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SUPER PIG III DESTRUCTIVE PAINT INSPECTION GAUGE
SP1100

MANUAL

1 SAFETY PRECAUTIONS

- A knife is a sharp object. Be careful when using it.

2 PRODUCT DESCRIPTION

The TQC SP1100 SuperPIG is a destructive precision tool for inspection and thickness measurement on single or multiple coats on virtually all substrates, including wood, plastics, metals etc. Also observes and measures substrate and film defects. Applies a small incision in the layer of paint, and uses an integrated microscope reticle. The SP1100 is a very stable instrument, also the integrated microscope has an excellent focus. The microscope is provided with a double scale (mm and inch) which allows you to calculate to micrometers and mils. Reduce of ambient light because of a rubber end cap on the microscope so when observing through the microscope you will have a better focus upon the specimen.

2.1 Specifications

Range : 2 to 1800 microns / 0,1 to 70 mils
Microscope: Magnification 50X (with graduation-scale)
Scale range: 0,00 – 1,8 mm / 0,00 – 0,07 inch (rectilinear measured)
Variation: Accuracy depends on chisel cut angle and users reading
Battery: 4 x AG13/LR44
Material: Titanium anodised aluminium
Width: 25mm
Height: 110mm
Length: 65mm

2.2 Details

1. Revolving knife holder
2. Selected cutter knife
3. Microscope with scale (scale sharpness adjustable to eye by turning the end cap)
4. Light on/off
5. Guidance wheel
6. Knob for microscope focus
7. Illuminated inspection area
8. Access for cutter change (not visible, back side)

3 STANDARDS

ISO 2808

4 WHAT'S IN THE BOX?

- Super Pig III destructive paint inspection gauge
- Black marker
- Knifes 1, 2 and 3 (sp1111, SP1112, SP1113)

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- Hex diagonal wrench
- Black leather case with belt clip

5 PREPARATIONS

5.1 Placing cutter 1,2,3 and/or 4

The knife holder can hold three cutters knifes at the same time. The wheel of the knife holder has engraved numbers. On the bottom of the wheel you see the number of the current selected cutter. While assembling, make sure this number corresponds with the cutter. Cutter number 1 and 4 share one place.

1. Place the SuperPIG sideways on a flat surface with the wheel of the knife holder (1) facing downwards.
2. Use the enclosed hex-diagonal wrench-3 to loosen the bolt (8). Place the cutter in the holder, with the number facing upwards, and slide the cutter (CAREFULLY!) inside until you feel some resistance. Use the enclosed hex-diagonal wrench-3 to tighten the screw.
3. Use the wheel to access the next knife holder and place the cutter as described above. Don't forget that a cutter is already loaded; be careful

5.2 Placing a crosshatch cutter

One crosshatch cutter can be mounted to provide an assessment of the quality of bond to the substrate.

1. Turn the crosshatch holder a little bit further than the 'click'.
2. Use the enclosed hex-diagonal wrench-3 to loosen the bolt (8), so the crosshatch cutter fits over the screw.
3. Use the enclosed hex-diagonal wrench-3 to tighten the bolt (8).

5.3 Preparations before measuring

Preceding actual use of the SuperPIG first several settings shall be made with a test plate:

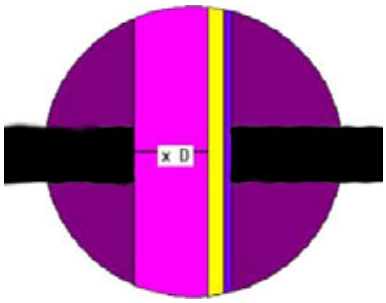
1. Mark the test plate with a black line of approximately 20mm for contrast on white light coatings.
2. Turn the end of the light (4) to activate the illumination and place the illuminated spot (with the SuperPIG rectilinear) at the center of the black line.
3. Look through the microscope (3) to the surface and adjust the focus of the microscope with the knob (6) until the borders of the black line become sharp.
4. The SuperPIG is now adjusted and ready for use.

6 PERFORM A MEASUREMENT

1. Mark the inspecting surface with a black line of approximately 20mm.
2. Place the SuperPIG with its cutter behind the line and pull (without putting pressure on the gauge) the SuperPIG across it (in the direction shown on the picture) just cutting through the coating. Any deeper cuts will affect the accuracy of the measurements as they create stress
   at the substrate which will deform the pattern of the coating layer. The additional negative of this is that the cutters wear out much faster than necessary.
3. Tilt the SuperPIG and place the illuminated area (7) at the intersection of he cut with the black line.
4. Look through the microscope (3) and turn the knob (6) to focus on the inspection area. (see picture)
5. Read the graduation-scale and multiply the divisions with the D factor engraved on the SuperPIG.

Cutter number	Cut angle (°)	D Factor (µm)	D Factor (mils)	Range µm / mils
1.	45	20	1	20-1800 / 1-70
2.	26,6	10	0,5	10-900 / 0,5-35
3.	14	5	0,25	5-450 / 0,25-17,5
4.	5,7	2	0,1	2-180 / 0,1-7

6.1 Remarks:
Several layers can be inspected at once because the differences in color and/or dry surface of each individual layer become visible. Adjusting the brightness, focus and changing the position of the SuperPIG or moistening the cut edge also will show layers with low pigment.



Left the image as is visible through the microscope of the SuperPIG after cut with chisel X, from left to right:

Purple The coating
Pink The coating cut with the cutters cut angle
Yellow The substrate
Blue The coating cut with the 90° side of the cutter

The coating thickness is obtained by counting the divisions of the graduation-scale on top of the pink surface multiplied with the D factor.
The microscope will inverse the view, which will cause the SuperPIG movement and the inspection surface to be inversed with respect to reality.

In order to determine the coating thickness only the graduation-scale is counted and multiplied with the D factor of the cutter, depending on µm or mil scale. Irregularity at the borders of the cut shall not be added to the count on the graduation scale!

7 REPLACING BATTERIES

Remove the back of the light by turning it and remove the old batteries. Place 4 new batteries type AG13/LR44.

8 CALIBRATIONS

The SuperPIG is designed to give many years reliable service under normal operating and storage conditions and does not contain any user-serviceable components. (other than new knifes, which has to be ordered separately) Always make sure the cutter is sharp and undamaged. Replace the cutter in case of doubt. There is no special calibration procedure for the SuperPIG. However, you can send the instrument to TQC for a check-up.

9 MAINTENANCE

- Though robust in design, this instrument is precision-machined. Never drop it or knock it over
- Always clean the instrument after use.
- Clean the instrument using a soft dry cloth. Never clean the instrument by any mechanical means such as a wire brush or abrasive paper. This may cause, just like the use of aggressive cleaning agents, permanent damage.

- Always keep the instrument in its case when not in use.

10 DISCLAIMER

The right of technical modifications is reserved.

The information given in this manual is not intended to be exhaustive and any person using the product for any purpose other than that specifically recommended in this manual without first obtaining written confirmation from us as to the suitability of the product for the intended purpose does so at his own risk. Whilst we endeavour to ensure that all advice we give about the product (whether in this manual or otherwise) is correct we have no control over either the quality or condition of the product or the many factors affecting the use and application of the product. Therefore, unless we specifically agree in writing to do so, we do not accept any liability whatsoever or howsoever arising for the performance of the product or for any loss or damage (other than death or personal injury resulting from our negligence) arising out of the use of the product. The information contained in this manual is liable to modification from time to time in the light of experience and our policy of continuous product development.