

How Printers Work, Tips and Hints.

Jere Minich
Program Director
Lake-Sumter Computer Society
Leesburg, Fl.
WWW.LSCS.US

Overview.

- How to printers really work. ?
- What can I do to save money on Ink. ?
- What is the most efficient MO for my printer.?
- What are the trusted sites for Ink.?

Printer Terms to Understand

- **Print head** - The core of an inkjet printer:
 - contains a series of nozzles that are used to spray drops of ink.
- **Ink cartridges** - Depending on the manufacturer and model of the printer,
 - ink cartridges come in various combinations,
 - such as separate black and color cartridges,
 - color and black in a single cartridge
 - even a cartridge for each ink color.
- The cartridges of some inkjet printers include:
 - the print head itself.

Print Head Design

Two Types = Fixed Head – Disposable Head

- The *fixed-head* philosophy provides an inbuilt print head that is designed to last for the life of the printer.
- fixed-head printers are manufactured primarily by Epson and Canon. Hewlett-Packard also offers a few fixed-head models,

Disposable Head

- philosophy uses a print head which is supplied as a part of a replaceable ink cartridge.
 - damaged or clogged print head is only a minor problem.
 - Hewlett-Packard has traditionally favored the disposable print head.
- An intermediate method does exist: a disposable ink tank connected to a disposable head, which is replaced infrequently (perhaps every tenth ink tank or so).

Inkjet Technology

There are two main technologies in use:

1. continuous inkjet (CIJ)
2. Drop-on-demand (DOD).

1. The continuous inkjet (CIJ) method is used:

- a. commercially for marking and coding of products and packages.
- b. a high-pressure pump directs liquid ink from a reservoir through a gunbody and a microscopic nozzle,
- c. creating a continuous stream of ink
- d. a piezoelectric crystal creates an acoustic wave as it vibrates within the gunbody and causes the stream of liquid to break into droplets at regular intervals

Inkjet Technology

1. Drop-on-demand (DOD) is divided into two types:

- a. thermal DOD – (Canon, Hewlett-Packard, and Lexmark) {a 1991 spin-off from IBM}
- b. piezoelectric DOD – (Epson, Brother Industries)

NOTE: A piezoelectric crystal creates an acoustic wave as it vibrates within the print head and causes the stream of liquid to break into droplets at regular intervals:

64,000 to 165,000 droplets per second

The nozzles used in inkjet printers are 'human hair' fine. (REALLY SMALL)

How Printers work w/ Cartridges

Thermal - Drop On Demand

- The ink acts as a coolant :
 - to protect the metal-plate heating elements –
- when the ink supply is depleted, and printing is attempted:
 - the heating elements in thermal cartridges often burn out
 - permanently damaging the print head.
- When the ink first begins to run low:
 - the cartridge should be refilled or replaced,
 - to avoid overheating damage to the print head.

Cartridges

- Epson's - designed for exclusive piezoelectric ink jet printing technology.
- HP - the brand that use vacuum-retained cartridges a lot.
 - These are more complicated to refill, because:
 - you'd have to re-seal the cartridge back
 - with the use of a hot glue or wax.

Bubble Jet Printers

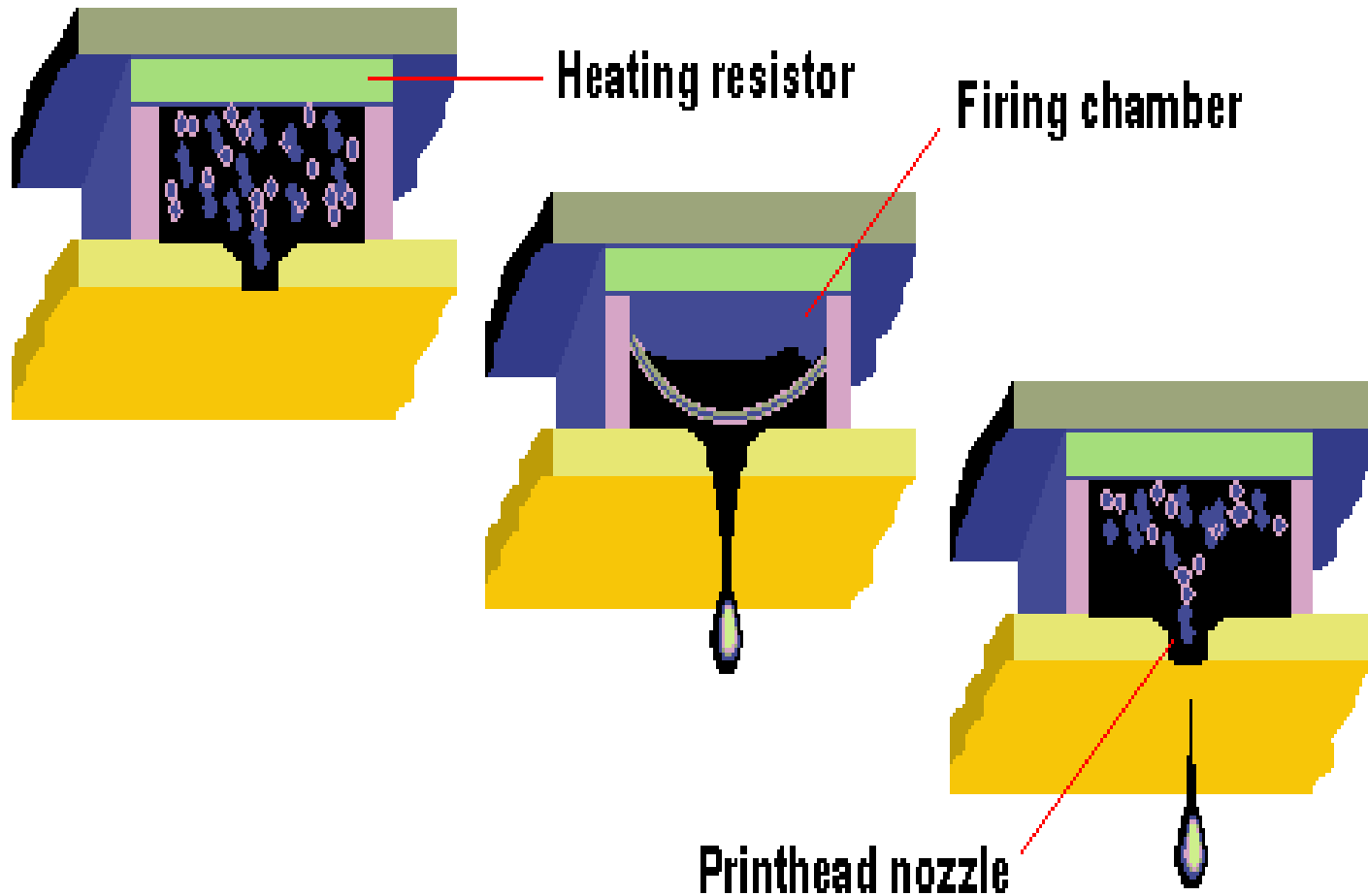
Thermal - DOD

1. Called **bubble jet**.
 - a. tiny resistors create heat,
 - b. heat vaporizes ink to create a bubble.
 - c. bubble expands,
 - d. ink is pushed out of a nozzle onto the paper.
 - e. bubble "pops" (collapses),
 - 1.) a vacuum is created.
 - 2.) pulls more ink into the print head.

Bubble Jet Printers

- f. A typical bubble jet print head has:
- 1.) 300 to 600 tiny nozzles,
 - 2.) all of them can fire a droplet simultaneously.

Bubble Jet Printers

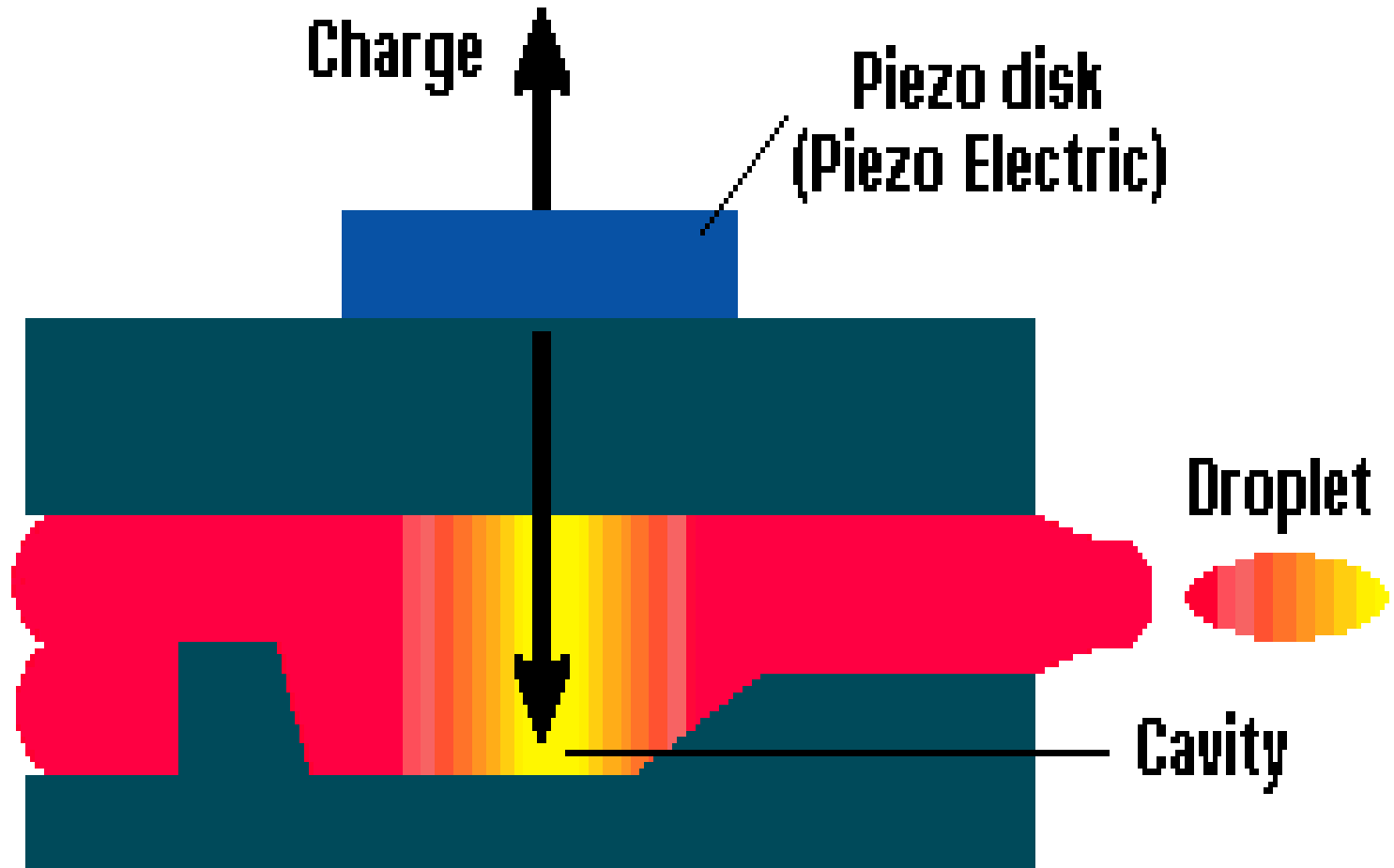


Piezoelectric Printers

Piezoelectric –

1. Patented by 'Epson'
2. technology uses **piezo crystals**.
3. A crystal is located at the back of the ink reservoir of each nozzle.
4. crystal receives a tiny electric charge that causes it to vibrate.
 - a. vibrates inward, it forces a tiny amount of ink out of the nozzle.
 - b. vibrates out, it pulls ink into the reservoir to replace the ink sprayed out.

Piezoelectric Printers



Types of Inkjet Ink Cartridges

- Sponge cartridges
 - Single color
 - 3 colors
- Single-color individual cartridges
- Multi-color cartridges
- Reservoir cartridges

- Go to this web site:
http://en.wikipedia.org/wiki/Inkjet_refill_kit

Single Color cartridge

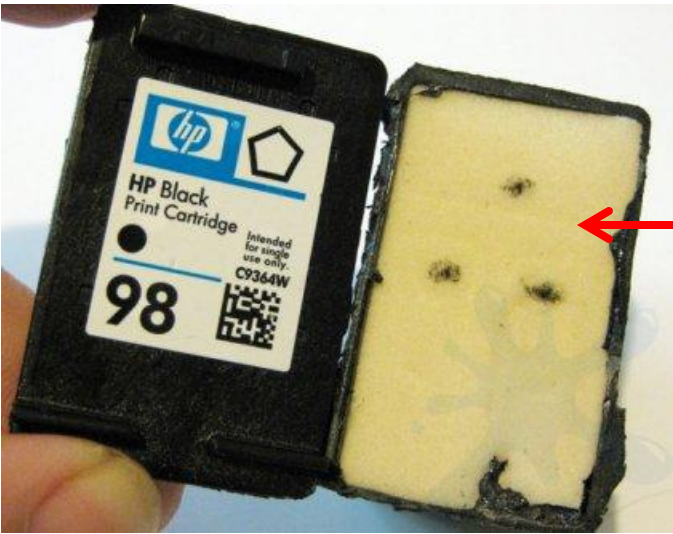


Inkjet Cartridge – Multicolor

Best Buy Price = \$39.95

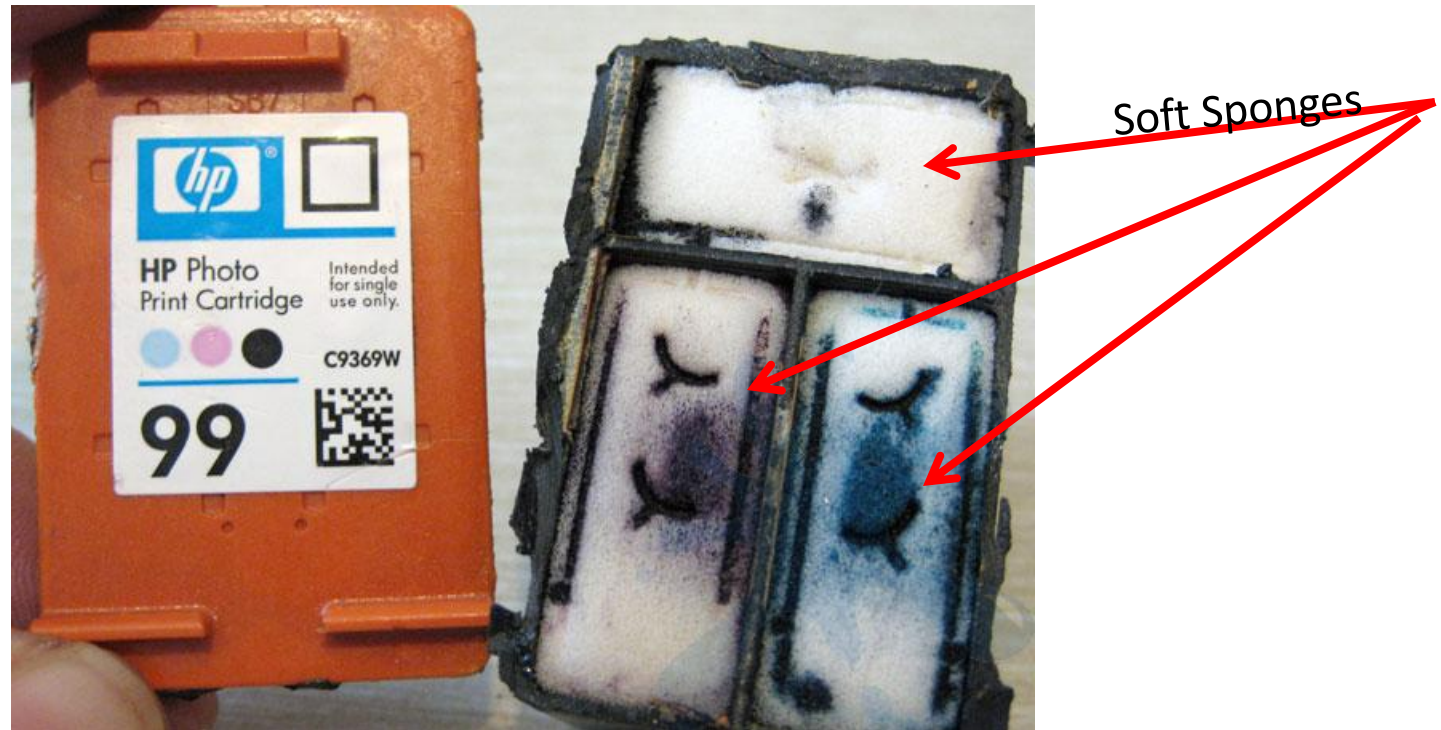


Black Cartridge w/ Sponge



Soft Sponge Material

Color Cartridge w/ Sponges



Sponges

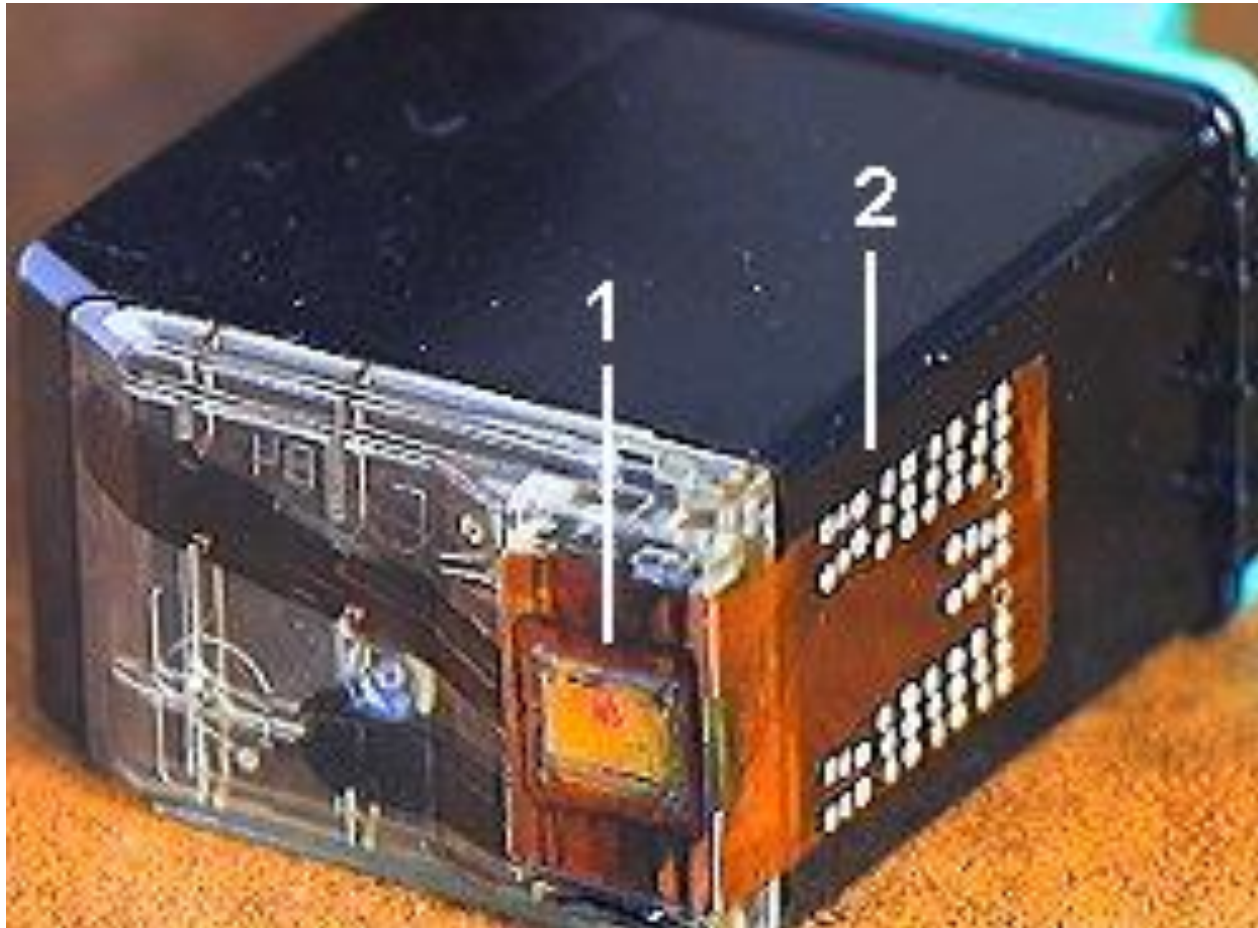
Are you feeling ripped-off yet?

- Some cartridges contain sponges,
 - so some ink remains behind in the sponge.
 - Sponge prevents ‘Sloshing of Ink’
- The printer reports that the cartridge is empty:
 - when there is still 10-15% of the ink left.
- The printer only estimates the amount of ink left.
 - Print Chip does the estimating .
- Between the **chip** and the **wasted ink**, you're losing \$\$\$ on every cartridge you buy.

HP Style Cartridge

1 = Print Head

2 = Contacts for Printer & Chip



Epson Style Cartridge



Contacts for Printer and Chip

Ink port – ink supplies
print head in the printer

k4994973 www.fotosearch.com

Close-up of Epson Style



Ink Port for print head in printer

Contacts and Chip

Printers

- **Note:** many printers contain the print heads in the cartridge.
 - These are safe to use remanufacture Cartridges
- Remanufactured cartridges should be tested against clogs.
 - Even if there is a clog, it will only affect the cartridge and will not damage the printer.

How to Save \$\$\$ on Printing

- Use Print Preview before you print.
 - See what your printout will look like.
- PC World magazine has conducted [significant research](#) into the question of third-party ink cartridges, and the bottom line is:
 - in most cases, prints made with off-brand ink were as good or nearly as good as their brand-name counterparts.
 - In the case of text and other black-and-white prints, we detected virtually no quality differences.
 - If you need the very best quality from glossy photo prints, investing in OEM ink may be worthwhile.
- Most people, particularly those who print text, can get by with third-party ink, which can offer a cost savings of up to **70 percent.**

Which Font Saves Ink and Money.??

- The winner: Century Gothic:
 - which delivered a 31 percent savings in printing costs over Arial.
- On a dollar basis:
 - the University Study projected that the average person printing around 25 pages a week would save \$20 a year by using Century Gothic for all documents.

Save Ink

- **Print in draft mode.**
- **Grayscale printing.**
 - print text jobs on a color inkjet,
 - may unknowingly be wasting color ink.
- **Printer settings**
 - are essential and will save you the most when done right.
 - make “low quality” the default.

How to save \$\$\$\$

- two ways:
 - 1. purchase compatible cartridges
 - 2. refill them up to ten times.
- Don't try and fill a cartridge that been sitting around for weeks or months.
- Even the professional have problems with these.
- Fill the cartridge at the first sign that it's going dry.

Printer – Saving \$\$

- Must Do
- Leave your printer **on**.
- When you turn your printer **off**,
 - it will clean print heads
 - The frequent cleaning conducted can consume quite a bit of ink
 - and has a great impact on cost-per-page determinations.

Running Your Printer

1. Power down your printer properly, don't just unplug it.
 - ❖ You want the print head to move into a position that protects ink from drying out.
 - ❖ turn printer off from a power strip/ unplugging it leaves the heads exposed.
2. Power down your printer IAW the procedures of the printer.

Cleaning Print Head Process

- The ink consumed in the cleaning process needs to be:
 - collected to prevent ink from leaking inside the printer.
 - The collection area is called the [spittoon](#),
 - In **Hewlett Packard** printers this is an open plastic tray underneath the cleaning/wiping station.
 - In **Epson** printers, there is typically a large absorption pad in a pan underneath the paper feed platen.
 - It is common for the dried ink in the spittoon to form a pile that can stack up and touch the printheads, **jamming the printer**.
- Some larger professional printers using solvent inks may employ a replaceable plastic receptacle to contain waste ink and solvent which must be emptied or replaced when full.

Save Money on Ink

Find a Internet Source

- You can purchase 'OEM' or refurbish printer ink cartridges for:
 - a fraction of the manufacturer brand cost
 - still experience the same quality of print outs.
- Google your Printer :
 - refill cartridges; refurbished cartridges; cheap ink.
 - **Example:** Epson WF500 refill cartridges

Where to get Ink Cartridges ?

- The key is to:
 - try to find the best replacement inks for your printer model,
 - not necessarily the cheapest,
- and for this you may have to try different suppliers,
 - on the internet
 - In your local area.
- Know the “What if” policy of your supplier.

2 types of Replacement Cartridges

- 1. a low capacity or starter cartridge.
 - These are often only ten to fifty percent full.
- 2. High Capacity Cartridge
- an example:
 - the HP 350 (low or standard capacity) 4.5 ml = \$21.95 = \$4.87 /ml
 - the Hp 350XL (high capacity). 25ml = \$32.95 = \$1.31 / ml
- So the XL cartridge can be a economical cartridge

What Make of Printers can I refill?

This changes constantly

- Canon, Dell, HP, and Lexmark cartridges are:
 - not difficult to refill,
 - some Lexmark cartridges employ a built-in counter chip that can't be reset.
- Epson cartridges also have a built-in counter chip,
 - however it is possible to purchase a chip re-setter.
- Brother cartridges generally lack any chip and consist of merely a sack of ink.
 - they can be readily refilled.

How do the printer companies prevent third-party cartridges from being recognized?

- a chip on their own cartridges which the printer reads.
- chip can not identify itself to the printer as a match, the cartridge will be rejected.
- They charge about two dollars more to cover the cost of that chip.
- So you are paying extra for a chip which prevents you from shopping for the best deal.
- When the cartridge is empty (or when the printer thinks it is)
 - printer sends a signal to the chip to self-destruct.
 - The chip can not be reset.

Refill Cartridges.

- Because of the expense of inkjet cartridges,
 - a huge business has grown around the idea of refilling them.
 - refilling makes good sense.
- But there are a few things to be aware of:
 - Make sure the refill kit is for your printer model.
 - If the wrong type of ink is used, it can degrade the output or possibly damage the printer.
 - Virtually all desktop inkjets for home or office use have water-based ink.
 - The exact ink composition varies greatly between manufacturers.
 - **For example:**
 - thermal bubble inkjets need ink that is stable at higher temperatures than piezoelectric printers.
 - Most manufacturers require that you use only their approved ink.
 - Therefore: **Refill kits normally will void your warranty.**

Refill Cartridges

- While you can refill cartridges,
 - be very careful of the ones that have the print head built into the cartridge.
 - You do not want to refill these more than two or three times,
 - the print head will begin to deteriorate
 - could damage your printer.

Symptoms of a Failing Cartridge

- Your ink cartridge will eventually wear out.
- When you start seeing:
 - streaks
 - areas where the ink fails to print,
- it's time for another inkjet cartridge.
 - You may still have ink in the cartridge.
 - At this point you still have the option of buying a compatible printer inkjet cartridge

How to save \$\$\$\$

- two ways:
 - 1. purchase compatible cartridges
 - 2. refill them up to ten times.
- Don't try and fill a cartridge that been sitting around for weeks or months.
- Even the professional have problems with these.
- Fill the cartridge at the first sign that it's going dry.

Single-color individual cartridges

- Printer brands have started using single-color individual cartridges.
 - only a single ink color.
 - one separate ink cartridge for black,
 - another for cyan,
 - another for magenta,
 - another for yellow.
 - The advantage of this is when only one ink runs out, you can replace the cartridge only for that ink instead of replacing all the colors.

Multi-color cartridges

- These are cartridges that contain all the ink colors the printer uses.
- The disadvantage is:
 - that you will rarely need to refill all of the colors at the same time,
 - you have to be very careful when refilling only one color.
 - The best way is to put a tape over the openings of the other colors to make sure you only refill one chamber of the cartridge.

Reservoir cartridges

- Cartridges that only contain an ink reservoir.
 - does not have a sponge inside.
 - You just see a chamber completely filled with liquid ink.
- obviously, the easiest to refill since you just have to transfer the liquid ink from one container to another.
- Reservoir cartridges can be repeatedly refilled.

recyclable

- Printer ink cartridges are recyclable.
- Especially with the latest recycling laws in place, it is even easier to [recycle your inkjet cartridges](#) than ever before.
- You can:
 - send them into the Print Country Recycle Program,
 - drop them off at your local supply store
 - wait for the waste round-up in your neighborhood.

Good Printer /Ink Information Web Sites

- <http://www.wikihow.com/Refill-and-Reuse-a-Printer-Cartridge>
- [http://en.wikipedia.org/wiki/Ink cartridge](http://en.wikipedia.org/wiki/Ink_cartridge)
- [http://en.wikipedia.org/wiki/Inkjet refill kit](http://en.wikipedia.org/wiki/Inkjet_refill_kit)
- Suppliers: (Good Prices and Trustworthy)
 - www.ccs-digital.com – Izzy in Rockaway, NY
 - www.inkquik.com -

CCS-digital Web Page

Epson Ink Cartridges, Brother Ink cartridges, Canon Ink Cartridges, HP Ink Cartridges, Brother Toner, HP Toner, Refilling Epson Cartridges - Mozilla Firefox

File Edit View History Bookmarks Tools Help

W Inkjet printing - Wikipedia, the fr... x CCS Epson Ink Cartridges, Brother I... x +

ccs-digital.com/inkpage.asp - bubble jet printers

Cards Latest Headlines Most Visited Getting Started CNN.com - Technology W Metro (design language... Metro (design language) - Wikipedia, the free encyclopedia http://en.wikipedia.org/wiki/Metro_(design_language)

CCS
CCS-Digital.com
sales & service since 1983

Complete Computer Services
Compatible Cartridges Sales
2412 Oceancrest Blvd Far Rockaway, NY 11691
sales@ccs-digital.com
(718) 868 - 3000
Open Sun-Thur 9AM-9PM, Fri 9AM-4PM

20 free cartridges every month!
Bonuses worth over 30%!
flat shipping cost - any quantity.
100% money-back guarantee!

100% SATISFACTION GUARANTEED

We accept:
VISA MasterCard Discover American Express
PayPal
U.S. Personal checks
Canadian postal money orders
cart

Update: very limited internet and no phone!
for details read [this notice](#)
When we have caught up, we will open the site to accept more orders. Thank you for your patience.

Ink:	Click the logos for product list.			Toner:	Click the logos for product list.		
						Canon, Ricoh, Samsung	

Photos shown are a representative sample. There may be variations in design. [design details](#) [warranty details](#)

Save up to 100% on ink costs* in two steps

Step One: Click the logo of your printer manufacturer above, left side (pink) for inkjet, right side (cyan) for laser.


Step Two: Choose your printer model or cartridge.

*after \$2 rebate from Staples or Officedepot

Place your no-risk order today! [Click one of the logos above.](#) With a money-back guarantee and many of our ink cartridges FREE or nearly so after rebate, what are you waiting for?

Subscribe to [our free monthly newsletter](#) and get the [secret bonus code!](#) Then enter the code in the box on the epon order page for discounts on many items.

Details for people who like to read:



Start | Skype™ [1] - jere... | Microsoft PowerPoi... | Epson Ink Cartri... | 9:08 PM

Refillable Epson Cartridge



InkQuik Web Page.

InkQuik - Ink and Toner cartridges as well as fax printer supplies! - Mozilla Firefox

File Edit View History Bookmarks Tools Help

W Inkjet printing - Wikipedia, the fr... x Epson Ink Cartridges, Brother I... x InkQuik - Ink and Toner cartridg... x +

www.inkquik.com

Cards Latest Headlines Most Visited Getting Started CNN.com - Technology W Metro (design language...



inkquik®

- High - quality printer supplies.
- Excellent customer service.
- Huge selection.
- Low prices.

- Now in our 12th year!
- 30 day money-back guarantee
- 180 day replacement guarantee
- \$3.95 flat-rate shipping
- Secure online ordering

Business Partner



- Home
- Payment Options
- Contact Us
- FAQ
- Shipping Info
- View Cart
- Testimony
- School Orders
- Policies

What our customers are saying...

More comments...

Locate your supplies in 2 EASY steps!

Step 1.

Click on the brand of your machine below

Most popular brands

[HP](#) [Brother](#) [Canon](#)
[Dell](#) [Epson](#)



All machine brands

Apollo	Epson	Lexmark	Samsung
Apple	Genicom	NCR	Sharp
Brother	HP	Oki	Siemens
Canon	IBM	Omnifax	TEC
Casio	Kodak	Panasonic	Toshiba
Compaq	Konica	Pitney	Xante
Dell	LaserMaster	Bowes	Xerox
		Ricoh	



TESTED 12-NOV





30/180 Guarantee!

30-day money-back guarantee!
180-day replacement guarantee!

\$3.95 Flat-rate Shipping



Most orders received in 3 days or less!

Scripts Currently Forbidden | <SCRIPT> : 1 | <OBJECT> : 0

Options...

Start Skype™ [1] - jere... Microsoft PowerPo... InkQuik - Ink an... 9:09 PM

Bottom Line.

1. Find out what kind of printer you have.
2. Google the make and model for information
3. Find a supplier for your cartridges.
 - A. Local Store Front.
 - B. Internet Supplier.
4. Find out the supplier “What if” policy.
5. Shop around.