



Assessment Schedule for the Caswick Integrated ladder system for manholes and access chambers

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1. Scope

1.1 This Assessment Schedule is for the first reapproval of the Caswick Integrated ladder system for manholes and access chambers. This Assessment Schedule supersedes the previous issue:

- **PT/250/1005:** Assessment of Caswick integrated ladder system for manholes and access chambers - schedule.

1.2 To assess the Integrated ladder system developed and produced by Caswick Ltd. for incorporation into precast concrete manholes. The assembled product gives access and egress to and from gravity sewers and other underground chambers.

1.3 The ladder comprises polypropylene encapsulated steps to which two polypropylene side rails (stringers) are attached. The steps are installed and the stringers slid through rings on each step until they rest on the floor of the manhole. A red end cap is slid over the top end of each stringer. Brackets are available to support the stringers above the top step at the point of access.

1.4 The preferred method of installation of the steps into a pre-cast concrete manhole ring is by casting plastic inserts into the concrete at the time of manufacture. The steps are hammered into the inserts. The steps may be retrofitted to concrete manhole rings by drilling parallel holes at the correct centres and fixing the step into the holes using an epoxy or cementitious grout.

1.5 The steps are supplied with projections of either 150 or 200 mm. The stringers are supplied in nominal 25m length coils.

2. Assessment Schedule

2.1 This Assessment Schedule is based upon the requirements of the original Assessment Schedule PT/250/1005, to:

- Assess the product against the performance requirements listed below through an audit of test data (see Section 3).
- Witness selected testing of the stringer and locating system.
- Audit installation instructions including witnessing of installation.

Note: There have been no changes to the product, standards and testing undertaken since the original assessment in 2005.

3. Review of Properties

3.1 Encapsulated step

The structural element of the product is a plastic encapsulated step manufactured and Kitemarked to BS EN13101:2002. The step meets the requirements of a Type D Class 1 step. The Kitemark requires compliance with the standard for:

- Materials
- Design features
- Dimensions
- Plastic encapsulation thickness
- Surface condition
- Corrosion resistance
- Twist
- Vertical loading
- Resistance to pull out
- Resistance to impact



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- Integrity of plastic encapsulation
- Marking and designation

3.2 Additional tests for locating eye:
The locating eyes for the stringer on the step are not covered by the Kitemark. The following additional tests are done:

- Loading test: 5kN load equally distributed between the 2 eyes on adjacent steps for at least 60 seconds with no signs of failure. Test method as per Appendix A of Caswick Limited's Document No. 50901, Issue 1.
- Dimensional check: To Caswick drawing no. 1264A, Issue A.

3.3 Stringer

The stringer is manufactured from a high impact resistant polypropylene copolymer with the properties listed below.

- Tensile stress at yield: 27.0MPa to ISO 572-2
- Flexural modulus: 1300MPa at 23°C to ISO 178
- Melt mass-flow rate (MFR): 1.5g/10mins to ISO 1133
- Thermal stability: >8minutes @ 200°C to BS EN 728
- Impact strength Charpy notched: 8.00kJ/m² @ -20°C and 50.0kJ/m² @ 23°C to ISO 179

3.4 Extruded section:

- Dimensions: To Caswick drawing No. 1341, Issue A
- Deflection under load: Maximum deflection 2.5% of unsupported length when 0.5kN load applied for a minimum of 60 seconds. Maximum residual deflection of

0.3% of unsupported length when load is removed. Test method as per Appendix B of Caswick Limited's Document No. 50901, Issue 1

- Shock loading: Withstand a load of 5kN for 5 seconds followed by a load of 1.5kN for 15 seconds. Test method as per Appendix C of Caswick Limited's Document No. 50901, Issue 1

4. Review of procedures

4.1 In addition to the performance of the component parts the following are checked:

- Installation of the steps and stringers into a concrete manhole assembled from individual pre-cast concrete rings with the inserts cast into the rings
- Caswick installation instructions for the steps and the stringers
- Quality control, as it applies to:
 - incoming materials
 - control of production

5. Reference documents

BS EN 13101: Steps for underground man entry chambers – Requirements, marking, testing and evaluation of conformity, 2002.

Appendix A of Caswick Limited's Document No. 50901, Issue 1.

Caswick drawing no. 1264A, Issue A.

ISO 527-2: Plastics – Determination of tensile properties – Part 2: Test conditions for moulding and extrusion plastics.

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ISO178: Plastics – Determination of flexural properties, 2010.

ISO 1133: Plastics – Determination of the melt mass-flow rate (MFR) and the melt flow volume flow-rate (MVR) of thermoplastics.

BS EN 728: Plastics piping and ducting systems – Polyolefine pipes and fittings – Determination of oxidation induction time.

ISO 179: Plastics – Determination of Charpy impact properties, 2010.

Caswick drawing No. 1341, Issue A.

Caswick Integrated Manhole Ladder System installation instructions.