Utility connections in port — Part 3 Low voltage shore connection (LVSC) systems — General requirements

Alimentation des navires à quai — Partie 3 Systèmes de connexion à quai à basse tension — Exigences générales

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CONTENTS

1 Scope ........................................................................................................................................ 10

2 Normative references .................................................................................................................. 10

3 Terms and definitions ................................................................................................................... 11
   3.1 cable management system ....................................................................................................... 11
   3.2 plug and socket-outlet ............................................................................................................ 11
       3.2.1 socket-outlet .................................................................................................................. 12
       3.2.2 plug ............................................................................................................................... 12
   3.3 ship coupler .............................................................................................................................. 12
       3.3.1 ship connector ................................................................................................................. 12
       3.3.2 ship inlet ........................................................................................................................ 12

4 General requirements .................................................................................................................. 13
   4.1 System description .................................................................................................................. 13
   4.2 Distribution system ................................................................................................................ 14
       4.2.1 General .......................................................................................................................... 14
       4.2.2 Equipotential bonding ................................................................................................... 14
   4.3 Compatibility assessment before connection ......................................................................... 15
   4.4 LVSC system design and operation ....................................................................................... 15
       4.4.1 System design ................................................................................................................. 15
       4.4.2 System operation ............................................................................................................ 15
   4.5 Personnel safety ...................................................................................................................... 16
   4.6 Design requirements .............................................................................................................. 16
       4.6.1 General .......................................................................................................................... 16
       4.6.2 Protection against moisture and condensation .............................................................. 16
       4.6.3 Location and construction ............................................................................................ 16
       4.6.4 Electrical equipment in hazardous areas ...................................................................... 17
   4.7 Electrical requirements ......................................................................................................... 17
   4.8 System study and calculations ............................................................................................... 17
   4.9 Emergency shutdown including emergency-stop facilities .................................................. 18

5 LV shore supply system requirements ....................................................................................... 19
   5.1 Voltages and frequencies ....................................................................................................... 19
   5.2 Quality of LV shore supply .................................................................................................... 20

6 Shore-side installation .................................................................................................................. 21
   6.1 General .................................................................................................................................. 21
   6.2 System component requirements ............................................................................................ 21
       6.2.1 Circuit-breaker and disconnector .................................................................................... 21
       6.2.2 Transformer .................................................................................................................... 22
       6.2.3 Neutral earthing resistor ................................................................................................. 22
       6.2.4 Equipment earthing conductor bonding ....................................................................... 22
   6.3 Shore-to-ship electrical protection system ............................................................................ 22
   6.4 LV interlocking ....................................................................................................................... 23
       6.4.1 General .......................................................................................................................... 23
       6.4.2 Operating of the low-voltage (LV) circuit-breakers and disconnectors .......................... 23
   6.5 Shore connection convertor equipment ............................................................................... 24
       6.5.1 General .......................................................................................................................... 24
       6.5.2 Degree of protection ....................................................................................................... 24
       6.5.3 Cooling ............................................................................................................................ 24
       6.5.4 Protection ....................................................................................................................... 24

7 Ship-to-shore connection and interface equipment ............................................................... 25
7.1 General ................................................................. 25
7.2 Cable management system ........................................ 25
  7.2.1 General ......................................................... 25
  7.2.2 Monitoring of cable tension ............................... 26
  7.2.3 Monitoring of the cable length .......................... 27
7.3 Plugs and socket-outlets and ship couplers ................. 27
  7.3.1 General ......................................................... 27
  7.3.2 Pilot contacts ................................................. 29
7.4 Ship-to-shore connection cable .................................... 29
7.5 Independent control and monitoring cable .................. 30
7.6 Storage ................................................................ 30
8 Ship requirements ....................................................... 30
  8.1 General ............................................................. 30
  8.2 Ship electrical distribution system protection ............... 30
    8.2.1 Short-circuit protection .................................. 30
    8.2.2 Earth fault protection, monitoring and alarm ....... 30
  8.3 Shore connection switchboard .................................. 30
    8.3.1 General ......................................................... 30
    8.3.2 Circuit-breaker and disconnector ..................... 31
    8.3.3 Instrumentation and protection ....................... 31
  8.4 On-board transformer ............................................. 31
  8.5 On-board receiving switchboard connection point ........ 32
    8.5.1 General ......................................................... 32
    8.5.2 Circuit-breaker ................................................. 32
    8.5.3 Instrumentation ............................................... 32
    8.5.4 Protection ........................................................ 33
    8.5.5 Operation of the circuit-breaker ....................... 34
  8.6 Ship power restoration ............................................ 34
9 LVSC system control and monitoring ............................. 34
  9.1 General requirements ............................................ 34
  9.2 Load transfer via blackout ...................................... 35
  9.3 Load transfer via automatic synchronization ............... 35
    9.3.1 General ......................................................... 35
    9.3.2 Protection requirements ................................. 35
10 Verification and testing .................................................. 36
  10.1 General ............................................................ 36
  10.2 Initial tests of shore-side installation ....................... 36
    10.2.1 General ......................................................... 36
    10.2.2 Tests ............................................................. 36
  10.3 Initial tests of ship-side installation ......................... 36
    10.3.1 General ......................................................... 36
    10.3.2 Tests ............................................................. 37
  10.4 Tests at the first call at a shore supply point .............. 37
    10.4.1 General ......................................................... 37
    10.4.2 Tests ............................................................. 37
11 Periodic tests and maintenance ..................................... 38
  11.1 General ............................................................ 38
  11.2 Tests at repeated calls of a shore supply point .......... 38
    11.2.1 General ......................................................... 38
Figure D.2 – Power plug and socket pin assignment .........................................................46
Figure D.3 – IS Barrier and cable properties (To be developed) ............................................47
Figure D.4 – Safety loop circuit for LVSC system in tankers (To be developed)......................47
Figure E.1 – LVSC general operating procedures for connection a) and disconnection b). ....48
UTILITY CONNECTIONS IN PORT –
Part 3: Low Voltage Shore Connection (LVSC) Systems –
General requirements

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A list of all the parts in the IEC 80005 series, published under the general title Utility Connections In Port, can be found on the IEC website.

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

<table>
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</tr>
</thead>
<tbody>
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INTRODUCTION

The following standard was developed jointly between IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units, ISO technical committee 8: Ships and marine technology, subcommittee 3: Piping and Machinery, and IEEE IAS PCIC Marine Industry subcommittee.

For a variety of reasons, including environmental considerations, it is becoming an increasingly common requirement for ships to shut down ship generators and to connect to shore power for as long as practicable during stays in port.

The intention of this standard is to define requirements that support, with the application of suitable operating practices, efficiency and safety of connections by compliant ships to compliant low-voltage shore power supplies through a compatible shore-to-ship connection.

With the support of sufficient planning, cooperation between ship and terminal facilities, and appropriate operating procedures and assessment, compliance with the requirements of this standard is intended to allow different ships to connect to low-voltage shore connection (LVSC) systems at different berths. This provides the benefits of standard, straightforward connection without the need for adaptation and adjustment at different locations that can satisfy the requirement to connect for as long as practicable during stays in port.

Ships that do not apply this standard may find it impossible to connect to compliant shore supplies.

Where deviations from the requirements and recommendations in this standard may be considered for certain designs, the potential effects on compatibility are highlighted.

Where the requirements and recommendations of this standard are complied with, low-voltage shore supplies arrangements are likely to be compatible for visiting ships for connection.

Clauses 1 to 12 are intended for application to all LVSC systems. They intend to address mainly the safety and effectiveness of LVSC systems with a minimum level of requirements that would standardise on one solution. This standard includes the requirement to complete a detailed compatibility assessment for each combination of ship and shore supply prior to a given ship arriving to connect to a given shore supply for the first time.

The other annexes in this standard are ship specific annexes that include additional requirements related to agreed standardisation of solutions to achieve compatibility for compliant ships at different compliant berths and to address safety issues that are considered to be particular to that ship type. These annexes use the same numbering as Clauses 1 to 12 with an annex letter prefix. Hence, the numbering is not necessarily continuous. Where no additional requirements are identified, the clause is not shown.

137

138
1 Scope

This part of IEC/IEEE 80005 describes low voltage shore connection (LVSC) systems, on board the ship and on shore, to supply the ship with electrical power from shore.

This standard is applicable to the design, installation and testing of LVSC systems and addresses:

- LV shore distribution systems;
- shore-to-ship connection and interface equipment;
- transformers/reactors;
- semiconductor/rotating convertors;
- ship distribution systems; and
- protection, control, monitoring, interlocking and power management systems.

NOTE: It does not apply to the electrical power supply during docking periods, e.g. dry docking and other out-of-service maintenance and repair.

Additional and/or alternative requirements may be imposed by national administrations or the authorities within whose jurisdiction the ship is intended to operate and/or by the owners or authorities responsible for a shore supply or distribution system.

It is expected that LVSC systems will have practicable applications for ships requiring up to 1 MVA while at berth. Low-voltage shore connection systems exceeding 250 A, equal or exceeding 400 V a.c. and up to 1000 V a.c. nominal voltage are covered by this standard. High-voltage shore connection systems are covered by Part 1 of this standard.

This standard does not cover marinas and boatyards, or systems intended to be operated by ordinary persons as defined by IEC 61439.

2 Normative references

The following referenced documents are indispensable for the application 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.

IEC 60034 (all parts), Rotating electrical machines

IEC 60076 (all parts), Power transformers

IEC 60079 (all parts), Electrical apparatus for explosive gas atmospheres


IEC 60092-201:1994, Electrical installations in ships – Part 201: System design – General
3 Terms and definitions

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

3.1 cable management system
all equipment designed to control, monitor and handle the flexible cables, for power and control, and their connection devices

3.2 plug and socket-outlet
a means enabling the connection of a flexible cable to fixed wiring. It consists of two parts:

NOTE For the use of plugs, socket-outlets, and ship couplers, see Figure 5 – Diagram showing the use of accessories.
3.2.1 socket-outlet

the part intended to be installed with the fixed wiring (shore side) or incorporated in equipment

NOTE A socket-outlet may also be incorporated in the output circuit of an isolating transformer.

3.2.2 plug

the part intended to be attached directly to one flexible cable, and to be connected to the shore socket-outlet

3.3 ship coupler

a means enabling the connection of a flexible cable to the ship. It consists of two parts:

3.3.1 ship connector

the part intended to be attached to one flexible cable connected to the supply, and to be connected to the ship inlet

3.3.2 ship inlet

the part incorporated in, or fixed to, the ship

3.4 equipotential bonding

provision of electric connections between conductive parts, intended to achieve equipotentiality

3.5 low voltage (abbreviation: LV)

a set of voltage levels used for the distribution of electricity and whose upper limit is generally accepted to be 1 000 V a.c.
3.6 **person in charge**
person responsible for LVSC system operation

3.7 **pilot contact**
a contact of the plug, ship inlet, socket-outlet and ship connector which signals correct connection and which is a safety-related component

3.8 **receiving point**
connection point of the flexible cable on the ship

3.9 **safe**
condition in which safety risks are minimized to an acceptable level

3.10 **supply point**
the connection point of the flexible cable on shore

3.11 **fail safe**
a design property of an item which prevents its failures from resulting in critical faults

3.12 **IT power system** an ungrounded power system

3.13 **safety relay**
is a fail safe relay as defined by the standards:

3.14 **physical connectors**
electrical connectors between shore and ship are defined as in Annexes

4 **General requirements**

4.1 **System description**

A typical LVSC system described in this standard consists of hardware components as shown in Figure 1.