

Darkroom Design for Amateur Photographers



When you take a pleasing photograph, develop the film, and make a print, there is a lot of satisfaction in knowing the photograph is all yours—you carried it through from start to finish. In addition to the advantage of being able to do your own custom darkroom work, we think you will get a lot of enjoyment out of developing and printing your own film. The first thing you will need is a darkroom.

DARKROOM PLANNING

How elaborate you make your darkroom will depend primarily on your need, finances, and space. To develop an occasional roll of black-and-white film, almost any makeshift arrangement will do. If you want to make prints and enlargements as well, you may want a well-equipped room that is conveniently arranged and properly heated, lighted, and ventilated.

The room must be lighttight. To check for stray light, stay in the darkroom for 5 minutes with all the lights turned off. After 5 minutes, if you still cannot see a sheet of white paper placed against a dark background, the room passes inspection. If there are light leaks, you will be able to see them because your eyes will have become adapted to the dark. Eliminate small light leaks with black tape. For large ones, such as a crack around a door, use dark heavy cloth or weather stripping.

For your health and comfort, make sure your darkroom is properly vented to allow fresh air into the room, especially during chemical mixing and processing operations. Check with your photo supply dealer for availability of lighttight vents, or check the photo magazines at your local library for articles on building lighttight ventilators. Also, be sure to follow the safety recommendations given in the instructions, labels, and Material Safety Data Sheets for the processing chemicals. The Material Safety Data Sheet (MSDS) is available for every KODAK Chemical, and tells you how to store, handle, and potential hazards of these products, along with recommendations for first aid and cleanup of spills. For further information on darkroom venting and safe handling of chemicals, refer to the Safe Handling of Kodak Processing Chemicals section on page 5 of this publication.

Safelights

Arrange your safelights so that they provide as much light as possible, but keep them at a safe distance—at least 4 feet (1.2 metres)—from your working area. Use a safelight equipped with a bulb and the filter recommended on the paper (or film) instruction sheet. You can make a simple safe-light test as described below. This test can be performed with both black-and-white and color materials.

1. Set your enlarging easel to give ½-inch (13-millimetre) white borders for the paper size you will use in the test.
2. Place a normal-contrast negative typical of your work in the enlarger. Be sure the clear borders of the negative are completely masked.
3. Size and focus the image on the easel.
4. With all safelights on, make a good-quality print on a photographic paper yielding normal contrast. Develop for the recommended time in your paper developer. Mark this print #1.
5. Turn the safelights off. In total darkness, expose and process print #2 in the same way as print #1.
6. Keeping the safelights off, expose print #3 in the same way as print #2. Do not develop print #3.
7. With the safelights still off, place a piece of cardboard over the developing tray and put print #3 on it, emulsion side up. Safelight illumination is generally brightest in this location. Cover one-fourth of the print with an opaque card and turn on all the safelights. In the same way that you would make an exposure test strip, expose print #3 to the safelight for 1, 2 and 4 minutes, in steps. This gives four steps with safelight exposures of 0, 1, 3, and 7 minutes superimposed on the image exposure. Develop the print for the same length of time as print #1 and #2, with safelights turned off.
8. Fix, wash, and dry all the prints in the normal manner.
9. Compare the prints. Prints #1 and #2 should be identical. If print #1 shows lower contrast or fogged highlights when compared with #2, you have a serious safelight problem. Be sure that the safelight filters (especially the one over the developing tray), bulb wattage, and distance and number of safelights are consistent with the recommendations on the paper instruction sheet. If all three prints are identical, your safelight conditions are good. If print #3 shows slight fogging of highlights in any of the safelight exposure areas, it is a warning to limit the time of exposure to safe-light illumination to a time that will produce no fogging. Note that fogging from safelight illumination will show up in areas that have already received some exposure before it will show up in the white borders. For this reason, safelight fog may go unnoticed unless the safelights are tested correctly.

In planning a darkroom, the main objective is to arrange your equipment and materials for efficiency and convenience. One of the most important requirements is to provide for a flow of work that can be done in the least amount of time with minimum effort. Another consideration is cost. Here are some desirable features for darkroom design and some suggestions you should consider in setting up your darkroom.

TEMPORARY AMATEUR DARKROOM

For developing black-and-white films and making prints, you can get started with only a minimum of equipment plus an easily darkened kitchen, bathroom, or any other room that has an electrical outlet. For night work, you can use practically any room as a darkroom; however, you should pull the shades or cover the windows with some dark material to exclude light from streetlamps, car headlights, or nearby lighted windows. A sink and a supply of water are desirable but do not have to be in the same room. The kitchen is probably the most convenient place to set up a temporary darkroom, since it is supplied with running water and electrical outlets, and the sink and counters provide adequate working space.

When space is not available for setting up a permanent darkroom and you must work in a room regularly used for other purposes, some darkroom conveniences have to be sacrificed. However, always try to arrange your equipment to allow a smooth, convenient flow of work from your enlarger through the developer and stop bath to fixing and washing. You should have a large tray filled with water for washing your prints. The KODAK Automatic Tray Siphon (available from the Tiffen Company at www.tiffen.com) is a handy gadget for converting an ordinary tray into an efficient print washer. You should also have a container of water to rinse the solutions from your hands. This helps prevent contamination of your developer with other solutions. Use a clean towel to dry your hands thoroughly before handling film, negatives, and photographic paper. Group your equipment so that you can perform all operations with a minimum of steps, but allow sufficient working space. One suggested arrangement for a kitchen darkroom is shown in Figure 1.

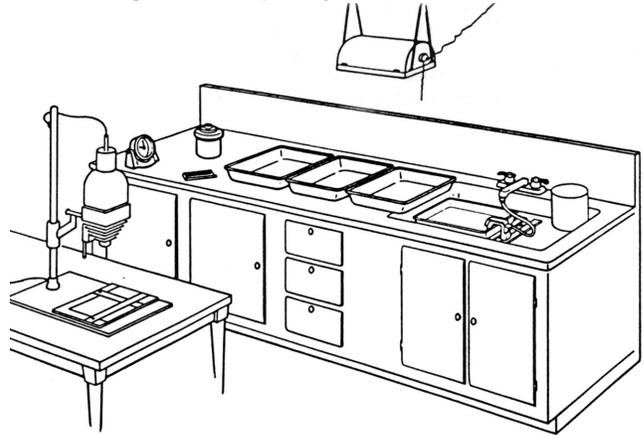
It is helpful to have a table or other separate work area on which you can perform all the dry operations, such as printing and loading film tanks. This prevents water and solutions from splashing on equipment and dry materials. Set up all wet processing operations in or near the sink.

If there is no lamp socket over your processing area, use an extension cord to suspend the safelight over the processing trays. Keep the safelight at least 4 feet (1.2 m) from your trays. A good safelight to use is the KODAK Darkroom Lamp, CAT No. 152 1178, or the KODAK Adjustable Safelight Lamp Model B, CAT No. 141 2212, with the appropriate safelight filter. These lamps accept a 5.5-inch circular filter and are available from your photo supply dealer.

The best way to develop your film, especially in a temporary darkroom, is to use a film-developing tank. Since these tanks are lighttight, any light that might leak into your darkroom would affect the film only during the time you are loading it into your tank. This minimizes the danger of light fogging your film, a frequent source of trouble. Check for stray light in your darkroom by following the procedure described under “DARKROOM PLANNING.” After you have placed the cover on your film tank, you can turn on the white lights during development and the remainder of the processing steps.

A changing bag—a large bag made of several thicknesses of opaque material—will allow you to load your exposed film into the developing tank with the room lights on. One side of the changing bag has a lightproof opening to insert your film and developing tank. The other side has lighttight sleeves for reaching inside.

Figure 1 Temporary Kitchen Darkroom



With a temporary darkroom, it is important to consider ways of reducing the time and energy required to prepare the room for use and to clean it afterward. For instance, keeping all of your darkroom equipment in one or two boxes reduces both the time spent collecting equipment and the chance of misplacing something.

While the kitchen usually makes the best temporary darkroom, other rooms will serve, too. One possibility is a bathroom. However, although it has running water and electricity, there is usually not enough work surface to support trays and apparatus. You can make a work surface by placing a piece of plywood across the bathtub, but processing trays will be uncomfortably low. Sometimes it is possible to set up a folding table to hold your trays and printing equipment. Protect the tabletop from spilled solutions by covering it with a plastic tablecloth.

You can also use a small closet for a temporary darkroom. A closet is usually easy to make dark, even in the daytime. However, this is its only advantage, since it will have no running water and possibly no electrical outlets. Moreover, the closet probably will be filled with its normal contents. If your closet has shelves, perhaps one of them is located at a convenient height. If not, you may be able to install a removable shelf or use a small table. In any case, place a waterproof material under the trays to catch any spilled solutions.

PERMANENT AMATEUR DARKROOM IN A SMALL CLOSET

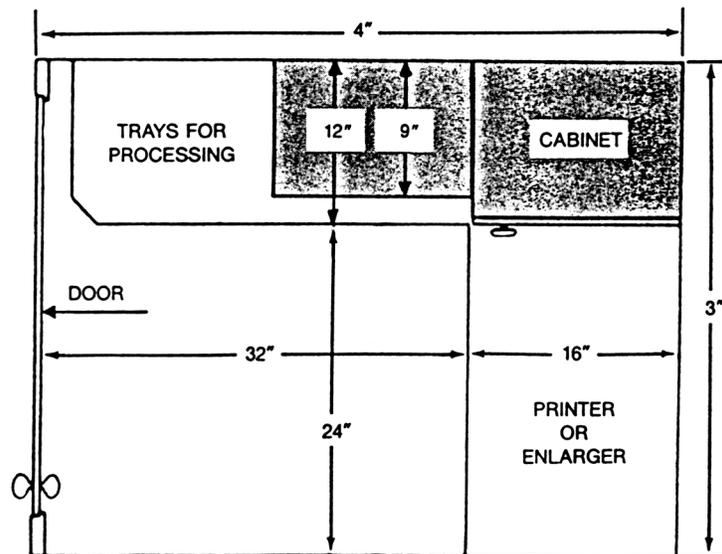
A permanent darkroom is much more convenient and saves a lot of setup time. If you have only a small closet available, make sure you utilize the space efficiently.

A closet, of course, will not have running water, but this is not too important if there is a sink nearby where you can wash your negatives and prints. However, the closet must have electricity available. If there is no light socket in the closet, it is usually easy and inexpensive to have one or two outlets installed. It is desirable to have one socket in the ceiling for the white light, and a double electrical outlet on the wall above the bench for plugging in your safelight and your enlarger or printer. Have a licensed electrician install or inspect the wiring to make sure that all wiring conforms to the electrical wiring code.

Figure 2 shows the arrangement of shelves for transforming a 3 x 4-foot (0.9 x 1.2 m) closet into a darkroom suitable for developing film and making contact prints and enlargements up to 10 x 12 inches (25.4 x 30.5 cm). The 12-inch shelf is 3 feet from the floor and holds the developing, stop bath, and fixing trays. The 16-inch (40.6 cm) shelf is the same height and supports your printer or enlarger.

A cabinet in the corner (upper right corner of drawing) on the wall above the processing shelf provides convenient and safe storage for your black-and-white paper supply. (Color paper should be stored under refrigeration. See the paper package and storage requirements.) A shelf about 9 inches (22.9 cm) wide and 2 feet (0.6 m) above the processing shelf extends along the wall next to the cabinet and provides shelf space for a timer and other small items. This shelf should extend no farther than about 15 inches (38 cm) from the end of the processing shelf below so that it does not block the safelight illumination above your developing tray. Mount a safelight, such as a KODAK Darkroom Lamp or KODAK Adjustable Safelight Lamp Model B, on the wall or ceiling no closer than 4 feet (1.2 m) from the processing shelf. You can store bottles of processing solutions on the floor under the tray shelf. Store the unmixed chemical concentrates in dry conditions, at temperatures between 40 and 86°F (5 - 30°C), away from direct sunlight or sources of heat, and away from food.

Figure 2 A Closet Darkroom



A RECOMMENDED AMATEUR DARKROOM

Although you can produce good work in a closet darkroom, it is preferable to have a larger darkroom equipped with running water. With more room, you can make bigger prints, and you will have space for additional equipment. For example, in the darkroom we are going to describe, you can conveniently process color film and make color prints.

Location

Where you decide to locate your darkroom will depend primarily on the space available. However, you should also consider convenience, temperature, and humidity.

Although a room on the first or second floor is suitable for a darkroom, a dry basement is usually the ideal location. If your basement is damp, you can make it drier by using a dehumidifier, available from appliance and department stores. The ideal relative humidity for darkroom work is between 45 and 50 percent; the ideal temperature is between 70 and 75°F (18.5 and 21°C). It is usually easier to maintain this temperature in a basement than in any other part of the house. Furthermore, hot- and cold-water connections and electrical connections are generally available in a basement. Another advantage is the ease of making a basement light-tight. Most basements have only a few small windows that you can easily cover with a piece of fiberboard or dark cloth.

One more advantage of the basement darkroom is that spilled solutions are likely to cause little damage. However, all spilled solutions should be wiped up immediately.

A damp basement without a dehumidifier is not a good location for a permanent darkroom. Dampness causes mildew and rust on supplies and equipment. It also causes deterioration of films and papers, which can result in weak, mottled pictures. However, if you must use a damp location, store your chemicals, films, and printing papers where it is cool and dry, and take them to your darkroom only when you need them.

An attic is another location that is usually not satisfactory for use as a darkroom. Unless it is well insulated, an attic is likely to be too hot in the summer and too cold in the winter. Also, it is usually difficult and expensive to install plumbing in an attic.

Size

The layouts for some recommended darkrooms, shown in Figure 3, are designed to provide the utmost convenience in the flow of work.

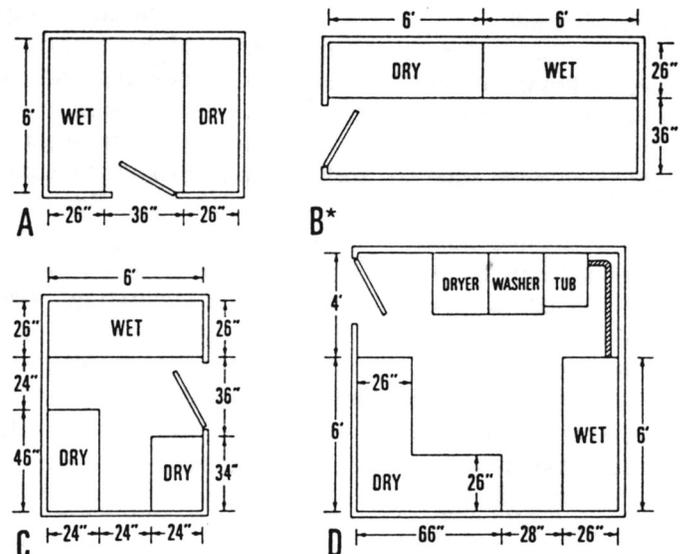
You can close off the darkroom space from the rest of the area with partitions of wallboard. Partitions will help keep the darkroom free from dust and also prevent light from entering the area if someone opens the door to the basement. As a precaution, post a sign that reads **DARKROOM IN USE—KEEP OUT** on the darkroom door.

Capability

You can use the darkrooms illustrated in Figures 3 and 4 for both black-and-white and color work. They are designed so that you can process roll film or sheet film; make contact prints; and make enlargements up to 16 x 20 inches (40 x 50 cm) or larger, depending on the size of your processing equipment.

These basic layouts are designed for areas which are equipped with running water. If you choose a basement location, you can connect your darkroom sink drainpipe to the existing drain and trap for the laundry tub. For plans A, B, or C, the darkroom can be built adjacent to the laundry area with the drainpipe passing through the wall to the nearby laundry tub. Plan D shows a way to solve the problem when the laundry tub and existing drain are located in a corner. The solution here is a combination laundry room/darkroom. (Note the routing of the darkroom sink drainpipe.)

Figure 3 Alternative Darkroom Plans

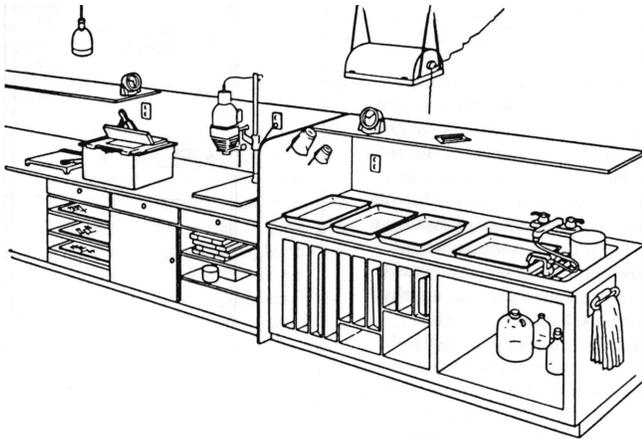


You can also readily adapt the room for other types of work, such as copying. The darkroom layouts are arranged so that you can work efficiently with a minimum of wasted motion. They are also designed so that two or more people can divide the various operations and work together without interference. You can dry negatives by hanging them with spring clothespins or film clips on a galvanized wire suspended between two walls in your darkroom. To keep construction costs at a minimum, you can omit conveniences such as tray racks and cheesecloth-covered frames for drying prints (shown on the shelves under the contact printer).

Arrangement

The darkroom units shown in Figures 3 and 4 consist of a dry bench (or benches) and a wet unit, each 26 inches (66 cm) wide. You can either have them built in a woodworking shop or assemble them yourself from ready-made kitchen cabinets.

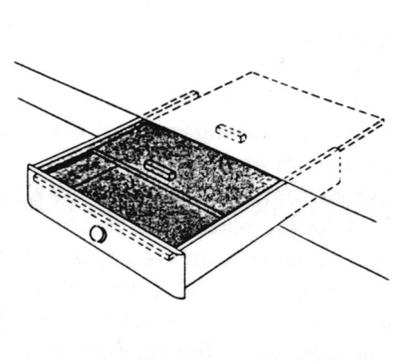
Figure 4 Plan for Permanent Darkroom



Use the dry bench for enlarging and printing and for handling films, negatives, and photographic paper. Since storage space for supplies and accessories is very important for work in this area, drawers and shelves are provided. Also, it is convenient to have a lighttight drawer (dark drawer) near your printing equipment. This will provide quick access to printing paper when you are making prints and will eliminate the necessity of opening and closing the package of paper every time you need a sheet of printing paper. When you have finished printing, you should return the unused printing paper to its original package.

To make a dark drawer (Figure 5) lighttight, install a sliding lid that fits in a groove around the top perimeter of the drawer. Paint the inside of the drawer and the lid flat black. Attach a small block of wood on the top of the lid and another one on the underside of the countertop. The blocks of wood will push the lid closed when you close the drawer.

Figure 5 Dark Drawer



You can use the space on top of the wet unit for mixing chemicals and for all processing operations. Storage space for processing trays and chemical solutions is beneath this bench. Shelves above each unit provide storage space for bottles of stock solution, timers, thermometers, and other small equipment. Wooden pegs mounted on the splash guard provide a place to keep graduates. Mount a towel holder near the sink.

You can locate the dry and wet units either on opposite sides of the darkroom with ample space between them or side by side with a splash guard separating them. With either arrangement, your equipment and materials will be protected against water and solutions splashed from the wet work area.

A safelight is suspended over each unit at a distance of no less than 4 feet (1.2 m) from the working surface. To provide safelight illumination for the dry bench, you can use a safelight such as a KODAK Adjustable Safelight Lamp, Model B, with the proper safelight filter. For the processing area, we recommend a larger safelight, such as the KODAK Utility Safelight Lamp, Model D, CAT No. 141 2261. This lamp holds a 10 x 12-inch safelight filter and hangs from chains attached to the ceiling to provide a broad direct or indirect illumination. A bracket is also available for mounting this lamp on the wall, table, or workbench. Double electrical outlets, properly grounded, are mounted over the units for plugging in your printer, enlarger, and other equipment.

A hot-and-cold mixing faucet is mounted over the sink. The nozzle should be at least 15 inches (38 cm) above the sink bottom, to provide space for filling gallon bottles. Because water and solutions will be spilled on the wet unit, it should have a waterproof surface. An excellent material for this is a laminated plastic such as that widely used for kitchen counters and tabletops. Sheet plastic has an extremely hard surface which is resistant to most stains and corrosion. It is available in a variety of attractive colors and is easy to keep clean. You can purchase this material in sheets and cement it to the top of the unit, or you can purchase it as a laminate, usually on chipboard, a form that is easier to install.

Another material which you can use on top of the unit is linoleum. You can extend the linoleum up the back wall to the shelf to protect the wall from splashes and eliminate the sharp, dust-catching corner at the rear. Treat the linoleum with a hard wax, rubbing the wax thoroughly into the surface to prevent penetration of spilled solutions. You can install vinyl floor materials in sheet form for the countertop of the unit in much the same manner as you would install linoleum. Vinyl is somewhat more expensive than linoleum but is more resistant to spilled solutions.

If you do not install a waterproof covering, the joints in the bench top must be tight enough to prevent solutions from dripping onto the shelf below. Also, to protect the wood, coat the bench top with a chemical-resistant paint or lacquer.

If you want to build a deluxe darkroom, you can purchase a special sink for darkrooms, made from either stainless steel (types 316 and 316L only) or a rigid, lightweight material like fiber glass.

To save money, many photo hobbyists prefer to build their own sinks out of plywood. If you use a thick wood, such as 3/4-inch exterior-grade plywood, the pieces can be fastened with waterproof glue and galvanized screws. Treat the wood with several coats of urethane varnish or fiber glass resin to make it waterproof. If a thinner material is used, the sink can be lined with fiber glass cloth for added reinforcement and coated with several coats of fiber glass resin. One advantage to building your own sink is that you can design it to the size and shape suitable for your needs and space requirements. Photo magazines often print step-by-step articles on building darkroom sinks. You can also check with a local supplier of fiberglass materials for additional advice.



Caution

Some photographic chemicals, particularly acid solutions, can cause corrosion. To minimize the chances of damage to your sink and drainage system, use cold water to thoroughly wash the sink and flush the drain after each use.

Placement of Equipment, Flow of Work

If you study your work pattern in the darkroom, you can readily see the reasons for the recommended arrangement of the bench units and equipment. To make enlargements, for example, you take the package of photographic paper from the paper-storage shelf, open it, and place the paper in the dark drawer. After placing your negative in the enlarger and composing the image on the enlarging easel, you place a sheet of printing paper in the easel and expose it. (For contact prints, you can place your printer on the bench next to the enlarger.) After the paper is exposed, you pass it on to the developer and the rest of the processing solutions. Then you wash your prints in the sink or in the tray equipped with a KODAK Automatic Tray Siphon (available from the Tiffen Company at www.tiffen.com) or equivalent.

When you have completed your work, you can place all equipment—including the printer, easel, and trimming board—on a shelf below the bench. This leaves the bench top clear for other activities.

One last point to remember. Darkroom cleanliness is very important for making pictures of high quality. Rinse the processing equipment you have used with water, and wipe the work surfaces clean with a damp sponge.

Safe Handling of KODAK Processing Chemicals

By using KODAK Chemicals, you ensure that you are using chemicals that provide optimum results with the least environmental impact. Chemicals are safe when handled properly. That's why it's important to know and understand the chemicals you're working with and the appropriate protective measures for handling them. To safely handle photographic processing chemicals, follow these guidelines:

- Always read and observe recommendations on the product labels and the Material Safety Data Sheets (MSDS) before mixing and using the chemicals. MSDS sheets can be obtained online at www.kodak.com/go/msds.
- When handling chemicals, avoid any skin and eye contact. Wear protective clothing to ensure your safety, such as:
 - Neoprene or nitrile gloves, to prevent contact with skin
 - Safety glasses with side shields or goggles, to prevent chemicals from getting into your eyes
 - Vinyl or rubber apron or lab coat, to prevent chemicals from coming in contact with your clothing
- Do not eat, drink, or smoke in chemical handling areas
- To avoid buildup of air contaminants associated with processing chemicals, provide adequate ventilation in chemical handling areas. Using a source of fresh air is recommended. As a guideline, the ventilation required should change the entire volume of air in the area 5 times per hour. In some cases, locally venting the chemical work area to the outdoors may be appropriate to prevent excess humidity and odors in the chemical handling areas.
- Properly dispose of photographic processing chemicals in accordance with local sewer discharge regulations. Kodak does **not** recommend the use of septic systems for disposal of photographic processing chemicals.

Darkroom Design for Amateur Photographers

MORE INFORMATION

Kodak has many publications to assist you with information on Kodak products, equipment, and materials.

Additional information is available on the Kodak website.

The following publications are available from Kodak Customer Service and from dealers who sell Kodak products, or you can contact Kodak in your country for more information.

- AJ-2 *Basic Developing, Printing, Enlarging in Black-and-White*
- AE-13 *Basic Developing, Printing, Enlarging in Color*
- O-3 *B/W Tips and Techniques for Darkroom Enthusiasts*
- J-98A *Safe Handling of Photographic Processing Chemicals*
- J-300 *Environmental Guidelines for Amateur Photographers*
- J-314 *Indoor Air Quality and Ventilation in Photographic Processing Facilities*

For the latest version of technical support publications for KODAK Products, visit Kodak on-line at: http://www.kodak.com

If you have questions about KODAK Products, call Kodak.

In the U.S.A.:

1-800-242-2424, Monday–Friday 9 a.m.–7 p.m. (Eastern time)

In Canada:

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