

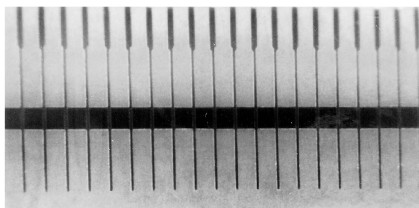


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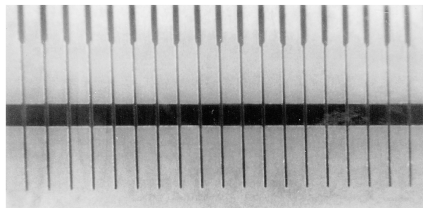
## Proper Printhead Care

The printhead is one of the most delicate, critical and expensive components contained in a thermal printer. The printhead is a consumable component and wears by the sheer nature of its application. The printhead contacts the media and the media passes over the printhead creating friction and wear. The printhead is comprised of several heaters (heater elements-also called pixels) that are used to either transfer an image from a ribbon to the media or for direct thermal printing the media is chemically treated and the imaging is produced by the heating of the media. This combination of applying heat and surface friction is demanding on the printhead. If proper care and maintenance isn't performed, or poor media is used, the life of your printhead can be drastically reduced. Since the printhead is a consumable item, the goal is to optimize the life of the printhead through proper operation, maintenance, and use of media.

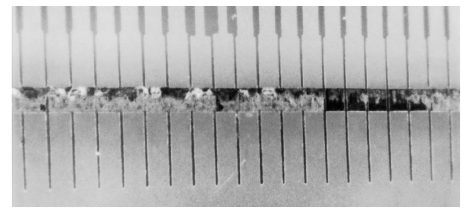
Below are photographs of three printheads. The first printhead is brand new. The second has printed over 1 million linear inches of thermal transfer labels and has been properly maintained. The third printhead has printed far fewer labels, but without proper care and maintenance, signs of abrasion and contamination build-up are evident.



*New*



*Over 1 Million Inches  
(Properly Maintained)*



*Less Than 1 Million Inches  
(Without Proper Care)*

The five main reasons that can shorten the printhead life are as follows:

- 1) Overdriving the head.
- 2) Excessive Abrasion.
- 3) Abusive contact.
- 4) Electro-Static Discharge (ESD).
- 5) Impurities.

- 1) Overdriving the head- Overdriving the printhead occurs when the printhead is not properly contacting the media. This doesn't allow the printhead heater element to dissipate the energy (heater) and will shorten the heater elements life, which will show up as missing pixels (white lines/voids where you would expect to see an image). This condition can be caused a couple of different ways;
  - a) The printhead has a build-up of residue/material at localized areas, which prevent an even contact of the printhead to the media/platen, not allowing the heater elements to properly dissipate the energy/heater and damaging the elements. One of the symptoms of residue buildup is poor print quality that may look like faded print or failed print element(s). The way to prevent this condition is to ensure you don't allow the residue build-up on printheads to occur. You need to use media that is of high quality that doesn't release the coating from the media to the head, and you need to clean the head frequently and properly (see below section on printhead cleaning).
  - b) Opening the print mechanism while printing or disconnecting internal printer cables with the power on also causes the energy/heat to not dissipate properly resulting in damage to heater elements. A print job should be



completed allowing the printhead heater element to fully dissipate the energy prior to opening the printhead mechanism and the printer should be off before connecting or disconnecting internal printer cables.

- 2) Excessive Abrasion-This will cause the protective overcoat layer (top coat) of the printhead to wear prematurely and subsequently expose the heater element, which may result in the opening or shorting of the element. The excessive abrasion is caused by one of two conditions; a) Poor quality media that has abrasive particles imbedded into the surface (which can subsequently contact the printhead). Or b) through the introduction of dirt or other extraneous contaminants that can come in contact with the printhead, while driving the media over the printhead. The best way to prevent excessive abrasion is to always use quality media and to use the printer in a clean environment. In addition, frequent proper cleaning of the printer will also reduce the chances of printhead abrasion (see below section on Proper Printhead Cleaning).
- 3) Abusive contact- this is where the printhead heater element protective surface has been physically damaged. What typically happens is either a sharp or hard object has contacted the protective overcoat layer of the printhead causing the surface to break, exposing the heater element resulting in the opening or shorting of the element. The protective overcoat layer over the printhead heater elements is fragile and delicate and must not be put in contact with hard or sharp objects/instruments. Additionally, proper storage and handling of the printhead is essential. Note: If the printhead has a label stuck to it, or if this is a build-up of residue see below section on Proper Printer Cleaning.
- 4) Electro Static Discharge (ESD)- The printhead is a semiconductor device that is very sensitive to ESD. At the connector end of the printhead just 200 volts of ESD can damage the printhead. If you are handling or installing a printhead, ESD protection is a must. Also, please ensure you are using high quality media that isn't already charged with a high amount of ESD (a typical cause are the printer ribbons). Whenever cleaning the printhead don't touch the protective heater element layer with your hands and don't use instruments that can cause ESD charging/discharging. In addition, another type of ESD damage is caused from a build-up of residue/material at localized areas. When printing, the friction from the media passing over the built-up residue/material can allow an ESD discharge to occur and lead to the development of a pinhole through the overcoat layer at the heater element. The pinhole creates a passageway to the heater element allowing corrosion to take place and destroy the heater element. Again proper cleaning (see below section on Proper Printhead Cleaning) will prevent the initial residue build-up that can lead to an ESD event on the heater element.
- 5) Impurities- These can either cause electronic circuit shorting or can cause corrosion to the printhead that can result in open/short circuits. Impurities can be introduced to the printhead by cleaning the printhead with a substance that isn't recommend. The printhead should be cleaned only with isopropyl alcohol with 99% purity or greater (any other solvents may damage the printheads and are not recommended). Another way impurities can be introduced to the printhead is from improper handling, poor quality media and exposure to an environment where there is excessive moisture, such as exposure to high humidity or other excessive wet environments-Water contains many impurities and shouldn't be exposed to the printhead.

**Conclusions:** The printhead is one of the most delicate, critical and expensive components contained in a thermal printer. The printhead is a consumable component and wears from the friction and heat used in the printing process. In order to get the most life out of the printhead you must handle and maintain the printhead properly and avoid the above five (5) conditions that attribute to prematurely reducing the life of the printhead.



The residue/build-up that can accumulate through usage on the printhead and bake on the surface will create a barrier to the heat transformation required in producing high quality images. The residue buildup occurs gradually and results in poor print quality that may look like faded print or failed print element(s). This build up is very resistant to cleaning with the cleaning pen, swabs or cloth and is difficult to remove and can cause overdriving, abrasion, and ESD failure modes with the printhead.

One of the most important steps that the user can do to lengthen the printhead life is to properly clean the printhead. The printer needs to be cleaned properly and regularly to extend the printhead life and the process is simple for the user to perform.

#### **Proper Printer Cleaning-**

The printer needs to be cleaned properly and regularly (After each ribbon/roll of media is recommended). Please follow the owner's manual for the correct cleaning techniques for the printer being used. Depending upon the type of printer you'll typically either use a cleaning card, Save-a- Printhead Cleaning Film and/or cleaning pen or cleaning swabs for cleaning the printhead and platen. If using lint free cloth/cleaning swabs and isopropyl alcohol use only 99% purity or greater. To properly remove a stuck label from a label printer please follow the owner's manual. The printhead elements are fragile and delicate and must not be put in contact with hard or sharp objects/instruments.

Cleaning requirements: Take care when handling or cleaning the printhead by removing any jewelry that may scratch the printhead and use a grounding strap or anti-static mat (ESD protection) to discharge static electricity that could damage the printhead.

To start, use the cleaning pen or cleaning swab or cloth using isopropyl alcohol 99% or greater. First, turn off the printer and open the printhead mechanism. Lightly blow or brush away any loose dust and lint particles within the print mechanism (i.e. Platen rollers, and printhead). NEVER use any hard, metallic, or abrasive objects—such as a screwdriver—to remove adhesives or other contaminants that may have built up on the printhead.

Next, press the cleaning pen or swab tip against the printhead and swipe the print elements from end to end. Then, turn the platen rollers (if possible) while wiping them from side to side. Repeat this step until the swab no longer shows dirt.

The cleaning pens must to be replaced when there is evidence of a dirt build-up on the cleaning pen surface (the cleaning pen is typically good for about 10 cleanings). The cleaning swabs, cleaning cloth, and cleaning cards are typically only good for one use to prevent the dirt from these surfaces contacting a printhead, and should be discarded after each use.