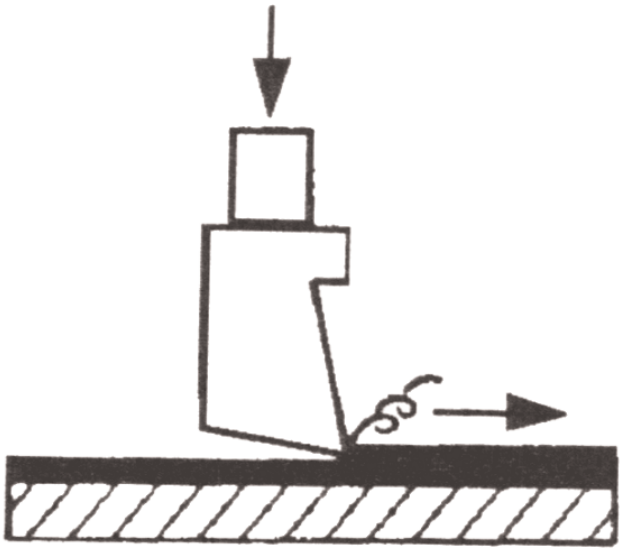
Scratching Tool acc. to van Laar, Model 426

Scratching Tool, SCRATCHMARKER 427

Scratching Tool acc. to Clemen, HANDCUTTER 428

Scratch Stylus acc. to Sikkens, Model 463

Scratch Stylus acc. to Sikkens, Model 463-Pro



Scratch Tool: Test Tip acc. to Clemen

testing equipment for quality management

ERICHSEN

Technical Description and Operating Instruction

Scratch tools with different geometries

Compact construction for fatigue-free operation

Portable instruments to apply defined scratches through coatings

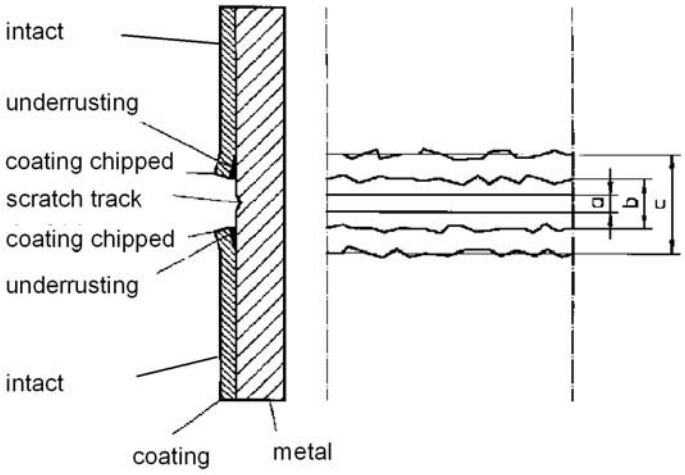
Scratching Tool acc. to van Laar, Model 426

Purpose and Application
Scratching-in of the St. Andrew's cross into test panels is a well-known preparation for short-term and endurance corrosion tests, enabling the examination of the protection of the coating against rusting of the substrate underneath the coating ("underrusting").
The **Sratching Tool acc. to van Laar** is a handy universal tool: for producing accurately defined incisions on the surface of the coating in preparation of forced corrosion tests, such as salt spray, continuous or intermittent immersion, accelerated weathering, gas corrosion and humidtiy tests.

Design of Apparatus
The 0.5 mm dia.(0.020") spherical tungsten scratch needle is firmly mounted in a pencil-shaped holder made of anodized hard aluminium. The special handy design of the instrument guaranties a stable appliance during the scratching operation. The spherical point was submitted to the following endurance test:
A cylinder of 100 mm dia. (4") free-cutting steel chucked in a lathe was scratched by a scratch needle at a surface speed of 20 cm/s (8") and a pressure of 50 N (11 lbs). No damage of the spherical point did occur after a run of 18000 cm (600 ft). It proved that at least 2000 scratches of 90 mm (3.1/2") length each can be made without a failure.

Principle of the Test
For producing a specified incision in the protective coating, the test panels are scratched with the scratching needle at the beginning of the corrosion test and again at regular time intervals. These scratches are made horizontally, one above the other, the first at the bottom on the shorter side of the panel. By this method it is easy to study the progression of the "underrusting". More or less strain will have to be exerted according to the thickness and hardness of the coating in order to reach the substrate with certainty and to produce a slight deformation of the metal. For drawing a clean scratch should be about 10 cm/s (4").

Fig. 1



Evaluation of the Test
As spreading rate the number of days is recorded it takes to form 1 mm of "underrusting". The extent of the rusting is measured from the edge of the original scratch track. If good adhesion prevails, the track width in the metal is about 0.5 mm (0.020"), with bad adhesion, however, part of the coating chips off at the edges. (The mean width of the chipped-off film can be taken as a measure for the adhesive strength of the film and for its change in the course of the test.)
In every case, it is the "underrusting" i.e. the rust below the adhering coating formed after scratching that is to be measured. The adjoining sketch demonstrates a case at which the paint coat was slightly chipped next to the scratch track.

The full extent of the spreading rust is essentially measured in both directions, the bare part is then deducted and the result divided by 2 in order to obtain the mean extent of the "underrusting".

For good adhesion is the "underrusting" index r therefore:

$$r = \frac{c - 0.5}{2}$$

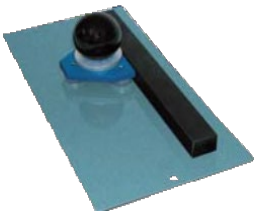
when c = is the over-all width of the "underrusting" in mm.

Further useful suggestions as to the evaluation of corrosion tests can be found in the paper by van Laar mentioned below.

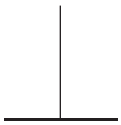
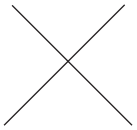
Order Informations	
Ord.-No.	**Product Description**
00940131	Scratching Tool acc. to van Laar, **Model 426**

References:
van Laar, J.A.W.: Die Unterrostung von lackiertem Stahl
(The "underrusting" of paint-coated steel).
Deutsche Farbenzeitschrift, 15 (1961), Page 56 - 67 and 104 - 117.

Scratching Tool, SCRATCHMARKER 427



Purpose and Application
The **SCRATCHMARKER 427** serves to apply defined scratches through coatings on specimen panels used for corrosion tests (e. g. in the ERICHSEN Corrosion Test Instruments, Models 519, 606 or 608).
According to the various standards different scratch pattern are produced. In the following table the most usual corrosion test standards as well as the relevant scribed marks are shown.

Standard	Scratch Geometry
DIN 53 167 VDA 621-414 VDA 621-415	
DIN 53 167 VDA 621-415	
ECCA T8	
DIN ISO 4623	
ECCA T8	

Design and Function
The **SCRATCHMARKER 427** consists of a basic unit including scratch tool (diameter 0.5 mm, point radius 0.25 mm) made of tungsten carbide, a graduated dial (max. scratch depth approx. 500 microns, graduation 25 microns) and a ruler. In addition the necessary calibrating device for adjusting the depth of the scratch is supplied with the instrument. The compact construction of the **SCRATCHMARKER** as well as the practical ruler enable a fatigue-free operation of the instrument even if there is a lot of work to be done.

Applying a Defined Scratch
First the thickness of the coating on the substrate has to be measured. For this purpose the following thickness gauges of the ERICHSEN product line can be used: P.I.G. 455, PAINT BORER 518 MC, MIKROTEST, MINITEST, LAYERCHECK. Afterwards the corresponding depth of the scratch is adjusted on the graduated dial of the **SCRATCHMARKER**. The depth of the scratch should exceed the maximum coating thickness in the area where the scratch will be cut, by at least 25 microns. The soft underside of the ruler is placed on the specimen panel and the **SCRATCHMARKER** is led along the ruler. The maximum length of the scratch is approx. 200 mm. The distance of the scratch from the edge of the panel should be at least 55 mm (perpendicular to the scratch) and 25 mm (in the direction of the scratch). The Circuit Indicator **Testboy® 20 Plus** provides the optical & acoustical indication of complete through-scratched insulating coating (for example the most lacquers) on conductive substrate (commonly several types of sheet metal). For this, one electric pole is connected to the scratch tool, whereas the other one is connected to the substrate. **Testboy® 20 Plus** is battery-operated.

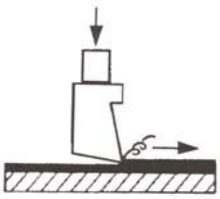
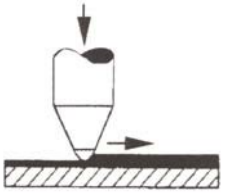
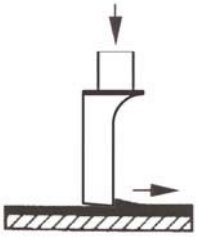
Order Informations	
Ord.-No.	**Product Description**
01700131	Scratching Tool, **SCRATCHMARKER 427**
Including: - calibrating device for adjusting the depth of the scratch - ruler - Circuit Indicator Testboy® 20 Plus - carrying case, operating instruction	

Scratching Tool acc. to Clemen, HANDCUTTER 428

Purpose and Application
It is a common method to prepare coated test panels for corrosion tests by applying various linear scratches in a vertical, horizontal or intersecting manner in such a way that the resistance of the coating system against rust formation under the coating can be tested.
Beside the use of a **test tip according to "van Laar" as scratch tool,** frequently the use of a **test tip according to "Clemen"** (included in the scope of supply) is specified for this procedure. Sometimes a **single test tip for cross hatch cutting tests** may also be used.
Depending on the requirements the user has to meet, these test tips used as scratch tools are appropriate tools to produce defined scratches on coating surfaces provided for accelerated corrosion tests, such as condensation water tests, gas corrosion tests, salt spray tests, continuous or alternate immersion tests and accelerated weathering tests etc.

Design
A solid adapter block made of aluminium and intended as tool holding fixture, is mounted into a sturdy plastic handle built in a high-class ergonomic manner to produce as fatigue-free as possible scratches through the often hard lacquer surfaces with the necessary force.
The scope of supply of the **HANDCUTTER 428** includes the test tip in accordance with **"Clemen"** as a scratch tool. Optionally, the above mentioned test tips in accordance with "van Laar" or for cross hatch cutting tests, respectively, can be used.

Scratch Tools

	Test tip acc. to Clemen, Ord.-No. 02180232
	Test tip acc. to van Laar, Ord.-No. 05390132
	Test tip for cross hatch cutting, Ord.-No. 05640132

Scratch Performance
For producing a specified incision in the protective coating, the test panels are scratched with the scratch tools at the beginning of the corrosion test and again at regular time intervals. These scratches are made horizontally, one above the other, the first at the bottom on the shorter side of the panel. By this method it is easy to study the progression of the "underrusting".
More or less strain will have to be exerted according to the thickness and hardness of the coating in order to reach the substrate with certainty and to produce a slight deformation of the metal. Advantageously, a ruler should be used to obtain a straight scratch line. For drawing a clean scratch should be about 10 cm/s (4").
It is important that during the through-scratching procedure the appropriate scratch tool is lead as vertically as possible over the coating to be scratched through.

Order Informations	
Ord.-No.	**Product Description**
02580131	Scratching Tool acc. to Clemen, **HANDCUTTER 428** Handle with adapter block for scratch tool fixing, incl. scratch tool acc. to Clemen

Accessories/Spare Parts	
Ord.-No.	**Product Description**
05390132	Scratch tool: test tip acc.to van Laar (dia. 0.5 mm)
05640132	Scratch tool: test tip for cross hatch cutting tests
02180232	Scratch tool: test tip acc. to Clemen (spare part)

Scratch Stylus acc. to Sikkens, Model 463 / 463-Pro

Mod. 463-Pro

Mod. 463

Application and Test Principle
The scratching stylus method is used to produce defined damages (cracks) on coated test panels to be used in corrosion tests, as, for instance, the Fog Spray Test acc. to DIN EN ISO 9227 with the ERICHSEN Corrosion Testing Apparatus, Models 606 and 608.
This method provides a criterion for the evaluation of the extent or influence of corrosion underneath a coating and its effect on the adhesion. The length of the lateral damage underneath the coating serves as a measure of the corrosion protection factor.

Design and Function
The Scratch Stylus acc. to Sikkens, **Model 463 / 463-Pro,** consists of a Sikkens cutting edge with a guide in the form of a side support head **(463)** or a rubber-tired impeller **(463-Pro)** and a handle; the Scratch Stylus **463-Pro** with a modified handle can now even be used freehand without a ruler and also by *left-handed people*. In the standard version of both models, the Sikkens cutting edge has a width of 1.0 mm and rectangular edges. Using the set screws, align the blade so that it is aligned with the support head / impeller (see Figure 2).

Upon request, Sikkens cutting edges of 0.5 mm and 2.0 mm can also be supplied; the cutting edges can be used on both sides.

As an option, an adapter for using the test tip acc. to Clemen is also available.

Execution of the Test
The test panels are prepared with one or several straight scratch tracks over the whole of the metal sheet width in such a manner that they lie parallel to the narrow edge of the sheet and penetrate to the substrate. In some cases a St. Andrew's Cross scratch track may be necessary.

Fig. 2

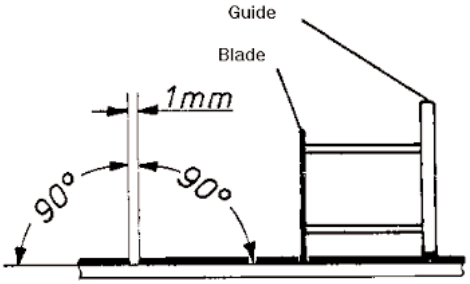
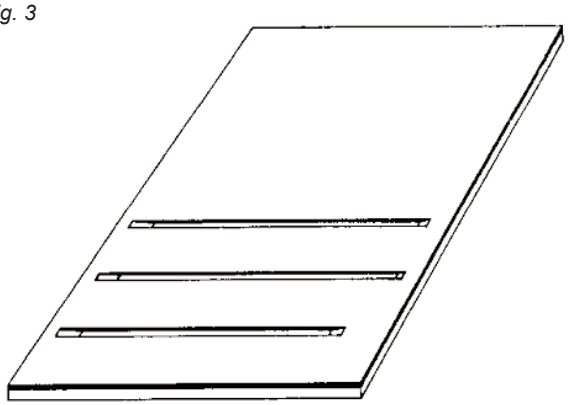


Fig. 3



Order Informations	
Ord.-No.	**Product Description**
32830131	Scratch Stylus acc. to Sikkens, **Model 463-Pro** with a Sikkens cutting edge of 1.0 mm
01000131	Scratch Stylus acc. to Sikkens, **Model 463** with a Sikkens cutting edge of 1.0 mm
910926442	Sikkens cutting edge 0.5 mm
910926441	Sikkens cutting edge 1.0 mm
910926443	Sikkens cutting edge 2.0 mm
34870132	Adapter for using test tip acc. to Clemen , incl. tip
02180232	Scratch tool (test tip) acc. to Clemen (spare part)

Subject to technical modifications.
Group 21- TBE/BAE-426/427/428/463 – IV/2026

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