Kodak

# ThermoFlex Wide II
## Planned Maintenance Procedure

**Customer:**_____ **Serial#:**_____ **Date:**_____

**SP#:**_____ **Service Rep:**_____

Perform this procedure at least every 6 months on every Kodak® ThermoFlex® Wide II output device.

Schedule regular Planned Maintenance (PM) visits with each customer in your region. When you are unable to honor the scheduled visit, reschedule the PM within a reasonable period of time.

**Total time required: approximately 8 hr.**

The eight-hour estimate includes TFX Head, Drum Vacuum Drive/Vacuum Pump and Chiller PM but does *not* include repairs and adjustments not listed here.

**Additional documents required:**

- *TFX Window Cleaning Procedure* (719-00111A-A) at http://techplanet.creo.com/output/heads/tfx/nav/proced.htm
- *Cleaning the TFX Debris Removal Nozzle* at http://techplanet.creo.com/output/heads/tfx/nav/proced.htm
- *Debris Cabinet Filter Replacement Guidelines* at http://techplanet.creo.com/output/computer_to_plate/thermoflex_ii/nav/reference.htm
- *Thermoflex Wide II ITP* at http://techplanet.creo.com/output/computer_to_plate/thermoflex_ii/nav/install.htm
- Chiller Maintenance at: http://techplanet.creo.com/output/computer_to_plate/thermoflex_ii/nav/chiller.htm

**Parts required:**

ThermoFlex Wide II PM Kit - Plate only (518-02885A) contains:

- Compressed Air Filter Service Kit (328-00001)
- O-Rings (59-3415)
- Photo Sensor Assembly (10-4733A)
- Power Box Dust Filter (55-0346)
- DHU Air Filter (55-1219)
- Test files at http://techplanet.creo.com/software/TESTFILES/TFX_Wide/flexo-ATP_2400b.p.1A.K.zip

For TFX head:

- Lens cleaning kit (04-0012B)

For Sleeve, Plate on Sleeve:

- Felt Pad Kit (512-00267A)

- Hydraulic Fluid Kit (512-00268A)

Other supplies needed for servicing ThermoFlex Wide II are listed in *Appendix A - Common Supplies for Servicing ThermoFlex Wide II*

**Prior to starting:**

Obtain permission from the customer to do the preventive maintenance on the system.

The procedure is divided into numbered sections so that you can divide the PM procedures according to customer schedule. Each section can be performed independently. After each section, you can return the device to operational status.

Output device, chiller, and drum vacuum maintenance 6 hr.

TFX head maintenance 2 hr.

**Note:** Increase these estimates for a firmware upgrade, FCOs, and/or repairs.

If possible, work with an operator or maintenance person while doing the work.

- Explain proper maintenance of the system to the operator, and point out any lack of maintenance that you notice.
- Take inventory of any spares on site as well as parts that should be returned to Kodak.

***IMPORTANT:***

- Check to see if any FCOs are required, and arrange to have the parts shipped to the site.
- Check that you have the current controlled release (CR) CD on hand.

# 1. LOGGING GENERAL INFORMATION (20 MIN.)

1. Update customer information if necessary (that is, supervisor/operator names, phone /fax/modem line numbers, address information, Kodak workstation login names/passwords, etc.).
2. Verify that the customer is performing regular system backups on the workstation computer.
3. Check the device's CR version, and use Service Shell to make a device NVS backup on the device workstation:

   For CR3.1:

   a. Click **BART**

   b. Click **Backup**.

      NVS backup is filed in **C:\creo\bart**.

   c. Copy the backup files to your laptop.

   For CR 2 and earlier:

   a. Click **Scripts**

b. Click **Device**

c. Double-click **Firmware Upgrade**

d. Click **Backup NVS**

NVS backup is filed in **x:\serviceshell\firmware**

e. Copy the NVS backup files to your laptop.

**Note:** You cannot use the Backup and Restore Tool (BART) or the Firmware Upgrade scripts to backup TFX head NVS.

To backup and restore TFX head NVS, use the following TFX commands:

a. **`TFX>>prm diff`** - to confirm that it is safe to perform a backup

b. **`TFX>>prm save -`** to overwrite the previous saved NVS file

c. **`TFX>>prm restore -`** to restore the last saved NVS file.

4. Use Service Shell **Version Checker** to identify all components that are installed.
5. Update any components to make the device compliant with the current CR.
6. Use **`scan bstatus`** to check for masked sensors.

## 2. SAFETY AND EXTERIOR (10 MIN.)

Ensure that the ThermoFlex Wide II is safe to operate and safe to work on.

1. Visually inspect the operator interface condition.
2. Check to see if any buttons are damaged or worn excessively.
3. Inspect the table, front cover, side, and back panels for any physical damage.
4. Verify that all panel and table interlocks are functioning correctly and that they disable the machine when triggered.
5. Check the safety interlocks both physically and logically by using the MCE command:

```
Flexo>> safety
```

Safety loop status should show the following:

```
Safety Loop Status
------------------
Emergency stop switch:        Off
Front Cover:                  Closed
Away Side Panel:              On
Rear Panels:                  On
Home Side Panel:              On
Load Table:                   Closed
Lock Solenoid:                Unlocked
Safety loop status            On
```

```
Safety loop status (head)     Off
Drum Brake Override:          Off
Safety override (key switch): Off
Safety write laser            Off
```

6. Verify that all emergency stop buttons disable the machine when pushed.
7. Verify the emergency stop buttons logically using the **`safety`** command.
8. Ensure that the chiller and debris cabinet hoses and cables are intact, and are well protected from damage.

   Make sure that the debris cabinet filter(s) are installed, and verify that the operator is aware of the recommended replacement schedule. The Thermoflex Wide II automatically monitors the particulate and chemical filters (if used) and will alert the customer for replacement.

## 3. SYSTEM OPERATION (15 MIN.)

Evaluate the current operating condition of the ThermoFlex Wide II device.

1. Ask the operator for feedback on machine operation.
   - Do they have any questions about how to operate or send files to the device?
   - Have they seen any errors in Print Console?
   - Have they experienced any degradation in image quality?
   - Have they experienced any imaging artifacts?
2. Verify that the operators have been trained on the device.
3. Submit a test plot for reference (**flexo-ATP_2400.p.1A.K.tif**) from Print Console and make note of any problems with the following:
   - Beeper functions when the table is ready to open.
   - Table vacuum works correctly.
   - Table opens smoothly.
   - Drum aligned to the correct position for media loading.
   - Table float activates automatically.
   - Drum vacuum stabilizes correctly.
   - Manual drum loading buttons work correctly.
   - Drum balancing works correctly.
   - Media thickness is measured correctly and within a tolerance of +/- 80 microns.
   - Debris cabinet turns on.

- Device images successfully.
- Imaged media unloads successfully.
- Print Console does not report any errors.

## 4. INITIAL REFERENCE PLOT CHECK (15 MIN.)

Ensure that the image quality is correct and that the imaging system is operating correctly. For details, refer to the *ITP* procedure at:

http://techplanet.creo.com/output/computer_to_plate/thermoflex_ii/nav/install.htm

1. Verify that the image margins are correct. The image should be positioned 12.7 mm (0.5 in.) from each registration bar.

   Before adjusting margins, confirm that the customer does not have special requirements for image placement.

   For subscan adjustments use the parameter:

   **`set prd ShImageStartPos`**

   For mainscan adjustments use the parameter:

   **`set gc mshift`**

2. Measure the 8 x 8 checkerboard (plot 50) area of the test file and confirm that it measures 50% ± 2%. Use one of the following methods:

   - Dot Meter:

     Adjust the dot meter settings for **transmissive** and **negative** measurements

     Measure the media on a light table.

   - Transmissive (Film) Densitometer:

     Use a piece of tape to completely clean a portion of the test media

     Mask and use this area to zero the densitometer.

     The 8 x 8 checkerboard image area should measure 0.301 when reading the 50% patch.

   - Visual Check:

     Using a 50x or 100x microscope on a light table, visually confirm that the 8 x 8 checkerboard corners are just touching, and that the black and clear squares are of equal size.

3. If the measurement is not exactly 50%, you must later perform media calibration for SD and Exposure.

4. Check 100% clear areas for debris banding.

   When the debris system is working correctly, you should see minimal per pixel debris lines in the solids. If the exposure, focus, or debris system is not optimized you will see thicker debris lines every 15 pixels.

5. If there is debris branding:
    a. Check the debris cabinet.
    b. Clean the TFX window.
    c. Clean the debris nozzle.
    d. Check exposure.

# 5. DEVICE INSPECTION (2.5 HR.)

## 5.1 Power Box

1. Test that the safety interlock override (SIO) key switch is operating correctly by verifying:
    - The carriage, drum and solonoids begin to work when the key is inserted.
    - The TFX head does not come online with the key inserted.

**WARNING: This would constitute a safety hazard.**

2. Confirm the power supply voltages:

    PS1 (to PDB) should be 24 V (+/-1.0 V)

    PS2 (to PDB) should be 48 V (+/-2.0V)

    PS3 (TFX laser supply) should be -5.5 V (adjust the power supply trim pot)

    PS4 (TFX power supply) should be 48 V (+/-2.0V)

3. Replace any power supplies that do not meet the specification listed above.
4. Verify that all boards and connectors are properly seated.
5. Check that the air intake filter is clean. Replace this filter if necessary.
6. Check that the power box fan runs smoothly, quietly, and is free of dust.

## 5.2 Fan Box

1. Check for oil or water in the air filter bowls.
2. Check that the customer has changed the compressed air filters (328-00001).
3. Check the main air manifold for leaks by listening.

## 5.3 Table

1. Check that the table opens and closes smoothly.
2. Check the **Table Float** operation using **`Table float on`** and **`Table float off`**.
3. Check the **Table Vacuum** operation using **`Table vacuum on`** and **`Table vacuum off`**.

4. Check that **`Table Lock`** and **`Table Unlock`** work correctly.

5. If the table fails to lock and unlock consistently, perform the *Table Alignment* procedure at http://techplanet.creo.com/output/computer_to_plate/thermoflex_ii/nav/proced.htm

## 5.4 Front Panel

1. Check that the front panel Release button is operational and panel movement is smooth. Slide the table back to see this button situated just to the left of the customer operation panel, on the home side of the machine.

2. Check that the gas struts properly support the panel.

## 5.5 Drum Vacuum System

1. Check all drum vacuum system hoses and cables for damage or leaks. Look and listen for leaks.

2. Verify the correct operation of the drum vacuum drive:

   a. Load any size plate between the minimum and maximum specified sizes.

   b. Use **`drumvacuum`** to confirm that the vacuum level is between 7 and 8 Hg.

      **Note:** If the customer is using 6.35 mm (¼ in.) media, use **`set mh DVSetpointFlexo`** to increase the MCE **`drumvacuum`** parameter from 7.5 to 8 Hg.

## 5.6 Debris Removal System

1. Clean and check the debris nozzle for damage according to the *Cleaning the Debris Nozzle* procedure at http://techplanet.creo.com/output/heads/tfx/nav/proced.htm.

2. Clean and check the TFX head window for damage using the *Window Cleaning* procedure at http://techplanet.creo.com/output/heads/tfx/nav/proced.htm.

3. Make sure that all debris nozzles sensors and air hoses are intact, and do not have leaks.

4. Verify the schedule of debris cabinet filter replacement with the customer.

## 5.7 Chiller

1. Check that the fluid level is topped up and that there are no leaks. If necessary, use 70-30 ethylene glycol (402-00056A) to top up the fluid.

2. Clean the pump strainer/ fluid filter.

3. Use a teaspoon of SAE 10W oil to lubricate two fittings on the pump motor. This should be done every 12 months.

4. Clean the condenser and air vents.

5. Verify that the chiller temperature is set for 23°C. If necessary, use the control pad on the front of the chiller to adjust the temperature.

6. Verify the TFX head temperature using the TFX **`temp`** command. The temperature should be approximately 23°C.
7. Verify that the chiller pressure is between 45 and 55 psi. Use the screw on the back of the chiller to adjust the pressure.
8. Disconnect the coolant hoses connected to the TFX head.
9. Inspect the O-rings (59-3415) on the hoses for damage and replace the O-rings if necessary.

See http://techplanet.creo.com/output/computer_to_plate/thermoflex_ii/nav/chiller.htm.

## 5.8 TFX Head Dehumidifier

Replace the DHU filter (55-1219), which is located in the Fan Box.

**Note:** If the pressure indicator is red, the DHU *must* be replaced and you must examine the air system for contaminants.

## 5.9 Drum Vacuum Drive

1. Verify that all electrical connections are secure and firmly seated.
2. Verify that the drum vacuum drive (DVD) controller fans are clean (DVD P7 model only).

## 5.10 Drum

1. Clean and inspect the drum and the drum registration bars.
   For cleaning, use a cloth dampened with water. For areas that do not come clean with water, use a 50% water and isopropyl alcohol solution.
2. Clean the drum grooves
3. Use tool 510K1R593 to clean the drum vacuum holes.
4. Make sure that the drum flyoff sensor operates properly.
5. Ensure that the drum flyoff sensor is aligned by verifying that the flyoff emitter beam on the away side aligns with the center of the flyoff sensor on the home side.
6. Verify that the drum home side clear vinyl tape is intact. Replace the clear home side tape (56-3357) if necessary.
7. Inspect the drum motor belt for wear and tension. If wear is evident, check the alignment.
8. Replace the belt if necessary.
9. Use a BRECOflex meter to adjust the new belt to 48Hz. or readjust an old belt to 46Hz. See the *Drum Drive Maintenance* procedure at http://techplanet.creo.com/output/computer_to_plate/thermoflex_ii/nav/maint.htm.

## 5.11 Carriage

1. Check to make sure that the carriage fan is running smoothly.
2. Check the carriage belt for wear or damage.
3. Verify that the carriage belt tension is 5-6 lbf (2.27-2.72 kgf) using the *Carriage Belt Maintenance* procedure at http://techplanet.creo.com/output/computer_to_plate/thermoflex_ii/nav/maint.htm.
4. Ensure that the carriage rails and leadscrew are properly lubricated. Use Klüber lube (89-0277) for the rails and NSK #1 (89-0276) for the leadscrew.

**Note:** The carriage motor may stall if the leadscrew grease is dirty or too thick. The grease on the rails is primarily to prevent rusting of the high-carbon steel, and the critical area is the inside of the v-grooves rather than the top of the rails.

5. Clean the carriage home and away sensors.
6. Check the carriage home and away sensor operation by breaking the sensor beam and confirming the change of state using the **`carriage`** command

## 5.12 Head Stage

1. Inspect all cables and hoses that connect to the head stage.
2. Inspect, clean and lubricate the head stage leadscrew using NSK # 1.
3. Clean the head stage home and away sensors.
4. Test the head stage home sensor and motor using:

   **`zdrive init`**

   **`zdrive (confirm home sensor changes state)`**

5. Test the head stage during plate loading:
   a. Load a plate onto the drum using **`load`**.
   b. Verify that the reported thickness is correct.
   c. Use **`focus position`** to confirm that the focus SUM and ERROR are within range.

      SUM = 1200 +/- 100

      Error = 0 +/- 20

6. Use a BRECOflex meter to test the head stage belt tension. The tension should be 10-12 Hz.

## 5.13 Drum Balance System

1. Visually inspect that balance weight actuators are secure. Check for leaks and ensure that the release tips are in good condition.
2. Test the balance system sensors and actuators:

a. Increase Access Level

```
Access dev
```

b. Manually balance the drum for a 400 x 400 x 1.7 mm piece of media:

```
balancer balance 400 400 1702
```

c. Locate the weights and make note of their positions:

```
balancer findweights
```

d. Manually balance the drum without media:

```
balancer balance 0 0 0
```

e. Manually balance the drum again for a 400 x 400 x 1.7 mm piece of media:

```
balancer balance 400 400 1702
```

f. Locate the weights again:

```
balancer findweights
```

g. Confirm that the weights are in the same position as in step c.

3. If the customer has reported balance weight problems or if the tests in step 2 do not pass, see FCO CA11245 (Balancer Upgrade) and order upgrade kit # 518-01844A.

## 5.14 Headstock Lubrication

*For serial numbers WTB002, WTB004-WTB014:*

An automatic lubricator on early model ThermoFlex Wide II devices was supposed to provide lubrication to the needle roller bearing. This automatic lubricator does not always work. In some cases, it does not provide any lubrication to the bearing. Lack of lubrication could result in premature failure of the bearing.

To prevent failure manually lubricate the bearing every 6 months using Kit # 518-02004A and *FCO CA11455: Replacing the Automatic Lubricator* procedure (719-00836A) at http://techplanet.creo.com/AgileContent/Extranet/719-00836A-A107377726.pdf.

# 6. WORKSTATION (10 MIN.)

1. Ensure that the configuration is up to date by checking the Controlled Release (CR) version.
2. Visually inspect the cables and connections to make sure that they are in good condition, and well protected from damage.
3. Use Service Shell Version Checker to confirm that all workflow software and device firmware are consistent with the latest CR.
4. Confirm that a system backup has been performed.
5. Upgrade software or firmware components to the latest CR versions if necessary.

## 6.1 RAS Check

Have the Response Center dial up the workstation to ensure the remote services are functioning properly.

# 7. IMAGING TESTS (1 HR.)

For each media type that the customer uses, submit and assess a test plot (**flexo-ATP_2400.p.1A.K.tif**) from Print Console for reference.

Ensure that the image quality is correct and that the imaging system is operating correctly. For details, refer to the ITP procedure at http://techplanet.creo.com/output/computer_to_plate/thermoflex_ii/nav/install.htm

1. Verify that the image margins are correct. To allow for correct media taping, the image should be positioned 12.7 mm (0.5 in.) from each registration bar.

   For subscan adjustments use the parameter:

   **`set prd ShImageStartPos`**

   For mainscan adjustments use the parameter:

   **`set gc mshift`**

2. Verify that the 8 x 8 checkerboard (plot 50) area of the test file measures 50% ±2%. You can use one of the following methods:

   - Dot Meter:

     Adjust the dot meter settings for **transmissive** and **negative** measurements

     Measure the media on a light table.

   - Transmissive (Film) Densitometer:

     Use tape to completely clean a mask patch from the plate you are going to measure.

     Use this patch to zero the densitometer.

     The 8 x 8 checkerboard image area should measure 0.301 when reading the 50% patch.

   - Visual Check:

     Using a 50x or 100x microscope on a light table, visually confirm that the 8 x 8 checkerboard corners are just touching, and that the black and clear squares are of equal size.

3. If the measurement is not exactly 50%, you must perform media calibration.

4. Check 100% clear areas for debris banding.

   When the debris system is working correctly, you should see minimal per pixel debris lines in the solids. If the exposure, focus, or debris system is not optimized you will see thicker debris lines every 15 pixels.

5. If there is debris branding:

a. Check the debris cabinet.

b. Clean the TFX window.

c. Clean the debris nozzle.

d. Check exposure.

6. Measure a solid area on the image and confirm that the density minimum (**Dmin**) is less than 0.1.

7. Check the SUM and Error for the media type:

   a. Load a 381 x 381 mm (15 in. x 15 in.) piece of media

   b. Confirm that the TFX head zeroes properly.

   c. Test the SUM and ERROR values using the **`focus position`** command.

      SUM = 1200 (+/-100)

      ERROR = 0 (+/-15)

8. Repeat this procedure with each type of the customer's media.

## 8. SLEEVE MAINTENANCE (1.5 HR.)

1. Check the hydraulic fluid level in the arbor.

   The number of the plunger screw required to fully pressurize the system determines the level of the hydraulic fluid in the arbor.

   a. Make sure that there is a shell installed on the arbor.

   b. Using a 5-mm tool, fully retract the plunger screw (counter-clockwise direction) until it stops against the stopper block.

   c. While tightening the same plunger screw, count the number of turns it takes before the center post of this 5-mm screw extends to push your tool out. During tightening this center post will extend as a result of hydraulic pressure.

   d. If the number of turns is:

| | |
|---|---|
| Less than 16 | The hydraulic fluid does not need replenishment. |
| 16 to 18 | Finish the current job but add hydraulic fluid before the next job. |
| 18 or greater | *Do not use* the arbor until hydraulic fluid has been added. See the *Adding Hydraulic Fluid to the Arbor* procedure at http://techplanet.creo.com/output/computer_to_plate/thermoflex_ii/nav/maint.htm. You will need a Hydraulic Fluid Kit (512-00268A). |

2. Change the arbor absorbent pad (512-00267A - Felt Pad Kit). According to the *Replacing the Arbor Absorbent Pad* procedure at http://techplanet.creo.com/output/computer_to_plate/thermoflex_ii/nav/maint.htm.

3. Inspect the arbor and shells:

   a. Inspect both the arbor and shells for any physical damage.

b. If you suspect that sleeve imaging artifacts are being caused by damage to either the arbor or shell, perform the in-depth inspections included in the *Shell Inspection* and *Arbor Inspection* procedures at http://techplanet.creo.com/output/computer_to_plate/thermoflex_ii/nav/maint.htm.

4. Check sleeve loading:

   a. Make sure a shell is installed on the arbor.

   b. Test removal and replacement of a sleeve on the arbor/shell. See the procedure in the *Thermoflex Wide II Sleeve Mode Operator Guide* (731-00155).

   c. If the sleeves cannot be loaded correctly, see the *Shell Air Valve Maintenance* procedure at http://techplanet.creo.com/output/computer_to_plate/thermoflex_ii/nav/maint.htm.

5. Use NSK #1 grease to lubricate the two leadscrews for the drum hoist system.

6. Check the headstock cam locks for alignment.

   For each cam lock, the locking nut inscribed line should be approximately at the four o'clock position, when tightened to the prescribed torque value. Use the customer torque wrench that is preset for 80 lbf.

7. Inspect the arbor transport cart for damage.

8. Check the operation of all sensors on the headstock and tailstock using the **`tailstock`** status command. The following example applies when the tailstock is engaged and locked.

```
Flexo >> tailstock

Tailstock System Status

Tstock Engaged    True

Tstock Disengaged False

Tstock Locked     True
```

# APPENDIX A - COMMON SUPPLIES FOR SERVICING THERMOFLEX WIDE II

| Item | Use | Part Number | Quantity |
|---|---|---|---|
| Compressed air | Dusting the encoder general cleaning | 89-0089 | 10 oz can |
| Premixed Chemical Coolant (30%) | External chiller | 402-00056A | 4 liters (1 gallon) |
| Vinyl gloves | To protect hands | 89-0002 | 100 per box |
| Shell Alvania grease | General purpose - not for carriage tracks or leadscrew | 89-0091 | 12 oz tube |
| Adhesive tape 3M™ #471 or Tesa 60760 | Media attachment tape Recommended for securing media to the drum. | 56-3322 | |
| Loctite® 242 | For M4 screws and larger | 89-0053 | 50 ml bottle |
| Loctite 609 | Permanent for pulleys and bearings | 89-0044 | 50 ml bottle |
| Loctite primer N | Apply to clean screw and hole before applying Loctite | 89-0041 | 52 ml bottle |
| Large Kimberley-Clark Kimwipes® | Low lint cleaning cloth | 84-0004 | 140 per box |
| Klüber lube | For carriage tracks | 89-0277 | 400 g tube |
| NSK #1 grease | For leadscrew | 89-0276 | 80 g tube |
| Q tips (6 in. lint-free) | For cleaning optics | 84-0006 | 200 |
| 3M™ Scotch-Brite™ pads | For cleaning corrosion from unpainted parts | 89-0102 | 5 |

Order the following parts from the Vancouver Response Center:

| Item | Use | Part Number | Quantity |
|---|---|---|---|
| 5/32 in. quick disconnect plug | Plug for quick connect | 55-0162 | 10 |
| 5/16 in. quick disconnect plug | Plug for quick connect | 55-0167 | 10 |
| ¼ in. quick disconnect plug | Plug for quick connect | 55-0270 | 10 |
| Photo sensor assembly | Most sensors | 10-4733A | 1 |
| Reed switch test cable | Testing reed switch and hall sensors | 90-1112A | 1 per kit |