

INTERNATIONAL STANDARD

ISO
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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
ISO 11125-3:1993(E)

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 11125-3 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*.

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 8: *Determination of abrasive mechanical properties*

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At the time of publication of this part of ISO 11125, part 8 was in course of preparation.

Annex A of this part of ISO 11125 is for information only.

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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 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.

This part of ISO 11125 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 1 Accurate testing of particles below 0,3 mm (grades S040/G050) is extremely difficult.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 11125. At the time of publication, the editions indicated were valid. All standards are

subject to revision, and parties to agreements based on this part of ISO 11125 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 6507-2:1983, *Metallic materials — Hardness test — Vickers test — Part 2: HV 0,2 to less than HV 5.*

ISO 11125-1:1993, *Preparation of steel substrates before application of paints and related products — Test methods for metallic blast-cleaning abrasives — Part 1: Sampling.*

3 Apparatus

3.1 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 $\times 200$.

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

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

NOTE 2 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.

EXAMPLE 1

A particle of nominal diameter 0,4 mm has an area of about 0,126 mm². At an applied test force of 9,807 N, a compressive stress of about 80 N/mm² results. The elongation limit of the mounting medium should therefore be above 160 N/mm².

NOTE 3 Use of a metallurgical sample mounting material which hardens at temperatures above 140 °C may lead to a tempering action on the material under test and affect the hardness values obtained.

3.4 Metallurgical sample moulds, at least 25 mm in diameter.

4 Sampling

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

5 Preparation of the sample

The abrasive particles shall be placed in a single layer in the base of a metallurgical sample mould (3.4) and embedded in the metallurgical sample mounting material (3.3) 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.

NOTES

4 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.

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

6 Procedure

Carry out the determination in duplicate.

6.1 Carry out all hardness measurements at ambient temperature in accordance with ISO 6507-2.

6.2 Prior to measuring the hardness of the sample, check the calibration using a hardness comparison plate (3.2) of range similar to the product to be tested.

6.3 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.

6.4 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 6 Definitions of defects are given in the part of ISO 11124 appropriate to the material under test.

6.5 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.

7 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 7 The arithmetic mean may also be calculated, although this is not necessary when using this method to assess compliance with the appropriate parts of ISO 11124.

8 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.

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 part of ISO 11125 (ISO 11125-3);
- 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.

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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 will consist 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

ISO 11125 will consist 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
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