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Indentation Hardness Tester acc. to Buchholz Model 263

Test Apparatus

with Measuring

Microscope

testing equipment for quality management

ERICHSEN

Technical Description and Operating Instructions

DIN EN ISO 2815

VDA 621-415

Testing Principle

In the Buchholz indentation hardness test a test body of specified geometry acts for a prescribed time on the specimen using a defined test load. After a specified recovery time the length (l) of the resulting indentation is measured using the microscope. Based on this length of impression (l) in mm, it is possible to calculate:

- Buchholz indentation hardness = 100/l (1)
- depth of impression (µm, approx.) = 8 x l² (2)

Both variables are rounded up to whole numbers.

Application Range

The Buchholz impression hardness test is applicable whenever the following marginal conditions are fulfilled:

- The coating to be tested must be even and smooth with a clean surface and applied to a level substrate which will resist the test force.
- There must be an adequate coating thickness (i.e. to exceed the depth of impression acc. to (1) above by at least 10 µm).
- For comparison testing the specimens should have the same coating thickness; and the conditioning and testing of the specimens should be conducted under identical ambient conditions.

Since the impression test causes only insignificant damage to the coating, testing is also possible on finished products.

Design

The **Indentation Hardness Tester, Model 263**, consists of a metal block in which two pointed feet and the impression body are imbedded. The impression body of carbide steel comprises a wheel of which the blade-type edge has been ground to 120°. The instrument weighs a total of 1000 ± 5 g. The testing force has been set to range between 4.90 N and 4.95 N (equivalent to 500 to 505 g), thus meeting the requirements of all relevant standards.
The measuring microscope with a magnification factor of 20 and integrated illumination has a measuring range of 4 mm with a 0.1 mm reticle.

Test and Evaluation

The Buchholz impression hardness test is conducted in compliance with the standards named overleaf, as follows:

- The template provided with the instrument is affixed to the specimen in such a way that
  - the Buchholz impression in the circular cut-out appears in the appropriate position on the specimen, and
  - the measuring microscope, oriented at right angles to the impression, can be set up in a stable position.
- Align the specimen using the spirit level.
- Position the instrument in such a way that the points correspond with the centres of the small circles on the template.
- Lower the instrument slowly, setting the penetrating body gently and without impact onto the specimen.
- After 30 ± 1 s, the instrument is lifted vertically from the specimen.
- Position the microscope above the indentation in the specimen in such way that the integrated lamp, which is switched on with the yellow button, illuminates the impression from the side.
- The reticle is focused by first rotating the ocular of the microscope, then raising/lowering the barrel to adjust to the surface of the specimen.
- Move the microscope until the cross-lines of the template correspond with those of the reticle in the ocular.
- 35 ± 5 s after lifting the instrument measure the length of impression.
- Examine the indentation through the microscope and determine whether the method in applicable in this case.
- Calculate the depth of impression (2) on the basis of the length of impression (l) in mm.
- Calculate the Buchholz indentation hardness with (1) based on the length of impression (l).

Technical Data

Instrument

Dimensions (L x W x H)	100 x 50 x 40 mm
Net weight	approx. 1 kg

Microscope

Dimensions (L x W x H)	100 x 30 x 10 mm
Net weight	approx. 0.2 kg

Reference Class:
The Model 263 is supplied with a Manufacturer's Certificate M in accordance with DIN 55 350-18 that includes among others the following information:

Actual and setting values of the impression body: diameter, thickness, cutting angle, cutting radius, test load, material's hardness, surface's roughness; product identification, test equipments used with calibration status, date, name of inspector.

The testing instrument is adjusted in such a way that the loading weight is in the range (500 ± 5) g.

Ordering Information	
Order No.	**Name of Product**
0058.01.31	**Indentation Hardness Tester acc. to Buchholz, Model 263** "REFERENCE CLASS"
	Included in scope of delivery: • Measuring microscope • Spirit level • Templates (adhesive) • Plastic case • Operating Instructions

Subject to technical modifications.
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