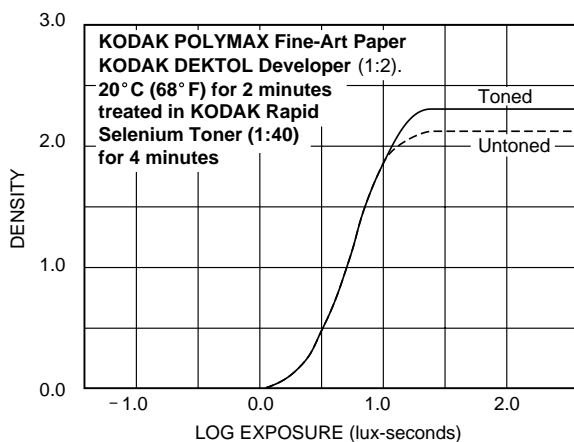


Toning KODAK Black-and-White Materials



Photographic print toners are chemical solutions used to treat black-and-white prints after processing. What does treatment with a toner solution do to a black-and-white print?

- **Changes or enhances the image color** to convey a mood or impression, from subtle to extraordinary.
- **Extends the life of the print image** during display or storage. Toning converts the black-and-white silver image to an inert compound, which reduces the harmful effects of intense light, ultraviolet radiation, oxidizing gases, extremes of temperature and humidity, and fumes. All Kodak toners will protect the image whether or not they produce a color shift.
- **Enhances the maximum density (D-max)** in the image. With some toners, you can increase the shadow densities in prints with little or no change in the image tone. For example, you can treat KODAK POLYMAX Fine-Art Paper in KODAK Rapid Selenium Toner to produce a richer range of tones in the shadow areas. The curve below shows the increase in upper-scale contrast and D-max of POLYMAX Fine-Art Paper toned in Rapid Selenium Toner (diluted 1:40).



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SELECTING A KODAK PACKAGED TONER

The visual effect of a toner depends on a combination of factors:

- the toner and toner dilution
- the paper emulsion type, surface, and stock tint
- the length of the toner treatment
- the processing of the paper

Not all toners perform the same way with all papers. Be sure to select a compatible paper/toner combination. See the tables *Tones Produced by Paper/Toner Combinations* and *Degree of Toning Produced by Paper/Toner Combinations*.

KODAK Packaged Toners

KODAK Rapid Selenium Toner. Produces several cool chocolate-brown hues with warm-tone papers, purplish brown tones with neutral-tone papers, and very little or no change with cold-tone papers. Use the 1:20 dilution for print protection. To increase shadow contrast and maximum density with a minimum tone change, use a 1:20 or 1:40 dilution. You can also use this toner with black-and-white films. It converts the silver image to silver selenide.

KODAK Brown Toner. Produces a variety of brown tones on neutral- and warm-tone papers. You can also use it to treat black-and-white negatives and slides for long-term keeping. It converts the silver image to silver sulfide.

KODAK Sepia II Warm Toner. Produces noticeably warmer brown tones on most black-and-white papers than KODAK Sepia Toner. It includes a bleach and a redeveloper. It converts the silver image to silver sulfide.

KODAK Sepia Toner. Produces warm brown tones on cold-tone papers or yellowish brown tones on warm-tone papers. It includes a bleach and a redeveloper. It converts the silver image to silver sulfide.

Tones Produced by Paper/Toner Combinations

Tone	KODAK PROFESSIONAL Paper	KODAK Toner	Dilution
Reddish Brown	KODABROME II RC PANALURE SELECT RC P-MAX Art RC POLYCONTRAST III RC POLYMAX II RC	Brown	Dilute according to the package instructions.
Chocolate-Brown	POLYMAX Fine-Art	Brown	Dilute according to the package instructions.
Warm Brown	KODABROME II RC PANALURE SELECT RC P-MAX Art RC POLYCONTRAST III RC POLYMAX II RC AZO	Sepia II Warm	Dilute according to the package instructions.
Sepia (full)	POLYMAX Fine-Art		
Cool Brown	KODABROME II RC PANALURE SELECT RC P-MAX Art RC POLYCONTRAST III RC POLYMAX Fine-Art POLYMAX II RC	Sepia	Dilute according to the package instructions.
No Tone Shift	KODABROME II RC PANALURE SELECT RC P-MAX Art RC POLYCONTRAST III RC POLYMAX II RC AZO POLYMAX Fine-Art	Rapid Selenium	1:20

Note: To produce the tones listed in the table, the papers were developed in KODAK DEKTOL Developer (1:2) at 20°C (68°F).

Degree of Toning Produced by Paper/Toner Combinations

KODAK PROFESSIONAL Paper	KODAK Developer,* Developer and Replenisher, or Processor	KODAK Brown Toner	KODAK Sepia II Warm Toner	KODAK Sepia Toner	KODAK Rapid Selenium Toner		
					1:3	1:9	1:20
Resin-Coated Base							
KODABROME II RC	DEKTOL, POLYMAX T, POLYMAX RT	F	F	M to F	N	N	N
	ROYALPRINT Processor, Model 417	M	F	M to F	N	N	N
PANALURE SELECT RC	POLYMAX T, POLYMAX RT, DEKTOL	M	F	M to F	S	S	N
	ROYALPRINT Processor, Model 417	M	F	M to F	N	N	N
P-MAX Art RC	DEKTOL	F	F	M to F	S	S	N
POLYCONTRAST III RC	DEKTOL, POLYMAX T, POLYMAX RT	F	F	M to F	S	S	N
	ROYALPRINT Processor, Model 417	M	F	M to F	N	N	N
POLYMAX II RC	DEKTOL, POLYMAX T, POLYMAX RT	F	F	M to F	S	S	S
Fiber Base							
AZO	DEKTOL	F	F	M to F	M	S	S
POLYMAX Fine-Art	DEKTOL	S	F	M	N	N	N
N = No tone change, but provides print protection VS = Very slight tone change S = Slight tone change M = Moderate tone change F = Full tone change		Note: N, VS, S, M, and F indicate the degree of color change under most conditions. Toning is not as predictable as most other processing steps; at times, prints may tone more or less easily than the information in the table indicates.					

* Developer used for tray processing.

ADJUSTING PRINT EXPOSURE AND DEVELOPMENT

Some toners will have an effect on print density and contrast. If you know you will treat your prints with a toner before you expose and process them, you can plan ahead to allow for changes.

- KODAK Sepia Toner, KODAK Sepia II Warm Toner, and KODAK Brown Toner will reduce print densities. Develop prints fully, and make them slightly darker than normal.
- KODAK Rapid Selenium Toner tends to intensify the image. You may want to shorten print development time slightly. However, toning a fully developed print with this toner yields an increased tonal scale.

Note: Exposure and development modifications also depend on the paper emulsion type and grade.

GUIDELINES FOR PRINT PROCESSING

Toning cannot disguise poor print quality. Use a properly exposed and processed print made from a high-quality negative. A good candidate for print toning should have a full tonal scale with good detail in the highlights and shadows.

To obtain consistent results with toners, follow processing instructions exactly, use fresh processing solutions, and establish a consistent technique. Use standard materials and methods to control the factors that can cause toning variations.

Development

To obtain uniform image color, use the development temperature and time recommended in the paper instructions (unless you adjust the time for a specific toner as described under *Adjusting Print Exposure and Development*). Avoid contaminating the developer with other solutions; don't exceed the capacity of your developer. Developer contamination or exhaustion can cause image-color variations.

Stop Bath

Bathe the prints in the stop bath according to the recommendations in the paper instructions.

Do not use an exhausted or overconcentrated stop bath. Replace your stop bath frequently, or use a stop bath such as KODAK Indicator Stop Bath, which signals when to change the bath.

If you leave stop bath in a tray for more than three days or in a tank for more than one month, evaporation may cause overconcentration. An overconcentrated stop bath can cause mottle in the base of a toned print.

Insufficient agitation of prints, especially during the first few seconds in the stop bath, can also cause mottle. The mottle won't be evident until you tone the print with a selenium or sulfide toner.

Fixing

Improper fixing is probably the major cause of stains in toned prints. Use two-bath fixing for best results.

Note: We do not recommend using a hardening fixer for prints that you intend to tone, because it will make the paper emulsion less receptive to the toner solution. Use a non-hardening fixer, such as KODAK Rapid Fixer *Part A only*. With some toners, use of a liquid hardener, such as KODAK Liquid Hardener (CAT 146 4239), is required *after* toning. (See the instructions for specific toners under *Using KODAK Packaged Toners* and *Using Mixed Toners*.)

Do not exceed the capacity of your fixer. An exhausted fixing bath contains insoluble silver compounds that will remain in prints; you can't remove them completely by washing. When these residual silver compounds come into contact with a toner, they form a dark yellow stain that is especially noticeable in print borders and highlights.

Proper agitation in the fixer is important. Stains commonly occur when prints stick together or float on the surface of the fixer. For example, air bubbles trapped between or under prints during fixing can later produce round purple stains in prints toned with selenium or sulfide toners.

Also avoid excessive fixing. Do not fix prints for longer than the recommended time (approximately 10 minutes for fiber-base papers, 2 minutes for resin-coated papers). Prolonged fixing expands the paper and allows the solution to penetrate the base. Fixer that is trapped in the base is difficult to remove, and will make prints that are toned in selenium or sulfide toners turn yellow. Prolonged fixing can also reduce the silver image.

Washing

Thorough washing is especially important when you prepare prints for toning. Residual silver salts and traces of hypo in the paper may cause stains, uneven tones, and fading.

Wash *fiber-base* prints for one hour with agitation in a tank or tray; the wash-water flow rate should provide a complete change of water every 5 minutes. To reduce washing time and conserve water, use KODAK Hypo Clearing Agent according to the instructions.

Wash *resin-coated* papers for 4 minutes in running water. The wash-water flow rate should be sufficient to change the water completely during the 4-minute wash. We do not recommend using Hypo Clearing Agent with resin-coated papers.

Agitate prints and keep them separated during washing. Don't overload your wash tank.

Toning

Do not use metal trays or tanks to hold your toning solutions. Use only unchipped enamel, hard-rubber, or plastic trays.

You can tone prints immediately after washing. (See the instructions for specific toners under *Using KODAK Packaged Toners* and *Using Mixed Toners*.)

If you tone prints that are already dry, soak them in water for 2 to 3 minutes before toning.

Note: Prints toned after storage may show stains due to adverse storage conditions.

When you tone resin-coated papers, keep toning times to a minimum to prevent the solution from penetrating the edges of the papers. If you tone resin-coated prints for longer than 8 to 10 minutes, leave a large border around the image so that you can trim off the edges if the toner penetrates them. (It is difficult to wash toner from the edges of a print.)

After you have soaked prints in toner solution, wash them as directed in the toner instructions.

Drying

Dry toned fiber-base prints slowly between sheets of blotting paper or on a drying rack.

Remove excess water from the surface of resin-coated prints, and air-dry them at room temperature or use circulated warm air.

Note: Drying with heat causes a shift to a cooler tone with some paper/toner combinations. Set the speed and temperature of the dryer to the lowest settings. You may have to adjust the amount of toning to compensate for the shift to a cooler tone.

SAFE HANDLING OF PHOTOGRAPHIC CHEMICALS

- Handle all chemicals carefully.
- Packages of Kodak photographic chemicals carry precautionary labels when necessary. Always read the labels and follow the instructions carefully. For safe-handling information for particular Kodak chemicals, see the product label or the Material Safety Data Sheet (MSDS). To obtain MSDSs, go to www.kodak.com/go/MSDS.
- Keep the darkroom and mixing room clean. Clean up spilled chemicals as soon as possible.
- Wear protective clothing, such as a waterproof apron and rubber gloves, when mixing solutions. Always wear goggles or a safety glasses when handling acids or strong alkalis.
- Avoid contact of any chemicals with your skin. Some photographic solutions and powders can cause skin irritation and an allergic skin reaction. (Use plastic print tongs and wear clean rubber gloves when you use KODAK Brown Toner, because the solution is quite alkaline.)
- Keep chemicals and processing solutions out of the reach of children and pets. Do not store chemicals where you handle or store food. Do not eat, drink, or smoke in chemical-handling areas. Always wash your hands thoroughly after handling chemicals, especially before eating or drinking.
- Maintain proper ventilation in the mixing room and darkroom.
- Dispose of used chemicals safely. Do not discard sulfide-type toners with stop baths or fixing baths. The combination of these solutions will generate hydrogen sulfide gas. (Hydrogen sulfide gas can fog unexposed paper and film, and will oxidize unprotected silver images in negatives and prints.) Discard the solutions individually, and flush the drain with plenty of water after you discard each solution.

USING KODAK PACKAGED TONERS

After you have selected a toner for your prints, follow the appropriate procedure below. Be sure to check the toner packaging for precautionary information.

KODAK Rapid Selenium Toner

Note: Observe the precautionary information on all chemical packages. The active ingredient in Rapid Selenium Toner is a sulfite salt that has a concentration of less than 2 percent. Working solutions of the toner generally contain less than ½ percent selenium sulfite. These selenium concentrations are not considered hazardous when you handle the solutions under normal conditions. However, we recommend that you use print tongs and wear clean rubber gloves when you use this toner. If toner splashes onto your skin, wash immediately with plenty of water.

If the prints you plan to tone are already dried, rewet them by immersing them in a fixing bath, and then rewash them. Otherwise, staining may occur.

1. Dilute the toner with water according to the tone change you want.
2. Immerse a thoroughly washed print in the toner solution at 20°C (68°F) and agitate the print. Complete toning occurs in 2 to 8 minutes, depending on the paper type and weight.
3. When the print has almost the required tone, remove it from the toning bath; toning will continue to some extent in the wash.

Wash fiber-base prints in running water at 18 to 20°C (65 to 75°F) for one hour, or use KODAK Hypo Clearing Agent to reduce the wash time; wash resin-coated prints for 4 minutes.

Note: If you use Hypo Clearing Agent after fixing fiber-base prints, you can use a working solution of Hypo Clearing Agent to dilute Rapid Selenium Toner 1:20 or 1:40, and eliminate the wash step between fixing and toning. To avoid stains, don't rinse the prints after fixing; immerse them directly into the combination bath, and tone for approximately 3 minutes for print protection or longer for a tone change. Do not reuse this Hypo Clearing Agent bath to treat untuned prints; it will contain traces of toner. After using this combination bath, wash the prints for at least 30 minutes in running water at 18 to 20°C (65 to 75°F) with frequent agitation.

To Use Rapid Selenium Toner with Black-and-White Films. Dilute the toner 1:29. After washing the film, immerse it in the toner solution at 20°C (68°F) for 4 minutes with occasional agitation. Wash the film in running water at 18 to 20°C (65 to 75°F) for 20 to 30 minutes. Dry the film in a dust-free place.

Note: You may notice a slight increase in contrast when you treat film with a 1:29 dilution. Higher concentrations (1:3 or 1:9) **will** increase the contrast.

KODAK Brown Toner

Note: Wear rubber gloves when you mix or use Brown Toner.

1. Dilute 30 millilitres (1 fluidounce) of Brown Toner in 946 millilitres (1 quart) of water and mix thoroughly.
2. Immerse a thoroughly washed print in the toner solution, and agitate. Tone prints for 15 to 20 minutes at 20°C (68°F) *or* for 3 to 4 minutes at 38°C (100°F) with continuous agitation.
3. When toning is complete, remove the print from the toning bath and rinse it with water for 2 minutes.
4. Treat fiber-base prints in Hypo Clearing Agent for 1 minute, and then treat them in a bath made from 1 part KODAK Liquid Hardener* and 13 parts water for 2 to 5 minutes.

Note: If hardening is required for resin-coated prints, you can treat them in the same way.

Wash fiber-base prints in running water at 18 to 20°C (65 to 75°F) for 30 minutes; wash resin-coated prints for 4 minutes.

To Use Brown Toner with Black-and-White Films.

Prepare the toner as described above. After washing the film, immerse it in the toner solution at 20°C (68°F) for 15 minutes with occasional agitation. Wash the film in running water at 18 to 20°C (65 to 75°F) for 20 to 30 minutes. Dry the film in a dust-free place.

*Eliminate this treatment if prints were treated with a hardening fixer during processing. We recommend using a non-hardening fixer such as KODAK Rapid Fixer Part A *only* for prints that you plan to tone.

KODAK Sepia II Warm Toner

1. Prepare the bleach and toning baths according to the instructions packaged with the toner.

Note: The bleach bath (Solution A) converts metallic silver in the print to light-sensitive silver bromide. You may want to bleach the print under safelight illumination to minimize the effect of light on the image. However, the effect is extremely small, and may not be noticeable.

2. Immerse a thoroughly washed print in Solution A (bleach) at 18 to 21°C (65 to 70°F), and agitate for about 6 to 8 minutes. Bleach the print until the blacks in the shadows have disappeared or turned yellow (depending on print density and paper grade).
3. Rinse the print thoroughly in running water for 2 minutes.
4. Immerse the print in Solution B (toner) at 18 to 21°C (65 to 70°F), and agitate for about 60 seconds or until no further tone change occurs.
5. Rinse the print thoroughly in running water for 30 seconds.
6. Treat fiber-base prints in a bath made from 1 part KODAK Liquid Hardener* and 13 parts water for 2 to 5 minutes.

Note: If hardening is required for resin-coated prints, you can treat them in the same way.

Wash fiber-base prints in running water at 18 to 20°C (65 to 75°F) for 30 minutes; wash resin-coated prints for 4 minutes.

KODAK Sepia Toner

1. Prepare the bleach and toning baths according to the instructions packaged with the toner.

Note: The bleach bath (Solution A) converts metallic silver in the print to light-sensitive silver bromide. You may want to bleach the print under safelight illumination to minimize the effect of light on the image. However, the effect is extremely small, and may not be noticeable.

2. Immerse a thoroughly washed print in Solution A (bleach) at 18 to 21°C (65 to 70°F), and agitate for about 5 to 8 minutes until the print image has disappeared or turned yellow.
3. Rinse the print thoroughly in running water for 2 minutes.
4. Immerse the print in Solution B (toner) at 18 to 21°C (65 to 70°F), and agitate for approximately 60 seconds or until no further tone change occurs.
5. Rinse the print thoroughly in running water for 30 seconds.
6. Treat fiber-base prints in a bath made from 1 part KODAK Liquid Hardener* and 13 parts water for 2 to 5 minutes.

Note: If hardening is required for resin-coated prints, you can treat them in the same way.

Wash fiber-base prints in running water at 18 to 21°C (65 to 70°F) for 30 minutes; wash resin-coated prints for 4 minutes.

*Eliminate this treatment if prints were treated with a hardening fixer during processing. We recommend using a non-hardening fixer such as KODAK Rapid Fixer *Part A only* for prints that you plan to tone.

TONERS MIXED FROM FORMULAS

If you want to prepare your own toners, the formulas and instructions for the following toners are included below.

Hypo Alum Sepia Toner T-1a. Produces cold-brown to chocolate-brown tones.

Sulfide Sepia Toner T-7a. Produces warm-brown tones similar to those produced by KODAK Sepia Toner. It includes a bleach and a redeveloper.

Gold Toner T-21. Produces a pleasing range of brown tones with most warm-tone papers by “plating” the silver image with gold. It has little effect on cold-tone papers. It tones the highlights and the shadows of the print at a uniform rate, allowing you to stop the toning when the print reaches the hue you want.

Gold Protective Solution GP-1. Provides print protection while changing the image tone only slightly.

Blue Toner T-26. Produces blue tones on some papers. Warm-tone papers react well to this toner. Neutral-tone papers change slightly to soft blue-black tones. Cold-tone papers will not change.

USING MIXED TONERS

Prepare and use the toner formulas as described below.

Hypo Alum Sepia Toner T-1a

This toner will cause a loss of print density and contrast. You can compensate for this by increasing the exposure time and the development time when you make your prints.

Mix the toner as follows:

Hypo Alum Sepia Toner T-1a

Water at 20°C (68°F)	2.8 L
Sodium thiosulfate (pentahydrated)	480 g
<i>Mix thoroughly; then add the following solution:</i>	
Water at 70°C (160°F)	640 mL
Potassium alum (dodecahydrated)	120 g
<i>Then add the following solution (including the precipitate) slowly to the hypo alum solution while stirring rapidly*:</i>	
Water at 20°C (68°F)	64 mL
Silver nitrate, crystals†	4 g
Sodium chloride	4 g
<i>After combining the solutions, add—</i>	
Water at 20°C (68°F) to make	4 L

* When you combine the solutions, a black precipitate may form. It will not adversely affect the toning action of the bath if you use the proper toning technique.

† Let the silver nitrate dissolve completely before you add the sodium chloride.

1. Place a tray in a tempered water bath. Pour the toner into the tray, and heat the water to 49°C (120°F).
2. Immerse a thoroughly washed print in the toner, and agitate it occasionally, especially during the first few minutes of toning. Tone for 12 to 15 minutes, depending on the paper type. Don't tone prints for longer than 20 minutes at 49°C (120°F), and don't use a higher temperature. (Prints will blister or stain at higher temperatures.)
3. Rinse the print in warm water, and wipe it with a soft sponge to remove any sediment.

Wash fiber-base prints in running water at 18 to 24°C (65 to 75°F) for one hour, or use Hypo Clearing Agent to reduce the wash time; wash resin-coated prints for 4 minutes.

Sulfide Sepia Toner T-7a

Prepare Stock Solutions A and B as follows:

Sulfide Sepia Toner T-7a

Bleach—Stock Solution A	
Water at 20°C (68°F)	2 L
Potassium ferricyanide (anhydrous)	75 g
Potassium bromide (anhydrous)	75 g
Potassium oxalate	195 g
28% acetic acid*	40 mL

* To make approximately 28% acetic acid from glacial acetic acid, add 3 parts of glacial acetic acid to 8 parts water.

Toner—Stock Solution B	
Sodium sulfide (anhydrous)	45 g
Water at 20°C (68°F)	500 mL

To prepare the working bleach and toner (redeveloper) solutions, mix them as follows:

Bleach Working Solution	
Stock Solution A	500 mL
Water at 20°C (68°F)	500 mL

Toner Working Solution	
Stock Solution B	125 mL
Water at 20°C (68°F)	375 mL

1. Immerse a thoroughly washed print in the bleach, and agitate until only a faint yellowish brown image remains. This will take approximately 5 to 8 minutes.
2. Rinse the print in cold running water for at least 2 minutes.
3. Immerse the print in the toning bath, and agitate until no further change occurs in the tone. This will take approximately 30 seconds.
4. Immediately rinse the print with water.
5. Treat fiber-base prints in a bath made from 1 part KODAK Liquid Hardener and 13 parts water (or 2 parts Hardener F-5a and 16 parts water) for 2 to 5 minutes.*

Wash fiber-base prints in running water at 18 to 24°C (65 to 75°F) for 30 minutes; wash resin-coated prints for 4 minutes.

*Eliminate this treatment if prints were treated with a hardening fixer during processing. We recommend using a non-hardening fixer such as KODAK Rapid Fixer *Part A* only for prints that you plan to tone.

Hardener F-5a

Stock Solution	
Water at 50°C (125°F)	600 mL
Sodium sulfite (anhydrous)	75 g
28% acetic acid*	235 mL
Boric acid, crystals†	375 g
Potassium alum (dodecahydrated)	75 g
Water at 20°C (68°F)	1L

* To make approximately 28% acetic acid from glacial acetic acid, add 3 parts of glacial acetic acid to 8 parts water.

† Avoid using powdered boric acid; it does not dissolve easily.

Gold Toner T-1a

Mix the two stock solutions as follows:

Gold Toner T-21

Stock Solution A	
Water at 50°C (125°F)	4 L
Sodium thiosulfate, crystals	960 g
Potassium persulfate	120 g
<i>Dissolve the sodium thiosulfate in the water. While stirring vigorously, add the potassium persulfate. If the mixture does not turn milky, increase the temperature. Cool to 27°C (80°F). Then slowly add the following solution, including the precipitate, while stirring. Solutions must be cool when you combine them.</i>	
Water at 20°C (68°F)	64 mL
Silver nitrate, crystals*	5 g
Sodium chloride	5 g

* Let the silver nitrate dissolve completely before you add the sodium chloride.

Stock Solution B	
Water at 20°C (68°F)	250 L
Gold chloride*	1 g

* Gold chloride is a deliquescent chemical; it will liquefy rapidly in a normal room atmosphere. Store the chemical in a tightly stoppered bottle in a dry atmosphere.

Mix the toner working solution as follows:

Toner Working Solution	
Stock Solution A	Entire amount
<i>While stirring rapidly, slowly add—</i>	
Stock Solution B	125 mL

Let the mixed solution stand for about 8 hours before using it. During this time, a yellow precipitate will form. Pour the clear solution into another container and discard the precipitate.

Save the remainder of Stock Solution B to replenish the toning bath as you use it. The volume that you add will depend on the number of prints you tone and the toning time. For example, if you tone to a warm-brown hue, add 4 mL of Stock Solution B after every fifty 8 x 10-inch prints (or equivalent).

1. Place a tray in a tempered water bath. Pour the clear toner solution into the tray, and heat the water to 43°C (109°F). Maintain this temperature during toning.
2. Immerse a thoroughly washed print in the toning solution for 5 to 20 minutes until it has the tone you want. (It's helpful to keep an untuned print on hand for comparison.)

Note: Some sediment will form in the tray, especially if you tone more than one print at a time. The sediment is harmless, but it can form a scum on the print. If scum forms, wipe the print with a wet sponge or wet cotton immediately after toning.

3. Remove the print from the toner and rinse it in cold water.

Wash fiber-base prints in running water at 18 to 24°C (65 to 75°F) for one hour, or use Hypo Clearing Agent to reduce the wash time; wash resin-coated prints for 4 minutes.

Gold Protective Solution GP-1

Prepare the solution as follows. For best results, mix it right before you use it.

Gold Protective Solution GP-1

Water at 20°C (68°F)	750 mL
Gold chloride,* 1% stock solution†	10 mL
Sodium thiocyanate (liquid)	15.2 mL
Water to make	1 L

* Gold chloride is a deliquescent chemical; it will liquefy rapidly in a normal room atmosphere. Store the chemical in a tightly stoppered bottle in a dry atmosphere.

† To prepare a 1% gold chloride solution, dissolve 1 gram of gold chloride in 100 mL of water. Or you may want to obtain a 1-percent solution from a photographic dealer.

Add the 10 mL of gold chloride stock solution to the 750 mL of water. Dissolve the sodium thiocyanate solution separately in 125 mL of water. Then slowly add the sodium thiocyanate solution to the gold chloride solution while stirring rapidly.

1. Immerse a thoroughly washed print in the solution at 20°C (68°F).
2. Treat the print for 10 minutes or until you can see a very slight change to a bluish black in the image tone.

Wash fiber-base prints in running water at 18 to 24°C (65 to 75°F) for 10 minutes; wash resin-coated prints for 4 minutes.

Blue Toner T-26

The contrast and density of prints treated in Blue Toner T-26 appear to increase. You can compensate for these increases by reducing the exposure time slightly when you make your prints. The exact tone you obtain will vary with the paper and developer you use. A soft gray-blue is more common than a saturated blue.

Note: Blue Toner is fairly expensive toner to produce. For best results, prepare the solution right before you use it. If you tone prints one at a time in Blue Toner, the first few prints will tone the most, and the last few may not tone at all. To obtain consistent results, immerse up to five prints in the bath simultaneously.

Mix the toner working solution as follows:

Blue Toner T-26

Water at 52°C (125°F)	937 mL
Gold chloride,* 1% stock solution†	40 mL
<i>Mix the gold chloride solution with the water. Then, while stirring, add—</i>	
Thiourea	1 g
Tartaric acid	1g
Sodium sulfate (anhydrous)	15 g

* Gold chloride is a deliquescent chemical; it will liquefy rapidly in a normal room atmosphere. Store the chemical in a tightly stoppered bottle in a dry atmosphere.

† To prepare a 1% gold chloride solution, dissolve 1 gram of gold chloride in 100 mL of water. Or you may want to obtain a 1-percent solution from a photographic dealer.

Stir until the chemicals dissolve completely.

Note: A fine white precipitate may appear in the solution if you store it overnight. This precipitate will not interfere with toning.

1. Immerse a thoroughly washed print in the toning solution adjusted to 20°C (68°F) or 38 to 40°C (100 to 104°F).
2. Tone with occasional agitation for 8 to 45 minutes at 20°C (68°F), or for 2 to 15 minutes at 38 to 40°C (100 to 104°F).

Note: The toning action is so gradual that only a small amount of agitation is necessary to prevent streaking. Toning will occur in the highlights first and the shadows last. Partial toning may produce blue highlights and untuned shadows.

Wash fiber-base prints in running water at 18 to 24°C (65 to 75°F) for at least 30 minutes; wash resin-coated prints for 4 minutes.

SELECTIVE AND MULTIPLE TONING

You can produce striking effects by using these techniques:

- Tone only particular areas of a print and leave the rest untoned.
- Use different toners on different areas of a print.
- Tone an entire print with more than one toner.

Selective Toning

Toning selective areas involves using a liquid or plastic frisket material to cover the parts of the image that you don't want to tone. For best results with this technique, choose scenes that have a distinct line between the areas that you want to treat differently.

You can apply a liquid frisket material, such as Photo Maskoid Frisket or Dr. Ph. Martin's Frisket Mask Liquid, with a brush. These materials are available from art-supply stores.

You can also use sheets of clear self-adhesive frisket material, such as Transpaseal or Grafix Frisket Film, sold for airbrush work. These materials are available from art-supply stores. After applying the sheet of frisket material to the print, use a frisket knife or an X-Acto blade to cut carefully around the areas you want to tone. Peel off the unwanted frisket material by picking up a corner with tweezers.

After you have applied the frisket material, follow these steps:

1. Soak the print in water (fiber-base for 10 minutes, resin-coated for 2 minutes).
2. Place the print in the toning solution. Let the toner flow freely over the uncoated portions of the print. Don't worry if the print buckles or curls during toning.

Note: If possible, keep the part of the print you don't want toned out of the solution in case the toner bleeds under the frisket. If you can't do this and the toner tends to bleed, try skipping the presoak step.

3. Wash the print as recommended in the instructions for the toner you're using.
4. Remove the frisket material. You can usually remove liquid frisket materials by rubbing your fingers gently over the print while it is still in the wash. Remove Photo Maskoid frisket by touching sticky tape to an edge.

When you use two or more toners sequentially, follow the same procedure for each toner.

Multiple Toning

Multiple toning can change the appearance of a print in many ways. For example, you can produce a print that has its original warm image tone, as well as sepia, blue, and red or orange tones, by using only Blue Toner and Sepia or Brown Toner.

The exact hues you produce will depend on the paper type. You may want to experiment with a selection of different papers. Cold-tone papers will yield a truer red; warm-tone papers will produce an orange hue.

This technique usually produces a density loss in the shadow areas of prints. For best results, start with a print that has higher-than-normal contrast.

First treat the print in KODAK Sepia or Brown Toner. Wash the print thoroughly. Then tone the print with Blue Toner T-26. The red or orange tones will appear after approximately 15 to 30 minutes in Blue Toner at 32°C (90°F).

Toning KODAK Black-and-White Materials

RETOUCHING TONED PRINTS

You can use liquid dyes, colored or graphite pencils, dry dyes, and opaque to retouch toned prints on Kodak fiber-base and resin-coated papers.

Use dry dyes, such as KODAK Retouching Colors, to make large-area corrections. Use liquid dyes, pencils, or opaque to make fine corrections—such as eliminating spots, scratches, and reflections—or to outline and accentuate details. If you use KODAK Liquid Retouching Colors, which are intended primarily for color prints, you can mix the colored and neutral dyes to match the tones in your prints.

You cannot use reducers on toned prints, but you can use an etching knife to lighten dark spots.

For more information on retouching, see KODAK Publication No. O-10, *Retouching Black-and-White Negatives and Prints*.

For information on other post-processing treatments for prints, such as laminating, lacquering, and mounting, see KODAK Publication No. F-35, *Protecting and Displaying Black-and-White Prints*.

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 dealers who sell Kodak products, or you can contact Kodak in your country for more information.

E-30	<i>Storage and Care of KODAK Films and Papers—Before and After Processing</i>
E103BP	<i>KODAK Black-and-White Papers Application Matrix</i>
F-2	<i>Pathways to Black and White</i>
F-35	<i>Protecting and Displaying Black-and-White Prints</i>
G-10	<i>KODAK AZO Paper</i>
G-16	<i>KODABROME II RC Paper</i>
G-21	<i>KODAK POLYCONTRAST III RC Paper</i>
G-24	<i>KODAK POLYMAX Fine-Art Paper</i>
G-26	<i>KODAK POLYMAX II RC Paper</i>
G-27	<i>KODAK PANALURE SELECT RC Paper</i>
G-28	<i>KODAK P-MAX Art RC Paper</i>

For the latest version of technical support publications for KODAK PROFESSIONAL Products, visit Kodak on-line at:
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