# Type Test Report

CASWICK
Part of the Afinitas Family

**Drawing Number:** 7149
**Product Code:** SLF600 - 6000
SLF600N - 6000N

Permutation :

## Ladder Modular Fixed SS-PE. Rung width 300mm or 400mm

| | |
|---|---|
| **Type of Test** | TYPE TEST |
| **Standard Tested to** | EN14396:2004 (including Annex ZA) |
| **Ladder Specification** | Fixed modular ladder to be used in underground concrete rings, chambers or other structures. |
| **Product Image** |  |

**Approved by**

Name: A. Turner
Signature: A. Turner
Position: Technical manager
Issue date: 16th September 2014





**Caswick Ltd**, Sandtoft Road,
Belton, Doncaster, DN9 1PN, UK

**Email:** info@caswick.co.uk
**Web:** www.caswick.co.uk

**Tel:** +44(0)1427 872017
**Fax:** +44(0)1427 873541

ISO 9001:2015 Quality Management
Ref. 1015
Rev 1

# Type Test Report - Contents

**All test results given in this document are taken from a random step sample. The step is picked at random from normal production and tested in accordance with standard EN13101. Although routine random sample testing is carried out to ensure our products meet the highest standard, due to variations beyond our control the results given here may vary slightly to the product supplied to you. All steps will comply with EN13101.**

**Content**



**Product Overview**

400mm rung width
300mm rung width with 'N' denotation
150mm, 200mm, 250mm or 300mm nominal projection by order
bright colour

**Intended use**

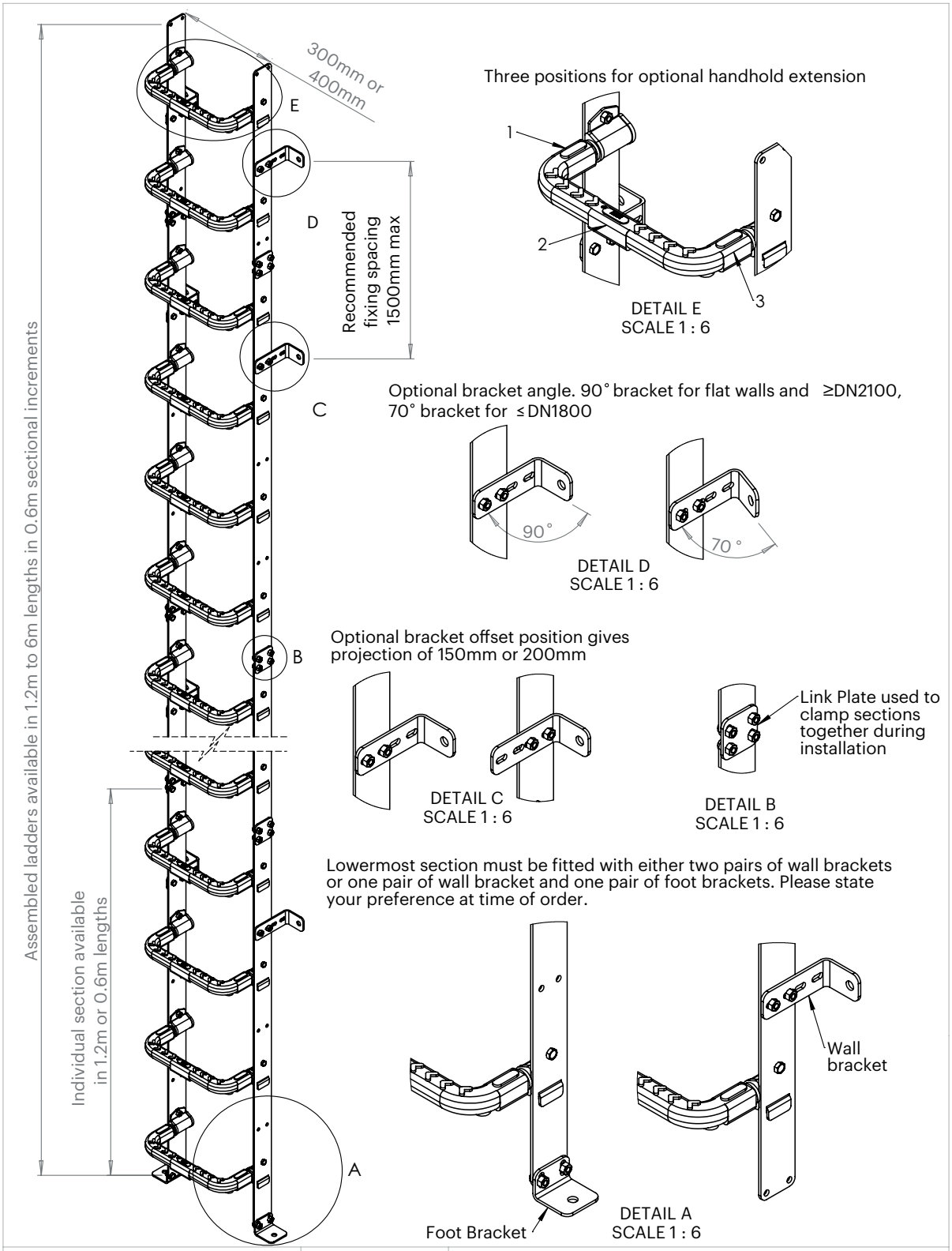
Incorporating into concrete structures. Fitting methods;
- Cast in
- Drill and glue
- Insertion into wet concrete



**Caswick Ltd**, Sandtoft Road, Belton, Doncaster, DN9 1PN, UK
**Email:** info@caswick.co.uk
**Web:** www.caswick.co.uk
**Tel:** +44(0)1427 872017
**Fax:** +44(0)1427 873541

Ref: 1015
Rev: 1

## Product Drawing




CASWICK
Tel: +44(0)1427 872017


THIRD ANGLE

TITLE: Ladder Modular Fixed

DO NOT SCALE - If in doubt ask!
Unless otherwise stated;
- All Dimensions in MM
- All sharp edges to be removed
- TOLERANCES: LINEAR: +/- 5mm ANGULAR: +/- 5°

| | | | |
|---|---|---|---|
| Drawn By: A. Turner | MATERIAL: Material <not specified> | DWG NO. 7149 | A4 |
| WEIGHT: 8665.33 g | REVISION | SCALE:1:12 SHEET 2 OF 2 | 08/02/2013 |



CASWICK
Part of the Afinitas Family

**Caswick Ltd**, Sandtoft Road,
Belton, Doncaster, DN9 1PN, UK

**Email:** info@caswick.co.uk
**Web:** www.caswick.co.uk

**Tel:** +44(0)1427 872017
**Fax:** +44(0)1427 873541



Ref: 1015
Rev: 1

**Materials**

Section 4.2
Where appropriate the step materials shall conform to the following;

| Type | Required Standard | Actual Standard |
|---|---|---|
| Steel | Steel to EN 10025 or ENV 10080:1995 or current equivalent and hot dip galvanised to EN ISO 1461 with thickness as outlined in table 1 EN14396 | EN10305 coated with PP Block Copolymer High Impact grade* |
| | Stainless steel to EN10088-1 or EN10088-3 grade X6CrNiTi18-10 (321) NOTE 321 is 304 with added titanium to resist intergranular corrosion.X6CrNiMoTi17-12-2 (316Ti) recommended for sewage or drinking water. | 304. 316 by special order. |
| GRP | To EN 13706 and UV resistant to Annex A EN14396. | N/A |

*An approved corrosion resistance method in EN13101 and tested to the relevant requirement of this standard.

**EN 14396:2004 Type** — **Requirement** – Section 4.3.1

**Requirement**

Steps shall be one of the following types;
**Type A** – Fixed ladder with movable top extensions
**Type B** – Fixed ladder with two stringers and fall arrester
**Type C** – Fixed ladder with one stringer and fall arrester
**Type D** – Fixed ladder with two stringers
**Type D** – Fixed ladder with one stringer

**Result**

The ladder is a type D



CASWICK
Part of the Afinitas Family

**Caswick Ltd**, Sandtoft Road,
Belton, Doncaster, DN9 1PN, UK

**Email:** info@caswick.co.uk
**Web:** www.caswick.co.uk

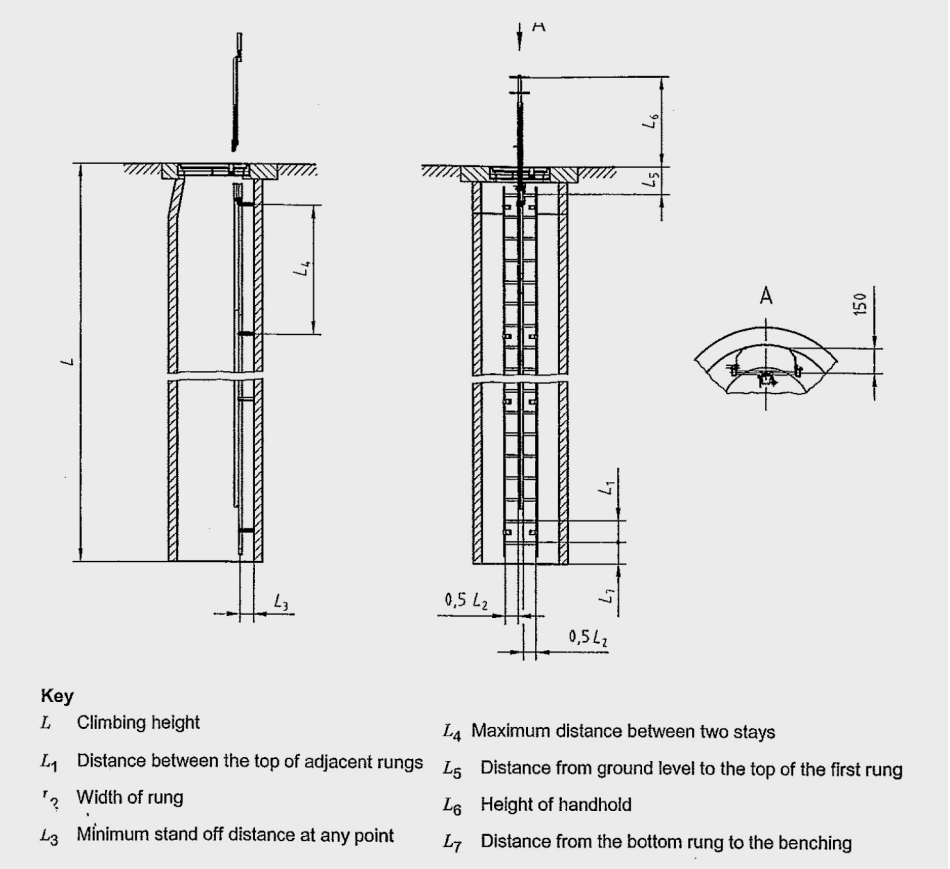
**Tel:** +44(0)1427 872017
**Fax:** +44(0)1427 873541

**EN 14396:2004 Dimension Check** **Requirement** – Section 4.3.2

**Requirement**

When measured at the points shown on the diagram below, the dimensions must be within the range set in the table below.

**Result**




**Key**

$L$ Climbing height
$L_1$ Distance between the top of adjacent rungs
$L_2$ Width of rung
$L_3$ Minimum stand off distance at any point
$L_4$ Maximum distance between two stays
$L_5$ Distance from ground level to the top of the first rung
$L_6$ Height of handhold
$L_7$ Distance from the bottom rung to the benching

| Tolerance | L1 | L2 | L3 | L4 | L5 | L6 | L7 |
|---|---|---|---|---|---|---|---|
| Min | 250 | 300 | 150 | - | - | 1000 | ≤L1 |
| Max | 300 | - | - | b | L1a | - | |
| Actual | 300 | 300/400 | 150+ | ≤1500 | >120c | ≤1000 | ≥175c |

**a** In special cases (e.g. where the manhole design so requires). For the installation national provisions valid in the place of use shall be taken into account.

**b** To be stated by the manufacturer but not more than 3000mm.

**c** Defined by installer, dimension quoted defines achievable range.



CASWICK
Part of the Afinitas Family

**Caswick Ltd**, Sandtoft Road,
Belton, Doncaster, DN9 1PN, UK

**Email:** info@caswick.co.uk
**Web:** www.caswick.co.uk

**Tel:** +44(0)1427 872017
**Fax:** +44(0)1427 873541

**EN 14396:2004 Surface Conditions:** **Requirement** – Section 4.3.3

Is the ladder free from visible defects, protrusions and sharp edges?

**Yes** ☑ **No** ☐

**EN 14396:2004 Threaded Joints:** **Requirement** – Section 4.3.4

Are threaded joints designed such that they cannot work loose?
**Yes** ☑ **No** ☐

Note: Achieved by nylon locking nuts

**EN 14396:2004 Welded Joints:** **Requirement** – Section 4.3.5

N/A

**EN 14396:2004 Rungs** **Requirement** – Section 4.3.6
**Procedure** – Annex A

**Requirement:** Flat treads shall be at least 20mm wide.
Circular treads shall be at least 20mm diameter but not greater than 45mm.
U-shaped rungs shall be at least 20mm deep.
For other forms the maximum circumferential length shall be 140mm.

**Results:**

Is the surface slip resistant? **Yes** ☑ **No** ☐

Does the ladder have either two stringers or 20mm high boot stops? **Yes** ☑ **No** ☐

**EN 14396:2004 Attachment to Manhole** **Requirement** – Section 4.3.7

For ladders with two stringers, does each section shall have at least four stays and anchorage points?
**Yes** ☑ **No** ☐

Note: Ladder has two fixings to the wall and two to the adjacent section.

Is the top stay located below the top rung but not by more than 600mm? **Yes** ☑ **No** ☐

Is the bottom stay located below the second rung from the ladder bottom? **Yes** ☑ **No** ☐



CASWICK
Part of the Afinitas Family

**Caswick Ltd**, Sandtoft Road,
Belton, Doncaster, DN9 1PN, UK

**Email:** info@caswick.co.uk
**Web:** www.caswick.co.uk

**Tel:** +44(0)1427 872017
**Fax:** +44(0)1427 873541

**EN 14396:2004 Vertical Imposed Load on Rungs:**

**Requirement** – Section 4.3.8
**Procedure** – Annex B

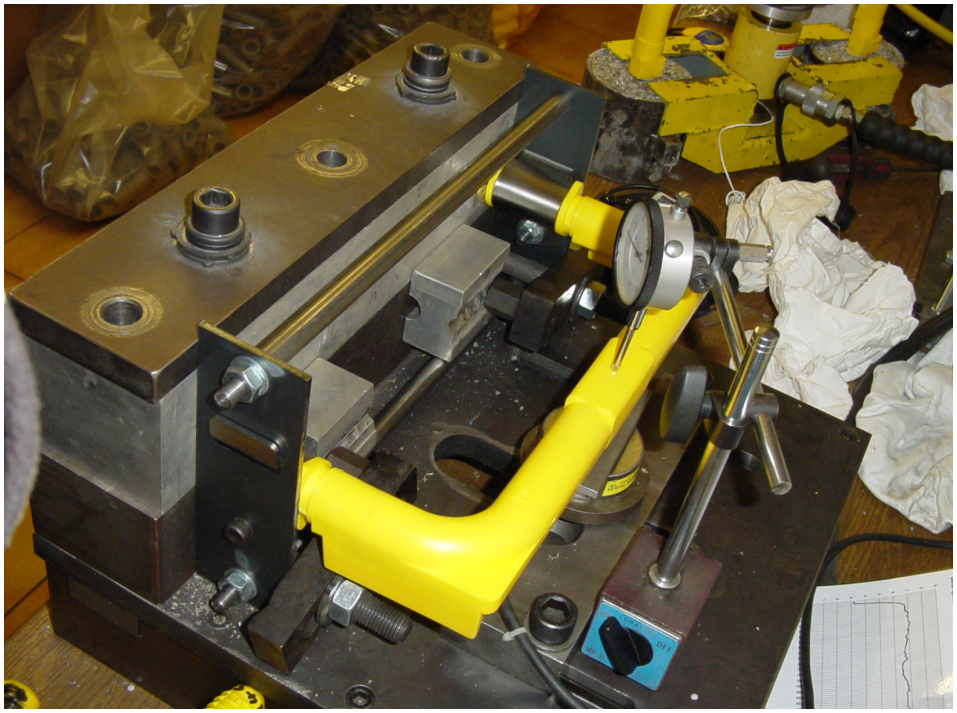
**Requirement:**

The rung shall have a permanent deflection of no more than 0.3% of its unsupported length after an applied test load of 2.6kN.

**Results:**

0.3% of unsupported length for 350 ladder =
62 + ($\frac{\Pi 76}{4}$) + 244 + ($\frac{\Pi 76}{4}$) + 62) x 0.003 = 1.46mm
First test cycle residual deflection 3.41mm
Second test cycle residual deflection 0.60mm

This is due to the nature of the design, the first test cycle removes all of the slack from the assembly tolerance build up. The second test tests the strength of the actual components.





CASWICK
Part of the Afinitas Family

**Caswick Ltd**, Sandtoft Road,
Belton, Doncaster, DN9 1PN, UK

**Email:** info@caswick.co.uk
**Web:** www.caswick.co.uk

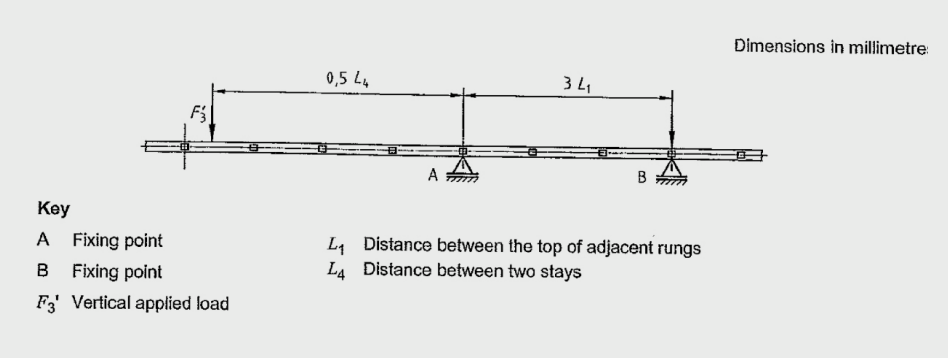
**Tel:** +44(0)1427 872017
**Fax:** +44(0)1427 873541

**EN 14396:2004 Ladder Strength**

**Requirement** – Section 4.4.3.2.1
**Procedure** – Annex C

**Requirement**

The ladder shall have a permanent deflection of no more than 0.3% of its unsupported length after an applied test load of F3' when tested in accordance with Annex C EN14396.




**Results:**

F3' = 0.4kN x 1.75 (safety factor for steel) = 0.7kN
0.5 x L4 (maximum distance between fixings) = 0.75m
Permanent deflection limit = 0.3% of 0.75m = 2.25mm

| Load (kN) | Deflection (mm) |
|---|---|
| 0.0 | 0.00 |
| 0.7 | 8.62 |
| 0.0 | 0.43 |



CASWICK
Part of the Afinitas Family

**Caswick Ltd**, Sandtoft Road,
Belton, Doncaster, DN9 1PN, UK

**Email:** info@caswick.co.uk
**Web:** www.caswick.co.uk

**Tel:** +44(0)1427 872017
**Fax:** +44(0)1427 873541

**EN 14396:2004 Anchorage Points:** **Requirement** – Section 4.4.4.2
**Procedure** – Annex E/F

**Requirement:** Fixings of ladders with two stringers are to withstand a 3kN load applied in accordance with Annex E of EN14396.

**Results:** The first installed section has 4 off wall fixings, subsequent sections have 2 off wall fixings and 2 off fixings to the previous section.

Determination of fixing load bearing capacity;
Assumptions;
- Load is to be held by two fixings 1500mm apart
- Ladder has the worst case load offset of 200mm

1. Direct shear force to be held per fixing is applied force of 3kN per stringer.
2. Pullout force on upper fixing through assumption that rotation will occur through pivoting around lower bracket;
Applied moment = 3,000N x 0.2m = 600Nm
Resultant force = 600Nm / 1.5m = 400N.

Using a safety factor of 4 the required fixing must withstand a pullout of 1.6kN and shear of 12kN.

Anchor SLB14/10SS will withstand a shear of 14.5kN and pullout of 12.6kN when tightened to 50Nm in C20/25 concrete or stronger.

**Marking:** **Section 5**

The following shall be visible after installation;

| Marking Requirements | Present? | | | |
|---|---|---|---|---|
| Manufacturers identification | Yes | √ | No | |
| Last two digits of year of manufacture | Yes | √ | No | * |
| Type | Yes | √ | No | |
| Maximum distance between two anchorage points | Yes | √ | No | |

*On underside of rung

Additional marking on this product (for information purposes only);

| | | | | |
|---|---|---|---|---|
| CE Mark next to manufacturers name? | Yes | √ | No | |
| Third party certification body (BSI Kitemark)? | Yes | | No | √ |



CASWICK
Part of the Afinitas Family

**Caswick Ltd**, Sandtoft Road,
Belton, Doncaster, DN9 1PN, UK

**Email:** info@caswick.co.uk
**Web:** www.caswick.co.uk

**Tel:** +44(0)1427 872017
**Fax:** +44(0)1427 873541

| | |
|---|---|
| **Instructions for Installation and Use :** | Section 5<br><br>The following shall be visible after installation;<br><br>**Instructions contain the following;**<br>- Pullout requirements of anchors<br>- Intended use of ladder |
| **Evaluation of Conformity :** | Section 7<br><br>- Initial type testing (this document)<br>- Factory Production Control. Caswick operate an FPC system for the manufacture of ladders including;<br>• Documentation of raw materials and components<br>• Inspection of received components<br>• Testing of manufactured components |



CASWICK
Part of the Afinitas Family

**Caswick Ltd**, Sandtoft Road,
Belton, Doncaster, DN9 1PN, UK

**Email:** info@caswick.co.uk
**Web:** www.caswick.co.uk

**Tel:** +44(0)1427 872017
**Fax:** +44(0)1427 873541