



## MICRO-SCRATCH RESISTANCE FOR HIGH GLOSS DECORATIVE SURFACES

## Application

This procedure is used to evaluate the micro-scratch performance of high gloss automotive materials (i.e. paint, resin, coatings).

## Apparatus and Materials Required

Crockmeter

Standard mechanically driven crockmeter with the ability to meet the following requirements:

Table 1:

|                         |           |
|-------------------------|-----------|
| Force applied to sample | 9 N       |
| Length of Scratch line  | 80-100 mm |
| Speed of Crockhead      | 1 Hz      |

Micro-scratch Head

Micro-scratch head shall meet VDA Guideline 230-208-2 (2015) and DIN 55654.

The width of the crocking head is 25 mm ( $\pm 0.5$  mm). The head is curved with a radius of 19 mm ( $\pm 0.5$  mm). The head of the crocking head is covered with EPDM open cell foam with a Shore 00 hardness of  $60 \pm 5$ . Movement of the microscratch head relative to the sample is perpendicular to the axis of the surface curvature.

The foam should be inspected regularly and replaced if defects or damages are visible.

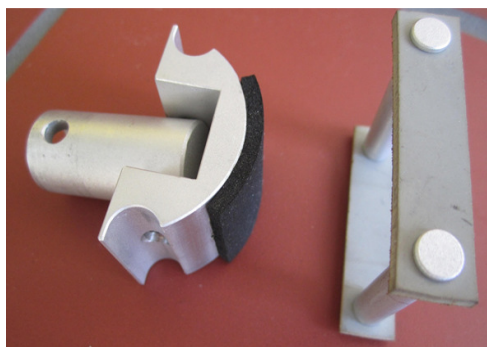


Figure 1a: Disassembled condition,



1b: Micro-scratch head in assembled condition with lapping film.

| Date       | Action   | Revisions | Rev. 00 |
|------------|----------|-----------|---------|
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Documents  
Page 1 of 4  
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Source Microscratch Head and Foam:

Ord.-No. 1910.01.32, Crockmeter test head acc. BMW AA-0134

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## **Lapping Film**

3M 261X Aluminum Oxide Lapping Polyester film with 5 µm grain size. (brown) or equivalent

## **Glossmeter**

Standard Glossmeter (capable of 20° and 60°).

## **Test Panel**

Flat test panels should be used to allow for an accurate gloss reading. The panels should be black, ungrained, homogeneous, and clean. Panels should be 100 mm x 150 mm and 2-3.5 mm thick. It should be noted that using non flat panels can falsify the results.

Samples must be free of dust, water spots, oil/grease/fingerprints and other contaminants which may affect test results. If needed, the recommended cleaning procedure is with lukewarm water and a mild nonabrasive detergent. The detergent must not leave a residue on the surface of the sample after cleaning. Cloth, sponges or brushes should not be used for cleaning, but gentle use of fingers is acceptable. Following this the samples should be rinsed with distilled water. Samples should be inspected for impurities before testing.

Subsequently, the handling of the test panels and the lapping film should be carried out with cotton gloves to avoid contamination from skin oils, etc.

For injected Molded in Color thermoplastic panels the direction of flow in the panel should be documented. The direction of scratch pattern should be in the flow direction of the panel and noted in the test report.

## **Test Procedure**

Note: When comparing micro-scratch performance of different systems the same color should be used.

1. On 3 clean panels measure gloss at multiple positions on each panel (Pre-gloss measurement). The exact location of the measurements can be chosen freely, but should be evenly distributed about the panel. If gloss measurements show a high standard deviation then a higher quantity of measurements should be made to calculate the average gloss. See Table 2 for the recommended number of gloss measurements.

Table 2: Required number of gloss measurements per panel

| Material                   | Std. Dev. ≤ 2 | Std. Dev > 2 |
|----------------------------|---------------|--------------|
| High Gloss Paints          | 4             | 10           |
| High Gloss MIC Resins      | 10            | 10           |
| High Gloss films/appliques | 4             | 10           |
| Other surfaces             | 10            | 10           |