

PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

***Panametrics DF 868 Ultrasonic Liquid Flowmeter
incorporating C-RS, CF-LP and C-PT transducers***

manufactured by:

GE Sensing EMEA

*Sensing House
Shannon Free Zone East
Shannon
County Clare
Ireland*

has been assessed by Sira Certification Service
and for the conditions stated on this certificate complies with:

**MCERTS Performance Standards for Water Monitoring
Equipment Part 3, Version 2.4 dated February 2013**

Certification Range:

0.25 m/s to 5 m/s

Project No: 674/0126 & 16W24591
Certificate No: Sira MC 050061/05
Initial Certification: 19 September 2005
This Certificate Issued: 02 November 2015
Renewal Date: 18 September 2020

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Deputy Certification Manager

MCERTS is operated on behalf of the Environment Agency by

Sira Certification Service

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Approved Site Application

Any potential user should ensure, in consultation with the manufacturer, that the monitoring system is suitable for the intended application. For general guidance on monitoring techniques refer to the Environment Agency Monitoring Technical Guidance Notes available at www.mcerts.net

The product is suitable for use, where it is appropriate, for regulated applications such as abstraction, effluent discharge, ultraviolet disinfection and industrial processing.

The product has been tested on pipe sizes of 50 mm, 600 mm and 1200 mm over a range of velocities, 0.25 to 5 m/s on 50 mm pipe, 0.28 to 2.2 m/s on 600 mm pipe and 0.1 to 1.8 m/s on 1200 mm pipe. The majority of the tests were conducted using the CF-LP-40 transducers. C-PT and C-RS transducers were substituted for some tests (see Note 2).

Basis of Certification

This certification is based on the following Test Report(s) and on Sira's assessment and ongoing surveillance of the product and the manufacturing process:

Sira Report	Reference No: C1229, dated September 2005
WRc Report	Reference No: UC6959, dated August 2005
Factory Mutual Report	Reference No: J.I.3Z9A1.AX, dated 24 July 1997

Sira/DTI flow programme report, DTI Ref: GBBK/C/03/18, dated August 2005

The field test requirements were satisfied by analysing data from an existing installation of a DF868 at Chellow Heights Water Treatment Works, Bradford on a raw water application. The DF868 (C-PT transducers) was installed on a 700 mm nominal bore carbon steel pipe in series with an electromagnetic flowmeter. Data was logged over a period of 4 months. Flow velocities between 0.23 and 0.91 m/s were experienced at the site over the test period.

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Product Certified

The Panametrics DF 868 Ultrasonic Liquid Flowmeter measuring system consists of the following parts:

- DF868 Electronics
- C-RS, CF-LP and C-PT transducers

The majority of the tests were conducted using the CF-LP-40 transducers. During the effect of different pipe sizes test (4.6.4) a test run was conducted using the C-RS transducers fitted to a 1200 mm pipe.

This certificate applies to all instruments fitted with software version F2AA (serial number DF964E onwards).

Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: -20°C to +50°C
IP Rating: See Description

The instrument meets MCERTS Class 1 requirements for the combined performance characteristic as specified in Table 6 of the MCERTS performance standard. Details of individual performance characteristics are summarized below:

Results are expressed as error % reading, unless otherwise stated.

Test	Results expressed as error % reading				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Protection against unauthorised access					Password required	Clause 3.1.2
Units of measurement					The flowmeter records in metric units	Clause 3.1.6
Indicating device					The flowmeter displays totalised volume and/or flow-rate	Clause 3.1.3
Flow computation					The flowmeter displays totalised volume and/or flow-rate	Clause 3.1.11
Combined performance characteristic					1.718	Clause 4.2.1 Class 1 ±2%

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Test	Results expressed as error % reading				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Mean error m/s 0.25 0.50 1.00 2.00 3.50 5.00			-1.65 -1.31			Clause 6.3.2 Class 1 ±5% lower zone ±2% upper zone Note 2
Test	Results expressed as error % reading				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Repeatability m/s 0.25 0.50 1.00 2.00 3.50 5.00	0.29 0.27 0.06				Note 1 Note 1 Note 1	Clause 6.3.2 ≤1% Class 1 Note 2
Bi-directional flow m/s 0.25 1.00 2.00 3.50 5.00			-1.54 -1.77		Note 2	Clause 6.3.13 To be reported
Output impedance	0.017				Note 2	Clause 6.3.4 ≤0.5% Class 1
Supply voltage 100-120 V a.c.	0.31				<0.1%	Clause 6.3.3 ≤0.5% Class 1
Loss of power					All pre-set data retained for 51 days	Clause 6.3.1 All pre-set data to be retained for 30 days
Warm up time					40 secs	Clause 6.1.2 To be reported
Ambient temperature -20 to +50°C	-0.40					Clause 6.3.6 ≤0.5% Class 1

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Test	Results expressed as error % reading				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Relative humidity	-0.49				Note 2	Clause 6.3.6 Class 1 ≤0.5% Class 1
Fluid temperature		0.33			Note 2	Clause 6.3.5 ≤0.5% Class 1
Effect of conduit material					Note 2	Clause 6.3.16 To be reported
Polyethylene		-0.82				
Carbon steel		0.99				
Cement lined ductile iron (Note 9)			1.20			
Effect of conduit size					Note 2	Clause 6.3.17 To be reported
50 mm	m/s					
Velocity range 0-5m/s	0.25		-1.65			
	0.50		-1.31			
	1.00	-0.46				
	2.00	-0.25				
	3.50	0.17				
	5.00	0.01				
600 mm						
Velocity range 0-2m/s	0.25	0.66				
	0.50	0.44				
	1.00	0.97				
	2.01	0.99				
1200 mm						
Velocity range 0-2m/s	0.25			-4.14		
	0.50			-4.01		
	1.06			-3.59		
	1.81			-3.50		
Response time					<24 secs	Clause 6.3.19 < 30 secs

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Test	Results expressed as error % reading				Other results	MCERTS specification
Error under field test conditions	Max error -1.39% Min error -0.71% Mean error -0.41% Proportion of errors $\leq \pm 2.00\%$ = 80.3% proportion of errors $\leq \pm 5.00\%$ = 98.8%					Clause 7.3.1 90% <5%
Up time					100%	Clause 7.4.1 >95%
Maintenance					No scheduled maintenance required	Clause 7.5 To be reported

Note: The following tests are not applicable to the flowmeter:

- | | |
|---|--|
| 6.3.7 Incident light | 6.3.12 User defined stage-discharge equation |
| 6.3.8 Sensor location | 6.3.14 Flow reversal |
| 6.3.9 Presence of stray currents | 6.3.15 Ancillary devices |
| 6.3.10 Sonic velocity compensation & response | 6.3.18 Fill level |
| 6.3.11 Accuracy of computation | 6.3.20 Vibration |

Note 1 Only one determination of error was made and hence it is not possible to calculate repeatability at this point.

Note 2 The majority of the tests were conducted using the CF-LP transducers. The tests for field test error, bi-directional flow and pipe material were conducted using C-PT transducers. When determining the effect of different pipe sizes, the test on 50 mm pipe was conducted using the CF-LP transducers and the test on 600 mm pipe was conducted using the C-PT transducers. The test on 1200 mm pipe was conducted using the CP-T transducers and repeated using the C-RS transducers. There was no significant difference between the results obtained using the C-RS transducers and the CP-T transducers.

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Description:

The Panametrics DF868 Ultrasonic Liquid Flowmeter is a fixed installation flowmeter that can operate with a variety of transducers of both clamp-on and wetted design. For the purpose of the MCERTS performance standards for water monitoring, only clamp-on transducers have been considered. The DF868 electronics console is rated IP66/NEMA 4X in its typical wall mounting arrangement and suitable for indoor and outdoor location. IP66/NEMA 4X rating is not applicable for the 19" rack mounted console. A text and graphics user interface with front-panel keypad provides access to programming menus, diagnostics and input/output configuration in the DF868 console. Outputs include alarm relays, analog outputs (4-20 mA), totalizer pulse/frequency, Modbus, and Foundation Fieldbus protocols as examples.

The clamp-on transducers feature a commonly used type C-PT which is suited to pipes from 2 inch/50 mm diameter to around 10 feet/3 m diameter, depending upon pipe material, condition and fluid condition. These transducers are suitable for continuous immersion and are rated IP68. A new high-power transducer type C-RS is now replacing the C-PT to extend the range of application. C-RS transducers provide a better signal to noise ratio allowing them to handling harsher environment applications. C-RS transducers are IP66 rated or IP68 rated (with proper connections and cabling). UTXDR transducers using the same concept as the C-RS transducers provide IP67 rating in a standard configuration. For pipes of 0.5 inch/12 mm to 2 inch/50 mm diameter, a miniature, high-frequency transducer CF-LP is typically used. A new UTXDR transducer may also be used in these applications.

The manufacturer states that the DF868 can be used on pure liquids such as de-ionised or demineralised water and on contaminated liquids such as raw sewage and many light slurries. Gas or air bubbles of <5% by volume content typically prove acceptable, and this case should be strengthened by the more powerful C-RS transducer. The manufacturer has seen successes with gas or air bubbles content up to 10%. However, the volume flow calculation error associated with the total void fraction cannot be ignored, as would be the case with other flow measurement technology. With respect to solids contamination levels, slurries of >4% by weight, such as activated sewage sludge, have been measured.

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General Notes

1. This certificate is based upon the equipment tested. The Manufacturer is responsible for ensuring that on-going production complies with the standard(s) and performance criteria defined in this Certificate. The Manufacturer is required to maintain an approved quality management system controlling the manufacture of the certified product. Both the product and the quality management system shall be subject to regular surveillance according to 'Regulations Applicable to the Holders of Sira Certificates'. The design of the product certified is defined in the Sira Design Schedule V03 for certificate No. Sira MC 050061/05
2. If certified product is found not to comply, Sira Certification Service should be notified immediately at the address shown on this certificate.
3. The Certification Marks that can be applied to the product or used in publicity material are defined in 'Regulations Applicable to the Holders of Sira Certificates'.
4. This document remains the property of Sira and shall be returned when requested by the company.

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