Problems with Variability

Variability in the outcome of your pipette, taper length, tip size, or resistance, is most often a result of unstable parameter settings. If you have tried the filament, glass and program settings recommended by Sutter Technical Support and are still unable to achieve stable and reliable results, please review the following topics to see if they help pinpoint the possible mechanical source of variability.

- **Drierite Granules**: The rear right canister on the base plate contains a desiccant (Drierite) which should be light blue in color. If the granules have turned lavender or pink, this indicates that the granules are saturated with moisture. If the air cooling your glass has a high level of humidity, this can introduce variability in cooling and cause the puller to generate inconsistent tip sizes. *SOLUTION:* Remove the Drierite and bake out the moisture, or refill the canister with new Drierite.

- **Old or Damaged Filament**: If your platinum filament (box or trough) is over 2 years old or the puller is in high use, the filament can be worn thin and will provide uneven heating to the glass. If your filament is old it will have a mat-like finish, look very dull and similar to very old aluminium foil. If it is in good condition it will have a clean and shiny surface. It might also be possible that your filament has survived a collision with the glass and is now bent or misshapen. *SOLUTION:* Replace your filament.

- **Filament Shape and Alignment**: If you have just replaced your filament and are experiencing variability, please check the shape of the filament and the alignment of the glass within the filament. A box or trough filament should be centered over the air jet and the air jet should be positioned 2 to 3mm below the base of the filament. A trough filament should be shaped such that walls angle inward by 80-degrees to the base. The glass should run through the center of a box filament or through the bottom 1/3 of a trough filament. To make sure your filament is perfectly centered over the air jet, pull a pipette with a long taper and compare the taper length of the right and left pipettes. If they are not identical in length, loosen the filament clamp screws and "nudge" the filament in the direction of the shorter pipette. Repeat this procedure until both pipettes are the same length. Refer to your manual or contact Sutter Instrument for further instructions about aligning the filament and the glass.

- **New Filament = New Ramp Test!** If you have replaced your filament, you need to run a new ramp test. Our filaments are hand made and the thickness and width of the platinum may vary ever so slightly. This normal variation could represent a change of 30-50 units of required heat. If you are changing from a trough filament to a box filament, your new ramp value could increase two-fold. Run a ramp test and adjust your heat values accordingly.

- **Build-up of Dirt and Oils on the Puller Bars and Bearings**: Check the beveled edge of the puller bars and the groove in the bearings (where the puller bars reside) for dirt and grime. These can be wiped down and cleaned with 70% Ethanol on a Q-tip or applicator. To check for obstructions, depress the spring stop and insure that the puller bars slide smoothly from left to right. You should also be able to rotate the bearings by holding the puller bar stable and rolling your thumb or finger over the bearing. DO NOT OIL THE BEARINGS!

- **Cable Tension**: To check the tension, hold both puller bars together and depress/tap the cable between the bumper and the pulley with your forefinger. The cables should have about 1 to 2mm of slack and should not be taut. You should be able to push down slightly on each cable and hear the pull solenoid plunger (within the Puller cabinet) hit it's stop and you will hear a "knocking" or "clunking" sound.

REFURBISH - You can send your P-87 or P-97 to Sutter Instrument to be refurbished. The main board will be upgraded, all worn parts will be replaced, and you will get an extended 1-year warranty. Contact Sutter for details.