PT/479/0921 - September 2021

Assessment Schedule for the Modular Ladder system for manholes and access chambers as manufactured by Caswick Ltd.

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SCOPE

This schedule specifies characteristics for the Modular Ladder system produced by Caswick Ltd. for incorporation into manholes and access chambers.

1. PRODUCT DESCRIPTION

1.1 Introduction

The Modular ladder system is developed for installation into underground chambers or manholes. The ladder is supplied in preassembled sections which are bolted together on site and fixed to the wall. The assembled product gives access and egress to and from gravity sewers and other underground chambers.

The ladder comprises flat stainless steel stringers and u-shaped rungs. The rungs are fixed to the stringers with clamps. In turn, the stringers are fixed to the wall, either flat or curved, by brackets which offer a variable projection from the wall. The ladder may consist of multiple sections that are bolted directly together. The ladder can also be fixed to the floor using optional foot brackets. The uppermost section can be cut to length to adapt the ladder as required on site.

The ladder is supplied in sections of 0.6 m, 1.2 m and 1.5 m. Since the vertical offset of the rungs is 0.3 m the optional section lengths are chosen to reduce the likelihood of cutting off the excess length. The ladder is also available in two widths (300 mm and 400 mm) and two projections (150 mm and 200 mm).

1.2 Applicable standards

The following relevant standard was identified:

1. BS EN 14396:2004[1]

1.3 Approval History

The Modular Ladder system was originally awarded WRc Approved™ certification in October, 2015 (PT/384/0916). This is the first re-approval.

There have been no significant changes to the product, standards and testing undertaken since the re-assessment in 2015. A minor modification has been made to the design of the ladder since 2015, in which the lower stringer now has how has a kinked feature for easier assembly. This change has not been deemed significant enough for any further testing.

2. REQUIREMENTS AND TESTING

2.1 Materials and Components

Stringers, brackets and rung clamps for ladders in foul and combined sewerage applications shall be made from 4571-316-35-I or 4401-316-00-I stainless steel in accordance with BS EN 14396:2004[1], 4.2 and Civil Engineering Specification for the Water Industry[2], 2.70.3. Fixings shall be made from grade A4 (316) stainless steel in accordance with BS EN ISO 3506-1[3].

Stringers, brackets and rung clamps for ladders for use in surface water sewerage or potable water applications shall be made from 4307-304-03-I stainless steel or higher in accordance with BS EN 14396:2004[1], 4.2. Fixings shall be made from Grade 304 stainless steel in accordance with BS EN ISO 3506-1[3].

The plastic encapsulated step shall be made from materials complying with the requirements of BS EN 13101:2002[4], 4.2.

2.2 Type Testing

The Modular Ladder system shall comply with the following test requirements:

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Mechanical resistance:

The rungs shall comply with the following:

- Vertical imposed load test requirements of BS EN 14396:2004(1), 4.4.2;
- Impact test requirements of BS EN 13101:2002(4), 4.3.10;
- Integrity test requirements of BS EN 13101:2002(4), 4.3.11.

The stringers shall comply with the requirements of BS EN 14396:2004(1), 4.4.3.2.1.
When tested in accordance with BS EN 14396:2004(1), 4.4.4.2 the fixings shall support a vertical load of 3kN.

When tested in accordance with BS 4211:2005(5), 5.8.2 the fixings shall withstand a 0.5kN pullout.

In accordance with BS EN 14396:2004(1), 4.3.4 threaded joints shall be designed so that fasteners cannot work loose.

Appearance:

In accordance with BS EN 14396:2004(1), 4.3.3 ladders shall be free from visible defects, protrusions or sharp edges.

In accordance with BS EN 14396:2004(1), 4.3.6 the surface of rungs shall be profiled to prevent slipping.

Dimensional requirements:

The ladder shall not exceed a height of 6m without an intermediate platform. (BS EN 752:2017(6), NA.6.4.4.4;
BS 4211:2005(5), Fig 1).

The clear space behind the ladder shall comply with the requirements of BS EN 752:2017(6), NA.6.4.4.4; Sewers for Adoption(7), Fig. B.8; Sector Guidance in relation to the adoption of sewerage assets by sewerage companies in England(8) Fig.B.4 and Sewers for Adoption Northern Ireland(9), Fig. 2.11

The rung stand-off distance shall comply with the requirements of BS EN 14396:2004(1), Table 3 without obstructing the minimum clear access distance in accordance to BS EN 752:2017(2), Sector Guidance in relation to the adoption of sewerage assets by sewerage companies in England(8) B5.2.7; Sewers for Adoption(7), B3.2.6; Sewers for Adoption Northern Ireland(9), Fig. 2.10 and Sewers for Scotland(10), Table 3.

The ladder shall not obstruct the minimum clear access distance in accordance to BS EN 752:2017(6), NA.6.4.3; Sector Guidance in relation to the adoption of sewerage assets by sewerage companies in England(8) B5.2.7; Sewers for Adoption(7), B3.2.6; Sewers for Adoption Northern Ireland(9), Fig. 2.10 and Sewers for Scotland(10), Table 3.

The distance between the top rung and the surface shall comply with the requirements of BS EN 752:2017(6) NA.6.4.4.4; Sector Guidance in relation to the adoption of sewerage assets by sewerage companies in England(8) B5.2.28; Sewers for Adoption(7), B6.2.28; Sewers for Adoption Northern Ireland(9), 2.12.16 and Sewers for Scotland(10), 2.20.7.

The distance from the bottom rung to the benching shall comply with the requirements of BS EN 752:2017(6), NA. 6.4.4.3.

The rung pitch and the width of tread shall comply with the requirements of BS EN 14396:2004(1), Table 3.

The minimum width and the maximum circumferential length of the flat tread shall

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comply with the requirements of BS EN 14396:2004(1), 4.3.6.

The encapsulation thickness of the rung shall comply with the requirements of BS EN 13101:2002(4), 4.3.2.2b.

The maximum pitch of fixings shall comply with the requirements of BS EN 14396:2004(1), Table 3 and BS EN 752:2017(6), NA 6.4.4.3.

The location of the top and bottom fixing with respect to rungs shall comply with the requirements of BS EN 14396:2004(1), 4.3.7.

Other requirements:

The first section installed shall have at least four fixings to the wall.

Each subsequent section shall have at least two fixings to the wall and two fixings to the previous section. The fixings connecting individual sections shall support a 0.5kN pullout (test method as per BS 4211:2005(5), 5.8.2).

2.3 Manufacture

To ensure the quality and performance of the Modular Ladder system the manufacturing process shall include appropriate systems for:

- Specification of component materials;
- Verification of component materials received are to specification
- Handling and storage of all component materials and finished units
- Fabrication and quality of workmanship

The manufacture of the Modular Ladder system and related Quality Control procedures shall comply with requirements to ensure the stated performance of the product is reliably achieved.

The manufacture of the encapsulated rung shall comply with the factory production control requirements of BS EN 13101:2002(4).

The manufacture of the Modular Ladder system shall comply with the factory production control requirements of BS EN 14396:2004(1).

2.4 Installation

When installed in accordance with the installation documentation, the Modular Ladder system shall be practicable and shall be reasonably expected to perform as described.

3. APPROVAL

The Integrated Ladder system has been audited and has successfully met all the requirements stated within this assessment schedule.

Signed:

Valid until: 2nd September 2026

4. REFERENCES

1. BS EN 14396:2004 Fixed ladders for manholes
2. Civil Engineering Specification for the Water Industry, 7th edition, UKWIR, 2011

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3. BS EN ISO 3506-1:2020 Fasteners – Mechanical properties of corrosion resistant stainless steel fasteners Part 1: Bolts, screws and studs with specified grades and property classes

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

5. BS 4211:2005+A1:2008 Specification for permanently fixed ladders

6. BS EN 752:2017 Drain and sewer systems outside buildings. Sewer system management

7. Sewers for Adoption, 7th edition, WRc plc, 2012

8. Sector Guidance in relation to the adoption of sewerage assets by sewerage companies in England, Water UK, 2020

9. Sewers for Adoption Northern Ireland, 1st edition, WRc plc, 2010

10. Sewers for Scotland, 4th edition, Scottish Water and WRc plc, 2018

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