



SublimationGuide

dye sublimation guide with digital inkjet

Imagine.  Roland



dye
sublimation
guide with
digital inkjet



The image features two abstract, colorful geometric patterns. The top pattern consists of overlapping shapes in shades of purple, blue, and green, separated by black lines. The bottom pattern consists of overlapping shapes in shades of red, green, blue, and purple, also separated by black lines. The text is centered in the middle of the page, between two horizontal dotted lines.

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WELCOME






Welcome to this useful information guide on dye sublimation printing. Whether you are new to print, currently using other print technologies or someone who has already started in the world of textile or sublimation printing, this guide is intended to give you a comprehensive overview to what digital inkjet dye sublimation printing is all about.

This guide starts with a brief introduction of the opportunities that are available to you with dye sublimation printing and an overview of the technology itself. It then explores the materials you can print onto, how digital inkjet sublimation compares to other textile printing methods, considerations for choosing your heat press or calender, and a whole host of information on the applications you can deliver. We've also included some examples of customers who are successfully using Roland DG digital inkjet dye sublimation technology today to give you an insight into what is possible.

We hope you enjoy reading this guide. If you have any comments or feedback, feel free to get in touch. Our contact details are at the back of this guide.

WHY CONSIDER DYE SUBLIMATION PRINTING?





Without a doubt, dye sublimation printing is one of the most effective methods for creating a whole range of customised and personalised products on-demand. This means you can deliver an almost limitless variety of creative and profitable applications, that will enable you to extend your range of services to your existing clients, or indeed open up a spectrum of new markets to you.

With inkjet dye sublimation printing, you can print onto a vast range of fabrics and coated surfaces in many widths and lengths, including stretchy sports fabrics, heavy canvas, fire retardants and ultra-light voiles. In addition to these textiles, you can sublimate onto a range of coated hard surface materials, such as wood, metal, plastics, glass and ceramic. This means you can deliver a huge range of applications including flags, banners, sportswear, fashion clothing, interior décor and promotional gifts.

It's easy to learn, quick to deliver and means you'll continue to surprise and delight your customers. Your clients don't see the difference between printing on paper, vinyl, banner or textile, to them it's just an image, graphic or piece of text they want to reproduce in different ways. Extend your capabilities, satisfy their demands and beat your competitors by adopting digital dye sublimation printing. Read on to find out more.

INTRODUCTION TO DYE SUBLIMATION



For the purpose of this guide, we won't be discussing analogue 'traditional' print processes that run dye sublimation production, such as screen print, litho and gravure. Instead, we'll focus on dye sublimation with digital inkjet.

Put simply, inkjet dye sublimation printing is the process where specially manufactured inks, containing heat activated 'dye sublimation' dyes, are fixed by heat and pressure into a polyester substrate, such as a polyester fabric or polyester coated surface.

Here are the key steps you follow with dye sublimation:

STEP 1: Special heat activated inks (dye sublimation inks) are printed onto a digital transfer paper, usually as a mirror image.

STEP 2: Next we need a heat press (suitable for loose pieces) or a calender (suitable for continuous media on rolls) and a receiver substrate to apply the image to the substrate. The receiver substrate will be a polyester fabric or a material which has been pre-coated with a polyester surface, including glass, metal, wood, plastics and ceramics. The paper is placed on top of the item to be imaged, with the printed side down. Pressure and heat is then applied using the heat press or calender (typically 180-200°C for 35-60 seconds).

STEP 3: The print is complete when the paper is removed. No drying time, or post treatment is required.

The process permanently images the polyester fabric and the print cannot be scratched or washed out. It becomes part of the fabric and has no handle, feel or texture above that of the fabric. This means it won't crack, peel or flake, and can be washed and ironed with minimal loss of colour.

In the case of a solid object, such as a glass cutting board, the print appears beneath the coated surface and is very difficult to scratch or remove.

WHAT'S SO SPECIAL ABOUT POLYESTER?





So why do we need to print onto polyester with dye sublimation printing?

Polyester is a plastic, so when enough heat is applied, it begins to melt, allowing the pores to open up. When heated, the dye sublimation inks change from a solid to gas, and this gas can then enter into the open pores. This means that it is possible for the ink to be transferred to the polyester fabric or the polyester-coated hard surface. This is not possible for materials such as cotton, paper, wood or wool, which scorch and burn when exposed to temperatures required to activate dye sublimation inks (typically 180-200°C).

But, don't worry, you are not going to be limited to just 100% polyester fabrics. As we have already mentioned, there are many products and materials which are coated with polyester, and they look stunning when printed. The opportunities are extended further through the availability of polyester sprays, allowing you to coat products yourself.

DIGITAL MEANS FLEXIBILITY

When compared to traditional printing processes digital wide format dye sublimation benefits from significantly reduced set up times and as such can be truly adaptable and flexible in its output. It's really easy to do one-offs, sampling or limited editions. Plus, you can also print different colour variations or completely different designs within the same print run.

This means you can achieve mass customisation of one piece or you can batch up different jobs during one long print run. Either way it's maximum flexibility or maximum efficiency. Imagine printing fashion items such as dresses, bags and shoes and offering your customer these customised and personalised options.

But what about high production work? Of course, you have the option of purchasing a separate higher-speed solution purely dedicated to high production. But, customers often choose a digital inkjet dye sublimation printer to sit alongside their production printer for sampling purposes. Alternatively, purchasing two or more printers can be another option to maximise production capability, whilst retaining the flexibility that digital print delivers.





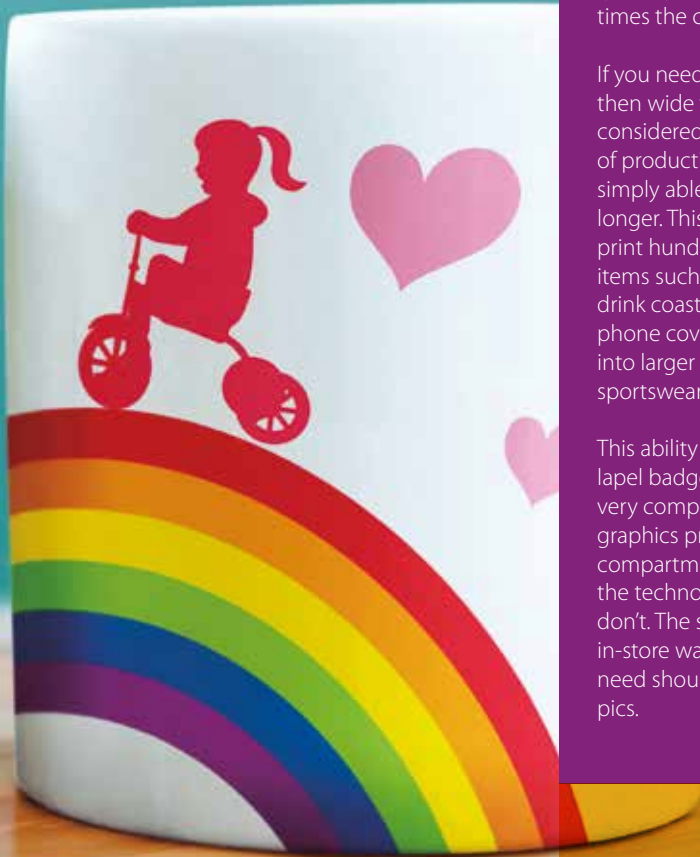
WIDE FORMAT AND DESKTOP SUBLIMATION



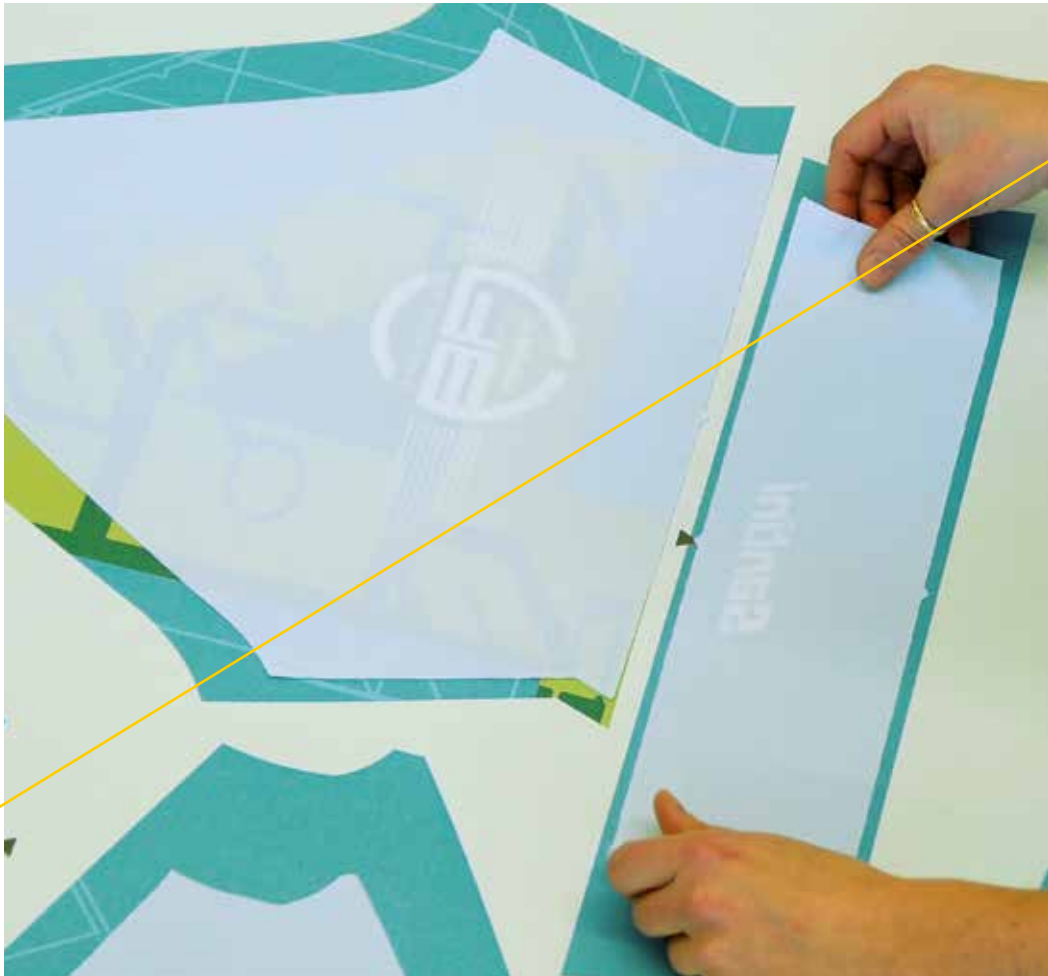
When choosing a dye sublimation system, a typical question to ask is whether to opt for a wide format printer or a desktop solution. Desktop sublimation is sometimes seen as an easier route to take, but you have to ask yourself whether this will be a sustainable option for your business in the long-term. Desktop systems use A4 or A3 paper and are, therefore, restrictive in terms of the size of item they can deliver, plus the ink costs are typically very high. In fact between 5 to 20 times the cost of wide format inks.

If you need to print higher volumes, then wide format printers are generally considered a much better option. In terms of productivity, wide format printers are simply able to print much wider and longer. This means that not only can you print hundreds and thousands of small items such as mugs, caps, t-shirts, bags, drink coasters, bar runners and mobile phone covers, but you can also diversify into larger items such as soft signage, sportswear, home décor and fashion.

This ability to produce anything from a lapel badge to tear-drop flags offers a very compelling marketing story for any graphics producer. We might try and compartmentalise the services we offer by the technology we possess, but customers don't. The same person that buys 4m x 1m in-store washable fabric banners may also need shoulder bags, mugs or even guitar pics.



DYE SUBLIMATION PAPER TRANSFER VERSUS DIRECT TO TEXTILE





There are some wide format printers dedicated to printing directly onto fabric. This works well if you want a long run of one type of fabric. However, this does not offer the same flexibility that printing dye sublimation onto paper provides, because you can take a roll of printed paper and apply sections onto numerous fabrics or solid surfaces with a minimum of 75% polyester.

Polyester fabric for direct printing has to be pre-treated with an inkjet receptive coating. This is usually done by the manufacturer or fabric wholesaler, so the cost is generally higher than uncoated polyester for heat transfer of inks from paper.

Also, if there is an issue during printing, such as nozzle drop-out or feed/tension issues, the cost of wasted fabric is considerably greater than the loss of equivalent paper.

It is also worth being aware that it is still necessary after printing directly on polyester to heat press the fabric in order for the ink to fix onto the fabric and activate the final colour.

It is possible to direct print other types of media, such as cotton, silk and wool. These fabrics must be pre-treated and require different inks, according to the type of fabric.

HEAT PRESSES - FLATBED AND CALENDER



Ok, we've printed our dye sublimation inks onto paper – what type of heat press do I need to transfer the image onto my substrate?

Calender presses are used to heat transfer from a printed roll of paper onto polyester fabric.

The roll of paper is attached to the press and fed through with the fabric. Pressure is applied around a heated cylinder (usually around 180-200°C) to ensure even transfer and no creasing.

Calender presses are generally available in widths of around 1 to 5 metres. Some are designed to enable pre-cut fabric pieces to be fed through individually, such as the front of a shirt or dress - pre-cut to shape for all-over print.

Flatbed presses are used to print solid objects such as sheet metal, wood, ceramic tiles, floor mats, carpet tiles and small pre-cut fabric pieces.

A popular addition to any dye sublimation solution is a T-shirt 'clam' type flatbed press. This is convenient for producing small fabric colour proofs before printing the full production. These can also be used to print small coated items such as tiles, metal signs and plaques.

Smaller flatbeds vary in sizes, styles, performance and cost. In addition, specialist presses are also available for mugs, caps and pockets.

Regarding settings, any heat press, paper, fabric or solid substrate combination will have its ideal temperature, dwell time and pressure settings to obtain optimum results. For example, a coated ceramic tile may require less pressure, but higher temperature and much longer dwell time than a fabric banner.

3D SUBLIMATION PRINTING





There are a variety of affordable heat presses that allow a paper print to image around 3D objects.

Examples of such objects include phone covers, mugs, ceramic plates and drinking glasses.

These desktop size presses use a vacuum to create negative pressure, sucking the printed dye sublimation paper around the object as heat is applied. In the case of smart phone covers, the paper is fixed using a heat resistant tape over a custom metal jig and placed in the 3D vacuum heat press. There is a growing range of suitable items to print on, and no post finishing is required – a key feature of dye sublimation printing.

Of course, there are more industrial style ovens for larger items. Indeed, some businesses have developed specialist in-house heat press equipment for bespoke items such as ski poles, bowling balls and even garage doors.

DIGITAL TRANSFER PAPER



You need specific papers for the dye sublimation heat transfer process. You cannot use a roll of inkjet paper which is typically used for printing graphics or posters.

Papers are specifically developed for dye sublimation printing. We do not want the ink to penetrate the fibres of the paper. We want the ink to stay on the paper after printing, but for as much ink as possible to be sublimated off the paper at the required temperature, not pressed back into the paper.

A good paper from 90gsm to 140gsm will hold the same amount of ink. Heavier paper 'cockles' (ripples) less under heavy ink loading. Lighter weight paper is sometimes chosen, as it is cheaper and can provide adequate results. You can also run presses a bit faster with lighter paper.

If you do a print run in advance and plan on transferring them days or maybe weeks later, the prints should be kept in a polythene bag (such as the bag the roll of paper is protected in). This will minimise absorption of moisture and maintain print integrity before heat transfer.

FINISHING



The last stage in dye sublimation is the finishing process. The extent to which finishing is required will depend entirely on the application and the substrate. For example, some applications don't require any finishing at all, such as mugs, floor tiles or mats, which once pressed, are ready for despatch. Other applications such as sublimated fabrics for sportswear or fashion require more complex finishing processes.

It is not always necessary to bring finishing skills in-house, as there are many companies who can complete them on your behalf. This is useful for businesses who are just starting in sublimation, or only produce small numbers of items, and therefore don't want to invest in additional equipment or new staff.

Should you choose to bring your finishing in-house, there are a number of options available, depending on which kind of applications and services you are offering to your customers. Here are some examples:

soft signage:

- simple cutting devices or a handheld hot knife will allow you to achieve a basic level of finishing for fabrics. A hot knife may be enough to stop fraying and unravelling, avoiding the need for sewing or welding;
- for stretch frames, a silicone beading is stitched into the fabric.

clothing, textile items and upholstery:

- laser cutting machines and professional sewing machines offer a great deal of versatility, and the skill required to operate them is well within the capability of every print company.

sublimated photographs on rigid materials:


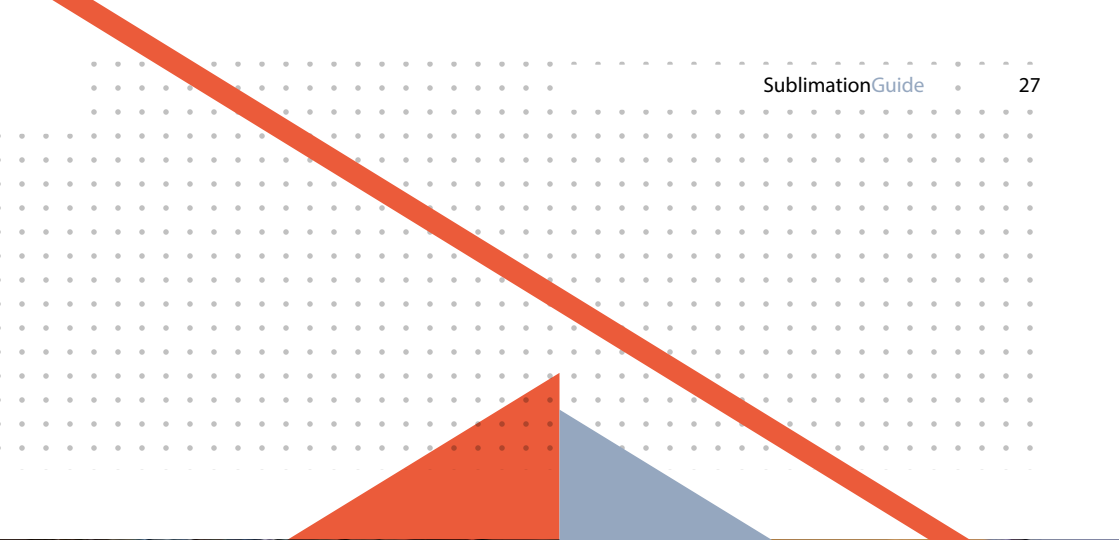
- photographs can be easily framed after printing to add value to the finished item.

Finishing in-house offers considerable opportunities to diversify your business profitably and should be embraced rather than avoided.

APPLICATIONS

SOFT SIGNAGE





Brands are increasingly choosing fabrics over traditional PVC based graphics. As such, soft signage is now a key application for print providers to consider.

What are the reasons behind this trend?

One reason is environmental. Fabrics will break down faster and can be recycled.

Another reason is aesthetics. Vibrant white polyester is very striking and the printed dots blend in with the weave of the fabric, giving a continuous tonal range.

For retailers, translucent stretched fabrics are a subtle alternative to traditional banners and important product placements are visible through the fabric. This translucency is hugely beneficial for exhibition stands too. Solid walls create blind spots, limiting the visitor's view of the stand messaging and products. Translucent fabric panels create the impression of structure without obscuring view and offer a more inviting feel.

Polyester banners of several metres can be folded easily into a small courier envelope and shipped to customers without risk of damage. They are also very easy to handle at the customer's location, washable and easily mounted.

Significant cost savings can be made on installation, as modern frames and sign systems can be fitted quickly and easily.

For external short-term use (around 6 months) there should be little or no fading from all but the harshest climates. Internally, the prints will retain their integrity for many years. Floor mats will withstand muddy boots, stilettos and even jet washing, if the material can resist it, so can the print.

APPLICATIONS

RIGID SURFACE
DYE SUBLIMATION



There are plenty of pre-coated rigid substrates to choose from. As with fabrics, dye sublimation only works on polyester, so this pre-coating is a heat resistant polyester lacquer or powder coating. Polyester is a category of polymers. These polymers are often used in the production of smart phone cases, skis and snowboards and, therefore, can be suitable for dye sublimation.

You can also choose to coat your own items. Most users will spray apply this and often a relatively low temperature oven bake will ensure firm adhesion to the surface.

When imaging onto pre-coated wood, ceramics, slates and the large array of glossy, satin and matt finished metal sheets, the end result will often look like it's had a post clear lacquer applied. This is because the gaseous dyes have penetrated the polyester coating, creating a wonderful encapsulated finish.



APPLICATIONS

INTERIOR DÉCOR





Sublimation has been used for several decades to apply images to upholstery, curtains, lampshades, carpets, cushions, furniture, window blinds and much more.

Due to high set-up costs and the limitations of traditional print processes, it is only since the mid 90s and the advent of digital dye sublimation that high quality photographic images have been printed onto everyday items. Momentum has gained steadily and it is now considered a 'must have' service since the late 2000s. The enormous range of substrates available continues to expand.

Custom designs were simply impossible to produce before wide format inkjet sublimation. That's true of other areas of digital printing, but none offer the amazing range of items that can be imaged so effectively, and from just a piece of paper.

APPLICATIONS

SPORTSWEAR





From soccer, basketball and ice hockey shirts, to Lycra based fabrics for swimming, athletics and cycling, if they have graphics on them they have almost certainly been applied by sublimation.

Most performance fabrics today are polyesters, and to maintain the fabric's feel and integrity, nothing does it better than dye sublimation. The vivid colours are also a prominent feature of dye sublimation inks.

Performance fabrics have been developed to evaporate sweat to the surface and are extremely durable, yet stretchy, light and in an abundant range of finishes.

Digital dye sublimation can just as easily produce a one-off or a short run of items for a team, or use the same overall image but customise each individual shirt. In fact, many designs can only be produced by inkjet sublimation, creating a completely new market for digital only sports clothing producers.

APPLICATIONS

FASHION



Digital sublimation has been used by many leading high-end fashion houses during the last decade or so.

There are incredible polyester fabrics for designers to choose from and many feel far from synthetic. From glossy satins for ties, tops and dresses, to hefty thick canvases for luggage.

For years, we printed fabrics with flat colours, or at best, coarse halftone images. Colours were mostly specified as 'spot colours' and CMYK (cyan, magenta, yellow, black) was rarely used.

Having the widest colour pallet available for digital dye sublimation printing is certainly of great importance to the fashion industry where there is often less room for compromise, and digital print processes are being pushed to the limits of what colours are achievable.

The sharpness and clarity of prints and breath-taking photographic imagery makes digital dye sublimation the only choice for many types of apparel, from performance sports to Paris couture.



THE ROLAND DG SUBLIMATION SOLUTION





Roland DG's Textart XT-640 and Textart RT-640 printers, combined with the CS-64 Calender unit, provide an exceptional solution for any business that wants to deliver outstanding dye sublimation results.

Superb quality and vibrant colours

Delivering bold and vibrant colours with subtle gradations and remarkable fine detail, the XT-640 and RT-640 are available in two ink configurations: 4 colours (CMYK) or 8 colours (CMYKLCm + Orange + Violet). The 8 colour version offers an extremely wide colour gamut, whereas the 4 colour version offers greater speed.

Delivers precise media tracking to aid in heat press process

A media Feed Adjuster provides even tensioning and prevents skewing, which delivers a precisely wound roll, to aid smooth transition to the next heat press process.

Unattended continuous printing

Equipped with the Roland Ink Switching System when in 4 colour configuration, this innovative system allows the printer to automatically switch to a new ink pouch when the original runs out, providing up to 2000ml of ink per colour for unattended printing.

Remote printer management

With Roland Printer Assist, you can manage your printer remotely when you're in the office using an iPad tablet. Free and available for download from the iTunes App Store, the Roland Printer Assist app enables users to manage production, test printing, and access cleaning functions from virtually any location within your office network.

Be the first to finish

The Textart CS-64 Calender unit is a professional heat transfer system that is fast, affordable and easy to use, making it a perfect finishing partner for the Textart RT-640 and XT-640 sublimation printers.

RIP SOFTWARE

Roland VersaWorks

RIP & PRINT MANAGEMENT SOFTWARE



8 Colours CMYK



Roland Edition

the rip for digital textile print production



8 Colours CMYKLcLmOrVi



4 Colours CMYK





In addition to your design package, you will also need RIP software. RIP stands for Raster Image Processing, and provides additional control over productivity and colour processing.

Roland's Textart XT-640 and RT-640 are available bundled with a choice of ErgoSoft Roland Edition or Roland VersaWorks. ErgoSoft Roland Edition boasts a range of textile-specific features and has a well-deserved reputation for quality in the textile printing industry. Roland VersaWorks provides easy, intuitive operation even for first-time users.

If you are familiar with wide format printers, you will be aware of profiles. In general, specific profiles for each substrate are not required for dye sublimation. However, occasionally, it is recommended to create profiles for specific fabrics in industries such as fashion and home furnishing.

COMPLEMENTARY TECHNOLOGY



If you are looking to focus on rigid substrate promotional goods and gifts, Roland DG provides a range of other engraving systems and direct printers to complement the Texart XT-640 and RT-640.

If you want to print directly onto solid objects without applying a pre-coating and have the option of printing directly onto any colour of substrate, then the VersaUV LEF-20 offers an alternative. Using UV-cured ink, you can print directly onto items such as phone covers, photo albums, wallets and all manner of items up to 100mm high. You can also achieve spot-varnish effects and textures, which are not possible using sublimation inks.

A full list of Roland's extensive range of wide format printers, flatbed printers, engravers and other 3D devices are available on request. Details can also be found at www.rolanddg.com.au



USER STORIES

MATERIALIZED



Materialised, located in South West Sydney, is a leading supplier of custom furnishing textiles across Australia and New Zealand and has been for the past 35 years. Specialising in the production of decorative furnishings for areas where performance fabrics are required, the company's customers come mostly from the hospitality and healthcare industries – hotels, hospitals and nursing homes.

Gary Price, Owner of Materialised, has been using Roland printers for their dye sublimation process for a number of years. The main benefit of dye sublimation being that the exact same custom pattern can be replicated across a number of different materials, from waterproof upholstery, drapery, tablecloths and beyond.

Initially, the digital printing process was conducted by one Roland printer for sampling purposes only, with full-scale production replicated off-shore. However, as momentum for the business has grown, Gary purchased three PRO4 XF-640s and has moved a portion of its large-scale digital production in-house, with the company looking to go 100% digital in the next few years.

The move has been a great success due to the increased productivity the company has been able to achieve. The machines have been quick and reliable, as print operator Carla Yeung explains: "The Roland printers... print really fast and the paper dries really quickly. The great thing is that we can leave our Rolands to go overnight and print gloriously!" This means that when the company has a one or two day turnaround time, they can still meet this deadline, printing up to 200m of fabric in 22 hrs as opposed to 50m per day.

With the market for textiles and soft signage ever expanding, Materialised is leading the way in the transition to digital and Roland DG are proud to be a key part of this process. Gary concludes, "We set out to make a difference, and having the right tools that function predictably... we can make a difference... and we consider Roland to be the right tool".

www.materialised.com

CONCLUSION



This guide hopefully explains what dye sublimation is, how it's done and what you can create and sell to your customers.

Print on paper, select a polyester receiver surface and use a heat press to 'sublimate' the image. That's the simplified version. The whole process takes minutes not hours and the results are truly spectacular.

Vibrant deep colours, and hundreds of readily available products to sublimate onto. Exhibition graphics, point of sale, interior décor and fashion industries, these are just some of the enormous market opportunities for the dye sublimation producer.

Dye sublimation is complementary to other wide format digital print, and is now firmly fixed in the buyer's sights when choosing a 'one-stop' print supplier.

With the widest range of achievable colours, class leading support and training, talking to Roland about your dye sublimation printing needs is the right choice.

If this guide has encouraged you to learn more about digital dye sublimation, please get in touch. Be inspired by visiting one of our Creative Centres, or expand your knowledge by joining one of our Roland DG Academy workshops. The next step is up to you, but we are here and ready to help you extend your business into the wide array of opportunities that await you with digital dye sublimation.

GET IN TOUCH - To contact us about your dye sublimation needs please go to www.rolanddg.com.au



ABOUT US

BE INSPIRED

ROLAND DG CREATIVE CENTRE

Here at Roland DG we believe in creativity and the power to transform imagination into reality.

What better way to do this than to showcase a range of wonderfully inspirational things you can do with a Roland DG device in one purpose built centre, bursting with ideas, applications

and the array of Roland DG equipment that made it all possible. We call this inspiration factory the Roland DG Creative Centre.

Bringing together a distinctive collection of creative works from top Roland DG artists and craftsmen from around the world, our Roland DG Creative Centres aim to spark new business opportunities, encourage creativity and develop your ideas.

The list of samples on display is vast, covering all of the key industry markets Roland DG serve such as; garment decoration, textile, sign, commercial print, packaging, label, promotional gift, engraving, dental and 3D modelling. From chairs, beanbags, fashion apparel, to guitars and guitar cases, we have it all, and everything has been created with a Roland DG device.

In addition to being a vibrant playhouse of the print, textile, engraving and 3D industries, the space works as a demonstration suite and training facility alongside the Roland DG Academy.





ABOUT US

LEARN WITH US

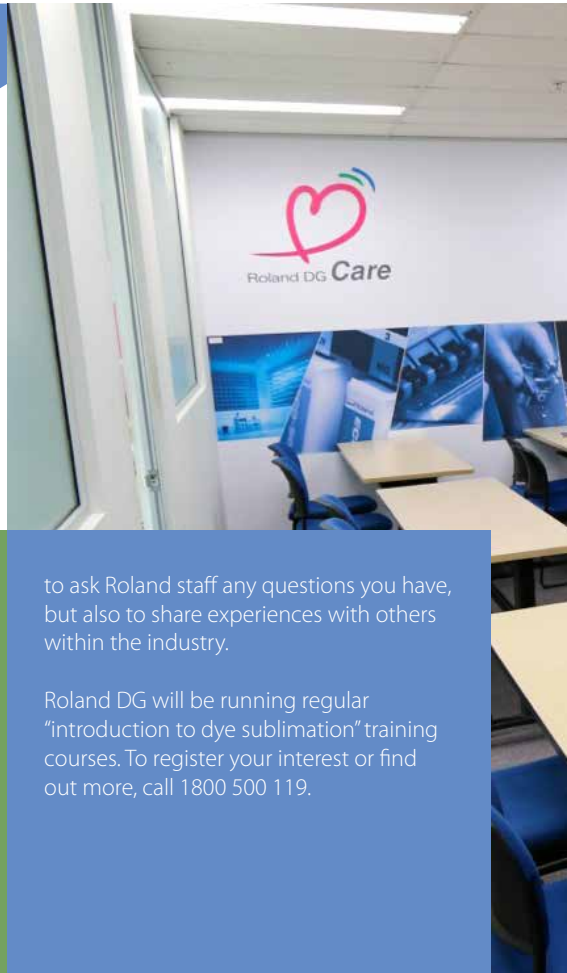
ROLAND DG ACADEMY

The Roland DG Academy is an important part of Roland DG's commitment to provide both pre- and after-sales support, providing a wide range of courses and workshops. Courses and seminars offer tips and tricks on not only how to maximise your use of Roland technology, but also how to build your business and its profitability.

Attendees include both existing customers and potential clients, and the sessions provide the opportunity not only

to ask Roland staff any questions you have, but also to share experiences with others within the industry.

Roland DG will be running regular "introduction to dye sublimation" training courses. To register your interest or find out more, call 1800 500 119.






OUR HISTORY

TRANSFORMING IMAGINATION INTO REALITY





Corporation's line of music synthesizers. This precision plotting technology quickly garnered widespread acceptance during the CAD/CAM revolution of the 1980s and provided the basis for new generations of digital input and output technologies to follow.



Within a few short years, Roland DG began introducing a wide variety of groundbreaking products including milling machines, engravers, vinyl cutters, thermal printers, inkjet printers and 3D scanners. The products blazed new trails for entire industries and earned Roland DG a reputation for innovation, quality and reliability.

Reflecting this dedication to fulfil its customers' requirements for high quality customer service as well as for consistent quality in manufacturing and distribution, Roland DG received ISO 9001 certification in 1999 and, in 2000, was granted ISO 14001 certification.

Professionals rely on Roland DG equipment everyday in the garment decoration, textile, sign, commercial print, graphic art, packaging prototype, labelling, promotional gift, jewellery, engraving, dental and 3D modelling industries. Roland DG's devices are used by some of the world's most famous brands.

Roland DG is the number one brand of wide format inkjet devices for the durable graphics market with more than 155,000 shipped worldwide*.

*Global figures calculated March 2015.

The origins of Roland DG stem from the music side of the business. The Roland Corporation was renowned for developing MIDI technology and for producing sophisticated digital music equipment including keyboard synthesizers, recording equipment and other related technologies. Roland DG's advanced plotting technology was originally used to record the sound waves for Roland

Note Page



A series of horizontal dotted lines for writing notes.



A series of horizontal dotted lines providing a template for writing notes.



www.rolanddg.com.au

Imagine.  Roland