
Plovila za celinske vode - Električne povezave s kopnim, trifazni tok 400 V, 50 Hz in vsaj 250 A

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

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

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

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47.060	Jezerska in rečna plovila	Inland navigation vessels

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EUROPEAN STANDARD

EN 16840

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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.

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EN 16840:2017 (E)**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of an identical text or by endorsement, at the latest by September 2017, and conflicting national standards shall be withdrawn at the latest by September 2017.

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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.

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EN 16840:2017 (E)**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 vessel 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

charging station

the shore-based section of the electrical shore connection, with one or more connection unit(s)

3.4**on-shore connection unit**

<inland navigation> a unit for connecting to the on-board electrical power network

3.5**transfer station**

spatially separated section of an on-shore unit with single conductor sockets for the on-shore connection cables

Note 1 to entry: See 4.1, Figure 1 b.

3.6**on-shore connection monitoring**

system consisting of several components, which releases the supply of on-shore power after inserting and locking single plug-type connectors.

3.7**on-shore connection line**

single-core flexible line provided with plugs and on-board couplings

3.8**rectifier unit**

<inland navigation> on-board devices which transfer electrical energy

3.9**landing stage**

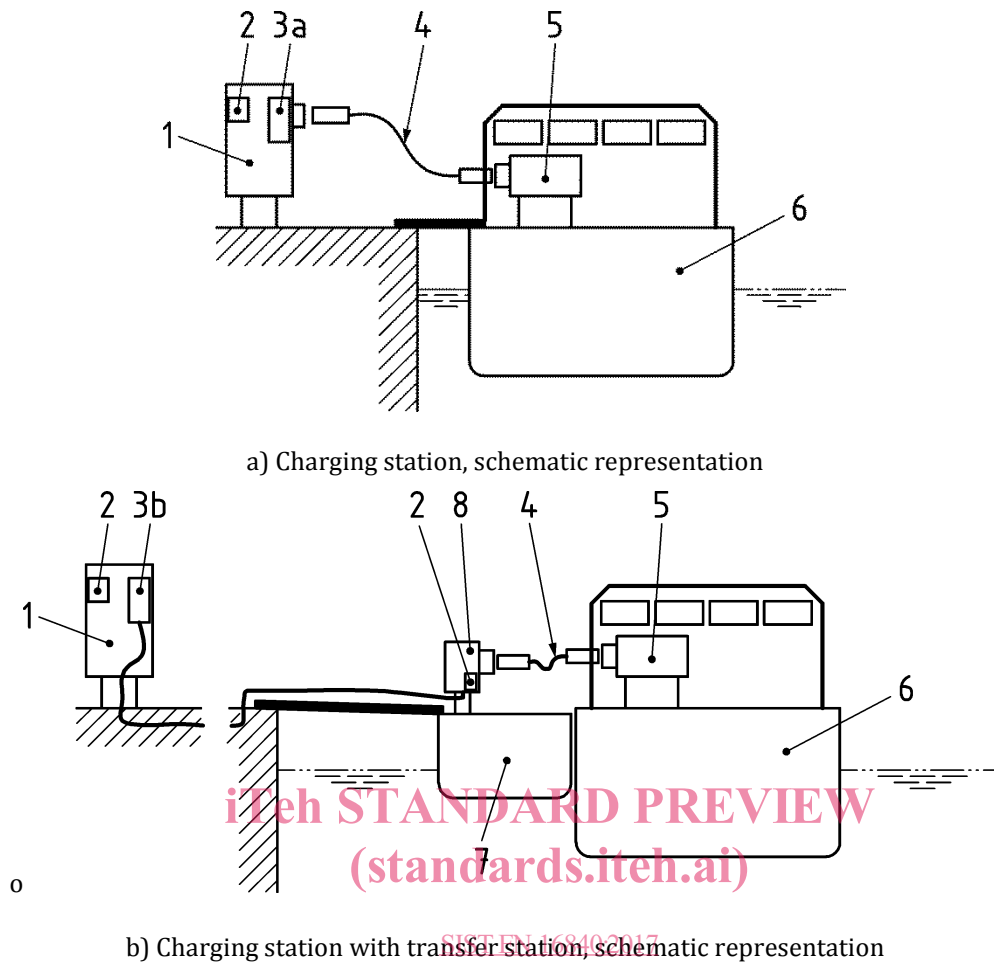
<waterways engineering> a shore location for landing vehicles

4 Requirements**4.1 Components**

The electrical shore connection consists of the following components, see Figure 1:

- Charging station according to Annex A;
- Transfer station according to Annex A (optional);
- Five on-board connecting cables according to Annex B;
- On-board rectifier unit according to Annex B.

Additional cable bridges and movable cable drums or containers (optional).

**Key**

- | | |
|-----|---|
| 1 | Charging station |
| 2 | Operating instructions |
| 3 a | Shore connection unit with socket outlets |
| 3 b | Shore connection unit with connection cables |
| 4 | Shore connections with plugs and on-board couplings |
| 5 | On-board rectifier unit with on-board plugs |
| 6 | Inland navigation vessel |
| 7 | Floating landing stage |
| 8 | Transfer station with socket outlets |

Figure 1 — Schematic representation of an electrical shore connection

4.2 Electrical characteristics

The electrical shore connection shall be rated for 400 V, 50 Hz and at least 250 A current. If higher currents are required, all components of the electrical shore connection shall be rated for these values.

4.3 Basic safety requirements

4.3.1 General

In order to abandon the landing stage in an emergency, it shall be possible for trained ship crew to disconnect the connection including all the necessary switching operations at any time, without help from shore-based personnel.

4.3.2 Plug-in connectors

Sockets, plugs, on-board plugs and on-board couplings shall be enclosed plug-in connectors with disengaging interlocking mechanisms as per EN 61984.

The plug-in connections shall comply with the required rated current and be constructed in such a manner that plug-in connections for different rated currents cannot be connected to one another.

An appropriate plug system shall ensure that a connection can only be established in the sequence PE, N, L1, L2, L3. Disconnecting a connection should only be possible in the sequence L3, L2, L1, N, PE.

After establishing all individual connections a mechanical locking mechanism shall ensure that the connection cannot be interrupted.

4.3.3 On-shore Connection Monitoring SIST EN 16840:2017

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4.3.3.1 On Shore

Technical measures shall be taken to ensure that the current can only be switched on when all five on-shore connection cables are plugged in and locked both on board and on shore.

Likewise, the electric on-shore connection shall be automatically switched off whenever one of the mechanical locks (on board or on shore) is opened.

4.3.3.2 On Board

Technical measures shall be taken to ensure that the on-board power supply system can only be switched on when all five on-shore connecting cables are plugged in and locked on board.

Likewise, the on-board power system shall be disconnected from the on-board rectifier as soon as the on-board lock is opened.

4.4 Other requirements

It is recommended that environmentally-friendly materials only should be used, which have the lowest impact on the environment both in terms of production as well as disposal/recycling.