

STN	Elektronické železničné zariadenia. Vlaková komunikačná sieť (TCN). Časť 3-4: Sieť skupiny vozidiel založená na sieti Ethernet (ECN).	STN EN 61375-3-4 34 2675
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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. 10/14

Obsahuje: EN 61375-3-4:2014, IEC 61375-3-4:2014

119664



Úrad pre normalizáciu, metrológiu a skúšobníctvo SR, odbor SÚTN, 2014
Podľa zákona č. 264/1999 Z. z. v znení neskorších predpisov sa môžu slovenské technické normy rozmnožovať a rozširovať iba so súhlasom Úradu pre normalizáciu, metrológiu a skúšobníctvo SR.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 61375-3-4

May 2014

ICS 45.060

English Version

**Electronic railway equipment - Train communication network
(TCN) - Part 3-4: Ethernet Consist Network (ECN)
(IEC 61375-3-4:2014)**

Matériel électronique ferroviaire - Réseau embarqué de
train (TCN) - Partie 3-4: Réseau Ethernet de Rame (ECN)
(CEI 61375-3-4:2014)

Elektronische Betriebsmittel für Bahnen - Zugbus - Teil 3-4:
ECN - Ethernet-Zugverband-Netzwerk
(IEC 61375-3-4:2014)

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Foreword

The text of document 9/1873/FDIS, future edition 1 of IEC 61375-3-4, prepared by IEC/TC 9 "Electrical equipment and systems for railways" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61375-3-4:2014.

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- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2015-01-23
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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 When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61076-2-101	-	Connectors for electronic equipment - Product EN 61076-2-101 requirements - Part 2-101: Circular connectors - Detail specification for M12 connectors with screw-locking		-
IEC 61076-3-104	-	Connectors for electronic equipment - Product EN 61076-3-104 requirements - Part 3-104: Detail specification for 8-way, shielded free and fixed connectors for data transmissions with frequencies up to 1000 MHz		-
IEC 61156-6	-	Multicore and symmetrical pair/quad cables for digital communications - Part 6: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz - Work area wiring - Sectional specification	-	-
IEC 61375-1	-	Electronic railway equipment - Train communication network (TCN) - Part 1: General architecture	EN 61375-1	-
IEC 61375-2-1	-	Electronic railway equipment - Train communication network (TCN) - Part 2-1: Wire Train Bus (WTB)	EN 61375-2-1	-
IEC 61375-2-5	-	Electronic railway equipment - Train backbone - Part 2-5: Ethernet Train Backbone	EN 61375-2-5	-
IEC 62439 series	-	High availability automation networks	EN 62439 ¹⁾	-
ISO/IEC 7498 series	-	Information technology - Open Systems Interconnection - Basic Reference Model: The Basic Model	-	-
ISO/IEC 8824 series	-	Information technology - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1)	-	-
ISO/IEC 11801	-	Information technology - Generic cabling for customer premises	-	-

¹⁾ EN 62439 is superseded by EN 62439-6:2010, which is based on IEC 62439-6:2010.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEEE 802.3	-	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 802.1Q	-	IEEE Standard for Local and Metropolitan Area Networks: Virtual Bridged Local Area Networks	-	-
IEEE 802.1D	-	IEEE Standard for Local and Metropolitan Area Networks - Media Access Control (MAC) Bridges	-	-
ANSI/TIA/EIA 568-B.1	2001	Commercial Building Telecommunications Cabling Standard - Part 1: General requirements	-	-
ANSI X3.263	1995	EN-Information Technology - Fibre Distributed - Data Interface (FDDI) - Token Ring Twisted Pair Physical Layer Medium Dependent (TP-PMD)	-	-



IEC 61375-3-4

Edition 1.0 2014-03

INTERNATIONAL STANDARD

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**Electronic railway equipment – Train communication network (TCN) –
Part 3-4: Ethernet Consist Network (ECN)**

**Matériel électronique ferroviaire – Réseau embarqué de train (TCN) –
Partie 3-4: Réseau Ethernet de Rame (ECN)**



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IEC 61375-3-4

Edition 1.0 2014-03

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Partie 3-4: Réseau Ethernet de Rame (ECN)**

INTERNATIONAL
ELECTROTECHNICAL
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COMMISSION
ELECTROTECHNIQUE
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PRICE CODE
CODE PRIX

XF

ICS 45.060

ISBN 978-2-8322-1447-3

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TRAIN COMMUNICATION NETWORK (TCN) –****Part 3-4: Ethernet Consist Network (ECN)**

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International Standard IEC 61375-3-4 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

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

FDIS	Report on voting
9/1873/FDIS	9/1904/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.

A list of all parts of IEC 61375 series, under the general title *Electronic railway equipment – Train communication network (TCN)*, can be found on the IEC website.

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
- amended.

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.

INTRODUCTION

This part of IEC 61375 series of international standards specifies the Consist Network based on Ethernet technology, i.e. the Ethernet Consist Network (ECN) within the TCN architecture as defined in IEC 61375-1, and End Devices which can attach to the ECN. In addition gateway services between Train Backbone and ECN are specified.

The general architecture of the TCN (see IEC 61375-1) defines a hierarchical structure with two levels of networks, Train Backbone(s) and Consist Network(s). This hierarchical structure specifies Consist Networks based on different technologies such as MVB, CANopen and ECN interfacing one Train Backbone. ECNs based on different design and implementation may be interfaced to the same Train Backbone reaching the result that the Train Backbone ensures interoperability between Consist Networks with different implementations.

The common part, consisting of Clauses 1 to 4, defines requirements and specifications which are common to all ECN implementations and End Devices and gateways.

The common part defines

- the data communication interface of End Devices connected to the ECN,
- functions and services provided by the ECN to End Devices,
- the gateway functions for data transfer between Train Backbone and the ECN, and
- performances of the ECN.

ELECTRONIC RAILWAY EQUIPMENT – TRAIN COMMUNICATION NETWORK (TCN) –

Part 3-4: Ethernet Consist Network (ECN)

1 Scope

This part of IEC 61375 specifies the data communication network inside a Consist based on Ethernet technology, the Ethernet Consist Network (ECN).

The applicability of this part of IEC 61375 to the Consist Network allows for interoperability of individual vehicles within Open Trains in international traffic.

This part of IEC 61375 may be additionally applicable to closed trains and Multiple Unit Trains when so agreed between purchaser and supplier.

2 Normative references

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.

IEC 61076-2-101, *Connectors for electronic equipment – Product requirements – Part 2-101: Circular connectors – Detail specification for M12 connectors with screw-locking*

IEC 61076-3-104, *Connectors for electronic equipment – Product requirements – Part 3-104: Detail specification for 8-way, shielded free and fixed connectors for data transmissions with frequencies up to 1 000 MHz*

IEC 61156-6, *Multicore and symmetrical pair/quad cables for digital communications – Part 6: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz – Work area wiring – Sectional specification*

IEC 61375-1, *Electronic railway equipment – Train Communication Network (TCN) – Part 1: General architecture*

IEC 61375-2-1, *Electronic railway equipment – Train Communication Network (TCN) – Part 2-1: Wire Train Bus (WTB)*

IEC 61375-2-5, *Electronic railway equipment – Train Communication Network (TCN) – Part 2-5: Ethernet Train Backbone (ETB)*

IEC 62439 (all parts), *Industrial communication networks – High availability automation networks*

ISO/IEC 7498, *Information technology – Open Systems Interconnection (OSI) – The Basic reference model*

ISO/IEC 8824 (all parts), *Information technology – Abstract Syntax Notation One (ASN.1)*

ISO/IEC 11801, *Information technology – Generic cabling for customer premises*

TIA/EIA-568-B, *Commercial Building Telecommunications Cabling Standard – Part 1: General Requirements (ANSI/TIA/EIA-568-B.1-2001)*

ANSI X3.263:1995, *EN-Information Technology - Fibre Distributed Data Interface (FDDI) - Token Ring Twisted Pair Physical Layer Medium Dependent (TP-PMD) (order number ANSI INCITS 263)*

IEEE 802.1D, *IEEE Standard for Local and metropolitan area networks – Media Access Control (MAC) Bridges*

IEEE 802.1Q, *IEEE Standard for Local and metropolitan area networks – Virtual Bridged Local Area Networks*

IEEE 802.3, *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*

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