Calculating the Total Duration of Administration for ALZET Osmotic Pumps

The nominal, or theoretical, duration of infusion for ALZET pumps ranges from one day to six weeks depending on the pump model. The actual duration of infusion for all ALZET pumps is always longer than their nominal duration. For example, the Model 2002 pump has a nominal duration of 14 days, but it will always infuse for longer than 2 weeks. The actual duration of administration for a particular lot of pumps can be estimated based on the mean pumping rate and fill volumes provided on the instruction sheet included in each box.

LOT NO.	10196-08	
MEAN PUMPING RATE	0.53	MICROLITERS/HR.
STANDARD DEVIATION	0.01	MICROLITERS/HR.
MEAN FILL VOLUME	216	MICROLITERS
STANDARD DEVIATION	10	MICROLITERS

Lot-specific data for Model 2002 pumps from lot 10196-08

It is important to calculate the actual duration of infusion to:

- Determine the maximum duration your pump will be able to deliver
- Estimate the residual volume remaining inside the pumps at any given time point
- Assess whether prolonged priming of pumps will impact an experiment
- Determine the actual number of pumps required for long-term studies requiring serial implantation

The actual duration of infusion can be calculated from the following equation:

$$D = (V/Q)\ (0.95)$$

Where D is duration in hours, V is the Mean Fill Volume in µl, and Q is the Mean Pumping Rate in µl/hr as listed in the lot specifications sheet. The 0.95, or 95%, represents the total volume that can be released by a pump. The remaining 5% of the solution is considered dead space and will not be infused.

Using the equation above and the provided lot-specific data, the total duration of infusion for Model 2002 pumps (lot #10196-08) is 387 hours, or 16.1 days. The recommended priming time for Model 2002 pumps is 4-6 hours. Even if these pumps were primed for 48 hours the total duration of infusion will still be ~14.1 days.