

How to Make the Ultimate Silver Print

Azo Silver Chloride Paper

By Michael A. Smith

Introduction:

When I first wrote about Azo contact printing paper almost ten years ago, few had heard of it and fewer still printed on this unique and remarkable paper. That has changed somewhat. Today few large-format photographers have *not* heard of it and hundreds have at least tried it.

In his book, *Examples*, when discussing the photograph, *Tenaya Creek, Dogwood, Rain*, Ansel Adams wrote, "Many years ago I made a print of this negative on a contact paper that, when fully toned in selenium, had a marvelous color. It is one of the most satisfactory prints I have ever made, and I have not been able to duplicate it with contemporary enlarging papers. The paper I used might have been Agfa Convira or Kodak Azo. Both were coated with silver-chloride emulsions, which tone faster and give more color than the predominant bromide or chloro-bromide emulsions of today." This statement has always made me wonder why Adams didn't use Azo more often. Surely he saw that it was a finer paper than the enlarging papers he was using.

What is Azo:

Azo is the last silver chloride photographic paper still being manufactured today. Silver chloride papers have slow emulsion speeds and because the exposure times through an enlarger would be unduly long, they are not suitable for enlarging, but only for contact printing. (This has historically been true, but in the past year a light head that enables enlarging onto Azo has been invented.) Silver chloride papers characteristically yield prints with an extremely long and smooth tonal scale—longer and smoother than is possible with enlarging papers and, by some reports and measurements, prints with a longer tonal scale than those printed on platinum paper.

The long scale of the paper insures that the dark tones and high values do not block up, but hold full detail, even without dodging and burning. The curve of the paper is a long straight line, with little toe and little shoulder. In addition, prints on silver chloride papers have more contrast in the midtones, giving the prints a glowing richness and greater depth. The magnificent contact prints of Edward and Brett Weston, Ansel Adams, Frederick Sommer, and the other great photographers from the late 1920s through the early 1950s were all made on silver chloride contact printing paper.

Azo is also the longest continuously manufactured photographic paper ever made. It was first introduced by Photo Materials Company in Rochester back in 1898. In July of that year Kodak bought out Photo Materials, and has continued producing Azo ever since.

My early experiences with Azo:

In 1966, when I first began to make photographs using a 35mm camera, the camera store I dealt with told me that if I would be making contact sheets as well as enlargements I would need contact printing paper. They sold me a 100-sheet box of Azo.

The quality of those first contact sheets was far better than my enlargements—the blacks were richer and there was a glow to those small prints that I just couldn't get in the enlargements. At that

time, and for many years after, I assumed the inferior quality of the enlargements was due to the enlarging process. It was not until later—after I had spent eight years making contact prints on chloro-bromide or bromide enlarging papers and still could not achieve the quality of those Azo contact sheets—that I came to realize that the problem was due to the enlarging paper itself.

As I learned more about fine print quality, I experimented with many papers, the following among others: Kodak papers—Kodabromide, Medalist, and Polycontrast; Agfa papers—Brovira and Portriga Rapid; and DuPont papers—Velour Black and Varigam. I settled on Velour Black. After only nine months of working in 35mm, I began using an 8x10-inch view camera and began making only contact prints, but I continued to use Velour Black. From time to time I would hear murmurings about Azo, and about once a year would try to make prints on it, but I was unable to do so to my satisfaction. In 1975 I showed my photographs to Dody Thompson, who was once Edward Weston's assistant, and she confirmed that something in my prints was missing. I determined to learn to print on Azo. I have now been printing only on Azo for thirty years.

About twenty years ago I resolved to reprint all of my earlier 8x10-inch negatives on Azo—negatives that originally had been printed on Velour Black, a chloro-bromide enlarging paper. Even though I had been printing with Azo for ten years, I was still surprised by the difference in the quality of those reprints. They were remarkably and vastly improved. In some cases, the new Azo prints looked almost as if they were from different negatives. And the printing process was far easier and quicker—less dodging and burning was required, and I still got more detail in the highlights and in the shadows, and the deepest blacks were much richer.

How to use Azo:

Exposing:

Silver chloride papers are much slower than enlarging papers. For making contact prints, exposure through an enlarger is impractical; the times would be prohibitively long. I recommend using an R-40 300-watt light bulb, one with the silvered part on the neck of the bulb. Depending on one's average negative densities, the average exposure should be between 10 and 20 seconds, but fine prints can be made with exposures as short as 3 seconds and as long as 3 minutes. Azo can handle almost any negative. For making enlargements, the newly invented light head allows normal exposure times. No other adjustment is needed other than getting the light head, which fits all 4x5 Beseler and Omega enlargers.

To make contact prints, any contact-printing frame, or even a piece of heavy glass, will work fine, but a vacuum frame is ideal. It is much quicker than a contact-printing frame. (So that the noise of the vacuum pump is not a distraction, I keep it outside of the darkroom, two rooms away, running a long hose under the floor and through the walls.)

Dodging and burning take place between the light and the negative, not between the negative and the paper, as with enlarging. To dodge a large area I use a large card and hold it close to the area being dodged. You can't raise a small card closer and closer to the light bulb as you can when an enlarger provides the light source. Keep in mind that Azo's long tonal requires far less dodging and burning than is required with enlarging papers. As stated earlier, dark areas of Azo prints will not block up; they will retain openness and detail. At the other end of the scale, the highlights will not wash out easily; they hold tone and detail into the lightest areas. This is one of the reasons that Azo is extremely easy to use.

Development Time:

Here is another area where working with Azo is significantly different (and easier!) than working with enlarging papers. Where enlarging papers usually take between two and three minutes to develop, the ideal developing time for Azo is only one minute. Rarely is more developing time necessary or desirable except with the newest emulsion batch of grade 2, which seems to require a minute-and-a-half to two minutes developing time. In general, the longer the developing time, the cooler Azo becomes and the more “on the surface” the image seems to be. With shorter developing times, Azo is warmer and appears to have more depth in the print, as if the image is *in* the paper. Scientifically, this may be the exact opposite of what is actually happening; usually, the longer the development time, the more in the depths of the emulsion the image is physically, but here one’s visual perceptions must override scientific explanation.

Developer:

I have used Amidol since 1970 when I was still contact printing on enlarging paper. While my decision to use Amidol may have been originally determined by the approach, “If it was good enough for Edward Weston, it is good enough for me,” use of this print developer for thirty years has convinced me that it has significant advantages over other more commonly used developers. Other developers yield prints that are either too contrasty or too flat or that have an “off” color.

Amidol is the most active developer known—it has the greatest reduction potential of any developer. However, in this formula, it is a soft-working developer. The major difference between this formula and other Amidol formulas is the extremely small amount of potassium bromide used. That’s the secret. The citric acid acts as a buffer and extends the life of the developer. Contrary to the rumor that Amidol lasts for just 15–20 sheets of paper, a tray of developer can be used for an entire printing session, lasting all day long. Eighty to 100 sheets of paper can be processed in 1,500 cc of developing solution with no reduction in developing strength.

	<u>1 liter</u>	<u>3 liters</u>
Water	1 liter	3 liters
Sodium Sulfite	30 grams	90 grams
Citric Acid	3 grams	9 grams
Potassium Bromide (10% solution)	2 cc.	8 cc.
Amidol	8 grams	20 grams

Note that in tripling the volume of water, not all of the ingredients are tripled; the Amidol is only increased two-and-a-half times and the Potassium Bromide is increased four times. For quantities larger than three liters or in between one and three liters, simply extrapolate.

Amidol and the use of a water bath:

Sometimes it happens that a negative prints too soft on grade 2, and too contrasty on grade 3. When using a water bath a compensating action occurs and it is possible to get to any point in between those grades.

The print is first immersed in the developer with full agitation. Then at the appropriate moment, the print is taken out of the developer and put in a tray of water for the remaining development time, but now with no agitation. The total development time does not change. The longer the print is in the water bath, the lower the contrast will be. What happens in the water bath is that the darker areas of the print will stop developing, having used up all of the developer that was in contact with the paper at those locations. In the highlights, development continues. The result is a print with both fully detailed highlights and open shadow areas. Relative to the highlights and shadows, the mid-tones are unaffected. By using one grade of paper higher than necessary and the

proper use of the water bath, it is possible to get the lighter and darker tones the way they would be on the softer grade, yet having the midtone separations of the higher grade. This imparts a wonderful glow to prints that would otherwise be either a little too dull or a little too contrasty. Use of a water bath in this way is not unlike the use of a two-developer method (Dektol and Selectol-Soft, for example), but the use of a water bath is much easier.

Water bath development works particularly well with Amidol because it is the most powerful of the known developing agents. Because its reduction potential is so high it is not necessary to go back and forth from the developer to the water bath as would be the case with another developer. To use Azo and Amidol in this way, go from the developer to the water and then directly to the stop bath. The time in the water bath counts as time toward the one-minute development. Of the one-minute development time, an average water bath use would be half the time, or 30 seconds. However, I once made a print with as little as 12 seconds in the developer and 48 seconds in the water. At the other extreme, I have also used as little as 10 seconds in the water bath. To know when to transfer the print to the water bath, look at the dark tones; when they start coming in to about 60%–80%, it is time to make the transfer. Too much time in the water bath (over 35 seconds or so) can sometimes result in streaking. One solution I have found is to ever so slightly move the print in the tray of water; that is, use the smallest amount of agitation.

The use of Amidol as a print developer complemented by the inherently long scale of Azo makes for an extraordinary combination. Used together, especially with a water bath, there is no need to resort to time-consuming, complicated, or esoteric processes and methods such as the use of ferricyanide and masking. And because far less dodging and burning are required than when using enlarging papers, printing becomes a real pleasure with Azo and Amidol.

Toning:

My only experience with toning Azo is with Rapid Selenium Toner. Older Azo was noted for its ability to split-tone. Newer Azo does not split-tone as well, but will change color drastically if left in the toner too long. I recommend toning with highly diluted selenium toner—a dilution of 1:128 for three to four minutes at 68°F. This is toning primarily for archival permanence, but even with this modest amount of toning the slightly green cast of Azo will be eliminated, and a slightly warm tone will result. Excessive time or more selenium will yield an eggplant color.

Care of Handling:

Azo is available only in single weight. After years of using double-weight enlarging papers, I was quite concerned about using single-weight paper when I began printing on Azo. But I quickly found that with careful handling, damage was infrequent. I also learned that single-weight paper dry mounts better, the surface being closer to the mount board. To handle single-weight paper there is only one bit of advice: Do not hold the paper with the thumb on one side pressing between two fingers on the other side. If you do, invariably a crescent shaped crease in the emulsion will result where your thumb falls between your two fingers. Instead, hold the paper between the thumb and just one finger. And never use tongs when processing the paper.

Availability of Azo:

Although Azo was previously manufactured in grades 0 through 5 and in a wide variety of sizes, due to lack of demand, it now only comes in grades 2 and 3 and only in two sizes. In the table below are grades, sizes, and quantities that are still available. It is possible that as those who make enlargements discover the new light source for enlarging with Azo, on 11x 14 and 16x20 sizes and

perhaps even different grades, it will once again become available. Kodak is paying attention to these new possibilities.

	<u>8x10</u>	<u>20x24</u>
Grade 2 SW	100/500 sheet boxes	50 sheet boxes
Grade 3 SW	100/500 sheet boxes	50 sheet boxes

Keeping properties of Azo

Azo has tremendous keeping properties. In the mid-1980s a friend gave me a box of 8¹/₂ x 11 grade 4. It was ten years out of date and had been stored unrefrigerated in the hot, humid conditions of New Orleans. The storage conditions had been so poor that the box had water stains and was swollen from the dampness. When I used it, however, the paper was perfect. Now, fifteen years later, the paper is still fine. Although it has lost a little bit of contrast, it is now a perfect grade 3¹/₂.

A few years ago I received a call from a photographer who had found a box of Azo that was so old that it predated the yellow packaging and was in a green box. He found the paper to be not only usable, but also not fogged and good for making fine prints. It had been stored unrefrigerated.

Gordon Hutchings, after seeing my photographs and those of Paula's, recalled Edward Weston's photographs and retrieved some of his Azo that had been stored unrefrigerated for twenty years on the top shelf of a closet. This was in the Central Valley in California where summer temperatures reach 100°. He reported, "The paper printed perfectly."

Summary:

I strongly recommend that anyone wanting to make the finest silver prints possible give Azo a try. Not only will your prints be richer and more glowing, but you will find the printing process to be significantly faster and easier, which will give you more time to make new negatives—or fresh incentive to print a backlog of unprinted negatives. Once you make contact prints on Azo you may never want to go back to using any other paper.

More information about Azo can be found at www.michaelandpaula.com under "Azo." There are additional articles and there is the "Azo Forum," a serious and comprehensive forum where all questions are answered.