

This procedure helps facilitate the replacement of the enzyme tubing and cleaning of the valves. To replace all Enzyme Tubing, purchase part TDF67 Enzyme Tubing Replacement Kit.

1. **From the back of the TDF instrument or when tilting the instrument forward access the Enzyme Pinch Valve, shown in Figure 1.**

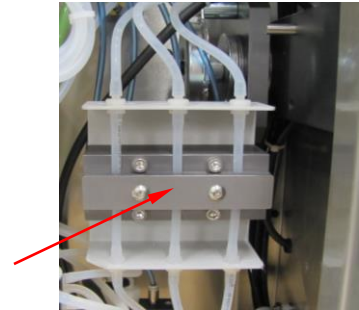


Figure 1

2. **Carefully cut the two cable ties holding the black HCL tubing and the Blue Braided Sleeving together.**



Figure 2

3. **Disconnect the tubes.**
 - a. Disconnect the tubes going to the three barbed fittings on the top of the Enzyme Valve bracket.
 - b. Pull tubing through the Blue Braided Sleeving.
 - c. Set the Blue Braided Sleeving aside for later use.

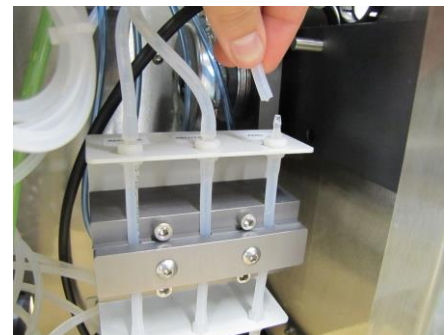


Figure 3

4. **Disconnect the three enzyme containers from the side of the TDF instrument.**



Figure 4

5. Disconnect the silicone tubing going to the barbs atop the enzyme shut-off valves. Remove and dispose of the tubing.



Figure 5

6. Open the Enzyme Valve.

Note: If the Enzyme Pinch Valve is labeled "TDF55", this step can be skipped because the valve will always be open when it is not energized.

- From the Control Box click the "Diagnostics" button and select "Valve Test." See figure 6.
- From the "Valve Test" screen, open the "Amylase Supply", "Protease Supply" and "AMG Supply." See figure 7. This will open the valves allowing access to the Enzyme Valve for replacement of the tubes.

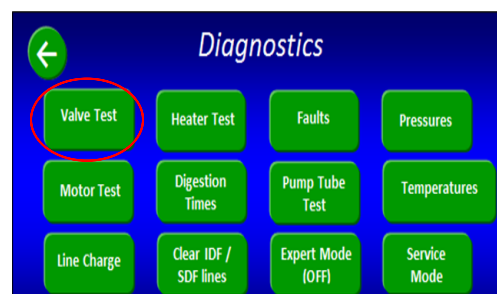


Figure 6

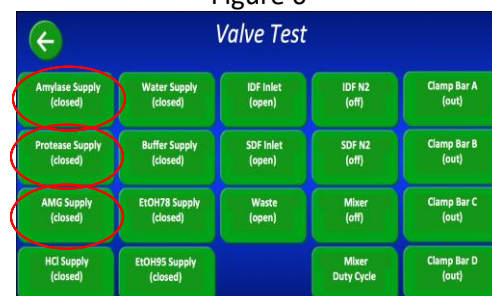


Figure 7

7. Remove the two screws holding the Enzyme Pinch Bar in place using a 1/8" Allen wrench.

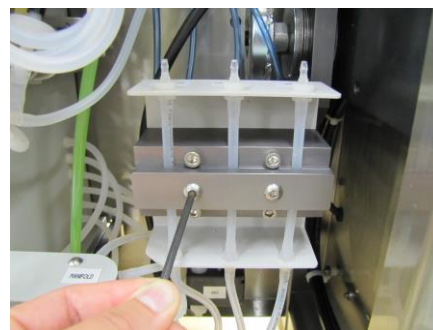


Figure 8

8. Remove and dispose the three tube pieces within the Enzyme Pinch Valve.

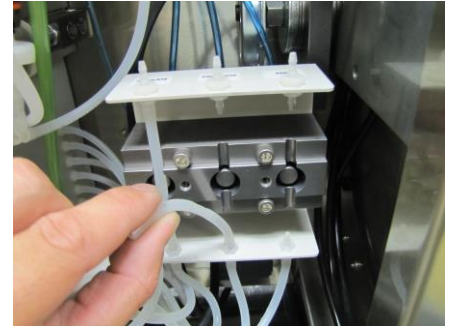


Figure 9

9. Remove the silicone tubing from the three barbed fittings on the bottom of the Enzyme Valve Bracket which go to the Manifold.

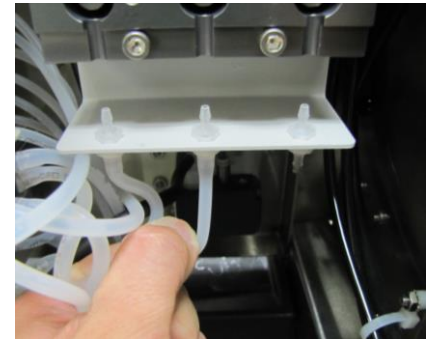


Figure 10

10. Remove the other end of the same tubes from the Manifold. These tubes can be disposed of as well.

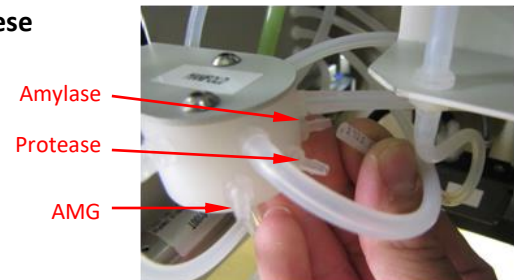


Figure 11

11. The contents of TDF67 Enzyme Tubing Replacement Kit shown in Figure 12.

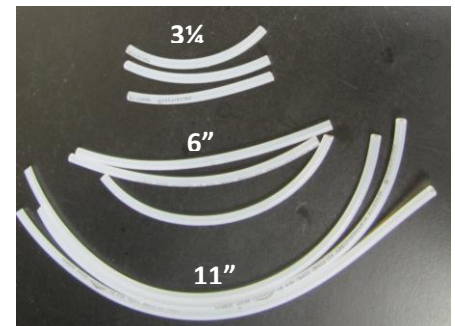


Figure 12

- 12. Install the 3¼" silicone tubes into the Enzyme Pinch Valve connecting them to the barbs above and below. (A package of TDF71 tube lengths came with the instrument and may contain the three 3¼" silicone tubes needed for this step, if they have not already been used.)**

NOTE: With all tube replacement, be certain of the correct placement before connecting. Avoid excessive disconnecting and reconnecting the same tube.

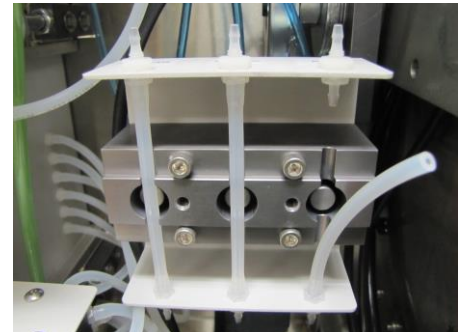


Figure 13

- 13. Reinstall the Enzyme Pinch Bar with the two screws using a 1/8" Allen wrench.**

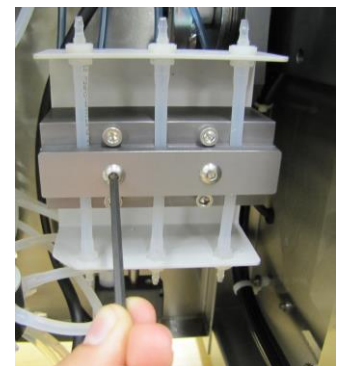


Figure 14

- 14. Install the 6" silicone tubes from the barb at the bottom of the Enzyme Pinch Valve bracket to the correct location on the Manifold. Refer to Figure 15 and drawing Figure 16.**

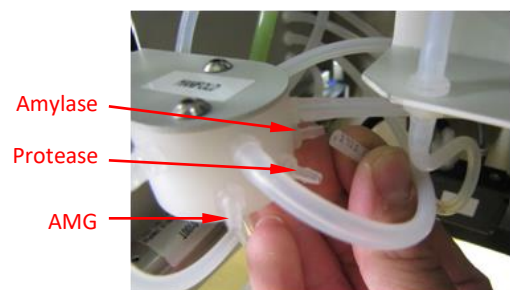


Figure 15

15. Drawing Figure 16 shows the correct location on the lower level of the Manifold for each of the three 6" silicone tubes coming from the Enzyme Pinch Valve.

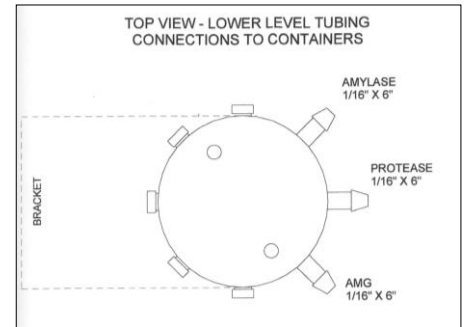


Figure 16

16. Use a $\frac{5}{8}$ " deep throat socket or wrench to remove the nut holding the enzyme shut-off valves onto the bracket.



Figure 17

17. Soak the shut-off valves in ethyl alcohol to aid in cleaning.



Figure 18

18. Use a small diameter tube brush to thoroughly clean each valve. Be sure to also clean the inside of the barb.

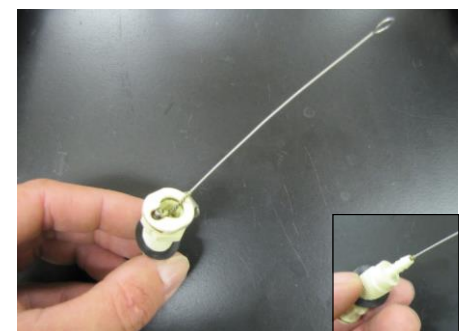


Figure 19

19. Verify that all growth and dried enzyme has been removed from the inside of the valve, as shown in Figure 20. Dry the valve with pressurized air before re-installing.



Figure 20

20. Reinstall the Enzyme Shut-off Valves, as depicted in Figure 21, making sure to use the black gaskets on the underside of the bracket between the valve and bracket. (The black gasket is pictured in Figure 20, above.)

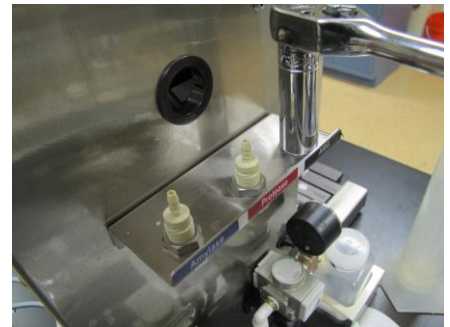


Figure 21

21. Soften the 11" tube ends.
- Prior to installing the tubs on the enzyme container barbs, soften the 11" tube ends to improve the connection of the 11" tubes to the barb fittings on the Enzyme Container Ports.
 - Roll a rod (pen, pencil, etc.) over them while pressing down on the rod. (It is Not necessary to soften the ends of the tubes that will connect to the barb fittings on the Enzyme Pinch Valve.)



Figure 22

Note: One of the aluminum rods from the IDF/SDF/Waste Pinch Valves can work well for this process.

22. Install the 11" Silicone Tubes onto the barbs on the top of the Enzyme Shut-off valves.

Note: Do these one at a time proceeding to the next step with each one before moving to the next tube. Feed the other end of the tube through the grommet in the Left Support Leg.



Figure 23

23. Connect the 11" silicone tubes to Enzyme Pinch Valve.

- a. One at a time, feed each 11" silicone tube from the barb fitting on the enzyme bracket, through the large 1¼" grommet in the left support leg and through the Braided Sleeve.
- b. Connect each to the appropriate barbed fitting on the top of the Enzyme Pinch Valve (amylase to amylase, protease to protease and so on.)
- c. Use two, Z10 Cable Ties to secure the black EPDM tubing to the Braided Sleeve.
- d. Cut the excess off of the cable ties.
- e. The Enzyme Pinch Valves can now be closed using the Diagnostics/Valve Test screen discussed in steps 6. You do not need to close the valves if you have a TDF55.



Figure 24

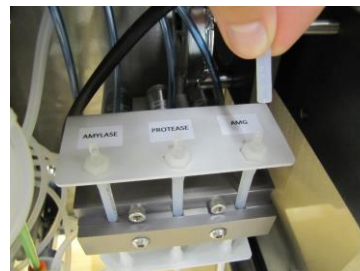
24. Install the other end of the 11" tube onto the correct barb on the top of the Enzyme Valve Bracket — AMG to AMG, Protease to Protease, Amylase to Amylase.


Figure 25

25. **Before beginning a run you must perform a line charge to avoid a Vacuum Sensor Fault. To charge the lines follow the steps below.**
- Make sure all your fluid containers are connected and filled with the appropriate fluids.
 - Press the Diagnostics button on the "Select a Function" screen. See Figure 26.
 - Press the Line Charge button on the "Diagnostics" screen. See Figure 27.
 - Press the ALL button on the "Line Charge" screen to charge all of the lines. Each button will change color as the associated line is being charged. All lines are charged when all of the buttons return to their original green color.

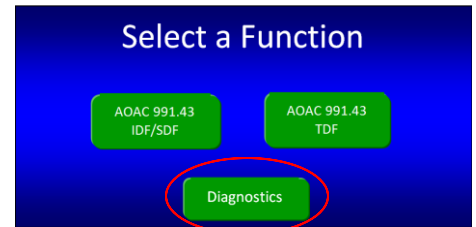


Figure 26

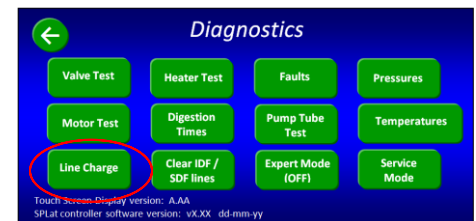


Figure 27

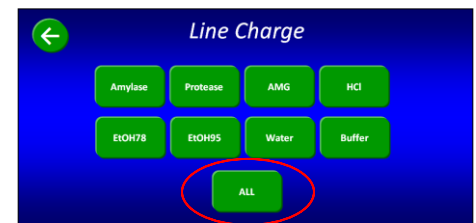


Figure 28

26. Final Enzyme Verification Test

Obtain three enzyme containers and fill each of them to 30mls with distilled water. Connect them to their fittings on the enzyme container bracket.

27. Go to *Diagnostics* and press *Motor Test*. Select *Set Valves* and open the *Amylase Supply* valve and the *Waste* output valve. Close all other valves. Set the volume to 5 ml (this should delivery 5ml per station = 30mls). Set speed to 120 RPM and press *GO*.
28. Confirm 30mls of Amylase is drawn from the vial. Refill the Amylase container to 30 mls. Repeat this test for Protease and for AMG. After each test start the next test with all three containers filled. Verify that for each enzyme delivery that the correct volume was drawn from the correct container and that nothing was drawn from the other two containers.