

## **1. SCOPE**

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

## **2. PRODUCT DESCRIPTION**

### **2.1 Introduction**

The Integrated Ladder system is developed for installation into precast concrete manholes. The assembled product gives access and egress to and from gravity sewers and other underground chambers.

The ladder comprises polypropylene encapsulated steps into which two tubular 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 cap is slid over the top end of each stringer. Brackets are fitted to support the stringers above the top step at the point of access.

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 at the manufacturing site. 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.

The steps are supplied with projections (distance between the wall and the step) of either 150 or 200 mm. The stringers are supplied in nominal 25 m length coils.

### **2.2 Applicable standards**

The following relevant standards were identified:

- BS EN13101:2002

- Civil Engineering Specification for the Water Industry, 7th edition
- BS EN 752:2008
- BS EN 4211:2005
- Sewers for adoption, 7<sup>th</sup> edition
- Sewers for Adoption Northern Ireland, 1<sup>st</sup> edition
- Sewers for Scotland, 3<sup>rd</sup> edition
- BS EN 14396:2004

### **2.3 Approval History**

The Integrated Ladder system was originally awarded WRc Approved™ certification in October, 2005 (PT/250/1005).

The product was re-assessed for WRc Approved certification in October, 2010 (PT/321/1010).

Note: There have been no significant changes to the product, standards and testing undertaken since the re-assessment in 2010.

## **3. TESTING & REQUIREMENTS**

### **3.1 Type testing**

#### **Materials:**

The plastic encapsulated step shall comply with the requirements of Civil Engineering Specification for the Water Industry, 2.75 and BS EN 13101:2002.

The stringer shall be manufactured from a high impact resistant polypropylene copolymer in accordance with the manufacturer's specification.

The brackets shall be manufactured from stainless steel Grades 304 or 316 in accordance with the manufacturer's specification.

**Dimensional requirements:**

The dimensions of the stringers and locating eyes shall be in accordance with the manufacturer's specification.

The ladder shall not exceed a height of 6m without an intermediate platform. (BS EN 752:2008, NA. 12.6.1; BS 4211:2005, Fig 1).

The clear space behind the ladder shall comply with the requirements of BS EN 752:2008, Table NA. 23; Sewers for Adoption, Fig. B.8 and Sewers for Adoption Northern Ireland, Fig. 2.11

The ladder shall not obstruct the minimum clear access distance in accordance to BS EN 752:2008, Table NA. 23; Sewers for Adoption, B3.2.6; Sewers for Adoption Northern Ireland, Fig. 2.10 and Sewers for Scotland, Table 3.

The distance between the top rung and the surface shall comply with the requirements of BS EN 752:2008, NA. 12.6.3.5; Sewers for Adoption, B3.2.27; Sewers for Adoption Northern Ireland, 2.12.16 and Sewers for Scotland, 2.18.7.

**Mechanical resistance:**

The locating eyes shall comply with the following:

- Loading test: 5kN load equally distributed between the 2 eyes on adjacent steps is applied for at least 60 seconds. The material shall not show any signs of failure.

When located in the locating eyes the stringers shall comply with the following:

- Deflection under load (test method as per BS EN 14396:2004, Annex C): the maximum deflection shall not exceed

2.5 % of unsupported length when 0.5 kN load is applied for a minimum of 60 seconds. The maximum residual deflection of unsupported length shall not exceed 0.3 % when load is removed.

- Shock loading: a load of 5kN is applied for 5 seconds followed by a load of 1.5kN for 15 seconds. The stringer shall not show any signs of failure.

**Appearance:**

The stringer shall comply with the requirements of BS EN 14396:2004, 4.3.3.

**3.2 Manufacture**

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

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

The manufacture of the Integrated 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 steps shall comply with the factory production control requirements of BS EN13101:2002.

The manufacture of the stringers shall comply with the factory production control requirements of BS EN 14396:2004.

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



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#### 3.3 Installation

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

7. Sewers for Scotland, 3<sup>rd</sup> edition, Scottish Water and WRc plc, 2015
8. BS EN 14396:2004 Fixed ladders for manholes

#### 4. APPROVAL

The Modular ladder system has been audited and has successfully met all of the requirements stated within this assessment schedule.

Signed: 

#### 5. REFERENCES

1. BS EN 13101:2002 Steps for underground man entry chambers – Requirements, marking, testing and evaluation of conformity
2. Civil Engineering Specification for the Water Industry, 7th edition, UKWIR, 2011
3. BS EN 752:2008 Drain and sewer systems outside buildings
4. BS 4211:2005 Specification for permanently fixed ladders
5. Sewers for Adoption, 7<sup>th</sup> edition, WRc plc, 2012
6. Sewers for Adoption Northern Ireland, 1<sup>st</sup> edition, WRc plc, 2010