testing equipment for quality management

**Technical Description**

- Thickness measurements in accordance with the standardised wedge cut method

- Thickness measurement of all coatings on any substrate
- Measurement of individual layers of a multi-layer coating

**DIN 50 986**
**ISO 2808**
**ASTM D 4138**
**ASTM D 5796**

**Universal Thickness Measuring Instruments**

**PAINT BORER**
518 MC

**PAINTXPLORER**
548
The Measuring Principle

The PAINT BORER 518 MC operates in accordance with the standardised wedge cut 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. With Model 518 MC the damage to the coating is limited to a small conical hole as illustrated in the sectional view. In the measuring microscope a system of concentric circles is visible and from the difference in the radii of the circles which are measured using the measuring microscope, the film thickness can be calculated by multiplying with a known factor.

The Measuring Instrument

The PAINT BORER 518 MC is a very compact instrument. All the principal components - the drilling device, the measuring microscope, the specimen illumination and the battery - are enclosed in a sturdy housing. A slide moving on horizontal slide-ways houses the drill and microscope and gives the PAINT BORER 518 MC its particular feature: the instrument itself does not have to be moved for measuring after drilling.

The Operation

The coating thickness measurement with PAINT BORER 518 MC is very simple: Apply a contrast mark (felt tip pen) and place the measuring instrument on the specimen. Move the drill into position over the test point and lower it causing the motor to switch on. Drill the coating through to the substrate. Move the microscope over the hole and switch the lamp on. Count the number of scale marks between the base material and the contrast mark and multiply this value by the scale factor which gives the measuring results.

Special applications (individual layers of a multi-layer system, measurements on curved/tilted specimens) are dealt with in the operating instructions.
The Measuring Principle

The PAINTXPLORER 548 functions in accordance with the same measuring principle of the standardized wedge cut method as the PAINT BORER 518 MC.

The Measuring Instrument

The PAINTXPLORER 548 has been developed to extend the range of the application of the PAINT BORER 518 MC, especially targeting sensitive drillings, particularly into rigid/brittle materials. It is possible that, already at minor eccentric irregular running of the drill used or of its centre axle, such materials can be subject to breaking off of the cutting edges including chipping off, leading afterwards during the optical measurement with the microscope also to limitedly definable transitions between the layers to be measured.

To minimise these limitations the PAINTXPLORER 548, a convenient tabletop unit, is equipped with an improved rotating/sliding high precision axle-bearing device. Although the application can be considered as mobile in the range of the length of the mains cable, it is nevertheless the question of a laboratory equipment. It can either be held in hand or used in connection with the measuring stand that is included in the scope of supply.

The appropriate measuring microscope is not integrated in the housing, as for the PAINT BORER 518 MC, but is available separately, if required, as a self-contained component (e. g. for the evaluation of damages of lacquers, corrosion creep, pores etc.) which results in the slender handy design of the PAINTXPLORER 548.

The Operation

In principle, the PAINTXPLORER 548 is used in the same way as the PAINT BORER 518 MC:

- Application of a contrast mark.
- Placing the instrument onto the specimen, positioning the drill directly above the test point. When using the stand, position the test point on the specimen directly beneath the drill. Then fix the specimen from underneath by rotating the pressure plate.
- Drilling through the layer to the substrate.
- Carrying out the measurement with the help of the microscope considering the scale factor.

The geometry of the specimen admissible for the coating thickness measurement with the PAINTXPLORER 548 depends on whether the drilling unit is used with or without drilling stand.

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Geometry of the specimen</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Length (mm)</td>
</tr>
<tr>
<td>Drilling unit only</td>
<td>min. 40</td>
</tr>
<tr>
<td>Drilling unit and drilling stand</td>
<td>min. 10</td>
</tr>
</tbody>
</table>
Technical Data (Model 518 MC)

Dimensions (L x W x H): 145 x 55 x 110 mm
Net weight: approx. 850 g
Measuring accuracy: 1%

Mains supply (optional):
- Accu 6F 22
- Battery (9V) 6LR 61
- Plug-in power pack (100 - 240) VAC, (47 - 63) Hz 18 VDC / 0,8 A

Min. dimensions of sample:
- without specimen table 150 x 25 mm
- with specimen table 10 x 6 mm

Order Informations

<table>
<thead>
<tr>
<th>Ord.-No.</th>
<th>Product Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0283.01.31</td>
<td>PAINT BORER 518 MC</td>
</tr>
</tbody>
</table>

Included in the scope of supply:
- drill no. 5
- 2 felt tip pens (black/silver)
- screw driver
- rechargeable battery (9 V)
- power pack (100 - 240) VAC, (47 - 63) Hz
- plastic case
- operating instructions

Accessories/Spare Parts

<table>
<thead>
<tr>
<th>Ord.-No.</th>
<th>Product Description</th>
</tr>
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<tbody>
<tr>
<td>910927241</td>
<td>Drill No. 2 (up to 200 µm)</td>
</tr>
<tr>
<td>910927741</td>
<td>Drill No. 4 (up to 500 µm)</td>
</tr>
<tr>
<td>910928241</td>
<td>Drill No. 5 (up to 300 µm) – Spare part</td>
</tr>
<tr>
<td>0326.01.32</td>
<td>Specimen platform for clamping specimen panels of any shape or profile</td>
</tr>
</tbody>
</table>

Drills for Models 518 MC and 548

<table>
<thead>
<tr>
<th>Drill</th>
<th>No. 2</th>
<th>No. 5</th>
<th>No. 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range (µm) up to 200</td>
<td>up to 300</td>
<td>up to 500</td>
<td></td>
</tr>
<tr>
<td>Cutting angle (α)</td>
<td>5,7°</td>
<td>8,5°</td>
<td>14°</td>
</tr>
<tr>
<td>Factor f (µm/sc.div.)</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>tan α</td>
<td>0.10</td>
<td>0.15</td>
<td>0.25</td>
</tr>
<tr>
<td>Geometry</td>
<td>two-edged</td>
<td>single-edged</td>
<td></td>
</tr>
<tr>
<td>Head dia.</td>
<td>5 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>carbide</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Technical Data (Model 548)

Drilling Unit

Dimensions (H x W x D): 145 x 70 x 40 mm
Net weight: approx. 600 g
Number of revolutions of the drill: approx. 500 rpm

Mains supply
- Plug-in power pack: (100 - 240) VAC, (47 - 63) Hz 18 VDC / 0,8 A

Drilling Stand

Dimensions (H x W x D): 280 x 190 x 120 mm
Net weight: approx. 3.2 kg

Measuring Microscope (456-50)

Dimensions (H x W x D): 105 x 130 x 40 mm
Net weight: approx. 150 g
Magnification factor: 50
Measuring range: 2 mm
Scale division: 20 µm
Power supply: battery (9V) 6LR 61

Order Informations

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<tbody>
<tr>
<td>0280.01.31</td>
<td>PAINTXPLORER 548</td>
</tr>
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</table>

Included in the scope of supply:
- drilling stand
- drill no.5
- 2 felt tip pens (black/silver)
- screw driver
- tool for change of drills
- power pack (100 - 240) VAC, (47 - 63) Hz
- plastic case
- operating instructions

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<tr>
<td>0836.01.32</td>
<td>Measuring microscope 456-50</td>
</tr>
</tbody>
</table>

The right of technical modifications is reserved.
Group 10 - TBE 518 MC/548 – IV/2012