

Metering portable pumps

A guide to installing metering on portable pumps

What is a portable pump?

Portable pumps are independent pumping units that can be carried, towed, or installed or removed easily from a dedicated extraction site.

They are usually centrifugal pumps powered by a small diesel, two- or four-stroke petrol engine, or electric motors. Portable pumps generally have lower flow rates and smaller pipework than larger, fixed installation pumps. These pumps are utilised for intermittent pumping use or for when the location of pumping is subject to change or in an area at risk of water inundation.

The approval size of the pump provided on the licenced work conditions will determine if the portable pump is required to meter under the threshold set for surface and groundwater users as part of NSW's non-urban metering framework.

If the licenced work is required to comply with the non-urban metering framework, the installation will provide a reliable and sustainable flow with the required metering, local intelligence device (LID) solution and potential telemetry connection to the data acquisition service (DAS) where required.

The [NSW Water Metering Guidance Tool](#) can provide the thresholds at which approved works, depending on their size, should be metered and equipped with an approved LID. Find the Water Metering Guidance tool at www.water.dpie.nsw.gov.au.



Figure 1. Skid mount portable pump



Figure 2. Lightweight portable pump



Figure 3. Trailer mounted portable pump



Figure 4. Portable pump secured in position on a typical riverbank

Portable pump flow metering considerations

Works that are affected by the NSW non-urban water metering reforms must be compliant by their rollout date.

Flow meters for portable pump installations must follow the [pattern-approved flow meter](#) installation conditions prescribed in AS4747.5-2013, *Meters for non-urban water supply, Part 5: Installation and commissioning of closed conduit meters fully charged*.

These meters have been certified and tested against [NMI M 10-2 Meters Intended for the Metering of Water in Full Flowing Pipes](#). This specification provides test methods for the pattern approval, and verification of water meters for full-flowing pipes designated as accuracy class 2.5 water meters. Find more information about pattern approval requirements at www.measurement.gov.au.

Disturbances

Correct installation ensures minimal disturbances through the flow meter and enables reliable and accurate water flow readings as required under the Water Management (General) Regulation 2018. Incorrect installation methods can cause errors in the measured water flow resulting in incorrect volume calculations and over or undercharging of the licence holder. These scenarios can be easily avoided by adhering to the flow meters manufacturing documentation and installation best practice guidelines.

Ensuring the pipework entering and exiting the flow meter is of solid and sound construction is a priority in these types of installations. The pipework should be well supported and at the appropriate length to suit the minimum distances required to reduce water flow disturbances. The required length of pipe is calculated by the actual diameter of the pipe x the recommended number of pipe diameters (DNs) outlined in the pattern-approved flow meter installation conditions.

The internal diameter of the pipework should match that of the nominal internal diameter of the flow meter to further reduce disturbances from mismatched pipe internal diameters.

Some manufacturers may promote in the specifications that a lower number of DN could be achieved, such as three and zero, which indicates three DN upstream and zero DN downstream. In practice, however this type of installation rarely provides a reliable and trouble-free installation. Always allow as much pipe upstream and downstream as practical above and beyond the manufacturer's recommendations.

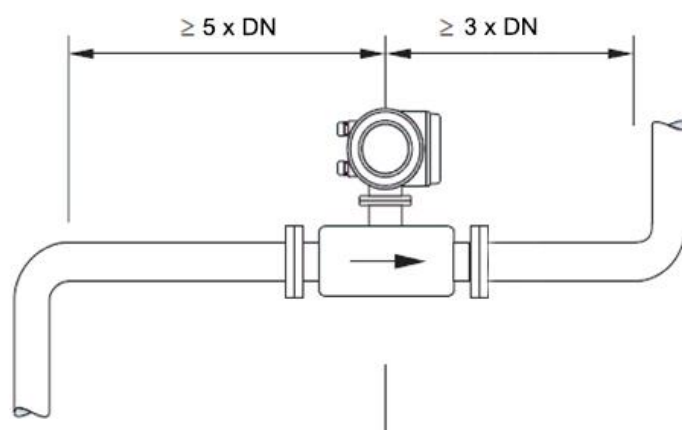


Figure 5. The pipe diameter (DN) length of pipe measurements are calculated from the centre of the flow meter and not the flange or edge of the flow meter body

Connections

How the water lines are connected to the upstream and downstream flow meter pipe sections is up to the water user and could consist of lay-flat hose, steel or PVC pipe depending on the installation.

Typical portable pump hose connection types include:



Figure 6. Lay flat hose connection fitting



Figure 7. Cam lock hose connection fitting



Figure 8. Lay flat hose with cam lock fittings attached



Figure 9. Suction hose with cam lock fittings

These connections must not compromise the security seals and the required upstream and downstream pipe sections of the flow meter.

When mounting a flow meter close to disturbance creating devices such as valves, bends, reducers, or pump impellers, it is imperative that as much distance as possible be allowed between the source of disturbance and the flow meter. The disturbance types and how to deal with them are outlined and detailed in the following standard and guides:

- [AS4747.5-2013 Meters for non-urban water supply](#), part 5: installation and commissioning of closed conduit meters fully charged. These meters have been certified and tested against:
 - [NMI M 10-2 Meters Intended for the Metering of Water in Full Flowing Pipes](#) (via www.measurement.gov.au)
- Irrigation Australia: [Understanding Flow Disturbances for Non-Urban Water Meters](#) (via www.irrigationaustralia.com.au).

Portable pump installation methods can create various other issues but generally, all disturbance creating devices should be kept as far away as practical from the flow meter section. To ensure a laminar flow, the solid and fixed straight sections of pipework should be bolted directly to the upstream and downstream sides of the flow meter. This pipework and flow meter should be sealed by the DQP with tamper-proof numbered seals as specified in the [NSW Non-Urban Water Metering Policy](#). Find the NSW Non-Urban Water Metering Policy at www.water.dpie.nsw.gov.au.

To ensure portable pump and flow meter manoeuvrability, keep solid upstream and downstream pipework lengths to a minimum. The length of flow meter pipework would depend on the DQP assessment of disturbances and installation methods used.

A certified portable pump installation will ensure a workable and sustainable solution is maintained. There will be no need for revalidation of the installation if the portable system is moved and returned to the same location.

Protection

Another major consideration is mechanical support and structure around the flow meter to protect the equipment and sensitive electronics within the flow measuring device and the display.

The flow meter and attached pipework should be mounted and secured to a solid support. Such supports could include a steel or timber brace, skid, trailer, or similar device that allows for simple and safe relocation of the flow metering section without disassembly or disruption to the validated and sealed components of the flow meter installation.

Lifting points should be suitable to the structure and well balanced for the weight distribution of the pipework, structure and flow meter.

Figure 10 provides an example of a 100 mm flow meter and pipework mounted and well supported to a solid structure. There is a lifting support and protective structure fixed to the base to ensure safe and protected relocation. The flow meter is sealed via the DQP seals on each flange via seals through the flange bolts. The flow meter display and controls are also sealed via tamper proof seals as per AS4747.

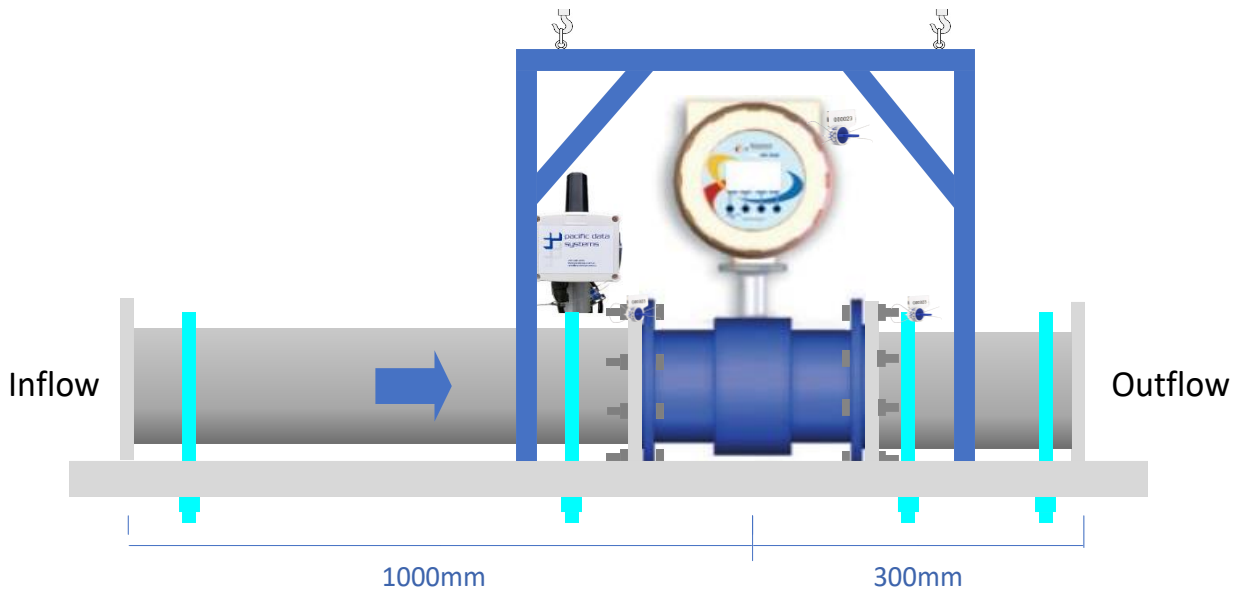


Figure 10. An example of a 100 mm flow meter and pipework mounted and well supported to a solid structure

Metering installation and tamper proof sealing

All metering equipment must have tamper-evident seals to secure the installation and show whether the equipment—including the meter itself, ancillary wiring, pipework, or other components—has been interfered with.



Figure 11. DQP seals on the flange bolt and the flow meter termination enclosure

Ongoing validation of metering equipment by a DQP is required. Validations should be done every five years, and in any other circumstances in which metering equipment is required to be validated by the [NSW Non-Urban Water Metering Policy](http://www.water.dpie.nsw.gov.au) found at www.water.dpie.nsw.gov.au—for example, when maintenance work affects the metrology of the meter.

If any damage occurs during relocation or the flow meter fails to read for any reason you must report the faulty metering equipment [under section 91i](#) to WaterNSW. You will need to follow these steps if your metering equipment is not working properly:

1. Report the faulty meter within 24 hours using WaterNSW's online self-reporting form at www.waternsw.com.au/s91i.

- You will need to specify in the form how the water extracted will be measured while the metering equipment is faulty and report it in a logbook that will be provided to you once you have submitted the form.
- Failure to self-report within 24 hours is a breach of the *Water Management Act 2000* and will be referred to the Natural Resources Access Regulator (NRAR).

2. Repair or replace the metering equipment within 21 days and have it certified by a DQP.

- A list of DQPs can be found on [Irrigation Australia's](http://Irrigation Australia's website at www.irrigationaustralia.com.au) website at www.irrigationaustralia.com.au.
- If the metering equipment cannot be repaired or replaced within 21 days of reporting it, you can apply to WaterNSW for an extension of up to 21 additional days. Visit www.waternsw.com.au/s91i-extension to apply.

3. Submit a S91i completion form to WaterNSW within 28 days including:

- the logbook used to record the water taken while the metering equipment was faulty
- a copy of the validation certificate completed by the DQP
- up to two photos of the new or repaired metering equipment.

The s91i completion form can be found at www.waternsw.com.au/forms.

Further information and requirements are outlined and detailed in AS4747 and depending on the pipework configuration, some guidelines and best practice examples are provided in AS4747 Section 5, Appendix B.

Data logging and telemetry requirements and local Intelligence devices (LIDs)

[The Water Management \(General\) Regulation 2018](#) sets out key technical requirements for data loggers and telemetry, and requires they meet any relevant requirements in the *Data logging and telemetry specifications 2021*.

Under NSW's metering rules, all surface water works, except for pumps below 200 mm, need to be fitted with an accurate meter and a compatible LID.

LIDs are very easily mounted to the pump or flow meter structure. They can be connected to the flow meter by the DQP as per the installation directions supplied with the LID and flow meter devices.

In the case of telemetry installations, a steel supporting pole can be installed to mount the antenna and solar panel (if required). The supporting pole will need to be installed and fixed to the flow meter or pumping structure for reliable and sustainable operations. This installation will generally be the same as other flow meter and LID installs but the antenna, support pole and LID must be part of the mobile structure and protected from damage or disconnection when in transit. The design may allow for a swivel or pivot pole design to lower and secure the antenna pole during movement and storage without the requirement for disconnection and tampering that would void the validation of the installation.

To enable the secure transmission of meter data, the DAS will collect and store data received from compatible LIDs. Data collected by the DAS will assist NRAR, WaterNSW and the department to undertake compliance and enforcement, billing, and other water management activities. Water users will also be able to access their information via a private online dashboard.

A compatible LID is one that meets the functional and security requirements of the DAS and has been installed by a DQP. In order to maintain a suitable level of data integrity throughout the

system, the department has created a set of [technical standards](#) to guide manufacturers to develop compatible devices. The department maintains a [list of devices and solutions](#) that have been tested and confirmed as meeting these requirements. Find the technical standards and list of compatible devices at www.water.dpie.nsw.gov.au.

If water users are not required to meet the telemetry requirements of the NSW non-urban metering rules, they may voluntarily enable their LID to communicate to the DAS via telemetry. This will alleviate the mandatory requirement for them to record and report their water take.

Further information about transitioning to telemetry and the [DAS](#) is available at www.water.dpie.nsw.gov.au.

Requirements to keep and provide records

New recording and reporting requirements will apply to all water users taking licensed water. The new requirements take effect on the rollout date applying to the relevant works. Visit www.water.dpie.nsw.gov.au to stay up to date with requirements.

Removal and reinstating the portable equipment

The LID and associated equipment should be secured to the portable skid, trailer or similar device that allows for simple and safe relocation of the flow metering section. Keeping this all mounted together in a solid and sustainable way is important to maintain the reliability and serviceability of the pump site and flow meter. This equipment should be well supported and designed in such a way that retains the integrity, validation, and calibration of the instrument. No movement, disassembly, or disconnection of the LID from the flow meter should be required during removal or relocation of the flow meter system from the fixed pipework or installation site.

Generally, telemetry LIDs are set up to point to the communication tower that provides the best signal strength. Ideally the validated antenna compass bearings will be documented and detailed on the portable equipment for easy reinstatement of equipment after relocation. This process will ensure the signal strength and optimum communication is maintained with the DAS.

Another important consideration for portable pump installations along riverbanks is signal strength. Deep channel banks and vegetation may block direct sunlight for solar panels. Poor connectivity in these circumstances may determine that an approved data logger LID is more suitable. In circumstances where signal strength is not adequate to support approved LID functionality, it is recommended to contact the authority to discuss alternative pathways to compliance.

It is also important to ensure that when reinstating the portable pump station and flow meter that all internals of the pipework upstream and internal to the flow meter are clear and clean of any dirt and debris upon reconnection.

Portable pumps and flow meter assemblies that are attached to a registered trailer may need to be inspected for road worthiness and registration prior to moving the trailer across the farm or public roads. For more information, contact [Transport for NSW](#) at www.roads-waterways.transport.nsw.gov.au.

Considerations for portable pumps taking from multiple extraction sites, access licences or water sources.

So water usage can be accounted for against the correct entitlement, it is critical that metering equipment is associated with the correct works approval and water access licence information.

Under NSW's metering rules, this is achieved by registering individual LIDs in the DAS to a Works Approval and designated extraction site (ESID), for example: 10CA102986-56395-1. There may be limitations to how a portable pump, meter and LID solution can be used depending on the work approval (WA), number of works, extraction sites (ESID), linked water access licences (WAL's) and water sharing plans (WSPs) and water sources.

In determining whether a metered portable pump solution can be associated with the correct work approval and water access licence, DQPs should take the following considerations into account:

- whether the pump is taking water from a single ESID or multiple ESIDs
- whether the pump is taking water from a single water source or multiple water sources
- whether the pump is taking water from different works approvals or access licences
- whether each of the extraction sites is within range of the Telstra Narrow Band Internet of Things network, used for the NSW Government's telemetry system.

In the following scenarios, a single portable metered pump can be used:

- **Scenario 1:** a water user is planning to use a portable pump across a single ESID under the same WA with one or more nominated WALs.

In the following scenarios, separate metered pumps will be needed for each ESID, WA or water source:

- **Scenario 2:** a water user is planning to use a portable pump across multiple ESIDs all under the same WA with one or more nominated WALs.
- **Scenario 3:** a water user is planning to use a portable pump across multiple ESIDs on different WAs, and nominating different WALs – in this case a dedicated meter should be considered for each WA.
- **Scenario 4:** a water user is planning to use a portable pump across multiple water sources like ground water and surface water – in this case, a dedicated meter should be considered for each water source.

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