Tips and Techniques

TIPS AND TECHNIQUES

Introduction

This collection of ideas is provided by Kodak people and others who work in the professional motion picture industry. The section discusses force processing, flashing, and shooting for television, what you need in the well-stocked ditty bag, and tools to survive. Also in this section (on the double foldout pages), is a filmmaker's flow chart that can help you with production scheduling.

If you have further questions about our films or their applications, please refer to the last few pages in this guide for the names, addresses, and phone numbers of Kodak people worldwide who can help.

Aspect Ratios

The aspect ratio is the relationship between the width and height of an image. While the image dimensions may vary in size according to projection requirements, the aspect ratio should comply with the cinematographic intent.

The industry standard for 35 mm theatrical motion pictures remained a constant 1.37:1 between the introduction of sound and the introduction of Cinemascope in 1953, when "wide-screen" presentations arrived. The non-anamorphic or "flat" wide-screen presentations had aspect ratios of 1.66:1, 1.75:1 and 1.85:1. Today 1.85:1 is the wide-screen (flat) presentation format of choice in the USA, while in Europe 1.66:1 is used.

In the early 1950's, television's demand for feature films increased. The typical television display provides a fixed aspect ratio of 1.33:1 (4 x 3) and many of the films shown on television, to fill the picture height, lost a substantial part of the image when this was "matted off" at the edges. To rectify this incompatibility, the academy aperture was introduced for flat (non-anamorphic) presentations. The academy aperture produced an image of greater height so that it would fill a television screen without compromising the width. The usual procedure when filming productions for both theatrical release and conventional television transmission is called "shoot and protect." The camera viewfinder is "matted" to indicate 1.85:1 for theatrical presentation and to keep all

pertinent action within this area. The cinematographer must make certain no scene rigging, microphone booms, cables, or lights are included in the expanded area that will be transmitted on television at 1.33:1. Subsequent interpositives, duplicate negatives, and prints contain sufficient frame height to provide normal telecine transmission. In the theater, the projectionist must use a 1.85:1 aperture plate and exercise some judgment in adjusting the projector framing.

Super 16 is a format that employs single-perforation 16 mm film stock and has two objectives. Super 16 was introduced in the early 1970s to provide an image suitable for enlargement to a 35 mm print for wide-screen presentation and for origination that will be displayed on wide-screen television (1.78:1 = 16 x 9). Super 16 and 3-perforation 35 mm are great fits for wide-screen television. The Super 16 camera aperture extends into the area used for a sound track on conventional 16 mm film providing more negative area to achieve a 1.66:1 aspect ratio, with some loss of image height when enlarged to wide-screen 35 mm film (1.85:1) and to 1.78:1 (16 x 9) for wide-screen television.

The Super 35, 4-perforation system uses the entire width of the film and is primarily used to extract an anamorphic print for theatrical release by optical reduction printing. This system is quite versatile; from a Super 35 negative, 70 mm blow-up prints can be produced, as well as extractions for 16 x 9 (1.78:1).

The Super 35, 3-perforation system is used for extracting 16 x 9 (1.78:1) prints and for origination for wide-screen television.

The 65 mm, 5-perforation system has a camera aperture of 2.29:1. It is primarily used for special effects, but when used in feature films, is projected on the screen using 70 mm release prints having an aspect ratio of 2.20:1. In lieu of origination on 65 mm for theatrical presentation, productions shot on 35 mm film with an anamorphic lens or in the Super 35 system are optically enlarged onto 70 mm release prints.

Other formats employing 65 mm negatives include 8-perforation (HydroFlex Iwerks 870 camera), 10-perforation and the Imax 15-perforation (horizontal) format.

You can obtain more information from ANSI and/or SMPTE by requesting a copy of the standards documents Image Areas, Cameras; Image Areas, Projector; and also Copy Dimensions for the sizes of the films you will use.

Force (Push) Processing

Force, or push, processing *increases* the effective speed of negative or reversal films by manipulating the time of development. This processing technique is usually requested to create a special effect, to compensate for an error in film exposure, or because not enough light is available. While you may increase the film speed, the effect may be detrimental to visual screen quality. Pushing color film by 1 stop may have a minimal effect, but further forcing may show a noticeable increase in grain and a softening of the shadows. Similar pushing conditions for black-and-white film will increase the grain and the contrast. Forced processing is considered one of the working tools of the motion-picture industry, but before requesting any forced processing, you should gain some familiarity with possible results through testing or discussion with laboratory personnel. However, today's faster films have decreased the need for forced processing. In any case, remember the following important ideas:

1. Find out if (and to what extent) your processing lab is prepared to offer force processing.
2. When possible, discuss your needs in advance of your assignment with a customer service representative or lab manager. A quick phone call usually gives you an answer.
3. Use the filter recommendations the lab may offer. This helps you avoid unwanted color balance shifts.
4. Be aware of the limits of the process. Decide beforehand if you can tolerate the losses in image quality that are associated with force processing your film. The best advice is usually available at the processing laboratory.

Storage and Care of Motion Picture Films

Although Kodak manufactures all KODAK Motion Picture Camera Films to very high-quality standards, you need to exercise a certain amount of care in the storage of unexposed, exposed unprocessed, and processed films. Given the care outlined in the chart on page 14, your films and film images will last longer and will not be adversely affected by short-term extremes of temperature and humidity.

Deviations from the recommended storage conditions can initiate degradation and cause instability of the silver or dye image. Deviations also weaken the mechanical properties of the support, can delaminate the emulsion layers, and deform and distort the film. The recommended storage requirements must be maintained if quality is to be retained.

There is further information on film storage and preservation in *The Book of Film Care*, KODAK Publication No. H-23. This publication also discusses theatrical projection, dye stability, film handling, rejuvenation and restoration, and it includes a Film Care Checklist. You can purchase *The Book of Film Care,* in the U.S. only, through Eastman Kodak Company, Dept. 412L. For ordering information see page 30. In countries outside the U.S., contact the nearest Kodak company or distributor in your country. Specifications for stability of imaging media on film are outlined in detail in ANSI Standard IT9.1-1989 and ANSI Standard IT9.11-1991.

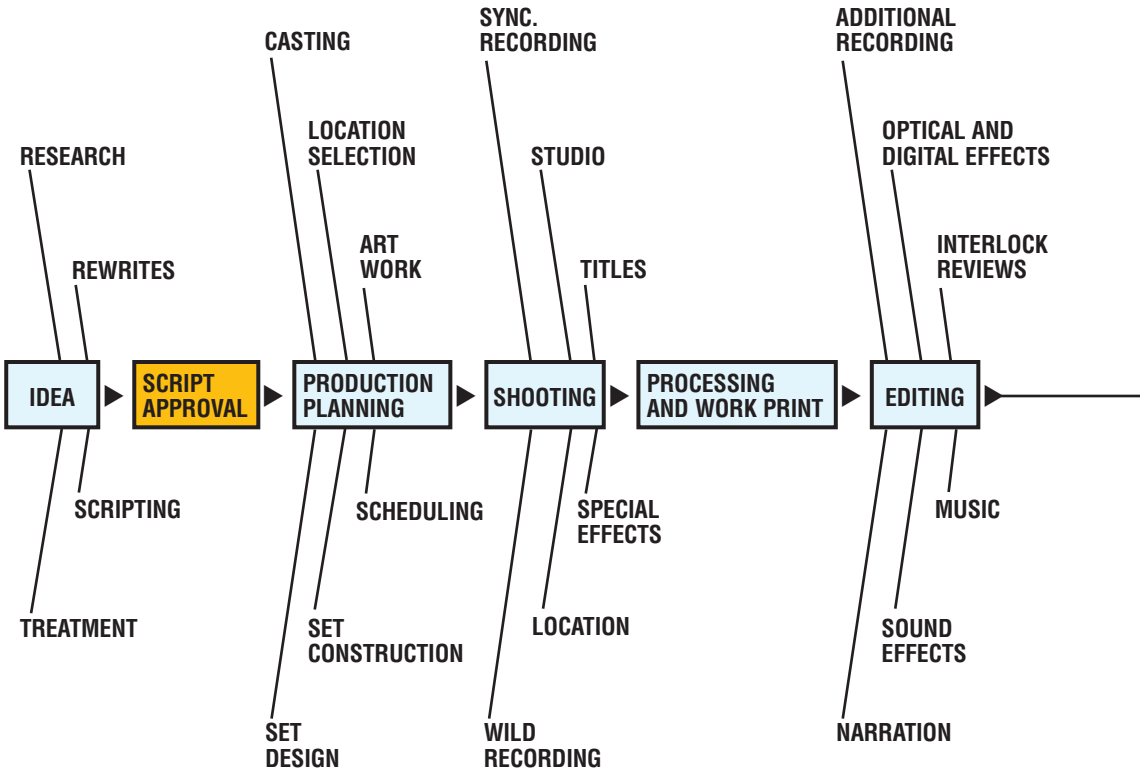
Raw Stock Relative Humidity

The quantity of moisture held by a photographic film at equilibrium is determined by US chemical properties and the relative humidity of the air.

Motion picture raw stock is packaged in taped cans. Until opened, the cans are water-vapor tight and do not require humidity-controlled storage. However, avoid storage at relative humidities of 60 percent or above. Such high humidities can damage labels and cartons (from moisture and mold), and can rust the cans. Keep raw stock in its original taped can until you are ready to use the film.

Unfold ◗

Filmmaker's Flow Chart



Storage Conditions

	Short Term (less than 6 months)		Long Term (more than 6 months)	
	Temperature	% Relative Humidity	Temperature	% Relative Humidity
Raw Stock (in original sealed cans)	13°C (55°F)	below 60	–18 to – 23°C (0 to –10°F)	below
Exposed Unprocessed	–18 to –23°C† (0 to –10°F)‡	below 20*	Not Recommended (see text below)	
Processed B&W	21°C (70°F)	60 or lower	21°C (70°F)	20 to 30
Color	21°C (70°F)	20 to 50	2°C (36°F)	20 to 30§

*Keep sealed (in original cans) until temperature is above the dew point of outside air. (See table of warm-up times.)
†With possible loss of quality.
‡ Process exposed film as soon as possible after exposure.
§ For infrequent use and when maximum useful life is primary concern.

Temperature

Storage of raw stock at –18 to –23°C (0 to –10°F) reduces sensitometric deterioration but does not preserve the film indefinitely. When you remove a package of raw stock from cold storage, allow it to warm up until its temperature is above the dew point of the outside air before you open it. For film in standard packages, use the following table as a guide for warm-up times:

Film Package	Warm-Up Time (hours) for Sealed Packages	
	14°C (25°F) Rise	55°C (100°F) Rise
super 8	1	1/2
16 mm	1	1 1/2
35 mm	3	5

Damage from moisture condensation occurs when you remove the can from cold storage and do not allow sufficient warm-up time before you remove the seal.

Protection Against Harmful Gases and Radiation

Certain gases, such as formaldehyde, hydrogen sulfide, hydrogen peroxide, sulfur dioxide, ammonia, illuminating gas, motor exhaust, and vapors of solvents, mothballs, cleaners, turpentine, mildew or fungus preventives, and mercury can damage unprocessed and processed film. It is safest to keep film away from such contaminants.

Film and Airports

For the protection of travelers, all domestic airports use electronic devices and X-ray equipment to check passengers and hand-carried luggage. Film can tolerate some X-ray exposure but excessive amounts will result in objectionable fog (increase in base film density, and noticeable increase of grain). This is particularly true for very high-speed films. In the United States, passenger inspection inflicts only very low level rates of X-rays which should not perceptibly fog most films (inspection stations can vary in radiation inten-sity). However, the effects of X-rays are cumulative, so repeated X-ray inspections can lead to an increase of fog and grain. **Be cautious.** You can avoid this danger to unprocessed film by hand carrying it, including film in cameras, and asking the attendant to hand inspect it, thus bypassing the X-rays.

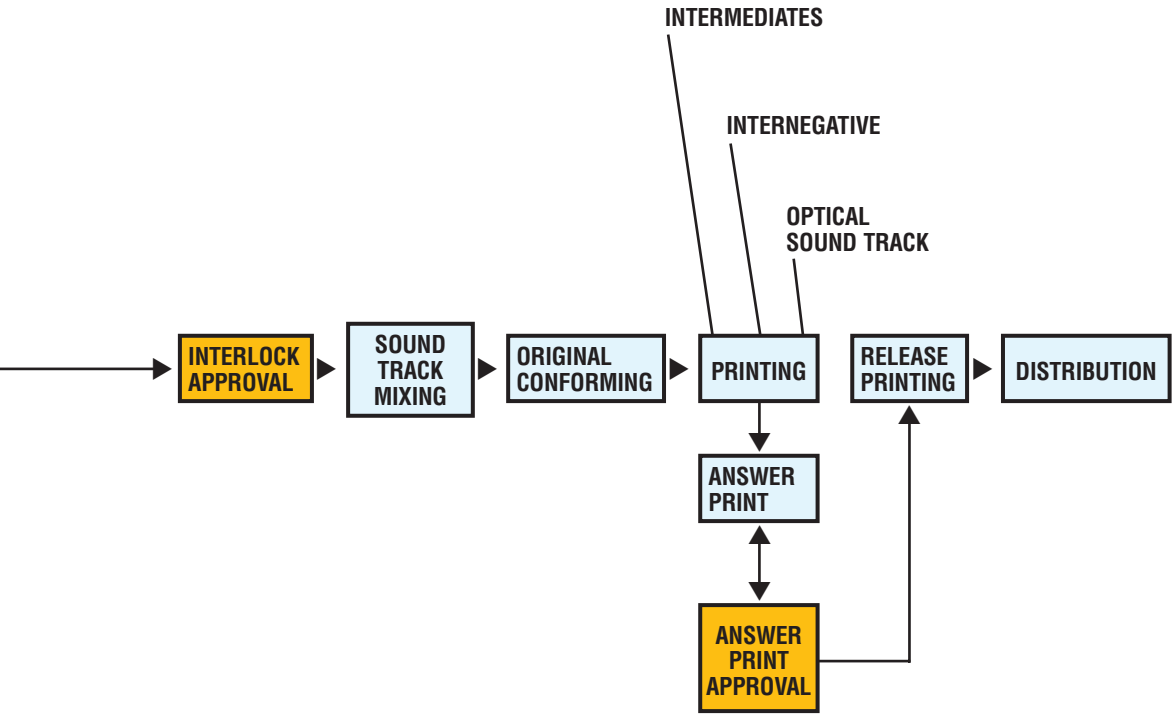
Foreign Travel

Airport security measures at international and foreign airports can pose a threat to unprocessed film. Not only is there a danger from X-rays, but security and customs agents may open containers of unprocessed film, ruining weeks of work.

The best protection, when traveling abroad, is to write to the airport manager well in advance of your arrival and explain the relevant details of your trip. Give them your arrival time, flight number and departure time. List the equipment and film you're bringing to your destination. Ask if there are any steps you can take to expedite matters and ensure the safety of the film. Repeat the process before leaving the foreign country. Speak with the airport manager and customs people, if possible, and make all advance arrangements that can be made.

For international travel, you may find it worthwhile to work with an export company or customs broker. There are private companies that expedite the handling of international shipments and do the paper work involved. Check the telephone directory yellow pages under "Exporters."

Another way to avoid problems is to have the film processed in the country where it was exposed. Eastman Kodak Company can help you find a local laboratory. Just consult one of the offices listed in the back of this book.


INTERMEDIATES
INTERNEGATIVE
OPTICAL
SOUND TRACK
INTERLOCK
APPROVAL
SOUND
TRACK
MIXING
ORIGINAL
CONFORMING
PRINTING
RELEASE
PRINTING
DISTRIBUTION
ANSWER
PRINT
ANSWER
PRINT
APPROVAL

Unprocessed Film Before and After Exposure

Exposed film, particularly color film, deteriorates more rapidly than unexposed film. Process films as soon as possible after exposure.

Do not keep film in the camera or magazine longer than necessary. If you load magazines a long time ahead of use, protect them from excessive temperature and relative humidity until you load the camera.

Keep loaded cameras or magazines and carrying cases out of closed spaces that can trap heat from the sun or other heat sources. Closed automobiles, airplanes, or the holds of ships should not be used for storage.

Immediately after exposure, return the film to its can and retape the can to help prevent any increase in moisture content.

Processed Film Storage

The following suggestions apply to extended storage of all motion picture films. Be aware that color dyes are more prone to change than are silver images over extended periods, with heat and humidity being the chief damaging factors. Before any extended storage (ten years or more), these minimum guidelines should be followed:

1. Make sure the film is adequately washed to remove residual chemicals, and that the residual hypo level does not exceed the recommended maximum. ANSI PH 4.8-1985 describes a test method for residual hypo.
2. At present, only EASTMAN EKTACHROME Motion Picture Films require stabilization during processing for dye stability. Be sure process specifications have been strictly followed.
3. All film should be as clean as possible. Cleaning is best done professionally. If you use a liquid cleaner, provide adequate ventilation. Adhere to local municipal codes in using and disposing of any solvents.
4. Keep film out of an atmosphere containing chemical fumes, such as hydrogen sulfide, hydrogen peroxide, sulfur dioxide, hydrogen sulfide, ammonia, coal gas, and automobile engine exhaust.
5. Do not store processed film above the recommended 21°C (70°F), 20 to 50 percent RH for acetate or for polyester, if extended life expectancy is to be maintained.

6. Wind films with emulsions in and store flat in untaped cans under the above conditions.

Shooting for Television

The television industry is changing. Advanced standards for high-definition television (HDTV) put more demands on the cinematographer. Even with the new standards, film remains the ideal, independent origination format. With film, you have the ability to transfer to any electronic format, without conversions problems.

Film origination format and aspect ratio are more important than ever before. Film choices for origination include 16 mm, super 16 mm, and 35 mm. When cinematographers and producers compose the image, they must decide to use the current 4:3 aspect ratio or 16:9 for HDTV. Some are shooting 4:3 and protecting the edges for 16:9.

The most widely used films in the television industry are KODAK Color Negative Films.

In all likelihood, your film will still end up on a video format for broadcasting. An important part of this process is the telecine transfer. Because the video output of the telecine is only as good as the film transfer input, this critical procedure must be performed with the highest quality standards.

No matter what format or aspect ratio you choose, the best television images start with the best practices in cinematography.

In general, photography expressly for television release should avoid high-contrast scenes and scenes with important details in dark shadows or against very bright backgrounds. The recommendations below should help you get the best possible results.

1. Always have a white reference (something brighter than a face) in every shot.
2. The white reference should not be more than 1½ stops brighter than your subject's face.
3. Keep your subjects away from windows or other high- brightness backgrounds, such as white walls or large expanses of open sky, except for a desired effect.

4. Don't photograph dark-skinned people against very bright or very dark backgrounds.
5. Try to maintain a range of 5 to 6 stops from the brightest to the darkest parts of the shot. A lighting ratio of 2:1 is a good starting point.
6. If you must shoot white or extremely bright costumes, try to maintain a good face-to-face white reference relationship. For these scenes, use soft lighting, such as that produced by an overcast day or open shade.
7. Flat lighting will give very good results for television, but may not be acceptable if the film is later released for theaters.

Getting Ready

Utility Bag

- Sanford Sharpie, both fine and ultra-fine point
- ear syringe
- small mag-type flashlight
- camel-hair lens brush
- lens tissue and lens cleaner
- dental mirror
- magnifying glass
- white cloth camera tape
- black camera tape
- masking tape
- highest quality gaffer's tape (NOT duct tape)
- scissors
- tweezers
- orange sticks
- *American Cinematographer Manual*
- assorted filters (85, 81EF, LLD, complete set of neutral density filters; yellow filters Nos. 2 thru 8 for B/W film)
- pencils and ballpoint pens
- screwdrivers
- paint brush (1-inch size with tapered bristles is preferred)
- leakproof precision oil can (the kind that looks like a fountain pen)

- rubber bands
- black cloth
- magazine belt clips and pick

Tools for Camera Maintenance

- longnose pliers
- diagonal cutters
- channel lock pliers
- screwdrivers—standard and Phillips head
- jeweler's screwdriver set
- Allen wrenches
- open end and box wrench sets
- files (for metal and wood)
- pocket knife
- "C" clamps 3-in. (7.5 cm)
- spring clamps
- scriber
- ¼ x 20 screws 1- and 2½-in. (2.5 and 6 cm)
- ⅜ x 16 screws 1- and 2½-in. (2.5 and 6 cm)
- washers
- tape measure (one 12 ft. and one minimum 50 ft.)
- voltmeter (w/adequate range to cover anticipated voltages)
- electrical tape
- ground adapters (both the 3-pin plug adapter and water pipe clamp types)
- electric drill and bits, up to ⅜-in. (0.75 cm)
- DREMEL Tool Kit and bits
- soldering iron and solder
- batteries: AA (12), AAA (12), 9V (4), and at least (2) spare batteries for light meter
- small and medium crescent wrenches
- expansion bit (and bit brace, if not electric)
- KODAK Gray Card Plus
- canned air
- blank camera reports
- clapper board

Camera Accessories

- 100-ft (30 m) camera spool*
- spare film cores (6 minimum)
- spare 85 conversion filters
- assorted ND filters (at least 0.3, 0.6, and 0.9)
- black camera tape
- gaffer tape
- insert slate
- log sheets
- dental mirror
- magnifier

Camera Operator's Meter Case

- favorite filters
- diffusion (gauzes or discs)
- two exposure meters
- color meter
- viewing filters
- calculators
- handbook (this one fits in almost any meter case) You may also want a copy of the ASC Manual.
- magnifying glass
- small hand mirror
- aspirin tablets

Some items on these lists you may not use often—the key is the word often—but even if you need an item only once and have it among your photo gear, you will be thankful that you remembered to bring it along.

*Load and unload all camera spools in subdued light.

Flashing Camera Films to Lower Contrast

"Flashing" means to deliberately fog film by giving it a uniform exposure before processing. The amount and type of exposure will vary with the "look" desired. This slight exposure lowers the film's contrast to some extent, primarily in the upper scale (shadow) areas, and allows for more detail in the shadows. The results are similar whether the film is pre- or post-flashed in a laboratory or on the camera (using equipment supplied by camera manufacturers).

Flashing is often done to establish a closer match between films of different contrast characteristics that will be intercut. Or to create pastels from more saturated colors—enhancing shadow details that have less fill light, etc. Effects such as changing the color of shadows can be made by selective filtering (non-neutral light source).

The amount of flash will affect the result, but flashing intensity has its limits, and too much will distort the image. Flashing is often measured in percentages by cinematographers and laboratory personnel. There is no consensus about what these percentages mean—this is usually perceived through past experience, and, as with most other creative techniques, it is important to work closely with the laboratory and gain experience through contacts and testing.

Exposed Film—What Now?

A Final Thought About Laboratories

Establish good communication with your lab. Doing so will help this step of your production go smoothly.

Know your needs—Know what you need from a lab and then discuss those needs with several labs before making a choice. Consider such things as editing, dubbing, special effects, animation, etc., so the lab can help you accomplish those tasks in the best way possible.

Get acquainted—Once you have made your choice of labs, get to know the people who will do your work. Tell them as much as you can about yourself, your needs, and your style. The more you communicate with them about yourself and your production, the better they can serve you.

Get it In writing—Face-to-face discussions and telephone calls are necessary for efficient work flow; but when it comes to specifying what you want, when you want it, and how much it will cost, a carefully written document—the purchase order—is a must.