

## SUPPLEMENTARY MATERIAL

# Water use pattern within each day: Variation between batches of growing pigs in commercial production systems

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**Table S1:** Characteristics of 3 types of water flow meters suitable for use in pig buildings

Factor	Type of flow meter		
	Turbine flow meter*	Electromagnetic flow meter <sup>†</sup>	Ultrasonic flow meter <sup>‡</sup>
Cost	Low	Moderate - High	Moderate - High
Accuracy, % (typical)	3	0.25-0.5	1-2
Repeatability, % (typical)	0.5	0.15	0.15
Ease of installation	Moderate	Moderate	High
Mains power source required	No	Yes	Yes if measuring for more than a few hours
Portability	Moderate	Low	High; Clamp-on models are easy to remove and reinstall on another pipe
Reliability	Low; Moderate risk that rotor may be damaged by sediments and other materials passing through pipe	High; No moving parts	High; No moving parts
Longevity	Low - moderate	High	High
Direction of flow measured	1 direction only	2 directions	2 directions

\* Turbine flow meters contain a rotor mounted perpendicular to the water flow within the pipe. The rotor's blades spin as water passes through them, at a velocity proportional to the velocity of the water. The rotational speed of the rotor is detected by a magnetic pick-up, photoelectric cell or gears, generating electrical pulses. The number of pulses per minute is counted and converted into the flow rate, based on the 'K-factor' provided by the manufacturer.

<sup>†</sup> Electromagnetic flow meters use a magnetic field and Faraday's law of electromagnetic induction that states that a current will be induced in a conductor that is exposed to a changing magnetic field. Energized coils outside the pipe create a magnetic field and the liquid serves as the conductor. The amount of voltage produced is directly proportional to the velocity of the water in the pipe and is used to calculate flow rate. The voltage is detected by 2 electrodes mounted in the pipe wall.

<sup>‡</sup> Two transducers are clamped to one side of the pipe at a calculated distance apart based on the pipe's internal diameter and the thickness of its wall, material, and the viscosity and temperature of the water. One transducer emits a sound wave at a given frequency across the pipe, which is reflected by the water in the pipe and received by the other transducer. The change in the frequency of the sound wave, which is proportional to the velocity of the water in the pipe, is used to calculate flow rate.

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Supplementary material to: Little SB, Woodward AP, Browning GF, Billman-Jacobe H. Water use pattern within each day: Variation between batches of growing pigs in commercial production systems. *J Swine Health Prod.* 2023;31(1):20-28. <https://doi.org/10.54846/jshap/1297>

Supplementary material DOI: <https://doi.org/10.54846/jshap/1297suppl1>.