

Commercial Solutions Division

3M™ Screen Print UV Gloss Clear 9760LX

Product Description 3M™ Screen Print UV Gloss Clear 9760LX is designed for use on HP 831, 871, 881 and HP 3M 891 Latex Inks.

This high-performance, ultraviolet-cured clear coat is only recommended for use in protecting latex printed graphics.

- Weather-resistant
- Tough, flexible, and abrasion-resistant

Important Note Do not clean 9760LX clear coated latex printed graphics with Isopropyl alcohol or other solvents as they may damage the finish.

Product Characteristics

These are indicative values for unprocessed products.
Contact your 3M representative for a custom specification

Physical & Application

Gloss	85 – 90 gloss units – 60 degree gloss
Recommended Coating Thickness	6 – 12 microns
Typical Coverage per US gallon	230 m ² - 460 m ²
Typical Coverage per liter	60 m ² – 120 m ² with a 380 plain weave mesh

Important Note Several elements affect the typical coverage:

- Screen mesh and type
- Hardness (durometer) of the squeegee
- Angle of the squeegee
- Viscosity

The values above are the results of illustrative lab test measurements and shall not be considered as a commitment from 3M.

Safety When handling any chemical products, follow the container labels and the Material Data Safety Sheets for health, safety and environmental information. Please dispose of cleaning cloths and paper toweling in a responsible manner. Since regulations vary, consult applicable regulations or authorities before disposal. When using any equipment, always follow the manufacturers' instructions for safe operation. Refer also to the Product Bulletins for each product in your graphic construction for specific details that may influence the information in this Bulletin.

Ventilation Always provide adequate local or general ventilation to remove emissions. Failure to provide adequate ventilation can result in operator exposure.

Air Quality Regulations Country Volatile Organic Compound (VOC) regulations may prohibit the use of certain cleaning chemicals with VOC's in graphic arts coatings and printing operations. Check with your country environmental authorities to determine whether use of this solution may be restricted or prohibited.

Storage

Shelf Life	Use by the expiration date shown on the product packaging. Do not use a clear that shows signs of gelling. Liquid clear can vary in color, depending on age and storage conditions. The color does not affect the performance or cured color of the clear.
Storage Conditions	0°C to +27°C, out of sunlight, original container in clean and dry area. Bring the clear to room temperature before use. Keep the containers covered when not in use to prevent curing from room light.

The shelf life as defined above remains an indicative and maximum data, subject to many external and non-controllable factors. It may never be interpreted as warranty.

Durability For detailed durability information, please refer to the Product Bulletin of each base film used in your graphic.

The durabilities mentioned are the results of illustrative lab tests. The values show the best performance expected from these products, provided that the clear will be processed and applied professionally according to 3M's recommendations.

The durability statements do not constitute warranties of quality, life and characteristics.

The durability of products is also influenced by:

- the combinations of graphics materials used
- complete ink drying or curing
- selection, condition and preparation of the substrate
- surface texture
- application procedures
- environmental factors
- the method and the frequency of cleaning

MCS™ Warranty

In addition, 3M provides a warranty on a finished applied graphic within the framework of 3M™ MCS™ warranty programs.

For detailed graphic construction and application options along with specific Warranty periods, please see the Warranty matrices and Warranty information on 3M Graphic Solutions/Warranties.

Visit www.3mgraphics.com/eu for getting more details about 3M's comprehensive graphic solutions.

Graphics Manufacturing

Shipping Finished Graphics

Flat, or rolled film side out on 130 mm (5 inch) or larger core. These methods help to prevent the liner from wrinkling or application tape, if used, from popping off.

Completely Dry or Cure Graphics

Inadequate drying can result in graphic failure including curling, increased shrinkage and adhesion failure, which are not covered under any 3M warranty. Build enough time into your process to ensure adequate drying of the graphic.

See the ink's product and instruction bulletin for more details.

See the test instructions below to determine if the printed film is properly dried. After winding printed film on a roll, the ink should not stick to the liner or block (change surface gloss).

To ensure proper latex ink curing, use the following recommendations:

1. Media presets

Media presets contain all the needed settings to print on a specific media. Download and use media presets from the following page:
www.hp.com/go/mediasolutionslocator

2. Environmental conditions

Media presets have been specially designed and tested for each printer-media combination. Recommended environmental conditions: +20°C to +25°C, humidity 40% - 60% RH.

3. Proper drying and curing performance tests

Tests to confirm curing performance are mainly visual. To check if a sample is properly cured, print a multi-colored test image using the correct media setting then perform the following tests:

- **Visual test:** Check the image immediately after printing. The sample should not be wet or sticky to the touch, or have an "oily" feel when it emerges from the printer.
- **Rubbing test:** After the visual inspection, wipe the printed sample with a wet paper towel. Fully cured ink should resist wiping. If the ink is easily removed by wet rubbing, then it is not cured.
- **Stacking test:** In some cases, the top surface will appear dry after printing but within a few minutes ink may migrate to the surface leaving an oily aspect. To ensure a proper curing, stack at least three sheets liner to printed side (cover the test sample on the printed side with a plastic or a non-porous substrate sheet) and let sit for one hour. After 1 hour, remove the bottom sheet and check for "oily" stains, wet surfaces or gloss changes in high ink laydown areas. If any of these occur, then the ink is not properly cured.

4. Improve curing

If a sample is not properly cured on the printer, reprint the image under a condition that allows complete curing. Common printer settings that improve curing performance are:

- Curing temperature. Increase temperature in 5-degree increments until the sample is properly cured.
- Number of passes. Increase the number of passes to slow down the print process. When the number of passes is increased, the time that the sample is under the curing module also increases allowing a better cure.
- Ink amount. Reducing the ink amount while keeping the remaining settings unchanged helps to cure the ink.

Important Note To achieve the highest clear coat adhesion, apply the clear within 3 days after printing.

Application Tape

See product bulletin ATR 'application tape recommendations' for information about selection and use of suitable application tapes for this product, please.

[> Product Bulletin Application Tape Recommendations <](#)

Refer to Instruction Bulletin 5.1 'select and prepare substrates for graphic application', for general application information.

[> Instruction Bulletin 5.1 'select and prepare substrates for graphic application' <](#)

Preparing the Clear

Mixing Mix the screen print clear for a minimum of 10 minutes to get an even distribution of all components. Some separation of the components is normal during storage.

Use a high-speed power mixer with a blade 1/3 to 1/2 the size of the container. If the blade is smaller than this, make sure to move it around in the container. A paint shaker can also be used. Mix for 15 to 20 minutes.

Important Note If using the same container for more than 8 hours, the clear should be remixed to ensure an even distribution.

Applying the Clear

- Frame**
- Use a rigid, metal frame
 - Include a 15 cm to 25 cm well between the frame and the graphic design on all sides.
- Fabric** Fabric selection is critical. Choose a fabric that lays the clear to a thickness of 6 to 12 microns.
- Use a monofilament thread, plain weave fabric.
 - Use a PE355 to PE380 (140 to 150 threads per cm) or any fabric that maintains a theoretical ink volume of 0.35 to 0.69 cubic inches/square yard (7 to 13.5 cm³/m²) and thus will produce a clear thickness of 6 to 12 microns. A thicker screen print clear coating produces a smoother and glossier graphic, but the thicker clear layer will be harder to cure and may require a higher curing intensity. See also important note below.
 - Use a thread with a diameter of 31 or 34 microns. The total fabric thickness should be less than 50 microns.

Important Note	Thicker clear coats may reduce the flexibility and extensibility of the graphic construction, leading to problems such as cracking around rivets or excessive film tearing during removal (where applicable).
Important Note	Calendared fabrics, twill weaves and thick threads affect the ink lay down and cause printing and curing problems.
Stencil	Use a photographic or hand-cut stencil that is water soluble and resistant to ketones and strong lacquer solvents.
Squeegee	Multiple durometer squeegee (70/90, 65/95/65, 70/90/70, or 75/95/75) provide the best results. A sharp squeegee with an 80 durometer or harder plastic blade will also work.
Important Note	A softer squeegee increases the clear lay down and can make printing more difficult. Use a squeegee large enough to overlap the design by at least 5 cm on each side. Set the squeegee angle to as near vertical as possible. Do not let the angle to the horizontal be less than 80 degrees. The exact angle may vary because of press design. A lower angle may result in a heavy clear lay down. This may cause curing problems.
Screen Printing Method	Use the off-contact screen printing method to produce a uniform impression. Make a fill pass and then make the impression pass.
Roller Coating Method	Use of roller coating is not recommended or warranted by 3M.
Curing Methods	Before using any equipment, always read the manufacturer's instructions for safe operation.
About Curing	Best results are obtained by curing immediately after screening. Placing the sheets in a drying rack or delaying the curing process may cause an undesirable surface appearance. Using the curing ranges specified ensures proper curing. Too low of an energy level may result in a wet and tacky print. If lamp intensity is too low (below 600 mw/cm ² in the UVA band), the clear may cure with a matte finish especially over dark films or dark ink areas. Too high a cure energy may lead to blistering of underlying ink, excessive yellowing of the clear, or embrittlement of the clear. High substrate temperatures associated with the UV curing process may cause a decrease in gloss due to residual solvent coming out of the inkjet printed film. This effect will be most noticeable in darker, heavy ink laydown areas. The effect can be minimized by reducing the amount of ink laydown and reducing heat generated during curing. If there is still blistering after minimizing the amount of retained solvent during printing, try the following: <ul style="list-style-type: none"> a) Reduce the base film temperature during curing such as by increasing ventilation in the curing unit. b) Reduce the cure dose to the lower level of the range found in Table A on page 6. c) Run at a higher belt speed during the curing process (at the same overall dose). Example: A lamp intensity of 120 watt/cm with a belt speed of 30 m/min to

give a UVA cure dose of 250 mJ/cm² would be preferred over a setting of 80 watt/cm lamp intensity with a belt speed of 20 m/min that also gives a UVA cure dose of 250 mJ/cm².

Color of the Printed Clear The clears when printed have a slightly yellow tint that increases as the cure dose used to cure the clear increases and/or the amount of heat the graphic is exposed to increases. Exposing the graphic to outdoor ultraviolet light will photo-bleach most of the tint within a few days.
Fluorescent light will also photo-bleach most of the tint, but it will take a longer period.

Focused-lamp Curing Unit Focused-lamp cure units use high concentrations of ultraviolet light to initiate polymerization.

- Specifications**
- Use a medium pressure mercury lamp that has an energy output of at least 200 watts per inch (wpi) or 80 watts per cm. If using lower wattage bulbs and slower speeds, there is a risk of generating too much heat and causing a gloss change and/or blistering.
 - Bulbs must have adequate energy in the 230 - 350 nm range to cure the clear correctly. Output intensity in the UVC band should be about 1/6 of the output intensity in the UVA band.
 - Bulbs need to produce a minimum UV Peak irradiance of 600 milliwatts/cm² in the UVA band.
 - Do not use ozone-free or doped bulbs. These bulbs may not produce the correct wavelengths to properly cure the clear. Some quartz IR filters can also interfere with the cure.
 - The UV energy output of the cure unit must be accurately measured. You may use a Uvicure® Plus II UVA/High Power model, for example. The Multiband Power Puck II unit can also be used and will allow you to also check UVC band output. This radiometer is available from EIT Corporation, 108 Carpenter Drive, Sterling, VA 22170. Telephone: (703) 478-0700.
 - The energy levels should be uniform across the entire web. Energy levels could be significantly lower at the web edges. Do not clear coat graphics that are wider than the width of the uniform output of the lamps.

- Operation**
1. Measure the UV lamp energy and irradiance levels at the beginning of every working day and whenever adjustments are made to the unit.
 2. Allow the lamps to heat up for at least 10 minutes or until the indicators show that the lamps have stabilized.
 3. Replace bulbs according to the bulb manufacturer's recommendations. Dirty lamps and reflectors or bent reflectors prevent the ink from curing properly.
 4. Adjust the lamp wattage and/or belt speed to get the specific energy level on the radiometer while maintaining the minimum peak irradiance or intensity. These are the recommended cure levels for the Uvicure® Plus Radiometer (measured in UVA band):

Table A. Calibration Standard for Uvicure® Plus Radiometer (mJ/cm²)*

Clear	Graphic Type	Target	Range
9760	Digital HP Latex	260	250 to 300

*Radiometer measures in joules/cm². To convert, 0.045 joules/cm² equals 45 mJ/cm².

5. Test the clear to make sure that it is properly cured. Test methods are outlined in "Testing" on page 7.
6. Adjust the unit until the clear is correctly cured.

Testing Maintain a testing log for future reference. Clear coating must pass these 2 tests.

Appearance Test

Tape Snap Adhesion Test

Appearance Test These are the surface characteristics of properly cured UV clear

High gloss (when coated over smooth surfaces)
No wet or tacky areas
Does not surface impress once sheets are cool

Tape Snap Adhesion Test	The Tape Snap Adhesion Test determines if the clear is over-cured or if the film or ink has been overexposed or over-cured. It tests the adhesion of the clear to ink and the adhesion of the clear to the film.
Frequency	Be sure to conduct the test daily on all printed colors and on unprinted areas to the film.
Procedures	<ol style="list-style-type: none">1. From the start of the print run, set aside enough production material to test the clear. You can also use misprinted material produced during the print run.2. Print the clear on the test material.3. Cure at the level for the screen print clear.4. Use the point of a sharp razor blade, knife or other suitable instrument to scratch at an angle a crosshatched pattern through the clear. Do not cut into the film. Be sure to scratch areas where the clear is applied over printed ink and film.5. Use 3M™ Hand Applicator PA-1 to firmly apply a 1-inch wide strip of Scotch™ Tape 610 over the crosshatched areas.6. Remove the tape by pulling it back upon itself (180°) using a rapid, firm pull.7. No separation should occur between the clear and the inks or between the clear and the film.8. If the layers separate, so that the clear coat or clear coat and ink is pulled off with the tape, then decrease the cure dose of the clear coat by increasing the belt speed slightly.
Important Note	The clear must still pass the Appearance Test after making any adjustments. <ol style="list-style-type: none">9. Repeat steps 1 through 8 until a sample passes the Adhesion Test.10. If you have made adjustments and still cannot get the clear to adhere, you may need to adjust the printing conditions of the underlying ink.

Maintenance and Cleaning

Use a cleaner designed 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).

Refer to Instruction Bulletin 6.5 'storage, handling, maintenance and removal of films and sheetings', for general maintenance and cleaning information.

[> Instruction Bulletin 6.5 'Storage, Handling, Maintenance and Removal of Films and Sheetings' <](#)

Important Note	Do not clean 9760LX clear coated latex printed graphics with Isopropyl alcohol or other solvents as they may damage the finish.
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Remarks This bulletin provides technical information only.

Important Notice All questions of warranty and liability relating to this product are governed by the terms and conditions of the sale, subject, where applicable, to the prevailing law.

Before using, the user must determine the suitability of the product for its required or intended use, and the user assumes all risk and liability whatsoever in connection therewith.

Additional Information Visit the web site www.3mgraphics.com/eu for getting:

- additional instruction bulletins
- a complete product overview about materials 3M is offering.

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