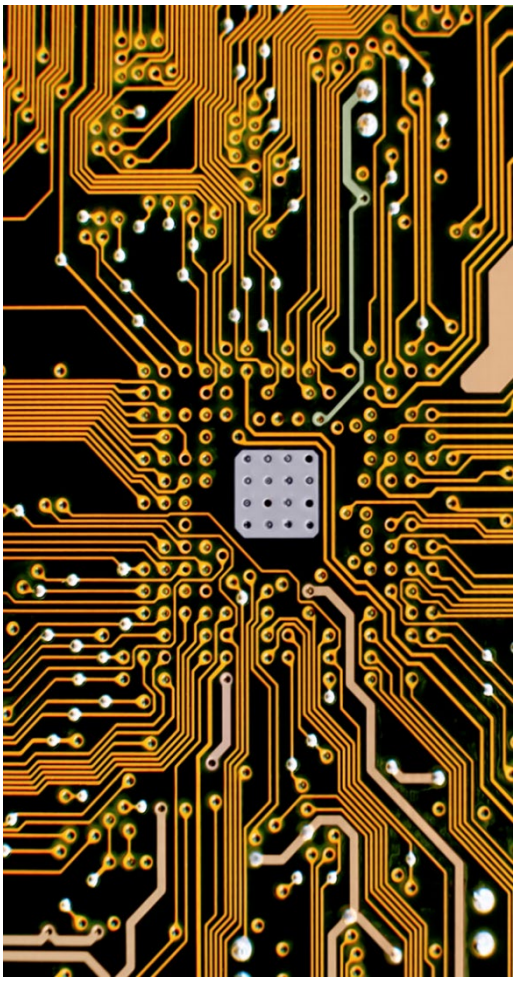
Simple Steps for Better Development of Diazo Films

Giving the developer a 30-minute warm up can make all the difference in performance

I'd like to look at the other critical phase in diazo phototool development. Unlike silver films, which can be over processed if the chemistries are not in sync, diazo films can never be overdeveloped. Here's a checklist of equipment setup and maintenance issues.



- Developer must be level to ensure proper ammonia flow.
- Locate the developer in an area where temperatures don't exceed 78°F. This helps prevent a vapor lock condition at the ammonia metering pump.
- Position the developer to simplify maintenance. Every month, wipe down the main drive belt or rollers, clean the Teflon mesh screen, vacuum any dirt and debris, lubricate parts, and advance the tubing on the metering pump.
- Proper venting is essential. An auxiliary exhaust system that vents to the outside may be needed to supplement the developer's internal blower. But don't over-vent: this can deplete the levels of ammonia and heat that are essential to developing the phototool film. A 500-cfm auxiliary blower with an attached adjustable damper is a popular remedy. Or try this: Use 2" PVC pipe running from the developer along a wall up to the building roof. Place the adjustable damper in line on the PVC pipe within easy reach of developer, then place the blower just below the roof line. Adding a weather cap on the roof outside will help prevent a backflow condition.
- Keep the metering pump tubing free of kinks, pin holes and outside pressure. These conditions can restrict flow of ammonia to the developer. The result is often an under-developed phototool and possible overheating which can dimensionally change the film.
- Typically, developers come with a drain system for evacuating condensation. Make sure the tubing is free from any obstructions or kinks that could restrict drainage. Regularly check the drainage bottle and empty as required. Never put the drain bottle solution back into the developer as it is mostly water.
- If the developer is belt driven, be sure belt tension is properly adjusted. If there is too much tension, heat and ammonia will escape the development chamber and the dimensional stability of the film could be altered. Too little tension and the film will not be driven into the unit or will stall.

There is no such thing as a one-pass developer! Sure, many developers can achieve full development if all conditions are perfect, but they rarely are. Seldom is only one piece of film processed. As a rule, process each piece of standard diazo film three times through the developer; four times when using chemical resistant diazo films.

Each time you pass the film through the developer, it draws both ammonia and heat from the developer. Also, most jobs have more than one sheet of film. A developer must have time to replenish itself.

Remember these simple A-B-Cs of diazo development:

A. Maintain a temperature range of 150 to 160°F at the film plane.
B. Use ammonium hydroxide with a strength of 26 to 30 baume.
C. Maintain a moist (vaporized) developer chamber environment.

- Maintain the correct temperature range to ensure proper development and prevent dimensional change. Use a 140 to 180° temperature tape to verify the "film plane" temperature. Place the temp tape on the sensitized side of the film and pass it through the developer. Look for a reading between 150 and 160°F.
- If a developer is too cold, the film will not fully develop. If too hot, expect dimensional change to the finished phototool. Also, never assist the film to leave the developer. Even the slightest tug can dimensionally alter the film.
- Turning a developer on and off during the day can compromise film development and performance. Always (!) give the developer 30 min. to warm up. When the developer is first turned on, the heat will spike up. As the ammonia is heated and vaporized, it cools down the developer. After 30 min. or so, the system should balance and remain constant. Many developers in the field have a thermometer located on the side of the unit. This only reads the developer tank temperature, not the "film plane" temp (what the film actually sees). We are only concerned about the film plane temperature. The only way to know the film plane temp is by using a temperature tape. These are readily available from the film manufacturer and/or distributors.

Many shops use technical grade (also called diazo grade) ammonia. Because it's cut with tap water, minerals from tap water will build up deposits on the evaporator tray. That inhibits free flow of the ammonium hydroxide. Specify semiconductor approved, analytical reagent (pure ammonia) or U.S. pharmaceutical grade ammonium hydroxide, 28 to 30 baume. This costs a little more but helps improve the efficiency of the developer. Never use ammonia that is less than 26 baume, Use a hydrometer to test baume levels and change out the ammonia as needed.

Most developers use a metering pump to provide a steady flow of ammonia. The ammonia flows along an evaporator v-tray with a heating rod under it, which heats the ammonia to a "vapor" - hence creating a "moist" environment. This type of system provides the optimum environment to develop the phototool in the fewest number of passes. Some developers have a bottle attached on the back; a technician must pump the bottle before each use. Other units pump (blow) air into a small ammonia bottle within the machine. Both of these designs can compromise development by either not being pumped before each use (or not enough "pumps"), or by not changing out the ammonia frequently enough (the air being pumped into the ammonia depletes the ammonia concentration.

Verify the amount ammonia being delivered by the metering pump. Take a beaker and place the metering pump tubing in it. Turn the pump on. It should deliver 15 to 17 rnl in 10 min.

Because diazo is such a simple process, operators tend to take the process for granted until a critical job shows up, then everyone panics. Much better to simply monitor the process. With the right equipment and training, a skilled artwork technician can monitor the entire process in five minutes.

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