

FLOW METER ACCURACY and CERTIFICATIONS OVERVIEW

APPLICATION

The purpose of this document is to provide an overview of calibration accuracy and traceability of the Aquamonix EMFLUX range of Electromagnetic Flowmeters, and how the accuracy is maintained and can be verified.

Applies to all Aquamonix flowmeters, models 1060, 2020, 2030 and 2060 flow tubes and all transmitter types.

SUMMARY

- **Aquamonix flow meters are designed to be compliant with Australian Standard AS4747.**
- **We have Full Pattern Approval for all our Flow Meters covering all sizes and models from 50mm up to 1500mm. We are approved for flow rates up to 5000 l/s.**
- **Our Pattern Approval Certificate is NMI 14/3/32 – Variant 9 – May 2024**

METER CALIBRATION, FLOW TESTING & INDUSTRY CERTIFICATION

Aquamonix is Australia's only manufacturer of electromagnetic flow meters and has worked closely with all major water and irrigation organisations and regulatory agencies in the ongoing development, certification and verification of innovative Flow Meter technology. We are pleased to provide the following information regarding the calibration, flow testing and certification and ongoing compliance of our meters.

FLOW TEST FACILITY – CALIBRATION and TESTING

Aquamonix flow calibration facility located at 268 Milperra Road Milperra NSW is capable of flow rates up to 1,100 litres per second continuously, in line sizes (diameters) of up to 1500mm. The facility consists of a volumetric tank, which is certified by *Department of Consumer Affairs Weights and Measures, Regulation 80*.

Our volumetric weigh tank has a capacity of over 60,000 litres and a weighing accuracy of better than ± 1 kg.

This tank is used to calibrate our master meters which have an uncertainty of $\pm 0.18\%$ at a 95% confidence level. Independent Master meters are located on each flow rig line. These Master meters are regularly submitted for independent third party NATA flow certification. All flow meters manufactured by Aquamonix are individually wet flow calibrated to an accuracy of typically better than $\pm 0.5\%$ and are provided with a calibration certificate.

All calibration equipment (ie: counters, volt meters, current meters) is certified to National Measurement Standards. The facility is under the control of our AS/ISO 9001 quality system. Certificate number is 101815.

NATA Certification

The calibration facility is NATA certified for 50mm to 200mm meters and flow rates from 3.5l/s up to 150 l/s by the methods of AS/NZS 2360.6.1:1993. All standard production meters are calibrated against the master meters. Meters requiring NATA certificate are calibrated against the tank. The flow calibration facility is currently being certified to NATA Standard ISO 17025 for larger meters.

This internationally recognised certification process provides independent verification of the accuracy of the flow calibration facility as well as verification of operational processes and procedures involved in the manufacturing and testing of the flow meters.

Statement of traceability:

- Master calibration equipment is certified in accordance with Regulation 13 of the *National Measurement Regulations 1999* (Certificate No. S06-12231-1)
- Verification meters are regularly checked to confirm testing batch consistency against master meters.
 - Master meters are located on each flow rig line and can be verified against a volumetric weigh tank as well as being regularly submitted for independent NATA flow testing and certification.
- Our volumetric weigh tank has a capacity of over 60,000 litres and a weighing accuracy of better than ± 1 kg. Monitoring of water temperature, salinity and atmospheric conditions allow density and buoyancy corrections. The weigh scales are regularly independently tested to NATA standards.
- This tank is used to calibrate our master meters which have an uncertainty of $\pm 0.18\%$ at a 95% confidence level, based on the *ISO Guide to Uncertainty in Measurement 1993*. Master meters are

located on each flow rig line. These master meters are regularly submitted for independent third party NATA flow testing and certification. All flow meters are individually wet calibrated along with their own corresponding transmitter against these master meters at three points over their range to an accuracy of better than $\pm 0.5\%$ of the master meter.

- All calibration equipment, (ie. counters, voltmeters, current meters) is certified to National Measurement Standards. The facility is under the control of Aquamonix's AS/ISO 9001 quality system which is certified by Global Mark and has been since 2004 when the flow calibration facility was established in Milperra. (Certificate No. 101815)
- Each meter is shipped complete with the calibration certificate to provide a traceable reference to individual manufacturing and calibration processes.
- The Aquamonix meter manufacturing and calibration process is covered under an ISO9001 quality system.

INFIELD VERIFICATION and ONGOING METER COMPLIANCE

To verify the original accuracy of Aquamonix EMFLUX flow meters, it is necessary to consider the factors that affect the accuracy of electromagnetic Flowmeters.

Electrical Verification versus Reverification (as defined in ATS 4747.8)

Flow or Laboratory re-verification as defined in the new Australian Standard ATS 4747.8 of electromagnetic flow meters involves removing the meter from site and installing in a flow rig for certification of the accuracy to within $\pm 2.5\%$ as per the standard. Reverification of the meter can be costly and remove the meter from service for extended periods of time.

Electrical verification is a field based alternative to removing the meter for reverification which can be included as part of meter validation by Aquamonix meter technician or certified person. Electrical verification is a complete system interrogation which comprises a series of diagnostic tests and signal analysis measurements. These tests are designed to check that the parameters that can affect the accuracy of the metering system are operating within specification. Electrical verification of the meter is performed with the meter in-situ. Field verification is a fraction of the cost of reverification in a flow lab with usually no downtime for the flow meter.

Contact your nearest Aquamonix service representative for details.

Third Party NATA Testing of Irriflow Flow Meters

Many water agencies have submitted Aquamonix Irriflow flow meters for independent third party testing by NATA approved authorities. There are several NATA certified Flow meter test laboratories that provide testing of meters. Aquamonix EMFLUX meters have been independently tested at facilities such as Manly Hydraulics Laboratory Sydney NSW. SA. A range of other NATA certified flow testing certifications have been carried out by the Australian Irrigation & Hydraulics Technology Centre (AIHTC), South Australia University test lab.

In-Situ Volumetric Measurement (As defined in ATS 4747.8)

Various water agencies have performed "In-Situ Volumetric Measurement" wet flow testing in the field via trailer or truck mounted flow rigs to confirm the accuracy and performance of the installed meters. While not required under new National Metering standards, EMFLUX meters have been subjected to third party in-situ flow testing by various agencies. Field testing has confirmed that the accuracy of the installed meters fully meets requirements under new guidelines.

NMI M 10 and AS 4747

The National Measurement Institute (NMI) is the government body responsible for the pattern approval of meters in accordance with new Australian Standards. Aquamonix is working to ensure our flow meters closely adhere and fully meet impending new standards for non-urban metering. The New Australian Standard (AS4747) will cover the manufacture, supply, installation and compliance of water meters and associated systems. . The framework requires measurement performance to be within a maximum permissible error (MPE) of $\pm 2.5\%$ in the laboratory and $\pm 5\%$ in the field. All Non-urban water metering will eventually need to meet these requirements.



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Pattern Approval

Pattern Approval refers to the independent industry recognition and verification of a metering system.

All Aquamonix flow meters (all sizes and all models) are fully Pattern Approved covering meter sizes from 50mm up to 1500mm, and flow rates up to 5000 l/s.

- **Our Pattern Approval Certificate is NMI 14/3/32 – Variant 9 – May 2024**

State and National Guidelines for Metering.

While the above generally cover the broad certification of metering systems in Australia, there are also numerous State, National and individual water agency guidelines and requirements for metering outlets which need to be considered when assessing relative applicability and certification of metering systems.

End.