

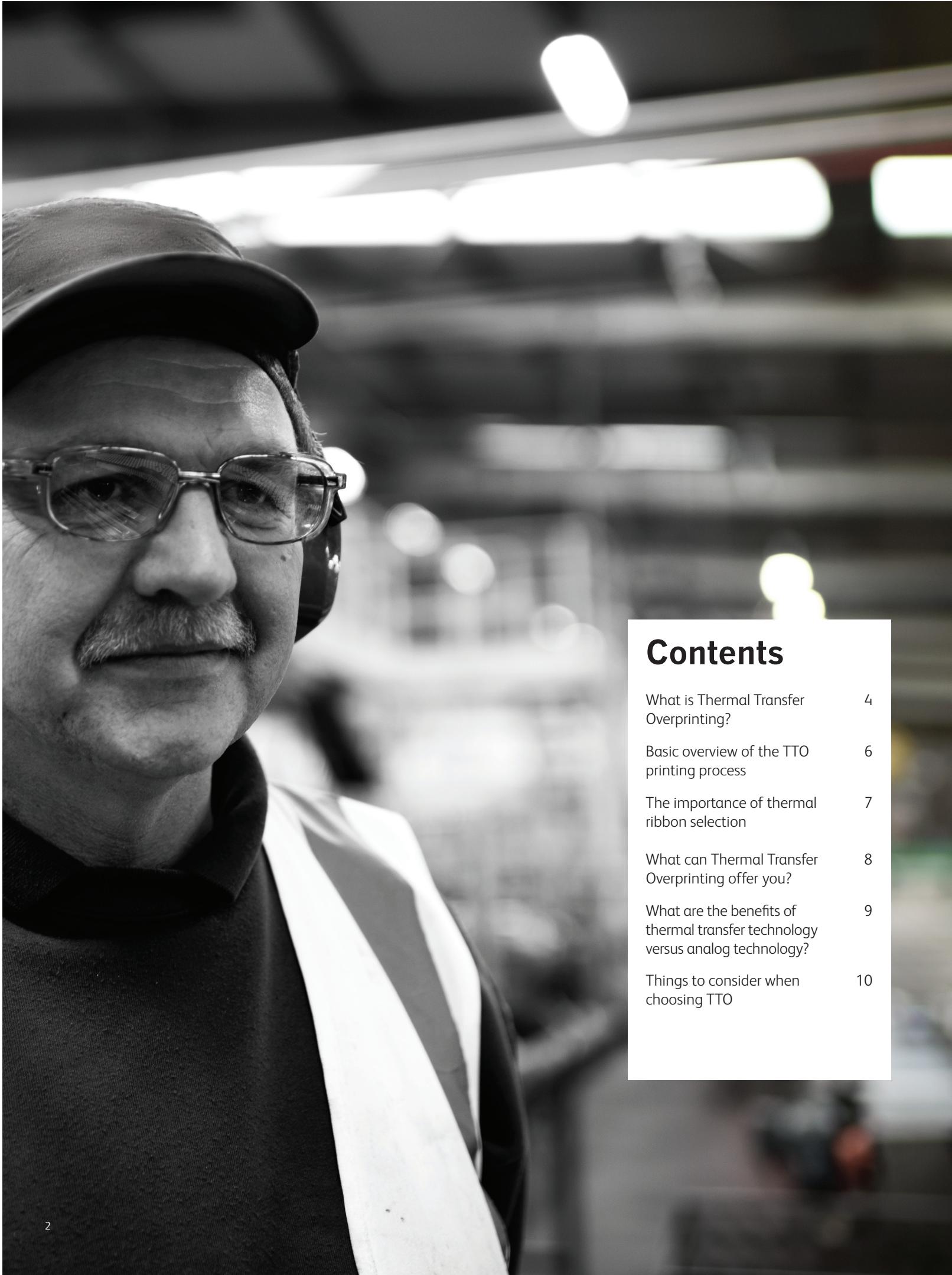


An introduction to Thermal Transfer Overprinting technology

Is Thermal Transfer Overprinting a suitable solution for your coding needs?



As innovation in coding technology continues, equipment advancements and new product design provide companies with more options when selecting suitable coding and marking solutions. It can be difficult to navigate through all the features and benefits of each technology to determine which is best suited to your application needs. This white paper will detail Thermal Transfer Overprinting (TTO) technology, its advantages, and certain selection criteria to consider.



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Thermal Transfer Overprinting (TTO) systems were developed specifically to mark directly on flexible film packaging and labels.

Unlike other generalist coding technologies, Thermal Transfer Overprinting has been engineered to work specifically on flexible substrates including flexible packaging materials and labels. TTO is a digital printing technology that overcomes many of the deficiencies of analog printing solutions like hot stamp/hot foil and roller coders.

Example packaging machinery where TTO would be the ideal coding solution:

Vertical Form, Fill and Seal machines used to package

- Potato chips
- Nuts / grains
- Candy
- Powders
- Hardware

Horizontal Form, Fill and Seal machines (also known as 'Flowrappers') used to package

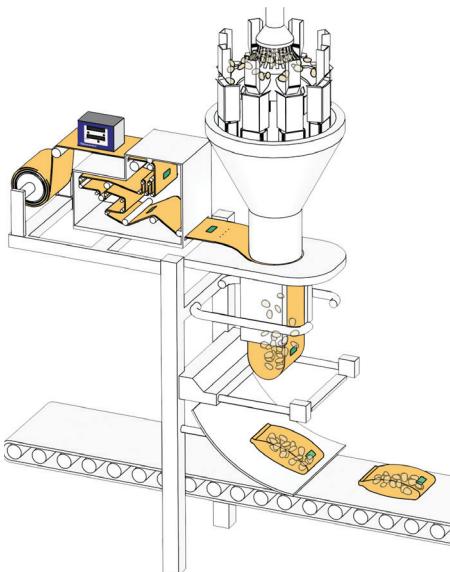
- Bakery products (bread, biscuits, cookies)
- Confectionery

Thermoform and Tray-sealing machines used to package

- Cheese
- Processed meats

Pouch filling machinery used to package

- Coffee
- Drinks
- Soup



Example of DataFlex® integrated with Vertical Form, Fill and Seal packaging machine

What is Thermal Transfer Overprinting?



Thermal Transfer Overprinting (TTO) is an ideal printing product for most flexible film packaging applications. The printing process produces a very high resolution code onto the package that is easy to read and also ensures no degradation of the aesthetic quality of the packaging film artwork and design.

TTO was engineered as an advancement over traditional analog coding technologies like hot stamp and roller coders. TTO brings digital printing technology to flexible film packaging applications, common in many food industries. As coding requirements change due to supply chain, customer or regulatory demands, analog technologies have limited flexibility – constrained by the number of characters held in the type holder or the amount of text that can be added to the circumference of the die wheel. TTO technology is not constrained in this way. Additional code content, including more lines of code and new date, time, or traceability data, can easily be added without any mechanical changes to the printer itself. And as product SKU counts increase, TTO offers a simple way to change printed content from one SKU to the next.

Print jobs can be stored on the printer controller and easily recalled in a matter of seconds. Inherent to the printhead technology itself, TTO printers offer yet another key advantage over hot stamp technology. Unlike hot stamp that requires a warm-up period to bring the type holder to proper temperature, TTO technology can go from power up to printing in less than 60 seconds. All of these TTO advancements translate into more flexibility and more productivity for flexible film packaging lines.

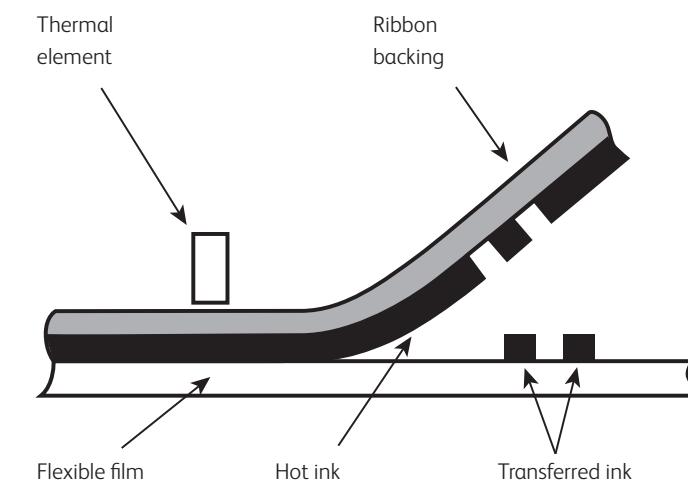
Thermal Transfer Overprinting is a printing process that applies a code to a flexible film or label by using a thermal printhead and a thermal ribbon.



TTO uses a thermal printhead and thermal transfer ribbon. The printhead comprises a ceramic coating, covering a row of thermal pixels at a resolution of 12 printing dots per mm allowing for high resolution codes.

The print information transfers to the thermal printhead and the individual printing dots are heated as required. The coloured ink in the ribbon is transferred onto the printing material in the specified target area to produce a code.

TTO is a contact coding technology, which means that it must touch the flexible packaging film or label to produce a code. To accommodate this requirement, the TTO unit is installed (using a bracket and some ancillary parts) directly onto the packaging machine or labelling system, typically very close to the point of packaging.



Basic overview of the Thermal Transfer Overprinting printing process

1

The TTO should be positioned on the packaging machine, such that the flexible film passes under the TTO printer unit; more specifically, the film should pass directly under the TTO printhead and over the top of a hard but pliable rubber surface (known as a platen pad or platen roller).



2

When it is time to print, a signal is sent (via the packaging machine or a photocell) to the TTO unit, that informs it that the pre-selected code needs to be printed.



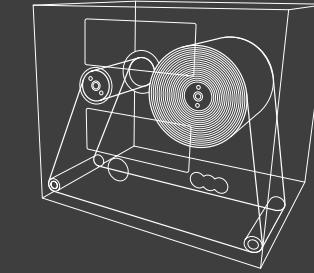
3

The TTO commences the print process.

- 3.1 The printhead lowers towards the packaging film.
- 3.2 As the printhead lowers, it contacts with the TTO ribbon.
- 3.3 The printhead and the TTO ribbon make contact with the film.
- 3.4 All 3 (printhead, ribbon, film) make contact with the hard rubber surface and this produces a pressure between the printhead and the rubber.
- 3.5 Once the printhead contacts with the rubber, the miniature printhead elements are switched on and off, which generates heat at the printhead.

- 3.6 The heated elements produce enough heat to melt the dry ink film of the ribbon, turning the ink to a liquid.
- 3.7 The pressure of the printhead, coupled with the heating of the elements and the wetting of the ink, transfers the ink to the flexible film and the required image is formed on the film.
- 3.8 Once the complete image is printed, the printhead returns to its 'rest' position inside the TTO unit and waits for the process to commence again.

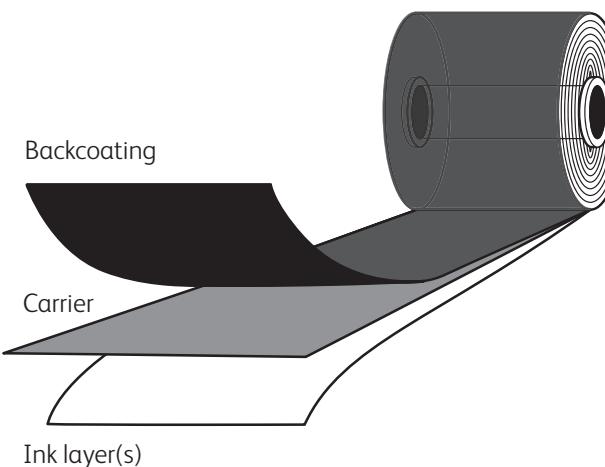
The importance of thermal ribbon selection



Selecting a suitable thermal transfer ribbon is an important part of the coding process, as different ribbons will suit different applications.

TTO ribbon has a very thin layer of dried ink on one side of a polyester film and a suitable printhead lubricant on the other side. The ink layer is either a mix of wax and resin or only resin. A wax/resin mix is often used in general purpose applications across most flexible film packaging environments. Using a resin only ribbon is more common in demanding applications where there may be an environmental impact such as extreme heat or where adhesion becomes a challenge from a chemical resistance perspective.

The ribbon type recommended by most thermal transfer suppliers will depend on the individual application and the exact coding requirements.



All Videojet ribbons feature advanced backcoat technology.

A non-abrasive silicone based coating is applied to protect the printhead and extend printhead life. This technology also helps in dissipating static charges (which can result in damaged printheads and code degradation), while providing an excellent thermal conductor for ink transfer.



Ribbons for all your needs



Long length

Enables extended run times with fewer ribbon changes

Applications: wrapped confectionery, bagged snacks, candy bars and sleeve wrappers for bottles.

Extreme temperature

Optimal choice for hot-fill applications 180-195°F

Applications: fresh-made soups and packages filled with hot products.

Standard

General use solution for mid-range speeds

Applications: salty/savory bagged snacks, fresh and frozen foods like vegetables, meat and poultry, dried fruit and candy.

Super standard

Provides extra adhesion and super durability, recommended when film type and speed often varies

Applications: glossy labels, pharmaceutical and nutriceutical labels, cosmetics, nutritional and ingredient statements.

Premium

Ultimate adhesion, well suited for applications requiring resistance to temperature or chemicals

Applications: glossy packaging, medical devices, pharmaceutical, automotive and high end cosmetic labels.

What can Thermal Transfer Overprinting offer you?



TTO is capable of responding to virtually all flexible packaging applications, whether running at slow, moderate or high printing speeds, and coding small, simple messages or large format codes with a lot of variable data.

Whatever your flexible packaging application, thermal transfer can offer an efficient solution with low cost of ownership.

Low cost printing of variable messages
Thermal Transfer Overprinters are freely programmable and can generate variable data for each print. The high resolution printhead enables text, graphics, batch numbers, real-time dates and bar codes to be printed. This established printing technology was originally developed to print directly on flexible film packaging materials, therefore replacing labels and significantly reducing the cost per print.

Economical solution for your industry
The latest technology in TTO only uses a minimal amount of ribbon by guaranteeing a 0.5mm gap between each print. This makes Thermal Transfer Overprinters an economical solution for the flexible packaging industry. Another advantage from using TTO is the ability to plan your line downtime, rather than manage unscheduled maintenance. By knowing the number of codes you achieve per roll of ribbon, you can accurately calculate the interval of ribbon change overs. The simple cassette design also makes ribbon change overs quick and easy to minimize the impact on your line.

Flexibility in production

Using thermal transfer technology allows you to mark the product when stationary (intermittent) or when moving (continuous) in a constant flow.

• Intermittent printing

Intermittent printing is used on lines where the web transport moves in an intermittent motion (stop/start). The stop-time (dwell) within the cycle is used for printing. Using a signal from the packaging machine, the real-time printing information is prepared, the printhead drops and moves across the printing surface. When the print is complete, the film is released and the printhead returns to its start position.

• Continuous printing

This is used on continuous flow lines. The packaging material is printed while the film is moving. After a signal from the packaging machine (e.g. an eye mark), the printhead is pressed against the platen roller, which is integrated into the bracket frame, and printing is started. As soon as printing is finished, the printhead returns to the start position. The print speed is adjusted automatically to provide a consistently clear print image.

What are the benefits of thermal transfer technology versus analog technology?

Improved print quality

TTO uses a 300dpi (dots per inch/12 dots per mm) printhead that produces consistent and repeatable high resolution codes. The printhead is a solid ceramic block that has no sharp edges, eliminating the opportunity for perforation of the packaging film. In addition, as the printhead uses digital technology to produce a code, all information is updated automatically and therefore it is not necessary to stop the production line when new codes are required.

• Analog coding technology, such as hot stamps and roller coders, use metal stamps that are held in a heated block. The stamps need to be replaced every time a new job is required in order to change the code data. Worn or broken stamps are a common occurrence and lead to poor print quality and often, perforation of the packing film leading to high levels of waste and rework.

• In addition, digital TTO technology virtually eliminates human error and downtime that occurs when operators incorrectly insert stamps, make spelling mistakes and lose stamps.

Real-time variable data

TTO is digital technology, which means it contains a real-time clock computer chip, it has the ability to print variable information including dates, lot codes and time. The computer will also allow you to do basic calculations, so that things such as 'Best Before' dates can be calculated automatically from the date of manufacture.

• Analog coding technology generally requires a long time to replace ribbon as there is often no ribbon cassette, so the operator needs to get access inside the packaging machine.

• Updating data for different jobs is also a long process because the coder needs to cool down and then warm up again after the stamps have been changed.

Increased uptime

TTO design ensures that it is fast and simple to change ribbons and the ribbon length can be very long (up to 1,200m). Software control of ribbon tension and movement (which are critical parameters in any ribbon-based coding technology) ensures the amount of unused ribbon is kept to a minimum.

Seamless integrating with your line.

TTO machines are small, lightweight and easy to install into all packaging equipment. Specialist brackets and accessories can be supplied to make even the most unusual of applications, a simple and neat installation.

Things to consider when choosing Thermal Transfer Overprinting

Thermal Transfer Overprinters can improve your packaging line performance and efficiency through patented design features that increase online availability and decrease coding errors...

Here are a number of advantages available from Videojet's range of Thermal Transfer Overprinters that should be considered when selecting thermal transfer over analog technologies.

Highest reliability and increased line uptime

A patented and proven clutchless ribbon drive with fewer wear parts than competitor models, increases mechanical reliability and minimizes maintenance-related downtime. Optimal ribbon tension is consistently maintained through software to virtually eliminate downtime caused by ribbon breaks and false ribbon breaks.

- Accommodates ribbons up to 1,200 meters long for less frequent ribbon changes and more prints per roll.
- Increased production line efficiency via simple cassette design and faster ribbon changes.

Best efficiency

The bi-directional ribbon drive utilizes motors that drive both the ribbon unwind and re-wind reels, allowing unused ribbon to be recaptured after each print. This maintains a 0.5mm gap between prints from the beginning to the end of a ribbon roll, creating more prints per roll and ensuring the highest possible ribbon efficiency.

Simplest operation

The intuitive, graphical user interface and color touch screen incorporate easy to learn, icon based controls and a WYSIWYG image display to reduce downloading and entry errors. It also makes learning how to operate the Videojet DataFlex® Line a simple exercise.

Code Assurance

Enhanced software provides Code Assurance by reducing operator interaction and minimizing potential for human error.

Highest quality

The Videojet DataFlex® line has been designed with the customer in mind. Quality and reliability are the benchmarks for our printer's success. The product delivers 300dpi on fixed and variable images, whether they are graphics, bar codes or more traditional times/dates and manufacturing traceability information.

Virtually eliminates rejects

Videojet's software, ribbon drive and easy to use controls consistently deliver the very highest resolution codes every print, virtually eliminating missed prints and expensive production re-runs.

Don't let your bottom line suffer by using out-dated, unreliable technology that does not support your production demands.

Choose a TTO technology to become more efficient and keep your line more productive, for longer.

If you want to learn more about Thermal Transfer Overprinters, receive free print samples, or view a demonstration, contact a coding expert.

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