Advancing with Technology ElektroPhysik

Coating thickness gauges

Paint Borer 518

Rétegvastagságmérő műszer

Thickness measurement using the wedge cut principle

- thickness measurement of all coatings on any substrate
- measurement of multiple layers
- Paint Borer remains in a fixed position for the entire test procedure
- minimum damage to specimen surface
- 4 measurement ranges up to 2,000 µm
- high measuring accuracy
- portable owing to built in electrical supply

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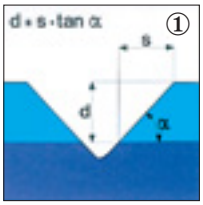
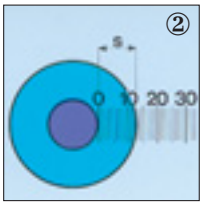


Section of wedge cut hole



Measuring the cut face

The measuring principle

The standardised wedge cut method to measure coating thickness is a destructive method in which the specimen is cut at a defined angle. From the projected width of the cut face the layer thickness can be calculated making use of a simple geometrical relationship. The Paint Borer 518 in principle uses the same technique but differs in that it features a number of important refinements. With Model 518 the damage to the coating is limited to a small conical hole as illustrated in the sectional view Fig. 1. In the measuring microscope a system of concentric circles is visible and from the difference in the radii of the circles which can be measured using the measuring microscope, the film thickness can be calculated by multiplying with a known factor (Fig. 2).

The measuring instrument

The Paint Borer is built to TNO specifications and is very compact. All the principal components, the drilling device, the measuring microscope, the specimen illumination and the battery are housed for optimum reliability and take up minimum space in a sturdy housing. A slide moving on horizontal slideways houses the drill and microscope and gives the Paint Borer 518 its particular feature: the instrument itself does not have to be moved for measuring after drilling. The drill is spring mounted in the slide so that it can be pressed down onto the specimen with minimum force, the drill being switched on automatically when this is done. The wear resisting carbide drills are easy to exchange and are supplied with different accurately maintained cutting angles for 4 standard measuring ranges. The measuring microscope with a magnification factor of 50 has a measuring scale with 100 lines so that a resolution of 1% is obtained irrespective of the measuring range. The light switch on the front plate of the Paint Borer can be set for either continuous or interrupted illumination to prolong battery life. A 9 volt rechargeable battery is used; mains operation with the charging unit is possible. Alongside the standard version of the Paint Borer 518 there is also a special version (Model 518-S) for the evaluation of elliptical holes that arise with curved specimens.

Range of supply and accessories

The basic equipment with Paint Borer 518 includes a 9 volt rechargeable battery, a felt tip pen for contrast marking, a carbide drill (measuring range 200 µm) and a screw driver for fixing the drill in the instrument. These standard accessories are contained with the basic instrument in a sturdy leather case; the charging unit for the rechargeable battery is delivered separately. Drills for measuring ranges of 500, 1,000 and 2,000 µm can be supplied as accessories. Further carbide drills for special measuring ranges, for example for non-metric scales (mils/thou), are available on request. For small specimens and profiles a special specimen table has been developed on which the Paint Borer is placed for making the measurement. What is the thickness of a coat of paint on a wooden or plastic object? This measuring problem is routine for the Paint Borer 518. The main field of application of the Paint Borer starts where conventional electro-magnetic measuring systems fail: to measure the thickness of a coating on a non-metallic base. However, Model 518 also opens up possibilities when making measurements on metallic substrates as it provides the means of measuring the thickness of individual layers of a multi-layer coating. The Paint Borer 518 is therefore a universal measuring instrument with very special advantages.

Drill	No. 1	No. 4	No. 5	No. 6
Measuring range (µm)	2–200	5–500	10–1,000	20–2,000
Cutting angle α	5.7°	14°	26.6°	45°
Factor (µm/sc. div.)	2	5	10	20

Technical data

- Measuring accuracy 1%
- Battery 6 F 22 (6 LR 61)
- Dimensions (L x W x H) 145 x 55 x 110 mm
- Net weight 850 g
- Min. dimensions of sample without specimen table 150 x 25 mm
- With specimen table 10 x 6 mm

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