electromotive

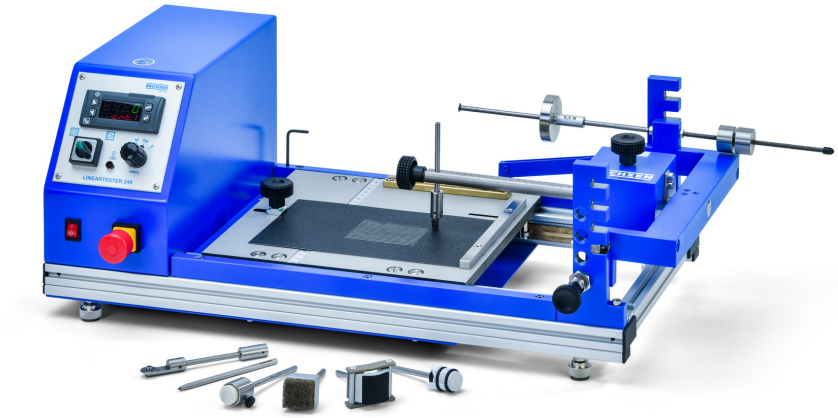
drive

Scratch Hardness Tester

LINEARTESTER 249

electric

through-scratching offer



variable

test speed

testing equipment for quality management

ERICHSEN

since 1910

Technical Description

van Laar
IHD
Bosch
ISO
BMW

Clemen
VW
Sikkens
Cross Hatch Cutting
Oesterle

Purpose and Application

The optimised scratch hardness tester **LINEARTESTER 249** is intended, in addition to its original purpose of application, i. e. to establish the ability of a surfaces to resist damage by scratching, also for several other tests:

- Scribe/Scratch tests
- To and fro-cycle abrasion tests
- Crockmeter tests
- MEK tests, tests determining the resistance against solvents in general or wipe test, respectively.

Principle of the Test

The test panel is fixed onto a mobile slide by means of clamping rails. Above this slide and held on two metal pillars is a reciprocating beam bedded in a free-moving manner and carrying the adequate test tool as well as a weight.
The required scratching force in the range of (0.5 to 20)N is set by moving the weight along the reciprocating beam, making use of a setting scale (an additional load weight of (1 to 40)N is optionally available). The testing machine is equipped with a 4-position height adjustable load arm device with standard height of about 10 mm (+20/+40/+60 mm). To use the vertical adjustment, a set of guide plate high level adapters is also required (Order No. 02101.01.32).

To start a scratch/scribe test, the test tool is lowered onto the specimen when moving forward initiating the scratching process immediately. The optionally used guide plate lifts the tool up, when the slide with the sample plate moves back.
The test panel can be moved sideways so that a series of scratches can be carried out side by side with different force settings. Due to a ruler integrated in the slide plate, an uniform distance between the scratches can be achieved very easily.
When testing insulating coatings on conducting substrates, an electric recognition of the through-scratching offers an additional security for setting the scratching force.
For abrasion tests, crockmeter tests, MEK or wipe tests the test movement is carried out with the tool lowered onto the specimen, in preset cycles to and fro. For this, the guide plate has to be removed from the slide plate. There are three fixed as well as one freely programmable test speeds available.
In addition to the fixed stroke length of 60 mm, the LINEARTESTER can be equipped optionally with variable stroke lengths (five additional stroke lengths of 35 mm, 50 mm, 65 mm, 80 mm and 95 mm).

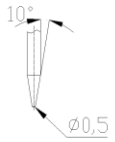
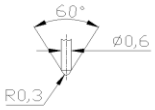
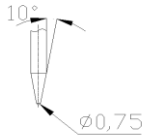
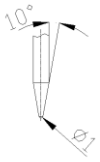
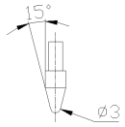
Version

The **LINEARTESTER 249** is a tabletop unit. The electromotive drive ensures a uniform forward motion of the slide. The test tool is lowered and lifted automatically when scratch/scribe tests are carried out. A multitude of different test tools are available (see table on the next page). The tools marked with (*) are made of Tungsten Carbide Steel, additionally covered with an extremely hard layer. Due to this layer's "golden" appearance, any worn parts are visually very easy recognizable because the Tungsten Carbide Material under the "golden" layer has a distincly different color. With the optional available universal adapter set (see last page) even also several user-specifc tool inserts can be used.

Order Informations	
Ord.-No.	**Product Desciption**
0263.01.31	Scratch Hardness Tester **LINEARTESTER 249** with an electromotive drive
	The scope of supply includes: Hex key, circular level, power pack, operating manual

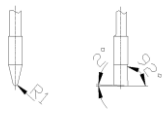
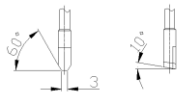
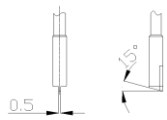
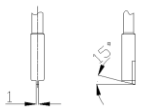
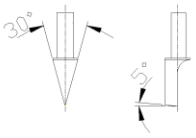
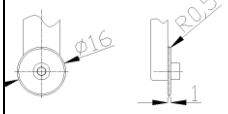
Accessories	
Ord.-No.	**Product Description**
0839.01.32	Load weight (1 - 40) N
2101.01.32	Guide plate height level adapters (set)
2043.01.32	Variable stroke lenghts
	Test Tip with long shaft
915030241	Test tip acc. to Clemen (R 1.0 mm)
0693.01.32	Test tip acc. to van Laar (Ø 0.5 mm)
0842.01.32	Test tip acc. to IHD (Ø 0.6 mm)
0208.02.32	Test tip acc. to ISO (Ø 1.0 mm)
915030441	Test tip acc. to VW (3 mm/60°)
0741.01.32	Test tip acc. to (0.5 mm/90°)
0740.01.32	Test tip acc. to (1.0 mm/90°)
	Equipment for MEK test
0840.01.32	MEK-Attachment
0841.01.32	Test plugs made of high dense special felt
	Equipment for Crockmeter test
0849.01.32	Crockmeter Attachment
0364.08.53	Crockmeter test head according to BMW AA-0134 (conforms to *Rub Head C acc. to DIN 55654*)
0364.08.53	Crocking cloth
	Universal adapter set and accessories
0690.01.32	Universal Adapter Set
	Spherical inserts for the clamping adapter (short shaft without clamping device)
0539.01.32	Test tip acc. to van Laar (Ø 0.5 mm)
0539.02.32	Test tip acc. to Bosch (Ø 0.75 mm)
0539.03.32	Test tip acc. to ISO (Ø 1.0 mm)
0539.07.32	Test tip acc. to ISO (Ø 1.0 mm) – additionally covered with an extremly hard layer
0539.04.32	Test tip acc. to BMW (Ø 3.0 mm)
	Asymmetric inserts (short shaft with clamping device)
0218.02.32	Test tip acc. to Clemen (R 1.0 mm)
0564.01.32	Test Tip for cross hatch cutting (30°) – additionally covered with an extremly hard layer
	Inserts (Ø 16 mm/R 0.5 mm) for the disc adapter
0430.01.32	Test discs made of Duroplast
0430.02.32	Test discs made of copper
0430.03.32	Test discs made of stainless steel
0539.05.32	Test discs made of stainless steel, additionally covered with an extremly hard layer
	Adapter for abrasion tests
0844.01.32	Squarish adapter (egde length 25 mm)
0845.01.32	Cylindrical adapter (dia. 25 mm)

Spherical Inserts

Description	Test geometry	Material
test tip acc. to van Laar [1) 2)]		carbide insert
test tip acc. to IHD [1)]		
test tip acc. to Bosch [2)]		
test tip acc. to ISO [1) 2)]		carbide insert [*)]
test tip acc. to BMW [2)]		hardened steel

*) additionally covered with an extremly hard layer
1) long shaft, directly assembled
2) short shaft, only for using with the adapter set
3) only for using with the disc adapter of the universal adapter set

Asymmetric Inserts

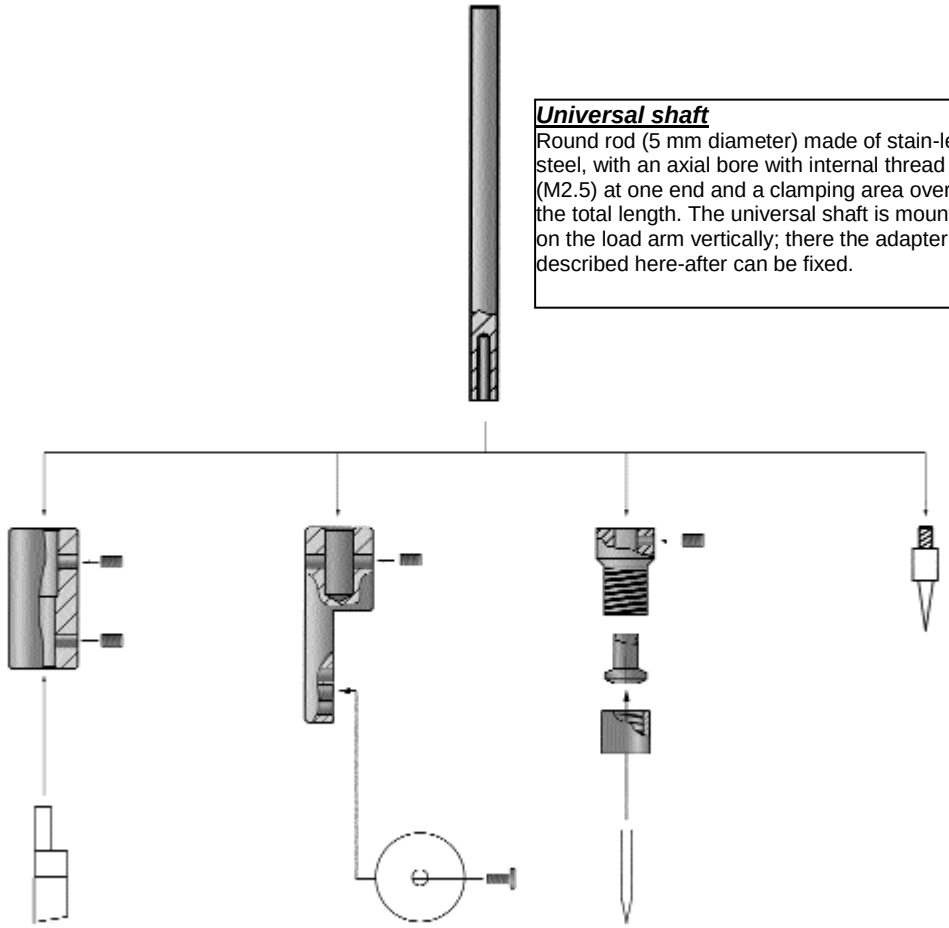
Description	Test geometry	Material
test tip acc. to Clemen [1) 2)]		carbide insert
test tip acc. to VW [1)]		
test tip acc. to Sikkens [1)]		
test tip acc. to Sikkens [1)]		
test tip for cross hatch cutting [2)]		hardened steel [*)]
test disc acc. to Oesterle [3)]		duroplast copper stainless steel stainless steel [*)]

Technical Data

Dimensions (L x W x H)	580 mm x 280 mm x 210 mm
Specimen dimensions	max. 150 mm x 210 mm (DIN A 5)
Power supply	(100 - 240) VAC, (47 - 63) Hz
Net weight	approx. 13 kg
Scratching force	(0.5 – 20) N
Medium test speed	25/35/200 mm/s (fixed) (10 – 200) mm/s programmable
Length of cycle	60/110 mm (with/without guide plate)

Universal Adapter Set

In addition to the standard range of test tools the Universal Adapter Set allows the use of a variety of additions tool inserts. In this way individual test problems with specific tool geometries deviating from established determinations can be solved in an easy manner. The adapter set consists of the following components:



Universal shaft
Round rod (5 mm diameter) made of stain-less steel, with an axial bore with internal thread (M2.5) at one end and a clamping area over the total length. The universal shaft is mounted on the load arm vertically; there the adapter described here-after can be fixed.

Clamping adapter
Cylindrical part made of stain-less steel, with one axial bore each of 4 mm and 5 mm dia-meter as well as radial threaded bores with clamping screws. The clamping adapter is intended for tool inserts using a cylindrical shaft (4 mm dia.).

Disc adapter
Cylindrical part made of stainless steel with axial bore (5 mm dia.) and radial threaded bores with clamping screws at one end; at the other end plane milling parallel to the axis with three radial threaded bores (M3). The disc adapter serves for fixing of plane tool inserts, especially such with circular letter disc geometry.

Chucking adapter
Clamping huck made of gunmetal finish steel with three-piece collet chuck se for 1/2.35/ 3 mm dia. The chucking adapter serves as a support for a cylindrical tool insert with spherical or pointed tip (pins, needles etc.).

Direct assembly
Gauge slide with outside thread M2.5 (e.g. probe tip)

Subject to technical
modifications. Group 14 - TBE
249 – IV/2020

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