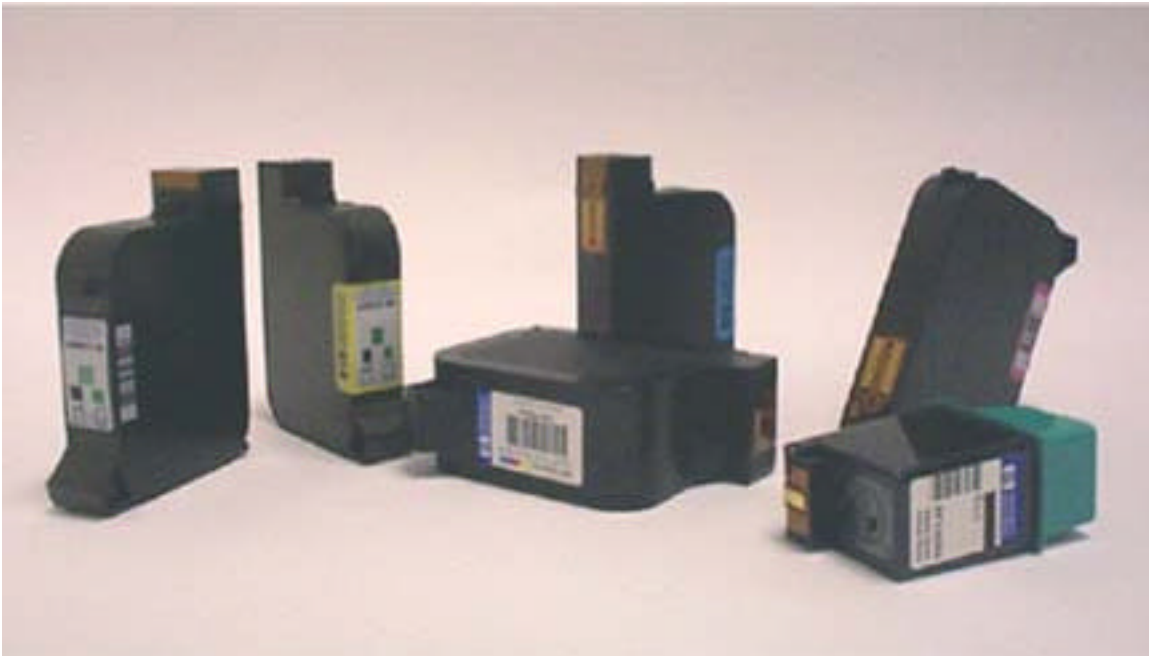


Hewlett-Packard Disposable Cartridge Maintenance Manual

(Applicable to the Following Cartridges: HP51626A, HP51638A,
HP51633M, HPC6117A, HP51640(A,C,M,Y), HP51641A, HPC6105A,
HPC1823A, HPC6116A, HP51645A, HPC6104A, HPC6168A,
HPC6169A, and HPC6170A.)

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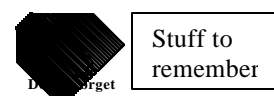
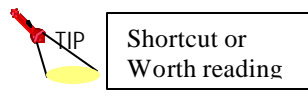
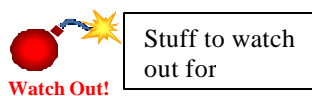
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1. INTRODUCTION

This document acts as a guide for the maintenance and care of Hewlett-Packard disposable print cartridge products including the HP51626A, HP51638A, HP51633M, HPC6117A, HP51640(A,C,M,Y), HP51641A, HPC6105A, HPC1823A, HPC6116A, HP51645A, HPC6168A, HPC6169A, HPC6170A, and HPC6104A. Each pen consists of a printhead and a pressurized ink source.

1.1 Background on Thermal Inkjet Technology

The disposable Hewlett-Packard cartridges are used in drop-on-demand thermal inkjet systems. Inkjet systems fire small drops of ink to form text and images on various types of medium.

Thermal inkjet uses a firing resistor to vaporize a small amount of ink. The vaporization process causes a small bubble to form. This bubble formation causes a small drop of ink to be forced out of the firing chamber through the nozzle.

Figure 1 shows the major components of the thermal inkjet system. In the figure, the entire ink supply is located near the printhead of the print cartridge. This is the case for all of the Hewlett Packard disposable print cartridges. Back pressure is controlled in the local ink supply by a spring or foam which prevents the ink from seeping out of the nozzles. The filter screen keeps any large particles or air bubbles away from the firing chambers. Bubbles or particles in the firing chambers will prevent ink from coming out of the nozzle when the resistor heats up. There is a firing resistor for every nozzle on the printhead.

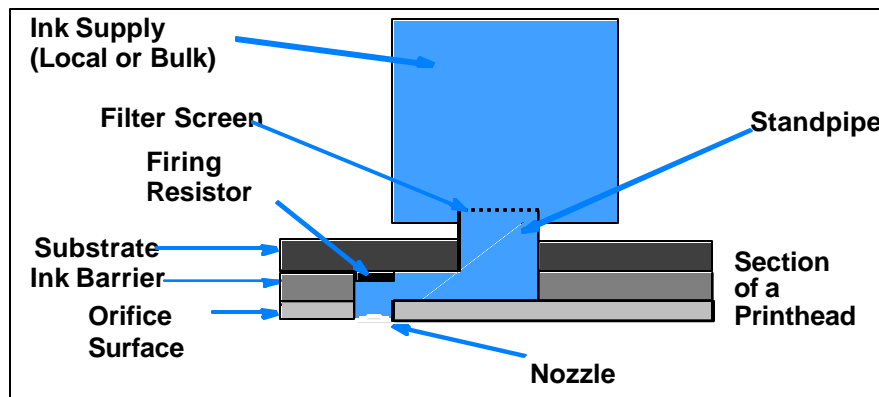


Figure 1: *Anatomy of a Printhead*

2. PRINT CARTRIDGE CARE



2.1 Set-up

Once the cartridge is out of the box it can be easily snapped into the carriage. It is important to remove the tape from the printhead before the cartridge is snapped into place. The cartridge will not function with the tape still in place.

2.2 Storage

Short-term storage is defined as less than 2 days or less than 1 day in a hot and dry environment. Long-term storage is defined as more than 2 days or more than 1 day in a hot and dry environment.

Short-term Storage

If the printing system has a capping station:

- ? Leave the cartridges in the printer

If the printing system does not have a capping station:

- ? Leave the cartridges in the machine for a short period of time
- ? The next time that the printer is used, the printhead will have to be cleaned as instructed in the Printhead Maintenance section

Long-term Storage

If the printing system has a capping station:

- ? Leave the cartridges in the printer

If the printing system does not have a capping station do the following:

- ? Keep the printhead in an area that is relatively free of dust and paper particles and is not too dry
- ? Place the cartridges in a Tupperware container with a damp sponge or towel to maintain humidity and prevent the printhead from drying out
- ? When the cartridges are ready to be used again the printhead will need to be cleaned as instructed in the Printhead Maintenance section

2.3 Disposal

- ? The cartridges may be disposed of in normal garbage
- ? If there should be an ink spill, use soap and water to clean up any problem areas. Lava brand soap also works well to get the ink off of hands.



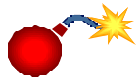
- It is important to take the tape off of the cartridge before it is placed in its holder.
- If the printing system has a capping station, leave cartridge in printer.
- If the printing system does not have a capping station, keep the cartridge in an area that is relatively free from dust and not too dry.

3. PRINthead AND INTERCONNECT CARE

3.1 Inserting and Removing the Print Cartridge

The print cartridge should stay in the carriage at all times except when the operator is

- ? Replacing it
- ? Cleaning it
- ? Storing it



Watch Out!

The print cartridge should never be:

- ? Shaken
- ? Dropped
- ? Hit against the palm of one's hand or any other hard surface (e.g. a table)

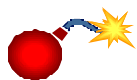
Shaking the print cartridge does NOT “mix” up the ink and hitting the cartridge against a hard surface does NOT clear the nozzles. Both of these actions actually hurt the print quality because they allow bubbles to form near the ink firing chambers. These bubbles prevent the nozzles from firing causing white streaks in print and images.

3.2 Wiping

The secret to good print output is the maintenance of the printhead. During printing, ink can build up on the printhead causing black or colored spray in the text. Paper fibers and dust can also build up on the printhead degrading the print quality. Proper printhead maintenance will allow the cartridge to produce good print quality its whole life. A cotton TexWipe[®] and de-ionized or distilled water is one of the best ways to wipe ink and other build-up off of the printhead. A TexWipe[®] is a 100% cotton, high-density cloth with no chemical additives. Contact information to order TexWipes is located at the end of this document. Something comparable is adequate to wipe the nozzles. A good choice of wipe would have the following qualities:

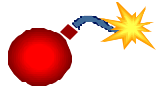
- ? Soft
- ? Fiberless
- ? No chemical additives
- ? Moist with De-ionized or Distilled Water

A cloth should NOT be:



Watch Out!

- ? Abrasive
- ? Dry
- ? Made of small fibers that can be left behind on the cartridge's nozzle plate



Watch Out!

Never use the following to wipe the printhead:

- ? Industrial paper towels (These cloths usually contain a high recycle content and are abrasive.)
- ? Toilet paper (These cloths are usually not fiberless.)
- ? Sponge (Particles from the sponge can be left behind on the nozzle plate.)

The cloth must be soft so that it does not scratch the printhead. It should be fiberless because small fibers from the cloth can be left behind and block the nozzles of the cartridge. The cloth must also be moist with liquid or it will scratch the printhead. Scratches on the printhead prevent the ink from coming out of the nozzle straight. If the ink drops do not come out of the nozzles straight they will not land on the paper in the proper place causing fuzzy text. Distilled water is better than tap water because tap water contains an unmonitored amount of minerals. During wiping the water cleans out the nozzles and the firing chambers. A small amount of water mixes with the ink in the chambers. Over time, the minerals in tap water can leave behind deposits in the chambers that block it completely. A blocked nozzle will show up as a white streak in text or graphics. The direction and force of the wipe is also important to note. During wiping, harmful particles on the top of the printhead can be wiped into the nozzles if one is not careful. Certain cartridges need to be wiped certain ways to obtain optimal print quality.



It is important to wipe the following cartridges in the direction of the nozzle rows (see Figure 2) for optimum print quality:

- ? HP51645A, HPC6104A
- ? HP51641A, HPC6105A
- ? HPC1823A, HPC6116A
- ? HPC6168A, HPC6169A, HPC6170A

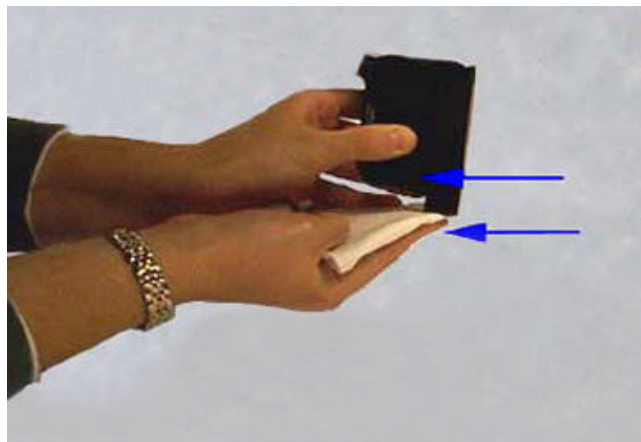


Figure 2: *Direction of Wiping for the HP51645A, the HPC6104A, the HP51641A, the HPC6105A, the HPC1823A, the HPC6116A, the HPC6168A, the HPC6169A, and the HPC6170A.*

The direction of the wipe should especially be monitored on the tri-color pens such as the HP51641A, the HPC6105A, the HPC1823A, and the HPC6116A. The cartridge can be ruined due to color mixing if the top plate is not wiped in the direction of the nozzle rows.



The following cartridges should be wiped against the row of nozzles to perform optimally (see Figure 3 & 4):

- ? HP51626A, HP51638A
- ? HP51633M, HPC6117A

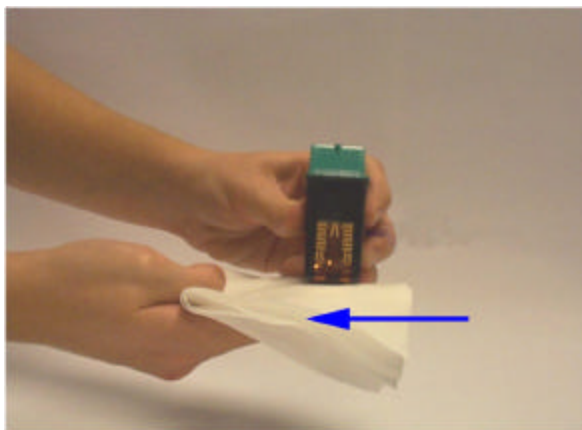


Figure 3: *Direction of Wiping for the HP51626A, HP51638A, the HP51633M, and the HPC6117A*

- ? HP51640(A,C,M,Y)

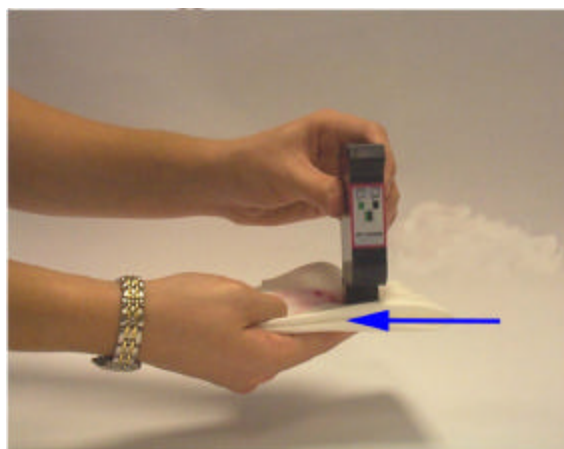


Figure 4: *Direction of Wiping for the HP51640(A,C,M,Y)*

In all three wiping configurations the printhead should be pointing down while it is being wiped. This position will prevent the nozzles from pulling little bubbles into the firing chambers.

Applying heavy pressure is not necessary to clean the particles off of the printhead. A large pressure can actually cause particles to scratch the printhead. Scratches can cause the nozzles to fire in improper directions adversely affecting print quality. It is very important to always be gentle when cleaning the printhead.

It is also important to keep the electrical interconnects of the printhead clean.

The interconnect pads can be cleaned with:

- ? Moist cotton TexWipe?
- ? Moist Q-Tip



The interconnects should not be cleaned with:

- ? Pencil eraser (A common misconception is that the interconnects can be cleaned with the eraser of a pencil. The eraser actually damages the interconnect and will decrease the life of the cartridge.)

It is important to make sure that this section of the cartridge is dry before it is re-inserted into the printer to eliminate the chance of an electrical short in the cartridge or permanent printer damage.

3.3 Purging the Nozzles

If the printhead sits inactive for a period of time, ink may dry in the nozzles. Printing may not remove these “ink plugs” from the nozzles. White streaks will then show up in the printed text or graphic. In order to obtain better print quality, this ink plug needs to be forced out or purged. The printhead should first be wiped with a wet cloth. Some machines offer purging or servicing functions that may remove these ink plugs if wiping alone does not cure the problem. If a machine does not have this capability, most ink plugs can be removed by printing a few lines of text or graphics in a high resolution. The higher resolutions (600 dots per inch, for example) exercise more nozzles and push more ink out. This purging operation as well as wiping the printhead with a wet cloth should be done after every extended period of down time in order to prevent unacceptable levels of print quality.

An example start-up procedure might include:

- ? Wipe the print cartridge with a moist cloth as described in the wiping section of this document
- ? Perform a purge algorithm or print a few lines of text in a higher resolution (600x600dpi, for example)
- ? Wipe the print cartridge with a moist cloth again as described in the wiping section of this document



- When the cartridge is removed from the carriage, it is important to hold the cartridge by the black side covers of the cartridge.





Watch Out!


- The print cartridge should never be shaken, dropped, or hit against a hand or any hard surface.
- Never use industrial paper towels, toilet paper or sponge to wipe the printhead.
- The interconnects should not be cleaned with a pencil eraser.

4. PEN FAILURE ANALYSIS

4.1 Trouble Shooting Guide

There are several things that can be done to recover damaged cartridges. The following list acts to troubleshoot any problems that may appear.

Problem	Example	Action
Cartridge will not print	“Sheet is blank even after it has gone underneath cartridge(s).”	<ul style="list-style-type: none"> ? Check to make sure the tape is off of the printhead ? Re-insert the cartridge into the carriage ? Install a new print cartridge
White streaks in text or graphics	 <p data-bbox="646 1528 974 1669"> Michael Harp Hewlett Packard 16399 West Bernardo Drive San Diego CA 92127-1899  </p>	<ul style="list-style-type: none"> ? Re-insert the cartridge into the carriage ? Wet wipe and purge the cartridge (There are clogged nozzles.) ? Clean the interconnects ? Insert a new print cartridge

<p>Black streaks around text or streaks the same color of the ink in the cartridge</p>		<p>? Wet wipe the cartridge (There is ink buildup.)</p>
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5. SUPPLIES ORDERING INFORMATION

5.1 The following process will work for ordering the suggested TexWipes.

The company TexWipe only sells their products through distributors, but partners/customers can contact TexWipe directly to obtain information about a distributor near them. TexWipe can be reached in a variety of different ways. All of the contact information can be found either below or at <http://www.texwipe.com/corporat/adres.htm>

If in the US --

Call the TexWipe North America Customer Service Line at 1-800-TEXWIPE (ext 120). The representative at this number will help determine a local distributor for the TexWipe products.

Customers can also call the distributor that the Hewlett Packard San Diego site uses directly. We use VWR Scientific Products. They can be contacted at 1-800-932-5000. VWR will sell all items with the exception of syringes and chemical products to a non-account company via credit card. If partners or end customers wish to set up accounts for accounting purposes, the process only takes 1-2 days.

If outside of the US --

Call the TexWipe International Customer Service and Technical Support Line at 1-201-327-9100 (ext 325 or 254). The TexWipe customer service representative will then determine a local distributor for the TexWipe Products. The International Customer Service Representatives can also be reached at intercs@texwipe.com. TexWipe does distribute products all over the world.

TexWipes are all Natural 100% cotton high-density construction cloths. They have no chemical additives, they are solvent-compatible, heat and acid resistant, they have strong tensile, absorbency, and antistatic characteristics, and they are cleanroom packaged. They come in a variety of quantities and sizes. The following information can be used to order TexWipes (The pricing information is from the latest 97/98 VWR catalog and is probably subject to change):

Size (in)	TexWipe Number	Pack of
3x2.5	TX325	2700/\$71.86
4x4	TX304	1200/\$64.95
4x4	TX304A	300/\$22.40
6x6	TX306	600/\$61.50
9x9	TX309	300/\$60.10
9x9	TX309A	150/\$39.25
12x12	TX312	150/\$61.20
17x17	TX318	75/\$66.95

The 4x4 size (either TX304 or TX304A) would be perfect. This size would allow end users plenty of space to wipe the cartridge without wasting a lot of cloth, but there are a variety of sizes given so the user can find the wipe that best fits their individual needs.

5.2 The following process will work for ordering the suggested DI Water.

Distilled water is better than tap water because tap water contains an unmonitored amount of minerals. Over time, the minerals in tap water can leave behind deposits in the chambers that block it completely. You can obtain distilled water from most local grocery stores.

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