Ford Motor Company

FORD LABORATORY TEST METHOD BI 112-02

TUKON HARDNESS OF PAINT

Application

This method is used to determine the microhardness of paint and is performed by indenting the paint film with a standard Knoop indenter by application of a 25 g load.

Apparatus Required

Microhardness Tester

Tukon Models 200 and 300, or equivalent.

Source: Rockwell Hardness Testers
Sandy Lane
Stourport-on-Severn
Worcestershire, DY133QA, England

or

Wilson Instrument
Division of SPM Corp.
P.O. Box 3006, 20 Commerce Park
Milford, Connecticut 06460 U.S.A.

Paint Thickness Tester

Refer to FLTM BI 117-01, Thickness Measurement of Paint Films.

Conditioning and Test Conditions

All test values indicated herein are based on material conditioned in a controlled atmosphere of 23 +/- 2 °C and 50 +/- 5 % relative humidity for not less than 24 h prior to testing and tested under the same conditions unless otherwise specified.

Procedure

1. Prepare the panel as described in the applicable Engineering Material Specification.

   Note: Minimum dry film thickness 35 microns.

Date	Action	Revisions
2001 03 19	Revised	Editorial – no technical change A. Cockman
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2. After preparation, condition the panel as required by the applicable Engineering Materials Specification. If not specified in the Engineering Material Specification, condition the panel for 24 h minimum a 23 +/- 2 °C and 50 +/- 5 % relative humidity and immediately test the panel.

3. On the area of the panel that is to be used for hardness tests, film thickness determinations must be made (FLTM BI 117-01) to ensure that film thickness on any one panel does not vary more than 2.5 microns; for different panels, 7.5 microns variation is permitted.

4. Rigidly attach the panel to the movable stage of the hardness tester so that the paint surface being measured is at right angles to the indenter. The panel must be mounted so that it will not move in any direction during the course of the test.

5. By adjusting the movable micrometer stage and by focusing the microscope on to the panel, select an area where the film thickness has been measured and the paint film is free from roughness or other surface irregularities. When this area has been selected, place it under the indenter by sliding the movable stage to the proper forward position.

6. Activate the instrument which will then mechanically apply the required 25 g load. Time the load application which is to be maintained for 18.0 +/-0.5 s.

   Note: If the equipment used is not automatic, consult manufacturer's directions for procedure to apply load.

7. Slide the movable stage back into its original position which will result in the indentation being in the microscope field. This step must be performed immediately after Paragraph 6.

8. Focus the microscope so that the extremities of the long diagonal impressions are sharp and clear. With the Filar micrometer eyepiece, measure the length of the indentation.

9. Convert the Filar length of the impression by multiplying by the appropriate factor for the microscope objective used.

Evaluation

A minimum of five hardness impressions shall be made and the results averaged. If a conversion table is not available, K.H.N. may be calculated as follows:

$$\text{Knoop Hardness Number} = \frac{L}{l^2 \times Cp}$$

Where: L = Load in kg applied to the indenter

l = Length of long diagonal of indentation in mm

Cp = Indenter constant = 7.028×10^{-2}

Chemicals, materials, parts, and equipment referenced in this document must be used and handled properly. Each party is responsible for determining proper use and handling in its facilities.

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