



UV Curable Ink System

Suggested Uses:

The PTX Series is a 100% solids UV curable screen printing ink that has been specifically formulated for second surface decoration of top coated and print treated polyester, polycarbonate and polycarbonate blend films commonly used for Industrial Graphics applications. The PTX Series exhibits excellent adhesion to top coated and print treated polyester films, where multiple exposure to UV energy is required.



Product Features

- * Superior Opacity & Color Strength
- * Flexible
- * Excellent Adhesive Resistance
- * NVP Free

Printing Recommendations:

The PTX Series is formulated to print from the container without the use of additives. Prior to printing, all colors should be well mixed. Excess ink from print runs should be kept in a separate container to avoid contamination.

Mesh:

305 or higher mesh counts are recommended for opaque colors where two (2) lamp systems are used. 355 or higher mesh counts are recommended where one (1) lamp systems are used. 305 or lower mesh counts are recommended for transparent colors, regardless of lamp system.

Stencil:

Direct or capillary emulsions that are UV compatible, with a micron thicknesses between 7-10 is recommended. Thicker stencils can be used based upon the ability to cure the increased ink deposit.

Squeegee:

Sharp 70-90 durometer polyurethane blade or multi-durometer blades can be used. For optimal ink lay down, a sharp 80 durometer blade is recommended.

Thinner:

The PTX Series is supplied in a print ready condition. For reduction of ink viscosity, the use of the 049 Clear is recommended.

Coverage:

Approximately 2,000-3,000 square feet per gallon, depending upon ink deposit.

Cure & Adhesion:

The PTX Series is formulated to cure under focused 200 watt medium pressure mercury vapor lamps. Two (2) lamp cure units are strongly recommended, however, it is possible to obtain a full cure of most of the PTX Series colors using a one (1) lamp system. Suggested minimum total energy density 270 m/Jcm², suggested peak power density .500 w/cm².

Packaging:

Available in one (1) gallon and five (5) gallon containers. Smaller or larger quantities are available upon request.

Screen Cleaning:

Most conventional solvent cleaners work well. Norcote's® NSW-824 Screen Wash is an environmentally friendly cleaner proven effective with UV and other inks. It is available in 1 and 5 gallon containers or 55 gallon drums. Refer to the NSW-824 technical data sheet for additional information. Alcohol based solutions must be avoided as they break down the emulsion.

Precautions:

Gloves and / or barrier cream is recommended when handling UV inks. Safety glasses are suggested, particularly for areas where ink may be splashed. If skin contact occurs, wash affected area with soap and water (do not use solvent or thinners).

Testing

Due to the inability of Norcote to anticipate or control the conditions under which the Products and information relating thereto will be used and/or stored, Norcote cannot guarantee the results obtained from using the Products. Any Suggested Uses are merely representative, and because the final product will depend on a number of specific factors, the end user should pretest all substrates with the Products prior to use in production.



Cross Hatch / Tape Test:

Adhesion was determined by the use of a cross hatch / tape test, following ASTM D-3359 using 3M # 600 tape. Test prints were tested after exiting the cure unit and cooling to room temperature. On Autotype polyester films, and listed polycarbonate and polycarbonate blend films, adhesion was obtained after 11 exposures to UV energy at 270 mJ/cm² and .800 WPI for each exposure. For some select colors, a 15 minute post cure period is required prior to performing this test. When exposing Marnot® polyester films to UV energy more than five (5) times, it is recommended that the PTX-049 Clear is used as a primer coating to obtain adhesion for extended passes. Exposing Autotype polyester films to UV energy more than 11 times, may require the use of the PTX-049 Clear to obtain further adhesion. Multiple exposures to excessive UV energy (greater than five (5) exposures to more than 500 mJ/cm² / 1.0 WPI) may cause the loss of intercoat adhesion between colors and / or may lower the number of passes that is obtained on Autotype print treated polyester films. Note: It is possible for opaque colors to pass a cross hatch / tape test at 170 mJ/cm² / .500 WPI. However, the cure may not be sufficient for other end use requirements, such as resistance to adhesives.

Polyester Films Tested:

Autoflex® EBA 77, Autotex® 2V87XE, Autotex® 2V67, Autoflex® EBG 7, Melinex® 561, Marnot® Clear PET and ProTek® Textured PET.

Polycarbonate / Polycarbonate Blend Films Tested:

GE 8010 Lexan®, GE 8B35 Textured Lexan®, GE Lexan® GS135 (PVF / PC laminate), ProTek® Clear Polycarbonate, Makrofol® DE1-4 polycarbonate, Makrofol® DE1-1 polycarbonate, Bayfol® CR6-2 (PC/PBT blend) and Marnot® Clear polycarbonate.

Flexibility - Emboss:

The PTX Series has been formulated for the flexibility required for standard embossing and die cutting without cracking or crazing of the printed ink film. Only inks that pass a cross hatch / tape test should be embossed or die cut. When printed through a 355 .34 plain weave screen and exposed to the minimum cure requirement , the PTX Series displayed excellent flexibility when embossed. Testing has been conducted using multiple substrates, ink layers and multiple emboss depths and types. Pass indicates that cracking or crazing of the ink surface was not detected on any portion of the embossed area. The PTX Series inks are not recommended for forming applications. Contact Technical Service for information on inks designed for forming applications.

Substrate	.015 rim	.020 Pillow	.014 rim / .032 dome combination	.014 rim / .036 pillow combination	.020 pillow	.022 dome
Autoflex EBA 77	PASS	PASS	PASS	PASS	PASS	PASS
Autotex 2V87XE	PASS	PASS	PASS	PASS	PASS	PASS
Bayfol CR6-2	PASS	PASS	PASS	PASS	PASS	PASS
GE 8010 Lexan	PASS	PASS	PASS	PASS	PASS	PASS

Flexibility - Fatigue Testing:

Using embossed test samples, the PTX Series inks have been tested for durability during simulated switch actuations. When printed through a 355 .34 plain weave screen and exposed to the minimum cure requirement , the PTX Series displayed excellent durability on a wide variety of substrates tested, including polycarbonate substrates. 'No visual defects' indicates that the printed ink film did not show any signs of delamination, cracking or crazing around the tested area. Testing was completed using the specifications below, with the following results.

Substrates:	GE 8010 Lexan®, Bayfol® CR6-2, GE 8B35 Lexan®, Longhua 835 Polycarbonate, Autoflex® EBA7, Autoflex® EB677, Autoflex® 2V67, Protex® Textured PET, Marnot® Clear PET.		
Test Colors: Two color combinations (All colors backed with PTX-1046 Opaque White)	PTX-422 Y.S. Red PTX-4000 Jet Black PTX-417 G.S. Yellow		
Emboss Type:	Tactile dome		
Equipment:	<u>Nomenclature</u>	<u>Model</u>	<u>Serial Number</u>
	Pioneer	2700	004
	KSI	BT04	002
	Entran	ELFS-B3-50L	99L98L16-Y07
	Microscope	QX3	N/A
	3M	.009 spacer stock	N/A
Cycles Completed:	1 million		
Cycles: Rate per contact closure	3 per second		
Force:	110 % of initial pre-test force displacement measurements, at ambient conditions (25° C with 50% relative humidity)		

Substrate	250,000	500,000	750,000	1 million
GE 8010 Lexan®	No visual defects	No visual defects	No visual defects	No visual defects
Bayfol® CR6-2	No visual defects	No visual defects	No visual defects	No visual defects
GE 8B35 Lexan®	No visual defects	No visual defects	No visual defects	No visual defects
Longhua 835 Polycarbonate	No visual defects	No visual defects	No visual defects	No visual defects
Autoflex® EBA7	No visual defects	No visual defects	No visual defects	No visual defects
Autoflex® EB677	No visual defects	No visual defects	No visual defects	No visual defects
Autotex® 2V67	No visual defects	No visual defects	No visual defects	No visual defects
Protex® Textured PET	No visual defects	No visual defects	No visual defects	No visual defects
Marnot® Clear PET	No visual defects	No visual defects	No visual defects	No visual defects

Fatigue testing completed to IAW ASTM F 1578—95, without the use of an electrical load, by Lab Tech & Advanced Technologies Testing Laboratory, Phoenix, AZ (accredited by the American Association for Laboratory Accreditation in both the Electrical and Mechanical fields).

Autoflex® is a registered trade mark of Autotype Americas, Inc.

Melinex® is a registered trade mark of Dupont / Teijian Films, Inc.

ProTek® and Marnot® are registered trade marks of Tekra Corp.

Lexan® is a registered trade mark of GE Structured Products, Inc.

Bayfol® and Makrofol® are registered trade mark of Bayer Corporation.

Note: All print treated polyester films should be kept covered and away from indirect and direct lights as they may degrade the print treatment. Contact your substrate supplier for information regarding shelf life and storage of print treated polyester materials.

Adhesive Resistance:

The PTX Series has been formulated for compatibility for use with standard pressure sensitive adhesives. When printed through a 355 .34 plain weave screen and exposed to the minimum cure requirement , the PTX Series displayed excellent resistance to applied adhesives. Testing has been conducted using colors on multiple substrates. For more information regarding adhesive test methods used, contact Technical Service.

Manufacturer / Type	Substrate	Results	
		Single Color	Multiple color (2) / Multiple exposure (11)
3M 468MP pressure sensitive	Bayfol® CR6-2	Exceeds 3M 468MP® standard specification with no delamination	Exceeds 3M 468MP® standard spec with <3% ink / ink delamination
	Autoflex® EBA 77	Exceeds 3M 468MP® standard specification with no delamination	Exceeds 3M 468MP® standard spec with <3% ink / ink delamination

Manufacturer / Type	Substrate	Multiple color (8) / Multiple exposure (7)
Flexcon Sw ichtmark® 2-0-0 white PSA	GE 8010 Lexan®	Exceeds Flexcon standard spec with no delamination
	Autotex® 2V87XE	Exceeds Flexcon standard spec with <3% ink / ink delamination
Flexcon Sw ichtmark® 200—L—606 pressure sensitive	Marnot® Clear PET	Exceeds Flexcon standard spec with <3% ink / ink delamination
	GE 8010 Lexan®	Exceeds Flexcon standard spec with no delamination
	Autotex® 2V87XE	Exceeds Flexcon standard spec with no delamination
Flexcon Sw ichtmark® 200—L—344 pressure sensitive	Marnot® Clear PET	Exceeds Flexcon standard spec with <7% ink / ink delamination
	GE 8010 Lexan®	Exceeds Flexcon standard spec with no delamination
	Autotex® 2V87XE	Exceeds Flexcon standard spec with <3% ink / ink delamination
3M 468MP pressure sensitive	Marnot® Clear PET	Exceeds 3M 468MP® standard spec with <3% ink / ink delamination
	GE 8010 Lexan®	Exceeds 3M 468MP® standard specification with no delamination
	Autotex® 2V87XE	Exceeds 3M 468MP® standard spec with <3% ink / ink delamination



Metallics:

Metallic colors offered by Norcote® work well when suspended into the PTX-049 Clear. Mesh selection should have open areas large enough to transfer the metallic particles through the screen without sifting. Generally, mesh counts of 305 or lower have shown the most consistent results. Metallic pigments will reduce the shelf life of the PTX Series inks to 4-8 hours.

038 Silver Powder:

The 038P is a type of coated powder that is meant to line up the silver particles at the bottom of a printed and cured ink film. Because of this, it is recommended for second surface applications only. This product requires gentle mixing. It is best mixed by hand. Avoid dispersion using (toothed) mixing blades on mixers. The 038 Silver Powder should be mixed with the PTX-000 Clear not to exceed 15% by weight. Be sure to thoroughly mix the powder into the Clear. Ability to cure a suspension is related to pigment load and UV exposure. Select mesh counts of 305 threads per inch (120/cm) or lower when printing a metallic mixture. Adhesion and inter-coat adhesion to the substrate should be monitored throughout the production run. Higher percentages of metallic pastes can decrease adhesion and inter-coat adhesion properties. Mix ink fresh daily. Keep the container away from exposure to direct and indirect light and away from heat. The lid should always be tightly secured

Color Matching:

The PTX Series colors are available in both standard opaque colors and high density colors. For matching custom colors previously matched in solvent based ink systems, use of the high density colors is recommended. It is not recommended to use any of the Standard Transparent Colors in custom color matches. Transparent colors may affect the adhesive compatibility of the ink system. Contact Technical Service for more information. A colorant database for computerized color matching is available upon request.

High Density Opaque Colors

PTX-412 R.S. Yellow •
PTX-419 HD R.S. Orange •
PTX-413 HD Chrome Yellow
PTX-421 HD B.S. Red
PTX-423 HD Rhodamine Red
PTX-430 HD Y.S. Green
PTX-434 HD G.S. Blue
PTX-437 HD R.S. Blue
PTX-4000 HD Jet Black

PTX-417 HD G.S. Yellow
PTX-420 HD Y.S. Orange •
PTX-472 HD Bright Orange
PTX-422 HD Y.S. Red
PTX-424 HD Rose
PTX-431 HD B.S. Green
PTX-435 HD Violet
PTX-450 HD Process Blue

High Density Process Colors

PTX-9001 HD Process Cyan
PTX-9003 HD Process Yellow

PTX-9002 HD Process Magenta
PTX-9004 HD Process Black

Standard Opaque Colors

PTX-000 Metallic Mixing Clear
PTX-002 Mixing White
PTX-005 Mixing Black
PTX-012 Radiant Yellow •
PTX-017 Medium Yellow
PTX-019 Permanent Orange •
PTX-020 Radiant Orange •
PTX-021 Cha Cha Red
PTX-022 Red
PTX-023 Rhodamine Red
PTX-024 Rose
PTX-030 Emerald Green
PTX-031 Spruce Green
PTX-034 Permanent Blue
PTX-035 Violet
PTX-037 Reflex Blue
PTX-049 Clear
PTX-060 Halftone Base
PTX-1019 Opaque Black
PTX-1046 Opaque White
PTX-1056 Non-Chalking Opaque White
PTX-2313 Lightfast Yellow
PTX-2872 Lightfast Orange

• **May not be suitable for lightfast applications and is not recommended for prolonged exposure to direct sunlight.**

Transparent Colors

PTX-493 Transparent Green
PTX-495 Transparent Yellow
PTX-4122 Dead front Black
PTX-494 Transparent Blue
PTX-496 Transparent Orange
PTX-4186 Light LED Red

***All transparent colors have limited intercoat adhesion**

Storage & Available Warranties

All UV PTX Series inks should be stored in tightly closed, black polyethylene containers in an area with the temperature not to exceed 90° F (32.2° C). Avoid direct sunlight and indirect white light. Excess ink from print runs should be stored in separate containers to avoid contamination and is not covered under any warranty. When stored under these conditions, Norcote warrants the Products shall be free from defects in material and manufacture for a period of one (1) year from the date of sale for the PTX Series standard inks, with no additives, and for a period of one (1) month from the date of sale for any custom color containing Day Glo® JZB or T-Powder. Norcote will not warrant any custom colors containing metallic pastes. Any warranties provided will be limited to the price paid for the actual products used which give rise to the warranty claim. This Technical Bulletin is intended to be used for informational purposes only, and is in no way intended to create any warranties or other obligations on behalf of Norcote. All warranties, terms and/or conditions for a particular product will be specified on the applicable invoice and are only valid upon the creation of a legally-binding contract.

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