

# KODAK PROFESSIONAL ENDURA Transparency and Clear Display

**Kodak**

## TECHNICAL DATA / DISPLAY MATERIALS

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KODAK PROFESSIONAL ENDURA Transparency Display Material and KODAK PROFESSIONAL ENDURA Clear Display Material are designed for making large backlit display transparencies from color negatives or internegatives. They are ideal for producing tradeshow displays, point of purchase materials, and indoor transit displays for airports and subways.

Both materials feature a strong, tear-resistant 7-mil ESTAR Thick Base with good splicing characteristics. KODAK PROFESSIONAL ENDURA Transparency Display Material has a white-pigmented base, which provides built-in diffusion for use on illuminators without built-in diffusers. KODAK PROFESSIONAL ENDURA Clear Display Material is a clear-base material designed for use on illuminators that have built-in diffusers.

These products can be exposed both digitally and optically.

Use KODAK EKTACOLOR Chemicals for Process RA-4 to process these materials. KODAK EKTACOLOR Digital Developer Replenisher RT is the recommended developer for processing, since higher contrast and D-max will be obtained than with KODAK EKTACOLOR RA Developer Replenisher RT. See Kodak Publication CIS-269 for additional information. With appropriate changes in transport speed and solution replenishment rates, this product can be intermixed with other KODAK PROFESSIONAL ENDURA Papers and Display Materials.

FEATURES	BENEFITS
<ul style="list-style-type: none"> <li>Robust processing characteristics</li> </ul>	<ul style="list-style-type: none"> <li>Less sensitivity to process variations caused by image-density variations, bleach-fix contamination, and changes in product mix or processor utilization</li> <li>Simplified calibration</li> <li>Clean process; reduced processor maintenance</li> <li>Less sensitivity to bleach-fix pH</li> <li>Reduced operating costs</li> </ul>
<ul style="list-style-type: none"> <li>Reduced developer replenishment rates</li> </ul>	<ul style="list-style-type: none"> <li>Less effluent</li> <li>Less frequent mixing</li> <li>Lower processing costs</li> <li>Lower environmental impact</li> </ul>
<ul style="list-style-type: none"> <li>State-of-the-art image stability</li> </ul>	<ul style="list-style-type: none"> <li>Improved permanence for both light and heat exposure</li> <li>Long-lasting image performance</li> </ul>
<ul style="list-style-type: none"> <li>Antihalation coating on non-emulsion side</li> </ul>	<ul style="list-style-type: none"> <li>Improved sharpness</li> <li>Higher readability</li> </ul>
<ul style="list-style-type: none"> <li>Improved post-process robustness</li> </ul>	<ul style="list-style-type: none"> <li>No color shift with overlaminates and adhesives</li> </ul>

FEATURES	BENEFITS
<ul style="list-style-type: none"> <li>Ease of use</li> </ul>	<ul style="list-style-type: none"> <li>Fewer calibration cycles</li> </ul>
<ul style="list-style-type: none"> <li>New emulsion technology</li> </ul>	<ul style="list-style-type: none"> <li>High quality prints and high productivity</li> <li>Excellent latent image keeping from 5 seconds to 24 hours</li> <li>Consistent results and easier print matching across digital and optical systems</li> </ul>
<ul style="list-style-type: none"> <li>Reduced text fringing</li> </ul>	<ul style="list-style-type: none"> <li>Sharper text that remains neutral regardless of D-max</li> </ul>
<ul style="list-style-type: none"> <li>Advanced color coupler technology</li> </ul>	<ul style="list-style-type: none"> <li>Brighter, more saturated colors, especially blues, cyans, purples, yellows and greens</li> <li>Wider color gamut</li> <li>Accurate color reproduction, consistent results</li> <li>Deep, rich blacks; uniform high D-max</li> <li>Higher contrast for more vibrant prints</li> </ul>
<ul style="list-style-type: none"> <li>Same product for optical and digital workflows</li> </ul>	<ul style="list-style-type: none"> <li>Simplified inventory</li> </ul>

## STORAGE AND HANDLING

Store unprocessed paper between 40 and 75°F (4 and 24°C) in the original sealed package. High temperatures or high humidity may produce unwanted print quality changes.

To avoid moisture condensation on material that has been refrigerated, allow it to warm up to room temperature before opening the package. For best results, remove the material from cold storage the day before you use it, or allow it to warm up for the appropriate time from the following table:

Warm-Up Times (Hours) to Reach Room Temperature of 21°C (70°F)			
Size (in. x ft)	From a Storage Temperature of		
	-18°C (0°F)	2°C (35°F)	13°C (55°F)
20 x 100	8 hours	7 hours	4 hours
30 x 100	10 hours	8 hours	5 hours
40 x 100	11 hours	9 hours	6 hours
50 x 100	12 hours	10 hours	7 hours

## Dimensional Stability

Thermal Coefficient of Expansion (length, width)	0.001 % / degree F (0.0018% / degree C)
Humidity Coefficient of Expansion (length, width)	0.0008 % / % RH

## DARKROOM RECOMMENDATIONS

Handle these materials carefully to avoid kink marks and fingerprints.

Handle these materials in total darkness. Be sure that your printing and processing darkrooms are lighttight. Eliminate any stray light from equipment in the darkroom.

**Note:** Using a safelight will affect your results. These materials are very sensitive to safelights; sensitometric shifts can occur before you observe any changes in D-min.

## EXPOSURE

### Optical Exposure

There are two basic methods for exposure:

- A single "white-light" exposure using cyan, magenta and yellow filters.
- Three successive exposures through red, green and blue filters.

### White-Light Exposure Method

Starting Filter Pack	
Transparency	40M + 40Y
Clear	35M + 30Y

If the enlarger does not have dichroic filters for the filter pack, use KODAK Color Printing Filters (Acetate). Use the CP Filters only between the light source and the negative. This way, any number of filters can be used between the light source and the negative. If cyan filtration is necessary, use filters identified by the suffix "-2," as in "CP10C-2."

If a starting filter pack is not available, make a first test transparency with the filter pack recommended above for KODAK PROFESSIONAL Films. Since light quality, optical components, filters, and dial settings may vary considerably between enlargers, this filter pack is only a starting point. Adjust the exposure to produce a satisfactory density. If the color balance is not satisfactory, try a different filter or combination of filters. Once a good transparency has been made from a typical negative, use the same "filter pack" for trial exposures with other negatives.

### Tricolor Exposure Method

To use this method, a timer is needed to time three different exposures without disturbing the enlarger or easel. Use a timer that can be read or set in the dark. The recommended KODAK WRATTEN Gelatin Filters are the No. 25 (red), No. 99 (green), and No. 47B (blue). Install a heat-absorbing glass near the light source. With a Photo Enlarger Lamp No. 212 or No. 302, operated at 115 volts, typical times at f/8 for a 6X enlargement from a normal color negative are:

Times for an Aperture Setting of f/8 for 8 x 10 Enlargement of a 120 Size KODAK PROFESSIONAL PORTRA 160NC Film Negative		
Filter	Transparency	Clear
Red	1.6 seconds	4.6 seconds
Green	1.8 seconds	7.2 seconds
Blue	3.8 seconds	11.3 seconds

## Digital Exposure

These materials may be exposed to the following types of digital printers (but not limited to):

- Durst Lambda and Epsilon Printers
- Oce Lightjet Printers
- Polieletronica LASERLab Printer
- ZBE Chromira Printer

### Printer Calibration Data

KODAK PROFESSIONAL ENDURA Display Material	Using KODAK EKTACOLOR Digital Developer Replenisher RT		Using KODAK EKTACOLOR RA Developer Replenisher RT	
	D-max	Basic Calibration (Starting Values)	D-max	Basic Calibration (Starting Values)
<b>Durst Lambda Printer (at 200 dpi)</b>				
Transparency	R = 350 G = 360 B = 350	Y = 78 M = 62 C = 0 D = 93	R = 320 G = 325 B = 325	Y = 90 M = 53 C = 0 D = 89
Clear	R = 300 G = 320 B = 305	Y = 94 M = 60 C = 0 D = 58	R = 275 G = 280 B = 275	Y = 103 M = 53 C = 0 D = 65
<b>Durst Lambda Plus Printer (at 200 dpi)</b>				
Transparency	R = 350 G = 360 B = 350	Y = 78 M = 62 C = 0 D = 93	R = 320 G = 325 B = 325	Y = 90 M = 53 C = 0 D = 89
Clear	R = 300 G = 320 B = 305	Y = 73 M = 73 C = 0 D = 58	R = 275 G = 280 B = 275	Y = 103 M = 53 C = 0 D = 65
<b>Durst Epsilon Printer (at 200 dpi)</b>				
Transparency	R = 310 G = 310 B = 310	Y = 0.195 M = 0.224 C = 0.0 D = 0.722	R = 295 G = 295 B = 295	Y = 0.195 M = 0.224 C = 0.0 D = 0.722
Clear	R = 265 G = 270 B = 265	Y = 0.277 M = 0.350 C = 0.0 D = 0.398	R = 250 G = 255 B = 250	Y = 0.277 M = 0.350 C = 0.0 D = 0.398

### Oce Lightjet 5000, 430, and 500XL calibration data:

Calibration targets must be downloaded from the Oce Imaging ftp site, <http://www.symbolic.com>.

## PROCESSING

KODAK EKTACOLOR Chemicals for Process RA-4 are required. For information on using EKTACOLOR Digital Developer Replenisher RT, see Kodak publication CIS-269.

Process these materials in roller-transport processors capable of handling the ESTAR Thick Base. Processing recommendations are the same as for KODAK PROFESSIONAL Papers; however the speed must be adjusted to provide at least a 120 second development time and a 1 minute 50 second bleach/fix time. Replenishment rates are higher for these materials than for KODAK PROFESSIONAL Papers.

## POST-PROCESS TREATMENTS

### Retouching

KODAK PROFESSIONAL ENDURA Transparency and Clear Display Materials are easily spotted or retouched using standard retouching techniques. Do not use opaque retouching materials. See Kodak Publication E-70, *Retouching Prints on KODAK EKTACOLOR and EKTACHROME Papers*.

### Laminating Prints

You can laminate prints made with KODAK PROFESSIONAL ENDURA Transparency and Clear Display Materials.

**Note:** Many municipalities have adopted as part of their local fire codes the National Fire Protection Association (NFPA) 701-1999 *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*, which applies to plastic films used for decorative or other purposes inside buildings. To comply with this standard, you must protect displays using any of these plastic films.

We strongly recommend that you take one or both of the following measures to protect all large displays, especially if the material is displayed in a public area:

- Fully enclose the materials in a light box or an illuminator.
- Frame and laminate the materials to a non-combustible mounting board, wall, glass, or 1/4-inch or thicker polycarbonate, e.g., Lexan, support.

Other standards covering the burning characteristics of these products may apply to markets outside the U.S. Check with the appropriate local agency. Do not use these materials as backdrop displays in theaters.

For more information, see CIS-37, *Combustion of KODAK Films, Resin-Coated Photographic Papers, and Print and Display Materials*.

## VIEWING

These materials are intended specifically for transmission viewing. When the transparency is viewed by reflected light, it should appear darker than a normal reflection print.

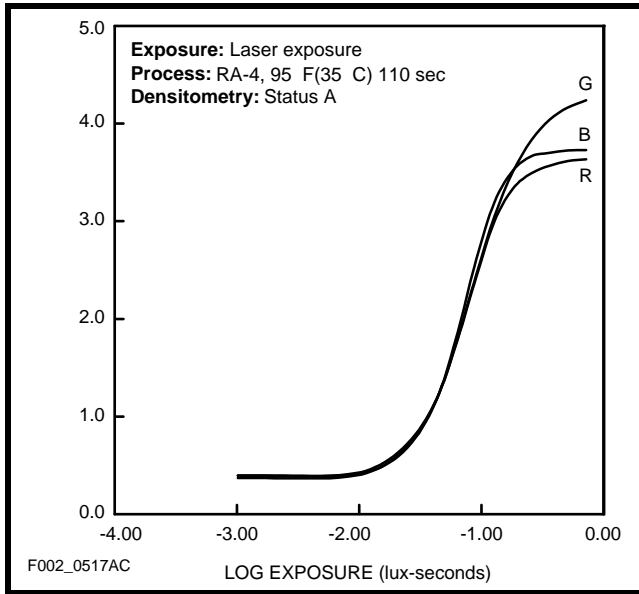
The degree of density will depend on the amount of light behind the transparency. Too much light will adversely affect the transparency quality by reducing the D-max and shadow densities excessively, resulting in a low-contrast image. With some illuminators, it may be necessary to use some neutral density or reduce the number of bulbs.

Color balance of the display transparency will depend on the color of the light source. A Color Rendering Index (CRI) of 90 or higher generally will give acceptable results. For best results, use cool white deluxe fluorescent bulbs.

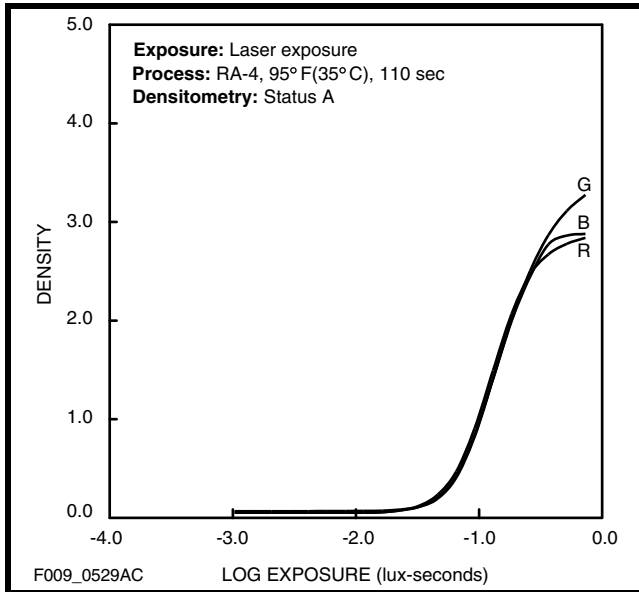
For critical evaluation, use an illuminator that meets ANSI Standard PH2.30-1985.

# CURVES

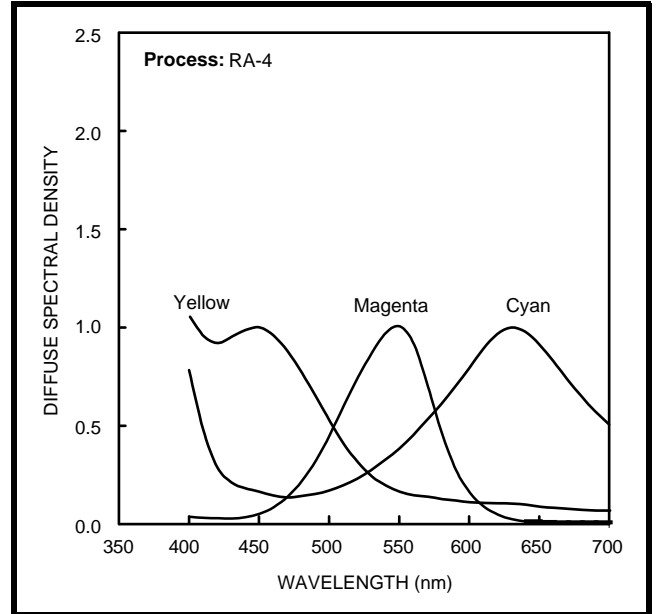
**Characteristic Curves:**  
**KODAK PROFESSIONAL ENDURA Transparency Display Material**



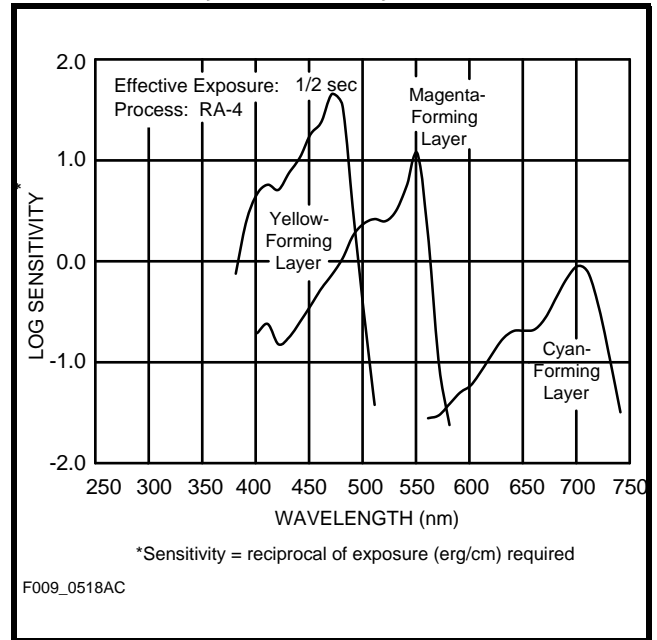
**Characteristic Curves:**  
**KODAK PROFESSIONAL ENDURA Clear Display Material**



**Spectral-Dye-Density Curves**



**Spectral-Sensitivity Curves**



**NOTICE:** The sensitometric curves and under the conditions of exposure and p production coatings, and therefore do n photographic material. They do not rep met by Kodak. The company rese characteristics at any time.

## MORE INFORMATION

Kodak has many publications to assist you with information on Kodak products, equipment, and materials.

Additional information is available on the Sino Promise website.

The following publications are available from dealers who sell Kodak products, or you can contact your Sino Promise representative in your country for more information.

E-30	<i>Storage and Care of KODAK Photographic Materials—Before and After Processing</i>
E-70	<i>Retouching Prints on KODAK EKTACOLOR and EKTACHROME Papers</i>
E-190	<i>KODAK PROFESSIONAL PORTRA Films</i>
E-71	<i>Retouching Color Negatives</i>
E-176	<i>Post-Processing Treatment of Color Prints—Effects on Image Stability</i>
J-39	<i>Tray, Drum, and Rotary-Tube Processing with KODAK EKTACOLOR RA Chemicals</i>
K-4	<i>How Safe is Your Safelight?</i>
Z-130	<i>Using KODAK EKTACOLOR RA Chemicals</i>

For the latest version of technical support publications for KODAK PROFESSIONAL Products, visit:  
[www.kodaksino.com](http://www.kodaksino.com)

**Note:** The Kodak materials described in this publication for use with KODAK PROFESSIONAL ENDURA Transparency and Clear Display Materials are available from dealers who supply KODAK PROFESSIONAL Products. You can use other materials, but you may not obtain similar results.

TM/MC/MR: Endura, Portra

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