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Small craft — Electric fans

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 9097 was prepared by Technical Committee ISO/TC 188, *Small craft*.

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Small craft — Electric fans

1 Scope

This International Standard specifies requirements and describes test methods for measuring the airflow of fans intended for use in engine compartments, galley areas and other spaces on small craft in which mechanical ventilation is desirable.

It applies to electrically operated fans rated for less than 50 volts direct current (d.c.). Fans may be of the centrifugal or axial flow type.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 8846:1990, *Small craft — Electrical devices — Protection against ignition of surrounding flammable gases*.

AMCA Standard 210-85/ASHRAE Standard 51-1985, *Laboratory Methods of Testing Fans for Rating*.¹⁾

BS 848-1:1980, *Fans for general purposes — Part 1: Methods of testing performance*.

DIN 24163-1:1985, *Ventilatoren — Leistungsmessung — Normkennlinien*.

DIN 24163-2:1985, *Ventilatoren — Leistungsmessung — Normprüfstände*.

NF X 10-200:1986, *Règles d'essais aérauliques en plateforme des ventilateurs à enveloppe refoulants*

et aspirants-refoulants — Méthode du caisson réduit au refoulement.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 ignition-protected device: Device that complies with the requirements of ISO 8846. (ISO 8846 describes appropriate test programmes.)

3.2 nominal voltage: Commonly used direct current (d.c.) voltages on boats such as 6 V, 12 V, 24 V, 32 V.

4 General requirements

4.1 Fans shall be designed to operate continuously at 120 % of nominal voltage.

4.2 Fans shall be ignition-protected in accordance with the requirements of ISO 8846.

4.3 Fans shall be rated for airflow. Fan airflow shall be measured in accordance with clause 6, and performance curves shall be available.

4.4 Materials used for fan blades or rotor and the housing shall be selected to prevent the creation of a spark should they contact each other.

4.5 Moving parts of fans shall, when necessary, be enclosed or fitted with guards for protection against injury. Enclosures shall be provided with drains to prevent the accumulation of water in all mounting positions. Enclosures and guards are not needed if contact with the fan's moving parts is judged not to be harmful.

4.6 Fans shall be provided with a means for securely mounting them to the boat.

1) Published by Air Movement and Control Assn., Inc. 30 West University Drive, Arlington Heights, IL 60004, USA.

4.7 Components of fans shall be selected to be galvanically compatible in the presence of sea-water.

4.8 Components of fans shall be selected or coated to be resistant to corrosion in the presence of sea-water.

4.9 Installation instructions including a fan performance curve shall be available for each fan (see 6.2).

5 Electrical requirements

5.1 Fans shall be of the 2-wire type, with both the power and return lines insulated from the motor and fan housing.

5.2 Conductors used for connection to the power supply shall be stranded copper.

NOTE 1 A future International Standard will specify requirements for extra-low-voltage electrical installations.

5.3 If external terminals are provided, they shall be designed or shielded to prevent short-circuiting that could result from accidental contact by a conductive object.

5.4 If external motor leads are provided with the fan, they shall be sized in accordance with the power requirement but not less than a nominal 1 mm². Conductor insulation shall be rated to be used in damp places and be suitable for 60 °C ambient temperature at 120 % of nominal voltage.

5.5 A fan shall be protected against continuous locked rotor conditions by

- integral overcurrent protection; or,
- overcurrent protection in the circuit sized to protect the fan motor; or,
- being capable of sustaining operation with a locked rotor for 7 h without generating surface temperatures in excess of 150 °C at an ambient temperature of 60 °C, and without evidence of charring, burning or melting.

6 Fan rating

6.1 Fans shall be rated electrically in volts and in amperes or watts.

6.2 Values for the fan rating, given in cubic metres per second, shall be plotted using the methods given in any of the relevant standards indicated.

NOTE 2 References have been given to some national standards concerning tests for ratings, which the future ISO 5801 will incorporate, replacing the national standards.

6.2.1 Fans with free inlet, ducted outlet (category B), see the following standards:

- AMCA 210-85/ASHRAE 51-1985, figures 9 to 12;
- BS 848-1, figures 27 a) to d);
- DIN 24163-1, Bild 1, Prüfstandsanordnung 2, Einbauart C;
- NF X 10-200.

6.2.2 Fans with ducted inlet, free outlet (category C), see the following standards:

- AMCA 210-85/ASHRAE 51-1985, figures 13 to 15;
- BS 848-1, figures 28 a) to d);
- DIN 24163-1, Bild A, Prüfstandsanordnung 1, Einbauart B;
- DIN 24163-2, Bild 4.

6.2.3 Fans with ducted inlet, ducted outlet (category D), see the following standards:

- AMCA 210-85/ASHRAE 51-1985, figures 9 to 15;
- BS 848-1, figures 29 a) to e);
- DIN 24163-2, Bild 4.

NOTE 3 Fans with free inlet and free outlet (category A) are not used in small craft.

6.3 The procedure for rating a fan is as follows.

Mount the fan to be tested making certain that all mating surfaces are sealed.

Run the fan at 120 % of nominal voltage for a break-in period of 3 h prior to testing.

Maintain the fan operating voltage at its nominal voltage throughout the test.

Correct the airflow readings taken during the test to a standard density of 1,2 kg/m³.

Vary the total pressure in sufficient steps to develop a performance curve.

7 Marking

7.1 Fans shall be permanently and legibly marked with at least the following information:

- a) manufacturer's or private labeller's name or trademark;
- b) model or type identification;

c) year of manufacture (may be coded);

d) electrical rating in volts and amperes or alternatively in volts and watts.

7.2 Evidence of compliance with this International Standard shall be indicated by the marking ISO 9097 together with the word "MARINE", arranged in any suitable manner.

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