

Microfluidic measurement of an infusion pump using a loadcell

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An infusion pump is used for precise dosage control to patients using an IV-set. The infusion pump is integrated with more than fifteen fingers to generate sine waves to a compliant tube. Spatial movement of the sine waves squeezes the compliant tube to provide patients drug at very low mass flow rate down to 10 mL/h. Even though the infusion pump is tested by gravimetric flow metering with a balance and a timer before its release, its performance is significantly influenced by the quality of the IV-set. However, the accuracy of the infusion pump has not been tested seriously during its operation. In this study, a loadcell was used to measure the weight of the IV-set when the infusion pump was operating. Timed measurements using a DAQ provided mass flow rate in units of g/h. The measurement indicated that the accuracy of mass flow metering by the loadcell was within 3.6 %, compared with the gravimetric flow metering with the balance. It was found that the loadcell could be used to check the mass flow rate of the infusion pump irrespective of the type of the IV-set. Such instrumentation will be useful for feedback control of the mass flow rate with the infusion pump in the future.

Keywords: gravimetric flow metering, infusion pump, loadcell, mass flow metering, micro flow, microfluidics

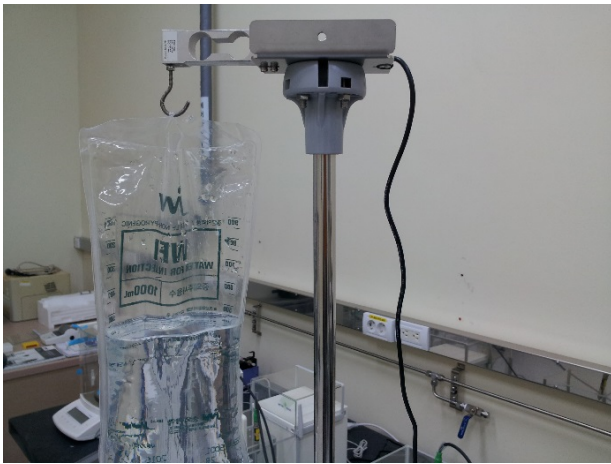


Fig. 1 Experimental setup for mass flow measurement of an IV-set using a loadcell

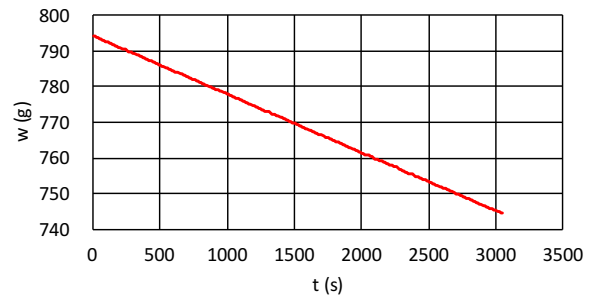


Fig. 2 Timed measurement of weight change for mass flow metering with a loadcell