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# PUBLICLY AVAILABLE SPECIFICATION

## PRE-STANDARD



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**Utility connections in port –  
Part 3: Low Voltage Shore Connection (LVSC) Systems – General requirements**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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# INTERNATIONAL ELECTROTECHNICAL COMMISSION

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## UTILITY CONNECTIONS IN PORT –

### **Part 3: Low Voltage Shore Connection (LVSC) Systems – General requirements**

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This Publicly Available Specification (PAS) IEC/ISO 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 and IEC technical committee 20: Electric cables, 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 IEEE.

This PAS will eventually be replaced with an IEC/IEEE prefix and IEC/ISO/IEEE triple logo standard.

The text of this PAS is based on the following document:

This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document

Draft PAS	Report on voting
18/1377/PAS	18/1390/RVD

Following publication of this PAS, which is a pre-standard publication, the technical committee or subcommittee concerned may transform it into an International Standard.

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.

This PAS shall remain valid for an initial maximum period of 3 years starting from the publication date. The validity may be extended for a single period up to a maximum of 3 years, at the end of which it shall be published as another type of normative document, or shall be withdrawn.

**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 Publicly Available Specification (PAS) was developed jointly 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 and IEC technical committee 20: Electric cables, 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 PAS 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 PAS 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 PAS may find it impossible to connect to compliant shore supplies.

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

Where the requirements and recommendations of this PAS 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 are intended to address mainly the safety and effectiveness of LVSC systems with a minimum level of requirements that would standardise on one solution. This PAS 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 PAS are ship-specific annexes which 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.

## UTILITY CONNECTIONS IN PORT –

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

#### 1 Scope

This PAS describes low voltage shore connection (LVSC) systems, on board the ship and on shore, to supply the ship with electrical power from shore.

This PAS 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
- 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. Low-voltage shore connection systems not exceeding 250 A, with a maximum of 125 A per cable and not exceeding 300 V to earth are not covered by this PAS. High-voltage shore connection systems are covered by IEC/ISO/IEEE 80005-1.

#### 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 60034 (all parts), *Rotating electrical machines*

IEC 60076 (all parts), *Power transformers*

IEC 60079 (all parts), *Explosive atmospheres*

IEC 60092-101:1994, *Electrical installations in ships – Part 101: Definitions and general requirements*

IEC 60092-201:1994, *Electrical installations in ships – Part 201: System design – General*

IEC 60092-301:1980, *Electrical installations in ships – Part 301: Equipment – Generators and motors*

IEC 60092-401:1980, *Electrical installations in ships – Part 401: Installation and test of completed installation*

IEC 60092-502:1999, *Electrical installations in ships – Part 502: Tankers – Special features*

IEC 60092-504:2001, *Electrical installations in ships – Part 504: Special features – Control and instrumentation*

IEC 60146-1 (all parts), *Semiconductor convertors – General requirements and line commutated convertors*

IEC 60204-1:2005, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

IEC 60228:2004, *Conductors of insulated cables*

IEC 60309-1:2012, *Plugs, socket-outlets and couplers for industrial purposes – Part 1: General requirements*

IEC 60332-1-2, *Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame*

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

IEC 60947-2:2006, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers*

IEC 60947-5-1:2003, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

IEC 61363-1, *Electrical installations of ships and mobile and fixed offshore units – Part 1: Procedures for calculating short-circuit currents in three-phase a.c.*

IEC 61439 (all parts), *Low-voltage switchgear and controlgear assemblies*

International Convention for the Safety of Life at Sea (SOLAS):1974, *Consolidated edition 2009, Ch. II-1/D, Regulations 42, 43 and 45*