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

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1	2	(3)	4	5	(6)	(7)
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	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

Attributed to ISO/TC 8/SC 3 by the Central Secretariat (see page iii)

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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

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UTILITY CONNECTIONS IN PORT –

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

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

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

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103 INTRODUCTION

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

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

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

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

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

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

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

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

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

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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.

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 60092-101:2002, *Electrical installations in ships – Part 101: Definitions and general requirements*

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

- 178 IEC 60092-301:1995 Ed. 3.0, *Electrical installations in ships – Part 301: Equipment –*
179 *Generators and motors*
- 180 *IEC 60092-401: 1980, Ed. 3.0, Electrical installations in ships – Part 401: Installation and test*
181 *of completed installation*
- 182 IEC 60092-502:1999, Ed. 5.0, *Electrical installations in ships – Part 502: Tankers – Special*
183 *features*
- 184 IEC 60092-504:2001, *Electrical installations in ships – Part 504: Special features – Control*
185 *and instrumentation*
- 186 IEC 60146-1 (all parts), *Semiconductor convertors – General requirements and line*
187 *commutated convertors*
- 188 IEC 60228:2004, *Conductors of insulated cables*
- 189 IEC 60204-1, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*
- 190 IEC 60309-1: *Plugs, socket-outlets and couplers for industrial purposes - Part 1: General*
191 *requirements*
- 192 IEC 60332-1-2: *Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test*
193 *for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-*
194 *mixed flame*
- 195 IEC 60947-2:2013 Ed. 4.2, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers*
- 196 IEC 60947-5-1:2003 Ed. 3.0, *Low-voltage switchgear and controlgear – Part 5-1: Control*
197 *circuit devices and switching elements – Electromechanical control circuit devices*
- 198 IEC 61363-1, *Electrical installations of ships and mobile and fixed offshore units – Part 1:*
199 *Procedures for calculating short-circuit currents in three-phase a.c.*
- 200 International Convention for the Safety of Life at Sea (SOLAS):1974, *Consolidated edition*
201 *2009, Ch. II-1/D, Regulations 42, 43 and 45*

202 **3 Terms and definitions**

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

204 **3.1** 205 **cable management system**

206 all equipment designed to control, monitor and handle the flexible cables, for power and
207 control, and their connection devices

208 **3.2** 209 **plug and socket-outlet**

210 a means enabling the connection of a flexible cable to fixed wiring. It consists of two parts:

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

212

213 [SOURCE: IEC 60309-1:2012, 2.1]

214 **3.2.1**215 **socket-outlet**

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

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

219

220 [SOURCE: IEC 62613-1:2011, 3.2 modified as follows: the words in the bracket and Note to
221 entry have been added]

222 **3.2.2**223 **plug**

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

226 [SOURCE: IEC 62613-1:2011, 3.3 modified as follows: the words “and to be connected to the
227 shore socket-outlet” have been added]

228 **3.3**229 **ship coupler**

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

231 [SOURCE: IEC 62613-1:2011, 3.4]

232 **3.3.1**233 **ship connector**

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

236 [SOURCE: IEC 62613-1:2011, 3.5 modified as follows: the words “and to be connected to the
237 ship inlet” have been added]

238 **3.3.2**239 **ship inlet**

240 the part incorporated in, or fixed to, the ship

241 [SOURCE: IEC 62613-1:2011, 3.6]

242 **3.4**243 **equipotential bonding**

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

246 [SOURCE: IEC 60050-195:1998, 195-01-10]

247 **3.5**248 **low voltage** (abbreviation: LV)

249 a set of voltage levels used for the distribution of electricity and whose upper limit is generally accepted
250 to be 1 000 V a.c.

251 [SOURCE: IEC 60050-601, 601-01-26]

252 3.6**253 person in charge****254 PIC**

255 person responsible for LVSC system operation

256 3.7**257 pilot contact**

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

260 3.8**261 receiving point**

262 connection point of the flexible cable on the ship

263 3.9**264 safe**

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

266 3.10**267 supply point**

268 the connection point of the flexible cable on shore

269 3.11**270 fail safe**

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

272 [SOURCE: IEC 60050-195:1998, 191-15-04]

273 3.12**274 IT power system**

275 ungrounded power system

276 3.13**277 safety relay**

278 is a fail safe relay as defined by the standards:

279 [EN ISO 13849-1 and IEC/EN 62061]

280 3.14**281 physical connectors**

282 electrical connectors between shore and ship are defined as in Annexes

283

284 4 General requirements**285 4.1 System description**

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