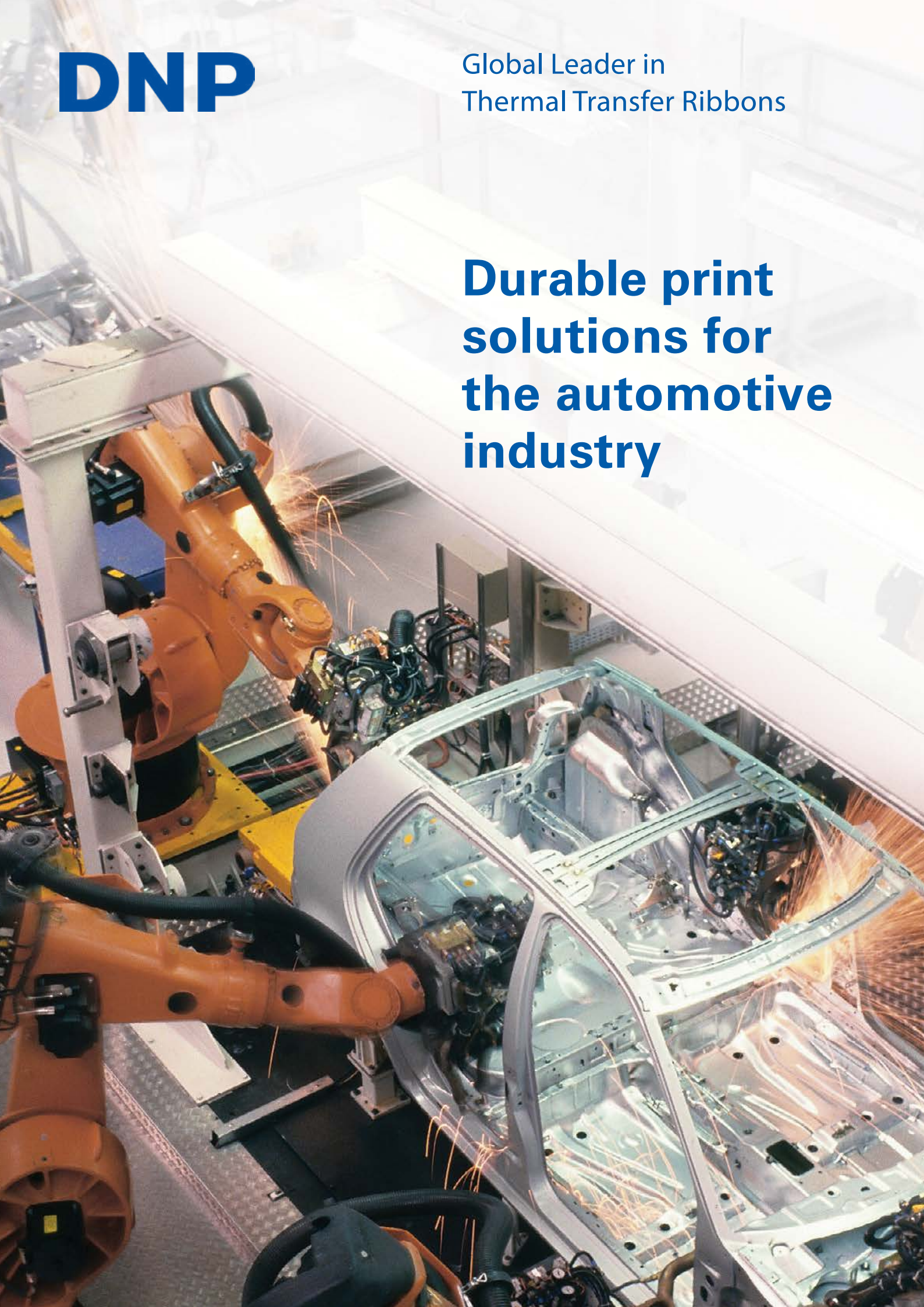
DNP

Global Leader in
Thermal Transfer Ribbons

Durable print solutions for the automotive industry



DNP R300 solves car manufacturer's logistic problems

A reseller in the United States approached DNP with a major opportunity: a large Japanese car manufacturer wanted to attach labels to SUV's at their US distribution center. These labels needed to contain many important pieces of information, such as the vehicle identification number (VIN) in both text and barcode. The end user had tried many other competitor ribbons without success.

The challenge

- Top-coated polypropylene label
- Various preprinted floodcoated colours
- Printspeed requirement 200 mm/sec
- Excellent smudge and scratch resistance

The solution

The labels were tested by DNP and we discovered that our R300 General Purpose Resin ribbon was an excellent solution for this application. One of the advantages of R300 is its great label adaptability. The print speed requirement could easily be matched; R300 has been shown to print ANSI Grade "A" ladder barcodes at print speeds of up to 300 mm/sec. In addition, it provided the necessary smudge and scratch durability required by the application.

Introduction

Printing variable information in the automotive industry has a very unique position, as its cost to risk ratio is remarkable: a label with printed information represents only a fragment of the costs of a car, yet if it does not work, production downtime will lead to increased costs for the manufacturer.

With at least one square meter of labels used inside a car and the high diversity of required resistance against all sorts of external factors, the printable ink on such labels is of equally great importance to provide clearly readable and long lasting printed information. With many labels already applied before actual assembly of the car, the automotive industry is highly demanding towards the printing industry.

From under-the-hood applications to tyre labelling, thermal transfer printing is perfectly suitable to render excellent results for UV, solvent, scratch and smudge resistance. Whether the durability concerns brake fluid, gasoline, direct sunlight or extreme temperatures; without a proper print, assembly or on-time deliveries could come to a costly standstill.

This brochure covers the following topics for the automotive industry:

- Supply chain
- Car part identification
- Cable & wire labelling
- Tyre labelling
- UL marks

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 improve batch identification, brand protection, safety and productivity.

We recommend using certified label substrates and adhesives in combination with a printing ribbon suitable for the application and compatible with the label substrate. DNP is collaborating with many label manufacturers such as Avery Dennison, UPM Raflatac, Lintec and Flexcon. We can test your label application in our laboratory and offer you advice about the best print solution.

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

REACH RoHS UL CDA IMDS

Automotive supply chain

Labels and correct information play a prominent role in the automotive supply chain. With various supply chain standards in use, it is important that, whichever standard is being used; the printed information should always be readable for swift handling in automatic and just-in-time manufacturing processes. As cars are built made-to-order, disruptions in this process must be prevented as much as possible.

As a single car can consist of up to 30.000 parts, many suppliers to the automotive industry produce goods for various manufacturers. In order to streamline the supply chain process, suppliers work with automotive supply chain label identification standards, as instructed by VDA (VDA 4902 and 4994), AIAG, GM (GM1724) and ODETTE. As printing valuable content with clearly readable information, the logistic handling and processing should run as smooth as possible.

To further enhance this process, ladder and/or 2D barcodes complying with these standards, the distribution and logistics labels need to be perfectly readable. Furthermore, printers should be reliable to operate as optimal as possible. DNP recommends using the TR4085plus® for printing on such labels. Since its introduction in 2000, this resin enhanced wax has been recognized as the best wax thermal transfer ribbon in the world.

With its high-end ingredients, TR4085plus® provides versatile print performances on many types of labels and is scratch and smudge resistant. The TR4085plus® has an anti-static backcoat to dissipate static build-up, so it can be used all year round. In addition, this product comes with a SmoothCoat® backcoat, which ensures that the printer's print head lasts longer, creating a care free printing experience.

Durable print solutions

Car part identification

Many of the thousands of parts used in each car come together under the hood. Having to cope with demanding elements found under the hood, labels have to withstand conditions ranging from extreme temperatures to liquids, such as engine oil, brake fluid and screen wash. Furthermore, these labels need to provide the same information many years after the day on which the car left the factory.

Battery labels

Labels on batteries carry a lot of information to indicate hazardous content and proper usage. A car battery can carry as much as 450 square centimeters of labels and a portion of this surface needs to be printed with variable information.

In traditional cars, easily recognizable warning labels on standard batteries indicate the acid level of the battery. As such, batteries require filmic labels with acid and temperature resistance (ranging from -40°C to +90°C).

In electric vehicles, these batteries also require proper labelling for safety and usage instructions. As these batteries are electrically charged, other requirements apply. Printed Circuit Boards with labels undergoing acid baths, UL-certified label combinations and electric shock resistance are some of the things which the labels and printed ink have to withstand.

Hybrid cars share all of the above in a limited space under the hood. Therefore, this lack of space causes more heat to build up with the traditional and electrical power supplies. This calls for more heat resistance of labels and marked information, as well as using smaller labels whilst still providing the same amount of information.

Protection labels

To avoid dust and dirt getting into parts of the car, many compartments are covered with adhesive labels. In case of printing variable information on such filmic labels, the print needs to be scratch and solvent resistant.

Powerplant labels

Powerplants transferring electrical energy into propulsion are an important part of a car's chassis. As such, the part and its labels need to withstand all sorts of adverse conditions applicable to the intended part of the vehicle. To guarantee a problem-free ride, these components and its labels have undergone extensive testing along salt spray test DIN 50021 and vapour stream test DIN 40050.

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DNP R510 is an industry standard for durable solutions

DNP's R510 thermal transfer resin ribbon product is recognized as an industry standard for automotive and electronic (circuit board) applications.

FLEXcon - Faye M. O'Briskie - Market Development Leader - Electronic Printing Business Team

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Durable print solutions

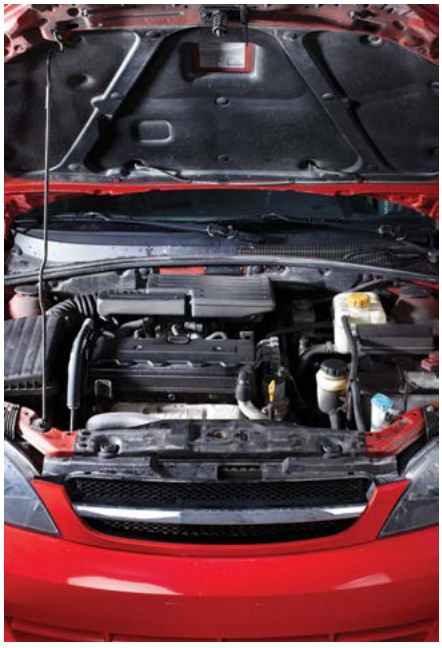
Car part identification

Thermal transfer printing solution

DNP's thermal transfer ribbons R510^{HF} and R550 offer superior scratch and solvent resistance, as well as withstanding extreme temperatures. Printable on polyester, PVC, PE and PP-labels to ensure a very durable and readable print, both ribbon qualities comply to the following regulations:

- REACH (EU 1907/2006)
- WEEE (EU 2002/96/EC)
- RoHS (EU 2011/65/EU)
- Labelling of dangerous goods (EU 2001/59/EC)
- UL-certified with many popular label materials
- International Material Data System (IMDS)

Rub test with various solvents		
	R510^{HF}	R550
Brake Fluid	✔	✔
Ethanol	Limited	✔
Anti-Freeze	✔	✔
Formula 409	✔	✔
Gasoline	Limited	✔
IPA	✔	✔
MEK	Limited	Limited
Mineral Spirits	✔	✔
Motor Oil	✔	✔
Toluene	Limited	Limited
Windex	✔	✔
Xylene	Limited	Limited
N-Hexane	✔	✔



Smudge resistance measured with Colorfastness Tester:
100 Cycles of 800 Grams with Cotton Cloth on topcoated PET

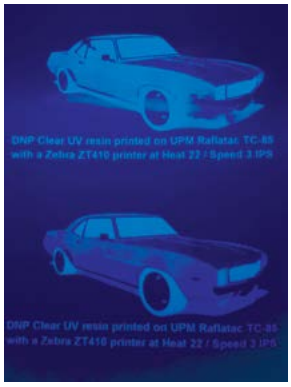
Anti-Counterfeit printing solutions

With an estimated 1.2 million vehicles stolen in the European Union each year, these thefts amount to at least € 15 billion in damage each year. With car parts often being less risky and more profitable for criminals, many of these stripped parts come back into the supply chain through internet and automobile repair shops. Labelling car parts with counterfeit labels for brand protection is a good idea to fight piracy of falsified goods. DNP has visible and invisible solutions that help to extra protect your brand and prevent loss of revenue due to counterfeit.

Durable print solutions

Car part identification

With our holographic ribbon solutions you are able to print predefined or custom patterns that immediately help protect your brand. Custom patterns can be created and changed from time to time. This way you will stay one step ahead of the forgers. Another solution is invisible to the naked eye. DNP's special UV clear and UV black fluorescent ribbon will enable you to print variable information on the label with added UV fluorescents that light up under a UV lamp, making it detectable for automobile repair shops, authorities and consumers.



These ribbons can be printed in any thermal transfer printer using moderate to high print heat settings. Although it is recommended to use filmic label materials, let us test your label material to suit your application.
Various colours of thermal transfer ribbons can also be used for printing such information, by printing unique pantone colours, to indicate the authenticity of the printed information on the label.

License plates

Thermal transfer ribbons are also used to mark license plate numbers as the ink provides a way to easily print variable information, which is logically required for plate numbers, as these numbers are unique. Although thermal transfer ribbons have a very high UV resistance, the print needs to be over laminated to shield against water, acids, salt and foreign object damage. To prevent others from stealing your identity by copying the license plate number, DNP offers UV and Hologram thermal transfer ribbons for added authenticity of your license plate number.

VIN labels (Vehicle Identification Numbers)

VIN labels are usually found inside the door on the driver's side of the car.
This label provides a lot of variable information made up from chassis number, engine number and all sorts of other codes to indicate the authenticity of the car and its parts. Such a label is likely to stay in the car for its complete lifecycle and has to be temperature and scratch proof. DNP's general purpose resin R300 is perfectly suited for this job, as it provides excellent readability and scratch resistance.

Airbag casings

The casing carrying the airbag is marked with lots of variable information indicating the airbag model and production date. These labels can be easily printed with DNP's general purpose resin R300, as this quality is scratch- and temperature resistant.

Seat belt tags

Seat belts require special tags indicating the vehicle, model and safety information. With excellent scratch and temperature resistance; DNP's R350 and R395 are your best options for printing variable information on textile labels. Satin care tags can be printed on with DNP's resin range (also the coloured resins), while often used nylon taffeta care tags can match with many DNP's wax/resin and resin qualities.

Durable print solutions

Cable & wire labelling

Drive-by-wire is the new reality of all car manufacturers and car owners, as the world is rapidly changing from mechanical to electrical linkages. Every electrical component in a car needs a reliable power source and to maintain the reliability, these should be marked with easy readable data.

Each wire leads to an action; like steering, head lights, throttle, windows and more.
Wires need an identification label to clearly identify its origin and/or destination in the car for easy recognition during maintenance and possible replacement. The information printed on wire labels needs a clear and precise print with high resolution and high resistance against abrasion and dirt, and this is where our resin ribbon solutions will do a perfect job.

When the harsh environment is requiring the print to be protected by a laminate solution, the label itself becomes part of the solution. This is perfectly printable with thermal transfer ribbons.

As most electronic materials are burned up at the end of their useful life, many of DNP's products are halogen free, so this further minimizes the risk of toxic gasses being released into the atmosphere.

DNP TTR ribbon solutions				
	Substrate types	**Wax/Resin** Premium durability	**Resin ribbons** Excellent durability	**Coloured ribbons**
General Scratch and Smudge resistant	Vinyl Polypropylene Polyester	M265	R300 | R390* R510HF | R550	R510W | R510C
Heat shrink tube Heat resistance depending on substrate type	Polyolefin 135°C FEP 175°C Nylon 190°C	M265	R316 | R510HF | R550	R510W | R510C
Under hood Oil and gasoline resistant	Polypropylene Polyester	-	R510HF | R550	R510W | R510C

*Near Edge printing solutions

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DNP's R510 ribbon ranked among one of the best ribbons to use

Polyonics, Inc., manufactures high temperature, chemical resistant label material for harsh industrial applications. Our state of the art laboratory facility is staffed by knowledgeable experts with over 100 years experience in inks, coatings, and industrial application problem solving. We have performed over 3500 individual tests to date on our product line with thermal transfer ribbons from numerous ribbon companies. DNP's R510 ribbon ranked among one of the best ribbons to use on Polyonics products using Polyonics laboratory tests. Underwriter Laboratories has given UL Recognition to DNP's R510 with many of Polyonics Label materials. The R510 is an excellent ribbon.

Polyonics of Westmoreland, NH - Mark Williams - Technical Services Manager

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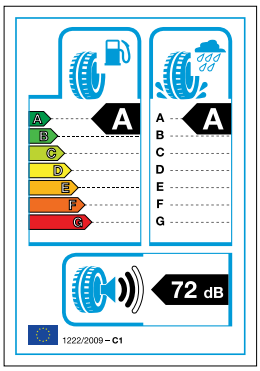
Durable print solutions

Tyre labelling

Aimed to increase road safety and to provide more information on the environmental impact of road transport, the European Union introduced labelling requirements for tyre distribution labels. As such, European Tyre Labelling Regulation EC/1222/2009 was introduced in 2012 and is intended to inform end-users about the following subjects on a best-to-worst performance scale for a full set of tyres:

- Fuel efficiency of the tyre
- Wet grip
- External noise



There are many different designs of tyre surfaces to cope with different requirements. The most notable examples are summer and winter tyres; the rubber surface is remarkably different to comply with the conditions of these seasons. As such, they require a label with a strong adhesive to bond well with such surfaces, so the label will not fall of the tyre during its seasonal storage. Therefore it is very important to choose the correct label for the rubber surface.

To withstand a variety of indoor and outdoor storage conditions throughout the supply chain, choosing the substrate of the label is equally important as the correct adhesive. There are many different tyre labels available, both filmic and paper based labels. These labels require a similarly resistant black thermal transfer ribbon to print the required information.

DNP TTR ribbon solutions		
Substrate types	**Wax/Resin ribbons** Premium durability	**Resin ribbons** Excellent durability
Paper labels	TR4500* | TR5080 | TR6080	R316 | R396*
Smooth paper labels	TR4500* | TR5080 | TR6080 | M265	R316 | R396*
Filmic labels	M265 | M295HD*	R300 | R390* | R396* | R510(HF) | R550 | TR7541*

*Near Edge printing solutions

DNP

Durable print solutions

UL marks on products

Every year, billions of UL marked products enter the global market and as such, these are commonly found in the automotive industry and its supply chain. But what does "UL" mean?

UL stands for Underwriter Laboratories: an independent science company with more than one hundred years of public safety expertise. UL certifies products along its globally recognized standards to test goods on public safety, such as overheating or high voltage shocks. After all, we all want to use goods which are safe and well-functioning.

Most products evaluated by UL need to be permanently marked with safety-related information. As the intended labels should also be safe to use and be able to carry the safety-related information during the useful life of the labelled product, this needs to comply with UL's Marking and Labelling System. Once approved, these labels can be printed with DNP's UL-certified thermal transfer ribbons.

Important notice: there is no such thing as UL approved ribbons.
Only labels can be UL-recognized in combination with thermal transfer ribbons.

UL testing procedure

Label manufacturers provide their label materials to UL for evaluation and mentioning in UL's Marking and Labelling Systems Category PGJI2 in accordance with test method ANSI/UL 969.

UL uses this test method on the complete solution (the combination of the label, thermal transfer ribbon, intended surface and the required application) to determine if it is compliant to ANSI/UL 969.Because UL already took care of these tests, it eases testing and supply chain complexity for all involved companies. Please look for "Dainippon" to indicate the tested and approved DNP products.

In case your preferred product combination is not found in UL's Marking and Labelling Systems Category PGJI2, please contact your label manufacturer to provide a solution.

If you need help to find our materials in category PGJI2, do not hesitate to contact
DNP Imagingcomm Europe BV.

UL listed DNP TTR ribbon qualities per label manufacturer								
	3M	Avery Dennison	CCL Design	FLEXcon	Lintec Graphic Films	Polyonics	Tyco Electronics	UPM Raflatac
R300 General Purpose Resin	✓	✓	✓	✓	✓		✓	✓
R316 Specialty Heat Resistant Resin	✓		✓	✓				
R410D-White Ultra Opaque White Resin				✓				
R510^{HF} Ultra Durable Resin	✓	✓	✓	✓	✓	✓	✓	✓
R510Blue Durable Colour Resin	✓	✓					✓	
R510Green Durable Colour Resin	✓	✓					✓	
R510Red Durable Colour Resin	✓	✓					✓	
R510White Durable White Resin				✓		✓		
R550 Extremely Durable Resin				✓				
TR3370 High Opacity White Resin				✓		✓		
TR4085plus* Resin Enhanced Wax				✓				
TR4500* Premium Wax/Resin		✓						
TR5080 Specialty Wax/Resin				✓				

*Near Edge printing solutions

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
Linking the Label Community