A New, Higher Speed Color Negative Film

By RAYMOND L. BEELER, ROBERT A. MORRIS and C. WESTON SIMONDS

Edit. Note: *This is a slightly abridged text from the presentation made at the Conference at which 35mm film was projected in addition to the slides. The demonstration included split-frame projection and random shots made with the new film.*

A NEW FILM, designated Eastman Color Negative Film, Type 5254, has been developed to increase the scope of scenes which can be photographed with existing light and to provide operating economies and greater comfort to the performers. The new film is regarded as a technological achievement because increased speed has been obtained at no increase in graininess.

The new film is structurally the same as its predecessor, Eastman Color Negative Film, Type 5251. The same safety support with a jet antihalation backing is used. The emulsion layers contain appropriate dye-forming couplers to yield the proper color images in each layer upon development. The couplers contained in the red-sensitive and green-sensitive layers are themselves colored to provide masking correction for the unwanted absorptions of the process dyes.

The Type 5254 film is color balanced for the same illuminant as Type 5251, i.e., studio tungsten lamps operating at 3200 K. Under daylight illumination the Kodak Wratten 85 filter or the 85N3 or 85N6, depending on the lens aperture desired, is used over the camera lens. Spectral sensitivities of the three emulsion layers are identical to those of Type 5251 (Fig. 1).

The Exposure Index of 100 for tungsten permits normal exposures at $f/2.8$ aperture for incident light measurements of 100 fc. For daylight conditions, with the Wratten 85 filter, the Exposure Index is 64.

Presented on May 7, 1968, at the Society's Technical Conference in Los Angeles, by Raymond L. Beeler, Film Emulsion Div., Eastman Kodak Co., Kodak Park, Rochester, N.Y. 14650; Robert A. Morris (who read the paper) and C. Weston Simonds, Film Testing Div., Eastman Kodak Co., Kodak Park, Rochester, N.Y. 14650.

Table I. Process Sequence for Eastman Color Negative Film, Type 5254.

	Kodak Formula	Time at 70 F
Prebath	PB-2	10 s
Rinse		10–20 s
Develop	SD-30	12 min
Rinse		10–20 s
Fix-stop	F-5	4 min
Wash		4 min
Bleach	SR-9	8 min
Wash		4 min
Fix	F-5	4 min
Wash		7 min
Stabilize	S-9	1 min
Rinse		1–5 s
Wetting Agent		1 s
Dry		

Processing

The processing solutions and times (Table I) are the same as those for Type 5251. The Eastman Kodak Company has never made any recommendations for pushing the speed of color negative by extended development although it is not uncommon practice in the industry to do so. Therefore, a word of caution is in order concerning interpretations of negative density and printer lights. Any increase in density that is not image density, e.g., increased fog, will cause a negative to print at higher light levels but will contribute nothing to the printed image and may detract from it since the increase in fog effectively lowers printing contrast. Therefore, in evaluating the contribution of extended development to increased speed one must differentiate between the increase in total density and the increase in useful image-forming density. The increased speed of Type 5254 may tend to minimize the practice of extended development. For those occasions when extended development may be justified, response of the new film is similar to that of Type 5251. The recommendations for handling and storage of raw stock are the same as for Type 5251.

Spectral Density Curves

The couplers used for the new film yield the same dyes upon development as those produced in Type 5251 film. The spectral density curves are shown in Fig. 2. The minimum densities to red, green, and blue light are nearly identical to those for Type 5251 so that the two films are easily intercuttable for printing. The relationship between effective printing contrast on Eastman Color Print Film, Type 5385 and red, green, and blue light contrast as measured by an Eastman Type 31A Densitometer is shown in Fig. 3. When using a subtrac-

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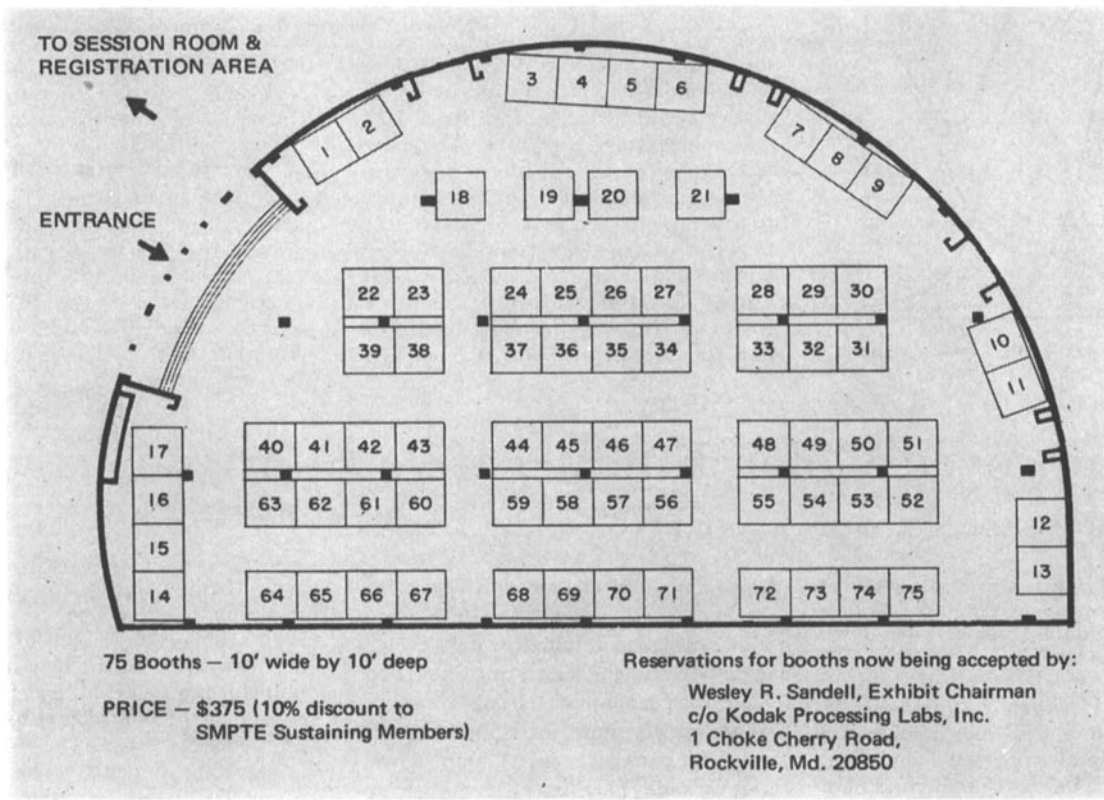

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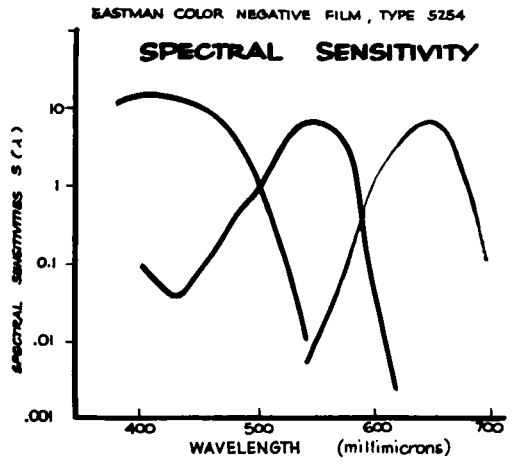

Fig. 1. Spectral sensitivity of the three emulsion layers of Type 5254 film.

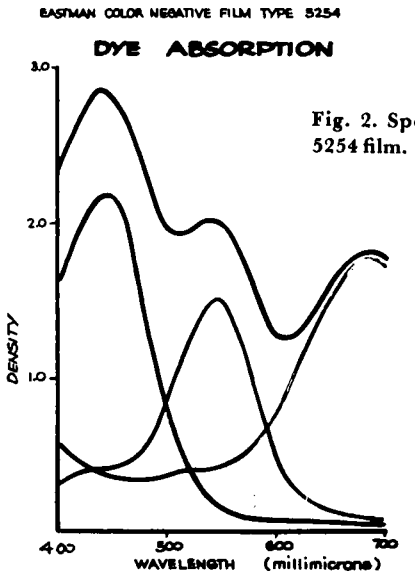

Fig. 2. Spectral density curves for Type 5254 film.

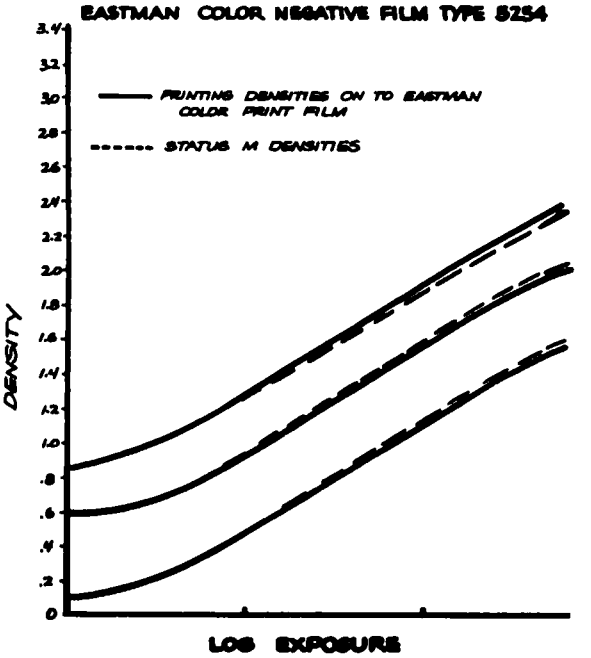

Fig. 3. Effective printing contrast onto Eastman Color Print Film, Type 5385 and red, green and blue light contrast measured on Eastman Type 31A densitometer.

tive printer, a Kodak Wratten 2B filter is recommended plus an efficient heat-absorbing filter such as Pittsburgh Heat Absorbing Glass No. 2043. The other filters required will, of course, vary with the printer and will be nearly identical to those needed for Type 5251. The new film can be timed for printing by using an Eastman 1635 Video Color Analyzer, just as for Type 5251. The stability of the processed image-forming dyes in the new film is equivalent to that of Type 5251. As with the older film, the S-9 stabilizing bath is recommended at the conclusion of other processing steps.

Other Characteristics

As mentioned earlier, the new film, although one stop faster, has the same graininess characteristics as Type 5251. In addition, all the other desirable characteristics of Type 5251 are preserved, including sharpness and color rendition.

An Improved Color Internegative Film

By ROBERT C. BROWN, ROBERT A. MORRIS and REID J. O'CONNELL

Edit. Note: *This presentation is a somewhat abridged text prepared from the complete Conference presentation which was made with 16mm film in addition to the slides.*

A SYSTEM OF 16mm color motion-picture production, in general use, involves the use of a reversal camera original film, Eastman Ektachrome Commercial film, Type 7255; a color internegative made on Eastman Color Internegative Film, Type 7270 and a release print made on Eastman Color Print Film, Type 7385. The expected increased use of this system to produce 8mm or super 8 prints suggested an evaluation of these films and related operational procedures with special attention to sharpness and graininess. This evaluation resulted in the development of Eastman Color Print Film, Type 7380, with grain and sharpness improvements which show up well under the magnifications at which 8mm movies are viewed. This paper describes another result, an improved Eastman Color Internegative Film, Type 7271.

Presented on May 7, 1968, at the Society's Technical Conference in Los Angeles by Robert C. Brown, Robert A. Morris (who read the paper), Film Testing Div., Kodak Park, Eastman Kodak Co., Rochester, N.Y. 14650, and R. J. O'Connell, Film Emulsion Div., Kodak Park, Eastman Kodak Co., Rochester, N.Y. 14650.

Film Characteristics

The structure of the new film is conventional, consisting of red-, green- and blue-sensitive layers coated on a safety support with a removable jet antihalation backing. A yellow filter layer between the blue- and green-sensitive layers prevents blue light from reaching the bottom layers. As in Type 7270, colored coupler masks are used in the red- and green-sensitive layers to improve color rendition.

In addition, development edge effects are introduced in the new internegative film to improve sharpness. Interlayer effects are exploited to improve color reproduction.

The improvements in sharpness, color reproduction, and graininess have been achieved in the 75 F Eastman Color Print Process so that the two films may be processed interchangeably in the same machine, including the Color Print Stabilizing Bath.

The speed of Type 7271 is slightly higher than that of Type 7270. Together with improved curve shape, this should result in a printer speed increase of about six printer points. Some laboratories have forced Type 7270 this far or farther by extended development. In this case there will be little speed increase with the new film but there will be much