

Inland navigation vessels - Electrical shore connection,
three-phase current 400 V, 50 Hz, at least 250 A

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

| | |
|---|--|
| See Eesti standard EVS-EN 16840:2017 sisaldab Euroopa standardi EN 16840:2017 ingliskeelset teksti. | This Estonian standard EVS-EN 16840:2017 consists of the English text of the European standard EN 16840:2017. |
| Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas | This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation. |
| Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 15.03.2017. | Date of Availability of the European standard is 15.03.2017. |
| Standard on kättesaadav Eesti Standardikeskusest. | The standard is available from the Estonian Centre for Standardisation. |

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 29.120.30, 47.020.60, 47.060, 93.140

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:

Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

ICS 29.120.30; 47.020.60; 47.060; 93.140

English Version

**Inland navigation vessels - Electrical shore connection,
three-phase current 400 V, 50 Hz, at least 250 A**

Bateaux de navigation intérieure - Connexion au réseau
électrique terrestre, courant triphasé 400 V, 50 Hz,
minimum 250 A

Fahrzeuge der Binnenschifffahrt - Elektrischer
Landanschluss, Drehstrom 400 V, 50 Hz, mindestens
250 A

This European Standard was approved by CEN on 9 January 2017.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

| Contents | Page |
|---|-------------|
| European foreword..... | 4 |
| Introduction..... | 5 |
| 1 Scope | 6 |
| 2 Normative references | 6 |
| 3 Terms and definitions | 6 |
| 4 Requirements | 7 |
| 4.1 Components | 7 |
| 4.2 Electrical characteristics | 9 |
| 4.3 Basic safety requirements | 9 |
| 4.3.1 General | 9 |
| 4.3.2 Plug-in connectors | 9 |
| 4.3.3 On-shore Connection Monitoring..... | 9 |
| 4.4 Other requirements | 9 |
| Annex A (normative) Shore-based section | 10 |
| A.1 General | 10 |
| A.1.1 Components | 10 |
| A.1.2 Designs | 11 |
| A.1.3 General requirements | 11 |
| A.1.4 On-shore Connection Monitoring..... | 11 |
| A.1.5 Lighting | 12 |
| A.1.6 Transfer station | 12 |
| A.2 Mechanical specifications..... | 12 |
| A.3 Electrical safety..... | 12 |
| A.4 Further connections | 12 |
| A.5 Other requirements..... | 12 |
| A.6 Operating instructions | 13 |
| A.7 Designation | 13 |
| A.8 Labelling..... | 14 |
| Annex B (normative) On-board section | 15 |
| B.1 On-shore Cable Connection | 15 |
| B.1.1 Components | 15 |
| B.1.2 Selection | 15 |
| B.1.3 Layout..... | 16 |
| B.2 On-Board Rectifier Unit..... | 16 |
| B.2.1 Components | 16 |
| B.2.2 On-shore Connection Monitoring | 17 |
| B.2.3 Mechanical specifications..... | 17 |

| | | |
|-----------------------|---|----|
| B.2.4 | Electrical specifications | 18 |
| B.3 | Operating instructions | 18 |
| B.4 | Designation | 18 |
| B.4.1 | On-shore connecting cable..... | 18 |
| B.4.2 | On-shore connecting cable | 19 |
| B.5 | Labelling | 19 |
| B.5.1 | On-shore connecting cable..... | 19 |
| B.5.2 | On-board rectifier unit..... | 19 |
| Annex C (informative) | Dimensions for On-shore Connection Cables | 20 |
| Bibliography | | 21 |
| Figures | | |
| Figure 1 | — Schematic representation of an electrical shore connection..... | 8 |
| Figure A.1 | — Circuit diagram — Example of a charging station with two connection units | 11 |
| Figure B.1 | — Schematic diagram of an on-shore cable connection..... | 15 |
| Figure B.2 | — Circuit diagram for an on-board rectifier unit | 17 |
| Tables | | |
| Table C.1 | — Current-carrying Capacity and Mass of a single-wire, flexible Hose Cable for Heavy-duty Use | 20 |

European foreword

This document (EN 16840:2017) has been prepared by Technical Committee CEN/TC 15 "Inland navigation vessels", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2017, and conflicting national standards shall be withdrawn at the latest by September 2017.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Inland navigation vessels are usually fitted with a three-phase low-voltage grid, which operates at a rated voltage of 400 V at 50 Hz. During navigation, a continuous supply of electrical power is ensured by the diesel on-board generators. While in port, these generators shall continue to operate if no suitable land-based electrical power supply is available. The operation of these generators can sometimes lead to severe noise pollution, both for the crew on their own vessel, for other vessels lying alongside, and for residents ashore. Added to this is the damaging impact on the environment of exhaust gases.

The electrical shore connections regulated in this European Standard provide a land-based source of electrical power to the ship while in port or in a similar facility. It is therefore vital to have a Europe-wide uniform on-shore connection which can be connected and disconnected in all harbours and landing stages by the vessel crew, and, where possible, without assistance from land-based personnel. The safety requirements set out in this Standard serve to prevent accidents when setting up, using and disconnecting the shore connection. It should be pointed out that other standards apply to maritime vessels.

1 Scope

This European Standard specifies requirements relating to electrical installations for the supply of electrical power (three-phase AC - 400 V, 50 Hz and with a rated current of at least 250 A) to vessels in port.

Annex A stipulates general and safety requirements relating to the shore-based section of the electrical shore connection.

Annex B stipulates general and safety requirements relating to the shore-based connecting cables and to the on-board section of the electrical shore connection.

Annex C contains information concerning the dimensioning of shore-based connecting cables.

The requirements according to the HD 60364 and HD 384 series of standards generally apply to shore-based low-voltage equipment.

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.

EN 15869-2, *Inland Navigation Vessels — Electrical Shore Connections, Three-Phase Current 400 V, to 63 A, 50 Hz — Part 2: On-shore Portion, Safety-Related Requirements*

EN 50525-2-21, *Cables and Wiring — High-Voltage Power Lines with Rated Voltage to 450/750 V (U_o/U) — Part 2-21: High-Voltage Power Lines for General Applications — Flexible Cords with cross-linked elastomeric insulation*

EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*

EN 60947-2, *Low-Voltage Switchgear — Part 2: Circuit Breaker (IEC 60947-2)*

EN 61984, *Plug-In Connector — Safety-Related Requirements and Testing (IEC 61984)*

HD 308 S2, *Identification of cores in cables and flexible cords*

HD 60364-7-730, *Low-voltage electrical installations — Parts 7-730: Requirements for special installations or locations — Onshore units of electrical shore connections for inland navigation vessels*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

on-board supply system

self-contained electrical power supply system of a vessel for distributing electrical energy

Note 1 to entry: A vehicle may have multiple separate on-board power supply systems.

3.2

electrical shore connection

<inland navigation> electrical installation for supplying electrical energy to inland navigation vessels in ports and at landing stages

3.3