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Methods of test for motor vehicle paints —

Part 3: Flexibility and adhesion

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Contents

Foreword

This Part of this British Standard has been prepared under the authority of the Automobile Industry Standards Committee and is based on Information Sheet No. NM – 5D of the Society of Motor Manufacturers and Traders Ltd. (SMMT).

Tests for paints for general purposes are given in BS 3900[1)] and, wherever possible, reference to that standard has been made.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 and 2 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

[1)] BS 3900, "*Methods of test for paints*".

1 Scope

This Part of this British Standard describes flexibility and adhesion tests for paints for motor vehicles.

The tests are grouped as follows:

Group 1. Deformation test.

Group 2. Cutting test.

Group 3. Peeling test.

2 General

2.1 Methods for the evaluation of adhesion and flexibility are essentially qualitative rather than quantitative and are primarily employed for determinations in comparison with a specified standard of performance.

Although adhesion and flexibility are fundamentally separate properties it is usual, for most practical purposes, to consider them as a combined function. Whilst these tests do not provide numerical expression of a single property, they are of practical value since they simulate deformation which may occur in service.

2.2 When testing a given paint system variations in results may be caused by the degree of cleanliness of the test panels and by the type and quality of the pretreatment used.

2.3 The testing methods may be divided into 3 groups as follows:

Group 1. A test panel is deformed either gradually or under shock. The degree of deformation or shock is then related to the extent and pattern of the damage to the paint system.

Group 2. The paint system is cut through to the substrate in single or multiple lines and the extent and pattern of the damage observed.

Group 3. The paint film is peeled off by the use of adhesive tape.

3 Test panels

Panels 150 mm × 100 mm or other convenient size, specified and pretreated in accordance with the requirements of BS 3900, Part A3[2)] (note particularly Clause **2.2** and the special requirements of **4.2.2** herein) shall be coated in accordance with the requirements of BS 3900, Part A4[2)], with the paint system to be tested. Normally steel panels are used and are essential for the cupping test (**4.2.2**), but otherwise it may be appropriate to use other substrates. The panels shall be aged, under normal laboratory conditions for 7 days, unless otherwise agreed.

4 Test procedures

4.1 General. The tests shall be carried out at a room temperature of 15.6 °C to 21 °C unless otherwise agreed between the purchaser and the paint supplier.

4.2 Group 1

4.2.1 *Cylindrical mandrel bend test.* The cylindrical mandrel bend test shall be carried out as described in BS 3900, Part E1[3)].

4.2.2 *Cupping test.* The cupping test involves the gradual and controlled deformation of a painted panel by the load applied by means of a hemispherical indentor to the reverse side of the panel.

The Erichsen cupping test (see BS 3900, Part E4[4)]) apparatus is widely used but other instruments operating in similar principles are available, e.g. the Olsen apparatus.

It is important to realise that the diameter of the indentor varies with the type of apparatus and consequently results cannot be directly compared. The size of the indentor used shall be agreed between the purchaser and the paint supplier.

4.2.2.1 The test panel is clamped in the instrument with the painted surface to be tested facing away from the indentor which is then slowly advanced to produce deformation of the painted panel.

The speed of indentation, which should be reasonably constant throughout the test, shall be agreed between the purchaser and the supplier.

4.2.2.2 Test panels shall be of autobody steel of thickness 0.91 mm and the size shall be chosen to suit the instrument employed in the test.

[2)] BS 3900, "*Method of test for paints*", Part A5, "*Preparation of panels prior to testing*", Part A4, "*Notes for guidance on paint application*".

[3)] BS 3900, Part E1, "*Bend test*".

[4)] BS 3900, Part E4, "*Cupping test*".