



DPC: 24/30446923 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

Date: 02 January 2024

Origin: International

Latest date for receipt of comments: 20 February 2024

Project No. 2021/03062

Responsible committee: MCE/21 Filters for gases and liquids

Interested committees:

Title: Draft BS ISO 16313-1 Laboratory test of dust collection systems utilizing porous filter media online cleaned using pulses of compressed gas. Part 1: Systems utilizing integrated fans.

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Introduction

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Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

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- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

DRAFT INTERNATIONAL STANDARD

ISO/DIS 16313-1

ISO/TC 142

Secretariat: UNI

Voting begins on:
2023-12-28

Voting terminates on:
2024-03-21

Laboratory test of dust collection systems utilizing porous filter media online cleaned using pulses of compressed gas —

Part 1: Systems utilizing integrated fans

Essais en laboratoire des systèmes de collecte de poussières utilisant des média filtrants poreux en ligne nettoyés par utilisation d'impulsions de gaz comprimé —

Partie 1: Systèmes utilisant des ventilateurs intégrés

ICS: 91.140.30

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Reference number
ISO/DIS 16313-1:2023(E)

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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.

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 documents 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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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 142, *Cleaning equipment for air and other gases*.

A list of all parts in the ISO 16313 series can be found on the ISO website.

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

Industrial dust collector is a system to remove or recover particles in the gas stream from industrial processes. Dust control filtration systems using pulse cleaning are one of dust collector and widely used to remove particulate matters suspending in gas such as, combustion flue gases, local dust emissions from various dust generation works (welding, machining, tapping of molten pig iron, bulk handling, surface treatment work such as sand or shot blasting,), to clean workshop environment, and so on.

This type of dust collection systems is most popularly used because of easiness in handling. However, design concept of the collector is different strongly depending on the size and type of dust generation source, amount of gas flow rate, dust concentration and also on the usage as shown in [Table A.1](#) and [Figure A.1](#) in [Annex A](#).

Performance of a dust collector system changes with time, especially changes significantly in the beginning of the use, and becomes stable after certain period of usage.

Dust collector system is roughly classified into two groups such as customized or general-purpose system. The former type of system is designed and manufactured based on the user's demand such as temperature, pressure, physical and chemical properties of particles and gases, etc. Hence, performance test of this type of dust collector is carried out to evaluate whether the collector satisfies these requirements.

The latter (compact type dust collector) is designed and assembled by the manufacturer based on the manufacturer's own concept. Most manufactures line up several different types of dust collectors to meet different applications such as industrial dust, fumes, and fume & mist mixture.

Most of these collectors are compact type dust collectors with cartridge filter elements. The performance from different manufacturers is likely different with each other, even if they are tested under the same dust and operation condition. It is also likely from the difference of test method adopted by each manufacturer.

This group of compact type dust collectors is mostly used by unspecified individual users, who do not have sufficiently enough knowledges about dust collection so that they are used as a plug-in type device like a household electronics. Hence users select a dust collector based on the disclosed information from the manufacturer but it may not be comparable because of different test methods.

This means that it would be better to provide a standard test method to predict the performance under simulated used condition of dust collector before product is delivered to users. Important information for users is collection performance of dust, pressure drop, energy consumption for fan and pulse cleaning system. Emission of fine particles like PM_{10} , $PM_{2,5}$ and PM_1 will be especially important for the protection of air pollution and working environmental control point of view.

Performance changes with time, especially changes much in the beginning of the usage, and becomes stable after certain time period. This means that the performance shown just after its production is different from that when user uses, i.e., performance at being used for long time.

Laboratory test of dust collection systems utilizing porous filter media online cleaned using pulses of compressed gas —

Part 1: Systems utilizing integrated fans

1 Scope

This document specifies the standard test method useful to assess the performance of dust collection systems utilizing integrated fans (compact type dust collector), which shall be applied with or without flow control.

Since the performance of this type of dust collector at being used for a certain period are different from those at the point of production, the performance test shall be carried out under a simulated used condition at the point of its production when the model has been newly developed and renewed.

To produce a state of used condition at the point of its production, it is needed not only to accelerate but also simplify the affecting parameters, since performance of a dust collector system depends on many factors such as structure of the collector, filter element used, dust and carrier gas properties, operation method, operation time and so on. To satisfy these requirements, the black box concept, i.e., test dust collector will be operated with the same specification by the manufactures except test dust condition and the pulse interval during ageing stage of the test.

Collection performance of dust, pressure drop, energy consumption for fan and pulse cleaning system and gas flow rate for without-gas-flow-rate-control system, shall be evaluated. Emission of PM₁₀, PM_{2,5} and PM₁ from the system may be added if necessary.

This document is applicable to relatively small dust collection systems using cartridge filter as filtration media for dry dust collection.

The performance obtained from this test does not guarantee the performance or certification of the system. This document is not intended to offer the superiority or inferiority of performance between dust collectors, but specifies a standard test method that provides users with performance under simulated conditions of use for a certain duration. It is recommended to publicize test condition and result on Web site (Home page) of manufacturer or on the product plaque of the system.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 5167-1, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 1: General principles and requirements*

ISO 5801, *Industrial Fans — Performance testing using standardized airways*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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

concentration, mass

amount of contamination material in the air expressed as a unit of mass per actual unit volume of air

3.2

pressure drop

difference of static pressure measurements between two points in a system

3.3

pulse cleaning system (PCS)

components used to momentarily and locally reverse the airflow through a filtration system with the objective of removing collected particulate from the system's filtration elements

Note 1 to entry: These systems include all parts from the compressed air connection to the point of compressed air discharge into the filter element, and any associated equipment.

3.4

pulse interval

amount of time between the initiation of two successive pulses when the pulsing algorithm has not been satisfied, typically measured in seconds (s)

3.5

Stairmand disk

plate occupying the central half of the area of a duct, oriented so it is perpendicular to the direction of airflow

Note 1 to entry: It is used to induce turbulence and mixing.

4 Symbols and abbreviated terms

A	Total filtration area [m^2]
C	Dust concentration [kg/m^3]
D	Duct diameter [m]
d_{pa}	Mean particle size (mass basis) [m]
F	Feed rate of test powder [kg/s]
m_{d}	Dust load per unit filtration surface [kg/m^2]
m_{r}	Residual dust load [kg/m^2]
n	Number of cleaning blocks [-]
Δp	Pressure drop [Pa]
Δp_0	Pressure drop of fresh cartridge filter [Pa]
Δp_{r}	Residual pressure drop [Pa]
Q	Gas flow rate [m^3/s]