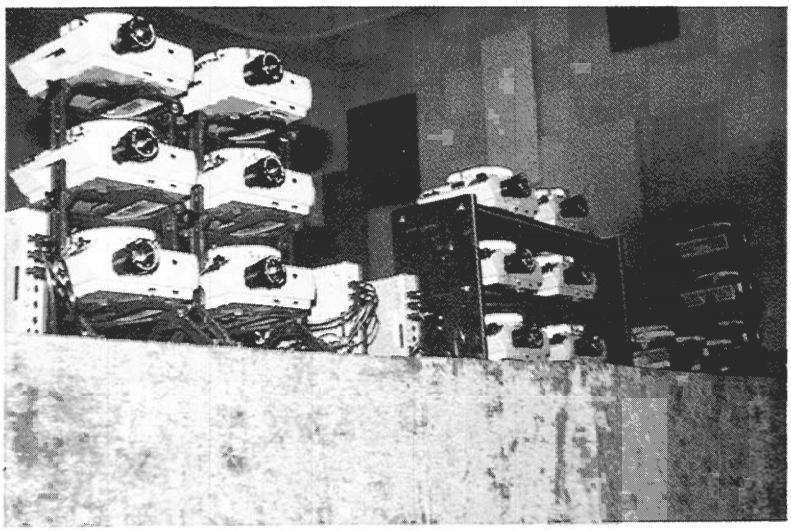
PART VIII
Maintenance and Care of *KODAK* AV Equipment and Slides

INTRODUCTION

In this section of *The Source Book* we discuss the heavy-duty use of *EKTAGRAPHIC* III and *EKTAGRAPHIC* Slide Projectors in ideal as well as adverse projection conditions (maximum-life conditions versus extremes of voltage and temperature). We outline routine projector-maintenance procedures, including the proper care and maintenance of *KODAK* Slide Trays. We show you how to examine your trays for damage, how and where to get replacement parts, and even provide hints on shipping them. Finally, we discuss the storage and care of slides, including factors that effect the useful life of a projected or stored transparency.



***EKTAGRAPHIC* III Projectors can withstand the workload of continuous heavy-duty operation.**

Packing and Shipping Your Show

Someday you may face the challenge of getting your audiovisual show from your home site to a distant one. Moving AV equipment across country requires the specialized knowledge of people who work for freight-delivery organizations; individuals in your shipping department are also reliable contacts. Tell whomever you talk to what, when, and where to make shipment and when you must have delivery. They will decide how to ship it. Then leave the details to that person—but check back periodically to be sure it is running on schedule. Also write down the bill-of-lading number and the flight number (if shipping by air); you will need to refer to these numbers later if your equipment doesn't arrive on time.

Some manufacturers of AV equipment provide shipping cases for their own gear to reduce the possibility of damage in transit. Check to be sure ample soft packing material lines the interior surfaces of the case—especially if it is intended to hold a reel-to-reel tape deck, computer programmer, or other delicate equipment. Usually, double packing is a good idea for sensitive equipment. (The component is placed inside its own special case which is surrounded by plastic foam inside a larger crate.)

Sturdy shipping cases and trunks can be constructed to the dimensions of your equipment and lined with foam rubber with "pockets" for projectors, lenses, trays, dissolve modules, piggyback projector stands, reel-to-reel tape decks and cassette decks, multi-image computer programmers, amplifiers, loudspeakers, and the boxed AV show itself. (Be sure your cases and trunks will be light enough, when fully packed, so that two people can handle them without strain.)

When packing equipment for an out-of-town show, ask yourself, "What will I do if this component is damaged in transit or fails during rehearsal?" Shipping backup equipment not available locally can be crucial to the success of your show. (If your four-channel reel-to-reel tape deck is damaged, don't assume you can find another easily. Pack a cassette deck and backup cassette show tape.)

Also know how your equipment will be treated on delivery. Usually, it will be shipped to the receiving department of the facility where the presentation will be shown—or to one close to it. Contact an individual at the receiving area to be sure your equipment will be accepted and held in a secure area until you arrive—and that you will have immediate access to it.

HEAVY-DUTY OPERATION

EKTAGRAPHIC III and *EKTAGRAPHIC* Slide Projectors can withstand the workload of continuous, heavy-duty operation because they are ruggedly built. (Such use often consists of long hours of operation with frequent slide changes and/or dirty operating conditions.)

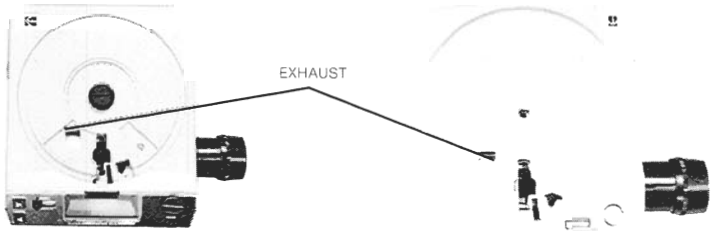
The projector parts that are subject to wear have about equal life expectancy. Very little maintenance is required other than periodic cleaning and lamp replacement. This built-in durability makes these projectors an excellent choice for exhibits, displays, study carrels, and other specialized applications requiring dependable projection.

Operating Conditions

Ideally, our projectors should be used in a well-ventilated, low-dust environment at normal room temperature—approximately 74°F (22°C). Maximum life for slides and projectors can be expected with ambient temperatures ranging from 40 to 85°F. High ambient temperatures, however, will shorten the life of both. Alternatively, no particular advantage is gained from providing operating temperatures below about 70°F (21°C).

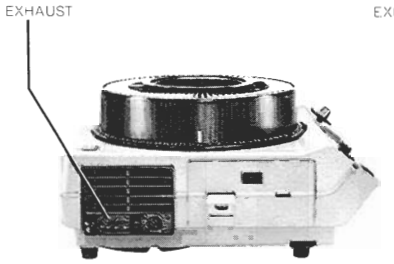
The parts of an *EKTAGRAPHIC* III or *EKTAGRAPHIC* Slide Projector that are subject to wear have about equal life expectancy. Very little maintenance is required other than periodic cleaning and lamp replacement.

Although projector life expectancy decreases gradually as incoming air temperature increases, there usually will not be sudden machine failure or dramatically shortened slide and projector life if the room temperature is a few degrees higher than 85°F (30°C). If the temperature rises considerably higher than this, however, the projector thermal fuses will eventually open (to prevent dangerous overheating) and the projector will stop.

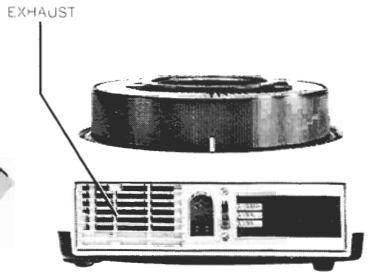


***EKTAGRAPHIC* III E Projector (top view)**

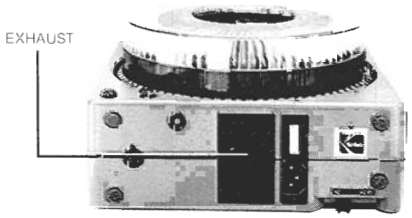
***EKTAGRAPHIC* Slide Projector, Model E-2 (top view)**



***EKTAGRAPHIC* III E Projector (rear view)**



***EKTAGRAPHIC* Slide Projector, Model E-2 (rear view)**



***EKTAGRAPHIC* Slide Projector, Model S-AV2050 (rear view)**

Projectors operated near the ceiling in very warm rooms or where hot air is drawn in from nearby radiators, light fixtures, or other heat sources will probably have shortened life.

Check the temperature of ambient air near a projector being used in an open-air environment by taking a temperature reading on the right side of the projector close to the base (as seen from behind the projector). Take another reading in front of the projector. *These readings must be taken while the projector is operating normally.*

If a projector is housed in an enclosure, or if ducts are used for ventilation, also check the projector-exhaust temperature.

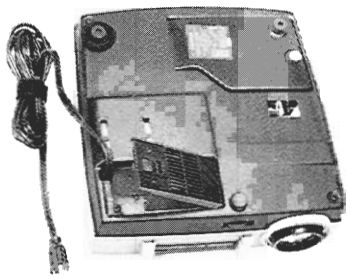
NOTE: This must be done under actual operating conditions—tray of slides in place, lamp on, and enclosure doors closed.

Use a bulb thermometer, which will not drastically restrict the airflow. Hold the bulb against the center of the exhaust grill and allow the thermometer to stabilize.

For best projector life, the exhaust air temperature should not exceed 160°F (71°C).

Do not allow any of the projector air passages to become blocked. The principal air intake is in the opening between the housing and the base cover. Another important intake is in the cord-compartment area (not applicable to *EKTAGRAPHIC* III Projectors).

IMPORTANT: *EKTAGRAPHIC* Slide Projectors having a cord compartment should not be operated unless the cord compartment is empty. (Withdraw the entire length of the projector power cord.)



Air intakes are also located in the base cover, and small amounts of air are drawn in at other locations.

The primary air outlet is through a vent in the rear of the projector. A secondary outlet is located in the top under the slide tray (for slide pre-projection warming).

ROUTINE MAINTENANCE

EKTAGRAPHIC III and *EKTAGRAPHIC* Slide Projectors require little maintenance other than replacement of burned-out lamps and an occasional cleaning of the lenses.

If the projector is operated in an enclosed area, clean the enclosure (and any mirrors, screens, ducts, and air filters). The projectors do not require lubrication during their normal life expectancy.

CAUTION: Before you attempt any maintenance or cleaning of a projector, make certain the machine is cool. Disconnect the power cord from its outlet. Removing the slide tray and the remote control is also a good idea.

The optical system of the projector must be kept clean for best results. Fingerprints or smudges on the lenses will reduce the brightness and clarity of screen images; a little dust will not. Clean the lens surfaces with a clean, soft, lint-free cloth moistened with a *single* drop of *KODAK* Lens Cleaner or with *KODAK* Lens Cleaning Paper or equivalent.

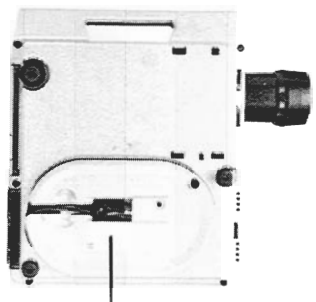
CAUTION: Heat-absorbing glass may shatter unexpectedly. Therefore, always wear safety glasses and handle heat-absorbing glass with care and follow these recommendations.

- For personal safety, use a piece of cloth or a glove while handling the glass.
- Place the glass on an insulating material, such as wood, rubber, or cardboard.
- Keep the glass covered so that shattering, should it occur, will be confined.

Voltage and Current

Most *EKTAGRAPHIC* III and *EKTAGRAPHIC* Slide Projectors made in the United States and Canada are for use with 60 Hz and 100 to 125 V, single-phase electric current only. A plate (located on the bottom of most Kodak slide projectors) lists the frequency and voltage for which the projector is intended.

The information is also provided in the instruction manual packed with the projector model.



PROJECTOR FREQUENCY AND VOLTAGE SPECIFICATIONS

NOTE: If possible, check the wiring of the 2-wire or 3-wire receptacle supplying power for the projector, particularly if the installation will be unattended. Improperly wired receptacles can cause projector malfunction and can contribute to potential hazards. Simple outlet testers are available from electrical and tool suppliers, ranging from $6 to $20.

The projector will operate satisfactorily if the supply voltage deviates slightly from the value shown on the data plate on the bottom of the projector. For instance, if the plate listing is 120 V, 60 Hz, the projector will operate satisfactorily on 60 Hz power throughout a range of 110 to 125 V. If you suspect that the supply voltage is not within the recommended range, proceed as follows:

- Connect the power cord from the projector to a 2-receptacle outlet.
- Turn on the projector and set the power-selector switch at HIGH.
- Turn on any other equipment that will be used on the same circuit.
- Using the other receptacle of the 2-receptacle outlet mentioned, check the voltage with an accurate meter.

IMPORTANT: Voltages greater or less than those recommended can cause overheating and erratic operation, and can result in costly damage to the projector.

CARING FOR YOUR SLIDE TRAYS

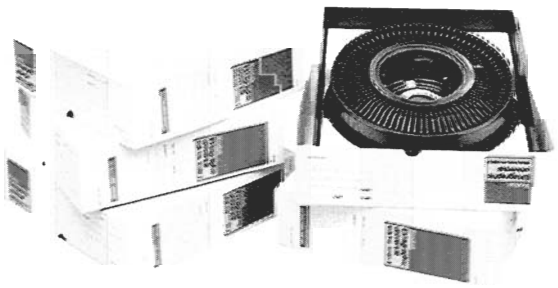
The following information can help you get more dependable operation and maximum life from trays and projectors made by Kodak, even in heavy-duty or specialized applications.

Periodic Tray Inspection

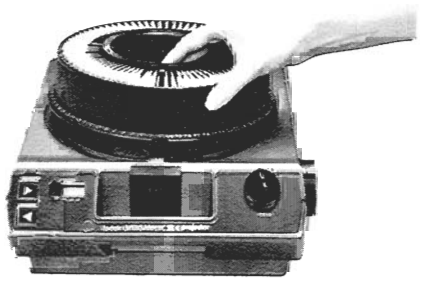
KODAK Slide Trays are molded from a material that retains its strength and rigidity at temperatures as high as 180 F (82 C). **Higher temperatures can deform the trays;** consequently, any warpage of the molded parts of an *EKTAGRAPHIC* Slide Tray indicates that operating temperatures were excessive for the safety of trays, slides, and projectors. High temperatures may occur when projectors are operated in small, inadequately ventilated areas.

Your trays should also be checked for damage following any period in which they have been transported, handled roughly, stacked unboxed, or used extensively.

NOTE: This inspection can be performed without removing the slides from the tray.



Normal use of *EKTAGRAPHIC* Slide Trays is discussed in the user's instruction manual packed with the projector.

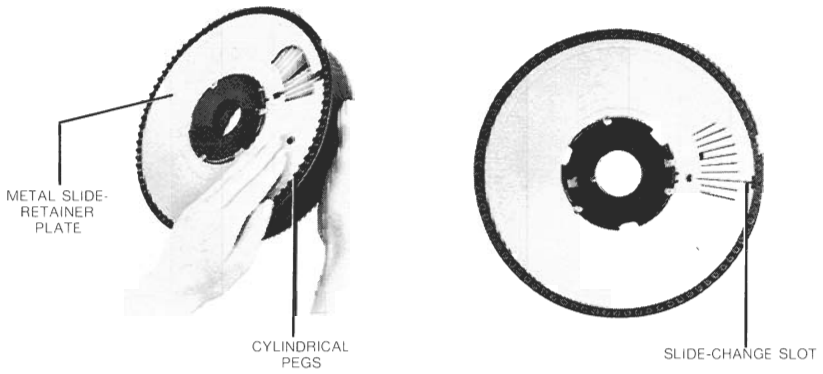


KODAK EKTAGRAPHIC Universal Slide Tray, Model 2, and *KODAK CAROUSEL TRANSVUE* 80 Slide Tray

Examine the tray for cracks, warpage, broken parts, or other damage. After making sure that the lock ring is secured (if the tray contains slides), turn the tray upside down and check the cylindrical pegs around the tray bottom. Damaged pegs can cause the tray to operate erratically and can prevent it from locking properly into position. Since repairing damaged pegs is impractical, replace the tray if any of the pegs are broken.

Also check to see if the metal slide-retainer plate on the bottom of the tray is damaged. A damaged plate usually will not rotate freely, possibly causing slide-change failures. Hold the inverted tray with one hand, extend a finger through the hole in the center, and retract the spring-loaded latch. Then check to see if the slide-retainer plate rotates freely by turning it 360 degrees. Release the latch and position the plate so that the slide-change slot is adjacent to the No. 0 peg. The latch must engage the notched inner edge of the plate.

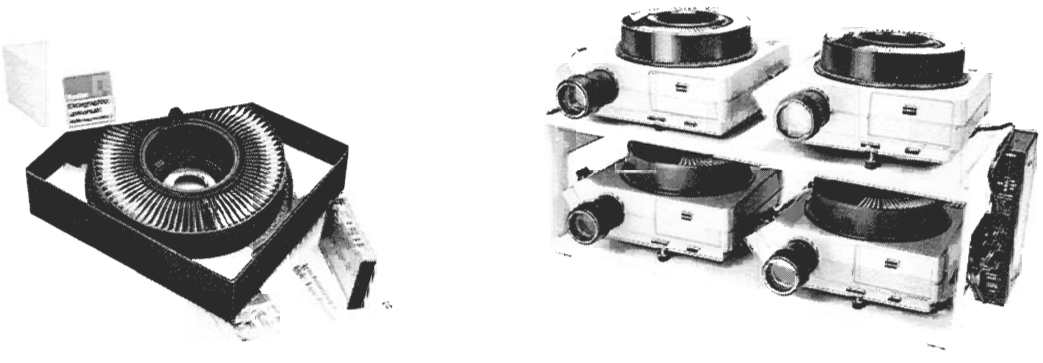
***KODAK EKTAGRAPHIC* Universal Slide Tray, Model 2**



Preventive Maintenance

In most cases, the 80-capacity slide trays are easier to maintain than the 140-capacity trays; they present less power load for the projector mechanism (except when glass-mounted slides are used) and they function well under more adverse operating conditions, such as with damaged or worn slide mounts and extremes of humidity.

When used on an *EKTAGRAPHIC* III or *EKTAGRAPHIC* Slide Projector for many hours with frequent slide changes, an *EKTAGRAPHIC* Universal Slide Tray, Model 2, loaded with metal- and glass-mounted slides will sometimes require attention.



***KODAK EKTAGRAPHIC* Universal Slide Tray, Model 2**

The factory lubrication on the upper side of the metal slide-retainer plate sometimes wears away and the selected slide fails to project because of a slight malpositioning of the tray. (This condition usually occurs only after many hours of prolonged use with heavy glass-mounted slides.)

The best solution to the problem is to replace the tray with a new one. However, replacing the slide-retainer plate or cleaning and lubricating the plate as suggested in the next section often helps.

Damage will seldom occur during the storage or transportation of trays, provided that the tray is packed in a box, such as that provided with each *EKTAGRAPHIC* Universal Slide Tray, Model 2 (*KODAK* Part No. **229918** for the box) and the *KODAK EKTAGRAPHIC* Universal Deluxe Covered Slide Tray (*KODAK* Part No. **229016.**) These boxes contain a pad that supports the tray base plate and relieves the strain on the screws. Similar support can be provided in the containers for the *CAROUSEL TRANSVUE* 80 and *CAROUSEL TRANSVUE* 140 Slide Trays (*KODAK* Part No. **219981** for the 80 Slide Tray and **226805** for the 140 Slide Tray) by the insertion of a soft foam-rubber or urethane pad, about $^3/_8$-in. (9.5 mm) thick and 9 in. (229 mm) square), in the bottom of each box. *Cardboard or other rigid material should not be placed over the pad.*

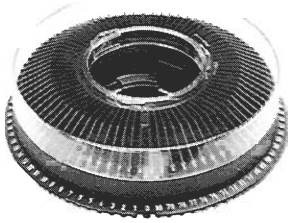
The slide-retainer plate is often damaged. *Damage usually occurs when a tray full of slides is taken off the projector and dropped, stacked unboxed under other unboxed (unprotected) trays of slides (such as after a multi-image presentation) or subjected to other forms of rough handling.* When the tray is not on the projector, the weight of the slides on the plate is supported only by three screws.

The slide-retainer plate is coated with a dry lubricant. After several hundred hours of operation, however, the plate should be cleaned and lubricated--particularly if metal- and glass-mounted slides are cycled frequently.

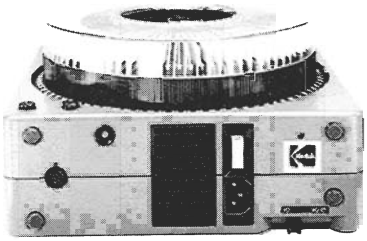
Turn the tray upside down (making sure that the lock ring is in place if the tray contains slides), remove the slide-retainer plate (see "Parts Replacement and Repair Procedures for *KODAK* Slide Trays" next), and clean and lubricate it with a dry aerosol spray or silicone. (Do not use powder or oil-base lubricants.) This will lubricate the two major friction areas: the top surface of the slide-retainer plate (on which the slides move) and the inner edge of the plate around the retainer. Replace the plate by reversing the disassembly procedure.

Parts Replacement and Repair Procedures for *KODAK* Slide Trays

Replacement parts may be ordered through your dealer in Kodak products or directly from Eastman Kodak Company, Parts Services, 800 Lee Road, Rochester, NY 14650. Specify the part name, part number and color, and quantity desired. Tray bodies are not available separately.



***EKTAGRAPHIC* Universal Deluxe Covered Slide Tray**



***EKTAGRAPHIC* Universal Deluxe Covered Slide Tray used with an *EKTAGRAPHIC* Slide Projector, Model S-AV2050.**

***EKTAGRAPHIC* Universal Deluxe Covered Slide Tray (disassembled)**

KODAK EKTAGRAPHIC Universal Deluxe Covered Slide Tray

Part Numbers

- **Locking Transparent Cover**, *KODAK* Part No. **600 6100.** If protection for slide corners is not required, the Lock Ring for *KODAK EKTAGRAPHIC* Universal Slide Tray, Model 2, Part No. 209062, may be substituted.
- **Lever (latch)**—*KODAK* Part No. **603 6321.** (The latch for the *KODAK CAROUSEL TRANSVUE* 80 Slide Tray cannot be used.)
- **Spring (latch)**—*KODAK* Part No. **603 6331.** (The spring for the *KODAK CAROUSEL TRANSVUE* 80 Slide Tray cannot be used.)

- **Slide-Retainer Plate**— *KODAK* Part No. **603 6311.** (The Slide-Retainer Plate for the *KODAK EKTAGRAPHIC* Universal Slide Tray, Model 2, *KODAK* Part No. **203978,** can be used in an emergency, but is not recommended because it changes the amount of friction; that for the *KODAK CAROUSEL TRANSVUE* 80 Slide Tray should not be used because of slightly different dimensions.
- **Flat Springs** (3)— *KODAK* Part No. **603 6341**

Slide-Retainer Plate Repair Procedure

- Turn the tray upside down and retract the latch by pressing down on it through the hole in the center of the tray. Press inward on the plastic retainer clip nearest the opening in the retainer plate, and lift the plate up slightly until it is free of the clip. Note the position of the flat friction spring under the clip. Release the tray latch, rotate the retainer plate and release it from the other two latches in the same way.
- Straighten any small dents in the plate or install a new plate.
- Replace the bottom by reversing the procedure above. Make sure the three flat springs are properly in place, with the end tabs located in the recesses provided, and the side tab of each spring under its plastic retainer. If the center portions of the springs, which bear on the retainer plate, are dry, put a small amount of light grease on the bearing surface of the plate. The bottom plate can be pressed on, so the plastic catches snap into place. Rotate the plate a full turn to distribute the lubricant, and check for proper operation. Considerably more frictional drag than is present in North American-made *KODAK* slide trays is normal.
- Rotate until the latch locks the retainer in position for use.

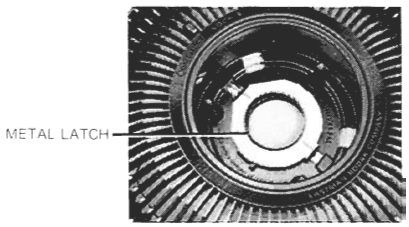
Latch Replacement

- In the center well of the tray, find the latch retaining catch and hinge point at the top of the latch. Press it counterclockwise to release the latch for removal. Note the coil spring in the formed guides toward the outer end of the latch, and remove it. To reassemble, insert the spring (or replacement) back in the guides, and slide the latch into place between the spring guides and the guides extending upward from the bottom of the tray, until it snaps into place.

KODAK EKTAGRAPHIC Universal Slide Tray, Model 2

The Universal Slide Tray, Model 2, has superceded the earlier Universal Slide Tray (provided with a red plastic center latch); the Model 2 Tray has a metal latch. It also has a white bar at the number 20 slide position that provides for tray alignment from behind the projector.

Replacement parts may be ordered either from your audiovisual dealer or directly from Kodak. However, you should note these important differences, in both the part numbers and repair procedures necessary for the Model 2 Tray.



Part Numbers

- **Lock Ring**, *KODAK EKTAGRAPHIC* Universal Slide Tray, Model 2—*Kodak* Part No. **159804**
- **Latch**—*Kodak* Part No. **185837**
- **Screw** (3)—*Kodak* Part No. **851271**
- **Slide-Retainer Plate**—*Kodak* Part No. **203978**

Slide-Retainer Plate Repair Procedure

- Turn the tray upside down and remove the three Phillips screws.
- Extend a finger through the hole in the center and retract the metal latch by pushing it in the direction opposite the slide-change slot.
- Lift the slide-retainer plate from the bottom of the tray.
- Straighten it or install a new plate.
- Replace the plate by reversing the disassembly procedure.
- Check for free rotation of the plate.

Latch

- Two flat springs on the latch operate against a boss on the tray bottom to keep the latch engaged in the notches on the slide-retainer plate so the plate will not rotate when the tray is off the projector. Sometimes, mishandling can cause the latch to be pulled up so that one of the springs clears the top of the boss and prevents normal action of the latch. If this happens, push the spring back behind the boss with a small screwdriver.
- A bent latch should either be straightened or replaced (the latter is preferred). To remove the latch, first remove the slide-retainer plate, as described above. Then, with the tray oriented right side up, push the latch toward the No. 0 slide position to retract the flat tab from the space in the tray body. Grasp the latch and lift the flat tab; at the same time, withdraw the formed tab from its slot near the "0" position.
- Straighten the latch and springs or replace the part.
- To restore the latch to its position in the tray, insert the formed tab into the slot that is toward the No. 0 slide position and guide the flat springs over and behind the boss on the tray bottom. Angle the latch downward so that the tab can be inserted all the way into the slot. With the formed tab fully inserted into its slot, press down on the side of the latch opposite the tab until the latch is resting on the bottom of the tray body. Finally, slide the latch toward the No. 40-41 slide position in the tray body to insert the flat tab carefully into its slot. The springs will cause the latch to snap into operating position.
- Install the slide-retainer plate and check for proper functioning of the latch and plate.

KODAK CAROUSEL TRANSVUE 80 Slide Tray

Part Numbers

- **Lock Ring**, *KODAK CAROUSEL TRANSVUE* 80 Slide Tray (white)—*Kodak* Part No. **159804**
- **Plastic latch** (black)—*Kodak* Part No. **211946**
- **Spring**—*Kodak* Part No. **218008**
- **Screw** (3)—*Kodak* Part No. **851271**
- **Slide-Retainer Plate**—*Kodak* Part No. **211947**

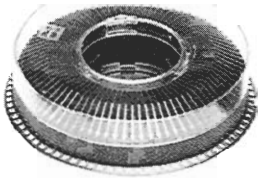
Slide-Retainer Plate Repair Procedure

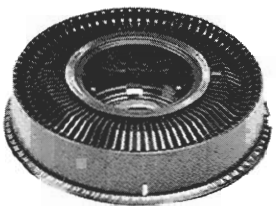
- Turn the tray upside down and remove the three Phillips screws.
- Lift the slide-retainer plate from the bottom of the tray.
- Straighten any small dents in the plate or obtain a new plate (preferably the latter.)
- Replace the plate by reversing the disassembly procedure.
- Check for free rotation of the plate.

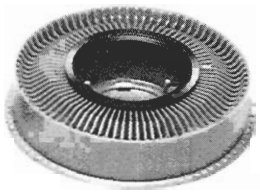
Latch

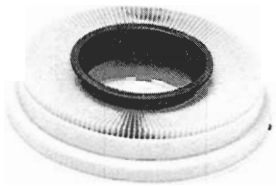
- A spring on the latch keeps the latch engaged in the notch on the slide-retainer plate so the plate will not rotate when the tray is off the projector. To replace the spring on the latch, squeeze the latch pivot points together with needle-nose pliers and raise the latch from its slot. Remove the spring from the tray. Replace the spring and latch by reversing the disassembly procedure.

NOTE: Eastman Kodak Company does not make available any component parts for the *TRANSVUE* 140 Slide Tray except the lock ring (*KODAK* Part No. **185230).**









A Do-It-Yourself Slide Tester

Slide trays are sometimes blamed for slide-change failures when, in reality, the slide *mounts* are at fault. For reliable operation, the slide mounts *must* fit freely in the tray compartment slots.

NOTE: Do not use damaged slides (with torn mounts, exposed sharp glass corners or edges, or loose or sticky tape). Such slides must be repaired or remounted before they are loaded into *any* tray.

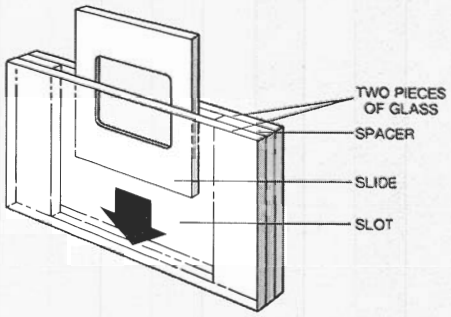
Shown here is a do-it-yourself slide tester for *KODAK* Slide Trays used most often. The tester is made of 2 pieces of glass 2 x 4 inches (approximately 51 x 102 mm) with edges ground to avoid cutting yourself, and 2 spacers $^1/_2$ x 2 inches (approximately 12.7 x 51 mm), $^1/_8$ or $^1/_{10}$ or $^1/_{16}$ of an inch (about 3.8, 2.54, or 1.59 mm) thick.

NOTE: Be sure that the spacer thickness is accurate.

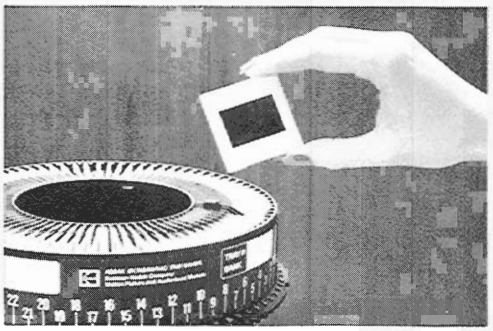
Sandwich the parts together with cement or rubber bands. Hold the tester with the slot upright and insert slides (mounted in different mounts) from the top; if they *drop through* they will work in the trays for which they are intended. Use spacers of the following thicknesses for the following trays:

- Use a $^1/_8$ inch (3.8 mm) spacer to test slides intended for the *EKTAGRAPHIC* Universal Slide Tray, Model 2, and *EKTAGRAPHIC* Universal Deluxe Covered Slide Tray.
- Use a $^1/_{10}$-inch (2.54 mm) spacer to test slides intended for the *CAROUSEL TRANSVUE* 80 Slide Tray.
- Use a $^1/_{16}$-inch (1.59 mm) spacer to test slides for the *TRANSVUE* 140 Slide Tray.

The do-it-yourself spacer gives you the opportunity to choose the tray that you *need* for the kinds of mounts used for your slides.



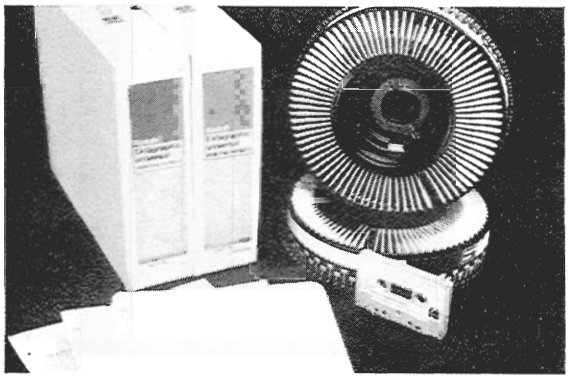
A Do-It-Yourself Slide Tester



NOTE: Slide mounts with soft aluminum frames provide satisfactory service for occasional use, but they are not satisfactory for heavy-duty, long-term use. With long-term use, the soft metal wears through or develops rough areas at friction points on the sides and bottom and on the rear surface where the pressure pads in the projector gate guide the slide into the tray.

PACKAGING OF *KODAK* SLIDE TRAYS

In general, it is best to store *EKTAGRAPHIC* and *CAROUSEL* Slide Trays in the boxes supplied. These boxes, however, *are not intended to be complete shipping containers.*



Additional packaging protection should be provided for mail, freight, or express shipments, particularly for boxes containing trays loaded with glass-mounted slides. The following procedures are suggested:

- Add a soft foam-rubber or urethane pad, about $^3/_8$-inch (9.5 mm) thick and 9 inches (230 mm) square, to the bottom of each box provided with the trays. This thick foam pad will provide protection against shock, breakage, and abrasion.
- Place strips of packing material around the tray as you put it into the box. This measure will help to prevent the box from splitting at the edges.
- Securely tape or tie the box cover to its base to minimize tray movement within the box. Abrasion will then be reduced at the four tray contact points on the inner sides of the box.
- Wrap each tray box on all six sides with a suitable cushioning substance, such as foam or air-cell material; and then insert the package into a larger, rigid shipping container.
- Whenever possible, make arrangements to carry trays in a vertical position (on edge).
- Place packing material around magnetic sound recording cassettes if they are to be shipped with the Universal Slide Tray, Model 2.

Some Manufacturers of Shipping Containers

Reinforced fiber or molded shipping containers serve well for mailing boxed trays. Such items are not provided by Eastman Kodak Company. However, the manufacturers listed below have indicated that they will supply shipping containers that are suitable for transporting boxed *EKTAGRAPHIC* or *CAROUSEL* Slide Trays:

Manufacturers of Shipping Containers for *KODAK* Slide Trays

Cargo Case Division
Icom, Inc.
237 Cleveland Ave.
Columbus, OH 43215

Fiberbilt Photo Products
Division of Ikelheimer-Ernst, Inc.
601 West 26th Street
New York, NY 10001

Midwest Fibre Products Co.
Box 397
Viola, IL 61486

Sirtage, Inc.
Umstead Industrial Park
P. O. Box 6417
Raleigh, NC 27628

MAINTAINING AND STORING SLIDES

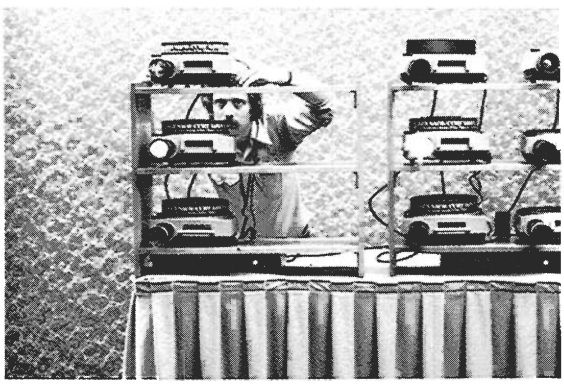
The following tips concerning the care, storage, and filing of slides will help you to gain maximum life from your slide transparencies and reduce the need to replace them at frequent intervals.

Care and Storage of Slides

The dyes used in *KODAK* Color Films are as stable as is consistent with the optical and chemical requirements of color processes. The primary factors affecting the permanency of the dyes in a color image are light, moisture, and heat. Faulty processing can hasten the deterioration of dye images. To delay dye image changes in properly processed films, store films in a dark, dry, and cool place. Avoid storage where sunlight or other stray light falls on the slides or slide trays.

Protection from Light

The projection life of a color transparency depends upon the amount of light and heat from the projection lamp falling on the slide. It also depends upon the total projection time. Avoid long projection times, if possible; make duplicate slides of the original and use them for projection purposes instead.



Avoid long projection times, if possible. Make duplicate slides of the original and use them for projection purposes instead.

Never use the projector with the heat-absorbing glass removed and never use a lamp of higher wattage than recommended. Do not restrict the flow of air to and from, or obstruct the openings in, the projector housing.

Protection from Physical Damage

Color transparencies should be kept as clean and dust-free as possible. They should never be touched with fingers except at the edges. Originals can be kept in transparent *KODAK* Sleeves, which you can buy from photo dealers, as protection against dirt and finger marks.

At relative humidities (RH) above 60 percent (not a recommended condition), shiny spots may occur on the emulsion surface of an original stored in contact with a sleeve, or, in fact, any smooth surface. These spots, as well as dirt and fingerprints, can be reduced by washing and drying the original. Use water between 65 and 75°F (18 and 24°C) and limit the washing time to a few minutes. Bathe the transparency for about 30 seconds in a solution such as *KODAK PHOTO-FLO* Solution (diluted as directed on the bottle), and hang it up to dry.

Do not store slides in the presence of moth-preventive chemicals, such as paradichlorobenzene crystals. Such chemicals tend to crystallize on the film and damage adhesives used in mounts. Gases such as nitrous oxide, hydrogen sulfide, and sulfur dioxide can cause slow dye fading.

Keep your slides away from chemical dusts; alkaline dust particles and hypo particles on the emulsion can cause dye fading after a prolonged storage period. If you use slide-mounting glass, it should be cleaned to remove contaminants before the transparencies are mounted.

Salvaging Water-Soaked Slides

Water from floods, fire-fighting, burst pipes, leaky roofs, etc, can inflict serious damage on stored transparencies. Damage can be kept to a minimum if you act quickly to salvage them.

First, keep the water-soaked transparencies and their enclosures (mounts, envelopes, sleeves, etc) *wet*. Do not allow them to dry. Immerse them completely in plastic containers of cold water, below 18°C (65°F), containing about 15 mL of Foramlin* per litre of water. The cold water and the formaldehyde will help prevent the swelling and softening of the gelatin emulsion which are the major causes of damage and the growth of bacteria.

CAUTION: Formaldehyde solutions and vapor are irritants. Keep eyes and skin from contact. Use protective gloves and glasses.

As soon as possible, carefully separate the transparencies from their enclosures and mounts and wash them for 10 to 15 minutes in water at 18°C (65°F) or lower. If necessary, the films can be swabbed, but extreme care should be taken because the wet emulsion is very susceptible to physical damage. Avoid any sudden temperature changes in the wash waters. Rinse *KODACHROME* transparencies for 1 minute in diluted *KODAK PHOTO-FLO* Solution. Rinse *KODAK EKTACHROME* transparencies for 1 minute in a working solution of *KODAK* Stabilizer, Processes E-3 and E-4.

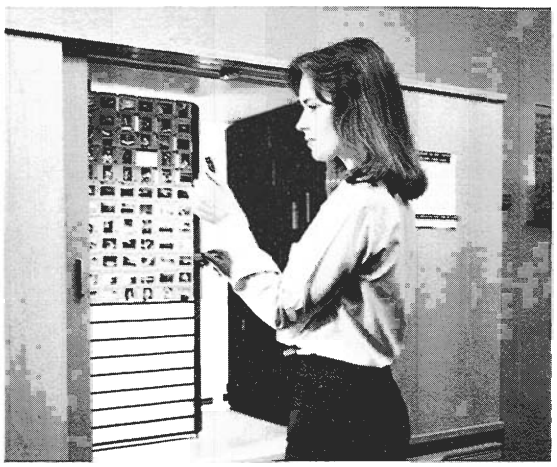
Dry in a dust-free area and remount them.

Exposed water-soaked film should be kept wet and processed as soon as possible.

*Formalin is a 37 1/2% solution of formaldehyde available from laboratory chemical supply houses.

FILING YOUR SLIDES

If you have a need to maintain a file of slides to use periodically for preparing such things as displays, presentations, and printed materials, the major considerations are safe storage, easy retrieval, and convenient viewing.



Through extensive experience, a number of audiovisual departments at Kodak have developed a rather effective slide-filing method. It has three main elements:

- A classification of categories (similar to the Dewey decimal system)
- A master slide set
- A slide file.

Using the method is easy. Establish the number for your category of interest and locate the category in the master slide set. Then, note the access code on the slide you choose, and use the code to obtain a similar picture from the slide file. Here's how the system works.

You can start classifying simply and build as required. For example, begin with whole numbers and represent major categories such as:

1. Art
2. Drama
3. Music
4. Science

As soon as any category becomes unwieldy, it can be subdivided. Thus, **Science** could be separated as follows:

4.0 Science
4.1 Biology
4.2 Chemistry
4.3 Ecology
4.4 Physics

Each of these categories can also be further subdivided as necessary. For example, **Ecology** might look like this:

4.30 Ecology
4.31 Air
4.32 Land
4.33 People
4.34 Water

Although the categories are not mutually exclusive, practicality limits extensive cross-indexing. The listing of categories is mounted on a sturdy card and placed prominently near the master slide set for ready reference.

The master slide set is composed of original transparencies that are used solely for duplicating and viewing for slide selection—*not for distribution.*

NOTE: Never take an original transparency from the master slide set for projection purposes.

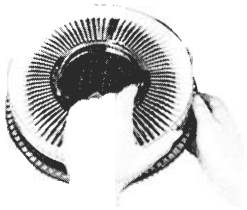
A combination storage-and-viewing cabinet* houses the master set safely and conveniently. The mount of each master slide is marked with an access code (using indelible ink), such as K82-350. The "K" indicates *KODACHROME* Film (it could be "E" for *EKTACHROME*). The numbers show it was the 350th slide shot and filed in 1982. This code is used to locate a particular transparency in the slide file.

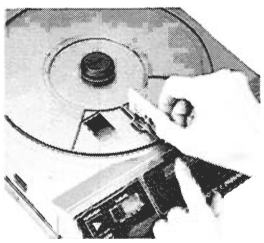
Expendable extra original (or duplicate) slides are stored in the slide file, one group for each of the slides in the master set. The slide file is situated near the master set cabinet (often directly underneath it for easy access). All file drawers are labeled serially by year and slide number and have front-to-back dividers placed about 2 inches (51 mm) apart. (Each group of similar slides is headed by a 2 x 2 1/4-inch card marked with the appropriate access code.

NOTE: When you or anyone else makes a slide for the master slide set, consider the relatively inexpensive step of shooting several additional *originals* for the slide file. Otherwise, needed duplicates can be made for a little extra time and money.

The number of originals (and duplicates) required depends upon the subject matter and the judgment of the librarian. For example, a picture of a building could serve many purposes for a long period of time, whereas one of a temporary scaffolding might not.

*Suitable cabinets that hold hundreds of slides in frames, with incorporated light panels for direct viewing, are available from suppliers such as Multiplex Display Fixture Co., 1555 Larkin Williams Rd., Fenton, MO 63026, and Elden Enterprises, P. O. Box 3201, Charleston, WV 25332.





The Life of a Slide

Q. What is the useful life of slides that may run from 8 to 12 hours a day, day in and day out?

A. Consider such heavily-used slides expendable. They will eventually fade or change color balance and will need to be replaced by a new set or duplicates.

Q. How often should they be replaced?

A. We can only offer general guidelines, and such guidelines cannot be exact.

Q. Why?

A. There are too many variables, such as proper processing, adequate projector ventilation, ambient temperatures, and so on. However, the film type, if it is photographic film with dye images, does *not* make a significant difference, assuming proper processing and the projector operating at relatively normal room temperatures.

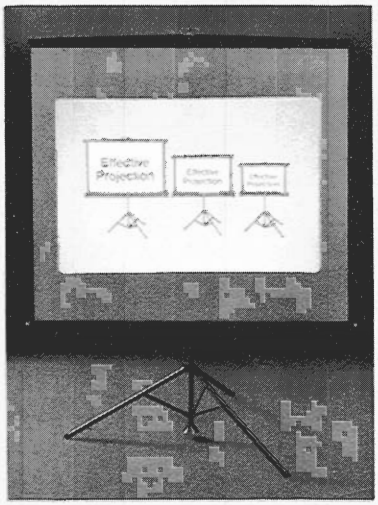
The projector is likely to make a difference, though. The optical design of an *EKTAGRAPHIC* III or *EKTAGRAPHIC* Slide Projector is efficient. The ELH lamp in an *EKTAGRAPHIC* Slide Projector or the EXR lamp in an *EKTAGRAPHIC* III Projector (and, of course, the condenser in each projector) concentrates a great deal of light—about 95,000 footcandles—on a piece of film only a little more than one inch square in size. *Ninety-five thousand footcandles is about 15 times as bright as direct sunlight.* We are asking that little chip of film to withstand a lot of radiant energy.

Q. Then why aren't our images brighter when we project them?

A. Because the projected light is spread over a much larger area. In enlarging that little chip of film (an ordinary 24 x 36 mm transparency) to an 8 x 12-foot screen image, for example, we have increased the area about 11,000 times. That reduces the footcandles by the same factor.

Q. What other factors determine how long a slide will look good on the screen?

A. Slide subject matter is important. A high-key artwork slide will appear to change less than a full-scale slide, in which the dark-shadow areas will absorb more energy and may tend after many projections to become smoky or slightly faded and lack punch. In a high-key slide, there are either no dark areas or they are much smaller and less important, so the high-key slide will remain satisfactory much longer than a full-scale slide. (A high-key slide will also be more visible than a full-scale slide in a projection room that has a high level of ambient light.)



A high-key artwork slide having noncritical pictorial content and fewer and less-important dark areas in the image will remain satisfactory for projection much longer than a full-scale slide and will be more visible in a room having a high-ambient light level.

Q. Are there other factors?

A. Yes. The variability in the definition of what is accepted as a "good" image. "Acceptable" to me might not be acceptable to you. We tend to be more critical about subjects with which we are most familiar. We will accept more change in the colors of a chart, for example, than in flesh tones of people.

Q. What should we consider when projecting with a high-intensity projector, such as those with a xenon-arc light source?

A. Transparency cooling is important, of course. That means that open-frame (not glass) mounts should be used. The transparency emulsion must absorb more radiant energy in a high-intensity projector no matter how well the projector is designed.

Q. And the usable slide life?

A. In general, it is roughly proportional. If you measure the light output of a high-intensity arc projector and find it is four times as great as with a regular tungsten projector, the slides will probably last only about a fourth as long.

(CONTINUED)

Q. What is an approximate figure for the projection life of a slide?

A. Keeping in mind the variables mentioned earlier, a slide can usually be projected for a few hours without objectionable changes. If a slide is high-key artwork with charts or lettering with emphasis on legibility rather than color fidelity, projection life, as mentioned earlier, can be much longer.

For most viewing purposes, pictorial slides made on properly processed Kodak color films will be acceptable through 3 to 4 hours of total projection time. This is true when the slides are used in an *EKTAGRAPHIC* III or *EKTAGRAPHIC* Slide Projector that is equipped with a tungsten-filament lamp and has unrestricted air circulation, even if the projector is operated with the power-selector switch set at HIGH.

Q. Will slides last longer if projected intermittently, for a few seconds each time?

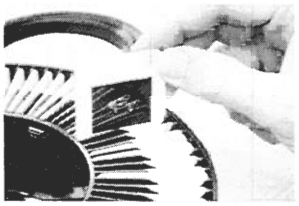
A. No. Oddly enough, they will change somewhat less if projected continuously for a given time rather than intermittently until the same projection time is achieved.

Q. How can I determine how long a set of slides will last, particularly if different slides are projected different lengths of time?

A. Do a test, using the same lamp, projector, film type, average density, and so on that will be used in the actual program. Or make an estimate based on no more than a few hours of projection time for each slide.

Multiply the estimate by 81 (the number of slides in the tray). For color slides, you may want to replace sets more frequently. For less critical material, the slide set can probably run longer.

Q. Is it better to shoot dupes or use multiple originals?

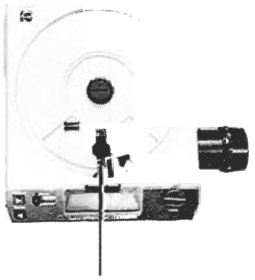


A. If you do not project the originals, you can have additional dupes made with color balance changes, if desired. Sometimes it is less expensive to shoot several originals—such as when copying flat artwork. But saving one set of originals is still good insurance.

Q. Is it a good idea not to mix originals and dupes?

A. Yes. And better not to mix dupes made at different times or by different processes. Using similar slide types helps to reduce focus shift in projectors.

Q. Would better cooling of the projector gate make slides last longer?



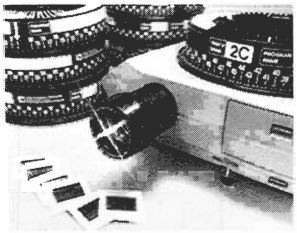
A. Not appreciably. The radiant energy slides absorb can cause changes even if they are kept very cool, in much the same way that people can get sunburned on a sunny ski slope as well as in a tropical lagoon.

Q. Any other recommendations for prolonging the projection life of slides that will be continuously?

A. Let's summarize.

- Use properly processed film.
- Use open-frame mounts.
- Run the projectors in ambient temperatures that are not too high.
- Choose non-critical, high-key slides, if possible.

Slide Fungus—Its Prevention and Removal



When transparencies are stored or kept for any length of time in an area having a relative humidity above 60%, fungus—often called mold or mildew—has a tendency to grow on them. Humidity 60% and higher is typical in tropical countries and in many sections of the United States, especially during warm summer months. (High temperatures alone without high humidity will not cause fungus growth.)

Any form of surface contamination is likely to promote the growth of fungus. Therefore, avoid leaving fingerprints on transparency surfaces. Remove any accidental fingerprints with *KODAK* Film Cleaner.

Damage caused by fungus on unexposed or unprocessed film can't be undone. A pattern of fungus filaments forms which shows up later in the processed image. The possibility of fungus damage can be reduced on unexposed films by keeping the moistureproof packaging sealed until the film is used. (Process your film as soon as possible after exposure.) Fungus can attack unprotected exposed film both inside and outside your camera.

When fungus grows on processed films, damage to the image is not immediate. If the growth is discovered in time, steps (described below) can be taken to remove it. If growth proceeds too far, however, permanent image damage can result.

The best way to prevent fungus growth is to store transparencies in a cabinet or container in which the relative humidity can be kept between 25% and 50%. Air conditioning with fully automatic relative-humidity control provides the most desirable situation for storage under exceptionally humid conditions.

If the prevailing relative humidity is above 60%, dry your transparencies with silica gel before storing them in cans, jars, or bags. Silica gel lasts indefinitely, but it must be reactivated periodically to remove the moisture. Heat the gel at 300° to 400°F (149° to 204°C) for about 30 minutes and allow it to cool in a closed metal container. If it is not to be used immediately, seal the container. One ounce of silica gel will protect about 50 *KODACHROME* Slides.

When you want to keep a small quantity of transparencies dry under humid conditions for just a short time—in transit, for example—place them in a container along with silica gel and then close and seal the container. (Neither silica gel nor other desiccants are recommended for permanent installations.)

Considerable protection can be provided by storing your transparencies in metal, polyethylene, or styrene rather than wood or cardboard. (One way to dry slides is to *project* them occasionally.)

If transparencies need protection from fungus growth, apply film lacquer. A lacquered surface is more readily cleaned, and in cases of minor fungus damage, restoring the surface is possible by removing the old lacquer and applying the new.

Do not use water to remove fungus from color or black-and-white films. Fungus growth on the emulsion usually makes the gelatin soluble in water. Water *will damage* the image.

Most surface fungus on *unlacquered* transparencies can be removed by wiping the transparencies with a soft plush pad, absorbent cotton, or a chamois moistened sparingly with *KODAK* Film Cleaner. (Kodak processing laboratories stopped lacquering *KODACHROME* transparencies in 1970. Kodak never lacquered *KODAK EKTACHROME* Films.) Remove the transparencies from their mounts before cleaning, and use new mounts after cleaning.

If there is fungus growth on *lacquered* transparencies, remove the lacquer as follows:

- Add 15 mL (about a tablespoon) of nondetergent cloudy or clear household ammonia to 240 mL (about 8 fluidounces) of denatured alcohol. (Wear cotton gloves to avoid touching the film.) Use shellac-thinning alcohol—*not rubbing alcohol.*
- Agitate the film in the solution for no longer than 2 minutes at room temperature. (Longer times may change the color in areas of minimum density.)
- Hang the transparencies up to dry and then mount them in *new* mounts—*not* the original ones. Be sure the transparencies and mounts are *dry;* warm the transparencies and mounts for ten minutes at 10° above room temperature.

To clean slides on a large scale, use an ultrasonic cleaner, the type sold for cleaning small metal parts and surgical and dental instruments. A cleaner of 1-pint capacity should be adequate for cleaning slides individually.