INTERNATIONAL STANDARD

ISO 12500-2

First edition
2007-06-01

Filters for compressed air — Test methods —

Part 2: Oil vapours

Filtres pour air comprimé — Méthodes d'essai —

Partie 2: Vapeurs d'huile

Reference number
ISO 12500-2:2007(E)

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Published in Switzerland

Contents

Page

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 12500-2 was prepared by Technical Committee ISO/TC 118, *Compressors and pneumatic tools, machines and equipment*, Subcommittee SC 4, *Quality of compressed air*.

ISO 12500 consists of the following parts, under the general title *Filters for compressed air — Test methods*:

- *Part 1: Oil aerosols*
- *Part 2: Oil vapours*
- *Part 3: Particulates*

Introduction

Oil adsorbent filters (e.g. activated carbon. etc.) are designed for the removal of oil vapours and odours from compressed air or gas streams.

The most important performance characteristics of the filter are its ability to remove hydrocarbon vapours, its total adsorptive capacity and pressure drop.

The aim of this part of ISO 12500 is to define a method and test condition by which the above characteristics can be measured and compared.

Filters for compressed air — Test methods —

Part 2:
Oil vapours

1 Scope

This part of ISO 12500 specifies the test layout and test procedures required for testing hydrocarbon vapour adsorbent filters used in compressed-air systems to determine their effectiveness in removing hydrocarbon vapours. The performance characteristics to be identified are

— adsorptive capacity;

— pressure drop (Δp).

This part of ISO 12500 defines one method of presenting filter performance as hydrocarbon vapour capacity, expressed in milligrams, from results obtained under test conditions.

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 1219-1, *Fluid power systems and components — Graphic symbols and circuit diagrams — Part 1: Graphic symbols for conventional use and data-processing applications*

ISO 2602, *Statistical interpretation of test results — Estimation of the mean — Confidence interval*

ISO 2854, *Statistical interpretation of data — Techniques of estimation and tests relating to means and variances*

ISO 5598, *Fluid power systems and components — Vocabulary*

ISO 7000, *Graphical symbols for use on equipment — Index and synopsis*

ISO 8573-1:2001, *Compressed air — Part 1: Contaminants and purity classes*

ISO 8573-6, *Compressed air — Part 6: Test methods for gaseous contaminant content*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5598 and the following apply.

3.1
activated carbon
charcoal which has an enhanced property of attracting certain gases or vapours into the pore structure of its surface layer

3.2
adsorbent
solid having the property of attracting gaseous or liquid molecules and causing them to adhere to its surface

3.3
adsorptive capacity
mass of a contaminant that can be adsorbed by tested filter

3.4
ambient temperature
temperature of the air surrounding the filter housing under test

3.5
breakthrough
point when a determined amount of the test agent is detected downstream of the adsorbent filter

3.6
equivalent rated flow
flow at which, when the test filter is operated at a 700 kPa [7 bar (e)] test pressure, an equal gas velocity to that for the device would be achieved were it to be operated at its rated pressure and flow

3.7
filter
apparatus for separation or removal of contamination from a compressed air or gas stream

3.8
pressure drop
differential pressure
Δp
difference between the inlet and outlet pressure of a component, measured under specified conditions

3.9
test agent
n-hexane vapour used to challenge the filter under test

4 Units and symbols

General use of SI units (Système international d'unités; see ISO 1000) as given throughout this part of ISO 12500 is recommended. However, in agreement with accepted practice in the pneumatic field, some non-preferred SI units, accepted by ISO, are also used.

1 bar = 100 000 Pa

NOTE bar (e) is used to indicate effective pressure above atmospheric.

1 l (litre) = 0,001 m^3

The graphic symbols on diagrams are in accordance with ISO 1219-1 and ISO 7000.

5 Reference conditions

The reference conditions for gas volumes shall be:

a) air temperature 20 °C;

b) absolute air pressure 100 kPa [1 bar (a)];

c) relative water vapour pressure 0.

6 Test requirements

6.1 Standard rating parameters

The standard rating parameters are as identified in Table 1.

Table 1 — Standard rating parameters

Reporting parameter	Units	Rating conditions	Maintain within actual gauge value	Instrument accuracy at test conditions
Inlet temperature	°C	20	± 5	± 2 °C
Inlet pressure	kPa [bar (e)]	700 (7)	± 10 (0,1)	± 10 kPa (± 0,1 bar) gauge reading
Ambient temperature	°C	20	± 5	± 2 °C
Test agent concentration in air [a]	mg/kg	1 000	± 50	± 0,1 %
Minimum air purity [b]	—	ISO 8573-1:2001, Class 2 2 1 [c]		
Air flow for testing	m^3/h	100 % rated flow	± 2 %	± 4 % gauge reading
Pressure drop	Pa (mbar)	Not applicable	Not applicable	± 1 kPa (± 10 mbar) gauge reading

[a] Density of air is taken as 1,18 kg/m^3.

[b] Minimum air purity to ensure that the filter under test is not affected by the presence of water vapour.

[c] The first number represents the solid-particle classification; the second, the humidity classification; and the third, the total oil classification.

6.2 Inlet air flow

Testing of hydrocarbon vapour adsorbent filters shall be carried out at the manufacturer's equivalent rated flow.

For the testing of filters that have their maximum flow rating quoted at a pressure other than 700 kPa [7 bar (e)] the measurement for hydrocarbon vapour removal can be made using equivalent flow velocity at rated pressure identified by the manufacturer for the filter under test.

The test flow rate, $q_{Ve,REF}$, at reference conditions, expressed in cubic metres per second, is calculated according to Equation (1):

$$q_{Ve,REF} = \frac{q_{Vn,REF} \times \kappa_T \times p_e}{p_n} \quad (1)$$

where

$q_{Vn,REF}$ is rated flow rate, at reference conditions, expressed in cubic metres per hour;

p_e is absolute test pressure, expressed in kPa [bar (a)];

p_n is absolute rated pressure, expressed in kPa [bar (a)];

κ_T is the compressibility factor of air at rated pressure and 20 °C, dimensionless.

6.3 Test agent

The test agent used to challenge the adsorbent filters under investigation simulates operation with compressor oils.