

Date: \_\_\_\_\_ Instrument Serial # \_\_\_\_\_

IDF Run Count (Select Diagnostics, Service Mode, IDF Count): \_\_\_\_\_

**Supplies:** PM Kit (TDF129), Pump Tube Set (see phase zero for part #s and additional tools required.)**Frequency:** Recommended to be completed annually for top performance.**Description:** This Process Guide provides instructions to complete the Preventative Maintenance (PM) process for the ANKOM TDF Dietary Fiber Analyzer. Prior to starting the PM process, ANKOM recommends you follow the TS015 Line Flush and Purge Procedure to ensure minimal chemical exposure. The process has been divided into phases with estimated completion times. The final page of this guide has hyperlinks to each process instructions.**This process guide assumes there are no current faults or leaks within the instrument.**

## Phase Zero—Preparation (~15 minutes)

This phase is the preparatory phase that includes gathering the needed parts and tools, as well as the Service Procedures for each step in the process.

### 1. Order the following items:

**PM Kit TDF129**, this includes:

- TDF127—Supply Tubing Set (Pre-cut)
- TDF88—EPDM Tubing Kit
- TDF71—Pinch Valve Tubing Set (Pre-cut)
- TDF126—Delivery Tubing Kit (Pre-cut)
- TDF30—Tubing Support Panel
- TDF34—N2 Check Valve (Quantity 2)
- TDF79—Fill Nozzle (Quantity 2)
- Other assorted parts

**Pump Tube Set compatible for your instrument:**

- TDF68—Silicone Pump Tube Set (For TDFs with 3.60 Software and earlier)
- TDF99—Longer-life Pump Tube Set (For TDFs with Software versions greater than 3.60)
- TDF25.5—Supply Valve Repair Kit (*For instruments that are greater than 3 years old, it is recommended that you have this item available.*)

### 2. Gather the following tools:

- Hex (Allen) driver 1/8" (Included with instrument)
- Nut Drivers 3/8" (Included with instrument)
- T20 Torx Head Wrench (Included with Instrument)
- Volume Calibration Cups (Included with instrument)
- TDF70 Flush Tube Assembly (Included with instrument)
- Hex Wrench 3/32"
- Combination Wrench 9/16"
- Side-Cut Pliers and Needle Nose Pliers

### 3. Reference hyperlinks at the end document for Service Procedure instructions for each step.

4. **Verify the temperature calibration of the paddle bar and in-line heaters.** Enter Diagnostics, select Temperatures. On the display screen each paddle bar heater and the in-line heater should show approximately the same temperature (between 20 and 27 degrees C). If necessary, to recalibrate, refer to the Temperature Sensing section in the TDF Operator's Manual.
5. **Verify regulator settings.** Confirm the High Pressure Regulator reads 50-55 psi and the low pressure regulator reads 4 psi. Adjust as necessary.
6. **Verify pressure sensors.** Enter Diagnostics, select Pressures. These pressure readings are affected by both altitude (sea level = 14.7PSI) and weather. Each of the line sensors should read approximately the same and the Input Pressure should read approximately 60-70 psi. Adjust High Pressure Regulator if necessary.
7. **Inspect each of the Fill Nozzles (TDF79) for potential cracks.** Replace as needed using TS014 Service Procedure. Two Fill Nozzles are included in PM Kit.

*Note: If any of the above readings remain out of range, contact ANKOM Service before proceeding.*

## Phase One — Supply Tubing (~2 Hours)

8. **Replace Supply Tubes.** Using the TDF127 Supply Tubing kit and the TDF88 EPDM Tubing kit, complete the TS007 Supply Tube Replacement Procedure.
9. **Perform a Vacuum Hold test.** In Diagnostics, select Motor Test. Set Motor speed to 240 RPM and 20 ml delivery. Select Set Valves, close all Supply valves and set Output to Waste. Then select the arrow to return to the Motor Test and select GO. After the test runs, the value in the upper right corner next to "cur" (lower left for software v3.60 or earlier) should read 12 PSI or greater. If value is incorrect, repair the buffer valve using the Supply Valve Repair kit TDF25.5.
10. **Inspect the Buffer and Water valve bases.** Follow steps 3-17 of service procedure TS017. Minor corrosion can be buffed out using steel wool or a fine abrasive pad (a Scotch-Brite pad or equivalent). Severe corrosion requires replacement of the valve base. Obtain TDF25.5 kit from ANKOM (one kit for each valve needing replacement) and follow TS046 Service Procedure for instructions to replace. If there will be a delay to obtain the repair kit, reassemble and complete valve base replacement prior to moving to the next phase.
11. **Perform steps 26 and 27** listed later in this document to verify this phase.
12. The instrument can be returned to service. No adjustments required.

## Phase Two — Pinch Valve Tubing and N2 Check Valves (~1 Hours)

13. **Replace Pinch Valve Tube.** Using the TDF71 Pinch Valve Tube Kit, complete the TS005 Pinch Valve Tube Replacement Procedure. Watch for any cracked or loose barb fittings in the Pinch Tube area. TDF104 Replacement Barb Fittings are included in the PM Kit if needed.
14. **Perform N2 Check Valve Test.** Connect Flush Tube Assembly with a deionized water container connected to the center fitting. Place calibration cups or beakers under each of the IDF Fill Nozzles. Enter Diagnostics, Motor Test and select Set Valves. For Supply, set Water to open and close all others. For Output, set IDF Inlet to open and close all others. Go back to the Motor Test Screen and set speed to 240 RPM and amount to 20 ml. Run the test. After the motor stops running, inspect each of the IDF Fill Nozzles for drips. If there are drips that continue after the motor has stopped, replace the N2 Check Valve (TDF34, two included in the PM Kit) for the dripping Fill Nozzle. Refer to TS041 for replacement instructions.
15. **Repeat Test for SDF Inlet.** Replace N2 Check Valves for any Fill Nozzles that continue to drip.
16. The instrument can be returned to service. No adjustments required.

## Phase Three —Delivery Tubes, Supply Panel and Pump Tubes (~2 Hours)

17. **Inspect in-line heater for any corrosion, discoloration or leaks.** If replacement is required, complete the replacement prior to continuing. The in-line heater core can be ordered from ANKOM part TDF120. If the in-line heater requires replacement, first complete step 1 of TS006 then install the new heater core using TS043 In-Line Heater Core Replacement instructions.
18. **Replace Delivery Tubing.** Using the TDF126 Delivery Tubing Kit and the TDF30 Tubing Support Panel, complete TS006 Delivery Tubing Replacement Procedure.
19. Using either TDF68 or TDF99 Pump Tubing Kit (whichever is appropriate for your instrument), complete either TS003 for the Silicone Pump Tubes (TDF68) or TS028 for the Long-Life Pump Tubes (TDF99).
20. After this phase is complete, each of the following final tests or adjustments **must** be completed.

## Final Tests and Adjustments (~2 Hours)

21. **Perform a Vacuum Hold test.** In Diagnostics, select Motor Test. Set Motor speed to 240 RPM and 20 ml. Select Set Valves, close all Supply valves, and set Output to Waste. Then select the arrow to return to the Motor Test and select GO. After the test has run, the value in the upper right corner next to “cur” (lower left for software v3.60 or earlier) should read 12 PSI or greater.
22. With the Flush Tube assembly attached and a container of Deionized Water connected to the center fitting, perform the Pump Tube Test three times (choose the Line Charge for the first two tests in order to fill the tubes with water). Record the values below:

Test 1	Line 1		Line 2		Line 3		Line 4		Line 5		Line 6	
Test 2	Line 1		Line 2		Line 3		Line 4		Line 5		Line 6	
Test 3	Line 1		Line 2		Line 3		Line 4		Line 5		Line 6	

23. **Verify values.** If there any values during tests 2 and 3 that are below 10 PSI for TDF68 Pump Tubes or below 15 for TDF99 Pump Tubes, verify the installation of Pump Tubes and inspect for any leaks. Resolve any issues found.
24. **Perform the Volume Calibration Procedure** (TDF Operator’s Manual pg.90) until you reach the accepted range. **Note:** Perform this procedure again in the next couple days to compensate for any pump tube break-in effect.
25. **Check for any leaks from any tubes and resolve any issues found.** Continue on the following page.

26. **Perform a Line Charge and Supply Delivery Vacuum Test.** In Diagnostics, run one line charge (All). Then run the routine again, record below readings displayed in the upper right corner next to “cur”. (**Note:** For software V3.60 or earlier each line must be checked manually using the following instructions.)

- Enter Diagnostics, Motor Test. Set Amount to 10 ml. Select Set Valves. Set Amylase to Open and close all other Supply Valves. Set Output to Waste .
- Return to Motor Test screen and select Motor Speed (Set to 120 RPM for Amylase, Protease and AMG; all others are 240 RPM). Select Run and record below the value displayed in the lower right corner. Repeat for each valve individually.

27. Typical readings are 0.7 to 3.5 psi. Investigate high readings for obstructions in tubing or low vacuum readings for leaks in tubing. Resolve any issues found.

<b>Amylase</b> VAC.PSI		<b>Protease</b> VAC.PSI		<b>AMG</b> VAC.PSI		<b>HCL</b> VAC.PSI	
<b>EtOH78</b> VAC.PSI		<b>EtOH95</b> VAC.PSI		<b>Water</b> VAC.PSI		<b>Buffer</b> VAC.PSI	

28. **Perform Enzyme Draw Test**

- Fill each enzyme vial with 30 ml of deionized water.
- In Diagnostics, select Motor Test, Set amount to 5.0 mls and Motor Speed to 120 RPM.
- Go to Set Valves, set Amylase to OPEN and close all other supply valves. Set Waste Valve to open. Use the back arrow to return to the Motor Test screen and select GO.
- After routine, confirm that Amylase vial is now empty and the other enzyme vials are still at 30 ml.
- Refill Amylase and repeat test for the other 2 enzymes refilling the emptied vial each time.
- Check for any leaks in the enzyme tubing area.

29. **Perform a Timed Heat-up Test.**

- Heat seal the bottom of 6 Flow-thru bags and install them in the IDF positions.
- Connect the Flush Tube assembly TDF70 with a container of deionized water connected to the center fitting.
- Start a 991.43 IDF/SDF routine by answering all the necessary questions. (For **Check pH Manually**, select NO.)
- Once the instrument is done initializing the lines, select “Check Temperature/Pressures and select Temperatures.
- Start timing the test after the mixing paddles start to move. All paddles should reach 90 degrees C within 20 minutes.
- Complete the timing chart below at the listed time intervals:

Time (Minutes)	Paddle 1	Paddle 2	Paddle 3	Paddle 4	Paddle 5	Paddle 6
<b>Tzero</b>						
<b>T10</b>						
<b>T15</b>						
<b>T20</b>						

30. **Perform a final leak check.** The instrument is ready to be returned to service. Retain this form for future reference.

## Reference Sheet

[TS003 TDF68  
Pump Tube Set](#)



[TS005 Pinch Tube  
Replacement Procedure](#)



[TS006 Delivery Tubing  
Replacement Procedure](#)



[TS007 Supply Tube  
Replacement Procedure](#)



[TS014 Fill Nozzle  
Replacement \(If needed\)](#)



[TS015 Line Flush and  
Purge Procedure](#)



[TS017 Solenoid Supply Valve Seat and  
Body Seal Replacement \(Reference\)](#)



[TS028 TDF099 Long Life  
Pump Tube Replacement](#)



[TS041 N2 Check  
Valve Replacement](#)



[TS043 In-line Heater Core  
Replacement \(If needed\)](#)



[TS046 TDF25.5 Supply Valve  
Repair Kit](#)

