

# Technicolor Triple-Rank Super 8

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The Technicolor Triple-Rank super 8 film format for use in the mass production of commercial super 8 prints by the Technicolor imbibition process is described. The use of this format results in the need for a very minimum amount of special processing equipment. Much of the processing can be done on existing 35mm equipment.

FROM THE INITIAL conception and announcement of super 8mm film by the Eastman Kodak Co., our Motion-Picture Division in Hollywood and our Commercial and Educational Division at Costa Mesa jointly recognized the great potential for this new film format in the commercial and educational fields. Therefore, they started on the design and manufacture of a Technicolor cartridge-loading super 8 projector and a new Triple-Rank super 8mm format. The first Technicolor super 8 projector was announced to the public in mid-December, 1965. The development of our new Triple-Rank super 8mm format for production of super 8mm prints by the imbibition or dye transfer process was started in mid-June, 1965.

## Technicolor Imbibition Process

The Technicolor imbibition process is the oldest and perhaps best known of commercial color processes and is today the only process servicing the world with original quality prints.

The imbibition process originally made use of three-strip negatives to photograph a scene, and from the separation negatives exposed in the camera, three separation matrices and subsequently color imbibition release positive prints were made.

Since the introduction of multilayer color negative camera original films, the Technicolor three-strip cameras have been retired.

In today's process, three separation matrices are made from a color negative through red, green, and blue filters on special matrix films.

Separation matrices are unique in that they contain neither silver nor dye images after processing. Instead, they contain a gelatin relief image, much like a lithographic printing plate. These relief images soak up magenta, cyan, or yellow printing dyes when immersed in dye solutions, and transfer these dyes to a special type of print film.

The print film is a black-and-white film designed to imbibe the printing dyes transferred from the three separation matrices.

The soundtrack is first printed on the

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release stock, and during the course of development, all of the light-sensitive silver halide is removed from the picture area. The only silver in an imbibition color release print is in the soundtrack area.

Each of the dye-bearing matrix films, one after another, is brought into contact with the imbibition print film, so that the dye carried by each matrix is transferred to the print film. Thus the imbibition color release film undergoes three successive dye-transfer steps, one with each matrix. Each separation matrix transfers a dye which is complementary in color to the color record of the matrix. The red record matrix transfers the complementary cyan dye, the green record matrix transfers the complementary magenta dye, and the blue record matrix transfers the complementary yellow dye. Since the dye images are transferred from three matrices, one after another, to a single print film, they must be transferred in exact superposition, or "register," if the print is to appear sharp and clear.

When Technicolor received a copy of Eastman Kodak Company's proposal for 35mm motion-picture film perforated super 8, 5-R Quadrank, the possibility of such a film being employed in Technicolor's imbibition process was studied.

Examination of this format revealed that its use in the Technicolor process would require very extensive and costly redesign and modification of printing, developing, and dye transfer equipment. Of even more concern, however, was the size of the super 8 perforations and the proximity of one row to the edge of the film. Past experience had shown that a

condition such as this renders the film very susceptible to perforation damage and leads to mechanical difficulties on our dye transfer machines.

## Technicolor Super 8 Format

It was at this point that A. P. Lofquist, vice-president and general manager of the Professional and Television Divisions, suggested that the possibility of placing three rows of super 8 perforations in the center of 35mm perforated film be investigated. Thus, the Technicolor super 8 film format came into being.

As can be seen in Fig. 1, the super 8 perforations are positioned on the 35mm film in such a manner that three rows of super 8 film can be printed down the center of the film. The film is symmetrical in that the dimensions from the edges of the 35mm film to the edges of the two outside rows of super 8 film are identical. This dimension is 0.218 in. in each case.

Because of the difference in pitch between the 35mm perforations and the super 8 perforations, it was necessary to perforate the film in such a manner as to incorporate a cycle mark for synchronizing purposes. In other words, a method had to be devised to provide repeating points at which the 35mm perforations and the super 8 perforations would occupy a common centerline. By establishing a theoretical pitch of 0.16678378 for the super 8 perforations (as compared to 0.1667 as recommended by Eastman Kodak Co.), a repeat cycle every sixty-six 35mm perforations or seventy-four super 8 perforations is obtained.

Perhaps the most important feature of the Triple-Rank super 8 format is the fact that it requires a minimum amount of equipment modification.

The following equipment is employed in the production of super 8mm film by the Technicolor imbibition process:

(1) A reduction step printer is used to print the yellow, cyan and magenta

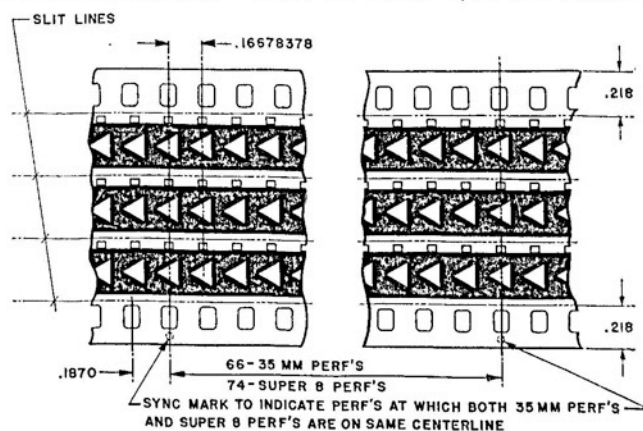


Fig. 1. Technicolor Triple-Rank super 8.

matrices. It was, of course, necessary to modify the positive head movement in order to shuttle in the super 8 perforations.

(2) The matrices are developed on a regular 35mm matrix developer.

(3) The three colors are transferred to the release print film on a regular 35mm transfer machine.

(4) The film is projected (before slitting) on a standard 35mm projector, equipped with a special shutter.

(5) The film is slit into 8mm widths on a special slitter, designed and built by Technicolor. The 35mm perforations are used to guide and drive the film through the slitter and all four cuts are made simultaneously.

It can readily be seen from the foregoing that the super 8 perforations, in the film which is delivered to the customer, travel through the entire Technicolor process without any possibility of damage. These perforations are not utilized in any part of the process. We feel that this is an important advantage of this system.

There is seemingly one disadvantage in the Triple-Rank super 8 format as compared to the Eastman Kodak Co. 5R proposal. Only three strips of super 8 film are obtained from the Triple-Rank format, whereas four strips are obtained from the 5R format. It would appear that we are sacrificing twenty-five per cent of the available film, which, indeed, we are. However, from our past experience in

the processing of regular 8mm film in the 5R Quadrank format, we feel that the much greater yield which we hope to obtain from the Triple-Rank format will more than offset the loss of this one strip of film.

With respect to sound on super 8mm film, Technicolor has complete facilities for providing super 8mm prints with magnetic sound.

We are, at the present time, setting up the necessary equipment for the printing of optical sound on super 8 film.

We hope, therefore, in a very short time, to be in a position to supply super 8mm prints with either magnetic sound or optical sound, as desired by the customer.

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