Scratch Hardness Tester TriForcePencil 293

three

testing forces

5 N, 7.5 N, 10 N

testing equipment for quality management

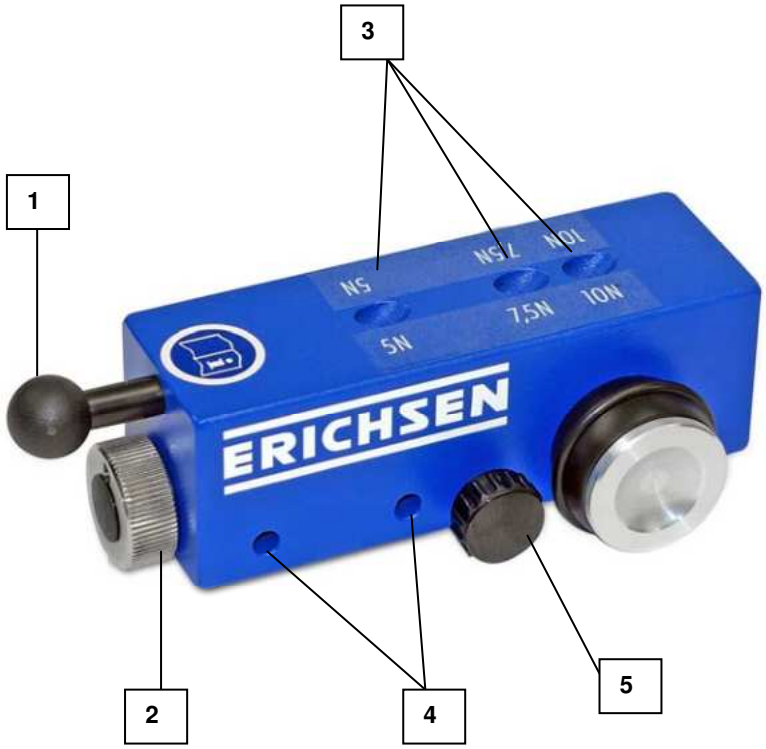
ERICHSEN

Technical Description and Operating Manual

ISO 15 184
SNV 37 113
SIS 18 41 87
NEN 5350
ECCA T4

Pencil Method -

simple and quick method for testing surface hardness



1 Lifting arm
2 Adjusting screw with Distance tip
3 Pencil guides
4 Pencil fixing hole
5 Fixing screw

Purpose and Application

The pencil method belongs to the group of scratch hardness testing instruments. This is a simple and quick method for testing the surface hardness of coatings with regard to stresses inflicted by scratching with sharp edges, or other rough surfaces.

It can also be applied during production, e. g. for coil coatings.

The equipment of the **TriForcePencil 293** with three test loads (5 N / 7,5 N / 10 N) instead of usually only one (7,5 N) meets the increasingly possibility of variation of the test load for this type of testing even currently demanded in the Asian market.

Test Principle

Pencils of various grades of hardness are moved over the painted surface at an angle of 45° to the horizontal with a force of 5 N, 7.5 N or 10 N (± 0.1 N). The pencil hardness is defined by those two grades of hardness the softer one of which just produces a writing trace while the next harder one leaves a perceptible scratch on the coating.

Design and Function

The **TriForcePencil 293**, enables the test to be carried out technically equivalent to Wolff-Wilborn and ensures that the specified force and angle remain constant throughout the test. Guidance of the instrument is easy and excludes manual influences of the pencil pressure.

The classic test according to Wolff-Wilborn performed with a test weight of 750 g originally. However, under consideration of the correct naming of forces, the test loads of 7.5N for this purpose has enforced.

The weight block of the **TriForcePencil 293** is equipped with three pencil guides, which apply by the principle of leverage the appropriate test load on the pencil tip, according to their positioning.

Setting the correct height or the defined projection of the pencil out of the weight block, is easily & comfortably ensured by rotating the adjusting screw with distance tip.

Recessed handles on the wheel covers provide good support for the controlled blanking sliding the device over the surface to be tested.

The Scratch Hardness Tester **TriForcePencil 293** is supplied in a plastic case. The package includes an assortment of pencils with 17 degrees of hardness from 6B to 9H, a special sharpener and a sheet of emery paper.

Test Procedure

- The pencil points are sharpened so that the graphite point protrudes about 5 mm. For this purpose use the special sharpener which is included in the scope of supply. The graphite point is face-ground sharp-edged on emery paper with a grain size of 400 for which the pencil is held vertically.

- Place the **TriForcePencil 293** on a flat surface and remove the fixing screw (5).

- Turn down the adjusting screw with the distance tip (2) for setting the correct height distance (10 mm).

- Then insert the prepared pencil into the guide of the selected power range.

- After inserting the fixing screw (5) the pencil is now fixed.

- Reset the adjusting screw (2) by rotation.

The pencil tip protrudes about 5 mm out of the holder block. Place the **TriForcePencil** carefully on the sample, set up first with the wheels and after then with the pencil tip. Lower the device slowly by index finger under the round knob of the lift arm. The hubs of the wheels are held with the thumb and forefinger and the instrument is moved over the specimen in the direction the pencil point shows at a speed of about 10 cm/s.

During the test it is necessary to be careful not to mix up the writing of the pencil with penetration into the film. Should it be necessary, a moist sponge or a soft pencil eraser can be used to remove excess marking.

The numbers of the two pencil types defined are indicated as pencil hardness. A pencil hardness of 2H...3H for example means that pencil type 2H still writes on the surface while pencil type 3H already slightly scratches the film.

The appropriate pencil hardness has to be established empirically. It is recommended to start testing with a medium soft pencil or medium hard one and to narrow down to the most suitable pencil type.

Highly pigmented paint or that containing flake-shaped pigments are not recommended for use with this test method.

Reference Class:

The Model 293 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 value of the loading weight (test load), product identification, test equipments used with calibration status, date, name of inspector.

The loading weight of the test instrument is adjusted – corresponding to the test loads of 5 N, 7.5 N, 10 N (± 0,1 N) – 0,1/0 N.

Order Information	
Order No.	**Description**
0306.01.31	**Scratch Hardness Tester TriforcePencil 293** incl. 17 standardised pencils 1 special sharpener, 1 sheet of emery paper

Spare Parts	
Order No.	**Description**
91 0919141	1 Set of standardised pencils (17 pcs.)

Group 14 – TBE/BAE 293 – I/2014

ERICHSEN GmbH & Co. KG
Postfach 1264 | 58652 Hemer | Germany | Tel. +49(0)2372-9683-0 | Fax +49(0)2372-6430 | www.erichsen.de | info@erichsen.de