TI2408 Issued 7-01
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KODAK Contact 2000 Film CA4, CA7, CA4M, CA7M
KODAK Contact 2000 Film CB4
KODAK Contact 2000 Film DS4 / EAMER
KODAK Contact 2000 Film DA4, DA7, DA4M, DA7M
KODAK Contact 2000 Film QCF
KODAK Contact 2000 Film QDF, QDF7
KODAK Contact 2000 Film CLA4 / LAR
KODAK Contact 2000 Paper QCP
KODAK Contact 2000 Papers CP4M, CP6M
KODAK Contact 2000 Paper DP6M

Features / Customer Product Specifications

These contact and duplicating films and papers are designed for use with virtually any safelight and contact exposing conditions. Their emulsion and base sides are sufficiently matte to minimize Newton's rings and provide rapid drawdown time in vacuum printing frames. In addition, those film names ending in "M" have a special matte surface on the emulsion side for fast vacuum drawdown when using flexographic or smooth-surface printing plates.

These products will achieve optimum results in KODAK RA 2000 Developer and Replenisher (diluted 1:4). It should be possible to obtain satisfactory results in most other rapid-access type developers that are indicated as Hard-Dot capable.

Contact 2000 Films are coated on a dimensionally stable antistatic KODAK ESTAR Base with antistatic and surface properties to ensure dependable transport and handling behavior.

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CA4, CA7, CA4M, CA7M Films	• Extremely high-contrast, negative working contact films recommended for making contact negatives or positives from line or halftone originals on transparent materials. • Designed for general contacting applications and capable of providing excellent image quality from a variety of image assembly functions and image orientations. Especially well suited for making sharp spreads and chokes. • Excellent exposure latitude allowing for elimination of cut lines and pinholes without significant dot size change.
CB4 Film	• Extremely high contrast, negative-working contact film recommended for making contact negatives or positives from line or halftone originals on transparent materials. • Excellent for general contacting applications, with special emphasis on image assembly functions which require high quality results (such as multi-layer - out of contact - image exposing and high quality spreads and chokes). • Excellent for dry and wet dot etching techniques. • Minimizes pinholes and opaquing requirements.
DS4 Film	• High-contrast duplicating film specially designed for making high density duplicates from combined film and paper originals of line or halftone images. • Suitable for general contacting applications, and can be exposed in all orientations, either to the emulsion or through the base. • Excellent for making sharp, uniform spreads and chokes. • Capable of providing very low D-min under a wide exposure range.
DA4, DA7, DA4M, DA7M Films	• High-contrast duplicating film recommended for making high density duplicates from a wide range of original line or halftone materials. • Designed for general contacting applications, and can be exposed in all orientations, either to the emulsion or through the base. • Excellent for making sharp, uniform spreads and chokes. • Capable of providing very low D-min under a wide exposure range.
QCF Film	• Quartz-speed, high D-max, very high-contrast, ultraviolet and short-wavelength blue sensitive negative-working contact film. • Designed for making line and halftone contacts to the emulsion or through the base. • Especially resistant to pinholes. • Can be exposed with either quartz or high-intensity metal-halide exposure sources (filtered or at low-intensity level).
QDF, QDF7 Films	• Quartz-speed, high-contrast, UV-sensitive duplicating film for use on quartz halogen contact exposure sources or attenuated high-intensity metal-halide exposure sources (filtered at low-intensity level). • Recommended for making film duplicates from original line and halftone negatives stripped to a clear carrier. • Designed for general contacting applications, and can be exposed in all orientations, either to the emulsion or though the base. • Excellent for making sharp spreads and chokes. • Capable of providing very low D-min under a wide exposure range.

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CLA4 Film	• High-contrast, negative working contact film; excellent for general contacting applications, with special emphasis on image assembly functions, such as wet (chemical) and dry dot etching operations. • Excellent dot-for-dot D-max and designed to produce maximum wet etching dot change results while maintaining acceptable image density. • Repeatable and predictable dot movement with overexposure. Able to maintain detail and high image quality, even with large dot movements. • Significantly minimizes pinholes and opaquing requirements.
CP4M, CP6M Papers	• Roomlight-handling, high-contrast, UV-sensitive, resin-coated papers for making contact prints using high-intensity, metal-halide light sources. • Specially designed surface suitable for most retouching applications. • Recommended for making high-quality black-and-white proofs and contact prints from line and halftone negatives or positives. • Emulsion side can be identified by its bright color. Backside of CP6M Paper has diagonal stripes.
DP6M Paper	• Roomlight-handling, high-contrast, UV-sensitive, resin-coated duplicating papers for making contact prints using high-intensity metal halide light sources. • White, water-resistant base with specially designed surface suitable for most retouching applications. • Recommended for making high-quality black-and-white proofs and contact prints from line and halftone negatives or positives. • Emulsion side can be identified by its bright color. Backside of paper has diagonal stripes.
QCP Paper	• A low speed, high contrast, blue-sensitive, resin-coated paper for making contact prints using a low wattage quartz-halogen exposure source. • Coated on a white, water-resistant, medium-weight base. • Backside of paper has diagonal stripes. • Low matte surface with very white background provides excellent notation surface and rapid vacuum drawdown. • Recommended for making high quality proofs and contact prints for paste-up from line and halftone negatives without the use of special filters.

Safelight Recommendations

Safe handling times can easily be determined; expose the film to a screen tint and use a card to step off various amounts of safelight exposure. A density change will indicate excessive safelight exposure. For further information on performing safelight tests, see KODAK Publication No. K-4, “How Safe is Your Safelight?”

KODAK Contact 2000 Products CA4, CA7, CA4M, CA7M, CB4, DA4, DA7, DA4M, DA7M, CLA4, CP4M, CP6M, DP6M

These films can be safely handled both before and after exposure in up to 40 footcandles (430 lux) of subdued white fluorescent roomlight illumination substantialy free of ultraviolet (UV) energy. Such illumination is supplied by yellow fluorescent lamps and also by white fluorescent lamps (warm white preferred) modified by UV-absorbing plastic diffusers. Other common roomlight sources contain varying amounts of UV energy, and their rooomlight tolerances for these films should be tested under the specific conditions used.

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KODAK Contact 2000 Film DS4
This film can be safely handled both before or after exposure in up to 40 footcandles (430 lux) of yellow fluorescent roomlight illumination substantially free of blue and UV energy. Such illumination is supplied by yellow fluorescent lamps.

Other common roomlight sources, including subdued white fluorescent lighting, contain varying amounts of UV / blue energy, and their roomlight tolerances for these films should be tested under the specific conditions used.

NOTE: DS4 Film may be less safe than KODAK Contact 2000 Film DA4 due to its different spectral sensitivity that enables its use with paper originals.

KODAK Contact 2000 Products QCF, QCP
This film can be safely handled under white-appearing light modified with ultraviolet- absorbing material recommended for use with this product.

The following types of illuminants can be used with this film:

- Standard cool-white or deluxe cool-white fluorescent tubes filtered with ARM-A-SAFELIGHT "Super" ULTRA-WHITE Shields (available from Illumination Technology, Inc.). An illumination level of 20 footcandles is considered good for both working conditions and safe handling times.
- "Low-uv" fluorescent tubes such as the 48-inch, 40-watt Sylvania Royal White F40/3K, the General Electric Regal White F40RW3, or the Westinghouse Ultralume 3000U. Tubes should be filtered with UV-absorbing sheeting material, such as 500-gauge Llumar clear polyester film (available from plastic supplies dealers in 50" x 100' rolls, and in other roll sizes). An illumination level of 20 footcandles is recommended.
- Gold fluorescent tubes, such as the General Electric 48-inch, 40-watt F4OGO (no sheeting or sleeves required). Films can be handled for up to 20 minutes under 20 footcandles of yellow light from these tubes.
- EncapSulite C20 safelamps

KODAK Contact 2000 Films QDF, QDF7
This film can be handled under white-appearing light modified with ultraviolet-absorbing material; under indirect, subdued levels of unfiltered white light; and under most yellow, orange, or red safelight illumination sources.

Safe handling times can easily be determined; expose the film to a screen tint and use a card to step off various amounts of safelight exposure. A density change will indicate excessive safelight exposure. For further information on performing safelight tests, see KODAK Publication No. K-4, “How Safe is Your Safelight?”

Storage

Keep unexposed film and processed film in a cool, dry place, preferably at a temperature of 70°F (21°C) or lower and 50% RH. Process film as soon as possible after exposure.

Exposure

An exposure time series should be run to obtain the optimum exposure time for the particular exposing equipment in use.

The KODAK Contact Control Guide, C-3 (KODAK Publication No. Q-94) can be used as a guide for standardizing and controlling exposures. The C-3 guide is a priced publication available from dealers in KODAK Polychrome Graphics products.

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NOTE: Exposures for optimum dot-for-dot reproduction are critical when using a broad-angle light source, and when making base-to-emulsion exposures. Any light falloff or light angularity from the center to the edge of the exposing source may affect overall reproduction quality and introduce problems with spreads and chokes.

The following methods can be used to help provide optimum dot-for-dot reproduction:

- To provide more even illumination across the exposure plane and reduce light angularity when using a modular system, increase the distance between the light source and the exposure plane. The exposure time should be increased accordingly.
- An accurate means of controlling the amount of exposure (such as a light integrator) is recommended to provide repeatable exposures.
- Image undercutting can prevent optimum dot-for-dot reproduction exposures. This may occur when making base-to-emulsion exposures due to the increased space between the emulsion of the original and the emulsion of the raw film. Light striking the original at various angles undercuts the image and interferes with optimum image registration.
- To prevent unwanted reflected light, walls near the exposing area should be a flat black or dark gray color.
- For more uniform spreads and chokes, always use a diffusion sheet over the glass of the contact frame.

PRECAUTIONARY NOTE: Contact the manufacturer of ultraviolet, pulsed-xenon or quartz-halogen lamps for safety information pertaining to ultraviolet radiation and ventilation requirements due to ozone generation.

KODAK Contact 2000 Products CB4, DS4, CA4, CA7, CA4M, CA7M, DA4, DA7, DA4M, DA7M, CLA4, CP4M, CP6M, DP6M
Expose with a multi-level, high intensity, 0.5 - 1.5 kW metal-halide exposure source. Optimum exposure should be determined by means of a trial exposure series, following the equipment manufacturer's recommended procedures. Use a trial exposure time of 5 to 20 seconds at an exposure distance of 36 to 60 inches (91 to 152 centimeters).

Exposure sources having an output of more than 1500 watts (1.5 kw) may require the use of filter attenuators to obtain exposures in the 5- to 20-second range. Contact your Kodak Polychrome Graphics representative for more information.

With paper originals, use a trial exposure time of 25 to 90 seconds at the same distance.

KODAK Contact 2000 Films QCF, QDF, QDF7, and KODAK Contact 2000 Paper QCP
These products can be exposed with a 1000-watt, quartz-halogen lamp or a multi-level, high-intensity metal-halide lamp operated at the low-intensity level or using filter attenuators. The lamp should be positioned at least 5 feet (1.5 metres) from the exposure plane. Observe safety precautions for the light source as specified by the manufacturer.

Examples of Exposure:
With a 1000-watt, quartz-halogen lamp operated at 120 volts at a distance of 5 feet (1.5 metres) from the exposure plane, the following exposure times can be used as starting points for trial exposures:

	QCF	QDF, QDF7	QCP
Exposure to the emulsion:	5 to 10 seconds	10 seconds	17 seconds
Exposure through the base:	5 to 10 seconds	15 seconds	--

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Mechanized Processing

NOTICE! Observe precautionary information on product labels and on the Material Safety Data Sheets.

Use KODAK RA 2000 Developer and Replenisher (1:4 dilution) for 20 to 30 seconds seconds at a temperature of 90 to 100°F (32 to 38°C). The recommended starting point is 22 seconds at 95°F (35°C).

KODAK RA 2000 Developer and Replenisher (1:4 dilution)

Average D-max Area	Basic Replenishment Rate
10%	0.12-0.15 mL/sq in. (185-235 mL/sq m)
20%	0.20 mL/sq in. (310 mL/sq m)
50%	0.30 mL/sq in. (465 mL/sq m)
80%	0.48 mL/sq in. (745 mL/sq m)
100%	0.60 mL/sq in. (930 mL/sq m)

If utilization rate will provide at least one tank turnover per week, KODAK RA 2050 Developer Replenisher can be used with lower replenishment rates.

Use KODAK 3000 Fixer and Replenisher 1:3 (parts A and B). The basic replenishment rate, regardless of exposure, is 0.35 mL/sq in. (545 mL/sq m).

For batch type processors, where ready-to-use solutions are required, KODAK RA 2001 Developer and KODAK 3001 Fixer are recommended.

Dot Etching

KODAK Contact 2000 Film CB4
Conventional techniques for dot etching can be used with this film. KODAK Dot Etch works well for this purpose.

NOTE: Observe precautionary information on product labels and on the Material Safety Data Sheets.

KODAK Contact 2000 Films DS4, QDF, DA4, DA7, DA4M, DA7M
These products are not designed for dot etching.

End of Instruction Sheet

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KODAK Contact 2000 Film CA4, CA7, CA4M, CA7M
KODAK Contact 2000 Film CB4
KODAK Contact 2000 Film DS4 / EAMER
KODAK Contact 2000 Film DA4, DA7, DA4M, DA7M
KODAK Contact 2000 Film QCF
KODAK Contact 2000 Film QDF, QDF7
KODAK Contact 2000 Film CLA4 / LAR
KODAK Contact 2000 Paper QCP
KODAK Contact 2000 Papers CP4M, CP6M
KODAK Contact 2000 Paper DP6M

1) Support

CA4, CA4M, CB4, DS4, DA4, DA4M, QCF, QDF, CLA4	4 mil (0.004 in., 0.10 mm)	ESTAR Base
CA7, CA7M, DA7, DA7M, QDF7	7 mil (0.007 in., 0.18 mm)	ESTAR Thick Base
CP4M	4.4 mil (0.0044 in., 0.112 mm) (Total Caliper)	Resin coated paper
CP6M, DP6M	6.2 mil (0.0062 in., 0.157 mm) (Total Caliper)	Resin coated paper
QCP	6.5 mil (0.0065 in., 0.165 mm) (Total Caliper)	Resin coated paper

2) Dimensional Stability

Dimensional stability is an all-inclusive term. In photography, it applies to size changes caused by changes in humidity and in temperature, and by processing and aging. The dimensional properties of ESTAR Base may vary slightly in different directions within a sheet; the differences that may exist, however, are not always aligned with the length and width directions.

Differences in size change between length and width should be within 10 percent of each other.

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Thermal Coefficient of Linear Expansion

Unprocessed or Processed	0.001% per degree F
Processed	0.0018% per degree C

Humidity Coefficient of Linear Expansion

Unprocessed	0.0012% per % RH
Processed	0.0011% per % RH

Processing Dimensional Change

Dependent on drying conditions

3) Reciprocity

The reciprocity speed change is negligible (1/3 photographic stop or less) within the exposure range of 1 second to 100 seconds; there is no change in contrast.

4) Graphs[1]

Using KODAK RA 2000 Developer and Replenisher (1:4)

Characteristic

A) KODAK Contact 2000 Film CB4 (12-94)
B) KODAK Contact 2000 Film DS4 (9-96)
C) KODAK Contact 2000 Film CA4, CA7 (5-90)
D) KODAK Contact 2000 Film DA4, DA7 (7-95)
E) KODAK Contact 2000 Film DA4M, DA7M (6-95)
F) KODAK Contact 2000 Film QCF (3-95)
G) KODAK Contact 2000 Film QDF (10-95)
H) KODAK Contact 2000 Paper DP6M (5-92)
I) KODAK Contact 2000 Paper CP4M (5-92)
J) KODAK Contact 2000 Paper CP6M (5-92)
K) KODAK Contact 2000 Paper QCP (2-96)

The Kodak products mentioned in this document may not all be available in all regions or countries. If you have questions or need assistance, contact your local Kodak Polychrome Graphics representative or visit our website: www.kpgraphics.com.

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Norwalk, CT 06850
USA

End of Data Sheet

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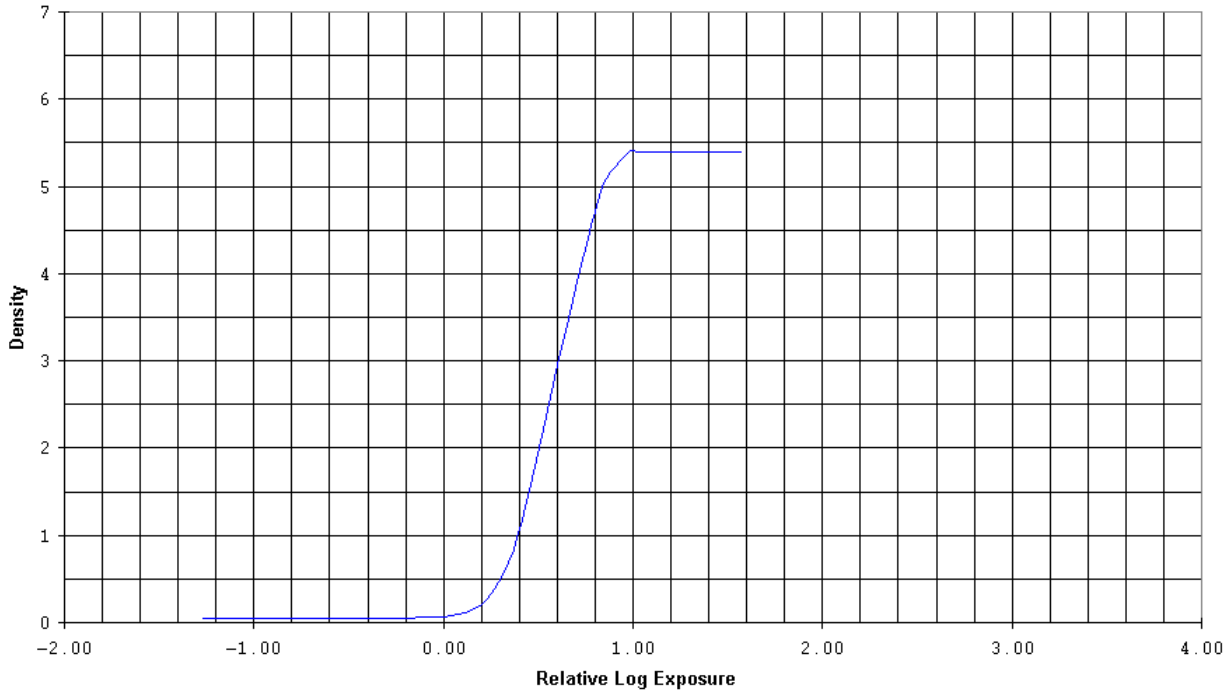
TI2407A 03-96
CHARACTERISTIC, For Publication

KODAK IMAGELITE ESY Scanner Film
Xenon Flash 85 microseconds; KODAK RA 2000 Developer and Replenisher (1:4),
95F (35C), 30 sec; Diffuse visual



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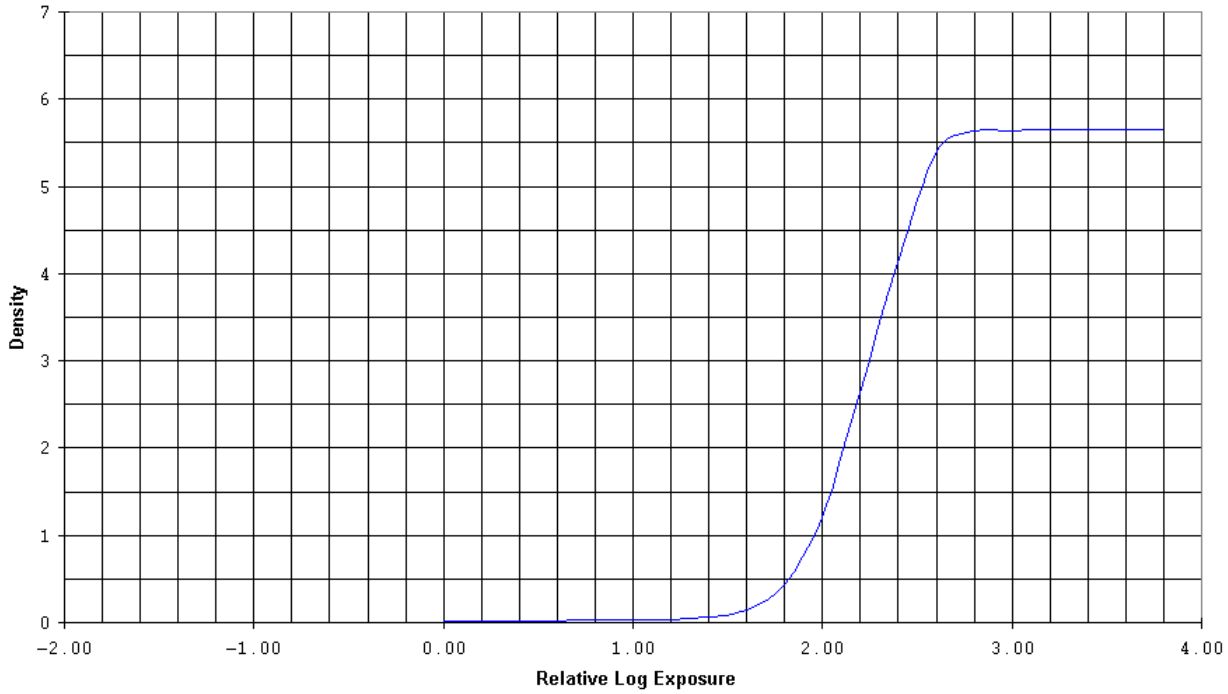
TI2407B 6-94
CHARACTERISTIC, For Publication

KODAK IMAGELITE HNF Scanner Film
HN Laser Exposure;
KODAK RA 2000 Developer and Replenisher (1:4),
30 sec, 95F (35C)



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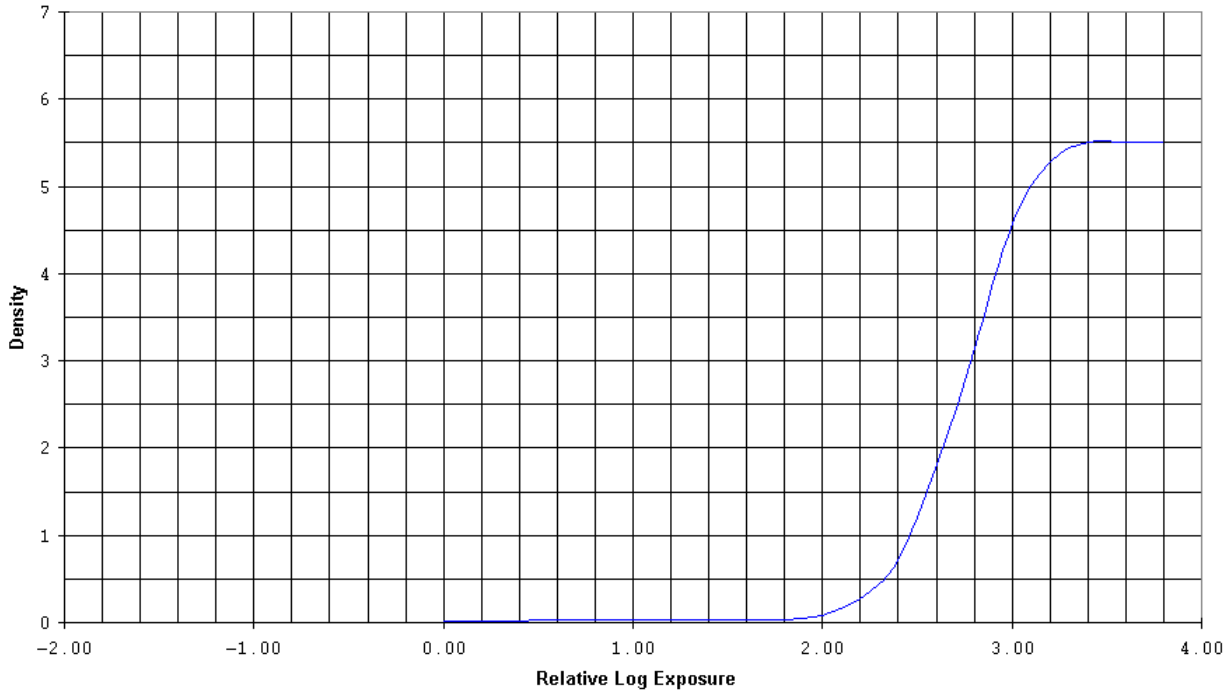
TI2407C 02-94
CHARACTERISTIC, For Publication

KODAK IMAGELITE IRF Scanner Film
IR Laser-Diode Exposure; KODAK RA 2000
Developer and Replenisher (1:4),
30 sec, 95 F (35 C); Diffuse visual



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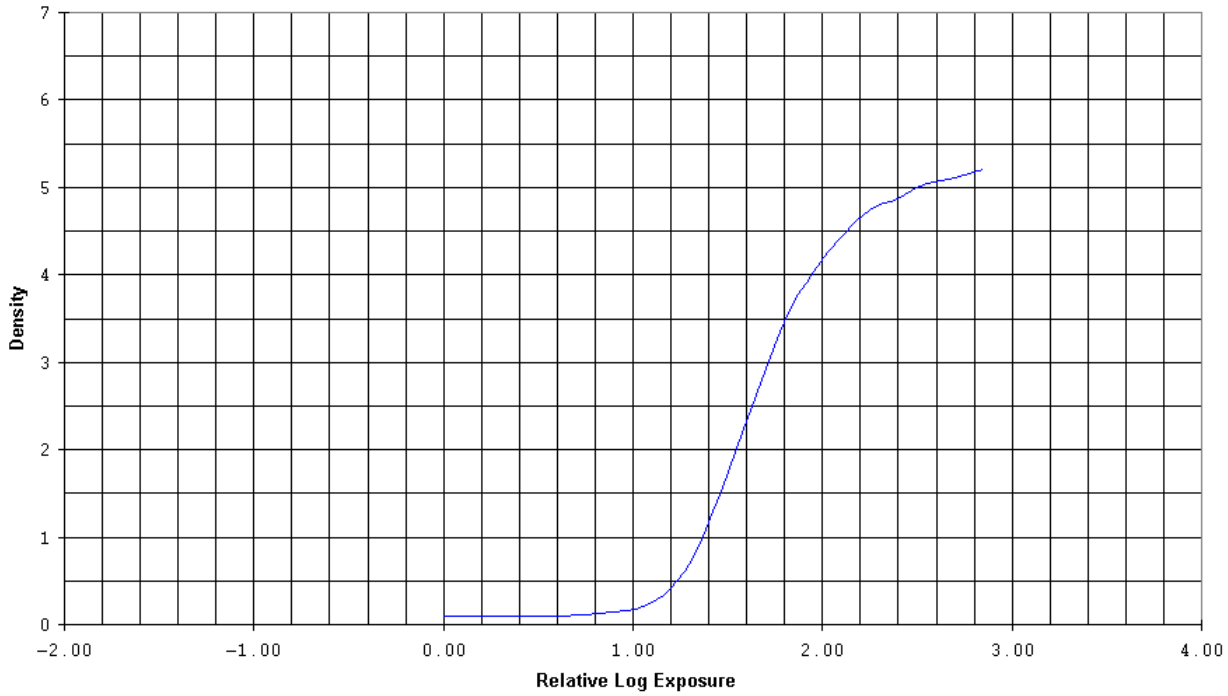
TI2407D 09-92
CHARACTERISTIC, For Publication

KODAK IMAGELITE LED Scanner Film
Pulsed-xenon 10 sec; KODAK RA 2000 Developer and Replenisher (1:4),
95F (35C), 30 sec, PAKO Processor; Diffuse visual



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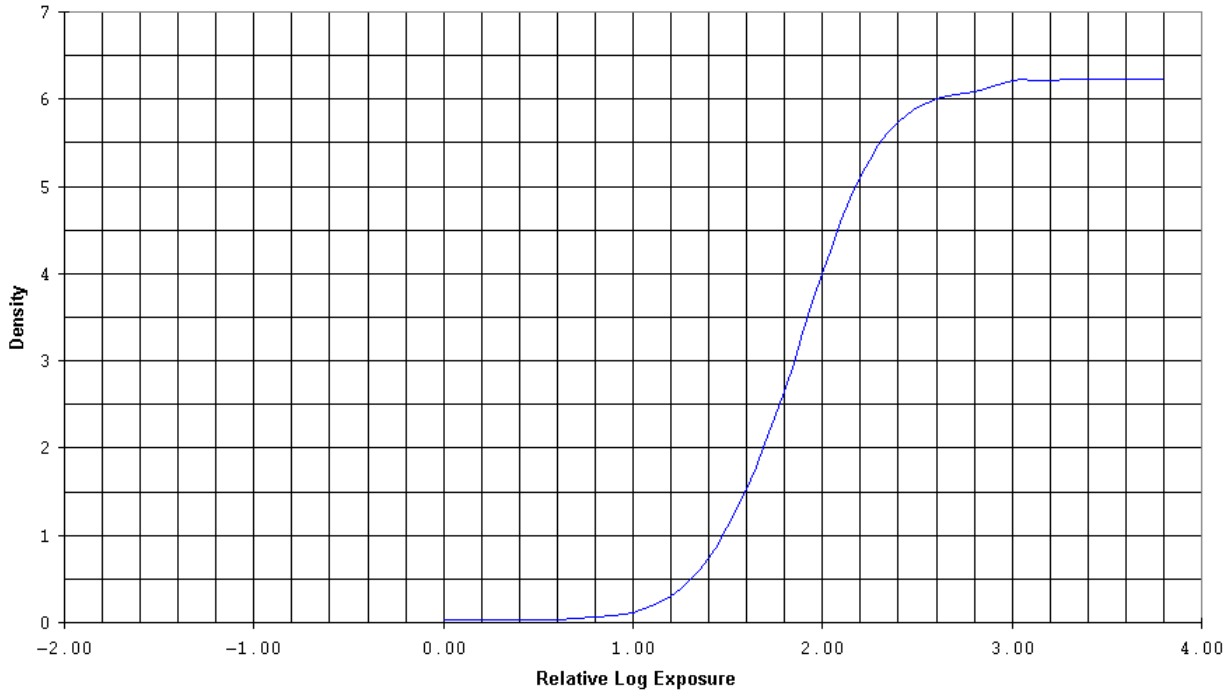
TI2407E 12-93
CHARACTERISTIC, For Publication

KODAK IMAGELITE LDF Film
KODAK RA 2000 Developer and Replenisher (1:4)
KODAK KODAMATIC 710 Processor,
30 sec at 95F (35C); Diffuse visual



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TI2407F 04-96
SPECTRAL SENSITIVITY, For Publication

KODAK IMAGELITE ESY Scanner Film
Effective exp 7 sec; KODAK RA 2000 Developer and Replenisher (1:4),
Diffuse visual; Density=0.60

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TI2407G 02-94
SPECTRAL SENSITIVITY, For Publication

KODAK IMAGELITE HNF Scanner Film
1.5 sec exposure;
KODAK RA 2000 Developer and Replenisher (1:4),
30 sec, 35 C (95 F); For Publication

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TI2407H 02-94
SPECTRAL SENSITIVITY, For Publication

KODAK IMAGELITE IRF Scanner Film
5 sec exposure; KODAK RA 2000 Developer and
Replenisher (1:4), 30 sec, 35C (95 F); D=0.60> D-min

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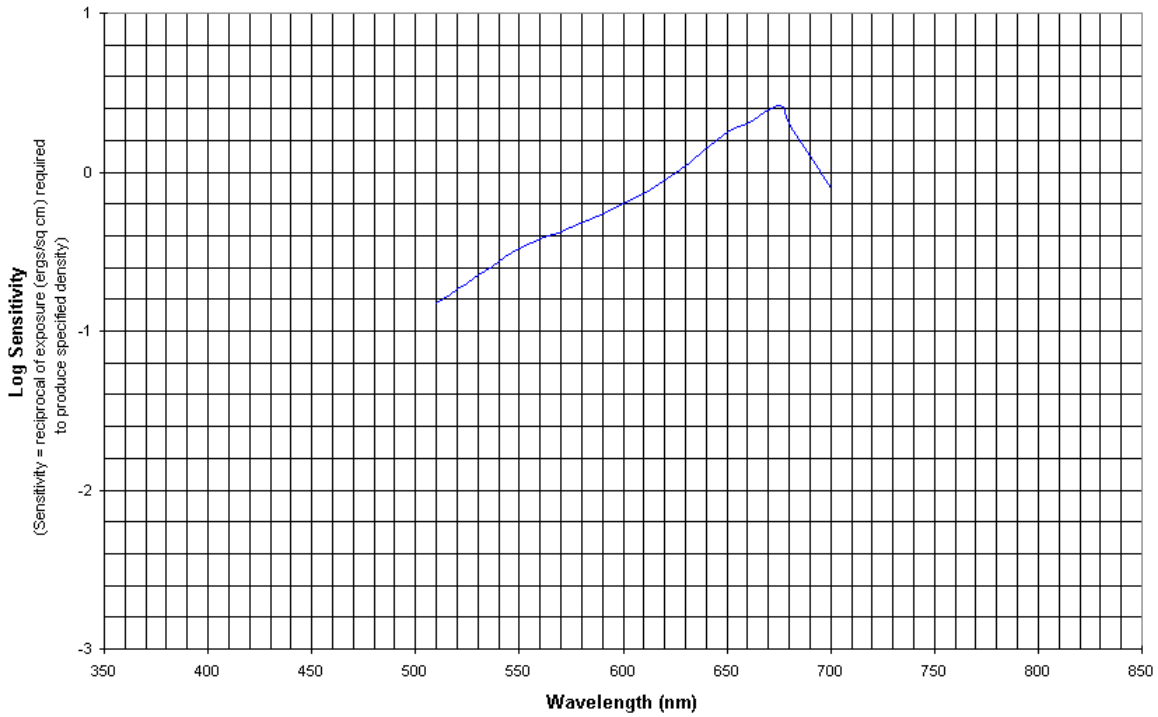
TI2407I 05-92
SPECTRAL SENSITIVITY, For Publication

KODAK IMAGELITE LED Scanner Film
0.1 sec exposure; KODAK RA 2000 Developer and Replenisher (1:4),
30 sec, 35C (95 F); D=0.60> D-min



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TI2407J 03-94
SPECTRAL SENSITIVITY, For Publication

KODAK IMAGELITE LDF Film
Exposure 1 sec, KODAK RA 2000 Developer and
Replenisher (1:4), KODAK KODAMATIC 710 Processor,
38 sec at 95F (35C); Diffuse visual

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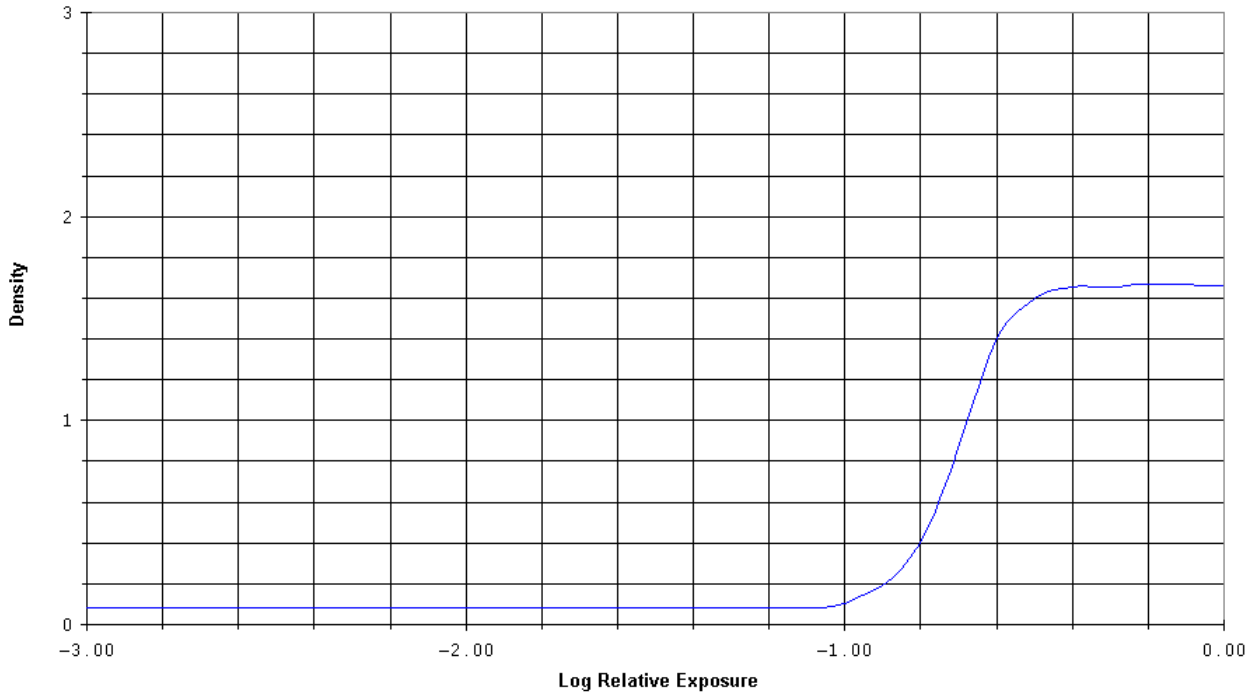
TI2408K 02-96
CHARACTERISTIC, For Publication

KODAK Contact 2000 QCP Paper
KODAMATIC 17B Processor, KODAK ULTRATEC Developer and Replenisher,
33 sec, 100 F (38 C)



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