

Paddlewheel-type flowmeters: Application Guide

The RPFS insertion paddlewheel flowmeter was designed, manufactured and introduced by Manu Electronics in 1984. There are now thousands of units in use every day.

The current range of RPFS-type flowmeters are used primarily for fresh and recycled water batching measurement in concrete plants, and also in many other process industry applications e.g. tradewaste, diesel and petrol measurement, water irrigation, salt water measurement, admixture batching.

- The **RPFS-P** version can be used with ME995-7 Batch Controllers for preset automatic batching, and with UIC interface cards for pulse scaling and input to a range of PLC/computers, FRT303 Flowrate/Totaliser Indicators, or coupled to any other frequency-input device.
- **RPFS-H** is used for the measurement of hot liquids. *RPFS-H shown with locking cap -->*
- **RPFS-L** has inductive coil pulse output, and is used for connection to battery-powered devices.



A wide range of pipe adaptor fittings are available to suit most pipelines (see the RPFS Datasheet from our website). If the fittings listed are not suitable for your application, consult ManuFlo for custom items. Most of our fittings are suitable for pipes up to 100mm diameter, but the RPFS has been used on pipes up to 2000mm diameters.

Pulses Per Litre

The following formula approximates RPFS output pulse for a given pipe diameter (for water), for matching the RPFS to your Flowrate Indicator, PLC or other devices:

$$\text{Pulses Per Litre for a given pipe diameter} = \frac{46,512}{(\text{pipe diameter in mm})^2}$$

$$\text{e.g. Pulses Per Litre for 200 mm diameter pipe} = \frac{46,512}{(200)^2} = \frac{46,512}{40,000} = 1.2 \text{ Pulses/Litre}$$

Minimum/Maximum flowrate

The following formulas give the approximate minimum and maximum flowrate (for water) that can be measured to $\pm 2.5\%$ accuracy (0.5 - 8 m/s flow velocity) for a given pipe diameter in mm.

$$\text{Minimum flowrate (Litres/min)} = 0.0236 * (\text{pipe diameter in mm})^2$$

$$\text{e.g. for 200mm diameter pipe, minimum flowrate} = 0.0236 * (200)^2 = 0.0236 * 40,000 = 944 \text{ Litres/min}$$

$$\text{Maximum flowrate (Litres/min)} = 0.377 * (\text{pipe diameter in mm})^2$$

$$\text{e.g. for 200mm diameter pipe, minimum flowrate} = 0.377 * (200)^2 = 0.377 * 40,000 = 15,080 \text{ Litres/min}$$

Application characteristics

For all applications, an on-site calibration test should be performed.

RPFS-type flowmeters:

- can be used for liquids of specific gravities upto 1.4, although the actual pulse output rate must be determined onsite when calibrating.
- are ideal for medium to high-velocity flow measurement (not suitable for low velocity measurement).

RPFS-type flowmeters are not suitable for measuring liquids that:

- vary in specific gravity, or
- are highly sticky, or
- contain fibrous matter or large particles.

In the RPFS:

- the rotor (paddlewheel) used is made of a impervious injection-moulded marine alloy (SAF2205). It can be used with acids and almost any liquid composition. The axle is tungsten-carbide and practically does not wear.
- the body and rotor bushes are made from injection-moulded Delron. The body is also available in brass (model RPFS-H) for hot liquids.
- The O-rings are Neoprene as standard, or Viton for petroleum products.

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Flow Measurement & Control products

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