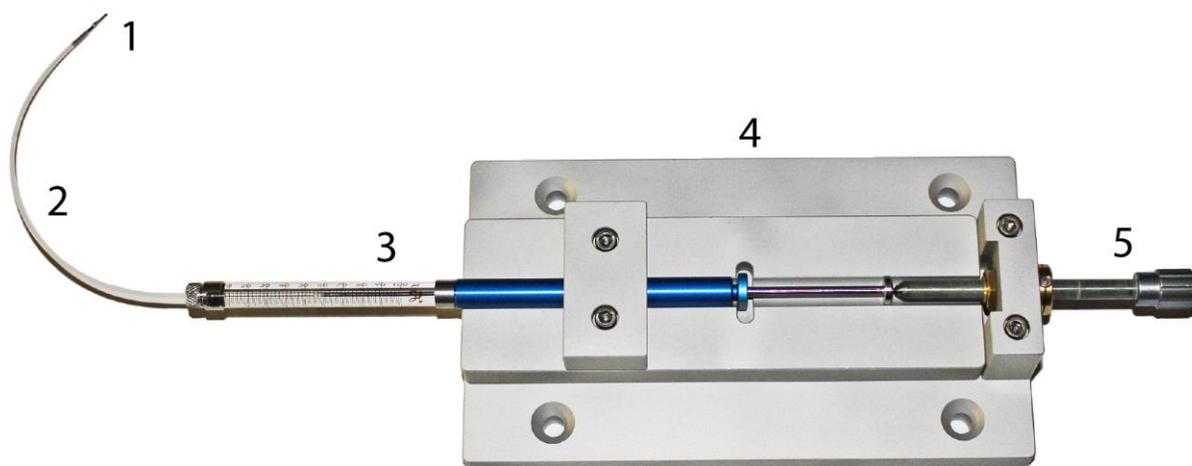


## Grease Injection Pump



**Figure 1.** Fully assembled Grease Injection Pump with components listed. 1 – Injector Tip; 2 – Polyethylene (PE) tubing (20 gauge standard wall); 3 – Hamilton syringe; 4 – Frame; 5 – Adjustment screw.

### Components:

#### **Injector Tip – Gray Matter Research**

20 gauge to 23 Gauge

#### **Polyethylene Tubing – Instech**

Part #: BTPE-60

#### **Ferrules – Hamilton**

Part #: 55751-01

Description: Dual Ferrule, RN Adaptor, .062

#### **Syringe – Hamilton**

Part #: 7662-01

Description: 100  $\mu$ L, Model 1810 RN SYR, NDL NO NEEDLE

#### **Frame and Adjustment Screw - GMR**

#### **High Vacuum Silicone Grease – Ellsworth Adhesives**

Part #: HI VAC GRSE 150G TUBE

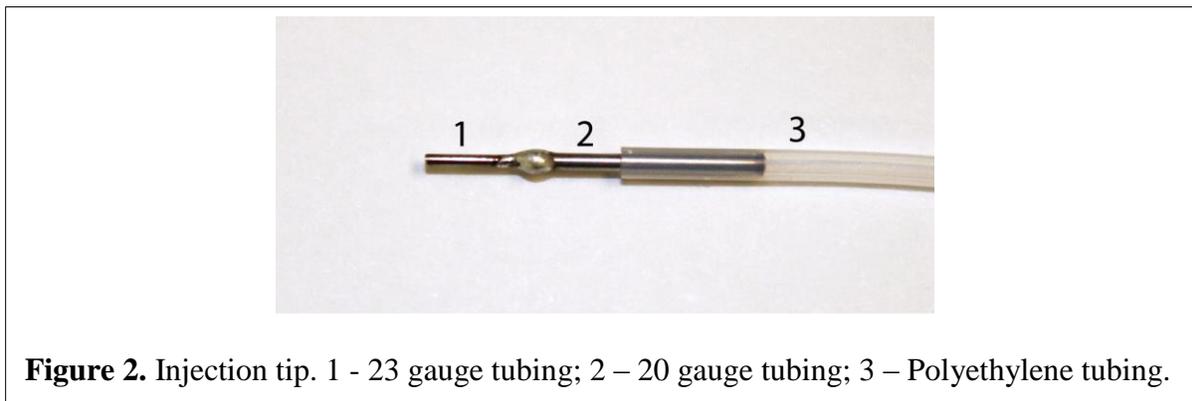
## Grease injection sequence

1. Load the Hamilton syringe with sterile silicone grease.
2. Advance the adjustment screw until grease begins to escape the Injection Tip.
3. Mount the Injection Tip into one of the counter-bored holes in the bottom of the actuator block.
4. Inject a calibrated amount of grease until the electrode guide hole is filled. Repeat.

## Assembly/Preparation

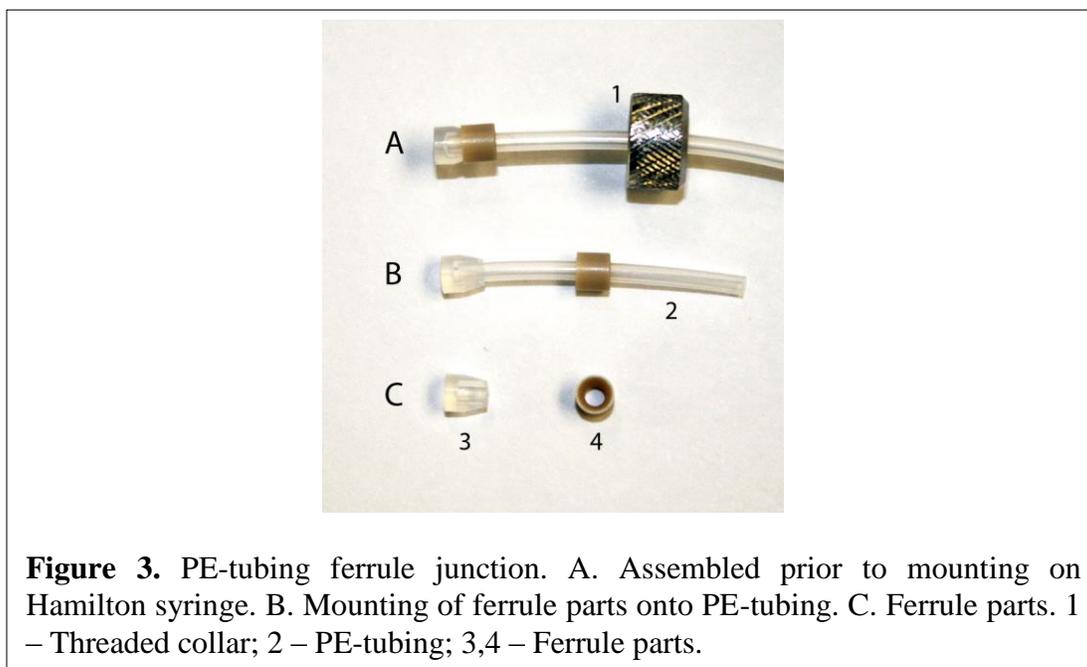
### Injection Tip

The injection tip (figure 2) is composed of two pieces of stainless steel tubing soldered together. The smaller piece is 23-gauge, and fits snugly within the counter-bored hole on the bottom surface of the actuator block (see figure 5). The larger tube is 20-gauge thin walled tubing, and fits tightly within the polyethylene (PE) tubing attached to the syringe.



### Ferrule/Collar

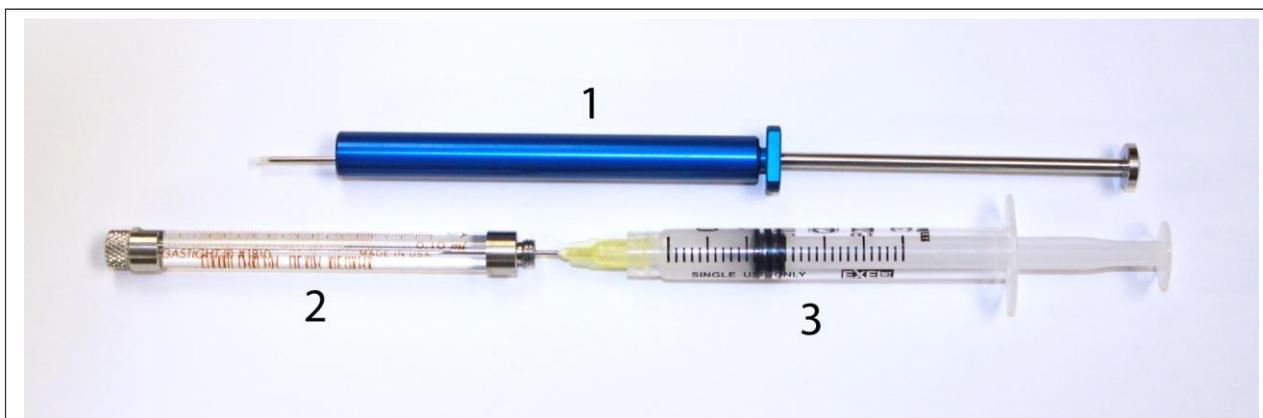
The ferrule/collar insures a tight seal between the PE-tubing and the Hamilton syringe. Mount the ferrules and threaded collar onto the other end of the PE-tubing (figure 3). Then mount the assembly onto the end of the Hamilton syringe.



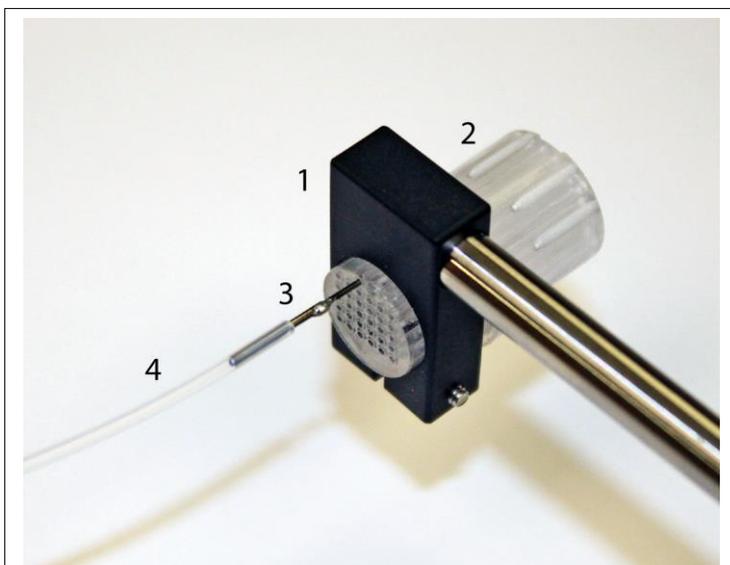
## Loading the Hamilton Syringe

The glass Hamilton Syringe should be loaded by using another “loading syringe” to inject the grease into the glass syringe (Figure 4). The sterile grease can be squeezed or pressed into the loading syringe, and then the grease can be transferred from the loading syringe into the glass syringe. Depending on the size of the Microdrive (i.e. number of channels) the injection syringe may need to be refilled several times.

When filling the Hamilton syringe care should be taken to avoid allowing air bubbles within the column of grease. The air bubbles will compress under the high pressure it takes to move the grease and ultimately may lead to inaccurate amounts of grease being injected. Thus, while injecting the grease with the loading syringe, it is important to make the injection in a steady continuous column. Also note that due to the high viscosity of the grease considerable force must be applied to inject the grease from the loading syringe. A small volume, loading syringe (i.e. 1 or 3 cc) can facilitate the process.



**Figure 4.** Filling of the Hamilton syringe using a loading syringe and needle (3). The plunger components (1) must be removed from the glass portion of the syringe (2) in order to fill the syringe.



**Figure 5.** Grease injection into the microdrive. 1 – Holder; 2 – Actuator block; 3 – Injection tip; 4 – PE-tubing.

The Grease Injection Pump is used to backfill the electrode guide holes on the bottom surface of the actuator block with a calibrated amount of sterile silicone grease. This is done after the electrodes have been loaded into the microdrive, retracted to the calibrated starting position, and the assembly gas sterilized.

The Injection Tip should fit snugly within the counter-bored holes on the bottom surface of the actuator block (figure 5). Test that the grease is appropriately filling the electrode guide holes by watching the grease flow into the bottom of the actuator block. By selecting an electrode channel that is on the outer aspect of the microdrive, it is possible to watch the grease enter the electrode guide hole. It is recommended that 3  $\mu\text{L}$  of grease be pumped into each guide hole.

Due to the high viscosity of the grease one should closely monitor that the Ferrule connecting the tubing to the syringe remains properly seated and doesn't allow any leakage.

### **Sterilization**

All metallic and glass components may be sterilized via autoclaving, while the plastic components (Ferrules, and tubing) can be soaked in 70% EtOH. The silicone grease may be sterilized by autoclaving the entire tube, or alternatively by placing an amount of the grease in a covered glass jar and autoclaving this.

Use sterile technique for all phases of the grease injection sequence. When finished, wipe off any excess grease on the bottom surface of the microdrive with a sterile cotton swab.