



Piezo Ink Jet Printing

with 3M™ Piezo Ink Jet Ink Series 4600

For Scitex Pressjet-W™ Digital Press

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Product Description

3M™ Piezo Ink Jet Ink Series 4600, when used with 3M films and sign facings, makes attractive, multicolour graphics. These solvent-based, pigmented inks are weather resistant and have excellent colour retention. They are designed for use in the Scitex Pressjet-W™ Digital Press.

This bulletin describes how to use ink series 4600, selected 3M films and overlaminates, and Scotchprint® Graphic Maker Software with the Pressjet-W digital press.

All printer site preparation and printer operation information is provided by Scitex. Please read and follow those instructions before using this bulletin.

After your Scitex printer is installed, a 3M representative will install Graphic Maker software and work with you to configure the software and perform printer calibrations and colour management tasks. An important part of that, which is described in more detail later, are the macros (printer parameter profiles) that 3M and Scitex have created for each of the recommended 3M medias.

This bulletin describes information that is unique to selecting print parameters using Graphic Maker software and using 3M materials.

Note: Refer to your Graphic Maker Software User's Guide for additional details.

Product Line

This information is subject to change. Be sure this is the most current Product Bulletin. See 3M Related Literature at the end of this bulletin.

Product No.	Colour
4691	Magenta
4692	Yellow
4695	Black
4696	Cyan

Compatible Films and Substrates

Note: For details on using a particular film or substrate for piezo ink jet printing, please refer to that product's Product Bulletin.

100 Micron

- 3M™ Controltac™ Plus Graphic Film IJ160-10
- 3M™ Controltac™ Plus Graphic Film Series IJ162
- 3M™ Scotchcal™ Perforated Window Graphic Film IJ8173
- 3M™ Scotchcal™ Graphic Film Series IJ40
- 3M™ Scotchcal™ Graphic Film Series IJ20

50 Micron

- 3M™ Controltac™ Plus Graphic Film IJ180-10
- 3M™ Controltac™ Plus Graphic Film IJ180C-10
- 3M™ Controltac™ Plus Curtain-Sided Vehicle Film 190
- 3M™ Scotchcal™ Translucent Film IJ3630-20
- 3M™ Scotchcal™ Graphic Film Series 3650

Reflective Film

- 3M™ Scotchlite™ Plus Flexible Reflective Graphic Film IJ680-10
- 3M™ Scotchlite™ Plus Flexible Reflective Graphic Film IJ680CR-10

Compatible Products continued on the page 2.

Compatible Products, continued.

Banner Material

- 3M™ Banner Material 8451

Clear Coats and Overlaminates

- 3M™ Screen Print Gloss Clear 1920
- 3M™ Screen Print Gloss Clear 9720UV
- 3M™ Scotchcal™ Overlamine 3645
- 3M™ Scotchcal™ Luster Overlamine 8908 ES
- 3M™ Scotchcal™ Matte Overlamine 8909 ES
- 3M™ Scotchcal™ Optically Clear Overlamine 8914i
- 3M™ Scotchcal™ Luster Overlamine 8519
- 3M™ Scotchcal™ Matte Overlamine 8520

Application Tapes

- 3M™ Prespacing Tape SCPS-2, SCPS-55
- 3M™ Premasking Tape SCPS - 100, SCPM-19

Software

- Scotchprint® Graphic Maker Software

Hardware

- Scitex Pressjet-W™ Digital Press
- Sun® Ultra® 10/440/Blade workstation
- Windows PC Platform

Cleaning Solvent

- 3M™ Thinner CGS-50

Note: All Product and Instruction Bulletins mentioned in this bulletin can be ordered through our Fax-on-Demand system. See 3M Related Literature near the end of this bulletin for details.

More Information on the Web

To find out more about piezo ink jet printing and software profiles that help ensure successful printing, visit our website at www.scotchprint.com.

If you are a Scotchprint® Graphics Authorized Manufacturer or 3M Piezo Ink Jet Registered Fabricator, you may also enter the extranet area: just click on *Login*, use your password, or to setup a new, free account, click *register*.

Health and Safety

Ventilation

Provide local and/or general exhaust ventilation in the printing drying areas to prevent a build up of solvent vapors and to maintain levels of solvents below the limit for worker exposure. An experienced industrial ventilation engineer and/or a certified industrial hygienist can help evaluate your ventilation requirements and design based on your site process conditions. Scitex, the printer's manufacturer, also provides ventilation information. Please refer to their literature also.

Guidelines for Successful Printing with Solvent-Based Piezo Ink Jet Inks

The Role of the Piezo Press Operator

An operator who understands pre-press operations and the relationship between media characteristics, printer setup, total ink coverage and drying time can produce graphics that achieve the performance expectations of the media and the customer. The operator should also work with the graphic designer and/or colour conversion operator so there is a common understanding of print and media parameters.

A wide variety of printing substrates (media) can be used with piezo ink jet printing. Although 3M media have been extensively tested in laboratory conditions, the knowledge and skill of the operator is a key factor in producing high quality graphics.

About Solvent-Based Piezo Inks Used in This Printer

The inks used in this printer contain a high percentage of solvent. If the solvent is not evaporated quickly through heat and air, it may significantly affect post-printing operations and how the media handles when applying it.

Solvent's Affect on Media and the Printed Image

Normally, the solvents in piezo inks do not damage the media or adhesive unless the solvent remains too long on the media and is also absorbed by the adhesive. When the media is not sufficiently dried immediately after processing, it may result in edge curling, shrinkage, aggressive adhesive and/or stretching, which contribute to handling and performance problems. Also, the graphic may be hard to overlamine and it could be damaged due to smearing or blocking during handling. The more solvent you can eliminate, the better the media performance.

How to Manage the Total Physical Amount of Ink on Media

Testing shows that properly managing the total physical amount of ink laid down in any area on the graphic results in better image quality, less ink usage, quicker drying times and greater throughput. It also helps ensure good media performance.

To help you achieve these goals, we have established maximum Total Ink Coverage for each 3M media. Total ink coverage is the total percentage of all inks (CMYK) used in the darkest shadow regions of the graphic. For example, CMYK values of 60%, 60%, 60% and 100% produces a total ink coverage of 280%.

Note: Depending on the software you are using or the colour printing reference books you use, total ink coverage may be called: total area coverage; total dot area; max CMYK; maximum ink amount; total ink limit; total printing dot.

There is a common misconception that because the ratio of ink solids to solvent is very low, the only way to achieve satisfactory density is to use high ink coverage. Testing shows that in many cases you can achieve very good density with lower total ink coverage with little or no loss of quality. The rest of this section discusses options for managing the total ink coverage.

Setting Total Ink Coverage During Colour Separation

The best results can be achieved when total ink coverage is taken into consideration by the graphic designer and set during pre-press operations.

The graphic designer and/or colour separator should always discuss printing parameters with the piezo press operator so that the total ink coverage can be set during separation. The typical methods of colour separation are Adobe® Photoshop®, ICC-based colour management, third party colour separation packages and direct conversion to CMYK at the time of scanning.

Part of establishing the total ink coverage is determining maximum black. We recommend limiting black ink to the minimum level necessary to achieve a maximum density. For example, if you review a series of black patches in 1% increments from 90% to 100%, a visible difference in density usually stops being noticeable between 94% to 100% of total black.

Correcting Total Ink Coverage During Printing

If the total ink coverage on a colour-separated image is too high for the media and your RIP software supports ink limiting, you may be able to use this function to reduce the total physical amount of ink on the media.

For example, in 3M's **Scotchprint® Graphic Maker Software**, the ink limiting feature manipulates the print data to reduce the amount of ink used while maintaining colour balance for the best possible image quality. It does this by limiting the number of ink spots that are printed over the top of one another without restricting the 100% solid colours (cyan, magenta, yellow and black). Ink limiting can be set for none, 100%, 150%, 200% or 250%. For complete details refer to the Graphic Maker User's Manual.

Keys to Successful Printing and Application

There are many keys to successful printing and application. The two most important keys for successfully printed media are total ink coverage and drying. The two most important keys for successfully using the inks are colour management and using software profiles. However, because of the variety of media used and the different operating conditions of each shop, follow all keys to achieve overall success.

1. Discuss the project with the graphic designer and/or colour separator.

Make sure the designer and/or colour separator know the parameters and printing recommendations for both the media and printer being used for each graphic.

2. Discuss the project with the media applicator.

Work with the media applicator so you are both aware of any special handling or application techniques that may be needed for the selected media construction. Any combination of high total ink coverages, hot application temperatures, and irregular application surfaces may make applying the media more difficult

Be aware that all 4 mil media with an overlamine will tent over rivets; this is true for all printing technologies.

3. Select the right media for your type of graphic and application needs.

- Each media has specific intended uses and applications, which are described in the media's Product Bulletin.
- Do not use rolls of media that are damaged; it can result in printer failure.
- Condition the media for 24 hours in the same environment as the printer prior to printing.

4. Understand the unique processing characteristics needed for each media.

- *Specific Media Processing Recommendations* on page 5 are guidelines we have developed that help provide the best graphic results with the media you are using.
- *An clear coat or overlamine* is required for graphics subjected to abrasion such as road debris and automatic/power washing, harsh cleaners, or chemicals. Some window graphic film and all graphics for floors require an overlamine.

- *Clear and translucent films for backlit signs require special consideration.* These films tend to be more sensitive to shrinkage due to high total ink coverage. Film that is not sufficiently dried prior to creating an overlap or seam may shrink and result in a light leak. Rather than increasing the total ink coverage to increase the density of the backlit image, we recommend printing two layers of film at lower ink levels. Refer to Instruction Bulletin 4.26 for the technique.

5. Achieving maximum image quality requires good colour management and correct settings

a. The operator must have excellent pre-press skills

Good colour management practices are essential. For good colour output, colour separations must take into consideration the printer, the halftoning method and the ink series being used. You can use whatever method you are accustomed to that provides the desired printing results, which may include Photoshop®, high end scanners or ICC profiles.

b. Always use the correct software profiles.

Each media has a unique printer profile that helps ensure successful printing. Select the appropriate Scitex macro (printer parameter profile) for the 3M media being used.

Use Graphic Maker software to calibrate the printer.

c. Use the printer settings discussed in **Specific Media Processing Conditions** on page 5.

6. Limit the Total Ink Coverage.

Refer to the "How to Manage the Total Physical Amount of Ink on Media" on page 3.

Use the Ink Limiting feature in the Graphic Maker software when recommended for specific media. This is discussed in more detail on page 10. Also see **Specific Media Processing Recommendations** on page 5.

Too much ink on the media results in media characteristic changes including shrinkage, loss of changeability, loss of positionability (3M™ Controltac™ Plus Graphic Films) and air release features (3M™ Controltac™ Plus Graphic Film with Comply™ Performance), as well as inadequate drying, overlamine lifting, difficult application and/or poor graphic performance.

7. Don't take shortcuts when drying graphics.

Graphics that seem dry to the touch may still be saturated with solvent. This causes the graphic to become soft and stretchy, and the adhesive may become too aggressive. Use the maximum dryer setting available for your printer that will not distort or damage the media.

Dry the media immediately after printing. Always use a conveyor-type dryer. The dryer speed should be in the range of 1.2 to 1.4 meters/minute at 82° to 93°C (4 to 7 feet/minute at 180° to 200°F). If liner blistering or shrinkage results, reduce the heat. To maximize solvent removal, we recommend that you start at 1.2 meters/minute at 93°C (4 feet/minute at 200°F) and change the temperature or drying times only if there are problems.

If the media still does not seem to be drying, slow the dryer. An auxiliary dryer may also be used to complete the drying (2 hours @ 65°C (150°F) should be sufficient). Air drying on racks may also be used, although it is less effective than oven drying. The average air drying for graphics printed with a total ink coverage of 300% is about 12 hours; graphics printed with higher total ink coverage may require up to 24 hours.

Remember, reducing total ink coverage reduces solvents and therefore reduces drying time.

To check dryness, use the Dryness Test on page 11.

These are problems that may occur due to insufficient drying.

- If the media you are using is a 3M™ Controltac™ Plus Graphic Film, the positionability feature will be significantly reduced if the film is not sufficiently dried.
- You may notice some problems, such as blocking or embossing, when the graphic is unrolled prior to application.
- An overlamine may be difficult to apply.

Too high a drying temperature can distort the printing media, resulting in:

- Transport problems in the printer.
- Wrinkling when the printed graphic is overlaminated or premasked.

8. Prepare test graphics.

The default settings in the printer for drying temperature and time, and the preselected settings in the software for total ink coverage and linearization, may not be the optimum for the graphic that you are printing.

You'll save time and money if you print test graphics for each media type you use. Print the graphics at different printer settings, total ink coverage and drying times. Try starting your tests with the total ink coverages mentioned in *Specific Media Processing Recommendations*, below. Keep these samples for future reference.

After printing is completed and the ink has dried, the graphic may be wound onto a spindle or core. Doing so before the ink that is completely dry may emboss or block (ink transfers to the liner).

9. Follow all standard good operation and maintenance procedures.

Specific Media Processing Recommendations

Note: For the full product names of the 3M products listed on this page, please see pages 1 and 2.

Note: *If you have **not** done colour separation ink limiting*, enter these percentage recommendations into Graphic Maker software.

If you have done colour separation ink limiting, use the percentages determined during colour separation, which may be lower than the values in this table, depending on the combination of colours used.

Media	Total Ink Coverage (maximum) With Ink Limiting	Overlamine or Overprint Required? ¹	Other Considerations
IJ160-10	300%	YES, fleet graphics	
IJ162-10 IJ162-114	400%	YES, an overlamine	
IJ180-10	250%	YES, fleet graphics	Recommendation: set Graphic Maker Ink Limiting parameter to 200
IJ180C-10	250%	YES, fleet graphics	Recommendation: set Graphic Maker Ink Limiting parameter to 200
190	400%		May show streaks in one colour black solids and marginal streaks in other solid colours. You may use four-colour black for one colour black, however, expect streaks in other solid colours. Colours with low dot fill percentage or busy halftones should print without streaks.
IJ680-10	400%	YES, selected applications	
IJ680CR-10	400%	YES, selected applications	
IJ3630-20	150%		Not recommended for multi-tile graphics.
3650B 6339	150%		Not recommended for multi-tile graphics.
IJ40-10/20/114	250%	YES, selected applications	For flat application, no rivets or corrugations.
IJ20 – 10/20/114	250%	YES, selected applications	For flat application, no rivets or corrugations
IJ8173	300%	YES, an overlamine	Due to the perforations in this film, it is harder to match the image quality of a solid film. Higher total ink coverage increases drying issues; the film may lift from liner, stick to liner when rolled up, wrinkle when being overlaminated. Undried solvent can cause film to lift from substrate after application.
8451	300%		Banner material is susceptible to blocking or embossing when rolled, especially if the graphic is not totally dried.

See When to Use an Overlamine or Clear Coat on page 8 for details.

Recommended Overlaminates, Clear Coats and Application Tapes

Note: For the full product names of the 3M products listed on this page, please see pages 1 and 2.

	Ink 4600	Films with Comply	Clear Coat or Overlamine ²									
			1920 DR ⁵	IJ20-114/8935	IJ40-114/8935	8519	8520	8908 ¹ 8909 ¹	3645 ³	8921	8914i ⁴	8912
Media												
IJ160-10	?		?			?	?	?				
IJ162-10 IJ162-114	?								?			
IJ180-10	?	?	?			?	?					
IJ180C-10 ²	?		?			?	?					
190	?									?		
IJ680-10	?					?						
IJ680CR-10	?					?						
IJ3630-20	?		?		?	?	?	?				
IJ3650-10 IJ3650-114	?		?		?	?	?	?				
IJ40-10/114	?		?		?							
IJ20-10/114	?		?	?								
IJ8173	?										?	
8451	?		?		?	?	?	?				
Application Tape												
Premasking Tape	SCPS-100	SCPS-100	SCPS-100	SCPS-100	SCPS-100	SCPS-100	SCPS-100	SCPS-100	None	SCPM-19	None	
Prespacing Tape	SCPS-2	SCPS-55	SCPS-2	SCPS-2	SCPS-2	SCPS-2	SCPS-2	None	None	SCPM-19 ¹	None	

¹ Not for use on fleet graphics or reflective films. Check the film's Product Bulletin for details.

² See **Using Overlaminates, Screen Print Clears and Application Tapes**, page 7.

³ Overlamine 3645 is required for floor graphics.

⁴ Use overlamine 8914i when optically clear window graphics are required.

⁵ Clear 1920 must be screenprinted or applied with a 3MTM approved roller coater to be warranted.

Note: For the full product names of the 3M products listed on this page, please see pages 1 and 2.

Using Overlaminates, Screen Print Clears and Application Tapes

Note: See the table on page 8 for an overview of film and overlaminate/screen print clear recommendations as of the date of publication. Please refer to the film Product Bulletins for further details.

When to Use an Overlaminate a Clear Coat

Refer to the table on page 7 for the appropriate clear coat or overlaminate.

Refer to Instruction Bulletin 4.22, *Cold Roll Lamination*, for applying overlaminates.

Refer to Instruction Bulletin 3.11 for printing details on clear coat 1920.

Graphics That Require Protection To Be Warranted

Most graphics, even durable, piezo ink jet printed graphics, require additional protection under certain conditions.

When using ink series 4600, the durability of the graphics is reduced when frequently subjected to any of the following environments: road debris or impinging foreign debris, foreign material rubbing on the graphic, power washing equipment, aggressive brushing, occasional chemical spillage such as acids and alkalis, and petroleum products such as gasoline spills at pumps.

Therefore, to protect the ink and graphics and receive the Warranted Durability, a clear coat or overlaminate is required when the graphic is used in such environments.

Graphics That Specifically Require An Overlaminate Or Clear Coat

- Graphics on the exterior of vehicles and railroad rolling stock
- Any graphics exposed to the abrasive or harsh environments mentioned above
- All graphics for floors (use overlaminate 3645)
- Window graphics that require optical clarity (use overlaminate 8914i)

Graphics That Do Not Require Protection To Be Warranted

If the graphics are not exposed to the environments listed above, a clear coat or overlaminate is not required to receive the Warranted Durability. However, for graphics applied in high contact areas such as bus shelters, hallways, etc., using a clear coat or overlaminate will provide additional protection.

How to Select an Overlaminate or Clear Coat

Typically, an overlaminate or clear coat is selected based on the following criteria. Refer to the overlaminate or clear coat's Product Bulletin for details.

1. Intended application: make sure the film and overlaminate or clear coat you select are recommended for your end use
2. Type of available processing equipment (screen printing, laminator or other coating equipment)
3. Desired durability
4. Gloss
5. Cost

When to Use an Application Tape

Refer to the Instruction Bulletin 4.3 for more complete information on applying the recommended application tape.

The type of 3M application tape to use depends on the type of graphic produced. Refer to the table above for the recommended tape for the clear coat or overlaminate you are using.

- Use premask tape if there is very little exposed liner.
- Use prespace tape if graphics have large amounts of exposed liner or are kiss cut.

Note: For the full product names of the 3M products listed on this page, please see pages 1 and 2.

Installing and Configuring the Printer to the Graphic Maker Software

System and Setup Requirements

1. Follow the Graphic Maker software Scitex Pressjet-W Release Notes Addendum that is included with the software.
2. A workstation is required to function as a RIP station.

There are two platforms:

- Sun Unix Blade 100/150 at least 18GB of hard drive.
- PC Based windows 2000 or XP Professional 40 GB Hard Drive.

In both cases, larger memory and faster processors improves RIP operation.

3. The Graphic Maker software (version 5.0 or later) includes:
 - A driver for the Pressjet-W.
 - A User's Guide with instructions for printer calibration and colour management.
 - A Release Notes Addendum with instructions for installation and use.
4. The system works with 100baseT ethernet network. This is used to network the workstation and the Pressjet printer controller and design station computer.

Colour Management

Graphic Maker software includes a ColourTable Manager to create RGB/CMYK conversion CLUTs (Colour Look Up Tables). CLUTs convert files from scanner RGB to printer CMYK. Instructions are included in *Colour Correction* in the Graphic Maker Software User's Guide.

Print out the Colour Chart files available in Graphic Maker software. These can be used to aid in customer colour selection.

Printer Calibration

The Graphic Maker Software Printer Calibration System provides a method to read your printer output, measure with a calibrated densitometer, and create a printer calibration file. Calibration aids in producing repeatable tone reproduction characteristics for consistent, repeatable and more accurate colour. Repeatable tones on different media and printers can be achieved.

Instructions are included in *Printer Calibration* in the Graphic Maker Software User's Guide. Please call a 3M Technical Service representative to assist you with calibration. Make a unique printer calibration file for:

- Each combination of screening methods, such as halftones, stochastics, and fast dithers being used

Note: 3M stochastics give the best results. However, fast dithers may be used successfully and they RIP somewhat faster.

- Media being printed
- Unique calibration files for each printer resolution.
- Any printer parameter that causes colour tonal value shifts.

Using Graphic Maker Software for Making A Graphic

1. In the software's Layout Manager window, be sure to select **Pressjet**.
2. In the Layout Manager RIP Setup window, make the appropriate selections for **Printer Resolution** and **Pixel Resolution**.

- **Printer Resolution**

Printer resolution relates to dots (drops) per square inch (DPI). Printer Resolution is a RIP option in Graphic Maker software.

- **224 x 224** is the lowest resolution
 - Higher throughput than higher resolutions
 - RIPs faster than 336 and files are smaller
 - Requires that a printer calibration file is created
- **336 x 336** is high resolution
 - Gives more dots per square inch
 - Drums turn faster and have longer satellites (Satellites refer to the small tail on each printed dot.)
 - Lower throughput than lower resolutions
 - RIP is longer, the file is larger and there is more density
- **300 x 300**
 - Similar to 336 x 336 with a slightly smaller file size and slightly faster RIP.
- **168 x 168**
 - Similar results as 336 x 336 with a RIP that is four times faster.

- **Pixel Resolution**

Pixel resolution relates to how many dots fit into a resolution cell like a 336 x 336 cell. If 336 is chosen, the resolution is the highest for that printer resolution.

- **Printer Calibration and CLUT selection**

Select the appropriate printer calibration file and CLUT, if necessary. Refer to the Graphic Maker Software User's Guide for information.

3. Layout Manager Print Setup

The ink limiting feature in the Print Options window may be used for materials that require a limitation to the amount of ink saturation. It is very important that the ink limiting parameter be set correctly. See the information pages 3 through 6 for a definition of ink limiting and recommended parameters for each media.

4. In the Layout Manager Print Setup window, select the Pressjet Options tab. These are print time options. If a print time option needs changing, the file does not need to be re-ripped.

- **Pause After First Copy**

This stops the printer after the first print, allowing the operator to examine the print to make adjustments or printer maintenance.

- **Long Bridge Shift**

This relates to how much the bridge moves across the image while making the image. Longer bridge shifts attempt to give better coverage of ink across the image to compensate for missing, plugged or inactive nozzles. A longer bridge shift causes the image to be slightly skewed with the media and reduces the print width slightly.

- Normal and long are the two selections made in GMS. Image tests at our beta site showed that the following bridge shift values gave optimum results at that site on their printer:

- 79 is normal
- 91 is long

- **Add to Queue**

This sends the ripped file directly to the Printer Controller Queue, but only if the queue is open. The image will not be printed until the queue is accessed on the Printer Controller.

- **Enable Printer Compression**

We recommend selecting this option as a default setting. This enables lossless (RLE) compression for Scitex data files. The size of your print files will be reduced when using this feature.

- **Image Quality**

This relates to number of drum revolutions required to make the image, and the printer and pixel resolution.

- **Normal:** 36 revolutions with intermediate number of dots and nozzles with average satellites and drum speed

- If 336 × 336 printer resolution, then 36 revolutions.

- If 224 × 224 printer resolution, then 24 revolutions.

- **Best:** 54 revolutions gives the most dots, uses the most nozzles, shows longer satellites and is the fastest drum speed

- If 336 × 336 printer resolution, then 54 revolutions.

- If 224 × 224 printer resolution, then 24 revolutions.

- **Drop Frequency**

This relates to the number of ink drops per second applied to the media. A higher drop frequency results in a faster drum rotation, longer satellites and more prints per hour.

- **2000** gives slower drum speed, which gives the shortest satellites
- **6000** gives medium drum speed and medium satellites
- **10,000** gives faster drum speed and longer satellite

- **Image Noise and Background Noise**

Depending on the ink coverage, selected nozzles in each print head may be idle. If idle for a long time, they clog. To keep the nozzles clean, the Pressjet periodically squirts ink through the inactive nozzles. This can be set as Image Noise, in which the periodic squirts occur within the area being printed. This is also known as spurious writing. Or it can be set as Background Noise, in which the periodic squirts occur outside the image area. The recommended settings, which cause the squirts to occur as background noise, are:

- Image noise: 0 for each colour (out of 0 to 100)
- Background noise: 50 for each colour (out of 0 to 100)

- **Load Macro**

Each type of recommended 3M media has a unique macro, or preset printer parameter profile, that has been shown to provide optimum results. The macro can be selected in Graphic Maker software or on the Pressjet printer controller.

Conclusions for Printer Parameters

- More drum revolutions will give better solids but longer print times
- Lower Drop Frequency values will give shorter satellites and are preferred for text and detail but result in longer print times

- Fastest print times are achieved when you select
 - Normal image quality
 - 224 × 224 resolution
 - 11000 drop frequency, but the image quality may not be acceptable
- Select the appropriate parameters for the job

Note: For the full product names of the 3M products listed on this page, please see pages 1 and 2.

Recommended Printer Parameters

Choosing the optimum printer parameters depends on the image. Several examples are given for various situations.

- **Images with large solids**
 - Resolution: 336
 - Image Quality: 54 revolutions (best)
 - Drop Frequency: 9000 to 11,000
 - Long Bridge Shift: not selected
- **Dark, busy images**
 - Resolution: 336
 - Image Quality: 36 revolutions (normal)
 - Drop Frequency: 9000 to 11,000
 - Long Bridge Shift: selected
- **Images with much detail and/or text, especially small text**
 - Resolution: 336
 - Image Quality: 54 revolutions (best)
 - Drop frequency: 2000 to 6000
 - Long Bridge Shift: selected

Ink Usage

Ink usage is affected by several factors:

- Image tonal value
- Ink limit parameter
- Printer calibration file
- Number of LPAP; these are low pressure puffs of ink through the print heads that keep the nozzles clean
- DPI of 336 or 224
- Printer also consumes ink when drum turning in the idle mode
- Scitex printer parameters

Dryness Test

The dryer times vary with the equipment being used, oven temperature, humidity conditions, etc. Insufficient drying can result in blocking or severe surface impression. Therefore, it is important to check for sufficient dryness when the printing starts. We recommend using the following procedures to determine if adequate drying has occurred.

1. This test is used to set the dryer conditions and approximate dryness.
 - a. Touch a printed sheet face to face.
 - b. Place the touched area close to your ear and separate it.
 - If the graphic is adequately dried, there is either a slight or no discernible sound when the surfaces separate.
 - If the graphic is not sufficiently dry, a crackling sound is heard. The louder the sound, the greater the amount of additional drying needed.
2. Even when the graphic feels or appears dry, some solvent will remain. Use this test to determine if minimum drying has taken place. If it does not pass this test, more drying is required.
 - a. Place several printed sheets face-to-face under a 30 cm (12 inch) stack of media or under a weight of 135 gm/ cm² (2 pound per square inch).
 - b. After 10 minutes, remove the sheets and check for blocking or surface impressions.

If blocking or severe surface impressions are noted, either increase the temperature or decrease the belt speed.

Graphic Maintenance and Cleaning

To clean a finished graphics, use a cleaner such as the kind used for high-quality painted surfaces. The cleaner must be wet, non-abrasive, without strong solvents and have a pH value between 3 and 11 (neither strongly acidic nor strongly alkaline.)

Printer Cleaning and Routine Printer Maintenance

Caution

Before handling any chemical products, always read the container label and the MSDS.

Printer cleanliness is very important in the production of high quality, full colour graphics. You must follow the routine maintenance schedule in the Scitex Pressjet-W Digital Press User's Guide.

We recommend that each customer assign a master operator that will have maintenance responsibilities. This person will be trained by the technician at printer installation and must use the recommended methods and safety measures.

You will need thinner CGS-50 cleaner for performing normal printer maintenance. For more aggressive cleaning, you may also use a mixture of 85% CGS-50 and 15% cyclohexanone. Cyclohexanone can be purchased at a solvent supply facility.

Shelf Life, Storage and Shipping

- Use the ink within one year of purchase.
- Store the inks at 0° to 27°C (32° to 80°F).
- Store the inks in the original container or in other sealed polyethylene containers.

Finished Graphics

- Be sure the ink is dry before packaging the finished graphic.
- Ship the finished graphic lying flat or rolled. To roll, wrap the graphic, printed image side out, onto a core that is 130 mm (5 inches) or larger in diameter. These methods help to prevent the liner from wrinkling or popping off.
- Put a slip sheet, such as easy release liner SCW -33, on the face of the printed side of these types of graphics: a graphic that is premounted on panels, panels that have graphics on both sides, or a liner that is printed by a customer.
- Store the graphics in a clean, dry area.
- Store the graphics out of the direct sunlight and at a temperature less than 100°F (38°C).

Waste Disposal

Waste from the printer includes ink waste, printer blotting cloth, and plastic bottles. Please handle all waste in a responsible manner. Some general guidelines are provided below.

Inks

Waste inks must be disposed of by a licensed waste disposal company.

Printer Blotting Cloth or Toweling (wipes)

The printer blotting cloth or toweling can be disposed of in the general trash or in a landfill if free liquid cannot be squeezed out. If inks can be squeezed out, the blotting cloth should be incinerated in an industrial or commercial facility.

Plastic Ink Bottles

Once bottles are empty of free liquid, dispose of the bottles in the general trash or in a landfill. The ink bottles are made of High-Density Polyethylene (HDPE) plastic as indicated by the recycling number "2". Check with your local recycler regarding recycling the bottles in your area.

Warranty and Disclaimers

The information contained and techniques described herein are believed to be reliable, but 3M makes no warranties, express or implied, including but not limited to any implied warranty of merchantability or fitness for a particular purpose. 3M shall not be liable for any loss or damages, whether direct, indirect, special, incidental or consequential, in any way related to the techniques or information described herein.

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Visit our password-protected website (www.scotchprint.com, then Login) for exclusive product information, services and product promotions.

To register, login as above and click "Register" on the right side of the screen. Certain restrictions apply.

3M Related Literature

Before starting any job, be sure you have the most recent product and instruction bulletins.

Listed below is related 3M technical literature that may be of interest.

Subject	Bulletin No.
Product Bulletins	
3M™ Piezo Ink Jet Ink Series 4600	4600
3M™ Screen Printing Ink Series 1900	1900
3M™ Controltac™ Plus Film Series IJ162	IJ162
3M™ Controltac™ Plus Graphic Film with Comply™ Performance IJ180C-10	IJ180C-10
3M™ Scotchlite™ Plus Reflective Graphic Film IJ680-10	IJ680-10
3M™ Controltac™ Plus Graphic Film Series IJ180-10	IJ180-10
3M™ Scotchlite™ Removable Reflective Graphic Film with Comply™ Performance IJ680CR-10	IJ680CR-10
3M™ Scotchcal™ Graphic Film Series IJ3650	3650B
3M™ Scotchcal™ Translucent Film IJ3630-20	IJ3630
3M™ Scotchlite™ Intermediate Graphic Film Series 40-10,114	IJ40
3M™ Scotchcal™ Perforated Window Graphic Film IJ8173	IJ8173
3M™ Controltac™ Plus Curtain-Sided Vehicle Film 190	190
3M™ Scotchcal™ Overlamine 3645	3645
3M™ Scotchcal™ Overlamine 8519 and 8520	8519/ 8520
3M™ Scotchcal™ Luster Overlamine 8908 ES	8908
3M™ Banner Material 8451	8451
3M™ Scotchcal™ Luster Overlamine 8910 ES	8910

3M™ Scotchcal™ Matte Overlamine 8911 ES	8911
3M™ Scotchcal™ Optically Clear Overlamine 8914i	8914i
3M™ Scotchcal™ Gloss Overlamine 8908 ES	8908
3M™ Scotchcal™ Matte Overlamine 8909 ES	8909
3M™ Scotchcal™ Flexible Overlamine 8921 ES	8921
Instruction Bulletins	
Design of graphics	2.1
Screen printing with ink series 1900	3.11
Screen printing with ink series 9700 UV	3.4
Screen printing with line ink series 2900	3.18
Cold roll lamination	4.22
Making backlit signs with piezo printed films	4.26
Scoring and cutting	4.1
Using 3M application tapes; premasking and prespacing for films	4.3
Application, substrate selection, preparation and substrate-specific application techniques	5.1
Application, general procedures for interior and exterior dry applications	5.5
Cutting and applying curtain sided vehicle film	5.12
Storage, handling, maintenance, removal	6.5
Warranties	
Worldwide 3M™ MCS™ Warranty Packet <i>(includes all Commercial Graphics MCS Warranties)</i>	
Worldwide 3M™ MCS™ Warranty Overview -Folder	
Scotchprint® Graphics Warranty <i>(includes overview)</i>	

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Sun and Ultra and registered trademarks of Sun Systems, Inc.

Health & Safety

Refer to the package label and the Material Safety Data Sheet for health, safety, and handling information on the products referenced in this bulletin. For 3M products, if necessary, you may contact our Toxicology/Product Responsibility Department on 01344 858000.

Important Notice to Purchaser

The 3M products described in this publication are covered by a 3M warranty and limitation of liability.

3M's warranty provides that if 3M finds that goods are defective in material or workmanship they will be replaced or the price refunded at 3M's option but note that 3M does not accept liability for other direct losses (except for personal injury or death) or consequential losses relating to defective products or from information supplied by 3M.

Purchasers and users of 3M products, and not 3M supplying companies, are always solely responsible for deciding on the suitability of the 3M product for their required or intended use.

Technical Assistance

For help on specific questions relating to 3M Commercial Graphics Division Products, contact your local Technical Service Representative.

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