

INTERNATIONAL STANDARD



**Industrial communication networks –
Installation of communication networks in industrial premises**

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INTERNATIONAL STANDARD



**Industrial communication networks –
Installation of communication networks in industrial premises**

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ELECTROTECHNICAL
COMMISSION

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INDUSTRIAL COMMUNICATION NETWORKS –**Installation of communication networks in industrial premises**

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International Standard IEC 61918 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

This second edition cancels and replaces the first edition published in 2007 and Corrigendum 1 (2009). This edition constitutes a technical revision.

This edition includes the following technical changes with respect to the previous edition:

- 4.4.7.2.1 is updated;
- 4.4.7.3.4 is updated;
- 5.7.4.3 is updated as result of the revision of the installation profiles;
- 6.2.3.1 is updated;
- Figure 2, Figure 15, Table 14 and Table B.3 are updated;
- a new Figure 35 is added;

- a new Table 10 is added;
- Annex D is extended to cover additional communication profile families;
- Annex F is extended to cover conductor sizes in electrical cables;
- Annex H is made normative; some common requirements are extended as result of the revision of the installation profiles.

This standard is to be used in conjunction with the IEC 61784-5 series with regard to the installation of communication profiles (CPs). This standard is to be used in conjunction with ISO/IEC 14763-2 with regard to the installation of generic cabling in accordance with ISO/IEC 24702.

NOTE For further information, see the Introduction.

This standard was developed in cooperation with ISO/IEC JTC1/SC25 which is responsible for ISO/IEC 24702.

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

FDIS	Report on voting
65C/599/FDIS	65C/614/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.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
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INTRODUCTION

Process and factory automation are increasingly relying on communication networks and fieldbuses that are inherently designed to cope with the specific environmental conditions of the industrial premises. The networks and fieldbuses provide for an effective integration of the applications among the several functional units of the plant/factory. One of the benefits of integrating field-generated data with higher-level management systems is to reduce production costs. At the same time integrated data helps maintain or even increase the quantity and quality of production. A correct network installation is an important prerequisite for communications availability, reliability, and performance. This requires proper consideration of safety and security conditions and environmental aspects such as mechanical, liquid, particulate, climatic, chemicals and electromagnetic interference.

The specifications of these communication networks are provided in the following standards.

ISO/IEC 24702 specifies design of generic telecommunications infrastructures within industrial premises and provides the foundations for some of the transmission performance specifications of this standard. ISO/IEC 24702 specifies only the raw bandwidth capability of a channel; it does not specify useful data transfer rate for a specific network using that channel or expected errors after taking account of interference during the communication process.

IEC 61158 fieldbus standard and IEC 62006 and their companion standard IEC 61784 (including parts 1, 2, 3, 4 and relevant subparts) jointly specify several CPs suitable for industrial automation. These CPs specify a raw bandwidth capability and in addition, they specify bit modulation and encoding rules for their fieldbus. Some profiles also specify target levels for useful data transfer rate, and maximum values for errors caused by interference during the communication process.

This standard provides a consistent set of installation rules for industrial premises as regards both generic cabling (of the telecommunication infrastructures) and fieldbuses. In addition, it offers support for the definition and installation of the interfaces between automation island networks and generic cabling. One of the problems it seeks to solve is the situation created when different parts of a large automation site are provided by suppliers that use non-homogeneous installation guidelines having different structures and contents. This lack of consistency greatly increases the potential for errors and mismatch situations liable to compromise the communication system.

This standard was developed by harmonising the approaches of several user groups and industrial consortia.

This standard provides a common point of reference for the installation of the media of most used industrial communication networks for most industrial sites. The standard covers the life cycle of an installation in the following clauses (see the map of the standard in Figure 1):

- Clause 4: Installation planning;
- Clause 5: Installation implementation;
- Clause 6: Installation verification and acceptance test;
- Clause 7: Installation administration;
- Clause 8: Installation maintenance and troubleshooting.

The methods described in these clauses are written in such a way as to provide installation guidance for a wide range of technician skills.

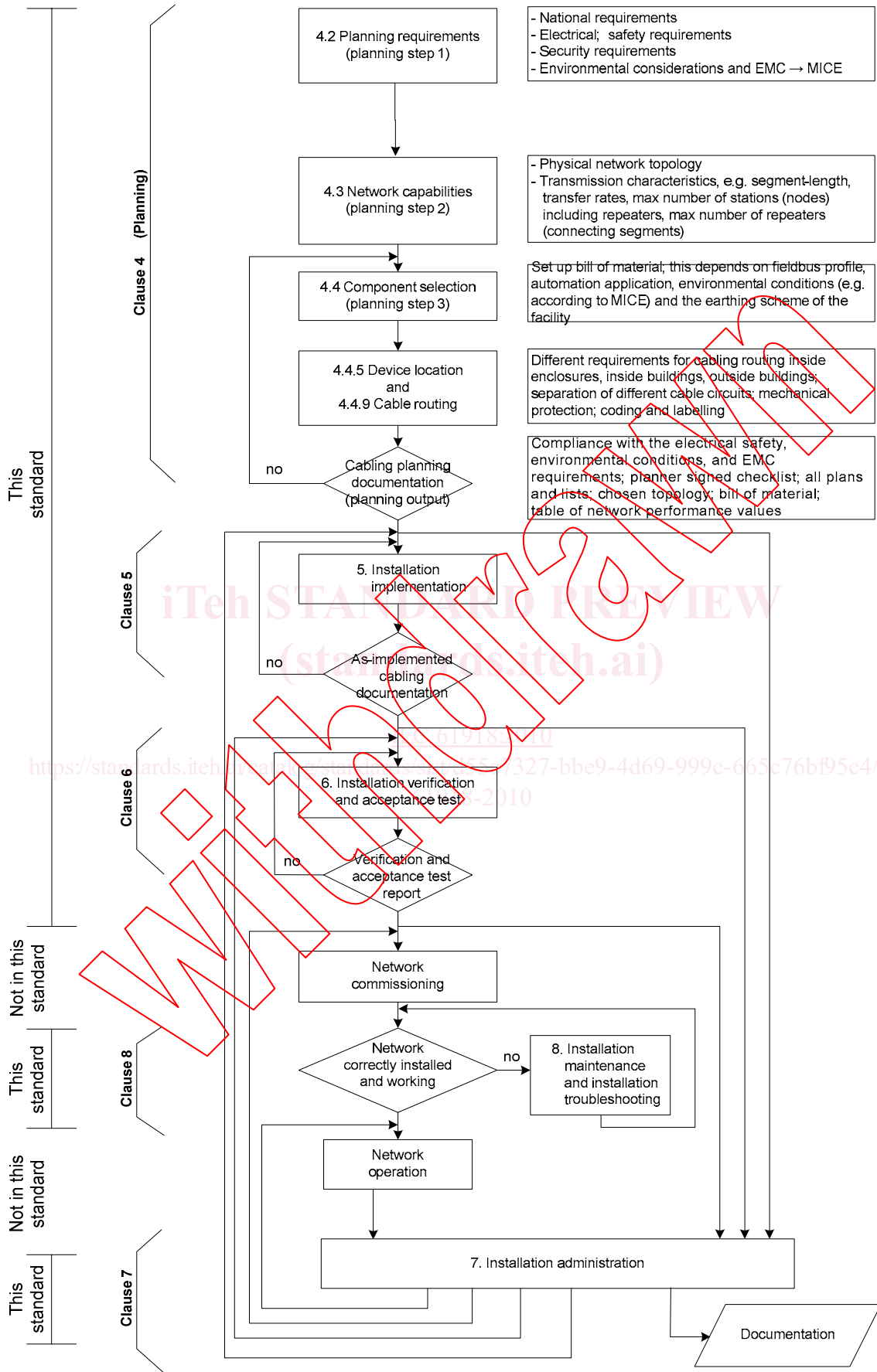


Figure 1 – Industrial network installation life cycle

The installation of a communication system is supported by this standard used in conjunction with the relevant installation profile. The installation profile establishes the technology-specific requirements in terms of which requirements apply as they are in this standard, or which have been extended, modified, or replaced.

For the fieldbus that are defined in the IEC 61784 series as communication profiles (CPs) of the communication profile families (CPF) the installation is specified in the installation profiles that are available in the IEC 61784-5-n series, where n is the CPF number. IEC/TR 61158-1 describes the relationship between the fieldbus and the CPs and the relevant installation profiles (see Figure 2).

For the installation of generic cabling, this standard is to be used in conjunction with ISO/IEC 14763-2 (see Figure 2).

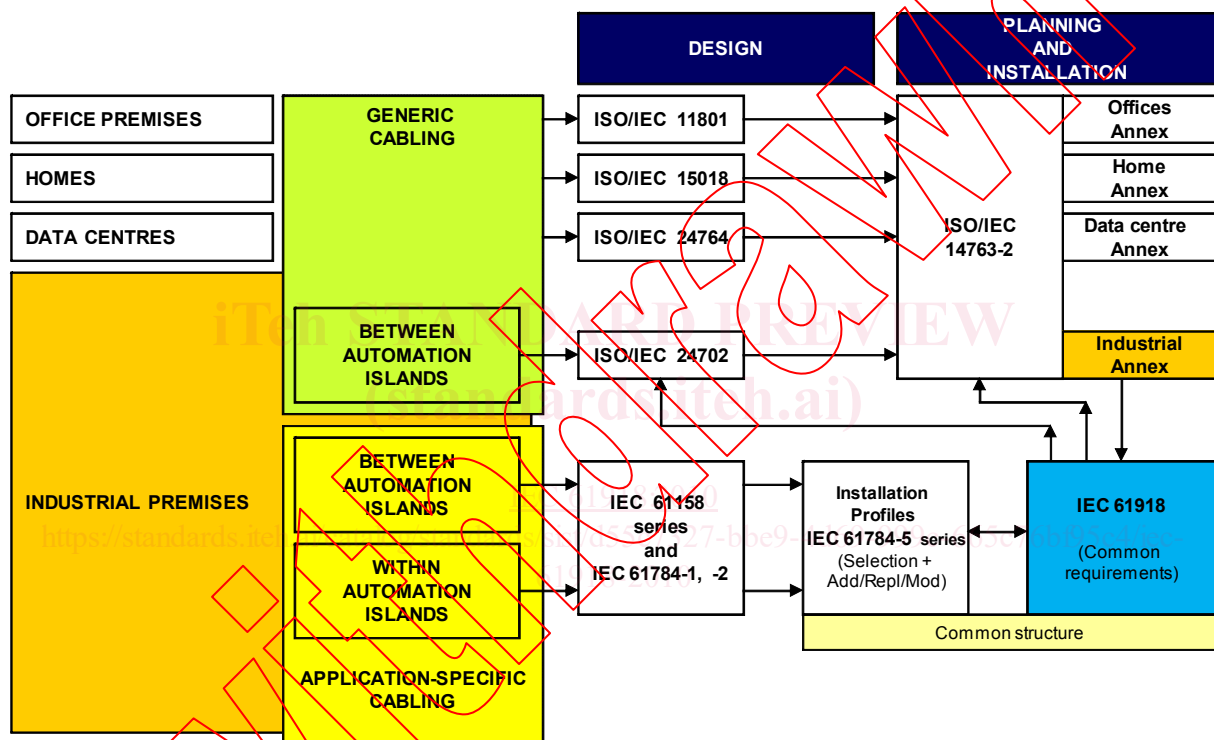


Figure 2 – Standards relationships

One of the advantages of this structure is that the users of a network know which installation requirements are common to most networks and which are specific to a particular network.

Every single plant/factory has its own installation needs in accordance with the specific critical conditions that apply to the specific application. This standard and its companion standards described above provide a set of mandatory installation requirements ("shalls") and a number of recommendations ("shoulds"). It is up to the owner of the specific industrial enterprise to explicitly request that the cabling installation is implemented in accordance with these standards and to list all recommendations that shall be considered as mandatory requirements for the specific case."