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Date: 05 February 2024

Origin: European

Latest date for receipt of comments: 29 February 2024

Project No. 2016/02415

Responsible committee: SME/32 Ships and marine technology - Steering committee

Interested committees:

Title: BS IEC/IEEE 80005-3 Utility connections in port

Part 3: Low Voltage Shore Connection (LVSC) Systems - General requirements

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Information on the co-operating organizations represented on the committees referenced above may be obtained from <http://standardsdevelopment.bsigroup.com>

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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UK Vote

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

IEC/IEEE DIS 80005-3.2

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*

ICS: 47.020.60

Member bodies are requested to consult relevant national interests in IEC/TC 18 before casting their ballot to the e-Balloting application.

This document is circulated as received from the committee secretariat.

ISO/TC 8/SC 3

Secretariat: **ANSI**

Voting begins on:
2024-01-30

Voting terminates on:
2024-03-26

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Reference number
IEC/IEEE DIS 80005-3.2:2024(en)

Full document details: 24/30487068 DC

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Published in Switzerland

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

UTILITY CONNECTIONS IN PORT –

**Part 3: Low voltage shore connection (LVSC) systems –
General requirements**

FOREWORD

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International Standard IEC/IEEE 80005-3 has been prepared by IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units, in cooperation with IEC subcommittee 23H: Plugs, socket-outlets and couplers for industrial and similar applications, and for electric vehicles, of IEC technical committee 23: Electrical accessories, ISO technical committee 8: Ships and marine technology, subcommittee 3: Piping and machinery, and IEEE IAS Petroleum and Chemical Industry Committee (PCIC) of the Industry Applications Society of the IEEE¹.

This publication is published as an IEC/IEEE prefix standard and IEC/ISO/IEEE triple logo standard.

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

FDIS	Report on voting
18/XXXX/FDIS	18/XXXX/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table. In ISO, the standard has been approved by XX members out of YY having a cast vote.

International Standards are drafted in accordance with the rules given in ISO/IEC Directives, Part 2.

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 IEC Technical Committee, the ISO Technical Committee and IEEE Technical Committee have decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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.

A bilingual version of this publication may be issued at a later date.

The National Committees are requested to note that for this document the stability date is 2029.

¹ A list of IEEE participants can be found at the following URL: (to be provided prior to publication).

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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/IEEE 80005 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 document 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 document 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 can find it impossible to connect to compliant shore supplies.

Ship types covered by the annexes of IEC/IEEE 80005-1 requiring less than 1 MVA, can be designed according to Part 1 with High Voltage Shore Connection to ensure interoperability.

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

Where the requirements and recommendations of this document 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 document 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.

Annex A includes cabling recommendations that can be used in LVSC systems.

Annex B 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.

UTILITY CONNECTIONS IN PORT –

**Part 3: Low voltage shore connection (LVSC) systems –
General requirements****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. Other standards are available specifically for inland vessel operations.

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

- low voltage (LV) shore distribution systems,
- shore-to-ship connection and interface equipment,
- transformers/reactors,
- semiconductor/rotating frequency 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, for example dry docking and other out-of-service maintenance and repair.

Additional and/or alternative requirements can 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 power supply or distribution system.

It is expected that LVSC systems will have practicable applications for ships requiring power up to 1 MVA while at berth. Low-voltage shore connection systems exceeding 250 A, equal or exceeding 400 V AC and up to 1 000 V AC nominal voltage are covered by this document. High-voltage shore connection systems are covered by IEC/IEEE 80005-1.

This document is not intended to cover systems to be operated by ordinary persons as defined in 3.21.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60079 (all parts), *Explosive atmospheres*

IEC 60092-101:2018, *Electrical installations in ships – Part 101: Definitions and general requirements*

IEC 60092-201:2019, *Electrical installations in ships – Part 201: System design – General*

- 310 IEC 60092-301:1980, *Electrical installations in ships – Part 301: Equipment – Generators and*
 311 *motors*
- 312 IEC 60092-352 *Electrical installations in ships - Part 352: Choice and installation of electrical*
 313 *cables*
- 314 IEC 60092-401:1980, *Electrical installations in ships – Part 401: Installation and test of*
 315 *completed installation*
- 316 IEC 60092-504:2016, *Electrical installations in ships – Part 504: Special features – Control and*
 317 *instrumentation*
- 318 IEC 60146-1 (all parts), *Semiconductor convertors – General requirements and line*
 319 *commutated convertors*
- 320 IEC 60204-1:2016, *Safety of machinery – Electrical equipment of machines – Part 1: General*
 321 *requirements*
- 322 IEC 60309-1:2021, *Plugs, socket-outlets and couplers for industrial purposes – Part 1: General*
 323 *requirements*
- 324 IEC 60309-5:2017, *Plugs, socket-outlets and couplers for industrial purposes – Part 5:*
 325 *Dimensional compatibility and interchangeability requirements for plugs, socket-outlets, ship*
 326 *connectors and ship inlets for low-voltage shore connection systems (LVSC)*
- 327 IEC 60332-1-2, *Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test*
 328 *for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-*
 329 *mixed flame*
- 330 IEC 60364 (all parts), *Low-voltage electrical installations*
- 331 IEC 60947-2:2016 + AMD1:2019, *Low-voltage switchgear and controlgear – Part 2: Circuit-*
 332 *breakers*
- 333 IEC 60947-5-1:2016, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices*
 334 *and switching elements – Electromechanical control circuit devices*
- 335 IEC 61363-1:1998, *Electrical installations of ships and mobile and fixed offshore units – Part 1:*
 336 *Procedures for calculating short-circuit currents in three-phase a.c*
- 337 International Convention for the Safety of Life at Sea (SOLAS):1974, *Consolidated edition 2009,*
 338 *Ch. II-1/D, Regulations 42, 43 and 45*

339 **3 Terms and definitions**

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

341 ISO, IEC and IEEE maintain terminological databases for use in standardization at the following
 342 addresses:

- 343 • IEC Electropedia: available at <http://www.electropedia.org/>
- 344 • ISO Online browsing platform: available at <http://www.iso.org/obp>
- 345 • IEEE Standards Dictionary Online: available at <http://dictionary.ieee.org>

346

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**shore plug and socket-outlet**

means enabling the connection of a flexible cable to fixed wiring, consisting of two parts: the socket-outlet and the plug

Note 1 to entry For the use of plugs, socket-outlets, and ship couplers, see Figure 5 showing the use of accessories.

Note 2 to entry See Figure 5.

3.3**shore socket-outlet**

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

Note 1 to entry A socket-outlet may also be incorporated in the output circuit of an isolating transformer.

Note 2 to entry See Figure 5.

3.4**shore plug**

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

Note 1 to entry See Figure 5.

3.5**ship coupler**

means enabling the connection of a flexible cable to the ship, consisting of two parts: a ship connector and ship inlet.

Note 1 to entry See Figure 5.

3.6**ship connector**

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

Note 1 to entry See Figure 5.

3.7**ship inlet**

the part incorporated in, or fixed to, the ship

Note 1 to entry See Figure 5.

3.8**equipotential bonding**

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

[SOURCE: IEC 195-01-10]

3.9**low voltage****LV**

set of voltage levels used for the distribution of electricity and whose upper limit is generally accepted to be 1 000 V AC

390 [SOURCE: IEC 601-01-26, modified — The definition has been rephrased.]

391 **3.10**

392 **person in charge**

393 **PIC**

394 Person(s) responsible for LVSC system operation

395 **3.11**

396 **pilot contact**

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

399 **3.12**

400 **receiving point**

401 connection point of the flexible cable on the ship

402 **3.13**

403 **safe**

404 condition in which safety risks are minimized to an acceptable level

405 **3.14**

406 **supply point**

407 connection point of the flexible cable on shore

408 **3.15**

409 **fail safe**

410 design property of an item which prevents its failures from resulting in critical faults

411 [SOURCE: IEC 821-01-10]

412 **3.16**

413 **IT power system**

414 ungrounded power system

415 **3.17**

416 **safety relay**

417 fail safe relay as defined by the standards ISO 13849-1 and IEC 62061

418 **3.18**

419 **safety circuit**

420 normally closed interlocking circuit with pilot contacts and safety devices that shuts down the
421 LVSC system in response to specific initiating events

422 **3.19**

423 **active cable management system**

424 detection system with device that limits cable tension

425 Note 1 to entry Such device could be a clutch system

426 **3.20**

427 **load**

428 device intended to absorb power supplied by another device or an electric power system

429 [SOURCE: IEC 151-15-15]

430 **3.21**

431 **ordinary person**

432 person who is neither a skilled person nor an instructed person