille de profils de communication 1

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 35.100.20; 35.240.50

ISBN 978-2-8322-6591-8

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

® Registered trademark of the International Electrotechnical Commission
Marque déposée de la Commission Electrotechnique Internationale

CONTENTS

FOREWORD 6
INTRODUCTION 8
1 Scope 9
2 Normative references 9
3 Terms, definitions, abbreviated terms, symbols, and conventions 10
3.1 Terms and definitions 10
3.2 Abbreviations and symbols 10
3.2.1 Common abbreviations and symbols 10
3.2.2 Other abbreviations and symbols 11
3.3 Conventions 11
4 CPF 1 (FOUNDATION™ Fieldbus) 11
4.1 General overview 11
4.2 CP 1/1 (FOUNDATION™ H1) 12
4.2.1 Physical layer 12
4.2.2 Data-link layer 27
4.2.3 Application layer 97
4.3 CP 1/2 (FOUNDATION™ HSE) 99
4.3.1 Physical layer 99
4.3.2 Data-link layer 99
4.3.3 Network layer 99
4.3.4 Transport layer 99
4.3.5 Application layer 99
4.4 CP 1/3 (FOUNDATION™ H2) 100
4.4.1 Physical layer 100
4.4.2 Data-link layer 102
4.4.3 Application layer 102
Annex A (informative) CPF 1 (FOUNDATION Fieldbus) communication concepts 103
A.1 Overview 103
A.2 Physical layer characteristics 103
A.2.1 H1 physical layer 103
A.2.2 HSE physical layer 103
A.3 Data-link layer characteristics 103
A.3.1 H1 data-link layer 103
A.3.2 HSE data-link, network and transport layers 104
A.4 Application layer characteristics 104
A.5 Management characteristics 104
Bibliography 105

Figure 1 – Example optical power budget for a 100/140 µm fiber system with a 16/16 optical passive star coupler 27

Table 1 – CPF 1: overview of profile sets 11
Table 2 – CP 1/1: PhL selection for communicating devices and their MAUs 12
Table 3 – CP 1/1: PhL classification of MAUs and attached devices 14
Table 4 – CP 1/1: PhL selection of Clause 16 for devices and their MAUs 14

Table 5 – CP 1/1: PhL selection of Clause 12 for devices and their MAUs 15
Table 6 – CP 1/1: PhL selection of recommended IS parameters for MAU classes 111, 112, 121, 122, 511 and 512 16
Table 7 – CP 1/1: PhL selection for media components 17
Table 8 – CP 1/1: PhL selection of imperative IS parameters for media in FISCO systems 18
Table 9 – CP 1/1: PhL selection for power supplies 19
Table 10 – CP 1/1: PhL selection of power supply types 20
Table 11 – CP 1/1: PhL selection of permissible output voltage and IS parameters for FISCO power supplies 20
Table 12 – CP 1/1: PhL selection for terminators 21
Table 13 – CP 1/1: PhL selection of IS parameters for terminators 22
Table 14 – CP 1/1: PhL selection of Clause 12 for intrinsic safety barriers 22
Table 15 – CP 1/1: PhL selection of recommended IS parameters for intrinsic safety barriers and galvanic isolators (Entity model only) 23
Table 16 – CP 1/1: PhL selection of Clause 12 for intrinsically safe galvanic isolators 24
Table 17 – CP 1/1: PhL selection of Clause 15, recommended optical fiber types 25
Table 18 – CP 1/1: PhL selection of passive star couplers, recommended maximum insertion loss 25
Table 19 – CP 1/1: PhL selection of active star couplers 26
Table 20 – CP 1/1: Optical power budget considerations 26
Table 21 – CP 1/1: DLL service selection 27
Table 22 – CP 1/1: DLL service selection of Clause 5 28
Table 23 – CP 1/1: DLL service selection of 5.4 28
Table 24 – CP 1/1: DLL service selection of 5.4.1 28
Table 25 – CP 1/1: DLL service selection of 5.4.3 29
Table 26 – CP 1/1: DLL service selection of 5.4.6 29
Table 27 – CP 1/1: DLL service selection of Clause 6 30
Table 28 – CP 1/1: DLL service selection of the summary of 6.3, DL-connection QoS 31
Table 29 – CP 1/1: DLL service selection of Figures 9 to 14 of 6.4 31
Table 30 – CP 1/1: DLL service selection of 6.5 32
Table 31 – CP 1/1: DLL service selection: replacement for Table 13 of 6.5 33
Table 32 – CP 1/1: DLL service selection of 6.5, replacement for Table 14 34
Table 33 – CP 1/1: DLL service selection of 6.5 for use of addresses for peer DLC 34
Table 34 – CP 1/1: DLL service selection of 6.5 for use of addresses for multipeer DLC connect request at publisher 34
Table 35 – CP 1/1: DLL service selection of 6.5 for use of addresses for multipeer DLC connect request at subscriber 34
Table 36 – CP 1/1: DLL service selection of 6.6 35
Table 37 – CP 1/1: DLL service selection: replacement for Table 15 of 6.6 35
Table 38 – CP 1/1: DLL service selection of 6.7 36
Table 39 – CP 1/1: DLL service selection of 6.7, replacement for Table 16 36
Table 40 – CP 1/1: DLL service selection of 6.7, replacement for Table 17 36
Table 41 – CP 1/1: DLL service selection of 6.7, replacement for Table 18 37
Table 42 – CP 1/1: DLL service selection of Clause 7 37

Table 43 – CP 1/1: DLL service selection of 7.5, replacement for Table 23 38
Table 44 – CP 1/1: DLL service selection of Clause 8 39
Table 45 – CP 1/1: DLL service selection of 8.5, replacement for Table 28 39
Table 46 – CP 1/1: DLL protocol selection 40
Table 47 – CP 1/1: DLL protocol selection of Clause 4 40
Table 48 – CP 1/1: DLL protocol selection of 4.3 41
Table 49 – CP 1/1: DLL protocol selection of 4.3.2.1 for use of link designators 41
Table 50 – CP 1/1: DLL protocol selection of 4.3.2.2 for use of node designators 41
Table 51 – CP 1/1: DLL protocol selection of 4.3.3.1 for predefined flat non–local DL-addresses 42
Table 52 – CP 1/1: DLL protocol selection of 4.3.3.2 for predefined flat link–local DL-addresses 42
Table 53 – CP 1/1: DLL protocol selection of 4.3.3.3 for predefined node–local DL-addresses 42
Table 54 – CP 1/1: DLL protocol selection of 4.7 43
Table 55 – CP 1/1: DLL protocol selection of 4.7.4 44
Table 56 – CP 1/1: DLL protocol selection of 4.7.5 45
Table 57 – CP 1/1: DLL protocol selection of Clause 6 46
Table 58 – CP 1/1: DLL protocol selection, replacement for Table 10 of 6.0 47
Table 59 – CP 1/1: DLL protocol selection of 6.5 48
Table 60 – CP 1/1: DLL protocol selection of 6.7 51
Table 61 – CP 1/1: DLL protocol selection of 6.8 55
Table 62 – CP 1/1: DLL protocol selection of 6.11 56
Table 63 – CP 1/1: DLL protocol selection of 6.12 56
Table 64 – CP 1/1: DLL protocol selection of 6.15 57
Table 65 – CP 1/1: DLL protocol selection of 6.20 58
Table 66 – CP 1/1: DLL protocol selection of Clause 7 59
Table 67 – CP 1/1: DLL protocol selection of 7.4 60
Table 68 – CP 1/1: DLL protocol selection of Clause 8 61
Table 69 – CP 1/1: DLL protocol selection of 8.2 62
Table 70 – CP 1/1: DLL protocol selection of 8.2.2 72
Table 71 – CP 1/1: DLL protocol selection of 8.3 85
Table 72 – CP 1/1: DLL protocol selection of 8.4 85
Table 73 – CP 1/1: DLL protocol selection of Clause 9 87
Table 74 – CP 1/1: DLL protocol selection of 9.3 87
Table 75 – CP 1/1: DLL protocol selection of 9.3.5 89
Table 76 – CP 1/1: DLL protocol selection of 9.3.5.2.2, replacement for element encoding 90
Table 77 – CP 1/1: DLL protocol selection of Clause 10 91
Table 78 – CP 1/1: DLL protocol selection of 10.2 91
Table 79 – CP 1/1: DLL protocol selection of 10.3 92
Table 80 – CP 1/1: DLL protocol selection of 10.3.7, specification of errors 94
Table 81 – CP 1/1: DLL protocol selection of 10.4 95
Table 82 – CP 1/1: DLL protocol selection of 10.5 96

Table 83 – CP 1/1: DLL protocol selection of 10.6 97
Table 84 – CP 1/1: AL service selection 97
Table 85 – CP 1/1: AL data type selection of Clause 4 98
Table 86 – CP 1/1: AL protocol selection 98
Table 87 – CP 1/2: AL service selection 99
Table 88 – CP 1/2: AL protocol selection 100
Table 89 – CP 1/3: PhL selection for H2 devices 100
Table 90 – CP 1/3: PhL selection for H2 media and related components 102

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

INDUSTRIAL NETWORKS – PROFILES –

Part 1-1: Fieldbus profiles – Communication Profile Family 1

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization 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 this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, 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 liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the 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. IEC 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-right holders. In all cases, the commitment to limited release of intellectual-property-rights made by the holders of those rights permits a layer protocol type to be used with other layer protocols of the same type, or in other type combinations explicitly authorized by their respective intellectual property right holders.

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

IEC 61784-1-1 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation. It is an International Standard.

This first edition, together with the other parts of the same series, cancels and replaces the fifth edition of IEC 61784-1 published in 2019. This first edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC 61784-1:2019:

a) split of the original IEC 61784-1 into several subparts, one subpart for the material of a generic nature, and one subpart for each Communication Profile Family specified in the original document.

The text of this International Standard is based on the following documents:

Draft	Report on voting
65C/1207/FDIS	65C/1236/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts of the IEC 61784-1 series, published under the general title *Industrial networks – Profiles – Part 1: Fieldbus profiles*, 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 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.

INTRODUCTION

The IEC 61784-1 series provides a set of Communication Profiles (CP) in the sense of ISO/IEC TR 10000-1. These answer the need of identifying the protocol families co-existing within the IEC 61158 series, as a result of the international harmonization of fieldbus technologies available on the market. More specifically, these profiles help to correctly state the compliance with the IEC 61158 series, and to avoid the spreading of divergent implementations, which would limit its use, clearness and understanding. Additional profiles to address specific market concerns, such as functional safety or information security, can be addressed by future parts of the IEC 61784-1 series.

The IEC 61784-1 series contains several Communication Profile Families (CPF), which specify one or more communication profiles. Such profiles identify, in a strict sense, protocol subsets of the IEC 61158 series via protocol specific communication profiles. They do not define device profiles that specify communication profiles together with application functions needed to answer the need of a specific application ("application profiles").

It is agreed that these latter classes of profiles would facilitate the use of the IEC 61158 series of standards; the profiles defined in the IEC 61784-1 series are a necessary step to achieve that task.

It is also important to clarify that interoperability – defined as the ability of two or more network systems to exchange information and to make mutual use of the information that has been exchanged (see ISO/IEC TR 10000-1) – can be directly achieved on the same link only for those devices complying with the same communication profile.

Profiles contained in the IEC 61784-1 series are constructed of references to IEC 61158-2 and the IEC 61158-3, IEC 61158-4, IEC 61158-5 and IEC 61158-6 series, and other IS, TS or worldwide-accepted standards, as appropriate[1]. Each profile is required to reference at least one part of the IEC 61158 series in addition to IEC 61158-1.

Two or more Profiles, which are related to a common family, are specified within a "Communication Profile Family" (CPF).

---

[1] International Standardised Profiles may contain normative references to specifications other than International Standards; see ISO/IEC JTC 1 N 4047: *The Normative Referencing of Specifications other than International Standards in JTC 1 International Standardized Profiles – Guidelines for ISP Submitters*.

INDUSTRIAL NETWORKS – PROFILES –

Part 1-1: Fieldbus profiles – Communication Profile Family 1

1 Scope

This part of IEC 61784-1 defines Communication Profile Family 1 (CPF 1). CPF 1 specifies a set of protocol specific communication profiles (CPs) based on the IEC 61158 series (Type 1, Type 5 and Type 9) and other standards, to be used in the design of devices involved in communications in factory manufacturing and process control.

NOTE All CPs are based on standards or draft standards or International Standards published by the IEC or on standards or International Standards established by other standards bodies or open standards processes.

Each CP selects an appropriate consistent and compatible subset of services and protocols from the relevant set that is defined and modelled in the IEC 61158 series. For the selected subset of services and protocols, the profile also describes any possible or necessary constraints in parameter values.

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.

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

IEC 60079-11, *Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"*

IEC 60079-25, *Explosive atmospheres – Part 25: Intrinsically safe electrical systems*

IEC 61158 (all parts), *Industrial communication networks – Fieldbus specifications*

IEC 61158-2:2023, *Industrial communication networks – Fieldbus specifications – Part 2: Physical layer specification and service definition*

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

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

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

IEC 61158-5-9:2014, *Industrial communication networks – Fieldbus specifications – Part 5-9: Application layer service definition – Type 9 elements*

IEC 61158-6-5:2014, *Industrial communication networks – Fieldbus specifications – Part 6-5: Application layer protocol specification – Type 5 elements*

IEC 61158-6-9:2014, *Industrial communication networks – Fieldbus specifications – Part 6-9: Application layer protocol specification – Type 9 elements*

IEC 61784-1-0:2023, *Industrial networks – Profiles – Part 1-0: Fieldbus profiles – General concepts and terminology*

ISO/IEC 8802-2:1998, *Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 2: Logical link control*

ISO/IEC/IEEE 8802-3, *Telecommunications and exchange between information technology systems – Requirements for local and metropolitan area networks – Part 3: Standard for Ethernet*

ISO/IEC 15802-3[2], *Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Common specifications – Part 3: Media Access Control (MAC) Bridges*

IETF RFC 768, J. Postel, *User Datagram Protocol*, August 1980, available at https://www.rfc-editor.org/info/rfc768 [viewed 2022-02-18]

IETF RFC 791, J. Postel, *Internet Protocol*, September 1981, available at https://www.rfc-editor.org/info/rfc791 [viewed 2022-02-18]

IETF RFC 793, J. Postel, *Transmission Control Protocol*, September 1981, available at https://www.rfc-editor.org/info/rfc793 [viewed 2022-02-18]

3 Terms, definitions, abbreviated terms, symbols, and conventions

3.1 Terms and definitions

For the purposes of this document, all terms and definitions provided in the IEC 61158 series and IEC 61784-1-0 apply.

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

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

3.2 Abbreviations and symbols

3.2.1 Common abbreviations and symbols

For the purposes of this document, all abbreviations and symbols defined in the IEC 61158 series and IEC 61784-1-0 apply.

CP	communication profile
CPF	communication profile family
MAU	medium attachment unit

[2] This standard has been withdrawn.

3.2.2 Other abbreviations and symbols

IP internet protocol (see IETF RFC 791)

IS intrinsically safe (as an adjective)
intrinsic safety (as a noun)

TCP terminal control protocol (see IETF RFC 793)

UDP user datagram protocol (see IETF RFC 768)

3.3 Conventions

For the purposes of this document, the conventions defined in IEC 61784-1-0 apply.

4 CPF 1 (FOUNDATION™ Fieldbus[3])

4.1 General overview

Communication Profile Family 1 defines profiles based on IEC 61158-2, IEC 61158-3-1, IEC 61158-4-1 physical and data-link protocol Type 1, IEC 61158-5-9 and IEC 61158-6-9 application protocol Type 9, and IEC 61158-5-5 and IEC 61158-6-5 application protocol Type 5, and on other standards (see Table 1).

The FOUNDATION Fieldbus family of protocols consists primarily of two distinct protocol sets, known generically (for historical reasons) as H1 and HSE. The H1 profiles are a subset of IEC 61158 Type 1 physical and data-link and Type 9 application services and protocols, and include both wire-media and fiber-media physical layers operating at 31,25 kbit/s. The HSE profiles are based on use of the ISO/IEC/IEEE 8802-3 (Ethernet-like) MAC and physical layers, and on use of standard internet network and transport layer protocols; they use the Type 5 application services and protocols.

A third profile set has been developed within the FieldComm Group, but is not in current or planned use. It is included in this profile because it provides a migration path to CPF 1 from some of the CPF 5 protocols, and exclusion from this document could inhibit that migration.

Table 1 – CPF 1: overview of profile sets

Layer	Profile 1/1 (H1)	Profile 1/2 (HSE)	Profile 1/3 (H2)
Application	IEC 61158-5-9, IEC 61158-6-9	IEC 61158-5-5, IEC 61158-6-5	IEC 61158-5-9, IEC 61158-6-9
Transport	—	IETF RFC 768, IETF RFC 793	—
Network	—	IETF RFC 791	—
Data-link	IEC 61158-3-1, IEC 61158-4-1	ISO/IEC/IEEE 8802-3, ISO/IEC 8802-2	IEC 61158-3-1, IEC 61158-4-1
Physical	IEC 61158-2, 31,25 kbit/s, primarily Type 1	any of ISO/IEC/IEEE 8802-3	Type 1 of IEC 61158-2

NOTE 1 See Annex A for an overview of FOUNDATION Fieldbus communications concepts.

NOTE 2 Profile CP 1/2 (HSE) supports communications through both local- and wide-area network infrastructures. It is readily obtainable as commercial off-the-shelf (COTS) technology.

[3] FOUNDATION™ Fieldbus is a trade name of the FieldComm Group. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the trademark holder or any of its products. Compliance with this profile does not require use of the trade name FOUNDATION™ Fieldbus. Use of the trade name FOUNDATION™ Fieldbus requires permission of the trade name holder.