Liquid Laminate Manual

Liquid Laminates
Clear Ultraviolet-Protective Coatings

A Product Guide for our Customers

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A Word from Stephen Berman:

Dear Clearstar Customer,

Thank you for your interest in our products. We've created this guide to answer questions that our customers frequently ask us. We hope this guide will help you understand, choose, and use our liquid laminates.

These are the sections of the Clearstar Product Guide:

- What are clear coatings and liquid laminates?
- Four major benefits of clear coatings
- How are the products different?
- How to apply our products
- Some technical information you may need
- We would love to hear from you.

If you have any questions about us or our products, please call us at **1-888-253-2778 OR 1-843-886-0094**. We would enjoy talking to you about your business, your ink or coating needs, and how Clearstar can help you.

Thanks,

Steve

Stephen Berman, President
Clearstar Coatings Corp.

What are clear coatings and liquid laminates?

Clear coatings, also called liquid laminates, are an inexpensive way to protect your *prints, fine art, signs, banners, awnings and other products*. Liquid laminates are cost-effective, easy to apply, and do not require extensive equipment. The cost ranges from 3-20 cents per square foot.

Clearstar liquid laminates feature the most current innovations in ultraviolet light absorbers and light stabilizers that offer protection for many products. Use liquid laminates for:

- digital inkjet output
- printed and airbrushed products
- traditional signage and graphic art applications

Our clear coatings, *ClearShield®* and *ClearJet®,* are premium grade, high-performance products. We created them specially to:

- protect inks from ultraviolet exposure
- protect inks from abrasion and marring
- provide resistance to chemicals and water

Four major benefits of clear coatings…

1. *Clear coatings protect ink.*

   In digital printing, inks are applied as a thin film that must be protected from a number of hazards:

   - abrasion and marring
   - wind, rain, and wind-borne particles
   - water
   - handling
   - UV exposure (fading)

   ClearShield and *ClearJet* give you the protection you need.

2. *Clear coatings enhance the color.*

   Clear coats enhance the visual appearance of ink.
   They heighten the color and increase the color density.

3. *Clear coatings protect e-stats and thermal transfers.*

   ClearShield and ClearJet protect *e-stat* printed materials against abrasion and are flexible enough for banners and for vehicle graphics. They will contour for application over rivets.

   ClearShield and Original ClearJet protect *thermal transfers*.

4. *Clear coatings benefit traditional materials, too.*

   Traditional materials like *painted surfaces* and *vinyl signage* also benefit from liquid lamination. Clear coats cut down on peeling by sealing the edges of vinyl graphics and lettering.

   Liquid laminates can significantly increase the life expectancy of plastic. Vinyl is protected without losing its flexibility. Clearstar's coatings also enhance the visual appearance of many products by enhancing the intensity of colors and making signs and banners look more unified and smooth.

How are the products different?

ClearJet is *solvent-based*, and ClearShield is *water-based*. They are both highly durable and provide comparable protection. To decide which product to use, wet a small area of the print:

- If you see any cracking or bleeding, choose ClearJet.
- If there is no water sensitivity, choose either ClearJet or ClearShield.
- If you are coating solvent-based inks, typically choose ClearShield.

ClearJet: clear coating for dye-based inks and water-sensitive ink/media combinations

Use ClearJet on most substrates, including canvas, vinyl (enamel receptive and non-enamel receptive), banners, fiberglass, wood, metal, plastic, and paper. ClearJet is typically used only for water-based inks: it is sometimes used on eco and light solvent-based inks. ClearJet is available in two series--*Original Version* and *Series FA* for fine art.

Series FA is made to penetrate the canvas, making the ink/media combination more flexible, not cause discoloration or color shifts and not react with the ink jet receptive layer of most fine art substrates.

- *Series FA* is available in aerosol, brush and roll, and spray versions in gloss, semi-gloss, and low gloss.

- *Original ClearJet* is available in aerosol, brush and roll, and spray versions in gloss and semi-gloss.

ClearShield: clear coating for non-water-sensitive ink/media combinations and solvent based inks.

ClearShield is your first choice for all *non-water-sensitive* applications. We created ClearShield using state-of-the-art resins and ultraviolet inhibitors that protect the substrate, ink, and the clear coating itself. These non-yellowing clear coatings have excellent exterior durability and are highly flexible.

Use ClearShield on most substrates, including water resistant canvas, vinyl, banners, fiberglass, wood, metal, plastic, and paper. You can apply it over solvent-based inks and most water-based paint systems. ClearShield is available in several versions. This chart gives you information about each product.

About Clearstar's Products

Version	Properties	How to Apply	Finish
ClearShield Original	Thickest film build. Suitable for vertical applications.	Spray, pad or foam applicator, roller.	gloss semi-gloss 20degree satin matte
ClearShield Type LL	Lower viscosity than original ClearShield. Same resin solids.	Spray, automated application equipment, and hand application with roller, pad, or foam applicators and window "mops."	gloss semi-gloss, 20 degree satin, low gloss matte
ClearShield Type C	Water resistant canvas applications (highly flexible). Also suitable for micro porous ink jet receptive substrates to reduce or eliminate pinholes.	Use all techniques, including most automated equipment. Daige requires an addition of water (10-15%).	gloss semi-gloss
ClearShield VG	Vehicle graphics. Highly flexible. Second in chemical resistance to CSX.	Apply only on horizontal surfaces. Use all techniques, including most automated equipment.	gloss only
ClearShield 20° Satin *ClearShield 20° Satin LL*	Low gloss applications not requiring dead flat finish found in matte version. Better abrasion and mar resistance. Suitable for many wallpaper applications.	Use all hand application techniques. For automated equipment specify Type LL.	20 degree satin
ClearShield CSX3000LL *ClearShield CSX4000*	High and semi-gloss applications where more hardness than Original ClearShield is needed. May react with some ink sets.	CSX3000 series for spray and automated machine application. CSX4000 For any type of hand application, including spray. Mop may require thinning with water.	gloss semi-gloss* *(CSX3500 or CSX4500)
ClearShield Anti-Graffiti Clear	Highly flexible, chemical and ultra violet resistant. Two-component, water-based clear coat easily cleaned with solvent or Clearstar's non-petrochemical citrus based cleaner.	Use all techniques. Automated equipment requires reduction with water to working viscosity.	gloss May be used without cross-linking agent and will exhibit excellent durability without graffiti resistance.

CX-100 CROSSLINKING AGENT

CX-100 is formulated for addition to any ClearShield system where improvement in water, chemical, impact, abrasion and humidity resistance is desired. It is particularly useful in improving alcohol resistance.

CLEARSHIELD RETARDER

In hot, humid and dry climates, it may be necessary to add a retarder to maintain the proper flow characteristics for brush and roll and even spray applications. Typically, retarders are added as needed with a recommended starting point of 1 – 3% by volume.

How to apply our products

ClearJet: Aerosol Cans

ClearJet A2000 Series and Series FA Fine Art

Using an aerosol is easy to learn. Here are some tips for achieving an even, nice finish:

1. Before you use a can, always shake it well. This is more critical with semi-gloss and low-gloss versions.

2. Always begin the spray off the surface to be coated.

3. Keep the can about 3 - 6 inches from the surface. Drier and warmer temperatures will require closer application. Sensitive ink jet receptive layers may require further distance on the first pass (6- 9 inches). This is called a tack coat and will protect the surface because most of the solvents will have evaporated when the coating reaches the print. A second medium to wet coat can then be applied. Spraying further off the surface will yield a lower gloss.

4. Never turn your wrist! Turning your wrist will change the amount of fluid volume delivered to the surface. To ensure an even coating, always keep your wrist the same distance from the surface, and move your arm.

5. Always continue the spray past the edge of the print you are coating.

6. To ensure a uniform coating, while off the print move the spray can about halfway down the coated area from the last pass and continue applying the clear in the reverse direction. This yields a 50% overlap (a 2-pass application).

7. Throughout the coating process, make this a continuous motion. Try not to stop, particularly when it's hot or dry.

ClearJet: Brush and Roll Version

ClearJet Original Series and Series FA Fine Art

For ClearJet, we do not recommend bristle brushes; we recommend *pad applicators or rollers*. For roll application, you'll get the best results with a 3/16" nap roller (not mohair) or a high-density white foam roller. We do not recommend black foam brushes or rollers because they occasionally bleed.

Applying solvent-based clears is an acquired skill. Here are our recommendations:

1. Load the roller by rolling it in the clear coating until it is saturated.

2. Then fully submerge the roller in the coating.

3. Using a back-and-forth motion, start in one corner of the print and roll to the opposite corner, drawing from the puddle you created when first placing the roller on the print. The roller should push out excess coating in the direction of the uncoated substrate.

4. Continue until you have completely covered the print or run out of liquid laminate. If you run out, load and submerge the roller again and begin in the last wet area to be coated. Do not start in an uncoated area and roll back. This technique mimics the wet edge associated with spray application.

To allow the material to flow out, try to work wet (thicker, full coats). If the finish does not appear smooth enough while still wet, you can re-roll the print with the same roller you used. Do not saturate the roller again.

If you want a second coat, wait for the first coat to fully dry (usually about 1 hour) and then apply the second coat at a 90-degree angle to the first.

ClearJet Retarder and Reducer are formulated for maximum compatibility with ClearJet and allow the user maximum control over application in a variety of climatic conditions.

ClearShield Original Formula (no version noted)

With ClearShield, we do not recommend bristle brushes. Use conventional or foam rollers and foam applicators. Follow the application recommendations for ClearJet Brush & Roll Version.

Important note: With water-based products it is very important to always work with *full, wet coats*. Water-based products dry very quickly and will not level well if applied dry.

- Work wet with a well-saturated 3/16" to 1/4" roller.
- Do not overwork the clear with your roller or foam applicator.
- Resist going back and forth many times over the same area, particularly with a dry applicator. (A dry applicator either is not sufficiently loaded with coating or the bulk of the clear coating has already been transferred from the applicator to the surface).

Sometimes, the finish does not seem to be fully even during application. If you have worked wet enough, the clear will flow out very smoothly and appear glass-like.

If this doesn't happen, you may be able to rework the ClearShield while the material is still wet. If it is wet enough, re-roll with a moderately loaded applicator. You need to do this very quickly after the initial application.

ClearShield Type LL, Type VG and Type CSX4000

Our previously described brush and roll recommendations for ClearJet and ClearShield apply to these versions, too. You can achieve excellent results with a mop applicator – a common window-washing mop head made of material like lamb's wool fastened to a dowel rod. Typically, you want the applicator to be fully saturated. Most people simply pour the coating in puddles or lines on the material to be coated. They then use the applicator to spread the coating. Try to apply the coating evenly and consistently. CSX4000 might require slight thinning with water when using mops.

ClearShield Type C

Begin by saturating the roller with Type C. Use either a high-density foam roller or a short nap roller with no more than a 3/16" nap. Remove excess fluid so it is not dripping off the roller. It is best not to use a pan for loading the roller. The irregular lines in the pan may transfer onto the image. If you do want to roll out the excess, use a piece of cardboard or other smooth surface to roll on. Apply one thin coat, moving from one side of the canvas to the other. It is not necessary to have a wet, saturated film across the whole surface. Allow the first thin coat to dry to touch, about 30 minutes to 1 hour. Apply a second thin to medium coat in the same manner as the first coat, from side to side. That should be sufficient for a pleasing visual appearance and adequate protection. Two thin coats yields a visually more pleasing finish than one, saturated coat.

Spray Application

Clearshield (all versions) and ClearJet Type S

For spray, use the same technique for aerosol cans, but increase the distance from the surface to 6-9". This will work with ClearJet Type S and any ClearShield version. If you intend to spray water-based ClearShield, use a Teflon-coated or stainless steelgun. For solvent or water based applications keep the pressure between 45-50 pounds. Even when using an HVLP make sure you have 45 – 50 pounds of air at the gun.

We recommend Harbor Freight HLVP gravity feed spray gun Item # 43430 with a 1.4 mm tip size. The Harbor gun is an economical, high quality gun that yields excellent results.

For best results, don't use the same equipment for water and solvent. But if you switch from solvent to water-based applications, be sure to eliminate all solvent from the system.

- For *solvent-based applications*, always spray solvent through the gun to purge any residue or contaminants including previously applied water based products.

- For *water-based applications,* always clean the gun with water before use and quickly after use. (ClearShield dries vigorously and can be difficult to clean once dry).

Cleaning Application Equipment

ClearShield Water-based Clears

Use warm, soapy water followed by a clear water rinse. Always clean spray equipment quickly.

ClearJet Solvent-based Clears

Use automotive grade reducers, xylene, lacquer thinner, ClearJet Original Reducer, or ClearJet Fine Art Reducer. Never use mineral spirits or "paint thinner".

Some technical information you may need

We generally recommend the following dry film thickness:

- *ClearShield Water-based Clears* – .7 to 1 mil dry film
- *ClearJet Solvent-based Clears* - .5 to 1 mil dry film

This chart shows you the theoretical coverage at 100% transfer efficiency. Fine Art versions tend to penetrate much more than standard versions so the surface film build will be lower, yet the protection will be excellent.

PER US GALLON

	1 mil dry	**.5 mils dry**
ClearShield (all products)	480 sq. feet	960 sq. feet
ClearJet Type S (FA & Original)	370 sq. feet	740 sq. feet
ClearJet Type BR (FA & Original)	485 sq. feet	970 sq. feet

PER LITER

	1 mil dry	**.5 mils dry**
ClearShield (all products)	11.75 m2	23.50 m2
ClearJet Type S (FA & Original)	9.08 m2	18.16 m2
ClearJet Type BR (FA & Original)	11.90 m2	23.80 m2

- Roll and mop applications transfer at 100% efficiency.
- Conventional spray applications transfer at 35% efficiency.
- HVLP spray applications transfer at 65% efficiency.