Physical Testing: Hardness

Mechanised Scratch Tester (705)

SH0530

Coating performance is related to many factors that include the hardness of the coating with other physical properties such as adhesion, lubricity, resilience, as well as the influence of coating thickness and curing conditions.

It is a quantifiable indication of the extent to which serious damage is resisted when a loaded needle is raked across a relatively smooth, flat surface. The motor driven machine is recommended as it provides better repeatability of test performance.

Mechanised Scratch Tester

This machine is encased with a cover enclosing the gears and other parts for operating the slide at a constant speed (3-4 cm per second) and the arm lifting mechanism. The needle arm is counterpoised and rigid to prevent whip or chatter at the ball-point.

A 1mm tungsten carbide ball ended needle (normally supplied with each instrument) is held in a chuck at 90° to the test panel and can be easily removed for inspection and replacement. The tungsten carbide needle will provide with care, a long useful life without the need to replace the tip after each test.

Weights providing increments of 100 g to 2 kg (0-20 N) mass are loaded above the ball ended needle (or stylus), additional weights up to maximum 10 kg loading are available as optional accessories for harder coatings.

Standard test panels (usually metallic) of 150 x 100 mm with thickness up to 1.65 mm can be used, however upon request provision can be made to accommodate thicker panels if required.

A plastic protective screen is available to avoid injury or intrusion into the mechanism or whilst instrument is activated.

200/250V 5OHZ AC supply.

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Method of test

Reference should be made to the relative test procedure, in general as follows:

1. Check suitable needle/stylus is fitted.
2. Clamp test panel to slide.
3. Load needle arm with weights to determine threshold of failure,
   a. as specified for go/no go tests. Or
   b. progressively increasing load until failure occurs.
4. Actuate slide. If failure occurs, needle on voltmeter will flick over.
5. Only conductive metallic panels will be suitable for this test result.
6. Remove panel for visual assessment of scratch.

ECCA Metal Marking Resistance test is a procedure designed to evaluate the resistance to a smooth organic coating when rubbed by a metallic object.

The standard model Scratch Testers can be used by simply substituting the ball-ended needle for a special tool onto which 15um thick annealed aluminium foil is attached.

ASTM D2197 Scrape Adhesion Test and D5178 Mar Resistant Test call for a test procedure, which requires a radius stylus, this is presented to the test panel at a 45º angle.

International standards

The Mechanised Scratch Tester (SH0530) has been updated to offer the weight set required by ISO 1518-1.

We continue to offer the weight set specified by the preceding international standard, ISO 1518, as spares (SH4783).

Please contact us if you wish to purchase a replacement weight set to update your machine to ISO 1518-1.

Mechanised Mar Resistance Tester SH705/1 - ASTM D5178.
Mechanised Scratch Tester SH705/2 - ASTM D2197.

Ordering information – Mechanised Scratch Tester (705)

Mechanised Scratch Testers	Description
SH0530	**Mechanised Scratch Tester - ISO 1518-1** (230VAC, 50HZ) 35 mm/s table speed, tungsten carbide hemispherical stylus, 20 N set of weights (2 x 0.5 N, 1 x 1.0 N, 2 x 2 N, 1 x 4 N and 1 x 10 N) and 1 spindle).
Accessories and spares	
SH4811	Weight set for ISO 1518-1 (2 x 0.5 N, 1 x 1.0 N, 2 x 2 N, 1 x 4 N and 1 x 10 N)
SH4783	2 kg Set of Weights (1 x 100 g, 2 x 200 g, 1 x 500 g, 1 x 1000 g) (superseded standard)

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