PAS 26:1998

Manhole tops intended for use on service station forecourts and pavement areas —

Requirements, performance and marking

ICS 93.080.30

This Product Assessment Specification, having been prepared under the direction of the Sector Committee for Building and Civil Engineering, was published under the authority of the Standards Committee and comes into effect on
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Contents

Foreword

In preparing EN 124 the Technical Committee CEN/TC165, Wastewater engineering, made provision for manhole tops and gully tops to be made of materials other than those specified in BS EN 124:1994.

BS EN 124:1994, **6.1.3** requires that "For any other materials used in the field of application of this standard, all requirements of this specification shall be met and an approved independent body shall establish any other relevant requirements and testing methods."

Accordingly, a working group was established to prepare a supplementary specification to BS EN 124 to cover composite and plastics materials used in the construction of manhole tops conforming to BS EN 124, which are not for use in the highway.

This Product Assessment Specification has been prepared to cover composite and plastics material used in manhole tops intended for installation in service station forecourts and pavement areas and should be read in conjunction with BS EN 124:1994.

Where thermoplastics materials are used in the construction of a manhole top frame intended for installation in service station forecourts and pavement areas, this Product Assessment Specification should also be read in conjunction with PAS 25:1998, *Plastics frames for use in gully tops and manhole tops for vehicular and pedestrian areas — Materials, performance requirements, test methods and marking*.

This Product Assessment Specification has been published to provide an interim specification in the absence of defined performance criteria for other materials within BS EN 124. It is not to be regarded as a British Standard. It will be withdrawn upon publication of its content in, or as, a British Standard.

Acknowledgement is made to the following organizations which where consulted in the development of this specification:

— British Plastics Federation;

— BSI Product Testing and Standards Development.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 3 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 Product Assessment Specification is applicable to manhole tops which conform to BS EN 124 and are intended for installation in service station forecourts and pavement areas.

It specifies material, performance and marking requirements for composite and plastics materials used in the manufacture of manhole tops in accordance with BS EN 124, **6.1.3**, together with the appropriate test methods.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this Product Assessment Specification. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS 476-7:1997, *Fire tests on building materials and structures — Part 7: Method of test to determine the classification of the surface spread of flame of products.*

BS 812-114:1989, *Testing aggregates — Part 114: Method for determination of the polished-stone value.*

BS 903-A18:1973 (1992), *Physical testing of rubber — Part A18: Determination of equilibrium water vapour absorption.*

BS 1006-A02:1990, *Methods of test for colour fastness of textiles and leather — Part A02: Grey scale for assessing change in colour (including half-steps).*

BS 1006-A03:1978, *Methods of test for colour fastness of textiles and leather — Part A03: Grey scale for assessing staining (including half-steps).*

BS 2050:1978 (1996), *Specification for electrical resistance of conducting and antistatic products made from flexible polymeric material.*

BS 2782-5:Method 540E:1995, *Methods of testing plastics — Part 5: Optical and colour properties, weathering — Method 540E: Methods of exposure to laboratory light sources. Xenon-arc sources.*

BS 2782-10:Method 1001:1977 (1994), *Methods of testing plastics — Part 10: Glass reinforced plastics — Method 1001: Measurement of hardness by means of a Barcol impressor.*

BS 2782-10:Method 1003:1977(1996), *Methods of testing plastics — Part 10: Glass reinforced plastics — Method 1003: Determination of tensile properties.*

BS 2782-10:Method 1005:1977(1996), *Methods of testing plastics — Part 10: Glass reinforced plastics — Method 1005: Determination of flexural properties. Three point method.*

BS 7413:1991, *Specification for white PVC-U extruded hollow profiles with heat welded corner joints for plastics windows: materials type A.*

BS EN 124:1994, *Gully tops and manhole tops for vehicular and pedestrian areas. Design requirements, type testing, marking, quality control.*

BS EN 295-3:1991, *Vitrified clay pipes and fittings and pipe joints for drains and sewers — Part 3: Test methods.*

BS EN 590:1997, *Specification for automotive diesel fuel.*

PAS 25:1998, *Plastics frames for use in gully tops and manhole tops for vehicular and pedestrian areas — Materials, performance requirements, test methods and marking.*

3 Materials

3.1 Composite and plastics material

The material from which the manhole top is produced shall comprise either composite or plastics material, incorporating or blended with other ingredients or materials as necessary to enable manufacture of a manhole top conforming to BS EN 124 and the other requirements of this PAS as applicable.

3.1.1 *Hardness*

Cut samples from a manhole top and test in accordance with BS 2782-10:Method 1001.

The mean Barcol Hardness shall be equal to or greater than 35.

3.1.1 *Tensile properties*

Cut samples from a manhole top and test in accordance with BS 2782-10:Method 1003. For each test cut two samples at 90° to each other.

The value of σ_f shall be equal to or greater than 222 MPa and the value of E_f shall be equal to or greater than 15 GPa.

3.1.2 *Flame resistance*

The following test method may be dangerous to health unless precautions are taken to control fire and fume. Testing shall be undertaken by a suitably competent person.

Cut samples from a manhole top and test in accordance with BS 476-7. If the size of specimen as cut from the manhole top can not be achieved in accordance with BS 476-7:1997, **4.3** it is permissible to manufacture a test specimen in accordance with BS 476-7:1997, **4.3.1**.

The samples shall achieve a flame resistance rating of Class 2 or better.

3.1.3 ***Chemical resistance***

Cut samples from a manhole top and test in accordance with BS 903-A18.

Weigh the samples before commencing the conditioning. Condition one set of samples for seven days at (23 ± 2) °C in reference solution (60 % volume toluene, 40 % volume enheptane) and subsequently test the samples in accordance with BS 903-A18, **4.1.2**. Condition another set of samples for seven days at (23 ± 2) °C in diesel and subsequently test the samples in accordance with BS 903-A18, **4.1.2**.

For both sets of samples:

— the change in mass shall be not more than 0.5 %;

— the change in flexural strength shall be not more than – 20 %;

— the change in flexural modulus shall be not more than – 30 %.

3.1.4 ***Surface resistivity***

Cut samples from a manhole top and test in accordance with BS 2050: Appendix **A 4.1**.

The surface resistivity shall be less than 1 $k\Omega/cm^2$.

3.2 Composite material

3.2.1 ***Weathering resistance***

Cut samples from the bottom surface of a manhole top, and cycle in accordance with BS 7413, Appendix H. Test in accordance with BS 2782-5:Method 540E.

The samples shall meet the requirements of **3.2.2** and **3.2.3**.

3.2.2 ***Aged flexure***

Cut samples from a manhole top and test in accordance with BS 2782-10:Method 1005.

The change of (flexural) strength and (flexural) modulus shall be not more than – 30 % and – 40 % respectively.

3.2.3 ***Colour fastness***

Cut samples from a manhole top and test in accordance with BS 1006:A02 or BS 1006:A03.

Retain five representative test pieces and store in a dark, dry place at (20 ± 5) °C for later comparison with the exposed test pieces. The colour change shall be equal to or not less than 3 to 4 on the grey scale.

4 Performance

4.1 Stress relief

Test a manhole top in accordance with BS EN 295-3:1991, **16.3** at a temperature of (150 ± 5) °C for 1 h.

There shall be no visible defects, blistering, cracks or delaminations.

4.2 Impact resistance

Condition a manhole top at a temperature of (– 20 ± 2) °C for 1 h. Drop a (4.5 ± 0.1) kg indenture with a (50 ± 1) mm diameter hemispherical end from a height of 1 m ± 10 mm onto the manhole top.

There shall be no visible cracking.

4.3 Skid resistance

Test a manhole top in accordance with BS 812-114.

The skid resistance (dry condition) shall be not less than 55.

4.4 Fuel exposure resistance

Testing shall be undertaken by a suitably competent person.

WARNING. The following test method may be dangerous to health unless precautions are taken to control fire and fume.

4.4.1 ***Petrol exposure***

Pour (500 ± 10) ml of reference solution (60 % volume toluene, 40 % volume enheptane) over a manhole top. Repeat at 24 hourly intervals for 30 days. After the 30 day period, test the manhole top in accordance with BS EN 124:1994, **8.3.1**.

The manhole top shall meet the requirements for permanent set specified in BS EN 124:1994, **8.3.1**.

4.4.2 ***Diesel exposure***

Pour (500 ± 10) ml of grade 50-53 CN diesel fuel (commercial grade, as specified in EN 590) over a manhole top. Repeat at 24 hourly intervals for 30 days. After the 30 day period, test the manhole top in accordance with BS EN 124:1994, **8.3.1**.

The manhole top shall meet the requirements for permanent set specified in BS EN 124:1994, **8.3.1**.

4.5 Thermal stability

4.5.1 Condition a manhole top at (60 ± 2) °C for 30 days. After the 30 day period cool to ambient conditions and test the manhole top in accordance with **4.2**.

The manhole top shall show no visible cracking.

4.5.2 Condition a manhole top at (60 ± 2) °C for 30 days. After the 30 day period cool to ambient conditions and test the manhole top in accordance with BS EN 124:1994, **8.3.1**.

The manhole top shall meet the requirements for permanent set specified in BS EN 124:1994, **8.3.1**.

4.6 Water ingress resistance

When the manhole top is described by the manufacturer as having a watertight sealing arrangement, the manhole top shall be tested as follows:

Create a water reservoir over the sealing arrangement of the manhole top to a depth of (50 ± 5) mm for 7 h.

The sealing arrangement shall show no visible sign of leakage through the seal.

With the reservoir remaining above the sealing arrangement, apply a load of (5 ± 0.2) tonnes at a rate of between 1 kN/s and 5 kN/s through a test block as specified in BS EN 124:1994, **8.2.2**. Once the load is achieved, it shall be released immediately.

The sealing arrangement shall show no visible sign of leakage through the seal.

4.7 Creep resistance

Load a manhole top to the permanent set load specified in BS EN 124:1994, **8.3.1** for $60\,^{0}_{+1}$ min. Allow to recover for $5\,^{-0.5}_{0}$ min after complete removal of the load. Test the manhole top in accordance with BS EN 124:1994, **8.3.1**.

The manhole top shall meet the requirements for permanent set specified in BS EN 124:1994, **8.3.1**.

4.8 Dynamic load

Load a manhole top at a rate of between 1 kN/s and 5 kN/s to achieve a load of (10 ± 0.2) tonnes. Release the load and repeat for 10,000 cycles.

Upon completion of the 10,000 cycles the manhole top shall meet the requirements of permanent set specified in BS EN 124:1994, **8.3.1**.

5 Marking

Manhole tops shall, in addition to markings in accordance with BS EN 124:1994, clause **9**, also bear the following marking:

— PAS 26:1998 (as the marking of this Product Assessment Specification);

— The "PAS 26:1998" marking shall be clear and durable and appear adjacent to the "BS EN 124:1994" marking.

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