

PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

NivuFlow 750 (incorporating POA-K sensor) Echo Profile Flowmeter

Manufactured by:

NIVUS GmbH

Im Täle 2
75031 Eppingen
Germany

has been assessed by CSA Group
and for the conditions stated on this certificate complies with:

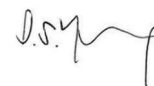
**Performance Standards and Test Procedures for Continuous Water
Monitoring Equipment, Part 3: Performance standards and test procedures for water
flowmeters, Environment Agency, version 4, March 2020**

The combined performance characteristic (U_c , the expanded uncertainty) is **3.84%** (Class2)

Certification Ranges:

Velocity: 0.1m/s to 2.5m/s
Fluid depth: 0.075m to 0.8m

Project No.: 80082260
Certificate No: Sira MC160303/02
Initial Certification: 21 July 2016
This Certificate issued: 20 July 2021
Renewal Date: 20 July 2026



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Environmental Project Engineer

MCERTS is operated on behalf of the Environment Agency by

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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 field trial was conducted on the outfall of the WWTP of Eppingen, Germany.

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:

- Nivus GmbH Test Report - Test report NivuFlow 750 with POA wedge Sensor and air ultrasound level meters, dated 09/05/2016
- Sira Witness Test Report (incorporated with Evaluation Report) dated 08/07/2016

Product Certified

The measuring system consists of the following parts:

- NF 750 - standard version transmitter (NF7-5S1 W0/2 A/D 001)
- NF 750 - multiple version transmitter (NF7-5M3 W0/4 A/D 001)
- POA-K - a V (velocity) sensor POA wedge with or without pressure level sensor (POA-V200KT010L0, POA-V2D0KT010K0, POA-V200KTE10L0, POA-V2D0KTE10K0)
- OCL - an air ultrasonic level meter for sewers (OCL-L1KS12010K, OCL-L1KS12E10K)
- i-6 (iSensor) - an air ultrasonic level meter for open channels (NMI006XX100000H, NMI006XX100001H)

Each system should be composed of a minimum of one transmitter, one velocity sensor, and one level meter.

This certificate applies to all instruments fitted with software versions 1.23 (Transmitters NF750), 2.06 (Sensor POA), 1.59 (OCL) and 6 (i-sensor) onwards.

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Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: -20°C to +50°C

The instrument meets MCERTS Class 2 requirements for the combined performance characteristic as specified in Table 7 of the MCERTS performance standard. Details of individual performance characteristics are summarised below:

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

Test	Results expressed as % of reading				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Mean Error						
Pressure Sensor			1.94			Clause 6.3.2 +/- 4% (Class 2) Note 1
OCL Sensor				2.22		
iSensor				2.08		
Repeatability						
Pressure Sensor		0.83				Clause 6.3.2 1% (Class 1) Note 1
OCL Sensor		0.85				
iSensor		0.89				
Supply Voltage (95 to 250 VAC, 10 to 35 VDC)	0.01					Clause 6.3.3 0.5% (Class 1)
Output Impedance (50 to 500 Ω)	0.01					Clause 6.3.4 0.5% (Class 1)
Fluid Temperature (+5°C to +30°C)	0.07					Clause 6.3.5 0.5% (Class 1)
Ambient air temperature (-20°C to +50°C)	0.45					Clause 6.3.6 0.5% (Class 1)
Relative Humidity (95%RH)	0.28					Clause 6.3.7 0.5% (Class 1)
Direct Solar Radiation						
OCL Sensor		0.67				Clause 6.3.10 1% (Class 1)
iSensor		0.67				
Bi-Directional Flow				-2.48		Clause 6.3.13 +/- 4% (Class 2)

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Test	Results expressed as % of reading				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Fill Level						Clause 6.3.18 To be reported Note 2
By height						
iSensor						
h (m)	v (m/s)	Mean Error				
0.15/0.20	0.091	-0.37% to 1.81%				
0.15/0.20	0.175	0.04% to -4.83%				
0.15/0.20	0.287	0.73% to 5.18%				
0.15/0.20	0.443	0.63% to 3.35%				
0.15/0.20	0.697	2.20% to 4.21%				
0.15/0.20	1.8	-0.09% to -2.34%				
0.15/0.20	2.505	0.32% to 2.05%				
0.5	0.162	-0.49% to -4.86%				
0.5	0.285	-0.37% to -3.02%				
0.5	0.463	-2.31% to -3.38%				
0.5	0.449	-0.10% to 1.24%				
0.75	0.451	-0.12% to -1.11%				
OCL Sensor						
h (m)	v (m/s)	Mean Error				
0.15/0.20	0.092	-0.19% to -2.64%				
0.15/0.20	0.175	0.49% to -5.41%				
0.15/0.20	0.283	2.18% to 7.22%				
0.15/0.20	0.435	1.05% to 6.37%				
0.15/0.20	0.696	2.64% to 4.87%				
0.15/0.20	1.763	0.12% to 1.61%				
0.15/0.20	2.401	2.75% to 6.84%				
0.5	0.161	-0.07% to -4.46%				
0.5	0.284	0.20% to -2.45%				
0.5	0.461	-2.12% to -3.19%				
0.5	0.452	-0.37% to -1.65%				
0.75	0.453	0.21% to 1.65%				

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Test	Results expressed as % of reading				Other results	MCERTS specification	
	<0.5	<1	<2	<5			
Pressure Sensor							
h (m)	v (m/s)	Mean Error					
0.15/0.20	0.094	-1.47% to -4.59%					
0.15/0.20	0.181	-2.26% to -8.32%					
0.15/0.20	0.289	0.98% to 5.20%					
0.15/0.20	0.451	0.07% to -2.78%					
0.15/0.20	0.692	2.94% to 5.62%					
0.15/0.20	1.792	-0.25% to 1.89%					
0.15/0.20	2.475	0.03% to 2.63%					
0.5	0.163	-1.12% to -5.47%					
0.5	0.286	-0.56% to -3.20%					
0.5	0.465	-2.89% to -4.13%					
0.5	0.449	0.07% to 1.24%					
0.75	0.451	-0.11% to -1.24%					
By Velocity							
iSensor							
h (m)	v (m/s)	Mean Error					
0.102	0.45	3.21% to 7.99%					
0.206	0.45	3.13% to 4.13%					
0.405	0.45	-0.45% to 2.03%					
0.507	0.45	-3.73% to -4.59%					
0.509	0.45	-0.10% to 1.24%					
0.754	0.45	-0.12% to -1.11%					
0.101	1.5	0.12% to 1.47%					
0.176	1.5	-2.94% to -5.12%					
0.142	2.45	-0.53% to 3.17%					
0.190	2.45	-2.20% to -4.36%					

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Test	Results expressed as % of reading				Other results	MCERTS specification	
	<0.5	<1	<2	<5			
OCL Sensor							
h (m)	v (m/s)	Mean Error					
0.103	0.45	2.25% to 7.99%					
0.205	0.45	2.63% to 4.28%					
0.40	0.45	-0.70% to -1.86%					
0.51	0.45	-3.73% to -4.59%					
0.506	0.45	-0.37% to -1.68%					
0.751	0.45	-0.33% to 1.65%					
0.103	1.5	1.18% to 2.49%					
0.179	1.5	-1.29% to -2.97%					
0.144	2.45	0.17% to -1.75%					
0.196	2.45	-0.16% to -1.37%					
Pressure Sensor							
h (m)	v (m/s)	Mean Error					
0.102	0.45	3.26% to 8.04%					
0.21	0.45	3.15% to 4.16%					
0.405	0.45	-0.44% to -2.02%					
0.507	0.45	-3.72% to -4.58%					
0.509	0.45	0.07% to 1.24%					
0.755	0.45	-0.11% to -1.24%					
0.101	1.5	0.30% to 1.99%					
0.176	1.5	0.40% to -2.26%					
0.143	2.45	0.41% to -2.24%					
0.192	2.45	-1.41% to -3.60%					
Response time					24 seconds	Clause 6.3.19 <30 seconds	
Combined performance characteristic							
Pressure Sensor					2.84%	Clause 4.2.1 Class 2 (≤5%)	
OCL Sensor					3.15%		
iSensor					3.84%		
Warm up time					39 seconds	Clause 6.1.2 To be reported	

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Test	Results expressed as % of reading				Other results	MCERTS specification
	<0.5	<1	<2	<5		
<p>Error under field test conditions</p> <p>Pressure Sensor</p> <p>Max error 2.6%</p> <p>Min error -6.5%</p> <p>Mean error -1.78%</p> <p>Proportion of errors $\leq 2\% = 37.5\%$</p> <p>Proportion of errors $\leq 5\% = 91.67\%$</p> <p>OCL Sensor</p> <p>Max error 6.7%</p> <p>Min error -7%</p> <p>Mean error -3.49%</p> <p>Proportion of errors $\leq 5\% = 62.5\%$</p> <p>proportion of errors $\leq 8\% = 95.83\%$</p> <p>iSensor</p> <p>Max error 0.91%</p> <p>Min error -6.24%</p> <p>Mean error -2.78%</p> <p>Proportion of errors $\leq 2\% = 37.5\%$</p> <p>proportion of errors $\leq 5\% = 91.67\%$</p>						<p>Clause 7.3.1 >90%</p> <p>Class 2 ($\leq 5\%$)</p> <p>Clause 7.3.1 >90%</p> <p>Class 3 ($\leq 8\%$)</p> <p>Clause 7.3.1 >90%</p> <p>Class 2 ($\leq 5\%$)</p>
Up time						
Pressure Sensor					98.7%	>95%
OCL Sensor					99.2%	>95%
iSensor					99.2%	>95%
Maintenance					39 hours (1.29%)	To be reported Note 3

Note 1: Testing was conducted with both one and three velocity sensors installed on a rectangular channel and closed pipe. Maximum values have been reported, occurring when one velocity sensor is installed.

Note 2: Testing was conducted with both one and three velocity sensors installed on a rectangular channel. Errors were generally lower with three velocity sensors installed therefore the errors reported for the fill level test are from the testing with one velocity sensor only.

Note 3: Of the three sensors, the worst maintenance result has been reported. 39 hours was spent on device malfunctions, repairs and scheduled manual interventions (out of 3024 hours)

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Description

The flowmeter type NivuFlow 750 including the Correlation Sensor supplied by NIVUS is intended to be used for continuous flow measurement in slight to heavy polluted media with various compositions. The flowmeter can be operated in partly filled and full channels and pipes with various shapes and dimensions. It is a stationary measurement system for flow measurement and storage of the measurement data.

The flowmeter simultaneously determines the velocity and level at a common measurement point. Depending on the level selected sensor type, the air-ultrasonic sensor or the pressure combi-sensor may contain 2 different built-in level measurements, an air-ultrasonic and hydrostatic level measurement. To ensure accurate level measurement, the fluid temperature is constantly monitored and fluctuations in atmospheric pressure are compensated for. A piezo crystal with a certain installation angle towards the flow direction operates as a flow velocity sensor. All the particles in the measurement path (air, dirt, suspended solids) reflect a part of the emitted ultrasonic signal pulse. This echo is received by the piezo crystal again and converted to electric signals. After a certain period, the echoes of a second pulse are measured too. By correlation these echo the velocity and a velocity profile can be determined. Associated to the cross section, the discharge is evaluated.

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 CSA Certificates'.
2. The design of the product certified is defined in the CSA Design Schedule V01 for certificate No. Sira MC160303/02.
3. If the certified product is found not to comply, CSA Group should be notified immediately at the address shown on this certificate.
4. The certification marks that can be applied to the product or used in publicity material are defined in 'Regulations Applicable to the Holders of CSA Certificates'.
5. This document remains the property of CSA Group and shall be returned when requested by CSA Group.

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