

DETERMINATION OF PHOSPHATE COATING WEIGHTS - CHROMIC ACID METHOD

Application

This procedure is used to determine the coating weight of iron, zinc or manganese phosphate used on iron or steel parts. Two methods are described in this procedure: Method A - employing test panels to check a phosphate coating system, and Method B - employing actual parts (primarily threaded fasteners) to determine the weight of phosphate on a submitted part.

Materials and Solutions Required

Chromic Acid Stripping Solution

Dissolve 200 g of CrO_3 in 500 ml of water and dilute to 1000 ml. Transfer the solution to a two-liter beaker and heat to 93 °C for stripping the coatings from the panels.

Test Panels for Method A

The test panels are 100 mm by 300 mm steel body stock (CRLC, Class A finish).

Process two panels through a complete cycle of the phosphate coating system under test, including cleaning, phosphating, acid rinse (if required) and drying.

Test Parts for Method B

Three or more actual production parts taken at random should be obtained from the lot, batch, etc., being evaluated.

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

Method A

1. Buff the 100 mm by 300 mm panels on the back or unexposed surface to remove any phosphate coating. Use a soft rag wheel for this purpose.

Date	Action	Revisions
2001 01 31	Revised	Editorial – no technical change A. Cockman
2000 04 20		Editorial – no technical change A. Cockman
1990 01 17		

Printed copies are uncontrolled

Page 1 of 4

Copyright © 2001, Ford Global Technologies, Inc.

2. Cut a 100 mm by 100 mm section from each of the buffed panels for determination of coating weight. Deburr after cutting.
3. Remove any grease or foreign matter from the test specimens by washing with ether, acetone and ethanol. Pouring a mixture of the three solvents over the test specimens should remove any soil.
4. Blot the test specimens with a soft cloth and then dry in an oven at 100 +/- 2 °C for five minutes.
5. Cool in a desiccator and weigh the test specimens to the nearest milligram.
6. Immerse the test specimen in the chromic acid stripping solution for approximately 90 seconds.
7. Rinse the test specimens in running water. Blot and then dry in an oven at 100 +/- 2 °C.
8. Cool in a desiccator, reweigh and repeat Steps 6, 7 and 8 to constant weight.

Calculations

$$\frac{\text{loss in wt. (mg)}}{\text{surface area of test specimen (sq. mm.)}} = \text{mg of coating per sq. mm.}$$

NOTE: The chromic acid solution should be renewed after twelve 100 mm by 100 mm test specimens have been stripped as phosphoric acid tends to build up in the solution after prolonged use and attacks the metal.

For calculating the coating weight, mg/m².

$$W_c = \frac{(W_o - W_i)}{A} \times 10^6$$

W_c = Coating weight mg/m²

W_o = Weight of panel before stripping in solution, mg

W_i = Weight of panel after removal of coating, mg

A = Area of panel, mm²

Method B

1. Obtain a minimum of three threaded fasteners from the lot in question after they have been processed through a complete cycle of the phosphate coating system, including cleaning, phosphating, acid rinse (if required) and drying.