

ALZET Osmotic Pumps can be adapted to allow for a recovery period following surgery, such as after implantation of brain cannulae. In this application, the ALZET pump is filled with drug solution and attached to a length of catheter tubing, which has been loaded with a control solution (no drug). If the control solution is such that mixing could occur between it and the drug solution, a spacer substance should be placed between the control and drug solutions. The spacer substance can be any liquid in which the drug solution is not miscible, such as oil or sterile air.

Upon implantation, the ALZET pump begins releasing the drug solution from the pump reservoir into the catheter tubing, displacing control solution from the catheter tubing into the animal. Once all of the control solution is released, the drug solution reaches the end of the catheter tube and is then released into the animal at the pump's constant rate.

I. Catheter length:

For CNS infusion, the tubing length should be 25% longer than the distance between the pump (placed subcutaneously over the scapulae) and the site of cannula placement. For example, if this distance is 8 cm, use a 10 cm length of tubing. If the 10 cm tubing is filled with control solution, the period of time for control solution delivery depends upon the total volume contained in the tubing and the pump model being used.

II. Catheter volume:

Use the following length-volume conversions to determine the appropriate length of catheter tubing:

Tubing Type	Size	Volume per Centimeter
Vinyl	V3/A*	3.739 μ l
Polyethylene (PE)	PE-60*	4.566 μ l
PE	PE-50	2.679 μ l

*V3/A & PE-60 tubing are available from DURECT Corporation.

V3/A comes either separately or as part of the ALZET Brain Infusion Kits

III. Example:

A researcher desires a one-week delay following brain cannula implantation. Drug infusion should begin after this delay period and last three weeks. The researcher is using ALZET Model 2004 with the ALZET Brain Infusion Kit, in an adult rat.

ALZET Model 2004 releases at 0.25 μ l/hr** and therefore delivers 42 μ l over one week. This amount of control solution (i.e., artificial CSF) should be loaded into the tubing.

The vinyl tubing in the brain infusion kit contains 3.739 μ l per cm, so 42 μ l will fill 11.2 cm. The researcher measures a distance of 8 cm between the pump and cannula implantation sites. The minimum catheter length would be 25% longer than this distance or 10 cm. The 11.2 cm needed to provide the one-week delay will work well. The catheter is filled with aCSF; a small air bubble is introduced to prevent mixing with the drug solution once attached to the primed and filled pump.

Note: When using a catheter, the entire contents of the pump reservoir will not be released in the animal. Some solution will remain in the catheter tubing at the end of the infusion period. Despite this, the pump must be filled completely in order to operate properly.

**Nominal pumping rate for Model 2004. (Refer to the instructions inside each box for lot-specific data.)