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**Preparation of steel substrates before  
application of paints and related  
products — Test methods for metallic  
blast-cleaning abrasives —**

Part 4:  
**Determination of apparent density**

*Préparation des subjectiles d'acier avant application de peintures et  
de produits assimilés — Méthodes d'essai pour abrasifs métalliques  
destinés à la préparation par projection —*

*Partie 4: Détermination de la masse volumique apparente*

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Published in Switzerland

# Contents

	Page
Foreword .....	iv
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Materials</b> .....	<b>1</b>
<b>5 Apparatus</b> .....	<b>2</b>
<b>6 Sampling</b> .....	<b>2</b>
<b>7 Procedure</b> .....	<b>2</b>
<b>8 Expression of results</b> .....	<b>2</b>
<b>9 Test report</b> .....	<b>3</b>
<b>Annex A (informative) International Standards for metallic blast-cleaning abrasives</b> .....	<b>4</b>
<b>Bibliography</b> .....	<b>5</b>

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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](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on 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 WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

This document was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 12, *Preparation of steel substrates before application of paints and related products*.

This second edition cancels and replaces the first edition (ISO 11125-4:1993), which has been technically revised.

The main changes compared to the previous edition are as follows:

- [Annex A](#) has been technically revised.

A list of all parts in the ISO 11125 series can be found on the ISO website.

# Preparation of steel substrates before application of paints and related products — Test methods for metallic blast-cleaning abrasives —

## Part 4: Determination of apparent density

### 1 Scope

This document specifies a test method for the determination of the apparent density of metallic blast-cleaning abrasives.

The purpose of the test is to establish the soundness of the metallic abrasive. Significant levels of internal shrinkage or hollow particles will reduce the apparent density.

This is one of a number of parts of ISO 11125 dealing with the sampling and testing of metallic abrasives for blast-cleaning.

The types of metallic abrasive and requirements on each are contained in the various parts of ISO 11124.

The ISO 11124 and ISO 11125 series have been drafted as a coherent set of International Standards on metallic blast-cleaning abrasives. Information on all parts of both series is given in [Annex A](#).

### 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 3696, *Water for analytical laboratory use — Specification and test methods*

### 3 Terms and definitions

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

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

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

#### 3.1

##### **apparent density**

mass of a given volume of metallic abrasive, as determined by the pycnometer method

### 4 Materials

**4.1 Distilled or deionized water**, of at least grade 3 purity, as specified in ISO 3696.

## 5 Apparatus

5.1 Ordinary laboratory apparatus and glassware, together with the following.

5.1.1 **Pycnometer, Gay-Lussac type**, of 50 ml capacity, with a capillary stopper.

5.1.2 **Balance**, capable of weighing to an accuracy of 0,01 g.

## 6 Sampling

Take a representative sample of the product to be tested, as described in ISO 11125-1.

## 7 Procedure

7.1 Carry out the determination in duplicate.

7.2 Allow pycnometer, test portion and water to stabilise to room temperature for one hour. Minimise handling of the pycnometer during the procedure to avoid warming by hand.

7.3 Weigh, using the balance (5.1.2), the clean and dry pycnometer (5.1.1) to an accuracy of 0,01 g ( $m_1$ ).

7.4 Add approximately 100 g of the test sample and reweigh ( $m_2$ ).

7.5 Add distilled or deionized water (4.1) to the pycnometer until it is completely filled. Replace the stopper and gently shake the pycnometer to displace air adhering to the test portion. Remove the stopper, fill with water and then replace the stopper, forcing excess water out through the capillary tube. Carefully dry the outside of the pycnometer. Ensure there are no air bubbles present. Reweigh the pycnometer and its contents ( $m_3$ ).

7.6 Empty the pycnometer of water and the test portion. Rinse several times to remove all traces of abrasive. Refill with distilled or deionized water, replace the stopper and ensure that there are no air bubbles present. Dry the outside of the pycnometer and weigh ( $m_4$ ).

## 8 Expression of results

Calculate the apparent density  $\rho_A$  of the product tested, expressed in kilograms per cubic metre (kg/m<sup>3</sup>), using the following [Formula \(1\)](#):

$$\rho_A = \frac{m_2 - m_1}{(m_4 - m_1) - (m_3 - m_2)} \times \rho_W \times 10^3 \quad (1)$$

where

$m_1$  is the mass, in grams, of the pycnometer;

$m_2$  is the mass, in grams, of the pycnometer and test portion;

$m_3$  is the mass, in grams, of the pycnometer, test portion and water;

$m_4$  is the mass, in grams, of the pycnometer and water;

$\rho_W$  is the density, in kilograms per cubic decimetre of water, at the temperature of the determination.

If the duplicate determinations differ by more than 10 % (relative to the higher result), repeat the procedure (see [Clause 7](#)).

Calculate the mean of two valid determinations and report the result to the nearest 100 kg/m<sup>3</sup>.

## 9 Test report

The test report shall contain at least the following information:

- a) all details necessary to identify the product tested, in accordance with the appropriate part of ISO 11124 (see [Annex A](#)), if applicable;
- b) a reference to this document, i.e. ISO 11125-4:2018;
- c) the result of the test;
- d) any deviation from the test method specified;
- e) the date of the test;
- f) the name of the person who carried out the test.

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## Annex A (informative)

### International Standards for metallic blast-cleaning abrasives

Requirements and test methods for metallic blast-cleaning abrasives are contained in ISO 11124 and ISO 11125, respectively.

ISO 11124 consists of the following parts, under the general title:

*Preparation of steel substrates before application of paints and related products — Specification for metallic blast-cleaning abrasives*

- *Part 1: General introduction and classification*
- *Part 2: Chilled-iron grit*
- *Part 3: High-carbon cast-steel shot and grit*
- *Part 4: Low-carbon cast-steel shot*
- *Part 5: Cut steel wire<sup>1)</sup>*

ISO 11125 consists of the following parts, under the general title:

*Preparation of steel substrates before application of paints and related products — Test methods for metallic blast-cleaning abrasives*

- *Part 1: Sampling*
- *Part 2: Determination of particle size distribution*
- *Part 3: Determination of hardness*
- *Part 4: Determination of apparent density*
- *Part 5: Determination of percentage defective particles and of microstructure*
- *Part 6: Determination of foreign matter*
- *Part 7: Determination of moisture*
- *Part 9: Wear testing and performance<sup>2)</sup>*

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1) Under preparation. (Stage at the time of publication ISO/DIS 11124-5:2018.)

2) Under preparation. (Stage at the time of publication ISO/NP 11125-9:2018.)