

EU Mutual Recognition Technical Requirements

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	Date	2014-06-11
	Tier	3

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1. PRODUCT DESCRIPTION

1.a General description of the product

- (a) A battery charger is a device used to put energy into a secondary cell or rechargeable battery by forcing an electric current through it.
- (b) Charger equipment shall be suitable for the type of storage batteries, the required charging characteristic, and the selected connection.

Note 1: Consideration is to be given to the temperature variation of the batteries.

1.b Application limitations

- (a) Restricted to Battery Chargers according to IEC 60947-1 and IEC 60255 installed onboard ships with exceptions as per SOLAS Ch. I Reg.3;
- (b) Installation on board ships within locations with climatic, biological, chemically active, mechanically active and mechanical environmental conditions not exceeding those for which performance has been proved according to IEC 60721-3-6 (1993) + A2 (1997);
- (c) The requirements are not applicable for chargers with a charging power above 2 kW and essential¹ services;

¹ Definition for Essential services: Definition of Essential services are to be considered by IACS UI SC134

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(d) The requirements are not applicable for battery chargers for use in propulsion and navigation and radio communication equipment and systems;

(e) Battery chargers for Li-ion and Ni-OH batteries etc. are to be excluded from the covered items.

1.c Intended use

(a) Power supply system characteristics as per IEC 60092-101

(b) Environment category 6K4, 6B2, 6C2, 6S2 and 6M3 according to conditions specified in IEC 60947-1 Annex Q.

1.d System context

See 1.c

2. DESIGN EVALUATION

2.a Engineering evaluation requirements

2.a i. Technical Requirements

(a) In the absence of indications regarding its operation, the battery charger is to be such that the fully discharged battery can be recharged to 100% capacity (e.g. output voltage) within a period of 10hours without exceeding the maximum permissible charging current;

(b) Battery charger units are to be constructed in accordance with IEC 62040 Series or equivalent;

(c) A charging rate other than (a) above (e.g. fully charged within 6 hours for batteries for starting of motors) is required in relation to the use of the battery;

(d) For floating service or for any other conditions where the load is connected to the battery while it is on charge, the maximum battery voltage is not to exceed the safe value of any connected apparatus. A voltage regulator with dropper or other means of voltage control shall be provided for this purpose;

(e) The battery charger is to be designed so that the charging current is set within the maximum current allowed by the manufacturer when the battery is discharged and the floating current to keep the battery fully charged;

(f) Trickle charging to neutralize internal losses is to be provided. An indication is to be provided to indicate a charging voltage being present at the charging unit;

(g) Battery charging facilities by means of D.C. generator and series resistor are to be provided with protection against reversal of current when the charging voltage is 20 % of the line voltage or higher. This applies even if the battery is inserted with the wrong polarity;

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- (h) Battery chargers are to be constructed to simplify maintenance operation. Indications are to be provided to visualize the proper operation of the charger and for troubleshooting;
- (i) If consumers are simultaneously supplied during charging, the maximum charging voltage shall not exceed the rated voltage described in Type testing requirements 2.b. (d);
- (j) The power demand of the consumers shall be considered for the selection of the chargers;
- (k) Battery chargers are to be provided with reverse current protection;
- (l) Monitoring and audible/visual alarm features are to be provided for the following (in a manned location):
- power supply failure (V and f) to the connected load;
 - earth fault;
 - operation of battery protective device;
 - bypass operation (in UPS units).

2.a.ii. Technical documents to be submitted

- (a) For all documentation, the English language shall be used.
- Type test reports, product descriptions, operation manuals, assembly drawings, dimension drawings, etc. to be submitted in English
- (b) Following charger's characteristics are needed to be submitted.
- Recharging time until the battery is ready for next discharge
 - Recharging current
 - Float voltage and current, e.g. under normal load conditions,
 - Accuracy of D.C. voltage control and stability under variation of 0 ~100% of nominal current and A.C. input full range variation.
 - D.C. output voltage regulation between 0~100% of full load output
 - A.C. input voltage range
 - D.C. ripple of current and voltage
 - harmonics, e.g. line, and through the battery
- (c) Prior to tests:
- Proposed test program and test schedule;
 - Description of test specimens and explanation of the selected test sample(s) providing evidence that the selected sample meets the most rigorous and demanding requirements;
 - Product descriptions, manuals, data sheets, assembly drawings, dimension drawings, etc. clearly identifying the product;
 - Complete accreditation certificate of the Test laboratory;
 - Details of production sites;
 - Product specification;

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- Application, working area;
- Instructions on fitting, assembly and operation;
- QM-certificate according to ISO 9001 or equivalent by an accredited certifying body.

On completion of tests, a report shall be issued, identified by number and date, which accurately, clearly and unambiguously presents the test results and all other relevant information.

(d) Test report(s) shall include the following information:

- Type of product, with type number / serial number(s) and quantity tested.
- Test specification for the product identified by number, revision and date.
- Details of test equipment and measuring instruments stating serial numbers and calibration certificates.
- Names of the test engineer and the engineer approving the report.
- Ambient environmental conditions during the test.
- The test results with a description of any failures encountered.
- Conclusion.

Test report(s) shall be signed by the test personnel and verified by a RO or the agreed independent representative witnessing the tests.

The complete product test report(s) shall be submitted to the Type Approval Centre.

2.b Type testing requirements

The following tests specified in IACS UR E10, IEC 60529 or IEC60947-1 shall be performed in the presence of RO's surveyor. In case the tests are conducted at a Nationally Accredited Laboratory, the presence of the surveyor can be omitted:

- (a) Visual Inspection (IACS UR E 10);
- (b) Performance test (current and voltage regulation, quick, slow, floating charge, alarms and ventilation rate) (IACS UR E10);
- (c) Temperature rise measurement;
- (d) Electrical Power supply variation test (IACS UR E10);
- (e) Dry heat (IACS UR E10);
- (f) Damp heat (IACS UR E10);
- (g) Vibration (IACS UR E10);
- (h) Insulation resistance (dielectric strength test and insulation resistance measurement) (IACS UR E10);
- (i) High voltage (IACS UR E10);
- (j) Cold (IACS UR E10);
- (k) Electrostatic discharge immunity (IACS UR E10);
- (l) Radiated radio frequency immunity (IACS UR E10);
- (m) Conducted low frequency immunity (IACS UR E10);
- (n) Conducted high frequency immunity (IACS UR E10);
- (o) Burst/Fast transient immunity (IACS UR E10);

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- (p) Surge immunity (IACS UR E10);
- (q) IP test (IEC60529);
- (r) Shock test (IEC 60947-1).

3. PRODUCTION REQUIREMENTS

Refer to EU RO "Product Quality Assurance (PQA)" procedure (Annex VI of EU RO Framework Document for the Mutual Recognition of Type Approval.

4. MARKING REQUIREMENTS

- Manufacturer's name or trade mark
- Type designation under which the product is type approved
- Rated Voltage
- Rated current
- Rated frequency
- Operating temperature range
- Charge voltage 'absorption' (VDC)
- Charge voltage 'float' (VDC)
- Battery capacity
- Humidity
- IP class

5. TYPE APPROVAL CERTIFICATE CONTENT

- Manufacturer's name or trade mark
- Type designation under which the product is type approved
- Input voltage
- Frequency
- Maximum input current
- Recommended battery capacity [Ah]
- Boost charge voltage
- Float charge voltage
- Output voltage range
- Maximum output current
- IP grade
- Certificate number
- Name and address of manufacturer
- Issue date and validity of certificate / expiry date
- List of approval documents
- Rules and Standards applied
- Test items and test levels applied
- Hardware, firmware, system software names and version.

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6. APPROVAL DATE AND REVISION NUMBER

Date	Revision	Comment
31 January 2014	0.0	Approved by the Advisory Board

7. BACKGROUND INFORMATION / REFERENCES

- (a) IACS UR E10 Test Specification for Type Approval;
- (b) IEC60529 Degrees of protection provided by enclosures (IP Code);
- (c) IEC61000-3-2 Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase);
- (d) IEC61000-3-3 Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection;
- (e) IEC60721-3-6 Classification of environmental conditions. Part 3: Classification of groups of environmental parameters and their severities. Ship environment;
- (f) IEC60947-1 Low-voltage switchgear and control-gear - Part 1: General rules
- (g) IEC60092-101 Electrical installations in ships - Part 101: Definitions and general requirements;
- (h) IEC62040-1 Uninterruptible power systems (UPS) - Part 1: General and safety requirements for UPS;
- (i) IEC62040-2 Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements;
- (j) IEC62040-3 Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements;
- (k) IEC62040-4 Uninterruptible power systems (UPS) - Part 4: Environmental aspects - Requirements and reporting;
- (l) EN 45510-2-3 Guide for procurement of power station equipment - Part 2-3: Electrical equipment - Stationary batteries and chargers;
- (j) EU RO Framework Document for the Mutual Recognition of Type Approval.

End of Document