INTERNATIONAL STANDARD

ISO 12103-2

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Road vehicles — Test dust for filter evaluation —

Part 2:
Aluminium oxide test dust

Véhicules routiers — Poussière pour l'essai des filtres —
Partie 2: Poussière d'essai d'oxyde d'aluminium

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.

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.

International Standard ISO 12103-2 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 7, *Injection equipment and filters for use on road vehicles*.

ISO 12103 consists of the following parts, under the general title *Road vehicles — Test dust for filter evaluation*:

— *Part 1: Arizona test dust*

— *Part 2: Aluminium oxide test dust*

Annexes A to C of this part of ISO 12103 are for information only.

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Introduction

This part of ISO 12103 specifies a range of inorganic test dusts, manufactured from fused aluminium oxide, primarily used for evaluating the performance of both fuel and lubricating oil filters for internal combustion engines, generally by gravimetric methods.

This part of ISO 12103 is to be used in conjunction with a number of other International Standards which refer to the use of these test dusts in various filter performance test procedures.

Road vehicles — Test dust for filter evaluation —

Part 2:
Aluminium oxide test dust

1 Scope

This part of ISO 12103 specifies the particle size distribution of five inorganic test dusts used for the evaluation of filters.

These dust are used in conjunction with various test procedures designed to evaluate, in general, fuel and lubricating oil filters for internal combustion engines by gravimetric methods.

The dusts may also be used for a number of other applications, such as for abrasion tests, where distinct, known particle size distributions of hard, abrasive material are required.

2 Test dust designation

2.1 Designation

These “M” series test dusts are available in five standard grades[1)], which are designated as follows:

— ISO 12103-M1 for nominal particle size: 5 µm

— ISO 12103-M2 for nominal particle size: 7 µm

— ISO 12103-M3 for nominal particle size: 14 µm

— ISO 12103-M4 for nominal particle size: 30 µm

— ISO 12103-M5 for nominal particle size: 55 µm

2.2 General description

All five grades of dust are made from fused aluminium oxide (Al_2O_3) having a density of 3 960 kg/m^3. The bulk density of the material, which varies with grade, is in the range 500 kg/m^3 to 2 300 kg/m^3. The colour of the material also varies, from off-white to brown, depending on the particle size range and grade.

1) Suitable products are available commercially. Details can be obtained from the Secretariat to Technical Committee ISO/TC 22 or from the ISO Central Secretariat.

3 Particle size distribution of test dusts

3.1 Explanation

The particle size distribution of each of the five grades of dust shall conform to the limits shown in figures 1 to 5 and tables 1 to 5, when determined by the Andreasen sedimentation method (see annex C).

It should be noted that other methods of particle size analysis, such as light scattering (laser diffraction) or the electrical sensing zone method (Coulter principle), of insoluble dusts in liquid suspensions, will give different results to those obtained by the Andreasen sedimentation method.

When these different methods of analysis are employed by a test laboratory, the laboratory should generate suitable correlation data between the method by which these powders are supplied to conform (Andreasen sedimentation) and by the method of analysis adopted by the test laboratory.

An example is given in annex A of the difference in the particle size distribution range of grade M2 dust (the most commonly used of the five grades of dust) obtained by the laser diffraction method from a range of dust samples representing material from both the minimum and maximum limits for the M2 grade.

3.2 Grade M1 particle size distribution limits

See figure 1 and table 1.

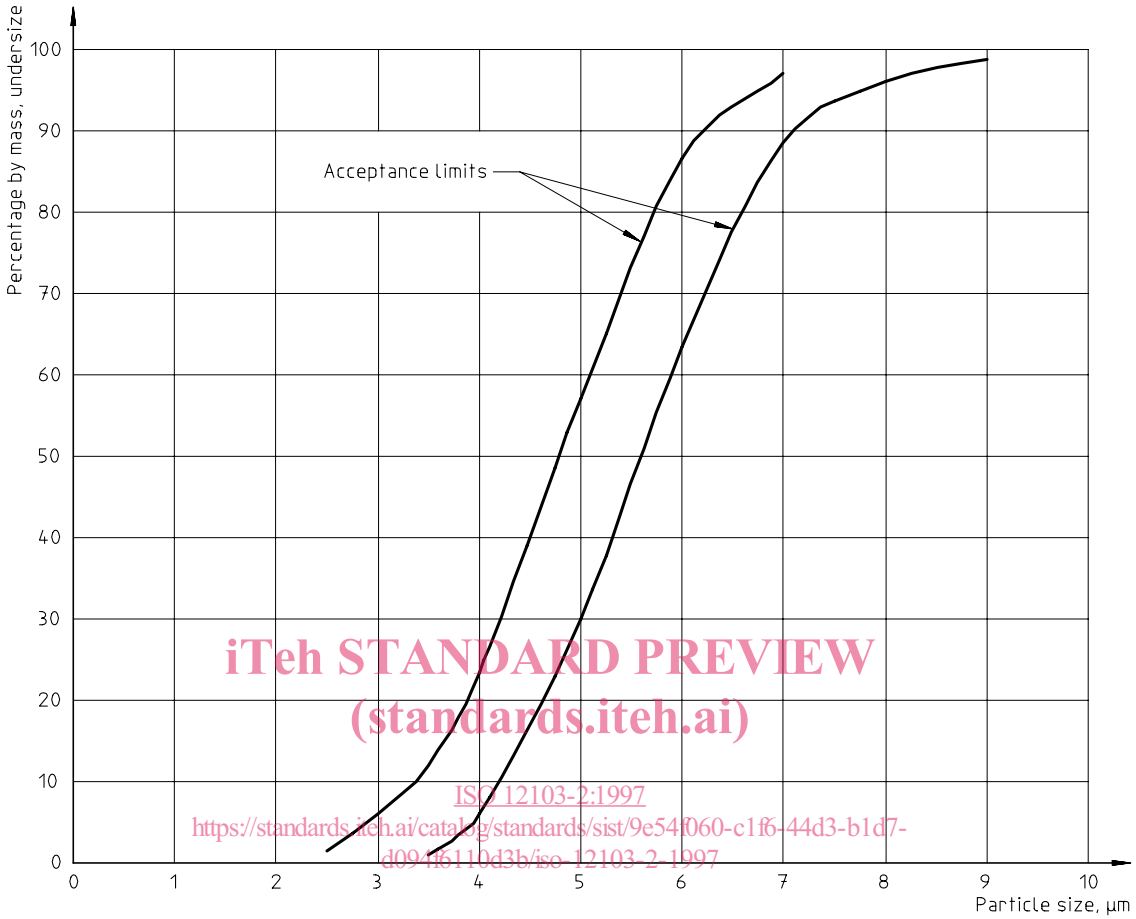

Figure 1 — Particle size (Stokes diameter) as determined by Andreasen sedimentation

Table 1 — Specification limits for grade M1 test dust

Particle size (Stokes diameter)	Percentage by mass, undersize	
µm	min.	max.
2,5	—	1,5
3,0	—	6,0
3,5	1,0	12,0
4,0	6,0	23,5
5,0	30,0	57,0
6,0	63,5	86,0
7,0	88,5	97,0
8,0	96,0	—
9,0	98,8	—
50 % mean size range: 5,2 µm ± 0,4 µm.		

3.3 Grade M2 particle size distribution limits

See figure 2 and table 2.

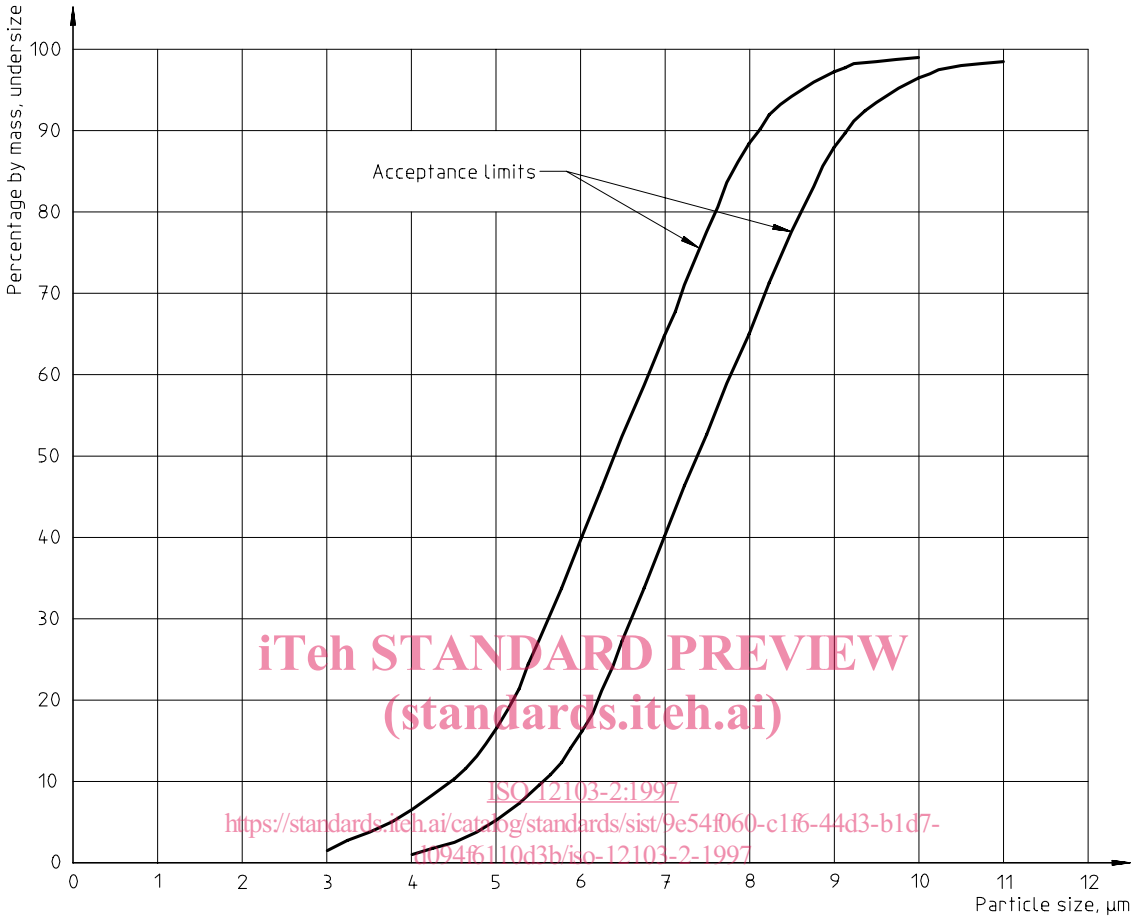

Figure 2 — Particle size (Stokes diameter) as determined by Andreasen sedimentation

Table 2 — Specification limits for grade M2 test dust

µm	min.	max.
3,0	—	1,5
4,0	1,0	6,5
5,0	5,2	16,5
6,0	16,0	40,0
7,0	40,0	64,7
8,0	65,0	88,5
9,0	88,0	97,3
10,0	96,5	98,9
11,0	98,5	—
50 % mean size range: 6,9 µm ± 0,5 µm.		

3.4 Grade M3 particle size distribution limits

See figure 3 and table 3.

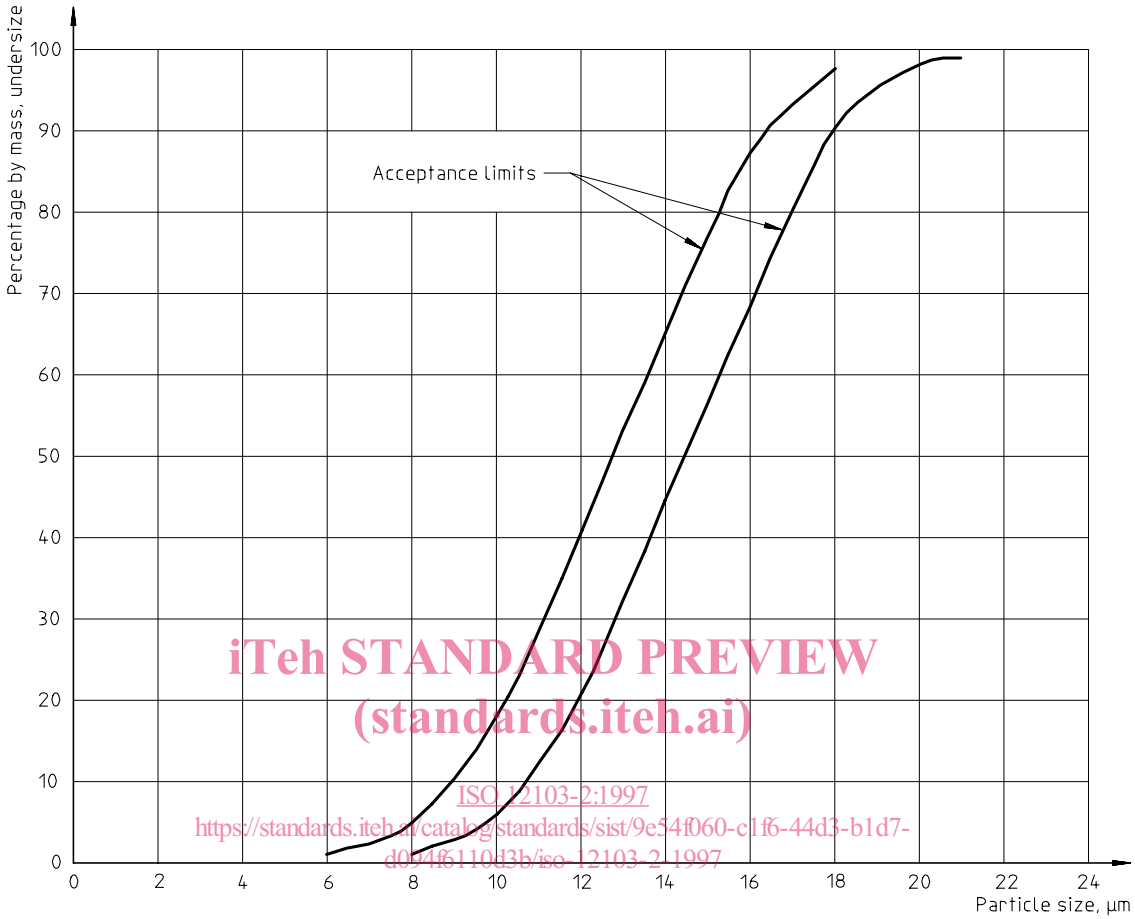

Figure 3 — Particle size (Stokes diameter) as determined by Andreasen sedimentation

Table 3 — Specification limits for grade M3 test dust

Particle size (Stokes diameter) µm	Percentage by mass, undersize	
	min.	max.
6	—	1,0
8	1,0	5,0
10	6,0	18,1
12	21,0	41,0
14	44,5	64,9
16	68,3	87,4
18	90,4	97,7
20	98,3	—
21	99,0	—
50 % mean size range: 13,6 µm ± 0,9 µm.		