
**Paints and varnishes — Determination
of stone-chip resistance of coatings —**

**Part 1:
Multi-impact testing**

*Peintures et vernis — Détermination de la résistance des revêtements
aux impacts de cailloux —*

Partie 1: Essais de chocs multiples

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO 20567-1:2005](https://standards.iteh.ai/catalog/standards/sist/4564e950-3da2-4c74-8b17-1beb6fdb98a7/iso-20567-1-2005)

<https://standards.iteh.ai/catalog/standards/sist/4564e950-3da2-4c74-8b17-1beb6fdb98a7/iso-20567-1-2005>



Reference number
ISO 20567-1:2005(E)

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO 20567-1:2005](https://standards.iteh.ai/catalog/standards/sist/4564e950-3da2-4c74-8b17-1beb6fd98a7/iso-20567-1-2005)

<https://standards.iteh.ai/catalog/standards/sist/4564e950-3da2-4c74-8b17-1beb6fd98a7/iso-20567-1-2005>

© ISO 2005

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
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Principle	2
4 Apparatus	2
5 Materials	3
6 Sampling	4
7 Test panels	4
8 Procedure	4
9 Evaluation	5
10 Precision	5
11 Test report	6
Annex A (informative) Recommended procedure for calibration of test apparatus	10

ISO 20567-1:2005

<https://standards.iteh.ai/catalog/standards/sist/4564e950-3da2-4c74-8b17-1beb6fbd98a7/iso-20567-1-2005>

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 20567-1 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

ISO 20567 consists of the following parts, under the general title *Paints and varnishes — Determination of stone-chip resistance of coatings*:

— *Part 1: Multi-impact testing*

— *Part 2: Single-impact test with a guided impact body*

[ISO 20567-1:2005](https://standards.iteh.ai/catalog/standards/sist/4564e950-3da2-4c74-8b17-16eb6fbd98a7/iso-20567-1-2005)

<https://standards.iteh.ai/catalog/standards/sist/4564e950-3da2-4c74-8b17-16eb6fbd98a7/iso-20567-1-2005>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Introduction

In the automobile industry, multi-layer paint coatings are applied to car bodies for protection. Grit, road-metal and other materials can damage these coatings in such a way that individual layers come off or the whole coating delaminates from the substrate.

Stone chipping can be simulated by means of single- and/or multi-impact tests. Part 1 of this International Standard describes multi-impact testing, Part 2 describes a single-impact test.

This part of ISO 20567 is based on the German Standard DIN 55996-1:2001, *Beschichtungsstoffe — Prüfung der Steinschlagfestigkeit von Beschichtungen — Teil 1: Multischlagprüfung (Paints and varnishes — Stone chip resistance test for coatings — Part 1: Multi impact test)*.

NOTE A recommended procedure for calibration of the apparatus is given in Annex A. Note that this annex is informative because the method described in it is not the only one suitable for checking whether a uniform impact pattern is produced.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO 20567-1:2005](https://standards.iteh.ai/catalog/standards/sist/4564e950-3da2-4c74-8b17-1beb6fbd98a7/iso-20567-1-2005)

<https://standards.iteh.ai/catalog/standards/sist/4564e950-3da2-4c74-8b17-1beb6fbd98a7/iso-20567-1-2005>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 20567-1:2005

<https://standards.iteh.ai/catalog/standards/sist/4564e950-3da2-4c74-8b17-1beb6fbd98a7/iso-20567-1-2005>

Paints and varnishes — Determination of stone-chip resistance of coatings —

Part 1: Multi-impact test

1 Scope

This part of ISO 20567 specifies three methods for the evaluation of the resistance of automobile finishes and other coatings to chilled-iron grit projected onto the surface under test to simulate the impact of small stones.

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 1513, *Paints and varnishes — Examination and preparation of samples for testing*

[ISO 20567-1:2005](#)

ISO 1514, *Paints and varnishes — Standard panels for testing*

[1beb6fbd98a7/iso-20567-1-2005](#)

ISO 2808, *Paints and varnishes — Determination of film thickness*

ISO 3270, *Paints and varnishes and their raw materials — Temperatures and humidities for conditioning and testing*

ISO 11124-2, *Preparation of steel substrates before application of paints and related products — Specifications for metallic blast-cleaning abrasives — Part 2: Chilled-iron grit*

ISO 11125-2, *Preparation of steel substrates before application of paints and related products — Test methods for metallic blast-cleaning abrasives — Part 2: Determination of particle size distribution*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

ISO 21227-2, *Paints and varnishes — Evaluation of defects on coated surfaces using optical imaging — Part 2: Evaluation procedure for multi-impact stone-chipping test*

IEC 60454-2, *Specification for pressure-sensitive adhesive tapes for electrical purposes — Part 2: Methods of test*

3 Principle

The stone-chip resistance of the coating under test is checked by projecting a large number of small sharp-edged bodies onto it in a short period of time. The material used in the test is chilled-iron grit which is projected onto the coating at a defined angle using compressed air. The extent of the damage caused will depend not only on the angle, but also on the pressure level, the mass of the projectiles, the duration of the bombardment and the design of the test apparatus.

Loose fragments of coating material are removed using adhesive tape.

The extent of the damage is determined by comparison with pictorial reference standards.

4 Apparatus

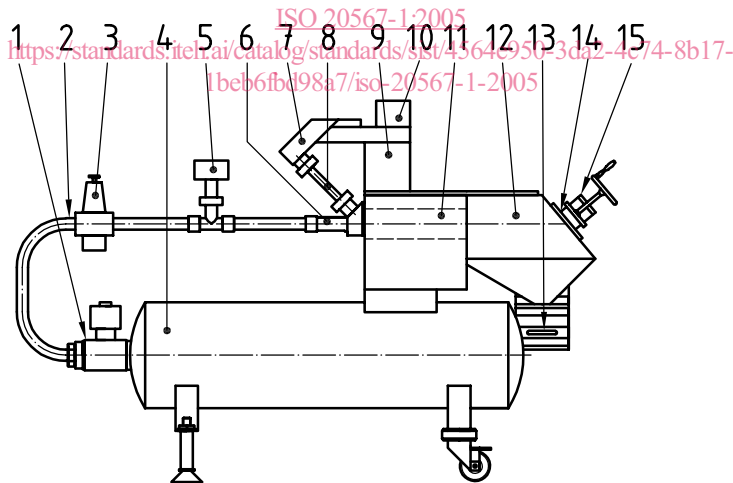
Ordinary laboratory apparatus, plus the following:

4.1 Multi-impact tester

Figures 1 and 2 show the test apparatus and its dimensions.

The vibrating conveyor carries the grit from the funnel into the air blast in front of the grit-accelerating nozzle. It shall be designed so that the grit feed speed can be varied. The apparatus shall be capable of projecting 500 g of grit during a period of 10 s. The pressure chamber shall be large enough to allow the specified working pressure of 200 kPa to be held at a constant level for at least 10 s while the solenoid valve is open.

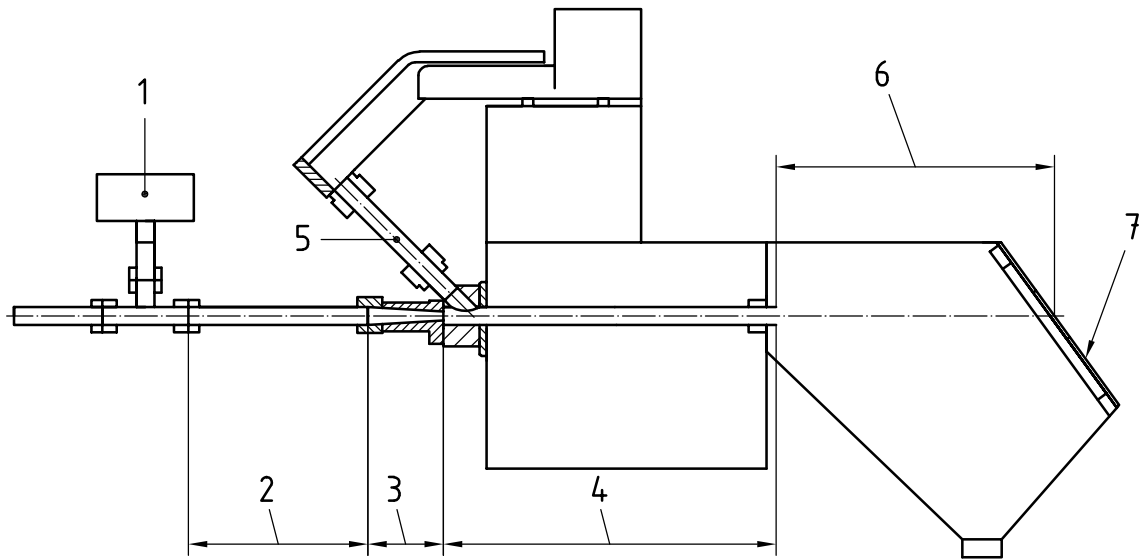
Used grit can be taken from the grit-catching chamber after the test and used again to a limited extent (see 5.1).



Key

- | | |
|--|--|
| 1 solenoid valve | 9 vibrating conveyor |
| 2 compressed-air line | 10 grit feed funnel |
| 3 pressure reducer (to working pressure) | 11 grit-accelerating pipe (accessible from back for replacement) |
| 4 pressure chamber (capacity 90 l) | 12 protective housing |
| 5 manometer (indicates working pressure) | 13 grit-catching chamber |
| 6 air-accelerating nozzle | 14 test panel |
| 7 grit feed chute | 15 test panel holder |
| 8 grit feed pipe | |

Figure 1 — Multi-impact tester — General view



Key

- | | |
|--|--|
| <p>1 pressure gauge</p> <ul style="list-style-type: none"> — measurement range: up to 400 kPa (= 4 bar) — diameter of scale: 100 mm — accuracy: class 1,0 <p>2 connecting pipe</p> <ul style="list-style-type: none"> — length: (190 ± 1) mm — inside diameter: $(19 \pm 0,2)$ mm <p>3 air-accelerating nozzle</p> <ul style="list-style-type: none"> — length: (80 ± 1) mm — inside diameter at entry: $(19 \pm 0,2)$ mm — inside diameter at exit: $(7 \pm 0,2)$ mm <p>4 flange and grit-accelerating pipe</p> <ul style="list-style-type: none"> — overall length: (352 ± 2) mm — inside diameter: $(30 \pm 0,2)$ mm | <p>5 grit feed pipe</p> <ul style="list-style-type: none"> — length: (205 ± 3) mm — inside diameter: (19 ± 1) mm — connected to grit-accelerating pipe at angle of $(45 \pm 1)^\circ$ and distance of (35 ± 1) mm from tip of air-accelerating nozzle <p>6 jet of grit</p> <ul style="list-style-type: none"> — distance from grit-accelerating pipe to centre of test panel: (290 ± 1) mm — angle between axis of jet and test panel: $(54 \pm 1)^\circ$ <p>7 aperture</p> <ul style="list-style-type: none"> — 80 mm \times 80 mm window defining test area on test panel |
|--|--|

Figure 2 — Multi-impact tester — Detailed drawing and dimensions

5 Materials

5.1 Grit¹⁾

The grit shall be chilled-iron grit conforming to the requirements of ISO 11124-2, except that the particle size, determined in accordance with ISO 11125-2, shall be 4 mm to 5 mm.

The grit shall be replaced after a maximum of 100 test runs (i.e. after it has been projected 100 times) or at the end of the series of tests during which the grit passes the point at which it has been used for a total of 100 test runs.

1) For information about grit suppliers, please contact the Normenausschuss Beschichtungsstoffe und Beschichtungen (NAB), at DIN, Burggrafstraße 6, 10787 Berlin, Germany.