



CONSTRUCTION PRODUCTS REGULATION DECLARATION OF PERFORMANCE

DoP Reference No. DoP-05 QD

Product Identification Code: QuikDrain drainage channel.
Identified as; AQD1000 (black plastic grate) or AQD1000G (galvanised steel grate).

Intended use: Drainage channel (Type M) for collection and conveyance of surface water from areas subject to pedestrians and pedal cyclists.

Manufacturer: Flexseal Couplings Ltd, Endeavour Works, Newlands Way, Valley Park, Wombwell, Barnsley, South Yorkshire, S73 0UW, United Kingdom.

Assessment and verification of constancy of performance: System 3

Relevant harmonised standard: BS EN 1433:2002

Notified Body: British Standards Institute No. 0086 confirmed by way of Test Report reference No. 2381/8026781 the performance as described below.



Declared performance:

Essential characteristics	Performance	Harmonised technical specification
Water tightness - Jointing of drainage channels	No leakage	BS EN 1433:2002
Load bearing capacity, deflection under load - maximum load - permanent set	A15 Pass Pass	
Durability - Abrasion resistance - Fatigue	Fulfilled Fulfilled	

The performance of the product identified is in conformity with the declared performance. This declaration of performance is issued under the sole responsibility of the supplier.

Signed for and on behalf of Flexseal by:
Derek Lawrence (Quality/H&S Manager)
Wombwell, 12th August 2013



Report No	2381/8026781	This Report consists of 6 pages
Client	Flex-Seal Couplings Limited Endeavour Works Valley Park Newlands Way Wombwell Barnsley S73 0UW	
Authority & date	BSI Quotation Acceptance Form Number BSI 0000480187 Dated 15 July 2013	
Items tested	Linear drainage channel bodies and gratings	
Specification	BS EN 1433:2002 + Amendment 1 clauses 7.5.1, 7.15.2 and 7.16 Direct commission test data review	
Results	See Summary of Results on Page 2	
Prepared by	G R Essam 	Principal Engineer
Authorized by	F Merrison 	Laboratory Manager
Issue Date	07 August 2013	
Conditions of issue	This Test Report is issued subject to the conditions stated in current issue of <i>CP0322 'Conditions of contract for testing'</i> . The results contained herein apply only to the particular sample/s tested and to the specific tests carried out, as detailed in this Test Report. The issuing of this Test Report does not indicate any measure of Approval, Certification, Supervision, Control or Surveillance by BSI of any product. No extract, abridgement or abstraction from a Test Report may be published or used to advertise a product without the written consent of the Managing Director, BSI, who reserves the absolute right to agree or reject all or any of the details of any items or publicity for which consent may be sought.	

EXAMINATION AND ASSESSMENT OF LINEAR DRAINAGE CHANNEL BODIES AND GRATINGS SUBMITTED AS A DIRECT COMMISSION TEST DATA REVIEW

INTRODUCTION

At the request of Flex-Seal Couplings Limited the test reports for linear drainage channel bodies and gratings detailed below were assessed against the requirements of BS EN 1433:2002 + Amendment 1 clauses 7.5.1, 7.15.2 and 7.16 as indicated on the following pages of this Report. This request was made a BSI Quotation Acceptance Form Number BSI 0000480187 dated 15 July 2013.

It is emphasised that assessments were not made against the other clauses of the Specification.

The testing detailed in this Report was subcontracted to Napier University, Edinburgh by the client. Napier University test reports dated 9 April 2007 (references FS1, FS2 and FS3), 9 October 2009 (reference FS7), 11 December 2009 (reference FS9) and 1 February 2013 refer.

TEST ITEMS

Item No	Class	Product	Description
1	A15	Flex-Seal QuikDrain	PP channel drain and PP grating
2	A15	Flex-Seal StormDrain PLUS	PP channel drain and PP grating
3	A15	Quad Connector and Flex-Seal StormDrain PLUS	PP channel drain and PP grating

SUMMARY OF RESULTS

The test items met the requirements of those clauses, or parts thereof, of the Specification against which assessments were made.

Sample No: 1**Component Description: CLASS:** A15**PRODUCT:** Flex-Seal QuikDrain
1000mm x 90mm x 117mm**EXAMINATION**

CLAUSE	ASSESSMENT		
6. MATERIALS			
6.1 General			
The channels and gratings were manufactured from polypropylene.	Not assessed		
See Page 6 for additional material testing			
7. DESIGN AND MANUFACTURING REQUIREMENTS			
7.5 Jointing of drainage channel units			
7.5.1 Watertightness			
Three channel samples were joined in accordance with the manufacturer's instructions and tested in accordance with clause 9.3.6 to a 50% fill-line			
After 30 minutes there was no leakage from the joints	Pass		
7.15 Strength testing			
7.15.2 Gratings and covers			
When haunched in C15 concrete and tested in accordance with clause 9.1.4.1 the covers of three units tested withstood loads of 9kN without failure.	Pass		
For information:			
	Specified		
	Actual		
Failure load			
Sample 1 (N)	-	18.0	-
Sample 2 (N)	-	17.5	-
Sample 3 (N)	-	29.1	-
7.16 Permanent set			
Three units haunched in C15 concrete were tested in accordance with clause 9.1.4.2.1 using loads of 6kN			
	Specified	Actual	
Permanent set			
Sample 1 (mm)	1.8 max	0.29	Pass
Sample 2 (mm)	1.8 max	0.09	Pass
Sample 3 (mm)	1.8 max	0.06	Pass
For information:			
Clear opening was 90mm			-
Test block size was 250mm x 75mm			-
Intermediate loading pad was made of wood			-

Sample No: 2**Component Description: CLASS:** A15**PRODUCT:** Flex-Seal StormDrain
1000mm x 93mm x 127mm**EXAMINATION (CONTINUED)**

CLAUSE	ASSESSMENT
6. MATERIALS	
6.1 General	
The channels and gratings were manufactured from polypropylene.	Not assessed
See Page 6 for additional material testing	
7. DESIGN AND MANUFACTURING REQUIREMENTS	
7.5 Jointing of drainage channel units	
7.5.1 Watertightness	
Four channel samples were joined in accordance with the manufacturer's instructions and tested in accordance with clause 9.3.6 to a 50% fill-line	
After 30 minutes there was no leakage from the joints	Pass
7.15 Strength testing	
7.15.2 Gratings and covers	
When haunched in C15 concrete and tested in accordance with clause 9.1.4.1 the covers of three units tested withstood loads of 9kN without failure.	Pass
For information:	
	Specified Actual
Failure load	
Sample 1 (N)	- 60.3 -
Sample 2 (N)	- 60.9 -
Sample 3 (N)	- 60.4 -
7.16 Permanent set	
Three units haunched in C15 concrete were tested in accordance with clause 9.1.4.2.1 using loads of 6kN	
	Specified Actual
Permanent set	
Sample 1 (mm)	1.86 max 0.09 Pass
Sample 2 (mm)	1.86 max 0.57 Pass
Sample 3 (mm)	1.86 max 0.59 Pass
For information:	
Clear opening was 93mm	-
Test block size was 250mm x 75mm	-
Intermediate loading pad was made of foam-backed packing piece	-

Sample No: 3

Component Description: CLASS: A15

PRODUCT: Quad Connector and Flex-Seal StormDrain
120mm x 120mm x 127mm

EXAMINATION (CONTINUED)

CLAUSE	ASSESSMENT
6. MATERIALS	
6.1 General	
The channels and gratings were manufactured from polypropylene.	Not assessed
See Page 6 for additional material testing	
7. DESIGN AND MANUFACTURING REQUIREMENTS	
7.15 Strength testing	
7.15.2 Gratings and covers	
When haunched in C15 concrete and tested in accordance with clause 9.1.4.1 the covers of three units tested withstood loads of 9kN without failure.	Pass
For information:	
	Specified Actual
Failure load	
Sample 1 (N)	- 42.1 -
Sample 2 (N)	- 40.8 -
Sample 3 (N)	- 41.5 -
7.16 Permanent set	
Three units haunched in C15 concrete were tested in accordance with clause 9.1.4.2.1 using loads of 6kN	
	Specified Actual
Permanent set	
Sample 1 (mm)	2.4 max 0.49 Pass
Sample 2 (mm)	2.4 max 0.55 Pass
Sample 3 (mm)	2.4 max 0.53 Pass
For information:	
Clear opening was 120mm	-
Test block size was 250mm x 75mm	-
Intermediate loading pad was made of foam-backed packing piece	-

EXAMINATION (CONTINUED)**CLAUSE****ASSESSMENT****6. MATERIALS****6.1 General****Additional testing performed on Flex-Seal StormDrain PLUS products**

The following tested were conducted according to a test programme agreed between the client and Napier University and is reported here for information.

Load testing

One unit haunched in C16 concrete was tested in accordance with clause 9.1.4.2.1 using loads of 50kN

For information:	Specified	Actual	
Permanent set Sample 1 (mm)	-	1.22	-

For information:

Clear opening was 93.5mm			-
Test block size was 250mm x 75mm			-
Intermediate loading pad was made of plywood and foam-backed packing pieces			-

The unit was then tested in accordance with clause 9.1.4.1 and the cover withstood a load of 75kN without failure.

For information:	Specified	Actual	
Permanent set after load testing Sample 1 (mm)	-	1.66	-

Fatigue testing

The unit tested above was then submitted to cyclic loading from 0 kN to 50 kN at 2.0 kN/s for 1000 cycles

For information:	Specified	Actual	
Permanent set after cyclic loading Sample 1 (mm)	-	3.47	-

Abrasion testing

The surface roughness of the bottom of a Flex-Seal StormDrain PLUS channel was determined and found to be $R_a = 0.95\mu\text{m}$

The coefficient of friction of the bottom of a Flex-Seal StormDrain PLUS channel was found to be approximately 0.24

The Taber abrasion test on the bottom of a Flex-Seal StormDrain PLUS channel (nominally following the method as described in ASTM D1044) was 4.03mg per 1000 cycles