Rolling test head „318 S“
with test tip

Test head „318“
with test tip

ERICHSEN
SmartPen

Rolling test head „435“
with test disc

Rolling test head „435 S“
with test tool

testing equipment for quality management

ERICHSEN
since 1910

Technical Description and Operating Manual

3 Force ranges:

0 - 3 N
0 - 10 N
0 - 20 N

Hardness Test Pencil
with digital
Test Force Setting

Safety Instructions
There is a risk of injury when using the SmartPen wih test head and test tips. Therefore, if handled improperly, there is a risk of injury in the form of stab and scratch injuries !

Proper Use

The **ERICHSEN SmartPen** is used to determine the scratch resistance of surfaces; depending on the used module, it can be used to determine the resistance to scratching, the tendency towards *metal marking* and the durability of printed markings.

A Note of Concept

The scratch resistance is perceived by a large number of users and for many years – *incidentally not physically correct* and *therefore misunderstood* - as related to the term "hardness", means in a proportionally assignable manner. Not least due to the often used term "scratch hardness", the "hardness" has mistakenly become part of the historically grown and living vocabulary of testing the ***resistance against moving mechanical treatment/influence*** which is the subject here. This explains the term "**hardness** test pencil", which has already been established for decades.

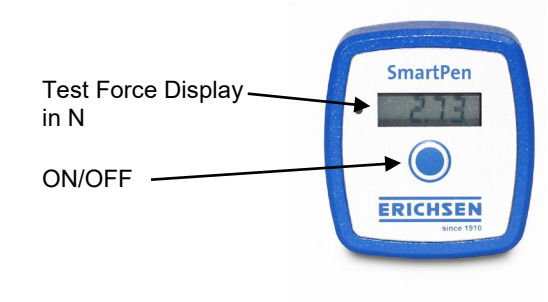
Purpose and Application

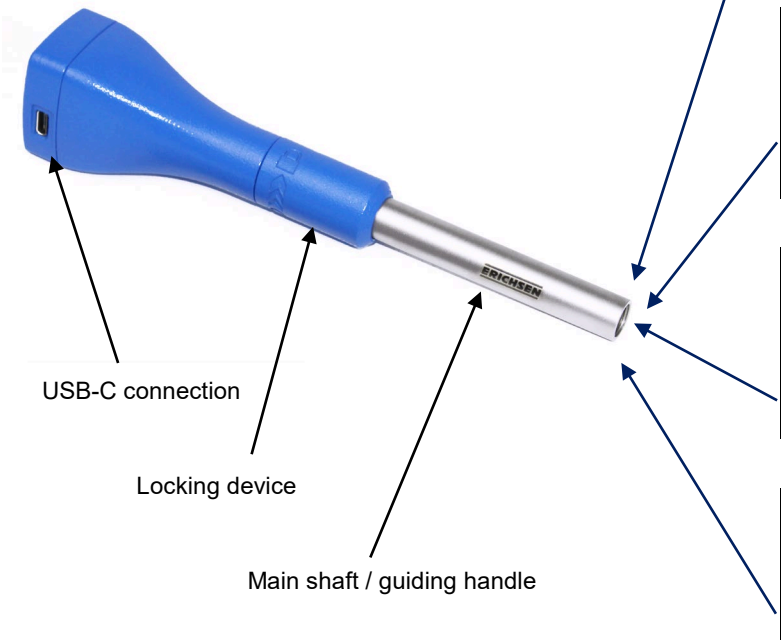
For the *hardness* measurement of surfaces, there are our since many years well-proven **hardness test pencils, models 318 and 318 S as well as models 435 and 435 S**, already well established across the branches. With these test devices, the degrees of hardness of paint films, plastic coatings, etc. can be determined, named, documented and communicated in numerical values. No matter whether on a flat or curved surface, small or large, the instrument is always ready for use and, because of it's small size, easy transportable.

With the **ERICHSEN SmartPen**, a modular hardness test pencil with digital test force setting and display (resolution 0.05 N) is now available. The **SmartPen** is supplied in a plastic case with three springs and a USB-C charging cable.

If there is no corresponding additional selection in the P. O., the **SmartPen** is supplied without test head.

Depending on the requirements, the user can choose all of the test heads with the corresponding test tools from our hardness test pencils or test rods from the model series 318/435.
Also the test heads of existing ERICHSEN test rods can still be used.





Test head „318"
usable with:
test tips no.1 up to no. 4 and
test tip for writing inclination test acc. to BMW

Rolling test head „318 S"
usable with:
test tips no. 1 up to no. 4 and
test tip for writing inclination test acc. to BMW

Rolling test head „435"
usable with:
test discs made of Duroplast, Copper and Stainless Steel

Rolling test head „435 S"
usable with:
test tool made of Stainless Steel

Application

Using test heads 318/318 S

Screw the test head with the selected test tip and spring.

Switch the ERICHSEN **SmartPen** ON by pressing the button.

With the locking device, the force setting of pencil is released or determined.

The force setting process is the same for all equipment variants:

Loosen force adjustment.

Place the SmartPen vertically on a flat, rigid surface and apply appropriate pressure to ensure that the used test tip or tool is maximally retracted into the head and remains retracted during the entire force setting process.

The desired spring force is set by turning the upper part of the pencil and can be read on the digital display (adjustable in 0.05 N steps).

Lock the force setting again.

Place the **SmartPen** vertically on the surface to be tested, press firmly enough until the test tip or tool is maximally retracted into the head and draw a line approx. 5 to 10 mm long with approx. 10 mm/s. The test tool should produce a scratch which is just hardly visible with the naked eye. If the spring pressure is too high, the scratch is clearly visible; if too low, no scratch trace appears.

A basic requirement to gain useful results is a sensitive guidance of the test pencil. If the pressure of the ***test head "318"*** exerted onto the surface is too high, it is possible that the outer edge of the test head produces a trace falsifying the results or rendering their interpretation difficult.
Therefore, if you have a choice, then the ***rolling test head "318 S"*** is in comparison the better decision.

Using test heads 435/435 S:

Screw the **test head „435"** with a test disc and the selected spring (after tighten the screw it must not be possible to turn the test disc).

Place the **SmartPen** vertically on the test surface.

The guide wheels must touch the surface.

Switch the ERICHSEN **SmartPen** ON by pressing the button.

"Force setting process as described".

The instrument is then moved a distance of a few cm so that the wheels roll over the surface, in a rapid motion appropriate for the mar effect. The test result is the spring force in Newton which is just sufficient to produce a *mar* clearly visible at the surface with the naked eye, but not a crack or scratch.

Screw the ***test head"435 S"*** with the test tool and the selected spring (the test direction of the rigidly locked test tool is rotated by 90°) and place the **SmartPen** vertically on the test surface. The guide wheels must touch the surface.

Switch the ERICHSEN **SmartPen** ON by pressing the button.

"Force setting process as described".

Now a movement is carried out in the rolling direction of the guided wheels over the sample to be examined (e.g. printed speedometer disc); if necessary along a suitable ruler, also repeated several times over/across the same area to be tested.

For vertical fixing and guidance of the **ERICHSEN SmartPen,** a rolling chucking adapter with handle is available. The SmartPen can be guided vertically in a controlled manner and without contact by the sleeve edge of the test head **"318"** over the surface to be tested (can also be used with test heads **"318 S" and "435 S"**).
Three polyamide wheels ensure the corresponding stability provide the vertical placement and guidance.

	Order Information	
	Art.-No.	**Product Description**
	03340031	**ERICHSEN SmartPen** with digital test force setting; wit 3 springs and USB-C charging cable in a plastic box Length (without test head): approx. 18 cm Weight (without test head): approx. 155 g
	Necessary Accessories (at option)	
	30070132	**Test head „318“** for using test tips no. 1 up to no. 4 and test tip for *writing* inclination test acc. to BMW
	22320132	**Rolling test head „318 S“** for using test tips no. 1 up to no. 4 and test tip for *writing* inclination test acc. to BMW
	04280232	Test tip no. 1 (acc. to Bosch; 0,75 mm Ø)
	04280332	Test tip no. 2 (technically equivalent to ISO 1518; 1,0 mm Ø)
	04280432	Test tip no. 3 (acc. to van Laar; 0,5 mm Ø)
	04280132	Test tip no. 4 (acc. to Opel, 0,5 mm Ø)
	04280532	Test tip (Ø 3 mm) for *writing* inclination test acc. to BMW GS 97034-8
	30120132	**Rolling test head „435“** for using test discs made of Duroplast, Copper and Stainless Steel
	04300132	Test disc made of Duroplast
	04300231	Test disc made of Copper
	04300332	Test disc made of Stainless Steel
	30120232	**Rolling test head „435 S“** for using a test tool made of Steel
	07960132	Test tool made of Steel
	19720332	Chucking adapter (rolling) with handle (using for SmartPen with test heads 318, 318 S or 435 S)
	04290132	Spring 0 - 3 N (spare part; blue)
	04290232	Spring 0 - 10 N (spare part; red)
	04290332	Spring 0 - 20 N (spare part; yellow)

The right of technical modifications is reserved.
Group 14 - TBE/BAE ERICHSEN SmartPen – VII/2021

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