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Industrial fans — Specifications for balance quality and vibration levels

*Ventilateurs industriels — Spécifications pour l'équilibrage et les
niveaux de vibration*



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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 14694 was prepared by Technical Committee ISO/TC 117, *Industrial fans*.

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Introduction

ISO 14694 is a part of a series of standards covering important aspects of fans which affect their design, manufacture and use. This series includes ISO 5801, ISO 5802, ISO 12499, ISO 13347, ISO 13348, ISO 13349, ISO 13350, ISO 13351, ISO 14695 and CEN/BTS 2/AH 17.

This International Standard addresses the needs of both users and manufacturers of fan equipment for a technically accurate but uncomplicated set of information on the subjects of balance precision and vibration levels.

Vibration is recognized as an important parameter in the description of the performance of fans. It gives an indication of how well the fan has been designed and constructed and can forewarn of possible operational problems. These problems may be associated with inadequacies of support structures and machine deterioration, etc.

Although alternative standards exist which deal with vibration of machines generally (e.g. ISO 10816), they currently have limitations because of their universal nature, when considering a specific family of machines such as fans, with installed powers below 300 kW.

Vibration measurements may therefore be required for a variety of reasons of which the following are the most important:

- a) design/development evaluations;
- b) in situ testing;
- c) as information for a condition-monitoring or machinery health programme (ISO 14695:2003, Annex C gives recommended measuring positions for machinery health measurement);
- d) to inform the designer of supporting structures, foundations, ducting systems, etc., of the residual vibration which will be transmitted by the fan into the structure;
- e) as a quality assessment at the final inspection stage.

NOTE All the information which can be obtained from tests conducted in accordance with this International Standard (see Clause 10 of ISO 14695:2003) is neither necessary nor appropriate for quality-grading purposes.

Whilst an open inlet/open outlet test may be useful as a quality guide, this International Standard recognizes that the vibration of a fan will be dependent upon the aerodynamic duty specified, which determines the rotational speed and position on the fan.

This International Standard should be read in conjunction with ISO 10816-1, ISO 10816-3 and ISO 14695 which describe the methods to be used and the positions of the transducers. When information is required on vibration transmitted to ducting connections or foundations, then this is especially important. The gradings included are such as are generally recommended for commercially available fans.

It is important to remember that vibration testing can be extremely expensive, sometimes considerably in excess of the fan's initial cost. Only when the functioning of the installation may be affected should discrete frequency or band limitations be imposed. The number of test points should also be limited according to the usage envisaged. Readings at the fan bearings are of most importance and for normal quality gradings should be sufficient.