

---

---

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

**Part 3:  
Determination of apparent density**

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

*Partie 3: Détermination de la masse volumique apparente*





**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2011

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

## 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 11127-3 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 11127-3:1993), which has been revised to update the structure of ISO 11126 and ISO 11127 presented in Annex A.

ISO 11127 consists of the following parts, under the general title *Preparation of steel substrates before application of paints and related products — Test methods for non-metallic blast-cleaning abrasives*:

- *Part 1: Sampling*
- *Part 2: Determination of particle size distribution*
- *Part 3: Determination of apparent density*
- *Part 4: Assessment of hardness by a glass slide test*
- *Part 5: Determination of moisture*
- *Part 6: Determination of water-soluble contaminants by conductivity measurement*
- *Part 7: Determination of water-soluble chlorides*



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

## Part 3: Determination of apparent density

### 1 Scope

This is one of a number of parts of ISO 11127 dealing with the sampling and testing of non-metallic abrasives for blast-cleaning.

The types of non-metallic abrasive and requirements on each are contained in ISO 11126.

The ISO 11126 and ISO 11127 series have been drafted as a coherent set of International Standards on non-metallic blast-cleaning abrasives. Information on all parts of both series is given in Annex A.

This part of ISO 11127 specifies a method for the determination of the apparent density of non-metallic blast-cleaning abrasives.

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

ISO 11127-1, *Preparation of steel substrates before application of paints and related products — Test methods for non-metallic blast-cleaning abrasives — Part 1: Sampling*

### 3 Terms and definitions

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

#### 3.1

##### **apparent density**

mass of a given volume of non-metallic abrasive, as determined by the pycnometer method described in this part of ISO 11127

### 4 Reagent

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

### 5 Apparatus

Ordinary laboratory apparatus and glassware, together with the following:

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

5.2 **Oven**, capable of being maintained at a temperature of  $(110 \pm 5)$  °C.

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

5.4 **Desiccator**, containing a desiccant such as dried silica gel impregnated with cobalt chloride.

## 6 Sampling

Take a representative sample of the product to be tested, as described in ISO 11127-1.

## 7 Procedure

7.1 Carry out the determination in duplicate.

7.2 Dry a sufficient quantity of the sample by heating it at  $(110 \pm 5)$  °C for 1 h. Allow to cool to room temperature in the desiccator (5.4).

7.3 Weigh the clean, dry pyknometer (5.1) to an accuracy of 0,01 g ( $m_1$ ), introduce into it approximately 10 g of the dried sample and reweigh ( $m_2$ ).

7.4 Add distilled or deionized water (4.1) to the pyknometer until it is completely filled. Replace the stopper and gently shake the pyknometer 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 pyknometer. Ensure there are no air bubbles present. Reweigh the pyknometer and its contents ( $m_3$ ).

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

7.6 Care shall be taken that the pyknometer is handled as little as possible in order to prevent warming by hand. Pyknometer, test portion and water shall, as far as possible, be at the same temperature.

## 8 Expression of results

Calculate the apparent density,  $\rho_A$ , of the product tested, expressed in kilograms per cubic metre ( $\text{kg/m}^3$ ), using the equation

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

where

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

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

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

$m_4$  is the mass, in grams, of the pyknometer 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 described in Clause 7.

Calculate the mean of two valid determinations and report the result to the nearest 100  $\text{kg/m}^3$ .

## 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 11126 (see Annex A), if applicable;
- b) a reference to this part of ISO 11127 (ISO 11127-3);
- 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.

## Annex A (informative)

### International Standards for non-metallic blast-cleaning abrasives

Requirements and test methods for non-metallic blast-cleaning abrasives are contained in ISO 11126 and ISO 11127, respectively.

ISO 11126 consists of the following parts under the general title:

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

- *Part 1: General introduction and classification*
- *Part 3: Copper refinery slag*
- *Part 4: Coal furnace slag*
- *Part 5: Nickel refinery slag*
- *Part 6: Iron furnace slag*
- *Part 7: Fused aluminium oxide*
- *Part 8: Olivine sand*
- *Part 9: Staurolite*
- *Part 10: Almandite garnet*

ISO 11127 consists of the following parts, under the general title:

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

- *Part 1: Sampling*
- *Part 2: Determination of particle size distribution*
- *Part 3: Determination of apparent density*
- *Part 4: Assessment of hardness by a glass slide test*
- *Part 5: Determination of moisture*
- *Part 6: Determination of water-soluble contaminants by conductivity measurement*
- *Part 7: Determination of water-soluble chlorides*





