DNP

Global Leader in
Thermal Transfer Ribbons

Durable print solutions for Food & Beverage

Introduction

Often customers are waiting in line at a supermarket, when a barcode is unreadable and causes a longer wait, as the cashier needs to enter an endless string of human readable characters or call the manager to look up the product in the inventory.

Whenever food is recalled by supermarkets, due to possibly unsafe consumer content, shops often refer to batch numbers or expiration dates printed on the packaging, to clearly indicate which products are safe or unsafe for consumption.

Food packaging with barcodes or expiration dates are the closest examples consumers get to thermal transfer printing, as many goods passing through the hands of cashiers at supermarkets are readable due to thermal transfer technology. Nowadays, barcodes are more commonly used by consumers, due to self-scanning equipment available at many supermarkets, so it is no wonder that many consider barcodes on products as common as the air we breathe.

What many do not realize is the amount of regulations concerned with printing on food packaging. Intended to protect consumers of inks and adhesives migrating onto the foodstuffs inside the packaging, food contact materials must comply with EU regulation (EC) 1935/2004.

This brochure covers the following topics for the food and beverage industry:

- Food packaging
- Direct thermal printing cost increases
- Printed food contact materials
- Unique solutions

What can we do for you?

With a wide range of globally available thermal transfer ribbons to print on various substrates, DNP can help you to ensure clearly printed barcodes and texts to ensure consumer safety by using our ISEGA-certified thermal transfer ribbons on food labels or packaging. DNP's ISEGA certified products are safe to use for indirect food contact.

We recommend using certified food printing labels, packaging materials and adhesives in combination with a printing ribbon suitable for the application and compatible with the printable substrate. DNP is collaborating with many renowned label manufacturers and we can test your label application in our laboratory to advice about the best possible print solution.

DNP supplies thermal transfer inks to print variable information required in the food and beverage industry. Suitable for many different types of regulations and compliances regarding printing, many DNP ribbons comply with industry certifications such as REACH, ROHS and ISEGA.

REACH RoHS ISEGA

Durable print solutions

Food packaging

Printing of expiration dates and lot numbers has increased as food safety becomes a growing concern among consumers. Expiration dates and lot number traceability is critically important in the event of a product recall and such printed information must remain legible for tracking information. In addition, other applications such as barcodes, part numbers and item numbers require durability. Besides printing on all sorts of labels used in the food and beverage industry, printing information on flexible packages with thermal transfer ribbons is normally an integrated part of the food packaging line.

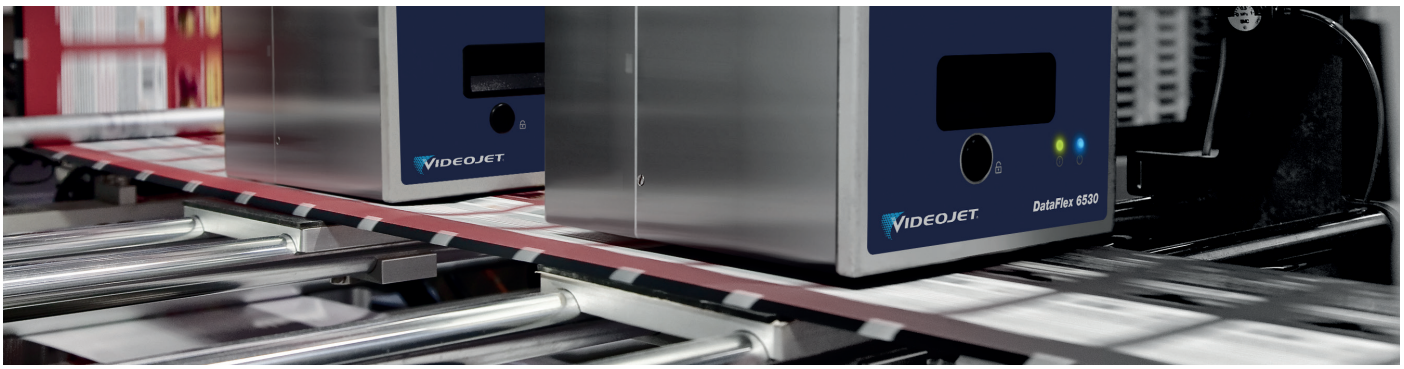
Printing on packaging

Attractive food packages are very common in the form of flexible packaging, on which the ink is printed directly. On usually a large surface of material, the thermal transfer print area is often small, but extremely crucial to the producer, retailer and consumer alike, as this area shows the expiration date or lot number.

An inline thermal transfer printer prints directly onto the substrate, typically a bag or some other type of container. Due to the limited lifecycle of the printed package, wax/resin thermal transfer ribbons are commonly used for printing on plastic bags (polybags). As these ribbons easily print on such surfaces, the packaging material does not have to be altered for printability with thermal transfer ribbons. When more durability is required for the printed data, please use resin thermal transfer ribbons, as these provide better solvent, smudge and scratch endurance.

To better adapt to the requirements of inline printing on packaging, DNP has improved the M295Plus with up to 25% more blackness and higher durability. DNP's excellent drop-in compatible wax/resin for printing on packaging is well suited for high speed printing and now goes under the name of M295HD.

DNP ribbons for inline printing				
Quality	**Ink colour**	**Smudge resistance**	**Scratch resistance**	**High Speed printability**
M295HD – Print-on-Packaging Wax/Resin	Black	✓		✓
M295C – Silver and White Wax/Resin	Silver White	✓		✓
R390 – Near Edge Resin	Black	✓	✓	✓
R396 – High Speed Durable Resin	Black	✓	✓	✓



Durable print solutions

Food packaging

General label printing

Many food products come with all sorts of labels, which could be anything from a blank paper label with a list of ingredients up to a very glossy label with consumer-appealing aspects. Although consumers of food and drinks often shop on visual appearance of the products they eventually buy, all the work which goes into a label is often underrated: label materials must have the correct adhesive to bond with the package, use approved inks, which cause no harm to the food or beverage inside the package as well as the consumer, incorporate as few materials as possible and meet the client's tight budgets.

In order to provide variable information on labels, DNP has a wide range of versatile thermal transfer ribbons, to help you find the correct product for your printing needs.

Whether you are printing on basic paper labels, converted labels, digitally printed labels or synthetic materials, DNP has a solution for you.

When an application calls for improved durability against fatty foodstuffs and moist; synthetic labels should be used. To ensure this durability, the surface of synthetic labels is very different from paper labels, so this requires a different form of thermal transfer ribbons to leave a print on its surface, which are resins-based thermal transfer ribbons. To offer the same diverse level of resistance as the synthetic label, we offer a wide range of resin thermal transfer ribbons.

DNP food and beverage printing solutions

DNP product type	Popularly used label stocks per product type		DNP quality	Smudge	Scratch	High speed
Wax	Uncoated Tag	Polyethylene	MP Wax	✓		✓
	Coated Tag	Polyolefin	TR4085plus®	✓	✓	✓
	Uncoated Face Sheet	Tyvek®				
	Gloss Sheets	Tyvek Brillion®				
	Polypropylene	Valeron®				
	Vinyl (Topcoat)					
Wax/Resin	Uncoated Tag	Polystyrene	M255	✓	✓	✓
	Coated Tag	Polyolefin	M265	✓	✓	✓
	Uncoated Face Sheet	Polyethylene	M295C*	✓		✓
	Coated Face Sheet	Polyester	M295HD*	✓		✓
	Gloss Sheets	Tyvek®	TR302X	✓	✓	✓
	Polypropylene	Tyvek Brillion®	TR4500*	✓	✓	✓
	Vinyl (Topcoat)	Valeron®	TR5080	✓	✓	✓
	Polybag		TR6080	✓	✓	✓
Resin	Uncoated Tag	Polystyrene	R300	✓	✓	✓
	Coated Tag	Polyolefin	R316	✓	✓	✓
	Uncoated Face Sheet	Polybag	R390*	✓	✓	✓
	Coated Face Sheet	Polyester	R396*	✓	✓	✓
	Gloss Sheets	Valeron®	R510C	✓	✓	
	Polypropylene	Polyimide	R510W	✓	✓	
	Vinyl (Topcoat)	PVC Shrink Wrap	R550	✓	✓	
	Polyethylene		TR3370	✓	✓	
			TR7541*	✓	✓	

** Near edge printing solutions*

Durable print solutions

Food packaging

Pre-printed labels

Digitally printed labels are becoming increasingly popular, as this printing technique enhances smaller quantities of labels to be produced at competitive prices and leaving more room for continuously adjusting or personalizing labels for next production runs.

When labels are converted, whether traditionally or digitally, varnishes are usually added to enhance the look of a label or protect the label for added durability. With every addition of ink or lacquer, the surface tension of a label changes and thus alters the printability of a label. It can make a non-thermal transfer printable label surface printable, but also the other way around, as some varnishes are non-thermal transfer printable. Surface tension is the invisible indicator whether to use a wax, wax/resin or resin thermal transfer ribbon.

With digital printing on the rise, this technique poses a challenge for thermal transfer printing as, often unknowingly, hardly printable varnishes are regularly being used. In order to make the surface printable for thermal transfer printing, the surface tension should be at least 38 dyne per centimeter.

Once switched to digitally printed labels, the end user often finds out that the thermal transfer ribbon previously used to print on these labels (usually wax or wax/resin ribbons), cannot print on their new digitally printed labels, as the non-printable lacquer is applied over the area reserved for variable information. As a result, more expensive resin thermal transfer ribbons need to be used, as these have less difficulty to deal with such surfaces.

As the food industry is usually a cost-sensitive industry, having to switch from a wax or wax/resin thermal transfer ribbon to a resin thermal transfer ribbon can cause a lot of frustration and additional costs.

Luckily DNP has always had the benefit of offering versatile products, such as the industry-leading wax TR4085plus®, but also the M265 Ultra Durable Wax/Resin, which prints like a resin, but is actually a wax/resin and therefore a cost-efficient solution for such surface tension issues.

Durable print solutions

Direct thermal printing cost increases

Since 2017, costs for operating direct thermal printing technology have steadily increased due to unavailability of materials.
With thermal transfer printing, the best alternative solution is often readily available.

Large volumes of direct thermal printing materials are used in everyday life. Many receipts, tickets and self-adhesive labels are printed on direct thermal papers in cost-sensitive markets, such as food, retail and transport.

Direct thermal printing requires a heat sensitive label material. Due to direct contact between the print head elements and the heat sensitive material, the exposed heat from the print head elements cause a colour change in the material to create the printed image. For thermal transfer printing, a thermal transfer ribbon is additionally required to print the ink onto any sort of substrate.

The basic method of printing direct thermal was long considered easier than thermal transfer printing for many printing purposes.

Since 2017 however, prices of direct thermal paper have increased tremendously. Due to environmental regulations, a number of manufacturers of leuco dye, the basis of direct thermal paper, were closed. Amongst these companies was the main manufacturer of leuco dye, resulting in a total estimated worldwide leuco dye shortage of at least 70%.

At the time of writing, there are no signs of the direct thermal printing market returning to normal, as it is unclear if the closed manufacturing companies are re-starting operations and at which capacity. Therefore it is impossible for analysts to make safe assumptions on the future of direct thermal printing.

Due to similar environmental regulations, prices for pulp, which is used for paper making, have also increased.
The total cost of ownership for direct thermal printing has therefore already become critical for a number of companies to keep their business going forward.
At a time of global economic growth and subsequent material needs, this situation is causing great concerns. Thermal transfer printing is the go-to alternative.

For some years, the costs for direct thermal printing were fairly similar to thermal transfer printing. However, the cost-gap is making thermal transfer printing very economical and could be a lifesaver for markets and consumers as a solution to the material shortage.

Durable print solutions

Direct thermal printing cost increases

Many direct thermal printers have a dual function to print both direct thermal and thermal transfer, so what other benefits does thermal transfer printing have over direct thermal printing?

- **Thermal transfer printing offers longer lasting print heads.**
  Contrary to direct thermal, there is no direct contact between the print head and the label material; therefore a 3 to 4 time longer print head lifetime is expected.
- **Thermal transfer prints are often more resistant to smudging and fading of the print.**
  A poor print quality could lead to difficult barcode-readability, which results into costly supply chain errors or longer waiting times at cash registers.
- **Thermal transfer can print on many different substrates.**
  It offers printing solutions for many different packaging materials, including directly on the packaging for long-term storage and readability of printed information.
- **Thermal transfer printers have become more customer-friendly.**
  To minimize downtime for changing materials, many different lengths of media can be loaded into the printer for a longer output of printed labels.
- **Thermal transfer printers have become increasingly eco-friendly.**
  More and more thermal transfer printer manufacturers provide printers with ribbon-save technology to optimize the usage of thermal transfer material and therefore creating less waste.
- **Thermal transfer printed labels have a longer life.**
  Exposure to heat changes the colour of many direct thermal labels. Standard labels printed with thermal transfer ribbons can still be read off long after printing.
- **DNP's thermal transfer ribbons are free from controversial Bisphenol-A (BPA).**
  Although many governments are banning BPA from food packages, it is still commonly found in direct thermal papers.

Durable print solutions

Printed food contact materials

As with packaging materials, many different labels can be used for food packaging. Although most labels are indirectly attached to the packaging, the European Committee views the complete combination of packaging materials, labels, adhesives, inks and lacquers as one packaging. These packages must comply to consumer-safety regulations.

As all sorts of materials are used as packaging material, some are more porous than others or the composition of the packaging is less favorable for packing food regarding food safety.

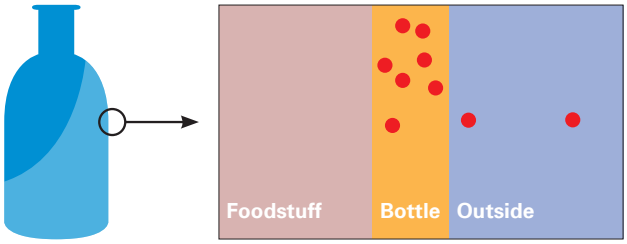
Many food packaging materials are made from plastic. Plastic itself is made from several non-biodegradable ingredients and as such, the public awareness about potential health hazards keeps growing. For example, containers labelled for safe microwave usage can still release contaminants while cooking. That is why rules are in place to prevent potentially dangerous packaging materials to enter the market.

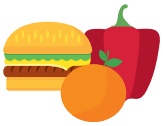
EU 1935/2004 is the general European food packaging regulation, which applies to all materials and products that come (or are intended to come) into contact with foods. These packaging materials must not endanger human health, must not cause any unacceptable change to the composition of the food and must not impact the organoleptic characteristics of the food (article 3 of EU 1935/2004).

As thermal transfer ribbons are commonly used in the food packaging industry, such products need to be tested and evaluated for usage in this industry to prevent its ingredients from migrating through labels or packaging materials and onto foodstuffs.
For such tests, DNP relies on ISEGA, an independent testing and certification institute, which tests our thermal transfer ribbons along Regulation EU 1935/2004. ISEGA's analytical work is highly regarded worldwide.

As every certificate expires after two years, a renewed test needs to be performed, to keep the certificate as relevant as possible.
Many DNP thermal transfer ribbons, be it wax, wax/resin or resin carry an ISEGA certificate. As such, these can be safely used for the printing of labels and food packaging, provided that it is ensured by an appropriate printing technique, where the print does not migrate from the printing substrates onto the foodstuffs.

It is important to understand that DNP's thermal transfer ribbons are certified for safe **indirect** food contact.
Do not hesitate to contact DNP Imagingcomm Europe for its latest overview of ISEGA approved indirect food contact TTR qualities.





Food chemistry

Fatty foods, acidic foods, aqueous foods; it depends on the food stuff which chemicals migrate from the packaging

Heat

Higher temperature increases migration

Time

Longer storage increases migration

Packaging size

A smaller packaging proportionately has a larger printable surface area, so more possible migration per volume of food

Durable print solutions

Unique solutions

Who doesn't remember the "Share a coke"campaign from a few years ago, where you could have personalized texts printed on its products in white? The mobile media-campaign made such printing possible with DNP's R510 White!

With some very unique TTR solutions, you can easily make your product stand out from a crowded market where appearance usually matters most. Here are a number of DNP's TTR solutions to give your product a nice touch.

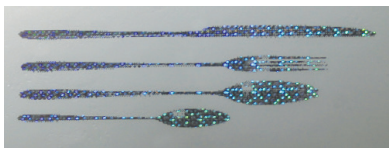
Coloured Thermal Transfer Ribbons

Printing variable information on dark labels is always a challenge with thermal transfer: a white print on a dark surface usually turns pale grey instead of bright white. Most of the durable coloured ribbons available on the market can never be 100% pantone proof. DNP offers double layer resins that will offer unique opacity to print variable information on dark or clear labels, which can be applied on dark surfaces in order to enhance brand recognition or add unique opportunities during promotional activities.

Coloured thermal transfer ribbons can also be a solution when you are tired of black barcodes or expiration dates. With our range of coloured thermal transfer ribbons, a previously generic black print can become a cool and colourful enhancement of your product's appearance or better blend in with the colours of the package or brand, whatever the type of substrate. If your preferred colour is not in the below range, do not hesitate to contact DNP, as we can help you to further customize and distinguish your product.

Hologram Resin:

Printable on glossy papers, synthetic labels and PVC, a hologram printed text, barcode or image can give your product a cool and unexpected print, which will make consumers turn their heads when browsing the shelves. Available patterns of Hologram Resin are "Polka dot" and "Rainbow".



Another solution, which our hologram resin offers, is a relatively inexpensive measure to fight product piracy. In case your food products are a victim of product piracy, take for example the recent fake formula milk or popular trademarks being copied, DNP offers solutions. When printing variable information with unique solutions, such as hologram-, UV-fluorescent or uniquely coloured resins, you can stay ahead of the forgers.

UV Fluorescent Resin

Readable during the day, but also during the night?
With DNP's UV Fluorescent Resin you can!

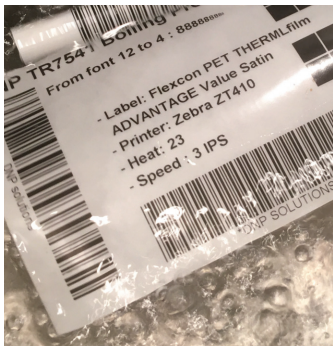
A print which is invisible in daylight, but making texts or codes appear under a black light? Our UV Fluorescent Resin comes available in black and clear film and leaves a very durable print on coated papers and synthetic label stocks. Mainly intended for brand-protection, the UV Fluorescent Resin can also be used for fun applications, e.g. when you want to promote your brand on the dancefloor under a black light or in a designated booth with black light in a supermarket.

Durable print solutions

Unique solutions

Hot Boil Resistant Resin

The birthplace of the TR7541 is obviously Japan, where there is a lot of focus on quick meals, such as dishes that are heated in boiling water. If the variable information of the flexible packaging still needs to be readable after this process, the TR7541 is a great choice, as it easily resists boiling water. Furthermore, TR7541 prints on both flat head and near edge printers.



Hopefully you have now noticed the unique possibilities with thermal transfer printing to enhance the appearance of your products. Do not hesitate to contact DNP.

Quality	Pantone colour*	Paper label stocks	Synthetic label stocks
TR3021 – General Purpose Red Wax	PMS1787	✓	✓
TR3022 – General Purpose Blue Wax	PMS286	✓	✓
TR3023 – General Purpose Green Wax	PMS3405	✓	✓
M295C* – Silver and White print on packaging wax/resin	PMS877, White		✓
R300 – General Purpose Red Resin	PMS185		✓
R410D - Ultra Opaque White Resin	White		✓
R510C – Durable Colour Resin	PMS116, PMS185, PMS287, PMS554, PMS347, PMS1505, PMS877, PMS2935		✓
R510W – Durable White Resin	White		✓
TR3370 – High Opacity White Resin	White		✓
VR301 – Durable Metallic Resin	Gold, Silver		✓

Near edge printing solutions

The colours shown here can be different from the actual colours

DNP

DNP Imagingcomm Europe B.V. is a subsidiary of Dai Nippon Printing Co., Ltd. DNP's TTR division has grown to be the world's largest manufacturer of thermal transfer ribbons for barcode and dye-sublimation printers. At DNP, we don't make thermal transfer ribbons, we craft it – with dedication, experience, the finest materials and stringent quality control. It's in our DNA.

At the most fundamental level, new creations and technology drive the concept of DNP as a Print & Information Solutions provider. Collaborating with expert teams, our R&D departments form the force that brings innovation to realization. We have in-house research and development to print and test various label and printer combinations. DNP can always assist you to determine the best print solution for your application.

For more information: **eu.dnpribbons.com**

DNP: committed to sustainable growth

DNP is actively working to preserve the environment. Corporately, we strive to achieve zero emissions, reduce water usage, protect biodiversity, thoroughly control the use of chemicals, develop eco-friendly products, and pursue green purchasing.

DNP Imagingcomm Asia Sdn Bhd

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FINAT
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