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Albumen Printing Kit Instructions

Thank you for purchasing this Albumen Kit from Bostick & Sullivan. The kit will make dozens of 5"x7" and 6"x9" prints on a variety of papers. The Albumen process is a POP "Printing Out Process." This means that the image will form completely during exposure to UV light, eliminating the need for a developer.

Please read the following safety and usage information and make yourself familiar with the entire process before starting. Observe standard lab and darkroom safety procedures and practice common sense when handling all chemicals. Some sections of these instructions may be redundant to promote clarity.

Your kit contains:

- 1000ml 15% Silver Nitrate Solution
- 1000ml Pre-Mixed Albumen Solution *Keep refrigerated and out of the way of children*
- 1000ml B&S Rapid Fixer
- 500ml 2 part Gold Toning Kit
- 100g Kaolin for cleaning Silver Nitrate
- (4) 8x10 trays
- (2) pieces of Cheese Cloth
- (2) funnels-one for Silver and one for Albumen
- (3) 32 oz clear storage bottles

Safety and Handling Information

The Albumen Printing Kit contains many different chemicals and mixtures necessary to produce a traditional Albumen print. Handle all chemicals as if they are dangerous, regardless of any safety warnings, or lack thereof, on their labels.

Albumen printing can be a messy process. The silver nitrate solution included with the kit will leave a black stain on skin, clothing and almost any other surface. Removal of these stains can be very difficult! Handle and work with the silver nitrate solution in a controlled environment, away from children.

Always wear an apron, latex or nitrile gloves, closed-toed shoes and eye protection when making Albumen prints.

Portions of the Albumen process must be practiced under subdued lighting. A darkroom safelight, a red compact fluorescent bulb, or red LED lights all work equally well. The red lights used can be very bright and will not interfere in the processing. Some processing of the paper may be performed under normal room lights.

Cleanliness is key when working in the albumen process. **Wear clean latex or nitrile gloves at all times. Transferring salt and oil from your hands to the paper will cause stains and anomalies to appear on your prints.** Cross contamination is the biggest source of problems in albumen printing.

Kit Contents

Albumen Solution 1000 ml - This is a ready-to-use salted albumen solution made from food grade powdered egg whites. This solution should make approximately 60 prints on 8x10 paper. **If possible, refrigerate or store in a cool place when not being used.** This solution contains a food-grade preservative to help extend its life. Shelf life: 3 months unrefrigerated, or 24-36 months refrigerated. The albumen solution works best at temperatures above 60F (14C). Many papers will resist absorbing cold albumen, so remove it from your refrigerator at least 2 hours before using. Dispose of Albumen by pouring down the drain with plenty of cold water.

Silver Nitrate 15% Solution 1000 ml - ***Silver nitrate will leave a black stain on skin and almost every other surface! Removing stains from hard surfaces is very difficult. Silver nitrate stains on skin are not harmful, although the black stains may take a week or more to disappear. Silver nitrate can cause severe burns to your eyes, so always wear glasses or safety goggles when using this solution.*** This silver nitrate solution will make many dozens of prints when properly maintained. Silver Nitrate 15% solution should remain viable for 10+ years, unused. Dispose of Silver Nitrate 15% with your other hazardous waste.

B&S Rapid Fixer - Your kit comes with B&S Rapid Fixer, an Ammonium Thiosulfate based fixer. A liter of working strength sodium thiosulfate will fix out approximately 15-20 albumen prints on 8"x10" paper.

Exhausted fixer contains high quantities of silver, which can be harmful to the environment. Dispose of used fixer with your other hazardous goods. *If you do not have access to a hazardous waste disposal station, you can neutralize used fixer at home. Add 2 pads of steel wool or copper scouring pads to 1 liter of exhausted fixer, and allow it to sit for 36-48 hours. After 36 hours the silver from the fixer will have chemically bonded to the steel wool, rendering the fixer safe for disposal. Remove the steel wool from the neutralized fixer, rinse well with water, and add the steel wool to your household trash. The remaining solution is now safe to dispose of in a city sewer or home septic system.* Fixer Shelf life: 10 years as a concentrate, and as an unused working solution.

Kaolin China Clay 100 grams - This powder is used to maintain the freshness of the Silver Nitrate 15% solution. After every printing session, the working Silver Nitrate 15% solution must be mixed with a small amount of kaolin, which then removes the impurities that contaminate the silver during a printing session. Those impurities, along with the clay will settle to the bottom of the bottle after 12-16 hours, and the solution is then decanted and filtered before each use. Shelf life: Indefinite as a powder.

Gold Toning Kit 500 ml - Gold tone your Albumen prints with our universal gold toning kit. Gold toning adds warmth and the classic aubergine hue seen in vintage Albumen prints. Gold toning also greatly enhances the archival stability of your image. Our kit will tone approximately 100 prints on 8"x10" paper. Shelf Life: 5-10 years unmixed. Maximum of a 12 hour usable life in a working solution. Used and unused Gold Toning solutions may be poured down the drain for disposal.

Cheese Cloth - This lightweight cloth is used as a filtering medium to remove any solids from your albumen solution. The used cloth can be washed in clean tap water and reused many times.

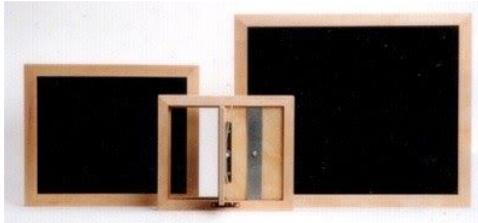
Funnels - Your kit includes two (2) funnels. Dedicate one funnel to your albumen solution, and the other for silver nitrate.

Empty bottles - Your kit includes several extra bottles to make filtering and storage of the Albumen Solution and Silver Nitrate easier.

Trays - Your kits contains 4 high quality Paterson darkroom trays. Mark these trays for use as "Albumen" "Silver" "Gold Toner" and "Fixer". Do not cross contaminate by using the trays for other purposes. You will need an additional tray for your final rinse wash.

Setting up your workspace

The albumen process is a contact printing process that requires a negative the same size as your final image. The image must be exposed under intense UV light such as a fluorescent UV exposure box, graphic arts plate burner, or sunlight. You will need running water for washing your prints, so make sure you have a sink in your workspace.



Split-Back Contact Frame



UV Light Source & Vacuum Frame



Safelight or Red/Yellow Bulb

A red or yellow light should always be used while drying your sensitized paper and during wet processing. Red LED bulbs are available at any hardware store and work well. You can not have too much red light, as it will not fog your paper.

A split-back contact printing frame, vacuum frame or two heavy sheets of glass may be used to sandwich your paper and negative together for exposure. A split-back frame is very helpful, as it allows the artist to inspect the image during exposure without disturbing the registration between the paper and negative. Avoid using “museum glass” or UV resistant glass for exposures.

You will need a dry mount press or a clothes iron to flatten and harden your albumenized paper. An inexpensive \$15-20 iron from your local variety store will work well.



A drymount press or clothing iron is used to harden the albumen coatings.

You will need a table large enough to handle at least two 8"x10" trays, your chemistry and paper. **The albumen solution may harm painted surfaces if allowed to dry, and the Silver Nitrate solution will stain most hard surfaces. We recommend placing a plastic-lined disposable table cloth over your workspace to making cleanup easier.**

Trays and Funnels

The trays provided with your kit should provide years of use. Remember to label them individually: Albumen, Silver Nitrate, Fixer, Gold Toner and Rinse. Your funnels should be labeled as albumen and silver nitrate. **Do not cross-contaminate!**

Papers

Select a paper that will stand up to the wet processing required with albumen printing. Watercolor paper with a weight of 145 GSM to 300 GSM (67-140 lb) are generally fairly easy to work with and produce good results. We prefer to use 310 GSM Arches Platine and Bergger COT320 in our darkroom.

Negative

The artist will need a negative that is the same size as the final image. Large format, in-camera negatives and digital inkjet negatives can be used for the albumen process. A large format negative suitable for printing on a Grade Zero or Grade One silver gelatin paper will work well for the Albumen process. Digital negative curves and printer settings for Epson inkjet printers are available in the "Digital Negative Resources" tab of the Bostick & Sullivan website. We use these curves along with Pictorico Premium OHP inkjet media in our own darkroom.

Setting up to print

Albumen Solution - Your Albumen solution comes pre-mixed and ready to use. It works best at temperatures above 60F (14C) You will need to filter the solution before each printing session.

Cut an 8"x8" piece of cheesecloth and fold it over once or twice, then place the cheesecloth loosely in the bottom of a funnel. Place the funnel over an empty one liter bottle, then gently pour the albumen solution through the cheese cloth filter. You may or may not see any solids collected in the cheesecloth. After filtering, rinse the cheesecloth well, let it dry and save it for later use. Pour the filtered albumen solution into your tray marked "albumen".



Place a piece of folded cheese cloth loosely in a funnel. Pour your albumen through the filter to remove any solids.



Using a paper spatula, wipe the bubbles from the surface before floating each piece of paper.

Your albumen solution will have bubbles on the surface after filling the tray. You need to remove these bubbles before floating your paper. Cut a piece of heavy paper approximately 2"x8" to use as a spatula. Drag the paper spatula through the solution slowly, pulling the bubbles to the side of the tray. When you complete the pass, drag the bubbles up the side of the tray, allowing any extra solution to drain back down. Lift your paper spatula out and wipe off any bubbles from the spatula with a paper towel. Your albumen is ready to use at this point.

Silver Nitrate 15% solution - The silver nitrate solution included with your kit is used to sensitize the dried albumen-coated paper. The silver nitrate solution itself is not light sensitive, but it will become light sensitive when it comes in contact with any organic substance.

The Silver Nitrate sensitized paper you create must be dried and handled under red safelight, with minimal exposure to fluorescent lights.

You must filter the silver nitrate solution before each printing session to remove any Kaolin or other foreign materials. Place a disposable paper coffee filter into your silver nitrate funnel and place it on your extra silver nitrate bottle. Slowly decant the silver nitrate solution from the storage bottle through the coffee filter. You may see a small amount of black silver powder captured in the filter. Once it is filtered, pour the silver nitrate solution into the properly marked tray.



To make filtering easier, fold a round coffee filter in half, then in half again, to form an “ice cream cone” filter that will fit into a funnel.

Purifying the Silver Nitrate Bath after Each Session

After a printing session, the silver nitrate solution will take on a red color due to a small amount of salt from the albumen solution contaminating it. Using a funnel carefully pour the silver solution from the tray into the Silver Nitrate storage bottle. Add ½ teaspoon of Kaolin to the bottle containing the used silver nitrate and replace the lid. Shake vigorously to mix the Kaolin well. In 12-16 hours, the kaolin and contaminants will settle to the bottom as a fine black precipitate.

Before each printing session filter the Silver Nitrate 15% solution through a paper filter. Slowly decant the silver from the bottle through the filter, leaving the majority of the black precipitate and Kaolin at the bottom of the bottle. Leave the cloudy solution at the bottom of the bottle to prevent it from getting in the Silver Nitrate tray.

Gold Toning Bath - The gold toning kit supplied with your Albumen kit will add the classic aubergine-colored warmth to your Albumen prints. The gold toning adds to the archival nature of your images by replacing some of the silver with a noble metal, which will never tarnish, and virtually eliminates any fading of vintage prints. To make a working strength toner, add 50 ml of Ammonium Thiocyanate 2% solution and 50 ml of Gold Chloride .2% solution to 900ml (30 fl oz) of distilled or filtered water. Mix all ingredients into your tray marked Gold Toner.

Make a half batch of the gold toner bath for smaller printing jobs. Use 25 ml of Gold Chloride .2% and 25 ml of Ammonium Thiocyanate 2% with 450 ml (15 oz) of water.



Mix 50 ml of each gold toning solution with enough water to make 1 liter. If you don't have an accurate graduated cylinder, add 7 capfuls of each toning solution to 30 oz of water.

Fixer - B&S Rapid Fixer is included with the kit as the fixer. To make a working strength solution mix 100 ml (3 oz) of Rapid Fixer concentrate to 900 ml (29 oz) of distilled or filtered water. Mix well. You can use clean tap water or filtered water to make the fixer solution. Pour into your tray marked Fixer.

1000 ml of working solution should fix out approximately 10 images on 8"x10" paper. Fixing times will increase significantly as the solution is exhausted. Store your used fixer in one of the empty bottles supplied with your kit. Dispose as specified on page 3.

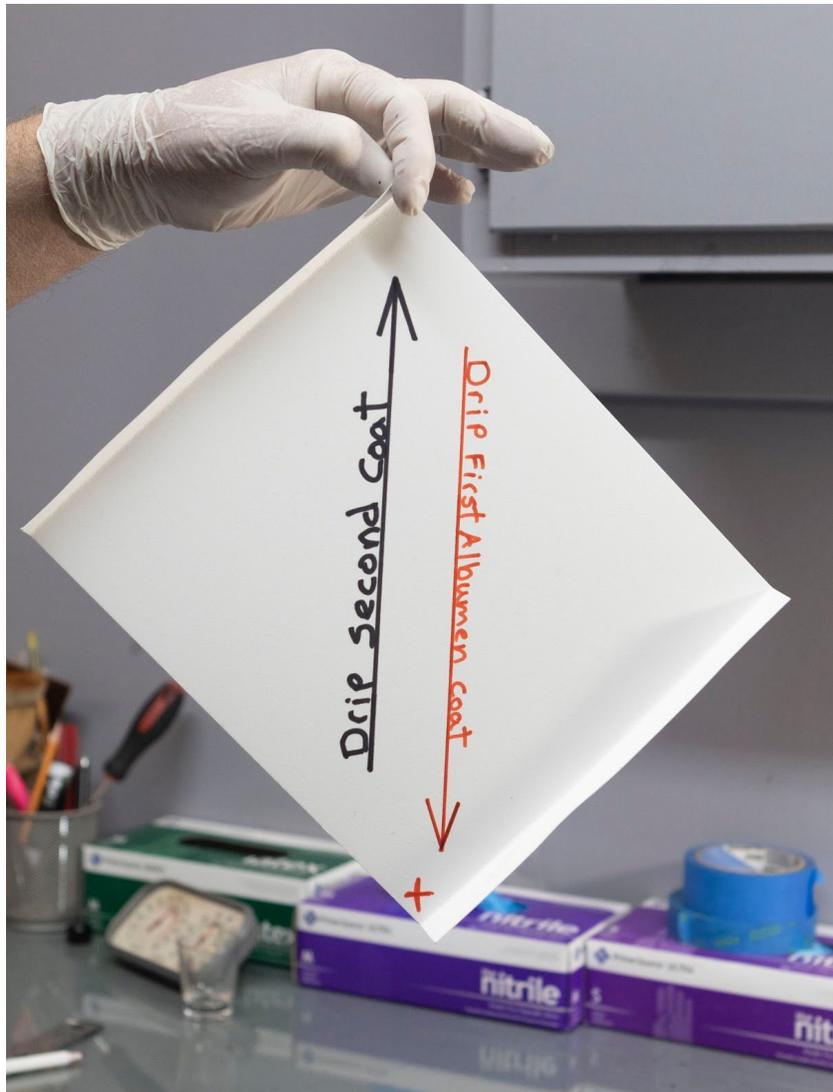


Add 100 ml of Rapid Fixer to 900 ml of cold water to make 1000 ml of working strength fixer.

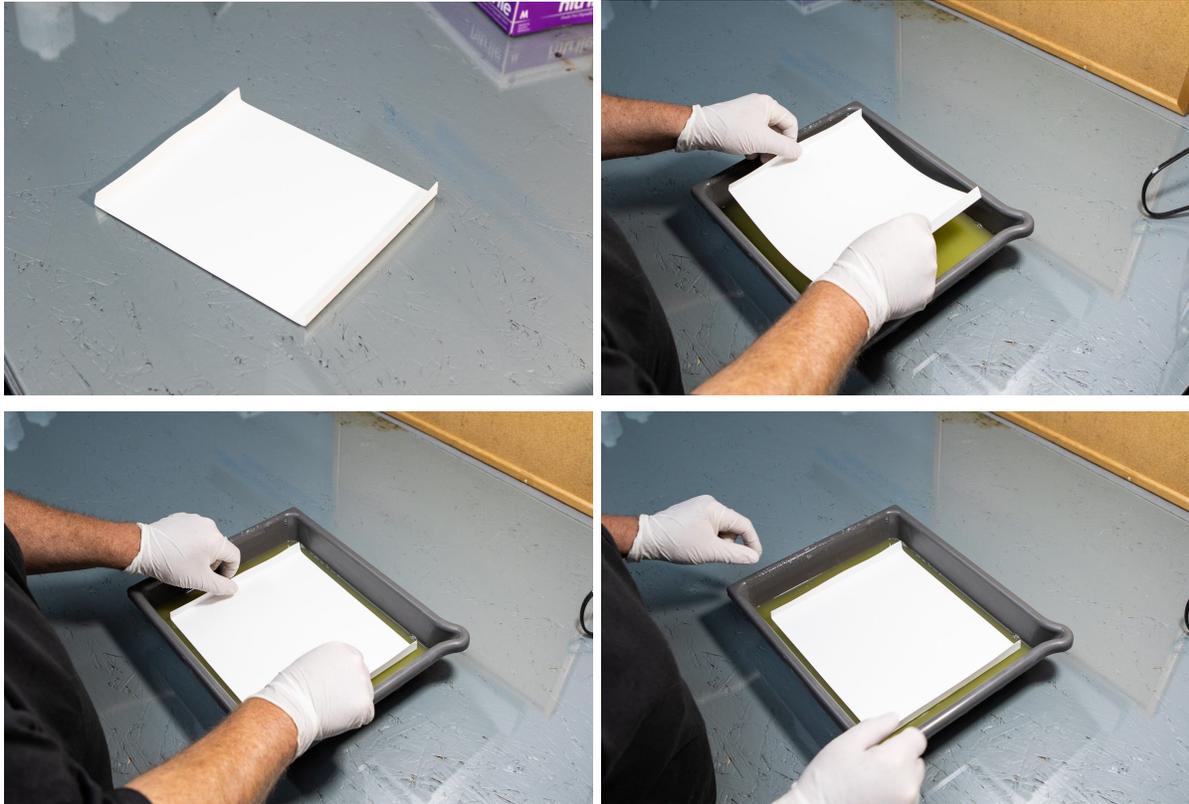
Making Albumen prints

Floating paper on albumen

The first steps of the Albumen Process will apply two layers of salted Albumen to the surface of the paper. A double coat will produce a denser, richer image. Select a piece of high quality paper to make your print. Fold and crease the two short ends of the paper upward. Mark the backside of one corner to act as an orienting reference point. The first and second coats should be drained from corners diagonal from each other to produce a consistent coating over the entire sheet of paper.



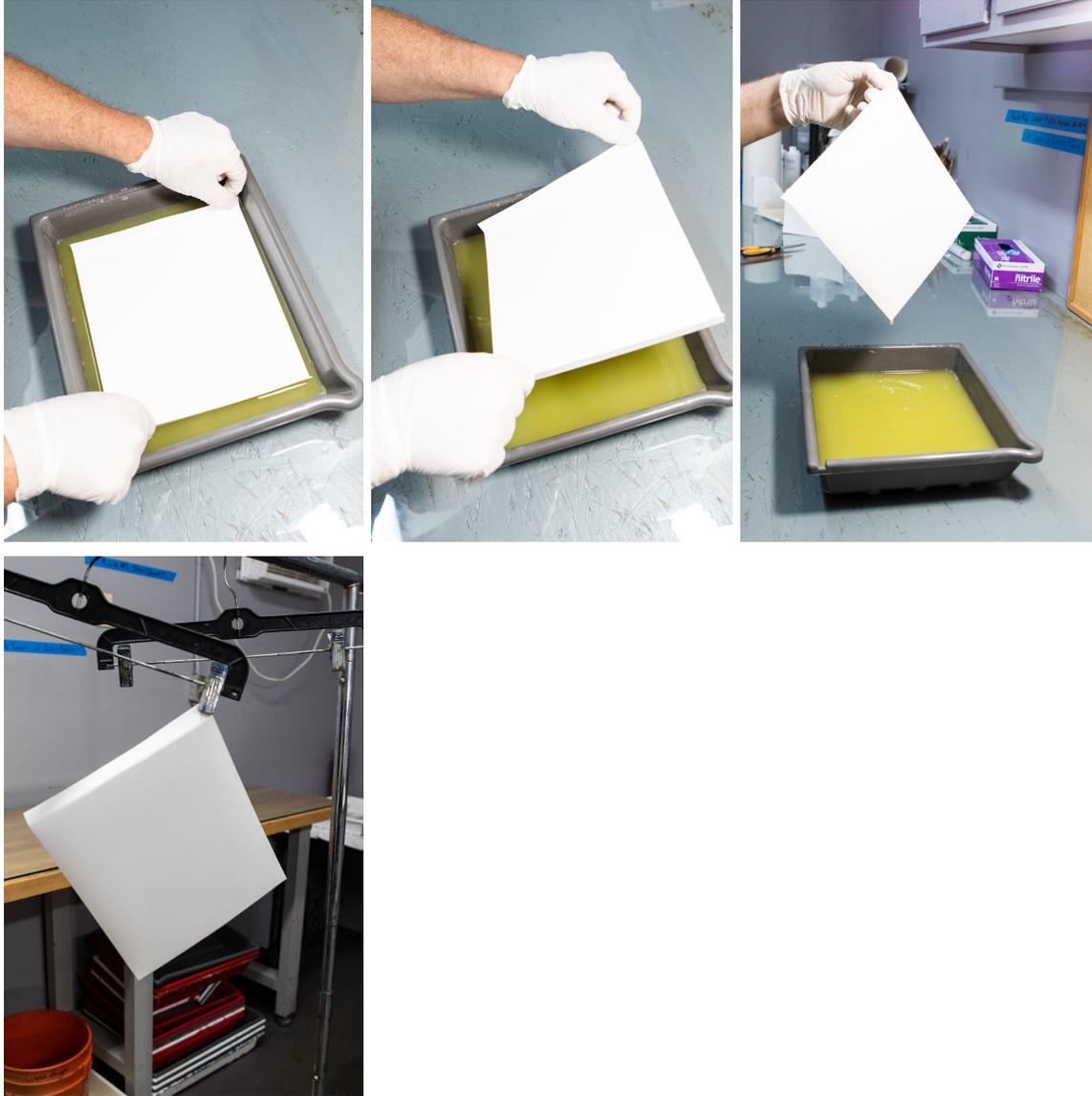
Gently place the folded paper on top of the albumen solution. Let the paper sit on the albumen solution for 6 minutes.



Crease your paper, then float on the albumen solution for 6 minutes.

After 6 minutes of floating on the Albumen, remove the paper from the tray. Grasp the paper from two corners diagonal from each other, then gently lift the paper from the tray. Hold the paper diagonally, from the corner you marked on the backside, and allow the excess albumen solution to drip back into the tray.

Hang the wet albumen-coated paper to dry, maintaining the same orientation as when you removed it from the albumen tray. If any small bubbles appear on the wet surface, they will disappear as the paper dries. Large bubbles can be popped with fine-tipped watercolor brush that has been wetted with Albumen solution..

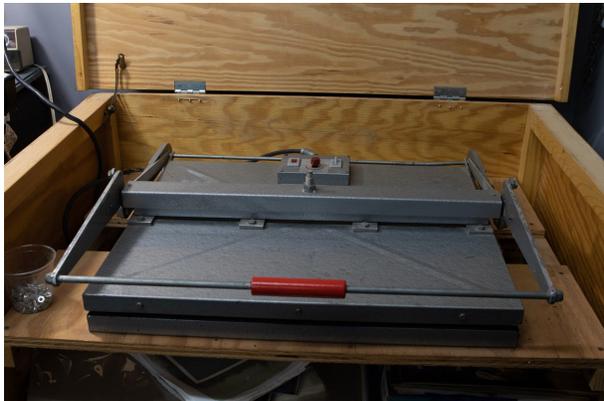


Hang the wet albumenized paper from a corner and allow it to air dry. It can take 60 to 90 minutes to dry completely, depending on the temperature and humidity. Make sure the bottom drip corner is completely dried before proceeding to the next step. You can gently dab the drip corner with a paper towel to absorb extra albumen.

Note: The paper will reticulate and become partly curled while the Albumen is drying. This is normal, and should not affect the paper or final image adversely. Remember to always wear latex or nitrile gloves to keep sweat and oils off of the paper. This will prevent cross contamination and image anomalies such as fingerprints.

Setting and Hardening The First Coat

Most artists prefer to double coat the albumen solution to achieve a denser, glossier image. You must harden the first coat using a drymount press or a clothes iron to prevent it from dissolving during the second Albumen coat. Set the drymount press to 250F or turn the iron to its highest setting. Flatten the print for 2 minutes in the hot drymount press.



Sandwich the albumenized paper between two clean archival sheets of paper, and place in a 250F drymount press for 2 minutes.

Alternatively, if you don't have access to a drymount press, a standard clothing iron will work. Set the iron to the highest temperature setting. Place the albumenized paper between two clean sheets of archival paper. Move the hot iron back and forth slowly, heating the entire paper evenly.



Flatten the paper for 2-3 minutes with a hot clothes iron if you don't have access to a drymount press.

Floating the second coating

After the albumenized paper has been dried and flattened with heat, re-crease the folds along the edges of the paper and float it in the albumen tray for another 6 minutes, to apply a second coating. The paper may have a few waves or ripples in it after removing from the drymount press. Gently manipulate the paper to make it relatively flat. When you place it on the Albumen solution, the paper will almost immediately relax and lay flat on the Albumen. A small amount of Albumen may appear around the unfolded

Lift and then drain the second coating by the corner diagonally opposite from the corner you lifted from during the first coating. Let the excess albumen drip from this opposite corner. This will allow the paper to take on an even Albumen coating across the entire sheet.

Once the second coating has dried, flatten the second coat with your drymount press or iron to harden the coating.



Flatten and harden the second coating of albumen for 2 minutes.

Sensitizing albumenized paper with silver nitrate

Note: The albumen coated paper is not light sensitive before this step. During this step, the artist will “sensitize” the albumenized paper to make it sensitive to light. Perform this step, and the steps after this, under subdued or safelight conditions.

Once the second coat of albumen has been dried and flattened with heat, re-crease the folds a third time. Manipulate the paper with a few gentle bends to help it lay flatter. A few curves in the paper will not hurt, as it will relax and flatten out while floating in the silver nitrate bath.



Float the albumenized paper on the surface of the Silver Nitrate solution for 6 minutes. The paper will become sensitive to light during this step, so limit the amount of UV light in your darkroom.



Float the albumenized paper on the silver nitrate bath for 6 minutes. These images were captured under normal room lighting, for illustrative purposes only. **Always use subdued lighting during this step and those following this step.**

After floating the albumenized paper on the silver nitrate solution, grasp the paper from diagonal corners and lift the paper from the silver bath. Hold the paper from one corner, and allow the extra silver nitrate solution to drip back into the tray. Let the silver nitrate drip from the sensitized paper until there is a minimum of 20 seconds between drops.

Hang the sensitized silver-albumen paper to dry. Place a plastic tray or blotter paper under the paper to catch any silver nitrate drips.



It is normal for the Albumenized and Silver-coated Albumen paper to curl as it dries. You can manipulate the paper with gloved hands after it has dried completely. Sensitized paper is shown here drying under yellow-red safelight conditions.

Exposing The Image

Once the silver-sensitized Albumen paper has dried, it is light sensitive and ready to expose with the negative.



The negative and sensitized albumen paper are placed in a split-back contact printing frame for exposure, and to allow inspection during the exposure.

Sandwich the sensitized paper and negative together in either a split-back contact printing frame, between two pieces of heavy glass, or in a vacuum easel. We find that a split-back frame works well for this process, because the artist can inspect the image in the midst of an exposure, without disturbing the registration of the negative in relationship to the paper.

Expose the negative and sensitized paper to high intensity ultraviolet light to form the image. Depending on the light source and negative used, exposure times can take anywhere from as little as 5 minutes to as long as an hour. The artist may periodically inspect the image by opening one side of the split back frame, folding the image back, and briefly judging the progress of the exposure.

Remove the print from the UV light source once the exposure is at the desired density. The artist can inspect the progress of the exposure under normal room light, as long as it is done for no more than 10 seconds at a time. Never open the split back frame to inspect the exposure outdoors or in direct sunlight, as this will lead to fogging of the image highlights.



The negative and sensitized paper are placed in a split-back contact printing frame and exposed in a UV exposure box. Open only one half of the frame when inspecting the image for exposure. This helps ensure the negative and paper maintain proper registration.

Washing the Print

Perform this step under safelight or subdued lighting. The image is still light sensitive during the initial washing process.

Remove the exposed albumen image from the contact printing frame and place it in the wash tray with a steady stream of cold water. Wash the print for a **minimum of 25 to 30 minutes**. The wash water will often turn a milky blue/gray as it removes unexposed silver nitrate from the print.



Wash the exposed image for 20 to 30 minutes under a steady stream of cold water from the faucet. The water will turn cloudy if your municipal water source has chlorine in it. Water from a local well should not contain high amounts of chlorine, so the water will not turn as cloudy as with a municipal water supply.

While the print is washing, dump all of the wash water from the tray once every five minutes. Allow fresh water to refill the tray. Perform this complete change of water a minimum of 5 times over a period of 20 to 30 minutes.

Note: Any extra silver nitrate left in the print will cause anomalies, such as brown spots and foxing, which will not be immediately visible, but can form on the print at any point in the future. Albumen prints require long washing and processing times, similar to fiber based silver gelatin papers.

Gold Toning the Print

After the initial wash, Albumen prints are typically processed in a gold toning bath to increase the archival permanence of the print, as well as adding a pleasing aubergine color to the image highlights and midtones. Gold toning typically takes place directly after the initial wash, while the paper is still wet.

Mix 50ml of .2% Gold Chloride together with 50ml of 2% Ammonium Thiocyanate in 900ml of filtered or distilled water to make a working strength toning bath. The gold toning bath has a usable life of 12-16 hours before it will become exhausted and inert. Mix a fresh toning bath for each days' printing session.

Make a half batch of gold toner for smaller printing sessions. Mix 25ml of Gold Chloride .2% and 25 ml of Ammonium Thiocyanate 2% into 450 ml of water for a smaller bath.



Place your wet print in a tray with the gold toning bath. Agitate the tray every 30 seconds to keep fresh toning bath circulating evenly across the image. Tone the image for 5 minutes.

After the image has been toning for a five minutes, remove the wet print from the toning tray, and move it to the Fixer bath.

Replenish the toning bath after processing 3 images on 8"x10" paper. Add 1 capful of .2% Gold Chloride to the gold toning bath to replenish the toner.

Fixing The Image

The gold toned Albumen image must be “fixed out” in order to make the image permanent. This step chemically removes any unexposed or undeveloped silver remaining in the paper, and makes the image archivally stable. This step can be done under normal room lighting conditions. No safelight is needed during or after this step.

Mix 100 ml of B&S Rapid Fixer with 900 ml of distilled or filtered water to make 1 liter of working strength fixer. This bath will generally fix out 8 to 10 images on 8x10 paper before it becomes exhausted.

After toning, transfer the wet print from the Gold Toner bath directly to the Fixer bath. Submerge the print into the fixer completely, then agitate the tray once every 30 seconds, for a total of 6 minutes in the fixer.

It is normal for the image color and density to show changes during the fixing process. The print will “dry down” after the final wash, regaining any lost density.



Place the gold toned print into the Fixer Bath for 6 minutes, agitating regularly. It is normal for the image to lighten slightly in the fixer.

Final Wash & Drying

After 6 minutes in the fixer bath, transfer the print to the wash tray. Wash the print with a steady stream of cold water for 30 minutes, agitating the tray once every minute. Shorter washing times can leave unwanted chemicals in the paper, leading to brown spots and image bleaching at any point in the future.

After a 30 minute wash the print can be removed from the washing tray. Place the print on a sheet of glass or plexi-glass (Perspex) and squeegee the water from the surface. Alternatively, the artist can blot the image dry with a paper towel to prevent water spots from forming while drying.

Prints can take 2 to 3 hours to dry completely. During this time, the shadow density will deepen to a warm, rich tone and the highlights will take on a red/pink color.

Flatten dry prints in a drymount press set at 200-225 degrees Fahrenheit. Use archival, acid free matte board when framing, or store the prints in an archival portfolio box. Properly processed Albumen prints should be archivally stable for several hundred years. Display and treat the prints as you would any other silver-based monochrome photograph.

For more information or for tech support questions, call the experts at Bostick & Sullivan. Call toll free 877-817-4320 Monday thru Friday 9 to 5 mountain time to speak with one of our tech support staff.