INTERNATIONAL STANDARD

ISO 11125-3

Second edition
2018-08

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

Part 3: Determination of hardness

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 3: Détermination de la dureté

Reference number
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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).

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).

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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

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 11125-3:1993), 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 3: Determination of hardness

1 Scope

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

This method is not recommended for the testing of particle sizes below 0,3 mm.

NOTE Accurate testing of particles below 0,3 mm (grades S040/G050) is extremely difficult.

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 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method*

3 Terms and definitions

No terms and definitions are listed in this document.

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/

4 Apparatus

4.1 Hardness tester, for application of a test force up to 10 N, and an **optical device** for magnification of the hardness-test indentations to at least ×200.

4.2 Hardness comparison plates, of hardness range similar to the product under test.

4.3 Metallurgical sample mounting material, which will harden at temperatures below 140 °C.

NOTE Use of a metallurgical sample mounting material which hardens at temperatures above 140 °C can lead to a tempering action on the material under test and affect the hardness values obtained.

The elongation limit value of the mounting material should preferably be at least twice the value of the compressive stress which is exerted on the test specimen due to the applied test force.

The compressive stress is determined from the cross-sectional area of the particle and the test force applied.

EXAMPLE

A particle of nominal diameter 0,4 mm has an area of about 0,126 mm^2. At an applied test force of 9,807 N, a compressive stress of about 80 N/mm^2 results.

For the above example, the elongation limit of the mounting medium should therefore be above 160 N/mm^2.

4.4 **Metallurgical sample moulds**, at least 25 mm in diameter.

5 Sampling

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

6 Preparation of the sample

The abrasive particles shall be placed in a single layer in the base of a metallurgical sample mould (4.4) and embedded in the metallurgical sample mounting material (4.3) so that a test sample is obtained which can be abraded and polished. Wet abrading of the sample shall take place until one-half of the nominal particle diameter is exposed. The bearing area and the test surface of the mount shall be parallel.

NOTE 1 Sufficient particles should preferably be taken for each test sample to ensure, as far as possible, that at least half the base area of the test specimen is covered after abrading and polishing.

NOTE 2 This mounted sample prepared for hardness testing can also be used for the determination of defective particles and microstructure as described in ISO 11125-5 (see Annex A).

7 Procedure

Carry out the determination in duplicate.

7.1 Carry out all hardness measurements at ambient temperature in accordance with ISO 6507-1.

7.2 Prior to measuring the hardness of the sample, check the calibration using a hardness comparison plate (4.2) of range similar to the product to be tested.

7.3 Measure the hardness of the samples using a test force of 9,807 N, i.e. HV 1, when testing particles with a diameter greater than 0,5 mm. Measure the hardness of the samples using a test force of 4,904 N, i.e. HV 0,5, when testing particles with a diameter of 0,3 mm to 0,5 mm. Use a test duration of between 10 s and 15 s.

7.4 Do not carry out measurements on particles which are located less than 3 mm from the edge of the test sample. Make the hardness indentations halfway between the edge and the centre of each particle.

Metallic abrasives sometimes contain internal shrinkage defects and voids which remain undetected beneath the surface in a mounted and polished sample. These hidden cavities cause a non-uniform hardness indentation and give an erroneous hardness reading. These indentations shall be ignored.

NOTE Definitions of defects are given in the part of ISO 11124 appropriate to the material under test.

7.5 Make ten acceptable indentations in different particles for each test sample, disregarding any indentations that have a difference between the two diagonals of greater than 5 %. Record the ten hardness values obtained.

8 Expression of results

From the ten hardness values obtained, calculate the percentage conformance with the requirements specified in the appropriate part of ISO 11124 (see Annex A).

NOTE The arithmetic mean can also be calculated, although this is not necessary when using this method to assess compliance with the appropriate parts of ISO 11124.

9 Alternative hardness scales

There is no general procedure for accurately converting Vickers hardness into other scales of hardness or into tensile strength. Such conversions should therefore be avoided, unless a reliable basis for conversion can be obtained by comparison tests.

A strict comparison of hardness values is only possible at identical test forces.

10 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 11125-3:2018;

c) any deviation from the test method specified;

d) the date of the test;

e) the name of the person who carried out the test;

f) the result of the test.

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*[1)]

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*[2)]

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.)