

RECOMMENDED PRACTICES **AND** **PROCEDURES**

Shooting 16mm color negative for blowup to 35mm

Note- Shooting 16mm for blowup to 35mm requires preparation and planning. Cameras, lenses and magazines should be thoroughly checked and tested. 16mm for blowup to 35mm is more critical than 16mm for 16mm prints.

The difference in picture quality between 35mm films shot in 16mm negative and those shot in 35mm negative is due primarily to differences in graininess. The 16mm frame, blown up to 35mm, is enlarged approximately 3 to 4 times its original size, greatly exaggerating grain size. To maintain the finest grain structure in 16mm Color Negative, proper exposure and normal processing is mandatory to insure its maximum latitude and detail, with minimum grain in the shadow area of the blowup. When in doubt, if light is available, it is advisable to lean to overexposure. In fact, contrary to what occurs in black and white negative, where density is created by a buildup of grain, color negative has less grain in areas of higher density. A slightly overexposed color negative of approximately a third of a stop would tend to produce a blowup with the least amount of grain.

Flashing and toning should be avoided. These pro-procedures increase grain, especially in the areas of no exposure.

An underexposed negative shows more grain than a properly exposed negative. This grain is most apparent in weak shadow areas.

Force processing increases graininess to the extent of the forcing. 16mm Color Negative has considerable latitude and it is recommended that scenes that are underexposed up to one stop be processed normal. This underexposure has a lesser effect on the grain size in the negative than force processing.

There are a number of psychological factors which affect the viewer's awareness of grain. When the picture is not sharp, the eye, struggling to focus the image, tends to focus on the grain, making it much more apparent. Definition is also a function of contrast. Low contrast pictures tend to be less sharp and, therefore, appear more grainy. High contrast limits the detail in the highlights and shadows. If possible, it is advisable to have a black reference and a white reference in a scene. These reference points can be quite small. The eye, looking at a picture, searches for these reference points and, if there are none, tends to focus on the grain.

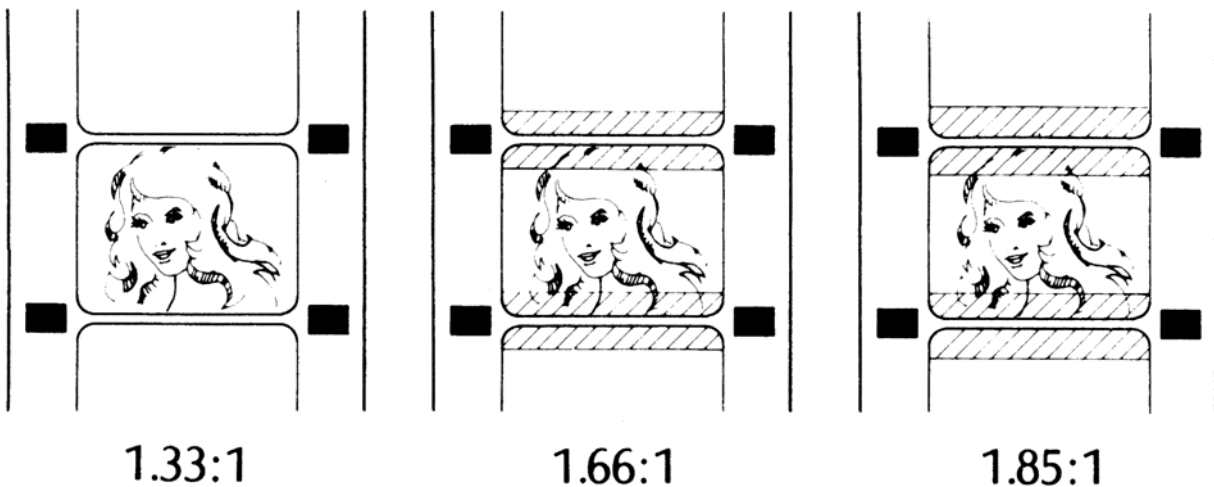
Special effects which require the blowup negative to be more than 1 generation away from the 16mm original should be avoided. The buildup in grain and loss in picture quality due to this additional generation is generally undesirable.

Composing image in the 16mm camera for a 35mm blowup

The aspect ratio of a picture frame is the relationship between its width and height. The ratio of the standard 16mm and 35mm frame is 1.33:1. Reducing the height of the picture while maintaining the width will increase its aspect ratio. This is done in 35mm projection by using a mask to crop equally the top and bottom of the picture frame.

35mm prints are projected at a 1.85:1 aspect ratio in the United States and at 1.66:1 in Europe. On TV, the picture is viewed at a 1.33:1 aspect ratio.

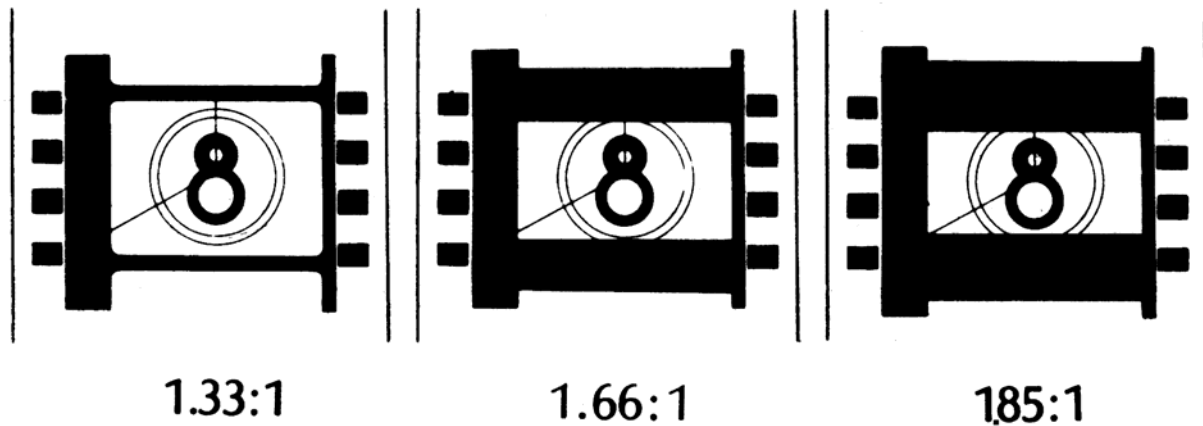
This diagram shows the area of a 16mm camera frame that the viewer will eventually see when screened at an aspect ratio of 1.33, 1.66 and 1.85.



When shooting a 16mm film for 35mm blowup, the camera person should compose the subject being photographed for wide screen projection.

A properly composed 16mm negative can be blown up to the standard 35mm aperture size, (style A, PH22.195-1984 ANSI). This negative produces a 35mm print with a picture in a 1.33:1 aspect ratio. This print can be used for television and projected theatrically in the United States and Europe with the appropriate mask. The aspect ratio of the projection mask and the framing position of the 35mm projector determines what part of the frame will be screened. The standard Academy leader is used by the projectionist to center the picture in the aperture of the projector.

If equal cropping of the top and the bottom of the picture eliminates important picture information, vertical scanning can be used in making the 35mm blowup negative. Scanning enables you to choose the part of the picture you want projected wide screen. Here you have the choice of losing picture information only at the top or the bottom or in a varied combination of the two. Blowup negatives that are scanned for a 1.85:1 or 1.66:1 aspect ratio require a frame line which fixes the desired aspect ratio. This frame line guides the projectionist in framing the picture properly. Prints from these negatives compared to a standard print look as follows:



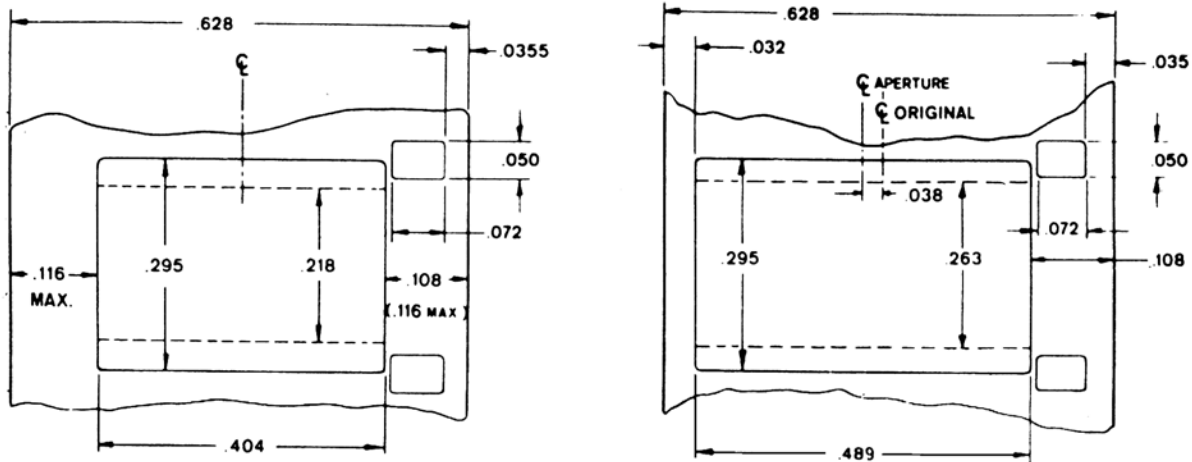
35mm prints made from a 1.85:1 or a 1.66:1 negative cannot be used for television unless the image is enlarged in the telecine chain when transferring to video-tape before broadcast. Cropping would have to be done on the left and right side of the picture to achieve a 1.33:1 aspect ratio. More cropping on the left and right side is required on a 1.85:1 aspect ratio print than a 1.66:1 aspect ratio print.

Prints from a scanned 1.66:1 negative are acceptable in theatrical screening for both domestic and foreign use. Prints from a scanned 1.85:1 blowup negative when screened foreign at 1.66:1 aspect ratio show a black border on top and bottom of the projected image.

We recommend that all scanning is done at a 1.66:1 aspect ratio and that the blowup negative be made with a frame line producing 35mm prints in which the picture information is framed in a 1.66:1 aspect ratio. Since there is not much difference in picture size between a 1.66:1 and 1.85:1 aspect ratio, this type of blowup negative enables you to make satisfactory prints for both domestic and foreign release.

Super 16mm

The Super 16mm format was designed to provide the greatest possible picture area on a 16mm original for enlargement onto 35mm for wide screen theatrical presentations. It achieves a wide screen format on single perforated 16mm camera film by extending the picture area into the unperforated area of the camera original. The following diagram compares standard 16mm camera original with Super 16mm.



REGULAR 16MM
ASPECT RATIO AREA

1:37	.1192
1:85	.0881

SUPER 16MM
ASPECT RATIO AREA

1:66	.1440
1.85	.1283
(46% Increase)	

The Super 16mm aperture produces an original image with an aspect ratio of 1.66:1. The blowup from this image can be cropped slightly in projection to yield the 1.85:1 aspect ratio. The increase in the useful picture area of a Super 16mm frame results in a substantial increase in the image quality obtainable in a 35mm wide screen blowup.

To optimize image quality, when shooting Super 16mm Color Negative for blowup to 35mm, follow the same recommended exposure practices as when shooting regular 16mm Color Negative for blowup to 35mm.

Super 16mm is a complete system requiring appropriately modified laboratory, editing and screening facilities as well as a modified camera.

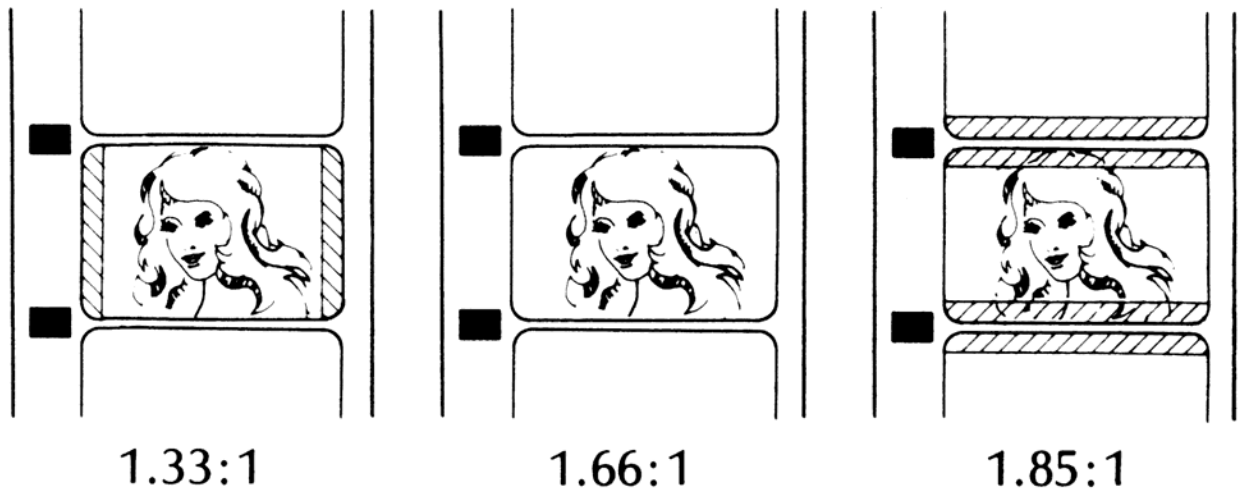
Principal camera modifications are: enlarging the aperture, re-marking the viewfinder and recentering the lens mounts. It may be necessary to modify the pressure plate and other parts of the film transport mechanism in both the camera and magazine to prevent scratching in the extended area of the frame.

Lenses should be carefully chosen to be sure that they provide a wide enough coverage to accommodate the wider frame. Many wide angle 16mm lenses cause vignetting in the Super 16mm frame. Cameras are available which have been specifically designed for adaptability to Super 16mm and some conventional 16mm cameras can also be modified for Super 16mm. Super 16mm cameras and magazines should be thoroughly tested before use on a production.

Editing and projection equipment must be modified to display the entire Super 16mm frame. Super 16mm film sent to the laboratory should be clearly identified so it can be handled properly. When a picture shot in Super 16mm has a television or 16mm release, the Super 16mm image must be converted to an image with a 1.33:1 aspect ratio by sacrificing part of the width of the frame. This is achieved by recentering the frame via an optical printer so that an equal amount is cropped on each side of the frame.

Composing image in the Super16mm camera for 35mm blowup

This diagram shows the area of a Super-16mm Camera frame that the viewer will eventually see when screened at an aspect ratio of 1.33:1, 1.66:1, 1.85:1.



The aspect ratio of the picture frame of a Super-16 Negative is 1.66:1. When shooting Super-16mm for 35mm blowup, the camera person should compose the scene for wide screen projection. A properly composed Super-16 Negative should be blown up to a 35mm negative having an aspect ratio of 1.66:1. Projecting a print made from this negative at 1.85:1 aspect ratio will crop equally the top and bottom of the picture frame. If important image information is eliminated, vertical scanning can be used in making the 35mm Blowup negative. Blowup negatives that are scanned for a 1.85:1 aspect ratio require a frame line which fixes the desired aspect ratio. Vertical scanning in Super-16 should, if possible, be avoided because foreign prints are screened at a 1.66:1 aspect ratio. This aspect ratio enables you to show all the information recorded on a Super-16 negative.

Television and standard 16mm prints show the picture information in a 1.33:1 aspect ratio. The

Super-16 image, in order to be converted to this aspect ratio, must sacrifice part of the width of the frame.

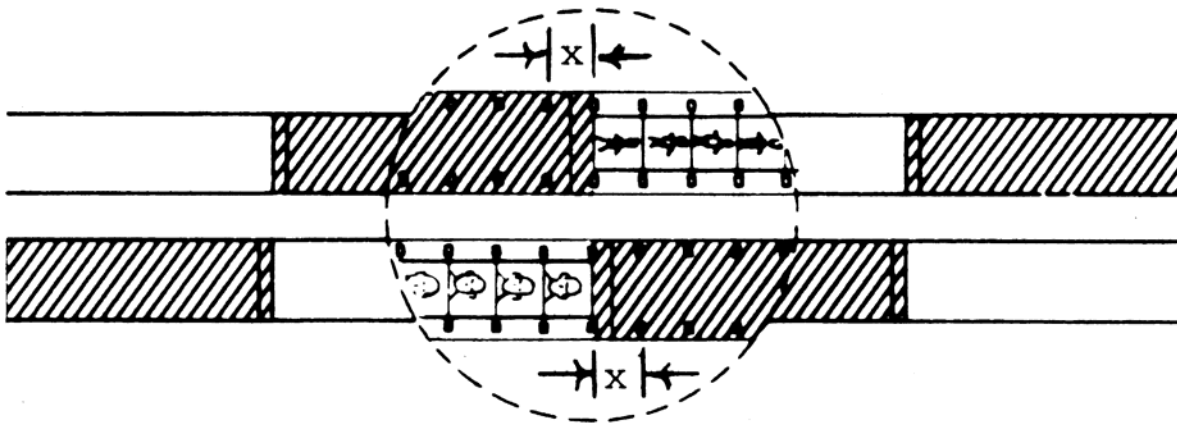
Titles

To be sure that your titles are suitable for different aspect ratio requirements, compose the titles so they will not be cut off horizontally when projected at a 1.85:1 or be cut off vertically when viewed at 1.33:1 for television.

If an action background is used for main and end titles, the action scene should be blown up to a 35mm 5242 Master Positive. The titles should be shot in 35mm hi-con. Using the 5242 Master and the 35mm hi-con titles with clear letters on opaque black background, a 5242 Dupe Negative of the main and end titles is manufactured.

Where titles do not use action backgrounds, it is often advisable to photograph the title scene completely in 35mm to maintain maximum quality.

Splicing for a blowup requires extra care



**SCRAPE PICTURE ONLY-NEVER SCRAPE
EMULSION FROM BLACK LEADER**

For a blowup, the 16mm original can be spliced in the standard 16mm A&B format. Besides normal care in splicing for cleanliness and assurance that the splice will hold, the conformer must be sure when making a 16mm splice for blowup that the cemented overlap of the splice maintains the proper pitch (x) between the perforation of the splice which is the first frame of picture negative and the perforation of the first frame of black leader. If this pitch or distance between these two perforations is not the same standard as the pitch between any two perforations where a splice does not occur, there will be a vertical jump in the picture at the

scene change. The reason for this is that the registration pins on all 16mm full immersion optical wet gates are either one or two perforations away from the frame being exposed.

Thus, the frame being printed is in a position established by a perforation on the opposite side of the splice. If the splice is off pitch, as described above, the first frame, or the first 2 frames after the splice is improperly positioned, with the adjustment coming on the following frame when the pin is registered after the splice. This problem will not show up when you make a 16mm contact print from your A&B original because, on the 16mm continuous printer, the sprocket teeth register the film and raw stock at the area of exposure. To help minimize the possibility of jumping splices, physically check your splicer before you conform the negative. Be sure that the distance between the pin that positions the black leader and the pin that positions the negative is correct. Splice some negative outtakes in A&B roll form, and, from this negative, make a test print using the optical printer with the 16mm immersion wet gate that will make the blowup. If jumps occur in this print at the splice, recheck all adjustments in your splicer and retest as before.

Zero-cutting

To completely avoid the possibility of jumping splices, the negative can be cut into A&B zero cut format. The zero cut method, with a minimum of four frames for an overlap, will definitely eliminate the splice-jump problem, but 16mm contact prints made from the zero cut negatives will have a one frame dissolve at the scene changes. Quite often, this one frame dissolve is noticeable when viewing the print.

Since Super 16mm contact prints with sound cannot be directly made from a Super-16mm Negative, there is no purpose in cutting your Super-16mm original negative in the conventional A&B roll format. To avoid the possibility of jumping splices it is advisable to cut the Super-16mm negative in A&B zero cut format.

Du Art Procedures for making a blowup

The workprint and the 16mm A&B original should be delivered to the laboratory in rolls up to 800 feet in length. The workprint rolls should represent the 35mm reel length format, where up to 2000 feet of 35mm goes on each reel. This conforms to standard theater projection practice.

The laboratory prepares a contact 16mm Answer Print, which is screened by the filmmaker and the timer for corrections. Note: Super-16mm contact prints with Sound cannot be made from a Super-16 negative.

For regular 16mm, the laboratory makes available to the filmmaker a 16mm flat bed with the picture screen masked to the desired aspect ratio. Supplied with a computer printout of each reel, indicating scene location by footage and frame number, the filmmaker views the Answer Print on the flat bed to decide whether vertical scanning is required. The filmmakers' decisions are indicated on the computer printout.

Using the corrected color timing and, if required, the filmmaker's scanning data, the Super-16mm or 16mm cut negative is optically enlarged to either a 35mm 5242 or 2242 Master Positive from which a 35mm 5242 or 2242 Dupe Negative is then made. Before the blowup intermediate is developed an additional printing operation is necessary, to create a clear picture frame in the 35mm negative. This is done so that prints made from the negative have a black frame line to help the projectionist center the picture on the screen. If the blowup negative has been scanned,

the frame line size is determined by the picture aspect ratio used in scanning. If the blowup negative has not been scanned, the filmmaker, depending on how the film will be screened, can decide upon the frame size. The processed negative is then synchronized with the 35mm sound track for the manufacture of 35mm prints.

If the A&B original has already been conformed in lengths other than recommended above, the 35mm blowup to proper reel length standards can still be accomplished without cutting the original material.

Our computer system provides us with all the necessary information so that the timing and scanning procedure will be handled the same as described above with the additional requirement that the filmmaker must decide where to end each 35mm reel for projector changeover. This changeover should take place in the film where a possible variance between the two projectors in lamp brightness and sound or a sluggish projectionist would least disturb the viewer.

If you would like more information on optical blowups or the new digital Arri blowups, contact our sales department. We are glad to discuss your project and guide you in choosing the process suited for you.



**245 WEST 55 STREET
NEW YORK, N.Y. 10019
(212) 757-4580**

Revised 10/25/02
M.S.