INTERNATIONAL STANDARD

ISO 9943

Second edition
2009-05-15

Shipbuilding — Ventilation and air-treatment of galleys and pantries with cooking appliances

Construction navale — Ventilation et traitement de l'air des cuisines et des offices avec appareils de cuisson à bord des navires

Reference number
ISO 9943:2009(E)

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Published in Switzerland

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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.

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

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 9943 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 3, *Piping and machinery*.

This second edition cancels and replaces the first edition (ISO 9943:1991), which has been technically revised.

Shipbuilding — Ventilation and air-treatment of galleys and pantries with cooking appliances

1 Scope

This International Standard specifies the design requirements and general considerations for the ventilation and air-treatment of galleys and pantries with cooking appliances onboard merchant seagoing ships, when such ventilation and air-treatment is specified by the shipowner.

It applies for normal conditions in all waters except those encountered in extremely cold or hot climates (i.e. with a lower or higher temperature than those stated in 4.3 and 4.4).

For the purposes of this International Standard, pantries with cooking appliances, referred to above, are those which contain appliances consuming more than the small amount of electrical power needed for coffee urns, hot-plates for keeping food warm, electric water boilers, etc.

NOTE Users of this International Standard should note that, while observing its requirements, they should at the same time ensure compliance with such statutory requirements, rules and regulations as may be applicable to the individual ship concerned.

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.

ISO 31-4, *Quantities and units — Part 4: Heat*

ISO 3258, *Air distribution and air diffusion — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 31-4, ISO 3258 and the following apply.

3.1
ventilation
provision of air to an enclosed space, sufficient for the needs of the occupants or process

3.2
air-treatment
use of devices to control such air properties as temperature, humidity and cleanliness

3.3
galley
enclosed space(s) containing appliances used for cooking food for the ship's crew

3.4
pantry with cooking appliances
pantry with devices that typically produce significantly more heat load than a single coffee urn, electric hot-plate, electric water boiler, etc.

4 Design requirements

4.1 General

A separate supply air system shall be provided for the galley; this supply air system shall take in outdoor air only.

A separate exhaust air system shall be provided for the galley, discharging the total airflow to the atmosphere.

The system shall be designed for the conditions given in 4.3 and 4.4 and the airflow required by Clause 5.

For pantries of comparatively low heat generation, the supply air system may be connected to an air-conditioning system serving other spaces. In such cases, approval by the appropriate authority of such arrangements is a precondition.

4.2 Ordering information

The purchaser shall provide the manufacturer with the following:

a) a plan showing the galley with its appliances;

b) rated power, heating method, amount of release of heat and humidity, and the details of the hood (if installed) with respect to each cooking appliance;

c) simultaneity factor for the appliances (see 5.1).

4.3 Summer conditions

The cooling power shall have the capability of cooling the supply airflow to 10 °C below an outdoor condition of 35 °C dry bulb and 70 % relative humidity.

4.4 Winter conditions

The heating power shall have the capability of heating the supply airflow to +20 °C when the outdoor air temperature is −20 °C dry bulb.

5 Airflow calculation

5.1 Supply airflow

The supply airflow to a galley shall be determined in accordance with the formula below.

The airflow, V_{qt} (expressed in m^3/s), to remove the sensible heat and latent heat emitted from appliances, shall be determined by the following formula (see also Annex C for example calculation):

$$V_{qt} = \frac{L \times \sum \phi_{qt}}{\rho \times \Delta_i}$$

where

L is the simultaneity factor [see a)];

ϕ_{qt} is the total heat emitted from the appliances, expressed in kW [see b)];

ρ is the density of the air, i.e. 1,2 kg/m^3 [see c)];

Δ_i is the difference between the average enthalpy of the room and the supply air, expressed in kJ/kg [see c)].

a) Simultaneity factor L means the ratio of operating and installed appliances. The factor shall not be lower than 0,5. Where specific data are not available, the following factor may be used for calculations.

L = 1 for pantries.

L = 0,8 for galleys with up to 250 cooked meals served per day.

L = 0,7 for galleys with more than 250 cooked meals served per day.

b) Where specific data on the emitted heat are not available, the values of Table B.1 may be used for calculation.

c) Supply air condition is changed as shown in Figure 1. Outside air (35 °C, 70 % RH) is cooled by 10 °C to 25 °C (see 4.3). Properties of supply air blown into the room change according to the incline angle of room sensible heat factor (RSHF) and reach room conditions.

RSHF = (Sensible heat kW / total heat kW) ratio (see Figure 1).

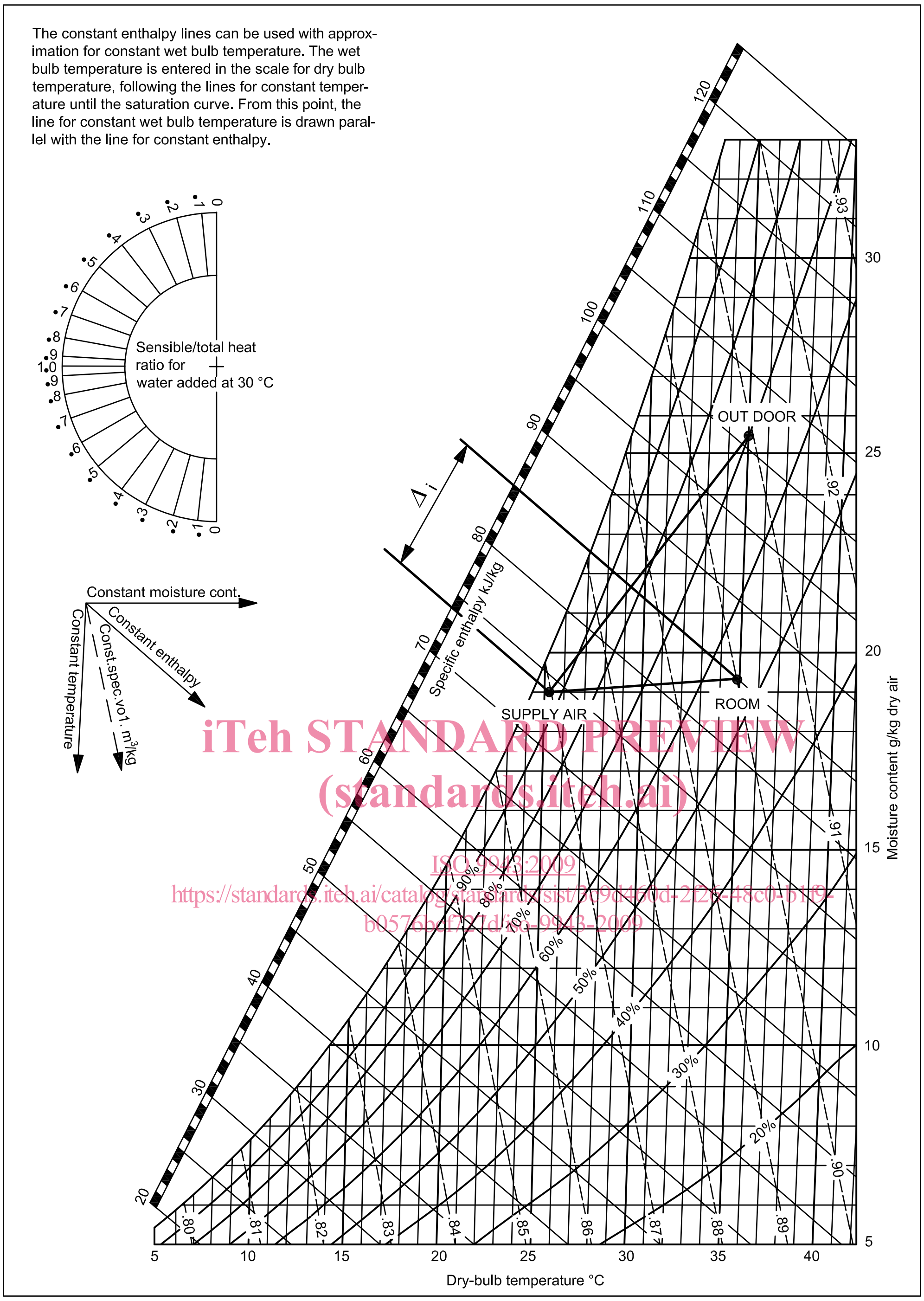

Figure 1 — Air flow conditions in psychrometric chart based on a barometric pressure of 1 013 mbar

5.2 Exhaust airflow

The quantity of the exhaust airflow shall be greater than that of the supply airflow. (See also A.2.3.)

Annex A
(informative)

Guidance and good practice

A.1 General

Special consideration should be paid to draughts. The planning of the galley and the arrangement of the exhaust and supply air terminal devices should be such that air movement in the areas occupied will, as far as possible, not have a velocity higher than 0,5 m/s.

Latent heat higher than 130 W/m^2 emitted in the space will generally result in a galley with a less satisfactory working environment.

A.2 Air distribution and equipment

A.2.1 Distribution of exhaust airflow

It is known that most of the heat and water vapour created by cooking appliances are emitted to the room. This heating effect can be reduced by providing appropriate exhaust air equipment (consisting of fans and ducts).

Appliances which heat and contaminate air (e.g. range, fryer) should be equipped with a hood-type exhaust air terminal device.

These hoods should be equipped with grease drip-trays and grease filters that are easy to clean and change; the hoods should be so designed that they will collect and evacuate the contaminated air before it has diffused.

Other exhaust air terminal devices should also be easy to clean.

A placard with cleaning instructions for all exhaust air terminal devices should be displayed in the vicinity of hoods and other exhaust air terminals.

A.2.2 Distribution of supply airflow

The supply airflow should be distributed with consideration of the cook's working areas. Air supply devices should be constructed so their operation does not inconvenience the cooks.

The supply airflow should be arranged so that exhaust air will not be affected and air mixing between supply and exhaust air terminals is avoided.

The system shall be designed to control room temperature during heating periods.

A.2.3 Pressure considerations

There should be lower air pressure in the galley than in adjoining accommodation spaces.

For this reason, it is necessary to install, in each supply and exhaust air duct, a damper which maintains proper air balance between the galley and adjoining spaces. In some cases, a natural supply air system should be fitted.