



The printhead cleaner built in your ribbon.

Preventative Maintenance for Thermal Transfer Printers

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Introduction

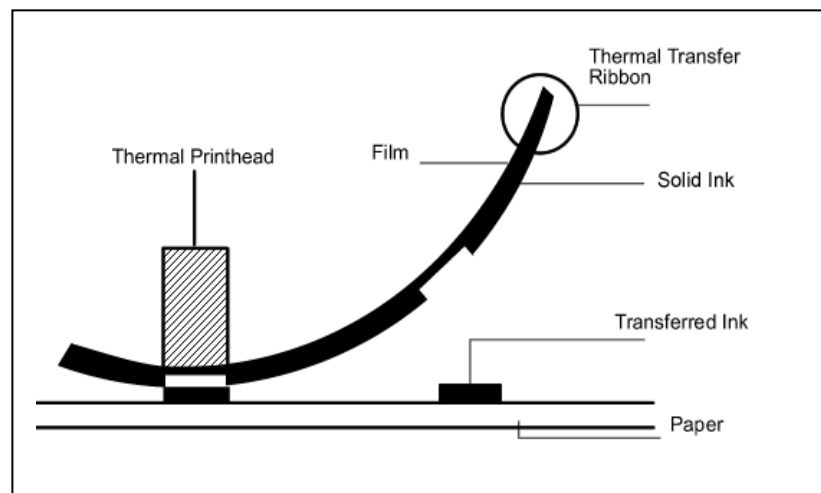
There are many advantages to using thermal transfer printers including low equipment cost, low maintenance cost, and high image quality. These advantages can be adversely affected if regular preventative maintenance is not performed. OEMs recommend cleaning the printhead after each ribbon use. This assures prolonged printhead life, which contributes to lower maintenance cost and higher print quality. Amazingly, research shows that less than 20% of people follow the manufacturer's printhead cleaning recommendations. One reason is because cleaning the printhead can be messy and inconvenient. Some traditional cleaning methods can also be time consuming, thus slowing down the printing process. This white paper will provide you with important tips on how to maximize printhead life.

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Thermal Transfer Printing – An Overview

Thermal transfer is a digital printing technology most commonly used to print unique, one-off images and variable information. Thermal transfer delivers high resolution print quality with excellent image durability.

In thermal transfer printing, the printer, ribbon and substrate work together as a printing system. The technology is simple and works by melting ink from the ribbon onto the substrate. Thermal transfer printing is reliable and low maintenance, and can be applied in a wide range of on-demand printing applications.



Ribbon Types

There are several types of inks commonly used for thermal transfer devices: wax, wax/resin and resin. Wax is most commonly used because it is the least expensive and suitable for most labeling applications. Wax/resin and resin ribbons are often more durable and hold up to many extreme conditions such as contact with chemicals and frequent handling. Each type of ink has different applications and requires different settings on individual printers for optimum performance.

Each ink type is applied to a carrier (a polyester film 3-6 microns thick) through a wide-format coating process producing a master roll. The master rolls are typically cut into smaller widths and lengths determined by the thermal transfer printers available in the market. Because of the variety of printers available, there are hundreds of possible ribbon configurations - each varying in width, length, printer shut off mechanism, core, or ribbon wind. Selecting the right ribbon for the right application can result in quality labels and the most cost-effective price.

Applications

Thermal transfer is most commonly used to print one-off, unique bar codes on tags and labels used in packaging. It's also ideal for printing alpha-numeric information that is one of a kind, like lot codes, expiration dates, and serial numbers. A majority of thermal transfer applications are found in manufacturing. Companies use thermal transfer in automated identification to improve data accuracy, which improves productivity. Some examples of this include:

- Work-in-process tracking
- Parts marking/product ID
- Inventory management
- Shipping and receiving
- Time and attendance

Warehousing and distribution found thermal transfer technology a perfect fit for :

- Inventory management
- Receiving/placing
- Picking/shipping



Newer applications for thermal transfer can be found in healthcare. Barcoding in the healthcare industry is gaining acceptance because it reduces medical errors and improves productivity. Emerging applications include labeling of unit dose medications at the point of care, patient identification, admissions, inventory management and record keeping. Labs also use thermal transfer to label test tubes and slides for specimen tracking. While

laser printing is the most common printing method in pharmacies, larger fulfillment centers find greater efficiency printing prescription labels using thermal transfer.

Supply chain security is another emerging application for thermal transfer. Brand owners around the world are facing huge challenges in protecting their products from counterfeiting and product diversion. Thermal transfer can be used to provide security throughout the supply chain. Special markers or identifiers can be included overtly, covertly and even forensically through the use of thermal transfer ribbon technology.

Factors that Affect Thermal Printhead Life

Thermal transfer ribbon printers need regular care to maintain their performance. When neglected, the results can include premature printhead replacement, unnecessary printer downtime and undesirable print quality. Regular printhead maintenance is recommended by printer OEMs, to maximize printhead life.

Printhead life is dependent on many variables including:

- Maintenance of the printhead per OEM recommendations – regular cleanings
- Residue build-up
- Abrasion
- Electro-static discharge
- Heat settings

Maintenance

Although printhead build-up is a normal occurrence in thermal transfer printing, premature printhead failure can be avoided with regular cleaning. Dirt and residue can be deposited on the printhead during the printing process. If the printhead is not cleaned regularly, per OEM recommendations, the residue will become permanent and will cause a barrier between the printhead element and the substrate, adversely affecting print quality.

Residue-buildup

Complex label formats, faster print speeds, high heat settings, and high volume printing are some extremely aggressive conditions in thermal transfer printing that accelerate printhead buildup. The type of printer and ribbon are other variables that affect the level and severity of buildup.



This label is a good example of one that was printed on a dirty printhead. You can see voiding rendering the barcode unreadable.

Abrasion

Excessive abrasion can cause a printhead element to wear prematurely and result in costly replacements. There are three main factors that can cause abrasion:

1. Using a ribbon that is not wide enough to cover the entire width of the label, allowing the edge of the label to abrade the printhead. Always use a ribbon that is approximately 1/8" wider than the label stock with liner to protect the printhead.
2. Using a printer in a dirty environment. Dust particles and other unwanted substances can stick to the printhead, causing wear and eventual failure.
3. The use of poor quality media. Some types of media contain particles, which can be abrasive and cause damage to the printhead.

Frequent cleaning contributes to less abrasion to the printhead.

Electro-static Discharge (ESD)

ESD can cause damage to a printhead with as little as 200 volts. Using a high quality anti-static media, when installing a printhead, is crucial to preserving the printhead life. Never touch the protective heating element with your hand or foreign instrument, as this can cause unwanted ESD discharge.

Heat Settings

Use the lowest heat setting possible for acceptable print quality. This will conserve energy and prolong printhead life.

Printhead Cleaning Methods Pros and Cons

The figure below dramatically demonstrates how quickly buildup occurs when a printhead is not cleaned. The photographs represent buildup induced by aggressively printing with three leading ribbon brands and NOT CLEANING at each ribbon load. This amount of buildup was generated after 5 ribbons, and has no impact on print quality. However, the rate of buildup will progress in a similar fashion if the printhead is not cleaned. Over time, print quality will suffer and the printhead elements will burnout prematurely, requiring the printhead to be replaced.



Brand A



Brand B



Brand C

IPA (Isopropyl alcohol) comes in four different types: wipes, pens, pads and swabs. Most OEMs recommend regular cleaning with IPA. There is also a time factor involved with IPA. When cleaning with IPA wipes, the printhead must be allowed to dry before the ribbon is rewbed. If not, the IPA solvent breaks down the ribbon's backcoat, defeating the purpose of cleaning the printhead.

Cleaning Cards should only be used periodically because of the abrasion that they can cause. The card is a heavy film coated with a strong abrasive designed to scrub off permanent buildup when fed through the printer.

Ribbons with built-in printhead cleaners, there are some ribbons available in the marketplace that have a printhead cleaner built-into the ribbons itself. Clean Start® is an exclusive product manufactured by the TTR industry leader IIMAK. It is spliced between the leader and the ribbon. It is a piece of film that removes debris and cleans the printhead with every use. Used in the webbing process, it adds little time with no additional drying time, thus is a quicker process. In three simple steps taking less than 10 seconds, printhead cleaning is achieved. When compared to not cleaning a printhead at all, CleanStart is significantly better for printhead maintenance as well as maintaining good print quality.



Printhead Maintenance Do's and Don'ts

Thermal printheads are the most expensive consumable product and eventually will have to be replaced. Maximizing printhead life can save replacement cost and reduce printhead downtime. Here are some simple things to follow and avoid when it comes to printhead maintenance.

Do

- ◆ Clean your printhead after each roll of ribbons. EACH ROLL!! This is the most important thing that you can do to prolong the life of a printhead.
- ◆ Use the lowest heat setting possible for acceptable print quality. This will conserve energy and prolong printhead life.
- ◆ Ground yourself before touching or changing the printhead to prevent static discharge.

Don't

- ◆ Forget to clean your printhead.
- ◆ Touch the printhead anywhere except the edges. Even the lightest touch can damage printhead glass.
- ◆ Use foreign objects of any kind on or near the printhead; this could cause scratching and severe damage.
- ◆ Use low quality thermal label stock; poor quality labels may cause excessive adhesive ooze and build-up on sensitive printhead components.
- ◆ Attempt any repairs if you are unfamiliar with printer mechanics.

About IIMAK Clean Start® Ribbons

IIMAK's Clean Start thermal transfer ribbons are sold through value added resellers and distributors around the world. Clean Start is exclusively available on IIMAK thermal transfer ribbons. For more information about IIMAK and its products, visit www.iimak.com or call 888.464.4625.