



# Piezo Ink Jet Printing

## with 3M™ Piezo Ink Jet Ink Series 2300

### For VUTEk UltraVu™ 2360/3360 Printers

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#### Description

3M™ Piezo Ink Jet Ink Series 2300, Version 2, make attractive, four color or six color graphics. These solvent-based, pigmented inks, which are weather resistant and have excellent color retention, are designed and approved for use in the VUTEk UltraVu™ 2360/3360 Printers (four, six or eight color).

Version 2 inks offer better color gamut, faster drying, improved image quality, and more printer operating latitude.

#### Switching from Original Inks to Version 2 Inks

The original and Version 2 inks differ chemically and in performance. They are not interchangeable. Therefore, you'll need to plan for an appropriate time to switch inks. The original formulation will be available for several months to give you time to switch to Version 2 inks when it is convenient for you. Include these items in your planning:

When you are ready to switch to the new inks, a 3M representative will assist you.

- If you are working on a large or ongoing production job that is sensitive to color gamut, which is different with the new inks, plan to do the switchover after the job is done.
- Schedule a 3M technical support representative to be on-site during the switch (1-1/2 to 2 days, no charge). This is required to assist you in a smooth switchover. Contact your local sales representative to set this appointment.
- Plan to have a full day of downtime. The actual ink change-out requires 2 to 4 hours plus time for test printing before and after the switch.

#### 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.

Note: Do not mix or use version 1 and 2 inks in the printer.

Note: Version 2 ink series 2300 does not have yellow toned magentas.

Product No.	Color	Stock No.
2381	Light Magenta	75-3470-3030-8
2382	Light Yellow	75-3470-3031-6
2385	Light Black	75-3470-3032-4
2386	Light Cyan	75-3470-3033-2
2391	Magenta	75-3470-3034-0
2392	Yellow	75-3470-3035-7
2395	Black	75-3470-3036-5
2396	Cyan	75-3470-3037-3

## More Information on the Web

Find out more about piezo ink jet printing, including software profiles that help ensure successful printing by visiting our website at [www.scotchprint.com](http://www.scotchprint.com). Then click on *business partner login*, which is located under the Scotchprint® logo.

To enter the *business partner login* area, you must be a Scotchprint® Graphics Authorized Manufacturer or 3M Piezo Ink Jet Registered Fabricator. If you are not, please contact your 3M sales representative.

## Compatible Products for Warranted Graphics

### 4 mil Films

- 3M™ Controltac™ Plus Graphic Film IJ160-10
- 3M™ Controltac™ Plus Graphic Film Series IJ162
- 3M™ Scotchcal™ Graphic Film IJ3470
- 3M™ Scotchcal™ Changeable Graphic Film IJ3555
- 3M™ Scotchcal™ Perforated Window Graphic Film IJ8171
- 3M™ Scotchcal™ Permanent Graphic Film IJ8641

### 2 mil Films

- 3M™ Controltac™ Plus Graphic Film IJ180-10
- 3M™ Controltac™ Plus Graphic Film with Comply™ Performance IJ180C-10
- 3M™ Scotchcal™ Graphic Film Series IJ3650
- 3M™ Scotchcal™ Translucent Graphic Film IJ3630-20

### Reflective Films

- 3M™ Scotchlite™ Plus Flexible Reflective Graphic Film IJ680-10
- 3M™ Scotchlite™ Removable Graphic Film with Comply™ Performance Film Series IJ680CR-10
- 3M™ Scotchlite™ Reflective Graphic Film IJ5000
- 3M™ Scotchlite™ Reflective Graphic Film IJ5100R

### Banner Material

- 3M™ Banner Material 8450
- 3M™ Single-Sided Banner Material 8451
- 3M™ Banner Material 8452
- 3M™ Mesh Banner Material 8453
- 3M™ Panagraphics™ II Intermediate Flexible Substrate

## Overlaminates and Clear Coats

- 3M™ Screen Print Gloss Clear 1920DR
- 3M™ Scotchlite™ Screen Print Gloss Clear 2920DR
- 3M™ Screen Print Gloss Clear 9720UV
- 3M™ Scotchcal™ Luster Overlamine 3645
- 3M™ Scotchcal™ Luster Overlamine 8519
- 3M™ Scotchcal™ Matte Overlamine 8520
- 3M™ Piezo Ink Jet Protective Clear 8530
- 3M™ Scotchcal™ Luster Overlamine 8908
- 3M™ Scotchcal™ Matte Overlamine 8909
- 3M™ Scotchcal™ Luster Overlamine 8910 ES
- 3M™ Scotchcal™ Matte Overlamine 8911 ES
- 3M™ Scotchcal™ Optically Clear Overlamine 8914 ES

## Application Tapes

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

## Health and Safety

### Caution

When handling any chemical products, read the manufacturers' container labels and the Material Safety Data Sheets (MSDS) for important health, safety and environmental information.

To obtain MSDS sheets for 3M products:

- By fax, call 1-800-364-0768 in the US and Canada or 1-650-556-8417 for all other locations.
- Electronically, visit us at <http://www.3m.com/msds>.
- By mail, or in case of an emergency, call 1-800-364-3577 or 1-651-737-6501.

When using any equipment, always follow the manufacturers' instructions for safe operation.

## 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. VUTEk, the printer's manufacturer, also provides ventilation information. Please refer to their literature too.

Note: Additional environmental, health and safety information is available in EHS Bulletin 2300, which is available on our web site at [www.scotchprint.com](http://www.scotchprint.com). See the information in the next column for how to access the site.

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

## The Role of the Printer Operator

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### √ Important Note

The color gamut for Version 2 inks is different from the original version. You'll notice a cleaner, brighter yellow, and you'll need only one magenta, which falls in the gamut range between the two magentas previously offered.

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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 work with the graphic designer and/or color conversion operator so there is a common understanding of print and media parameters.

A wide variety of printing media (substrates) 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 the most important 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: Some software or color printing reference books may refer to total ink coverage as: 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 Color Separation

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

The graphic designer and/or color 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 color separation are Photoshop®, ICC-based color management, third party color 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% and 100% of total black. When doing color separations, we recommend setting the UCR/GCR between 260% and 280% and no more than the recommended total ink coverage (usually 300%).

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

### **Correcting Total Ink Coverage During Printing**

If the total ink coverage on a color-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 color 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 colors (cyan, magenta, yellow and black). Ink limiting can be set for none, 100%, 150%, 200% or 250%. For most images, the recommended default is 150%.

If you are not using Graphic Maker software, consult your RIP software manual for how to limit ink.

#### ***If you do not have print time ink limit functions***

You may have to re-separate your image for correct total ink coverage. This is not the optimal method as loss of color fidelity and image quality problems can occur.

## **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 color 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 color separator.**

Make sure the designer and/or color separator know the parameters and printing recommendations for both the media and press 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 films with an overlaminate may 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.

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

- ***Specific Media Processing Recommendations*** on page 6 are guidelines we have developed that help provide the best graphic results with the media you are using.
- ***An overlaminate or clear coat*** is required for graphics subjected to abrasion such as road debris and automatic/power washing, harsh cleaners, or chemicals.
- ***Clear and translucent films for backlit signs require special consideration.*** Clear 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 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 the appropriate instruction bulletin for the technique.

### **5. Achieving maximum image quality requires good color management and correct settings**

#### **a. The operator must have excellent pre-press skills.**

Good color management practices are essential. For good color output, color 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.

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

b. **Always use the correct software profiles.**

Each printer/ink combination has a unique printer profile that helps ensure successful printing.

**NEW ICC PROFILES for the VUTEk printers and Version 2 inks** as well as other news and information are available at [www.scotchprint.com](http://www.scotchprint.com). Click on *business partner login*, which is located under the Scotchprint® logo. See *More Information on the Web* on page 2.

c. Use the printer settings discussed in **Specific Media Processing Conditions** on page 6.

**6. Limit the total ink coverage.**

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

Too much ink on the media results in media characteristic changes including shrinkage, loss of changeability, loss of positionability (Controltac *Plus* graphic films) and air release features (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.

If the graphics don't seem to be drying sufficiently in the printer, we recommend increasing drying time or drying temperature in the printer, or using an auxiliary dryer to complete the drying (2 hours @ 150°F should be sufficient), or air drying. Air drying 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 9.

These are problems that may occur due to insufficient drying.

- If the media you are using is a 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. We recommend starting your tests with the total ink coverage at 250% to 270%. Refer to **Specific Media Processing Recommendations**, page 6, for guidelines.

If the graphic is wound on a spindle or core during printing, check to see that the graphic does not emboss or block.

**9. Follow all operation and maintenance procedures recommended in the printer user's guide.**

## Specific Media Processing Recommendations

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

The most commonly recommended printer setting is “Ultra Standard” because of its image quality. It has the added bonus of providing the longest dwell time in the dryer with the smallest amount of laydown per head pass.

Run the pre-heat temp very low (80° to 120°F / 26° to 49°C) so you get sufficient dot gain. Run the post-heat (dryer) at 140° to 160°F (60° to 71°C) to dry out as much solvent as possible and facilitate drying. The more solvent you can eliminate, the better the media performance.

Media	Total Ink Coverage (Maximum)	Lifting on Corrugations/ Tenting on Rivets	Other Considerations
IJ160	300%	Yes, fleet graphics	
IJ162	270%		Pay close attention to Key 7, page 5, and Key 4, page 4.
IJ180-10	270%		Pay close attention to Key 7, page 5.
IJ180C-10	270%		Pay close attention to Key 7, page 5.
IJ680-10	270%		
IJ680CR-10	270%		
IJ5000	270%		
IJ5100R	270%		
IJ3470	300%	Possible at high total ink coverage	
IJ3555	300%	Possible at high total ink coverage	There may be some shrinkage at this ink coverage level and default printer drying time and temperature.
IJ3630-20	300%		Pay close attention to Key 4, page 4.
IJ3650-10	270%		
IJ3650-114	270%		Pay close attention to Key 4, page 4.
IJ8171	270%		Due to the perforations in this film, it is harder to match the color density of a solid film. Pay close attention to Key 7, page 5. 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. If the printer carriage is striking the media due to edge curling, raise the printer carriage height. Pay close attention to the shipping recommendations in Product Bulletin IJ8171
IJ8641	300%		
IJ8643	300%		
8450	300%		Banner material is susceptible to blocking or embossing when rolled, especially if the graphic is not totally dried.
8451	270%		
8452 8453			
<b>Panagraphics II</b>	The ink coverage is determined by whether the substrate will be used for a banner or backlit graphic. Backlit images will require greater density, which may be achieved by using the printer’s double strike input mode. When using this mode, you have exceeded the maximum total ink coverage when you can no longer obtain color consistency throughout the graphic and/or the graphic cannot be adequately dried after printing.		

## Using Overlaminates, Clear Coats and Application Tapes

Note: See the table on page 6 for an overview of film and overlaminate/clear coat recommendations as of the date of publication. Please refer to the film Product Bulletins for complete details.

### When to Use an Overlaminate or Clear Coat

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

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

Refer to Instruction Bulletin 3.18 for printing details on using clear coat 2920DR.

### *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 2300, 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, an overlaminate or clear coat 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

### *Graphics That Do Not Require Protection To Be Warranted*

If the graphics are not exposed to the environments listed above, an overlaminate or clear coat is not required to receive the Warranted Durability. However, for graphics applied in high contact areas such as bus shelters, hallways, etc., using an overlaminate or clear coat 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 or laminator)
3. Desired durability
4. Gloss
5. Cost

### When to Use an Application Tape

The type of 3M application tape to use depends on the type of graphic produced.

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

Refer to the table above for the appropriate application tape. Refer to the Instruction Bulletin 4.3, June 2000 or later, for more complete information on applying the recommended application tape.

## Recommended Overlaminates, Clear Coats and Application Tapes

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

	Ink 2300	Films with Comply	Overlamine or Clear Coat <sup>1,2</sup>							
			8519 8520	8908 <sup>3</sup> 8909 <sup>3</sup>	3645 <sup>4</sup>	8914 <sup>10</sup>	1920DR <sup>5</sup>	2920DR <sup>5</sup>	9720UV <sup>5</sup>	8530 <sup>8</sup>
<b>Film</b>										
IJ160	●		●	●			●		●	
IJ162	●		●	●	●			●		
IJ180-10	●		●	●				●		●
IJ180C-10	●	● <sup>6</sup>	● <sup>6</sup>	● <sup>6</sup>				● <sup>6</sup>		●
IJ3470	●		●	●				●		
IJ3555	●		●	●				●		●
IJ3630-20	●		●	●				●		
IJ3650-10 IJ3650-114	●		●	●				●		
IJ8171	●					●				
IJ8641	●		●	●				●		●
IJ8643	●		●	●				●		●
IJ680-10	●		● <sup>7</sup>					●		● <sup>7</sup>
IJ680CR-10	●	● <sup>6</sup>	● <sup>7</sup>					●		● <sup>7</sup>
IJ5000	●		● <sup>7</sup>					●		● <sup>7</sup>
IJ5100R	●		● <sup>7</sup>					●		● <sup>7</sup>
8450	●		●					●		●
8451	●		●					●		●
8452	●		●					●		●
8453	●		Does not use an overlaminate							
Panagraphics II	●		●						●	
<b>Application Tape<sup>9</sup></b>										
Premasking Tape	SCPM-3	SCPS-55	SCPM-3	SCPM-3	None	Do NOT use an Application Tape	SCPM-3	SCPM-3	SCPM-3	SCPM-3
Prespacing Tape	SCPS-2	SCPS-55	SCPS-2	None	None		SCPS-2	SCPS-2	SCPS-2	None

<sup>1</sup> See **When to Use an Overlamine or Clear Coat**, page 7.

<sup>2</sup> See **How to Select an Overlamine or Clear Coat**, page 7.

<sup>3</sup> Do not use overlaminates 8908 and 8909 for use on fleet graphics, reflective film or certain banners. Check the film bulletin for details.

<sup>4</sup> Overlamine 3645 is required for floor graphics.

<sup>5</sup> Clears 1920DR, 9720UV and 2920DR must be screen printed to be warranted. Do not use these clears on interior graphics. 9720UV must be UV cured.

<sup>6</sup> Films with Comply performance use only premasking tape SCPM-55.

<sup>7</sup> Do not use matte overlaminates on graphics made with reflective film.

<sup>8</sup> Designed for use only with the Seal Graphics AS1600, SW3000 Liquid Laminator or PrintSeal 1000. Use on single-sided banners ONLY.

<sup>9</sup> See **When to Use an Application Tape**, page 7.

<sup>10</sup> Overlamine 8914 is required for optically clear window graphics.

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

## Recommended Printers Settings for Version 2 Inks

These settings provide a good starting point. Follow VUTEk UltraVu User's Guide for printer adjustments to achieve optimum output.

### 2360/3360 Printers with IR Heaters

	Starting Point	Typical Range
<b>Pre-heat</b>	100°F (40°C)	85-110°F (30-45°C)
<b>Post-heat</b>	120°F (50°C)	100-130°F (40-55°C)
<b>IR heater</b>	140°F (60°C)	130-150°F (55-65°C)

### 2360/3360 Printers without IR Heaters

	Starting Point	Typical Range
<b>Pre-heat</b>	120°F (50°C)	100-130°F (40-55°C)
<b>Post-heat</b>	140°F (60°C)	120-150°F (50-65°C)

Adjust the vacuum for optimum test 1 jetting. The setting may be slightly lower for Version 2 inks (-0.21 to -0.25 psi).

Due to the faster drying rate, higher weep cycles will help maintain open jets when not printing. The settings must be changed to:

Weep interval	4 sec
Weep count	20
Spittoon count	2

## About Printing On Double-Sided Banner Material

For the best results, print on the rougher side first and allow dry thoroughly. Then print on the smoother side. This reduces the potential problem of the material sticking on the post-heat printer surface.

Inadequately dried material will stick to the printer during the second side printing.

## Dryness Test

### Caution

When using any equipment, always follow the manufacturers' instructions for safe operation.

The conveyor times given in the previous section vary with the equipment being used, the amount of thinning, 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 degree of dryness.
  - a. Touch a printed sheet face to face.
  - b. Place the touched area close to your ear and separate it.
  - c. 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. This test is used to definitely determine if adequate drying has taken place.
  - a. Place several printed sheets face-to-face under a 12 inch (30 cm) stack of film or under a weight of 2 pounds/square inch (135 gm/cm<sup>2</sup>).
  - b. After 10 minutes, remove the sheets and check for blocking or surface impressions.
  - c. If blocking or severe surface impressions are noted, increase the drying time. If you are jet drying, either increase the temperature or decrease the belt speed.

## Support Information for the UltraVu Printer

- Hardware support information for the UltraVu printer is available on the VUTEk website at [www.vutek.com](http://www.vutek.com).
- Contact 3M Technical Support (1-800-328-3908) for questions about using 3M inks and media, color profiles, color calibration, temperature and machine settings.

## 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.)

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

## Printer Cleaning and Routine Printer Maintenance

Printer cleanliness is very important in the production of high quality, full color graphics. You must follow the routine maintenance schedule in the VUTEk UltraVu User's Guide, including the periodic changing of in-line filters.

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

You will need thinner CGS-50 for performing normal printer maintenance.

## Ink Change-Over

Proper ink change-over is critical. Failure to make the change-over correctly will result in poor image quality and/or graphic failure. Improper procedures may damage the printer.

The ink change-over procedure must always be followed in these situations:

- When you change from yellow toned magenta to regular magenta ink.
- When you change from yellow-toned light magenta to regular light magenta ink (in six color printers).
- When you change the full set of inks from or to 3M piezo ink jet ink series 2300.

Follow the instructions in Instruction Bulletin 4.34, *Ink Change-Over: 3M™ Piezo Ink Jet Ink Series 2300*.

## Shelf Life and Storage

### Ink

- Store ink series 2300 in the original packaging.
- Store the inks at 32° to 90°F (0° to 32°C).
- Use the inks within one year of purchase.
- Ink series 2300, Version 2 may be regulated for shipping. In the United States, the inks are not regulated for ground shipping. They are, however, regulated for air shipment and should not be shipped by air without proper documentation. Opened ink bottles (foil seal broken) no longer meet UN packaging guidelines and cannot be shipped by air without special UN-approved overpacking containers.

## Finished Graphics

- Be sure ink series 2300 is dry before packaging the finished graphic.
- Ship the finished graphic lying flat or rolled. To roll, wrap the graphic, film-side out, onto a core that is 5 inches (130 mm) or larger in diameter. These methods help to prevent the liner from wrinkling or popping off.
- Put a slip sheet, such as 3M™ 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

The inks are considered non-hazardous waste according to U.S. EPA requirements. Even though the inks are classified as non-hazardous, non-regulated waste, the EPA requires that any ink waste must be incinerated in an industrial or commercial facility. Do not pour the inks down the drain, or put in the general trash or in a landfill. Since regulations vary, consult applicable regulations or authorities before disposal.

### 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.

Note: Additional environmental, health and safety information is available in EHS Bulletin 2300, which is available on our web site at [www.scotchprint.com](http://www.scotchprint.com). See the information in the next column for how to access the site.

## Warranty and Disclaimers

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## 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. You may view and print these Bulletins from our Web site at [www.scotchprint.com](http://www.scotchprint.com), or order them via our Fax-on-Demand (FOD) system. Call one of these phone numbers to order the desired bulletins, and specify the FOD document number provided in the chart.

United States or Canada: 1-800-364-0768  
International: 1-651-732-6506

Subject	Bulletin No.	FOD No.
<b>Product Bulletins</b>		
3M Piezo Ink Jet Ink Series 2300	2300	4538
3M™ Controltac™ Plus Graphic Film IJ160-10	IJ160-10	4567
3M™ Controltac™ Plus Graphic Film Series IJ162	IJ162	4561
3M™ Controltac™ Plus Graphic Film IJ180-10	IJ180-10	4539
3M™ Controltac™ Plus Graphic Film with Comply™ Performance IJ180C-10	IJ180C-10	4540
3M™ Scotchlite™ Plus Flexible Reflective Graphic Film IJ680-10	IJ680-10	4541
3M™ Scotchlite™ Removable Graphic Film with Comply™ Performance IJ680CR-10	IJ680-10CR	4564
3M™ Scotchcal™ Graphic Film IJ3470	IJ3470	4543
3M™ Scotchcal™ Changeable Graphic Film IJ3555	IJ3555	4548
3M™ Scotchcal™ Graphic Film Series IJ3650	IJ3650	4544

Subject	Bulletin No.	FOD No.
3M™ Scotchcal™ Translucent Film IJ3630-20	IJ3630	4527
3M™ Scotchlite™ Reflective Graphic Film IJ5000	IJ5000	4566
3M™ Scotchlite™ Intermediate Reflective Graphic Film IJ5100R	IJ5100R	4562
3M™ Scotchcal™ Perforated Window Graphic Film IJ 8171	IJ8171	4545
3M™ Banner Material 8450	8450	3523
3M™ Single-Sided Banner Material 8451	8451	4552
3M™ Banner Material 8452	8452	4556
3M™ Mesh Banner Material 8453	8453	4572
3M™ Scotchcal™ Permanent Graphic Film IJ8641	IJ8641	4546
3M™ Scotchcal™ Temporary Graphic Film IJ8643	IJ8643	4547
3M™ Scotchcal™ Luster Overlamine 3645	3645	1508
3M™ Scotchcal™ Overlamine 8519 and 8520	8519/8520	4524
3M™ Piezo Ink Jet Protective Clear 8530	8530	4565
3M™ Scotchcal™ Luster Overlamine 8908 ES	8908	3554
3M™ Scotchcal™ Matte Overlamine 8909 ES	8909	3565
3M™ Scotchcal™ Luster Overlamine 8910 ES	8910	3519
3M™ Scotchcal™ Matte Overlamine 8911 ES	8911	3520
3M™ Scotchcal™ Optically Clear Overlamine 8914 ES	8914	3542
3M™ Screen Printing Ink Series 1900	1900	2501
3M™ Scotchlite™ Screen Printing Ink Series 2900	2900	2512
3M™ Screen Printing Ink Series 9700UV	9700	2507
<b>Instruction Bulletins</b>		
Design of graphics	2.1	5501
Ink change-over for ink series 2300	4.34	6534
Screen printing with line ink series 1900	3.11	6011
Screen printing with line ink series 2900	3.18	6018
Screen printing with ink series 9700 UV	3.4	6004
Making digitally imaged, single and double-sided promotional banners	4.15	6515
Cold roll lamination	4.22	6522
Making backlit signs with piezo printed films	4.26	6526
Application, substrate selection, preparation and substrate-specific application techniques	5.1	7001

*Continued on the next page.*

Subject	Bulletin No.	FOD No.
Application, special applications and vehicles	5.4	7004
Application, general procedures for interior and exterior dry applications	5.5	7005
Scoring and cutting	4.1	6501
Using 3M application tapes; premasking and prespacing for films	4.3	6503
Storage, handling, maintenance, removal	6.5	8505

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### **Bulletin Change Summary**

Changed film 180-10 to IJ180; changed film 180C-10 to IJ180C-10; changed film 3650 to series IJ3650; changed film IJ5100 to IJ5100R (no longer called "changeable")-- these changes affected Compatible Products, and the tables on pages 6 and 8. Added information for IJ160 to tables on pages 6 and 8. Added clear 9720UV as a compatible product for most films, which changed the table on page 8.



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### 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.

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

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