Standard Operating Procedures

--EnvisionTEC 3D Bio-Plotter

This S.O.P is a quick guide for operating the EnvisionTec bio-plotter in Rm 1A26. All personnel should go through (1) this S.O.P, (2) the manual and (3) training session scheduled with group assistant before s/he starts his/her research. The content is intended to serve as one of the resources for its proper operation but not the only one. For any other usage and specifications of this instrument, please refer to the Manual or speak to the technician or assistant.

Pre-operation:

Magic 13:

VISUAL MACHINE OPERATION -3D BIOPLOTTER

After turning on the 3D bioplotter (knob by the side of the machine), open the VisualMachine program and click the ON button.

1)Execution go to

Build control >>> Project name : select the design you saved from the Bioplotter RP program

Project Editor >>>> Open: select the same design picked in the project name.

Go to Parts: Assign High Temp OR Low Temp parameter that you have created in the Programming >>>> Material Editor section of this software and saved.

Then, Inner Structure Patter>>> Assign: the Inner structure built in the Programming >>>> Inner Structure Pattern Editor Part of the software.

Check Inner structure

Uncheck Contour

Click Save

2) Configuration:

Dispensing Tool Manager: Depending on whether you are using High Temp (HT) or Low Temp (LT):

Dispensing Tools >>> Assign: choose the material you created in the Programming section >>>> Material Editor (This will start heating up the material for HT Dispensing Head)

Tool Changer Configuraion: Do nothing if your dispensing head position has been scanned. In case you are using the Position for the dispensing head for the first time, click Scan Current Configuration.

3) Maintenance:

Robot Head: Purge >>> The pressure assigned at the Programiming >>> Material Editor will be shown. Move the head to Purge Station>>>> Purge and Hold ( This will ensure that materials is properly extruding)

Tool Changer: From here you will see the positions that are empty and the ones that are being used. Of the HT is being used, you will see the temperature at which it is operating.

Robot: Click Move to Pack if the head has been removed to rest the arm

Change Mounted Tool >>> Choose High Temp Or Low Temp and click Change to pick up either heads, Choose Remove Current to drop the head

Current Mounted Tool: This shows you thye Tool that is currently in use and dispensing,and the temperature at which it is dispensing.

You do not need Thermocouples, Robots and Cameras sections if you are working at room temperature.

4) Calibration:

Camera and Needle >>>> Needle>>>> Calibrate ( this will ensure that the assigned prossure dispense properly and in the right position.

Vision Results>>> Needle Cal\_Light: the green line wrapped around the droplet indicates that the calibration was successful. You may do this twice to ensure that its properly done.

Programming:

Material Editor:

Depending on the temperature at which the material can be dispense, choose High Temp if material needs melting before it can be dispense and Low Temp if the material does not require high temperature for it to be dispensed.

Creating a new one; Click on new: name your material and assign the parameters that you want to use for your extrusion process.

Name: Give it a name that you will CALL each time you need this paramters in other places.

Description: any parameter of the material that is very important e.g: Molecular weight of material

Basic Parameter: all the parameters that will allow the extrusion go smoothly e.g PCL depending on the molecular weight may require temperature of 65 - 120 degree Celsius to melt

Build Platform: If you require that the dispensing platform be at certain temperature, assign temperature here. This tenperature won't take effect until you switch on the thermocube

Cleaning: Purge >>>>> check Do purge

Purge Time>>>> 1 s should be okay here

Cleaning Process>>> click on the procedure that you wish to use.

Automatic cleaning interval>>> (state when you want it to reclean the needles)

Calibration>>> (Any of the two works but I use Dark Background for the camera to see the contrast between my colorless material and the black background)

Calibrate After Tool Change: (You may or may not uncheck, I usually uncheck)

Caluibration/ Dot Printing: Assign Pressure, Dispensing Time and Needle Z Offset: 0.4 mm is okay

Inner Structure Pattern Editor:

Click New>>> Basic Parameters>>> Check Continuous Strands

Distance From Contour: 0 mm

Layers Parameters>>> Strand shift X: 0, Strand Shift Y: 0, Angle: 0, Distance Between Strands: (Assign any nuber you wish i.e 1 mm or 2mm and so on).