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Fans — Dimensions

Ventilateurs — Dimensions

ISO/TC 117

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 117, *Fans*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 156, *Ventilation for buildings*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 13351:2009), which has been technically revised.

The main changes are as follows:

- added to the sizes of the heavy-duty fans in [Table 3](#);
- aligned definitions and symbols to ISO 13349-1;
- clarified [Figure 3](#) for mixed flow fan.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document gives dimensional details of circular and rectangular flanges of fans in addition to specifying the fan size designation. For circular flanges, the values specified in ISO 6580¹⁾ have been retained for light-duty fans, in parallel with those values given in [Tables 3](#) and [4](#) for medium- and heavy-duty fans.

While it does not constrain the manufacturer's choice of flange details, this document facilitates interchangeability, thereby helping reduce technical barriers to trade.

Throughout this document, the principal dimensions are based on the rounded values of preferred numbers given in ISO 497.

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1) Cancelled and replaced by ISO 13351.

Fans — Dimensions

1 Scope

This document specifies the dimensions of the circular and rectangular flanges of general-purpose fans, as well as the fan size designations. It is not applicable to cross-flow fans or to fan appliances used for individual household or similar applications.

For circular flanges, it provides for three different flange series: one for light-duty casing thicknesses, another for medium-duty fans and the third for heavy-duty fans as used on sea-going vessels or in heavy industry.

In order not to restrict fan design unduly, only the pitch diameter, hole numbers and hole diameters are specified. Flange thickness, as well as internal and external flange diameters, can be chosen freely within the limits of good engineering practice.

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 3, *Preferred numbers — Series of preferred numbers*

ISO 13349-1, *Fans — Vocabulary and definitions of categories — Part 1: Vocabulary*

ISO 13349-2, *Fans — Vocabulary and definitions of categories — Part 2: Categories*

3 Terms, definitions and symbols

For the purposes of this document, the terms and definitions given in ISO 13349-1, ISO 13349-2 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 Terms and definitions

3.1.1

light-duty fan

fan suitable for air that is non-toxic, not saturated, non-corrosive, non-flammable, free from abrasive particles, and not exceeding a temperature of 80 °C, or 40 °C if the motor or the fan bearings are in the air stream, and for pressures up to 2 kPa

Note 1 to entry: See [Table 1](#).

3.1.2

medium-duty fan

fan designed for pressures up to 10 kPa.

Note 1 to entry: Applications that require a robust design can be referred to as "medium duty", such as in marine applications.

3.1.3

heavy-duty fan

fan designed for pressures up to 40 kPa.

Note 1 to entry: Applications that require a more robust design can be referred to as "heavy duty", such as in marine applications.

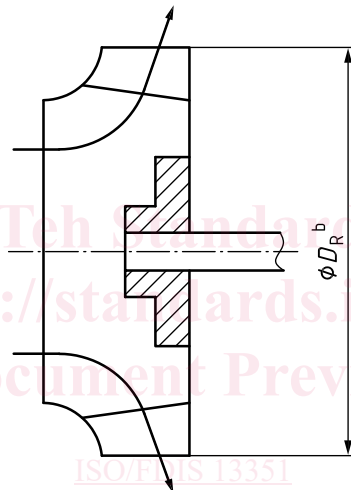
3.1.4

nominal impeller tip diameter

D

diameter of the impeller tip on which the design of the fan is based

Note 1 to entry: See [Figures 1](#) to [3](#).

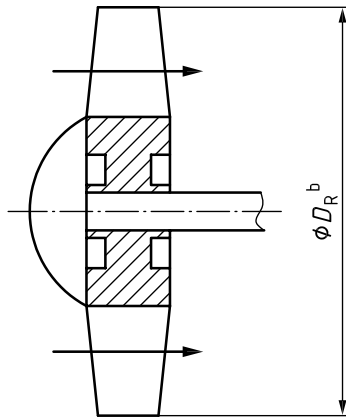


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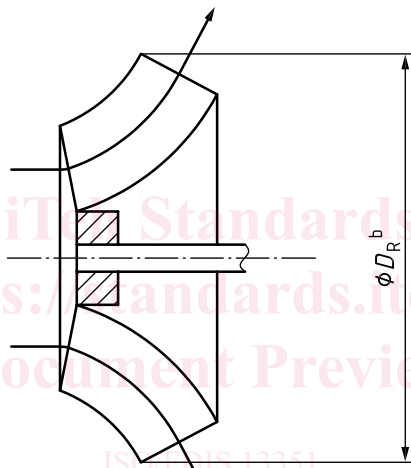
^b D may be smaller than, larger than or equal to D_R .

Figure 1 — Impeller — Centrifugal fan



^b D may be smaller than, larger than or equal to D_R .

Figure 2 — Impeller — Axial-flow fan



^b D may be smaller than, larger than or equal to D_R .

Figure 3 — Impeller — Mixed-flow fan

3.2 Symbols

Symbol	Parameter	Unit
D	nominal impeller tip diameter	mm
D_R	impeller tip diameter ^a	mm (see Figures 1 to 3)
d_0	internal duct diameter	mm
d_1	pitch circle diameter	mm
d_2	hole diameter	mm
d_3	bolt diameter	mm
d_4	washer diameter	mm
e	casing thickness	mm
g	hole offset	mm

^a Reference ISO 13349-1:2022, 3.7.4 i.e. maximum diameter measured over the tips of the blades of the impeller.

Symbol	Parameter	Unit
l	arc length between bolt holes	mm
N	number of holes	
P	pitch	mm
α	angle between bolt holes	degrees
^a Reference ISO 13349-1:2022, 3.7.4 i.e. maximum diameter measured over the tips of the blades of the impeller.		

4 Requirements

4.1 General

This document adopts the Renard R 20 series, according to ISO 17, and preferred numbers in ISO 497 as the nominal dimensions (D) for impeller tip diameters, the inside diameters of circular flanges and the inside lengths of the sides of rectangular flanges. It takes into account the maximum casing thicknesses likely to be used for general-purpose fans, as well as typical manufacturing tolerances representative of engineering “good practice”.

The smallest practical pitch circle diameter can be related to the inside diameter of the casing, the casing thickness, the size of the weld fillet or bend radius at the junction of the flange and the casing, and the normal washer diameter. Light-duty circular flanges might not be suitable for the use of open-ended spanners in all cases.

This document accepts that the number and diameter of bolts or screws cannot be established on a theoretical basis. Practical experience of satisfactory service, optimum cost of installation and manufacture, as well as dimensional tolerances of production are the most important considerations.

The dimensions of circular and rectangular flanges are given in sizes corresponding to nominal diameters from 100 mm to 2 000 mm (3 550 mm for heavy duty fans, [Table 3](#)). In the smaller sizes (below about 200 mm) flange details may be determined by the customer's specification. However, where this is not the case, then the specifications of this document are to be applied.

4.2 Circular flanges

The number of flange holes is divisible by four to permit the orientation of cylindrical cased fans at positions of 90°. The holes are disposed equally on each side of the centrelines of the fan. This permits a flange to be divided in half if a split casing is required. It also allows better access to the fixings on the remote side of a fan in a confined installation.

When an intermediate fan size is required, the R 40 series in accordance with ISO 3 shall be used to obtain the nominal inside diameter. The flange details shall be interpreted from the next larger R 20 size.

In exceptional circumstances, when even smaller increments of fan size are required, it is recommended that the R 80 series be used.

See [Figure 4](#).