Manu Electronics Pty Ltd (ManuFlo) Tradewaste measurement systems are specifically designed to accurately monitor the discharge of liquid trade wastes from industrial pre-treatment facilities. The design of the systems have taken into consideration the requirements of both the consulting engineers within the pre-treatment design and construction area, and those of the various Government and trade waste statutory authorities.

We are proud to be one of the founding local companies involved with Sydney Water, when design and implementation of flowmetered tradewaste measurement systems were first enforced back in 1984. Sydney's waterways are cleaner than ever before in the last 80 years, due to programs like tradewaste monitoring implemented by Sydney Water.

Electromagnetic flow sensors are the most widely accepted instruments for measurement of full pipe flow liquid tradewastes.
- Since the flowmeter sensor is an obstructionless bore (i.e. an empty pipe, with nothing in the pipe to impede the flow), a variety of liquid contaminates can be passed;
- There is virtually no maintenance; and
- Measurement from very low to high flow rates is possible with great accuracy.

Choosing the right electromagnetic flowmeter system depends on the pipe diameter, expected flowrate of discharges, and any agreements made and/or requirements requested by your local Sydney Water tradewaste inspector.

Your chosen ManuFlo Magmaster electromagnetic flowmeter will be fully programmed, wired, calibrated and wet-tested on our internal flow test rig facility, and will be supplied with a compliance calibration certificate (Specifications as per Wastewater Source Control Branch 2001 Edition manual). When you choose your system from ManuFlo, simplicity of installation is assured.

MAGMASTER ELECTROMAGNETIC FLOWMETERS (MFS)

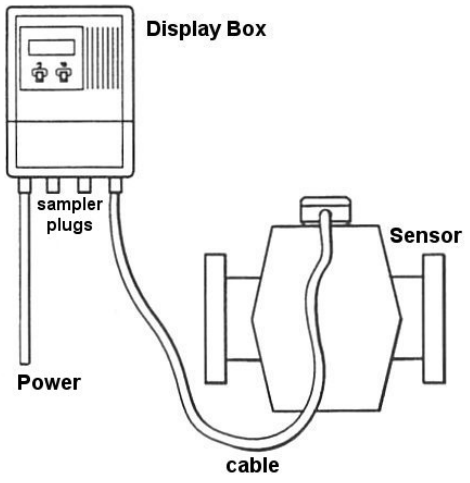


Fig. 1

As shown in Fig. 1 at left, the **MFS flowmeter range** consists of **a MAGMASTER ELECTROMAGNETIC FLOW SENSOR (available in various pipe sizes 25-150mm) ,** which is connected via **a few metres of cable** to a **display box** which displays flowrate and grand total and which also has a sampler output signal facility**.**

At site, you fit the flow sensor inline into your pipe, and the display box is usually wall mounted (in some cases, the display box can be ordered integrally mounted onto the sensor).

Each MFS flowmeter complies with Sydney Water tradewaste specification requirements, and can be optionally fitted with PVC flanges and a Stainless Steel earthing ring for PVC pipe runs.

The display box:
- has a 9-digit grand totaliser (with non-volatile memory), programmed to Sydney Water preferred total KiloLitres (or to Litres for small discharges i.e. less than 5,000 Litres/day);
- displays instantaneous flowrate in Litres/minute;
- comes with:
  - a 6-pin MIL spec sampler output plug scaled to 1 KiloLitre/pulse (or to 100 Litres/pulse for small discharges i.e less than 5000 Litres/day), with minimum 300 millisecond pulse width; and
  - a 4-20mA 2-pin output plug.
- has a protection rating of IP65;

- Fitout includes a 2 metre 240vac mains power cord (simply hard wire it to a GPO).
- 2 metres (or optionally longer) of special low voltage signal cable is wired from the display box to the sensor unit.
- PVC pipe flanges and Stainless Steel earthing rings can optionally be fitted to the sensor unit, making installation easier.

The measurement principle of Electromagnetic flowmeters is based on Faraday's law of conductivity/induction, where a voltage is induced in a conductor as it flows through a magnetic field. The processor box then converts the proportional voltage signal into scaled readings. **The fluid being measured must have a conductivity of at least 5 microsiemens**. With a 1000:1 measurement ratio, the MFS is unrivalled with +/-0.2% accuracy. Due to its obstructionless bore with no moving parts, a Magmaster can measure the harshest of liquid tradewastes. As a result, there are vitually no ongoing maintenance requirements.

ManuFlo Systems customers

Our customers include many prominent manufacturing companies large and small, Municipal Councils, and government authorities.

INSTALLATION PRECAUTIONS / CONDITIONS

To choose the correct diameter Magflow sensor, you must establish approximate minimum and maximum flowrates (refer to the MFS data sheet, or consult ManuFlo) - this is helpful but not critical with electromagnetic meters.

As shown in Fig 2 below, the flowmeter sensor must be installed in a pipe section that is full of liquid at all times.

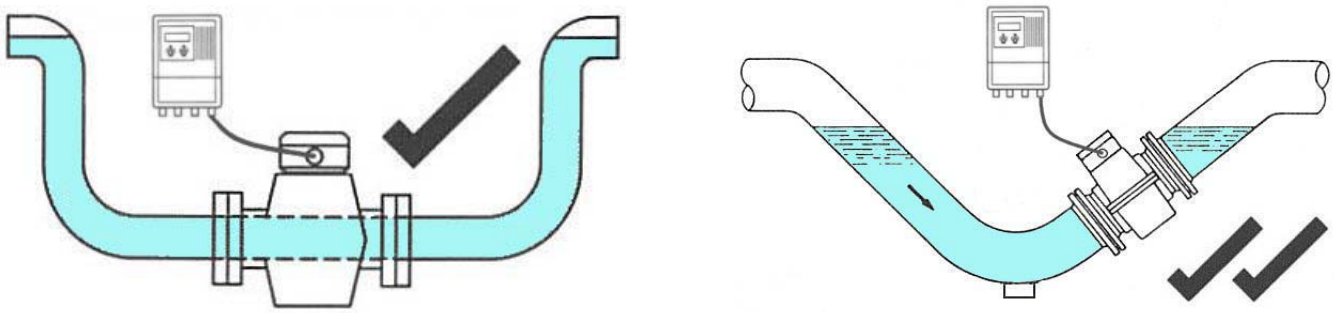


Fig. 2 Pipe must be full at all times.

At installation, MFS electromagnetic flowmeters require straight pipe sections (being the same diameter as the sensor pipe diameter) for a minimum of 10 diameters upstream and 5 diameters downstream (see Fig 3 below), in order to eliminate flow turbulence to ensure accurate readings e.g. a 50mm sensor requires 10x50mm=500mm straight pipe upstream and 5x50mm=250mm straight pipe downstream. As long as the straight pipe requirement is met, larger pipe diameters can be fitted upstream of the sensor, and preferably the same or smaller diameters should be fitted downstream of the sensor.

For horizontal pipes, ensure the sensor's electrodes are facing either side of the pipe rather than at the top (see Fig 4 below), as air bubbles could affect readings.

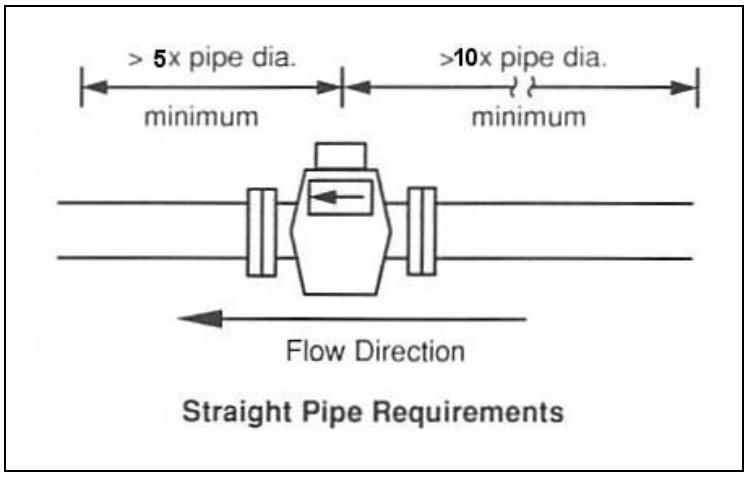


Fig. 3

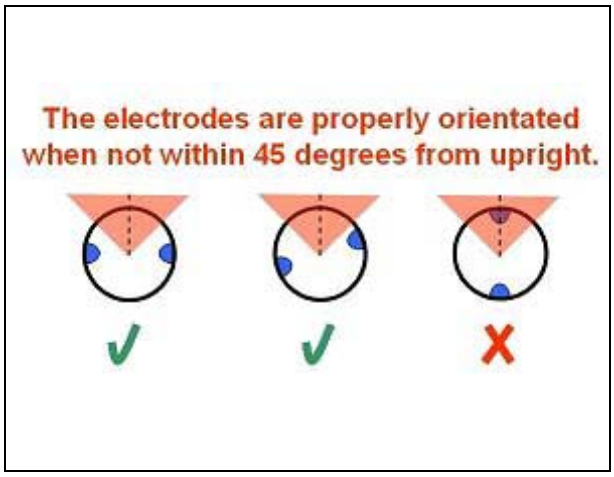
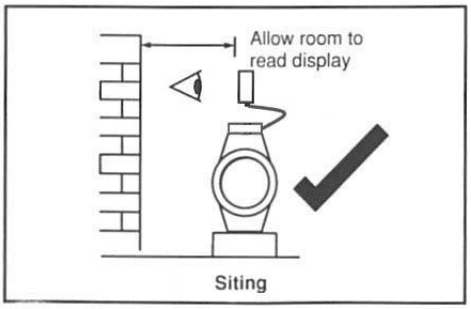
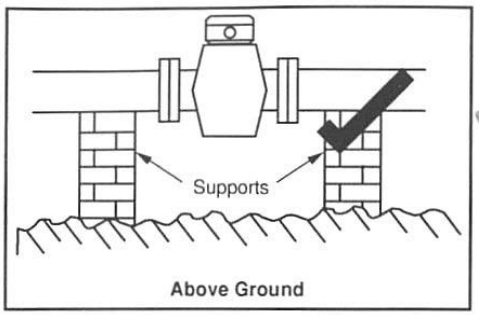
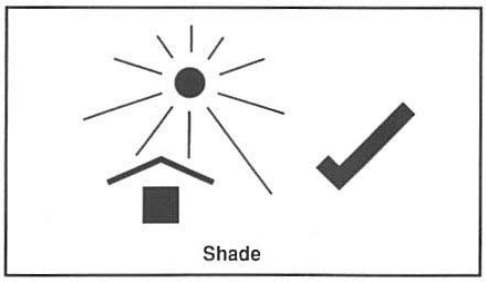


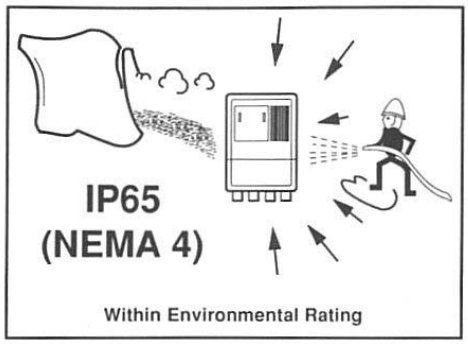
Fig. 4

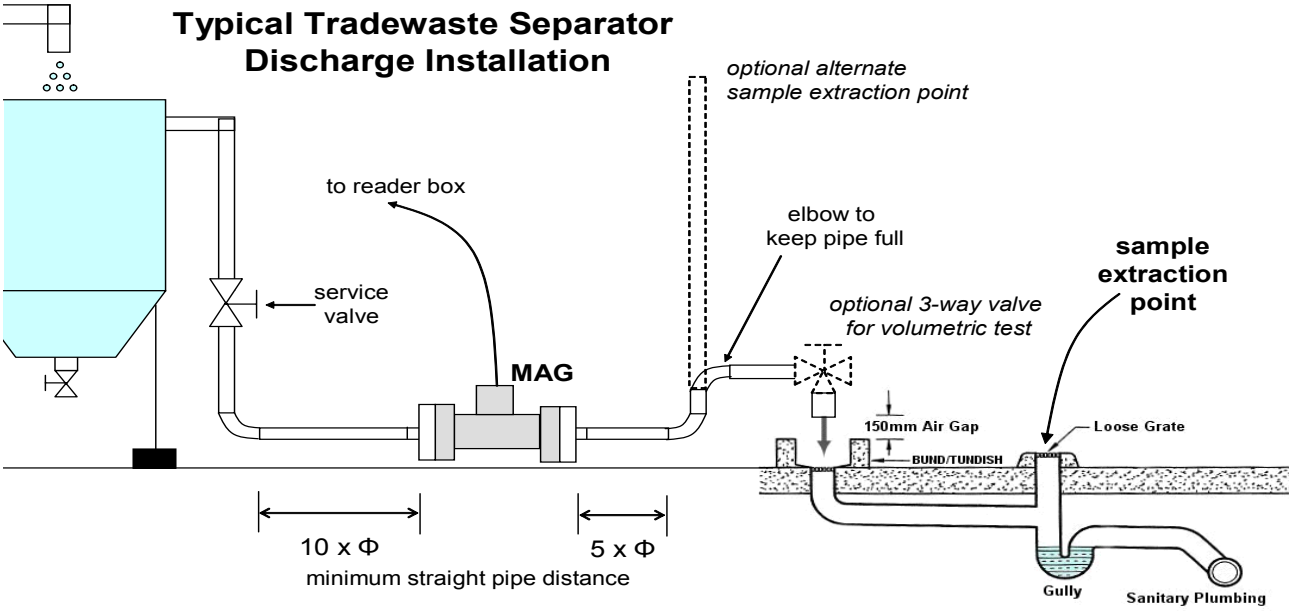
INSTALLATION PRECAUTIONS / CONDITIONS











CALIBRATION OF TRADEWASTE MEASUREMENT SYSTEM

i) Pre-delivery calibration: All systems are precalibrated at the ManuFlo factory, with pumped or gravity fed water, using a Water Board designed weir tank rating facility cross-referenced with a NSW Weights and Measures certified load cell and Magmaster flowmeter verification system. A fully compliant Sydney Water calibration certicate is issued, valid for 1 year.

ii) Field calibration: (Sydney metro area only) After the system has been installed, onsite calibration can be performed via the revolutionary CalMaster process, where the flowmeter is calibrated electronically without the need to remove the flowmeter or to collect liquid. A CalMaster calibration certificate is issued that the system is verified to tradewaste requirements and can be submitted to your tradewaste inspector. A tradewaste flowmeter/indication system should be checked and calibrated at least once a year. The time taken to calibrate will vary according to installation, but one hour should be taken as a guide.

iii) Re-Calibration service: If ongoing onsite calibration is not possible due to installation constraints, we offer an in-house calibration with certificate at the ManuFlo factory, on our Weights and Measures certified flow-rig.