

Rapid



Customer Expectation Document

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Getting the Most out of your Digital Inkjet Press

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2. What does this document mean to me?

The purpose of this document is to ensure that you understand the product capabilities, with regards to performance, and to explain the recommended operating guidelines. With the information contained herein, you will be able to ensure this is the right product for your business.

We ask you to please read and make sure you understand the capabilities of the products as set out in this document. At the end we will ask you to fill out and return a form to us, so that we can be confident that you are comfortable with the capabilities of the machine you are about to purchase.

If there are any parts of this document you do not understand, or you have further questions, please contact your RapidX sales representative, and they will assist you in obtaining answers to your questions.

This document was assembled using knowledge available at the time of publication and is for you to keep for future reference.

This document may be updated from time to time and the latest copy will be available on-line at:

www.rapidlabelsystems.com/CED

3. Product Specifications

3.1. Monthly Volume Range

The RapidX, Memjet based print engines are designed to provide:

Output - Roll to Roll

Continuous web feeding, unbroken between first and last print
Web must be cut and retracted after the last print
Extended pause delays while the head is uncapped may lead to temporary reduction in print quality, and may require manual maintenance to restore.
Threshold: 1 roll, 500ft (152m) long with preventative print quality maintenance between rolls.
Target: Multiple rolls, with periodic preventative or restorative print quality maintenance.

Output - Roll to Cut

Intermittent web feeding with automated end of job cutting, web automatically retracted after the individual print job.
Additional dust mitigation practices may be required due to frequent use of the end of job cutter.
Threshold: 32ft (10m) long with periodic preventative or restorative print quality maintenance.

Cutter Life

500,000 cuts of label liner stock (bidirectional)

Print Engine Life Expectancy

3 to 5 years
Professional periodic preventative maintenance must be performed to achieve maximum printer life.
Periodic maintenance and replacement of high mortality and/or consumable parts may be required during the expected life of the printer.

3.2. Machine configuration & options

X1

Unwind Spindle Type	Spring retainer
Unwind Spindle Diameter	76 mm (3") nominal
Minimum Web Width	50 mm
Maximum Web Width	222 mm
Print Engine Technology	Memjet Northstar (as below)
Re-register Sensing	Internal fixed label gap and tick mark
Print resolution/speed	1600x1600 DPI at 9m per minute 1600x800 DPI at 18 m per minute
Ink Type	Aqueous Dye
Colour capability	CMYKK
Operating System Compatibility	Windows XP (SP3) and Windows 7 tested. Memjet state Windows Vista and OSX are supported, but these have not been tested by Rapid.
End of Roll Cutter	The preferred mode of operation for the cutter is to use it only for cutting at the end of a roll of labels, it is not optimized for individual sheet cutting.
Rewind Spindle Type	Spring Retainer
Rewind Spindle Diameter	76 mm (3") nominal
Power Supply	110-250VAC 50/60 Hz. Self selectable.
Packed Weight Estimate	130 kg
Installed Weight	100 kg
OPTIONS	
Razor Blade Slitting	3 to 7 blades
Rewind Spindle Diameters	25, 38, 40, 44, 50, 50.8, 63 mm
External Media Edge Sensor	Tri-colour LED

3.3. Machine configuration & options

X2

Unwind Spindle Type	Spring retainer
Unwind Spindle Diameter	76 mm (3") nominal
Minimum Web Width	50 mm
Maximum Web Width	222 mm
Print Engine Technology	Memjet Northstar (as below)
Register Sensing	Internal fixed label gap and tick mark
Print resolution/speed	1600x1600 DPI at 9m per minute 1600x800 DPI at 18 m per minute
Ink Type	Aqueous Dye
Colour capability	CMYKK
Operating System Compatibility	Windows XP (SP3) and Windows 7 tested. Memjet state Windows Vista and OSX are supported, but these have not been tested by Rapid.
End of Roll Cutter	The preferred mode of operation for the cutter is to use it only for cutting at the end of a roll of labels, it is not optimized for individual sheet cutting.
Rewind Spindle Type	None
Rewind Spindle Diameter	None
Power Supply	110-250VAC 50/60 Hz. Self selectable.
Packed Weight Estimate	180 kg
Installed Weight	150 kg
OPTIONS	
Razor Blade Slitting	3 to 7 blades
Rewind Spindle Diameters	25, 38, 40, 44, 50, 50.8, 63 mm
External Media Edge Sensor	Tri-colour LED
Rewind Spindle attachment	3" Spring retainer type
In-Line Semi-Rotary Die Cutter	Min 4" repeat, Max 12" repeat
Lamination unit	
In-Line Semi Rotary Flexo Coater	Min 4" repeat, Max 12" repeat
In-Line Flat Bed Hot Foil/Emboss	220 x 210 max format

3.4. Print Engine Specifications

Printer technology	Drop on demand thermal inkjet Printable width is 222.8mm 70,400 nozzles (14,080 per colour) Five channels: typical allocation is CMYKK
Print speed	300mm/s at 1600 x 1600 dpi black, 1600 x 800 colour 150mm/s at 1600 x 1600 dpi black and colour
Print quality	Black: 1600 dpi native resolution Colour: 1600 dpi native resolution
Print engine life	3-5 years (conditional).
Data pipeline	1 x OmniPEC custom ASIC (65 nm CMOS, >100 million .transistors) 650 MHz ARM processor with DSP extensions Real-time hardware JPEG expansion and correction Real-time 3D colour space conversion Real-time hardware image scaling Real-time stochastic halftoning Calculates 774 million dots per second
Operating system (To be confirmed)	Microsoft Windows XP. Apple OSX, Windows 7 and Vista proposed but not yet fully supported.
Media formats	Cut sheet Roll media
Media dimensions	Max media width: 222.25mm Minimum width: 50mm Minimum media length: 91.5mm Paper thickness: 0.13 to 0.33mm
Media handling	Gap sensing, black mark sensing, continuous roll handling Optional integrated cutter
Print Head Cleaning	Mechanical wipe with media cut and removed Manual Wipe with media cut and removed Print Head Pressure Purge with media cut and removed
Data Interface	USB 2.0 Ethernet 10/100T
Power interface Power consumption	20 amps @ 24VDC (Maximum current power supply load) 480W
Acoustics	<45db (A)
Ink cartridges	Dye based inks, non-refillable ink cartridges, total of 5 cartridges Black: 250ml cartridges (2 cartridges per machine) Cyan, Magenta, Yellow: 250ml cartridges
Dimensions/weight	Preliminary: W, H, D 419mm, 229mm, 229mm Weight: 14kg
Environmental	5-30C, 20-85% RH Operating 0-45C, 0-90% RH Storage

4. Product Performance

This section details the performance of this product range. This includes any known system limitations, image quality information and the way media, environment and other factors may affect image quality and product performance.

Multi page PDF printing of personalised label documents is enabled, however this process may affect performance of the system.

There is no external RIP. The RIP is integrated in the OmniPEC chip within the print engine, and is optimised to process the supported file types. This information is specific to the production of labels.

4.1. Recommended Workflow

The supported workflow best suited to the production of labels with RAPID X1 & X2 is a PDF based workflow with PDFs being emitted from Acrobat Viewer. For optimum performance, images within the PDF should be as follows:

Performance testing has shown that embedded bitmap images do not need to be at higher than 400 DPI. The system will output 1600 x 1600 DPI interpolated images from this 400 DPI input. Where possible these images should be embedded as uncompressed sRGB TIFFs, since this gives the most reliable response of the colour gamut, however it may be possible to achieve similar quality using JPEGs.

There may be other workflows which will give acceptable results, but as at this version of the document, only the disclosed workflows have been tested. Any alternative workflows which are fully tested, validated and supported will be announced at the appropriate time.

4.1.1. Stock and ink factors:

High ink density and large area coverage may increase the risk of transient image degradation appearing.

Some materials will accept only so much ink before the substrate becomes saturated and can absorb no more ink. In this case the actual printed surface may either show signs of mechanical degradation or the ink may sit on top of the stock. If the ink sits on top of the stock it is likely that it will be transferred off onto other components of the web handling unit such as rollers and will then appear as printed lines or smudges in the final image.

Other materials will accept the volume of ink printed without transferring onto other parts of the machine, however the ink may spread or bleed on the stock, with variable results, between jetting and 'drying'. This is analogous to dot gain in traditional letterpress and offset printing processes to paper and pulp based media, and/or to reticulation of ink when printing on to non-absorbent or synthetic media.

The use of qualified and profiled media is usually sufficient to reduce the risk of the above print/media defects. Media which has not been qualified and profiled for use in the RapidX printer can not be guaranteed to reproduce acceptable image quality.

Static build up in and around the media and printer can contribute to the appearance of fine ink mist deposits on the printed media. Due to the fine nature of the dots printed with the Memjet technology external factors can cause the ink to move from its designated trajectory between the

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nozzle and the media. Static may cause drops to deviate or even repel from the media surface, airflow may cause drops to deviate, and increasing the print head to media distance can cause drops to interact with each other in the flight from nozzle to media. The first two are able to be alleviated by ensuring that the environment the machine is operated in is controlled to the specification set out elsewhere in this document, the third by ensuring that the media is within specification for the machine, and the machine is maintained adequately.

4.1.2. Environment:

Heat, humidity, lack or excess ventilation, emissions from other equipment, vibration and contamination will affect system performance. Clean, constant climate sites are strongly recommended to reduce system maintenance and downtime. *(Refer to the Installation requirements section of this document, and the specifications for the equipment model.)*

4.1.3. Web stock condition:

Ensure all stock is handled and stored correctly to avoid detrimental changes to its manufactured state.

Media must be presented in good condition to the printer to ensure accurate image reproduction and colour to colour register.

Operator skill and understanding of web handling practices is imperative to ensure the quality of the final output.

Note: Attempting to process stocks outside the specified weight or type that the equipment was specified for can cause significant and expensive damage to the printer. Contact your RapidX representative for advice before attempting to process such materials.

4.2. Image Reproduction Quality

4.2.1. Image and colour alignment:

Media supply condition is critical in ensuring correct image and colour alignment. Feed stock with badly slit edges, inconsistent wind tension, uneven web stretch, loose edges, damaged surfaces, etc. may cause the media to behave erratically in the print section. This may manifest as image alignment defects, missing or distorted print, stock damage etc.

4.2.2. Colour Reproduction and Colour Gamut:

Every printing process has certain parameters under which they perform image reproduction and this controls the range of colours that the specific system is capable of reproducing.

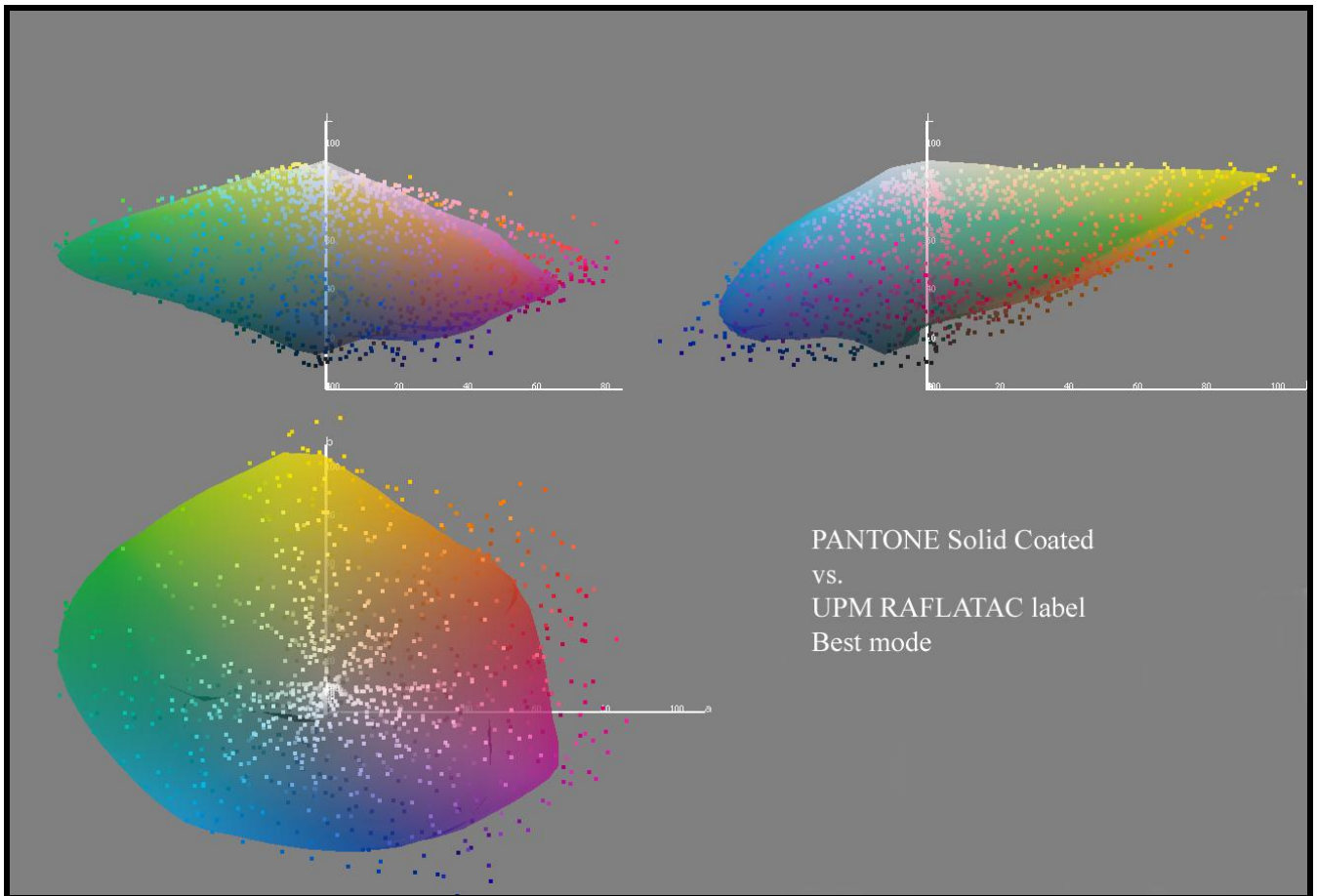
The aqueous dyes which the Rapid X printers are configured to print with are currently the only inks available which may be jetted through the Memjet Remora print head. Attempting to print with any other ink will not yield a predictable output and may damage the printer irreparably.

The PANTONE™ colour system has long been used as an industry reference for colour in order to attempt a best match between copies of the same image reproduced with different technology, onto different media, or in different locations. The 2010 PANTONE™ Solid Colour System was derived from 14 basic colours, which are mixed in different specific ratios to achieve the full Colour Gamut of the current Pantone system on a specified media.

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Taking the above statement in context, it can be determined that the CMYK inks of the Rapid X1 and X2 will have a limited Gamut when compared to the full PANTONE™ Solid Colour System. In response to this limitation, Pantone have created the '2010 PANTONE™ Colour Bridge™'. This Colour Bridge may be used as a guide to help determine when it may be possible to adequately reproduce a Solid PANTONE™ Colour in CMYK.

The image below shows the output of a spectrophotometer scan of the colour gamut of the Rapid X inks printed onto UPM Raflatac JetGloss label stock compared to the PANTONE™ Solid Colour Guide. The small squares of colour indicate the PANTONE™ colours, and the rainbow coloured cloud represents the available range of colours which may be achieved with the Rapid X inks, Memjet Print engine and Raflatac JetGloss label stock. Different combinations of stock, ink print speed and colour specifications will produce a different colour response.



*Fig 4.1 Results for **Raflatac JetGloss** (ID861) at 1600 x 1600 DPI print resolution*

65% of the available PANTONE™ Solid Colours are inside the available gamut of RAPID X ink/JetGloss

8% of the PANTONE™ Solid Colours may be achieved with colour differences bigger than 10dE

Different ink sets, stock types and different surface treatments and finishing processes can also affect the available colour gamut of the system

4.3. Media Considerations

4.3.1. Recommended Media

From time to time a **Qualified Media** list for the specific equipment will be published. This is available from your RapidX sales or support representative on request.

Products not included in the Qualified Media list may be suitable for use in the RapidX printers, however they will not be considered as supported until such time that they have been through the qualification process which includes, but is not limited to: printability testing, colour profiling, and mechanical performance testing.

4.3.2. Media Type Considerations

The X1 and X2 printers are capable of handling a wide range of paper based media, however any media including or containing: ABS, Acrylic, Epoxy, FKM, Hytrel, Liquid Crystal Polymer, Nylon, Polycarbonate, Polyethylene, Polyurethane, PVC, Silicone and any materials containing plasticisers should be tested and evaluated for compatibility with the print engine components to avoid the risk of incompatibility with the ink or damage to the hardware.

4.3.3. Media surface tension and ionic charge:

Stocks with high or low surface tension may cause problems with either: ink deposition, curing, bond strength or resilience. High differential charge between ink and stock may cause erratic drop placement, shape and deposition.

Operator skill and understanding, and the correct application of applicable mitigation methods will help minimise the effect that these may have on output quality.

4.3.4. Media Storage

The recommended long term storage conditions for all ink and stock is 20°C - 23°C at 45% - 55% Relative Humidity (RH). Paper stored outside the recommended environmental constraints is likely to affect image, guiding and transport performance. Web stocks should always be stored horizontally and the outer wrap of stock discarded prior to feeding into the machine. For self adhesive media, siliconised slip papers should be applied to either face of the roll to prevent adhesive bleed and contaminant build up on the edges of the stock. Minimising dust build up on the rolls of cut stock is important in maintaining print unit integrity. All media should be stored and handled as per the manufacturer's or supplier's instructions.

4.3.5. Media Coatings

From time to time pre-treatment coatings may become available for use with the RapidX printers.

4.3.6. Media Cleanliness

The RapidX printer relies on the condition of the nozzle plate to ensure acceptable and reliable jetting of the RapidX inks. If nozzle plate cleanliness is compromised the print reproduction from the RapidX printer may not be as expected.

The most common source of contamination to the nozzle plate is the media. This may be transferred into the printer on the surface of the media when it is passed into the machine, or can be carried back from the cutter system when an end of job cut is performed.

Cleaning the cutter area and internal surfaces of the printer regularly can ensure that the risk of contamination from internal sources is minimised. The control of feed media surface cleanliness can ensure that contamination from supply sources is minimised. RapidX printers may be fitted with an optional web surface cleaner which can transfer loose contaminants such as dust off the

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media and trap them on a replaceable adhesive coated roller. Severely contaminated media should only be used after careful consideration and acceptance of all risks by the operator.

Adhesive gum bleed should be cleaned off the machine surfaces regularly to minimise the risk of adhesive transfer to the nozzle plate.

Print head cleaning and capping for maintenance of print quality must be performed with the web media removed from the printer to obtain access to the nozzle plate for manual or mechanical cleaning.

4.4. Installation and environmental considerations

4.4.1. Installation

The machinery should be located on a stable floor, or bench, structure as required which is capable of supporting the weight of the unit as specified.

The machine must be levelled to within 0.5°/m to suit the ink tank priming requirement.

Floor space requirements: X2 900 mm long x 600 mm deep with operator access at all sides.

Bench space requirements: X1.1400 mm long x 700 mm deep bench, (the bench height should be determined to suit the chosen operator position, whether seated or standing.)

4.4.2. Delivery constraints

It is important that there is equipment available for unloading the machines from the delivery vehicle. Weights and dimensions are as noted elsewhere and in the equipment specifications.

4.4.3. Environmental

Temperature and Humidity

While the machine can be operated within a range of conditions, colour response and material handling will vary across the range of operating conditions. To achieve the best operating performance out of the Print Engine, it is advised that it is operated within the "Ideal operating conditions" noted below.

If the conditions vary over a short period of time, dramatic changes in performance may be experienced which could be detrimental to the output of the machine. It is strongly advised that the machine is operated in a controlled environment to achieve best performance and stability.

Maximum operating conditions	32C, 85% RH
Minimum operating conditions	5C,20% RH
Ideal operating conditions	20-25C, 45-55% RH
Storage conditions	0-45C, 0-90% RH Storage

Cleanliness

The Rapid X printer should **not** be installed in an open environment such as a warehouse with open roller doors, or a room which may be subject to ingress of airborne dust or dirt. An office with short pile carpet, and closed doors with a filtered, continuously replaced air flow (such as externally replenished air conditioning), or a sealed hard floor environment is ideal. Environmental conditions should be maintained as detailed elsewhere in this document.

5. Designing for RapidX.

5.1. Image Reproduction Quality

Image reproduction is strongly influenced by paper surface structure, texture, colour, treatment and handling. Inkjet printing may be at risk of some image and colour banding across the print width due to the physics of ink distribution and head mounting relationships. This may be noticeable in some image areas.

The current recommended workflow is to present graphic elements of a print file to the machine in PDF format via Adobe™ Acrobat viewer. Rastering vector art prior to printing can produce disappointing printed results.

5.2. Image Creation and Job Layout

Files for printing on the Rapid X1 and X2 should be created in such a way that they suit the requirements of the print engine otherwise less than optimum reproduction may occur. There are many different tools for creating graphical images for print reproduction, it is not within the scope of this guide to discuss or make recommendation of the ideal software for image manipulation, or how best to use any specific software. Users are encouraged to perform their own tests and also seek professional advice from specialists in each specific type of software prior to committing to use a specific package. Note any third party software mentioned herein is not specifically recommended, but only mentioned to illustrate a possible workflow. Note different versions of software may require significantly different workflows to achieve the same results.

Two software packages commonly used for graphic art production are **ADOBE™ ILLUSTRATOR** and **COREL™ DRAW**. These software packages can create graphics in vector format, where straight lines are mathematically defined exactly that, a line from point to point, and curves are exactly that, a mathematically defined curve, rather than a series of small squares (pixels) placed in a certain relationship to each other and differently shaded to best represent a drawn line or curve. Specifying lines as vectors can take much less data to define in the file structure, meaning that the file is smaller/more efficient. The other benefit is that images can be scaled “infinitely” as the vector data may be directly scaled without distortion.

In these software packages, photographs etc may also be embedded as bitmaps (collections of pixels/dots of varying colour), at a certain resolution. The file structure of a bitmap is much more complex as it must define every pixel by colour, brightness position etc. A possible issue with bitmaps, is that when files are re-sized, re-scaled or rastered in the printer, every pixel must be adjusted to appear in a new position which matches either the new image size, or the native resolution of the image reproduction device. There is always the chance that some information will be lost every time the image is adjusted.

Using compressed JPEGs for bitmap data may add another level of complexity to the print reproduction. The JPEG file compression algorithm works by minimising the size of the colour information in the file structure. This may be performed every time the file is resaved. To minimise the information required to “reproduce” the image the JPEG compression algorithm adjusts the tone and brightness values of each pixel, tricking the eye to see the image on a PC monitor in a similar way to the original file. It is possible to observe the effect and results of this by opening and saving a JPEG multiple times with a software package that performs JPEG compression automatically. Each time the file is opened and saved the file storage size may reduce until the image either loses definition or depth of colour, or JPEG artefacts are introduced in areas of subtle shading.

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This compression can be acceptable when an image is manipulated for viewing on a PC monitor at 72 DPI, however the undesirable effects can be readily appreciated when the image is printed with a high resolution printer. Ideally images for reproduction by the RAPID X1 and X2 should be created with as much data as possible in the vector format to get the best from the machine capability, and where possible bitmap images should be presented in a non-lossy format such as sRGB TIFF.

5.3. Solids and Tints

Large flat areas of colour, such as that in Fig 5.1 below, are often challenging to print, whether by digital, letterpress or offset methods. There are many factors which influence the visual response of a printed solid area. Midtone tints of many colours may exhibit unevenness or banding normal to the direction of web travel, and this can be exacerbated by the use of high gloss stocks.



Fig 5.1 Flat mid-tone background image areas

Grained or textured stocks, and uncoated stocks can also exhibit colour density variation where the grain of the stock affects ink lay-down and large areas of solid colour may appear mottled or uneven. Some aqueous inkjet receptive stocks may also exhibit uneven colour response due to surface effects. It is the responsibility of the operator to ensure the stocks chosen exhibit the performance required, however it is possible, using certain techniques in the file creation to mask some undesirable print effects.



Fig 5.2 Textured and patterned background image areas

In order to reduce these visible effects, it is recommended that some 'noise' is introduced to the print, such as shown in Fig 5.2 above. Either a background image, texture or patterning can be used effectively. In other cases, breaking up the large area with text or other design elements can render the desired result.

6. Operating Considerations

6.1. Consumables

6.1.1. User Replaceable Items

Remora Print head: 8.5" width x 5 colour x 1600 DPI
Ink Cartridges
5 separate tanks - 250 ml ink CMYKK,
Waste tank absorber
1.6 litre capacity
Knit Polyester Class 10 Clean-room wipes
De-ionised ASTN D5127-90 Type E-11 Electronic Grade Water
Wiper roller

6.1.2. Technician Replaceable Items

Maintenance Module (Service Station)
Wiper Assembly
Cutter assembly
Cutter Blade
Exchange Print Engine

6.1.3. Third Party Sourced Consumable Items

Inkjet receptive print media
Personal protective equipment (talc free gloves, etc.)
Knit Polyester Class 10 Clean-room wipes
De-ionised ASTN D5127-90 Type E-11 Electronic Grade Water
Note: It is the responsibility of the user/operator to ensure that all third party sourced consumables are compatible with the RapidX system, and exhibit the desired performance characteristics.

Consumables Lists are subject to change from time to time as a result of continuous product development.

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Remora Print Head

Printing Capabilities

Ink channels: 5
Ink colors: CMYKK, and single-color printing
Maximum printable width: 222.8 mm (8.77")
Printhead resolution:
 Best mode: 1600 dpi x 1600 dpi
 Normal mode: 1600 dpi x 800 dpi
Physical resolution: 1600 nozzles per inch per colour
Nozzle count: 70,400
Maximum line fire frequency: 11 kHz
Ink drop volume: 1.4 pL nominal
Ink drop velocity: 8 m/s
Print speed:
 Best mode: 30 A4 ppm (paper velocity: 6"/s)
 Normal mode: 60 A4 ppm (paper velocity: 12"/s)

Media

Recommended media weights: 65 to 245 gsm

Dimensions

Width: 267.50 mm (10.51")
Height: 50.00 mm (1.968")
Breadth: 33.80 mm (1.33")
Weight (dry): 200 g

Noise and vibration

Acoustic noise: Less than 30 dB(A) (as per ISO 7779)
Vibration: None detectable

Ink Supply

Supply pressure: -100 mm H₂O ± 30 mm H₂O (0.98 kPa ± 0.29 kPa)
Imbalance between color planes: ±5% (max)
Ink quality: Filtered to 2 µm absolute

Lifetime

Printing: 30,000 A4 prints ISO 24711 test pages
Storage (in original packaging): 18 months from date of manufacture
Operational: 12 months from date of installation in a printer
Non-operation: Six months (installed in a printer)

Solvent Compatibility

Only ASTN D5127-90 Type E-11 Electronic Grade Water is to be used for cleaning the print head or engine components. Note: This is De-Ionized **NOT** Distilled water.

6.2. X1/X2 Ink

Rapid X Ink

The Rapid X ink is a consumable for the X1 and X2 printer. The cartridges are considered disposable currently and are not able to be refilled at this time. The Rapid X ink cartridge is QA protected and can only run with a matching QA printer, it only has a licence to print with the volume of ink originally supplied from the factory.

The ink is an Aqueous Dye.

Colours available are Cyan, Magenta, Yellow and Black. Two Black cartridges and one each of Cyan, Magenta and Yellow are required for printing to proceed. See the section Colour Reproduction and Colour Gamut for further details.

A level detector prevents printing once the ink level drops below a usable level.

A filter is incorporated in the ink cartridge to assist in maintaining print quality, and achieving print head life.

All ink shipments shall be accompanied by a copy of the Rapid X ink Material Safety Data Sheet (MSDS). A copy is available from RapidX dealers and distributors.

Shelf life of the ink is approximately 18 months from manufacture under specified storage conditions

Storage conditions

0-45C, 0-90% RH Storage

The indoor lightfastness of the Rapid X inks is between 3-4 years on inkjet coated media stock. This is based on accelerated testing run internally at Silverbrook and Memjet similar to that of the Wilhelm Research Institute which specifies accelerated florescent test conditions. Also, the failure point is defined by density loss of the least lightfast ink (color).

The degree of lightfastness does depend on the following conditions:

- Exposure to indirect sunlight
- Temperature and humidity
- Media coating and/or surface treatment/condition
- Post processing of print

6.3. Daily Maintenance Tasks

6.3.1. Print Head Cautions

Only ASTN D5127-90 Type E-11 Electronic Grade Water is to be used for cleaning the print head or engine components. Note: This is De-Ionized **NOT** Distilled water.

The print head is a precision piece of equipment and is fragile. The following points are recommended to improve print head life and performance:

- Always store replacement print heads in the orientation shown on the packaging,
- Never store an unused print head out of its original sealed packaging,
- Do not drop or bend a print head,
- Print head cleaning must be performed with the web media cut and removed from the print engine.
- Never drop the print engine clamshell with a print head installed,
- Do not touch the nozzle plate or contacts of the print head with anything other than ASTN D5127-90 Type E-11 Electronic Grade Water and a clean-room wipe.

6.3.2. Changing a Print Head

Installing the print head: Quick Notes

- The shipping fluid is an irritant wear eye protection and Latex or Nitrile gloves.
- The head is Electro-static-discharge sensitive use ESD protection.
- Do not remove the print head from the package until you are ready to use it.
- Shipping fluid may leak from the package or the print head so make sure you have something to safely capture a few milliliters of fluid.
- Cut the package near the seal joint.
- Carefully remove the print head from the bag
- Do not remove the Orange clip until just before installing in a printer.
- Wipe any other excess fluid from the cartridge body
- Do not touch any of the fluid couplings or nozzle plate after the orange cover is removed.
- Carefully remove the white protective cloth from the nozzle plate and the protective tape from the electrical contacts.
- Wipe off any remaining shipping fluid ensuring only clean-room wipes are used on the nozzle plate.
- Set the new print head on its orange cover clip in a safe and convenient location ensuring the nozzle plate is down most, and the nozzle plate is not touching any hard surface.
- Lift the print engine cover
- Close the ink system valve by the close valve command in the EWS
- Open the print head latch by either the printhead release command in the EWS or by pressing the green print head release button adjacent to the printhead.
- Place the orange clip from the old print head in a convenient and accessible location
- Lift the purple latch plate fully which will release the ink connections from the print head.
- Pressing on the handle tab on the print head push away from the exit side of the machine until the old print head is released from its locating tabs
- Slide the print head upwards out of the mounting slots
- Carefully place the old print head in its orange clip sealing the nozzle plate and ink connections from leakage.
- Take the new print head in hand
- Point the ink connections away from the front (paper exit side) of the printer.
- Align the print head with the print head slot.
- Tilt the top of the print head toward the back of the printer about 20°.

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- Gently seat the back of the print head in the printer and press downwards lightly.
- When the back of the print head is firmly seated and the location tabs are aligned, gently rotate the print head into position against the stops on the print head connector board by pulling the handle section towards the aluminium bar across the exit side of the engine. If the print head will not rotate into position do not force it.
- Close the latch by pressing downwards gently until a click is heard..
- Wipe the nozzle plate with a lint free cloth moistened with de-ionized water.
- Close the clam shell.
- Prime the print head.
- Perform a test print.
- If bubbles or potentially blocked nozzles are evident perform a print head purge cycle, manually wipe the print head nozzle plate (as specified in the section 'Cleaning a Print Head') with a new clean-room wipe, perform another test print.

6.3.3. Cleaning a Print Head

Only ASTM D5127-90 Type E-11 Electronic Grade Water is to be used for cleaning the print head or engine components. Note: This is De-Ionized **NOT** Distilled water.

- Only a class 10 or better clean-room cloth as specified in the consumables list moistened with de-ionized water (reference ASTM D5127-90 Type E-II Electronic Grade Water) should be used for wiping the print head.
- Gently wipe the moistened cloth from one end of the head to the other.
- Ink or contaminants may also need to be wiped from the print head electrical interconnect pads.
- Mechanical wipe can be requested through the software interface. Web media must be cut and removed from the print engine prior to performing cleaning routines.

6.3.4. Periodic Print Head Maintenance

The Memjet Remora print head is considered a consumable item. As such there are no supported maintenance routines apart from periodic cleaning, and replacement as specified elsewhere in this document.

6.3.5. Priming a print head

- For shipping the print head is filled with a clear fluid. Priming helps recirculate both the liquid and air in the ink lines to allow filling of a new head with ink, and recovery of a de-primed print head. Priming can also help to remove air bubbles from a previously primed print head.
- The priming process includes:
 - Circulate ink through the print head in the direction of flow
 - Fill the main channels of the print head
 - Draw ink through the main ink channels to dislodge any bubbles in them
 - Cap the head to prevent dehydration.
- Total ink used for the process is targeted at <1ml per instance

6.3.6. Purging a print head

- For shipping the print head is filled with a clear fluid. Purging helps purge both the liquid and air in the ink lines and nozzle chambers to allow reliable printing. Purging can also help to remove air bubbles from a previously primed print head.
- The priming process includes:
 - Reverse circulate ink through the print head against back pressure
 - Fill the main channels of the print head
 - Fill the nozzle chambers of the print head

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- Generate a pressure pulse to push out any bubbles
- Push out contaminated ink from within the print head minimizing the risk of contaminating the ink tanks' reserve
- Clean and dispose of the ink pushed out onto the nozzle plate
- Print out color mixed ink
- Cap the head to prevent dehydration.
- Total ink used for the process is targeted at <15ml per instance

6.3.7. Replacing an Ink Cartridge

- Note which colour is indicated on each slot and obtain a suitable cartridge for insertion.
- Remove the ink cartridge from the plastic bag.
- Inspect the cartridge for presence of the QAI board.
- Inspect the septum seals to ensure they are a) all present, b) all look the same depth in the endplate of the ink cartridge.
- If any defects are observed on the ink cartridge do not attempt to install it in a machine but raise a non-conformity report (NCR).
- Carefully insert the cartridge into the bay, making sure the septum seals go in first and the ink label is uppermost.
- When resistance is felt, carefully push the ink cartridge into position. It may take a few wiggles to get all three septum to pierce.
- If the cartridge springs back more than 1-2 mm, carefully remove it and inspect the septum for the appearance of ink. If there is ink on all three then re-insert the cartridge, it should go in easily now. If not repeat the steps above and re-check.

6.3.8. Cleaning a print engine

Only ASTN D5127-90 Type E-11 Electronic Grade Water is to be used for cleaning the print head or engine components. Note: This is De-Ionized **NOT** Distilled water.

The print engine is a precision module. It contains electronics, mechanical systems and the ink delivery and print systems. The web path and some exterior covers are the areas which require routine manual cleaning. A class 10 or better clean-room cloth as specified in the consumables list should be used for cleaning the interior parts of the engine.

6.4. Periodic Maintenance Tasks

Consult with your RapidX dealer for periodic professional maintenance, and supported user maintenance routines.

7. Statement of Acceptance

Once you have read and understood this document please print this page, read the statement below, then complete the section at the bottom of the page. Please return this sheet to your RapidX dealer.

I have received and read the **X1_X2_Customer_Expectation_Document_1.6** and understand and accept the capabilities of the machine described therein. I also understand that there are procedures which must be followed to ensure proper operation of the machine, and that failure to follow these and further procedures described in the RapidX user guide, or supplementary information provided by Rapid Packaging Services Pty. Ltd. may compromise the operation of, or result in damage to, the machine.

Company _____

Contact phone number _____

Authorised Person

Name _____

Signature _____

Date _____