

DuPont™ Artistri® Xite P1500 Series Ink

Pigment Roll to Roll Ink – General Process Guidelines

DuPont™ Artistri® Xite P1500 is a premium pigment ink for roll-to-roll printing

DuPont™ Artistri® Xite P1500 inks are utilizing proprietary binder and pigment stabilization technology for excellent color, fastness and runnability with mid-viscosity Kyocera piezo print heads.

They may also be suitable for other mid-viscosity printheads. If you are planning to use Artistri® Xite P1500 on a print head that is not included in DuPont's recommended list, we advise that you thoroughly test to assure compatibility with your printer/print head, runnability and ability to meet your customer's required end use performance requirements. Your ink distributor can provide the latest information on print head compatibility for any DuPont ink.

What you need to know if you are new to binder containing pigment inks

If you are new to digital printing or have been using dye inks or a binder-less pigment ink, the transition to binder containing inks, like the Artistri® Xite P1500, may require some adjustments in your practice.

Typically there are two kinds of textile aqueous pigment inks - binder-containing and binder-free. Binder-free pigment inks like the Artistri® PK2600 series usually need a pre and post-treatment to achieve fastness. Binder containing pigment inks like Artistri® Xite P1500 or Artistri® Xite P3600 may not need a post-treatment to achieve fastness; therefore giving you the advantage of lower process cost, simpler operations, and potentially shorter production cycle. The binder is a polymer that helps pigment particles adhere to the fabric by formation of a strong and resistant coating around the fabric yarns during the fixation step. The binder imparts characteristics to pigment inks that may be different than those of aqueous dye inks or pigment binder-free inks.

Installing DuPont™ Artistri® Xite P1500 inks on your printer

It is important that proper procedures are followed when loading a new ink system on your printer. Experienced pigment ink users should have no problem performing the ink changeover themselves. Less experienced users can request technical support through their OEM, ink distributor or DuPont.

When loading Artistri® Xite P1500 on your printer, schedule adequate time to complete the process. Keep the following points in mind:

- a. Pigment inks by different manufacturers are not necessarily compatible and should not be considered miscible or interchangeable. Even pigment inks supplied by the same manufacturer may not be compatible, so it is important that transition from one ink to another is done carefully and in a way that minimizes chances of contamination. It is recommended that filters are always replaced when loading a new ink on your printer. Do not rinse and reuse filters that have been used with another ink, as this practice may lead to retention of incompatible ink components in the filters and potentially cause damage to expensive printer components.
- b. Always use the ink supplier's recommended flushing solution when loading or removing their ink from your printer. Flushing solutions from one supplier are not necessarily compatible with inks from another supplier. To avoid any costly mishaps, only use the manufacturer's recommended flushing solution.
- c. Before removing the incumbent ink from a printer/print head, print a last nozzle check on paper (if possible) and retain it as a proof of the print head status. Then follow the supplier's guidelines to flush the ink with the proper flushing solution. Next flush the lines with deionized water. Using a lint-free cloth soaked in flush compatible with the incumbent ink, clean the nozzle plate, wiper and capping station of all remains of the incumbent ink to avoid contamination. Replace the water in the wiper station and capping station containers. Remove all remains and deposits of the incumbent ink from the nozzle plate and all parts that come in contact with the nozzle plate during regular maintenance procedures. Repeat the cleaning steps with deionized water, then flush the lines with a DuPont recommended flushing solution. Load the Artistri® Xite P1500 inks and perform several purges to remove air from the system. Let the inks stand in the system for at least 4-8 hours to allow degassing and removal of trapped air pockets in feed lines. Additional help on the proper procedure for loading and using the Artistri® Xite P1500 inks on your printer, please consult **DuPont Artistri Ink Conversion Procedure** and your printer OEM's Operations Manual.

The new inks are installed. Can you start printing production?

Once you have successfully loaded Artistri® Xite P1500 inks on your printer, there are a couple of steps you should follow before starting to print your customers' production to ensure the best print quality.

- a. You will need to select the best waveform for Artistri® Xite P1500 inks among those available on your printer. Your ink distributor or a DuPont Field Marketing Specialist can assist you (where available) in this task.
- b. You will need to create color profiles for the Artistri® Xite P1500 inks on your system so that colors are rendered correctly on the fabrics you are printing for your customers. If the fabric selection changes significantly seasonally or by customer, create an Artistri® Xite P1500 color profile for each fabric type. For more details on color profile generation, consult your printer OEM's Operations Manual, or contact your ink distributor or a DuPont Field Marketing Specialist to assist you.
- c. Especially in the first few days of running Artistri® Xite P1500 inks on your printer, it is advised that you monitor closely the nozzle plate cleanliness during long runs to establish a nozzle plate cleaning procedure and frequency that is suitable for your production schedule and fabric mix.

Maintaining excellent print quality

Improper maintenance can negatively affect print quality and shorten the life of the print heads. Pigment inks typically contain higher amounts of solids than dye inks and may require more frequent print head maintenance than dye inks. Frequent nozzle checks are recommended to monitor the status of the print heads and to maintain an in-control printing process. Misdirected or missing nozzles should be cleared with a cleaning cycle as soon as possible. If they are allowed to persist, they will eventually become permanent missing nozzles and will eventually lead to poor print quality. Never store the print head in the capping station without thoroughly cleaning the nozzle plate. Deposits of binder pigment inks left on the nozzle plate to dry may be difficult to remove.

It is important to consider the effect production volumes or new fabrics will have on print head maintenance and adjust the frequency of print head cleaning appropriately to maintain excellent print quality. When you are printing on fabrics with a lot of lint or loose fibers, it may be necessary to increase the cleaning frequency or perform manual cleaning with a lint-free cloth soaked in deionized water or a compatible flush. Monitor the condition of the nozzle plate and adjust auto-clean frequency as necessary. Perform the daily, weekly and monthly maintenance procedures for the capping station, wiper and print head maintenance as recommended by your equipment's OEM. If there are any concerns on maintaining print quality, please contact your ink distributor or a DuPont Field Marketing Specialist to assist you.

Optimizing process parameters for great color and fastness with DuPont™ Artistri® Xite P1500 inks

Excellent fastness can be achieved with Artistri® Xite P1500 inks and many commercial pretreatments. Some users also find that the inks perform satisfactorily with their own proprietary pretreatments. Keep in mind that acceptable print quality and fastness (depending on end user requirements) may also be possible on untreated fabrics. Pretreatment wet pickup on the padder, pretreatment drying conditions and print fixation conditions should be optimized with your pretreatment supplier for your fabric selection. Your Ink distributor or DuPont Field Service Specialist may also be able to recommend suitable pretreatments for Artistri® Xite P1500 inks. Fixation in tenter frames (dry heat forced air dryers) and calender dryers is typically recommended. Adequate fixation can also be achieved in systems using IR heaters. Pressing is not recommended as it may yield lower fastness properties.

It is advised that you test your fabrics and optimize the pretreatment application and print cure conditions for each fabric type on your fixation unit. For medium weight (~150gsm) cotton and cotton blends, you can start with fixation at 160-170°C for 3 minutes. General guidance is to prolong fixation at lower temperatures and shorten the time at higher temperatures. The general rule of thumb is to add one minute of fixation time when you decrease the temperature by 10°C. Please consult your DuPont Technical Representation for pretreatment advice.

Removing Artistri® Xite P1500 Inks from your printer

When removing an ink from a printer/print head, it is a good practice to print a last nozzle check on paper (if possible) before initiating the flushing process. Retain that nozzle check as proof of print head status. DuPont™ F700 and DuPont™ KF200 Flushing Solutions are compatible with all Artistri® Xite P1500 inks. Your distributor can help you select the best flushing solution for your printer.

After flushing the lines with DuPont flushing solution, introduce deionized water to minimize any compatibility issues with a subsequent ink. For more information on the procedure for removing the Artistri® inks from your printer, please consult DuPont's Artistri Ink Conversion Procedure and your printer OEM's Operations Manual.

Printer/Print-head Storage with DuPont™ Artistri® Ink

DuPont™ F700 and KF200 are NOT storage solutions.

They are intended for use as a system flush only. DuPont recommendations for head storage when using Artistri® inks are as follows:

- a. In cases where the idle time is less than 7 days, it is suggested that the user simply leave the ink in the system. The head should be cleaned thoroughly and be fully capped (sealed) when stored to prevent dripping from nozzles or drying out. In addition, capping stations with standing DI water or ink tend to maintain higher humidity levels near the nozzles and have been shown to improve nozzle re-start after the idle period.
- b. In cases where the idle time is longer than 7 days, it is suggested to flush the print head with a suitable DuPont flushing solution and immediately load a cleaning or storage solution (recommendation from the printer OEM) for longer term storage. After loading the storage solution, follow steps listed above in "less than 7 days idle".

Always consult your specific print-head/printer OEM's technical documentation for the best practices for their individual products.

Maintenance and Troubleshooting

Standard printer maintenance:

Clean daily:

- Waste ink drain bottle (when starting the day)
- Flushing stage
- Front roller
- Printing table and media guides
- Front and rear dancing bar
- Capping unit and its surroundings
- Wipers (when finishing the day)
- Print nozzle checks on paper (if possible) daily to monitor printer and nozzle status

Clean weekly:

- Head baseplate
- Machine's exterior

Clean monthly:

- Machine's interior
- Encoder strip
- Capping unit (deep cleaning)

Bear in mind that the following maintenance periods are suggestions. Maintenance intervals mostly depend on printer usage, the type of fabrics, and the cleanliness of the surrounding environment. If the unit is heavily used (16-24 hours run for example), with fabrics with heavy coatings, or in dusty environments, we would recommend the user increase maintenance frequency. **Always follow manufacturer's suggested maintenance.**

Troubleshooting Tips:

- Missing nozzles after an ink changeover should come back with time. It is best practice to perform multiple purges and let the new ink sit overnight so that air settles out of the system.
- Initial jetting sustainability may be poor as air works its way out of the system. This can be overcome by printing at slower speeds before ramping up to normal printing speeds.
- After an ink change, ensure filters are free of trapped air. If air entrapment occurs and restricts ink flow, bleed air as necessary.
- Severe starvation may be a symptom of restricted flow through the last chance filters. Additional replacement of the last chance filters may be required.
- Do not over-exercise the print heads if you observe starvation symptoms as this will affect the life of the printhead. If this occurs, verify all filters and ink feed lines are free of trapped air, then check the negative pressure setting.
- If the machine is misting, this could be caused by excessive print gap. Check the print gap to make sure you have the right height.
- Nozzle plate wetting or dripping from the print head could be caused from air in the ink lines or not having the negative pressure set correctly.
- If banding and/or misdirects occur, check the alignment of the printer and purge the print head.

Technical Data

Storage Temperature and Shelf Life

It is recommended that Artistri® Xite P1500 Pigment Inks be stored in sealed containers in a clean, dry area, with temperatures regulated between 10 – 40°C (50 – 104°F). Improper storage temperatures or storage of open ink containers in dusty, ambient conditions may shorten the ink's shelf life. When properly stored your DuPont inks should last at least 12 months.

Ink Physical Properties

The table below lists the pertinent physical ink parameters of the Artistri® Xite P1500 CMYK inks.

Physical Properties	P1510	P1520	P1530	P1540
pH, as made	7.0 – 9.0	7.0 – 9.0	7.0 – 9.0	7.0 – 9.0
Viscosity 25°C (cP)	3.0 – 5.0	3.0 – 5.0	3.0 – 5.0	3.0 – 5.0
Surface tension (mN/m)	23 – 29	23 – 29	23 – 29	23 – 29

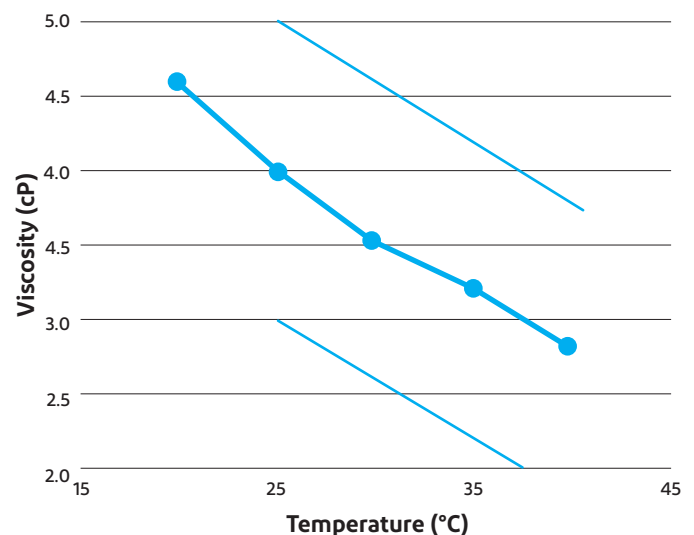
Jetting Properties

1. De-gassing

DuPont recommends de-gassing ink to achieve <2ppm dissolved oxygen.

2. Effect of Head Temperature on Viscosity

These inks have been extensively tested on Epson print heads operation at 25°C. Some customers prefer higher operating temperatures. Keep in mind that higher operating temperatures accelerate evaporation of volatile components and may affect latency and increase maintenance frequency. The graph below can be used to aid your selection of operating parameters for your print head.



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