BRITISH STANDARD

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Methods of test for rubber and plastics hoses and hose assemblies —

Part 102: Hydraulic pressure tests —

Section 102.3 Determination of volumetric expansion of fuel-dispensing pump hoses

UDC 621.643.33 – 036:620.1

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Rubber Standards Committee (RUM/-) to Technical Committee RUM/9, upon which the following bodies were represented:

Association of Metropolitan Authorities
British Coal Corporation
British Compressed Gases Association
British Fluid Power Association
British Gas plc
British Railways Board
British Rubber Manufacturers' Association
Chief and Assistant Chief Fire Officers' Association
Department of the Environment (Property Services Agency)
Fire Extinguishing Trades Association
Health and Safety Executive
Home Office
Institution of Fire Engineers
Institution of Production Engineers
Liquefied Petroleum Gas Industry Technical Association (UK)
London Regional Transport
Malaysian Rubber Producers' Research Association
Ministry of Defence
Society of Motor Manufacturers and Traders Limited
Water Authorities Association

This British Standard, having been prepared under the direction of the Rubber Standards Committee, was published under the authority of the Board of BSI and comes into effect on 30 November 1988

The following BSI references relate to the work on this standard:
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Contents

Foreword

This Section of BS 5173, prepared under the direction of the Rubber Standards Committee, is a revision of clause **5** of BS 5173-2:1976, which is to be withdrawn by amendment. The remainder of the 1976 edition is to be revised and as each of the tests is revised it is intended to issue it as a separate Part or Section of BS 5173, as described in BS 5173-100.

Fuel-dispensing pump hoses are required to dispense specific volumes of fluids. The volumetric capacity of the hose is permitted to vary by only small amounts at the dispensing pressure. This Section of BS 5173 describes methods for checking that such requirements can be met.

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Summary of pages

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

This Section of BS 5173 describes two methods of measuring the volumetric expansion of a hose assembly at a specified pressure, in one the hose is twisted axially and in the other it is not. The tests are applicable to fuel-dispensing pump hoses only.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Apparatus

2.1 The apparatus, shown in Figure 1, shall comprise a source of fluid, in this case water, which can be maintained by air pressure at the required pressure, together with a pressure gauge, piping, valves and fittings, so that a horizontal hose assembly can be subjected to hydraulic pressure, the volume of fluid corresponding to the volumetric expansion of the hose under pressure being measured in a graduated tube.

2.2 The bore of all piping connections shall be smooth without recesses or off-sets, so that all air may be freely removed from the system before carrying out each test. The valves shall be of such a design as to open and close with minimum displacement of the fluid. The apparatus shall be capable of increasing the pressure in the test piece in accordance with BS 5173-102.1. The rate of increase in pressure shall be between 0.075 MPa/s and 0.175 MPa/s for test pressures up to 12.5 MPa.

3 Test pieces

For either method, two test assemblies each of length 3.6 m shall be tested.

4 Procedure

4.1 General

Whether or not the hose is twisted axially, carefully connect the test assembly in position on the apparatus in such a way that a leakproof seal is obtained, taking care to avoid twisting the assembly. Use the test pressure specified in the product standard. Unless otherwise specified, all tests shall be carried out at the standard temperature specified in BS 903-A35.

4.2 Test without axial twisting (see Figure 1)

4.2.1 With valves A and E closed, position valve B so as to connect the pressure gauge, air vessel and gauge glass tube to the atmosphere.

4.2.2 Open valves C and D to flush the hose assembly with water and remove all of the air.

4.2.3 Close valve D and open valve A to bring the water level in the gauge glass tube to the datum mark. Then close valve C and check that the water level remains at the datum mark.

4.2.4 Position valve B so as to close the air exhaust and connect the air supply through to the gauge glass tube.

4.2.5 Open valve E and adjust the air pressure reducing valve to supply a constant air pressure at the test pressure to the gauge glass tube. Record the water level reading in the gauge glass tube.

4.2.6 Reduce the air pressure to 0.02 MPa and again record the water level reading in the gauge glass tube.

4.3 Test with axial twisting

4.3.1 Carry out the procedure described in **4.2.1** to **4.2.5**.

4.3.2 After the air pressure has been raised to the test pressure, twist the hose axially through 360° in both the clockwise and counterclockwise directions, and record the maximum reading of the water level.

4.3.3 Reduce the air pressure to 0.02 MPa, twist the hose axially through 360° in both the clockwise and counter-clockwise directions, and again record the maximum water level reading.

5 Expression of results

Calculate the volumetric expansion by subtracting the reading obtained at 0.02 MPa from that obtained at the test pressure. Determine the mean expansion of the two hose assemblies. Take the test results to be invalid if the individual values differ from the mean by more than 25 % of the mean.

6 Test report

The test report shall include the following information:

a) a reference to this Section of BS 5173;

b) a full description of the hose and its origin;

c) the method of manufacture and details of reinforcement;

d) the nominal bore;

e) the mean volumetric expansion and the individual results;

f) whether the test was performed with or without axial twisting.

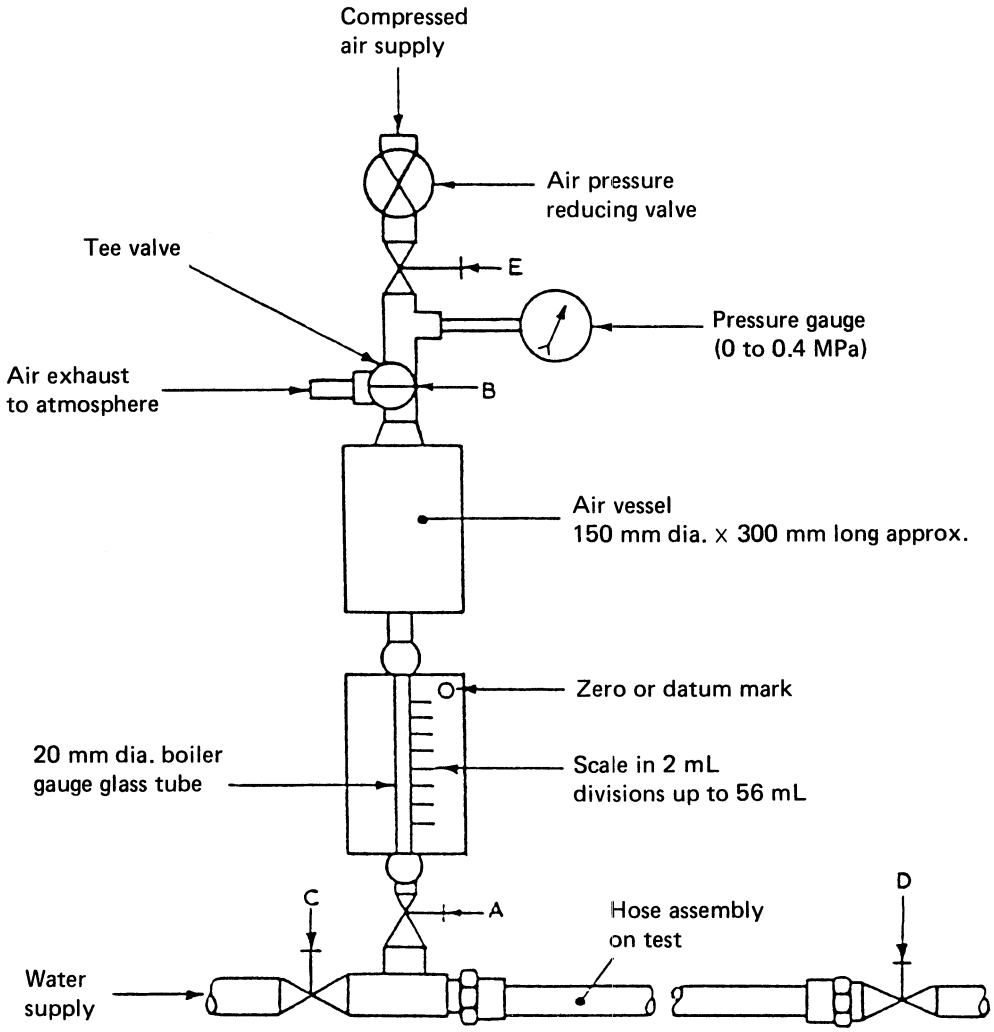

Figure 1 — Schematic arrangement of test apparatus

Publications referred to

BS 903, *Methods of testing vulcanized rubber.*
BS 903-A35, *Temperatures, humidities and times for conditioning and testing of test pieces.*
BS 5173, *Methods of test for rubber and plastics hoses and hose assemblies.*
BS 5173-2, *Hydraulic pressure tests*[1)].
BS 5173-100, *General introduction*[1)].
BS 5173-102.1, *Hydrostatic tests.*

[1)] Referred to in the foreword only.

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