

2 and 3 Color Dichromate, Production Method

The two color method produces rich Red-Orange and bright clean Blue-Green colors that mix to a creamy white. Color coding of the object is optional but helpful in most cases and production is done from two masters in two different films. The three color system requires color coding for Red at the mastering stage but no coding for Blue or Green, which are mastered first. Both systems are part natural, part pseudo color and require only two laser lines and two film formulations. Blue is obtained naturally by using the 458 argon line and Green or Red are derived from the 514 line. In production the two color system is identical to current master/copy methods in that batches are shot at 458 or at 514 and later registered and laminated together. The three color system requires Blue and Green exposures in the same emulsion and Red in a second batch. The laser must then be operated multiline or be switched constantly or a second laser introduced. The preferred method is multiline operation with independent shuttering.

The two color system makes very satisfying flesh tones and color balance is fairly easy to maintain because it can be done by mixing and matching batches and or individual holograms at the laminating stage. Object preparation is as follows, Blue-Green areas should be over coated lightly with a bright blue pigment such as Liquitex Brilliant Blue #20002-381 or Pelikan Deep Blue #39. This will effectively inhibit reflection at 514. The Red-Orange areas must be touched up with Yellow pigment such as Liquitex #1002-411 or Pelikan Yellow #10 both of which absorb 458 but reflect 514. At this stage H1 masters or correctly colored copies can be made, the Blue-Green master may be made to reconstruct at 488 so that production copies can be done using only 488 and 514. The 514 exposure is done with the film side facing the reference beam and the 458 exposure is done the other way around with a spacer between the object and film having the same optical thickness as the 514 substrate.

Formulas for each film and processing details are as follows.

Red-- mix 3-30-250 using Potassium Dichromate spin on at 80-90 RPM, expose single beam 90-100 mj\cmE2 @ 514 if RH = 60% and T = 70 F. Process: develop 5 min., rinse, 30 sec in 1HAB @ 120 F and .86 SG. Dry with slow pull from LHAB followed by hot air. Color should be bright Red-Orange.

Blue--Mix 9-30-250 using Ammonium Dichromate, spin on at 80-90 RPM, expose single beam 24 mj\cmE2 @ 458 if RH = 60% and T = 70 F. Process: develop 3 min., rinse, 15 sec in 1HAB @ 120 F and .86 SG. Dry with slow pull, color should be bright Blue to Blue-Green.

This film was 2-4 hours old, shorten times for older film.

For 3 Color system use 10-30-250 and expose twice, once with 24 mj @ 458 and once with 50 mj @ 514. Then code the object for Red and use the same red procedure.

(This paper was used for a class at Lake Forest College and was never published as is. The same information has been published in SPIE Vol 1600 mostly on page 35.)