

KODAK MIN-R 2000 Film / 4316

1) Description

KODAK MIN-R 2000 Film / 4316 is a medium-speed, single coated, ortho-sensitive medical x-ray film for mammographic use with green-emitting intensifying screens.

It is coated on a blue, approximately 0.2mm (7-mil) polyester support that has a base density of approximately 0.18, with a dyed pelloid backing which affords anti-halation protection. MIN-R 2000 Film exhibits significantly higher contrast and is the same speed as KODAK MIN-R M Film/4515 when used with KODAK MIN-R Screens. In order to orient the film properly, the film is emulsion side up when the notch is at the right-hand side of the top edge of the film. A double V notch is used. It is processable in existing automated standard processing cycles.

KODAK MIN-R 2000 Film is intended for use with KODAK MIN-R, KODAK MIN-R 2000 Screens, KODAK MIN-R 2190 Screens or KODAK MIN-R 2250 Screens. When used with a KODAK MIN-R 2000 Screen, the system has a speed of 150.

2) Safelight

Use a KODAK GBX-2 Safelight Filter with a frosted 7.5-watt bulb located at least 4 feet from the film or a KODAK Mammography LED Safelight (see GRAPHS).

Latensification: Safelight exposure after primary x-ray exposure.

Hypersensitization: Safelight exposure before primary x-ray exposure.

3) Storage and Handling

Storage -

Unexposed:	10 to 24°C (50 to 75°F), 30 to 50% RH, properly shielded from x-rays, gamma rays, or penetrating radiation.
Exposed:	Keep cool, dry, and properly shielded from penetrating radiation. Process as soon as possible.
Processed:	16 to 27°C (60 to 80°F), 30 to 50% RH

Handling -

Hands must be clean, dry and free of lotions, etc. Film should be handled carefully by the edges to avoid physical strains such as pressure, creasing, or buckling.

4) Relative Film Systems Speed

Screen	Film	Relative Speed	Recommended Application
MIN-R	MIN-R 2000	100	Routine Mammography
MIN-R 2000	MIN-R 2000	150	Routine Mammography
MIN-R 2190	MIN-R 2000	190	Special Application
MIN-R 2250	MIN-R 2000	250	Special Application

Screen-Film Characteristics

KODAK Screen	KODAK Film	Relative Processing Cycle	Relative Speed		Contrast		D-Max
			RP	EX II	RP	EX II	
MIN-R 2000	MIN-R 2000	Standard	150	150	3.60	3.80	>4.0
MIN-R 2190	MIN-R 2000	Standard	190	190	3.60	3.80	>4.0
MIN-R 2250	MIN-R 2000	Standard	250	250	3.60	3.80	>4.0
MIN-R	MIN-R 2000	Standard	100	100	3.60	3.80	>4.0

5) Sensitometric Parameters

Speed:	Measured at a density of 1.00 above gross fog.
Contrast:	Measured as slope of the straight line portion of the sensitometric curve, and computed as the value for the rise for any three consecutive steps.
Gross Fog:	Density of film base plus processing fog.

6) Process Variations

Changes to speed, contrast, and fog as a result of temperature variation from normal are included in GRAPHS Section.

7) Intermix

This film can be processed with intermixes of common medical x-ray films.

Variations of bromide ions in KODAK RP X-OMAT Developer cause sensitometric speed effects. With KODAK MIN-R 2000 Film, these changes are similar to those for T-MAT Films; included in GRAPH Section.

8) Automated Processing

Note: For low use rates, if sensitometry does not stay within control limits, flooded replenishment may be needed.

Flooded replenishment is intended to maintain the developer solution at a continuously fresh chemical activity.

This is accomplished by replenishing not only when film is fed, but also on the basis of processor on time.

KODAK RP X-OMAT Developer Starter is added to the replenishment tanks at the rate of 3 fl oz. per gallon, or 89 mL per gallon, or 25 mL per litre. (Use KODAK RP X-OMAT Developer Starter only.) Fill the processor tanks with the solution from the replenishment tank. However, do not add extra starter to the processor developer tank.

For more detailed information on how to set up each processor for Flooded Replenishment, see the Installation or Service manual for each processor and Service Bulletin 30. Qualified service personnel should perform the setup.

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

Fixer Retention -

The ability to maintain a quality image over several years is dependent on the stability of the image you produce. Image stability begins in the processing cycle. A high level of residual fixer (hypo) in processed film indicates insufficient washing, and this can significantly impact the stability of the film. Insufficient washing can be caused by improper wash flow rates, loss of fixer temperature control, inactive fixer, or improper film storage conditions. An analysis of fixer retention in film should be performed quarterly.

Drying -

Use the lowest possible dryer temperature that will maintain proper film drying. The dryer temperature will vary depending on the processing cycle, the relative humidity, the environmental temperature, and should be adjusted to meet individual conditions. Different processing cycles will require different dryer temperatures to compensate for varying times that the film is in the dryer section. Refer to the Operator Manual for dryer temperature adjustment instructions.

For dryer information see KODAK Publication *Dryer Venting Requirements - All KODAK X-OMAT Processors*, Service Bulletin 101.

9) Graphs¹

Characteristic:

- A) KODAK RP X-OMAT Chemicals (11-07)
- B) KODAK X-OMAT EX II Developer (11-07)

Process Variations from Normal Processing Temperature:

- D) Speed (11-07)
- E) Contrast (11-07)
- F) Fog (11-07)

²NOTICE: The data in this publication represent product tested under the conditions of exposure and processing specified. They are representative of production coatings, and therefore do not apply to a particular box or roll of photographic material. They do not represent standards or specifications that must be met by Carestream Health, Inc. The company reserves the right to change and improve product characteristics at any time.

rms Granularity:

G) (4-02)

Safelight Sensitivity:

H) (4-02)

Bromide Effects:

I) (11-07)

Spectral Sensitivity:

J) (2-02)

MTF:

L) (2-02)

Reciprocity:

M) (2-02)

Inverse/Squared Sensitometry:

N) RP X-OMAT Chemicals (4-02)

O) X-OMAT EX II Chemicals (4-02)

Note: The Kodak materials described in this publication for use with KODAK MIN-R 2000 Film / 4316 are available from dealers who supply Kodak products. You can use other materials, but you may not obtain similar results.

The contents of this publication are subject to change without notice.

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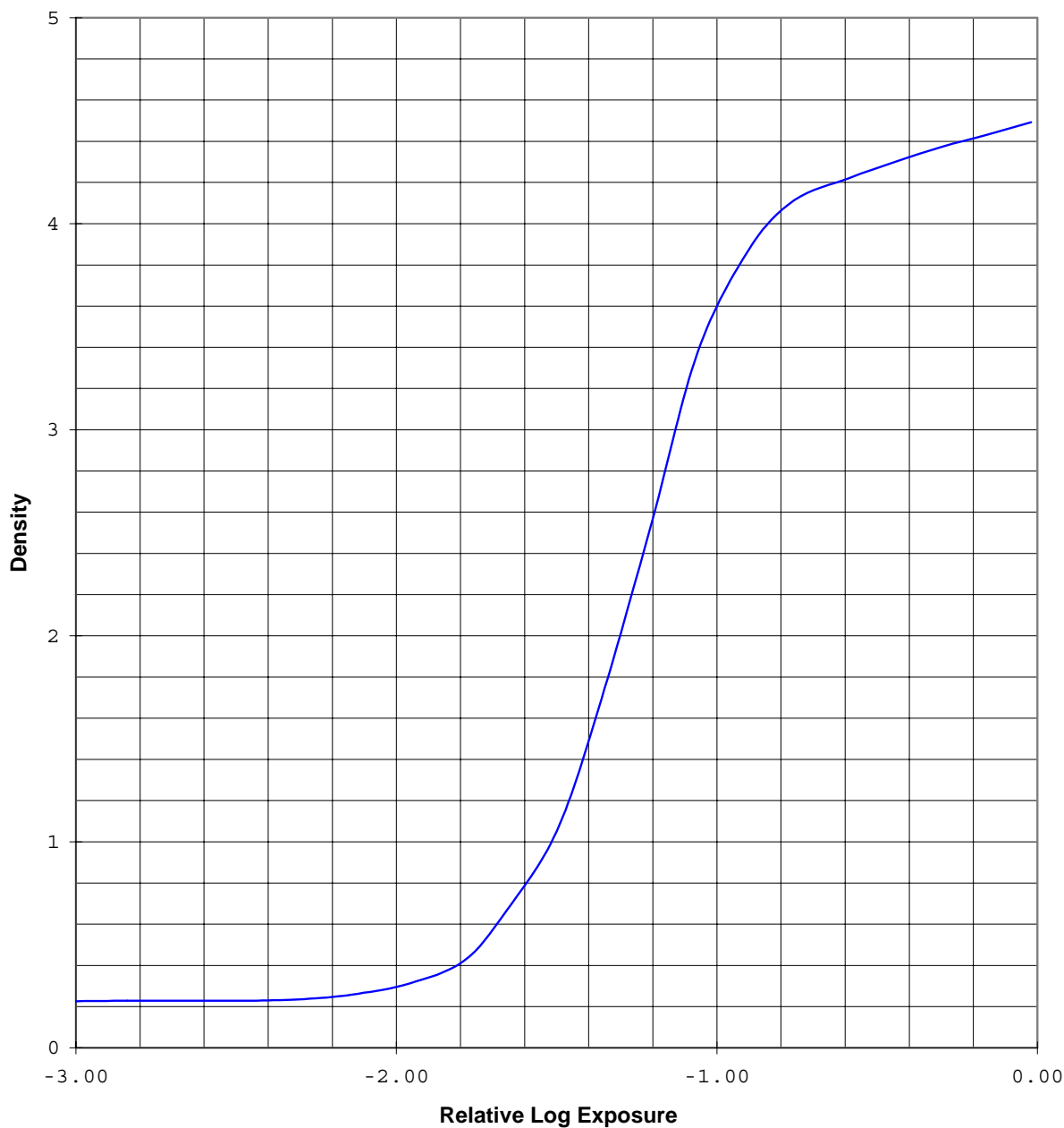
Carestream Health, Inc. – Rochester, NY 14608

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End of Data Sheet

TI2291A 11-07
CHARACTERISTIC, For
Publication

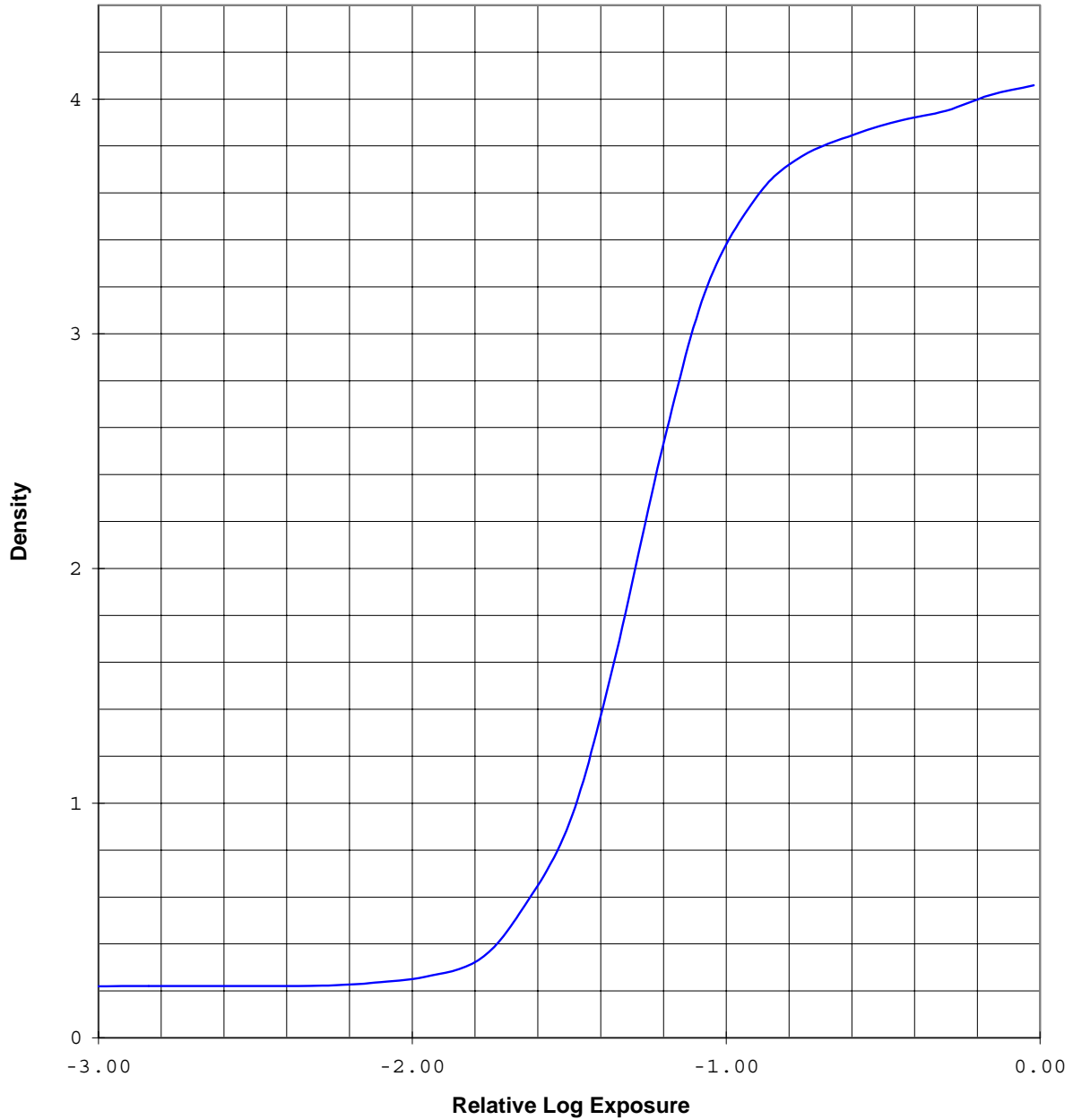
KODAK MIN-R 2000 Film / 4316
1/2 second simulated Green Screen Exposure,
KODAK RP X-OMAT Chemicals, 33.3 C (92 F), KODAK MIN-R Mammography Processor;
Diffuse Visual Densitometry



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TI2291B 11-07
CHARACTERISTIC, For
Publication

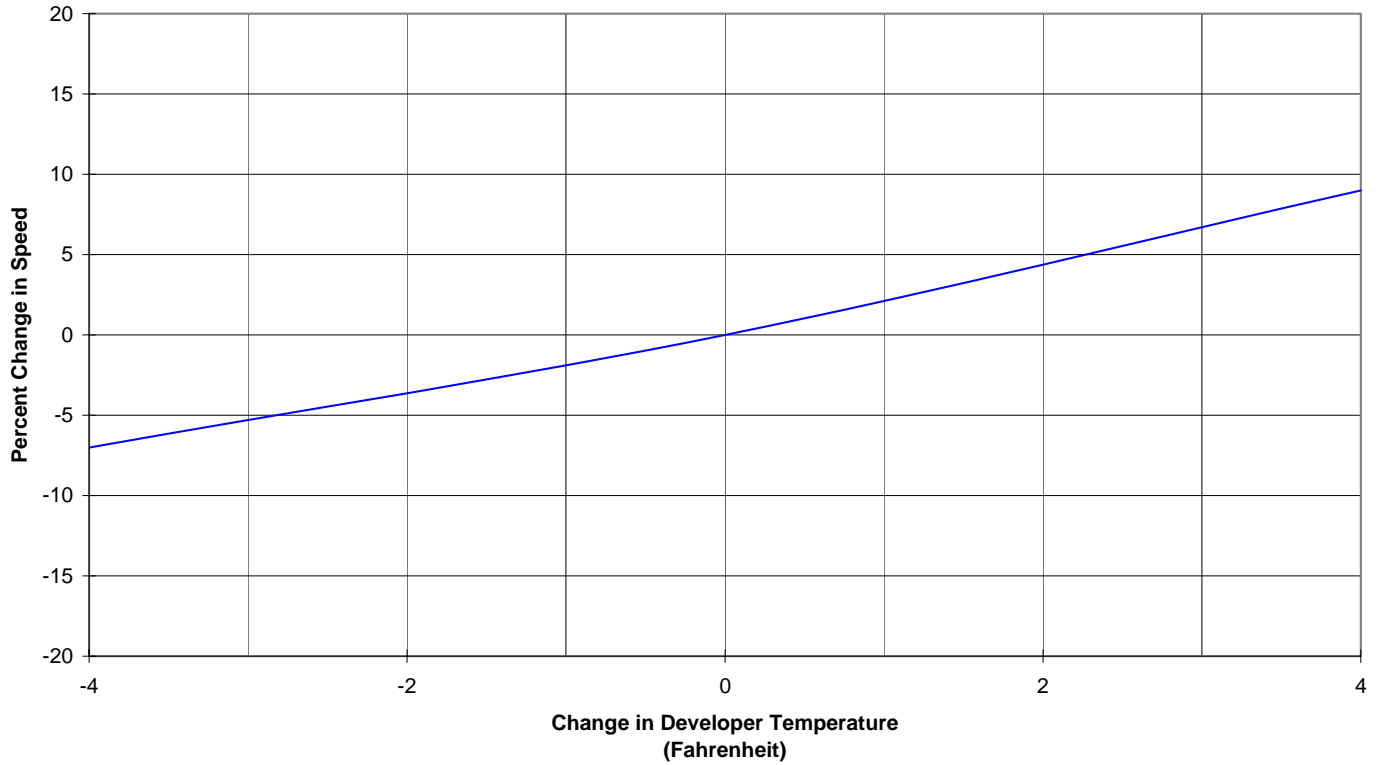
KODAK MIN-R 2000 Film / 4316
1/2 second simulated Green Screen Exposure,
KODAK X-OMAT EX II Chemicals, 33.3 C (92 F), KODAK MIN-R Mammography Processor;
Diffuse Visual Densitometry



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TI2291D 11-07
TEMPERATURE VARIATION, For Publication

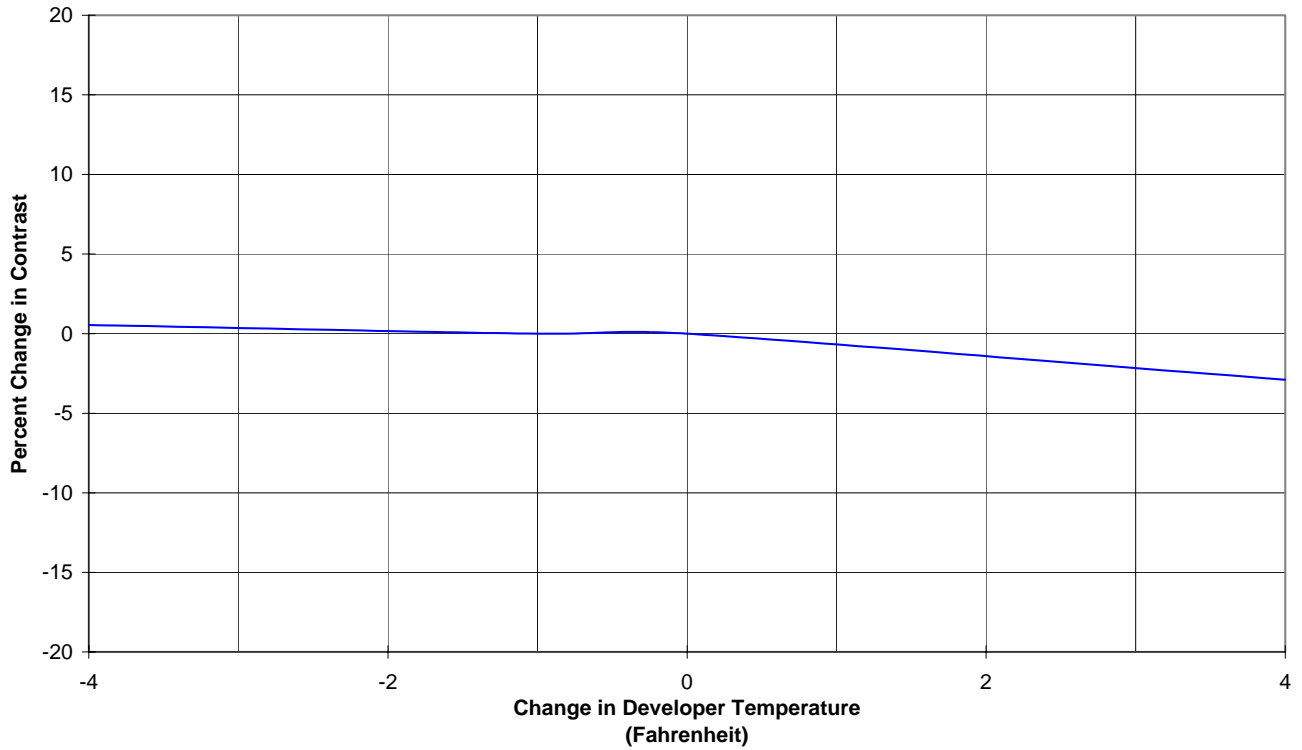
KODAK MIN-R 2000 Film/4316
Percent Change in Relative Speed
KODAK RP X-OMAT Chemicals, KODAK MIN-R Mammography Processor, 33.3 C (92 F);
(Reference: Normal Temp. = 0% Change)
(4 F = 2.2 C)



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TI2291E 11-07
TEMPERATURE VARIATION, For Publication

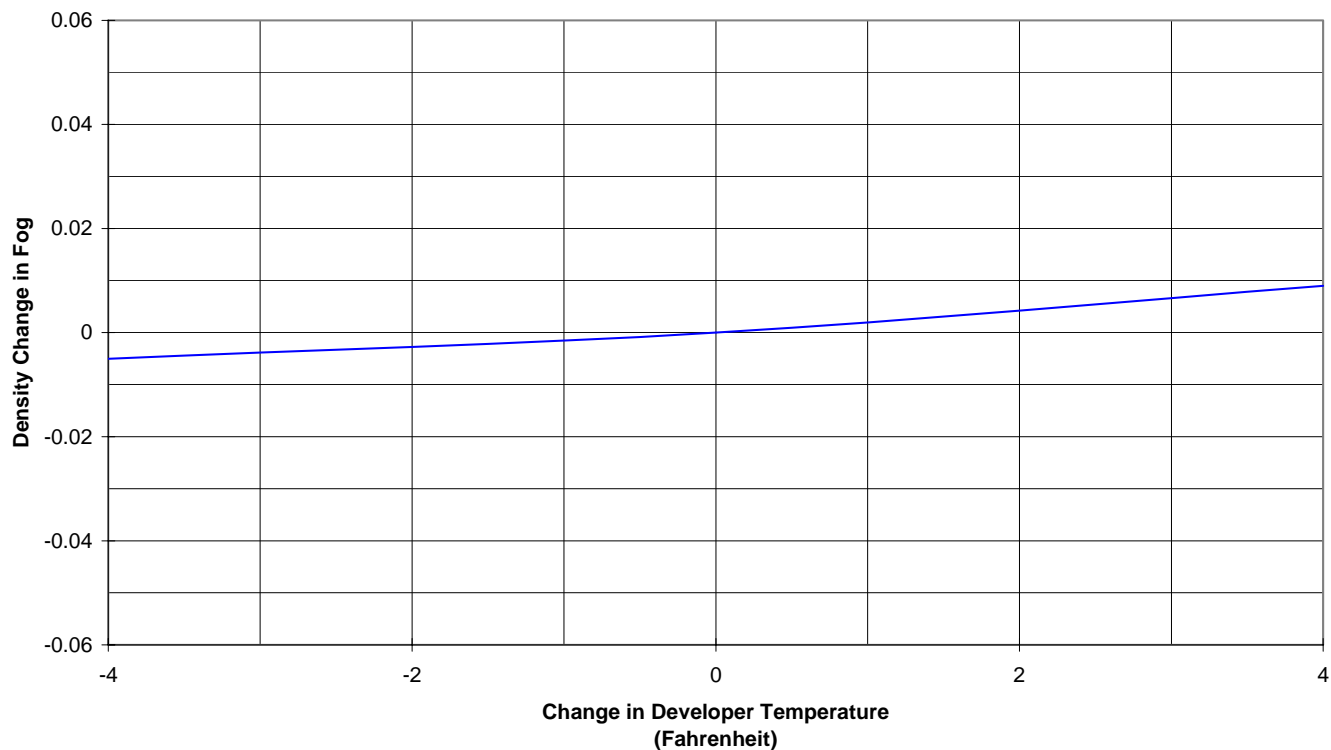
KODAK MIN-R 2000 Film / 4316
Percent Change in Contrast
KODAK RP X-OMAT Chemicals, KODAK MIN-R Mammography Processor, 33.3 C (92 F);
(Reference: Normal Temp. = 0% Change)
(4 F= 2.2C)



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TI2291F 11-07
TEMPERATURE VARIATION, For Publication

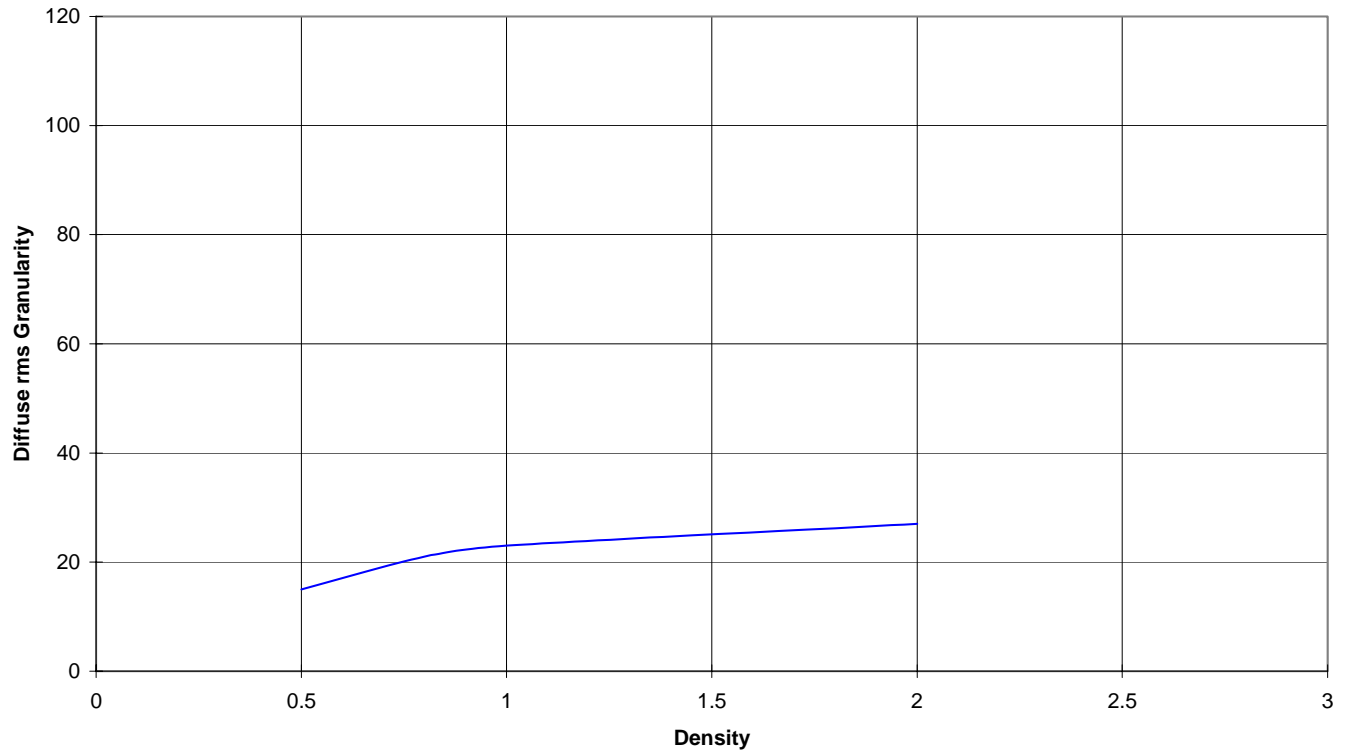
KODAK MIN-R 2000 Film / 4316
Density Change in Fog
KODAK RP X-OMAT Chemicals, KODAK MIN-R Mammography Processor, 33.3 C (92 F);
(Reference: Normal Temp. = 0)
(4 F = 2.2 C)



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TI2291G 2-02
GRANULARITY, For Publication

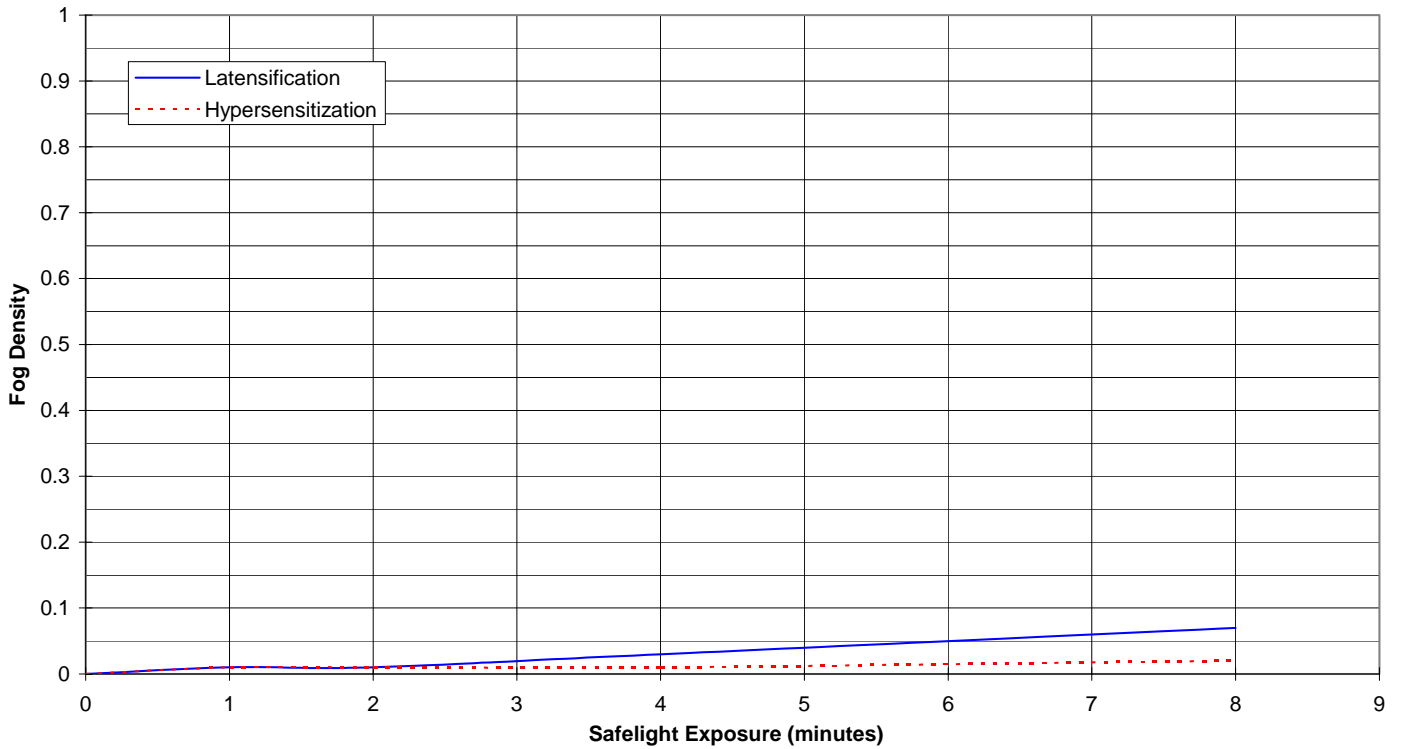
KODAK MIN-R 2000 Film / 4316
KODAK RP X-OMAT Chemicals, 35 C (95 F)
KODAK X-OMAT 460 RA Processor



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TI2291H 4-02
SAFELIGHT SENSITIVITY, For Publication

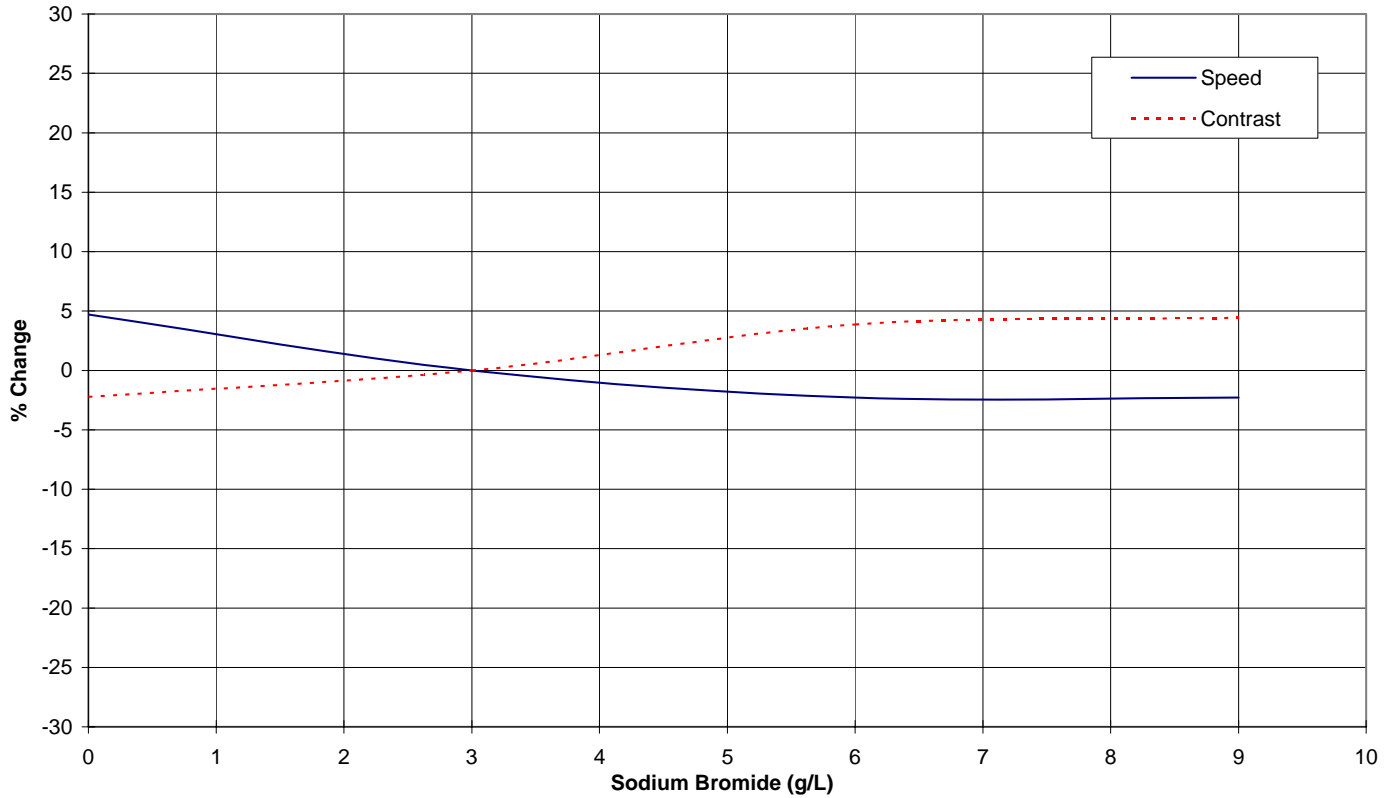
KODAK MIN-R 2000 Film / 4316
KODAK GBX-2 Safelight Filter, 7.5 watt lamp, located 4 feet from film;
KODAK X-OMAT 480 RA Processor; KODAK RP X-OMAT Chemicals, 35 C (95 F);
(Fog Growth with Increasing Safelight Exposure)



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TI2291I 11-07
BROMIDE EFFECTS, For Publication

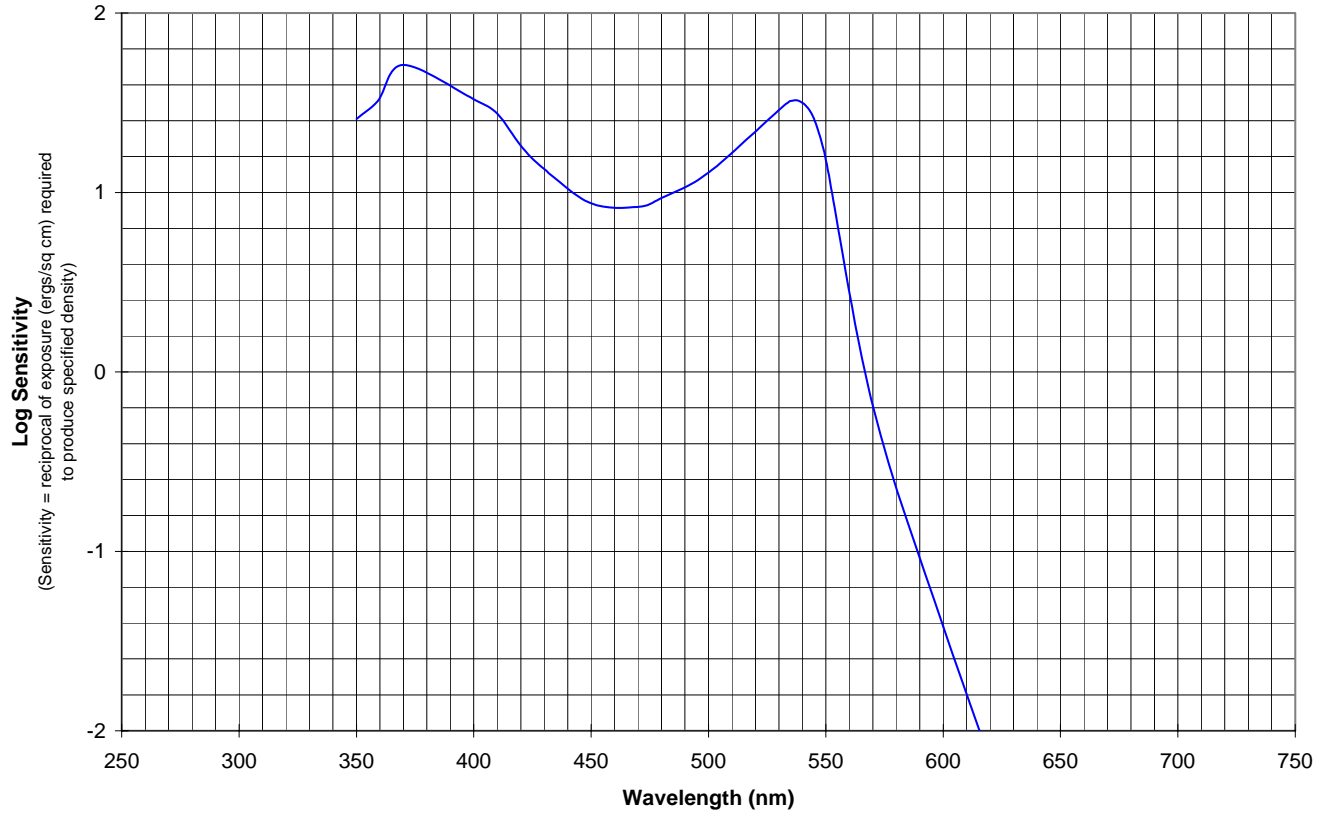
KODAK MIN-R 2000 Film / 4316
KODAK MIN-R Mammography Processor, KODAK RP X-OMAT Chemicals, 33.3 C (92 F);
Normal Level is 3 g/L



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TI2291 J 2-02
SPECTRAL SENSITIVITY, For Publication

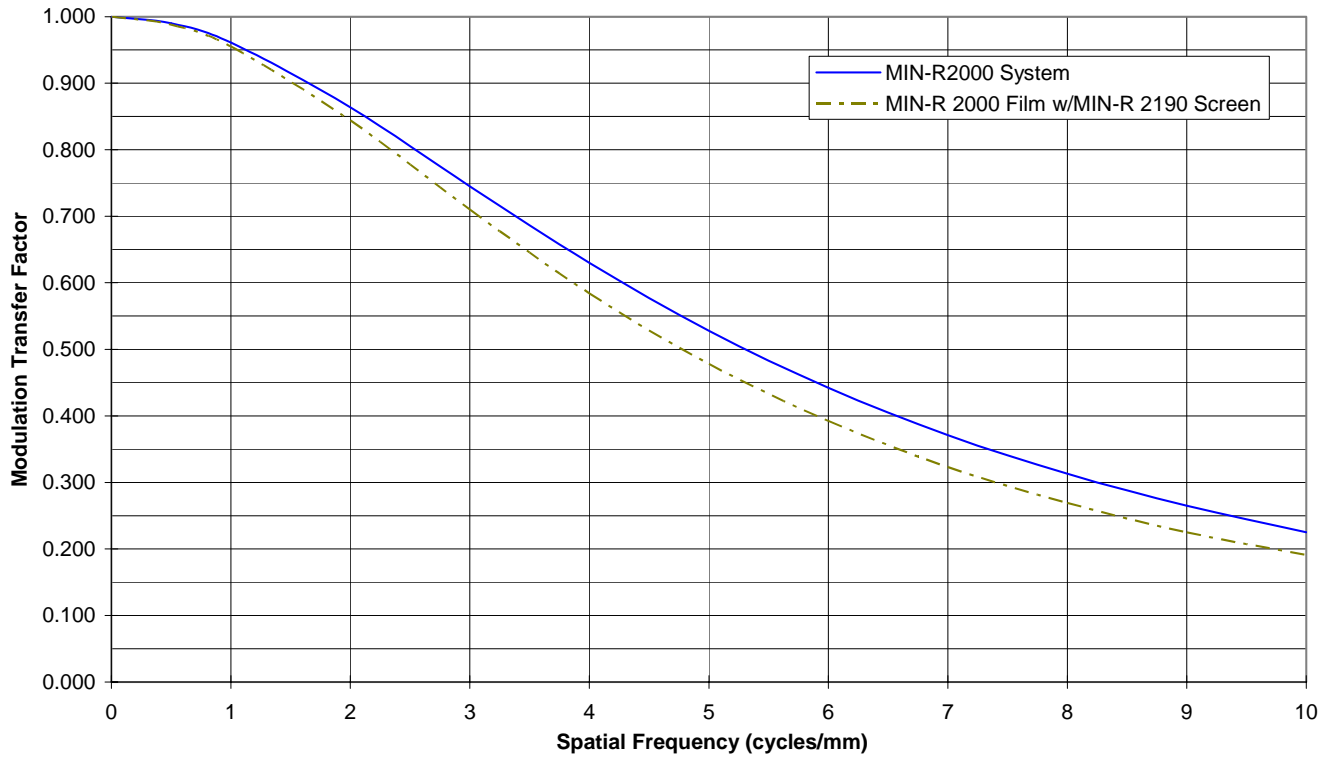
KODAK MIN-R 2000 Film/4316
Effective Exposure 1.4 sec; Seasoned KODAK RP X-OMAT Chemicals,
KODAK X-OMAT 460 RA Processor, 35 C (95 F);
Diffuse Visual Densitometry, 1.0>Gross Fog



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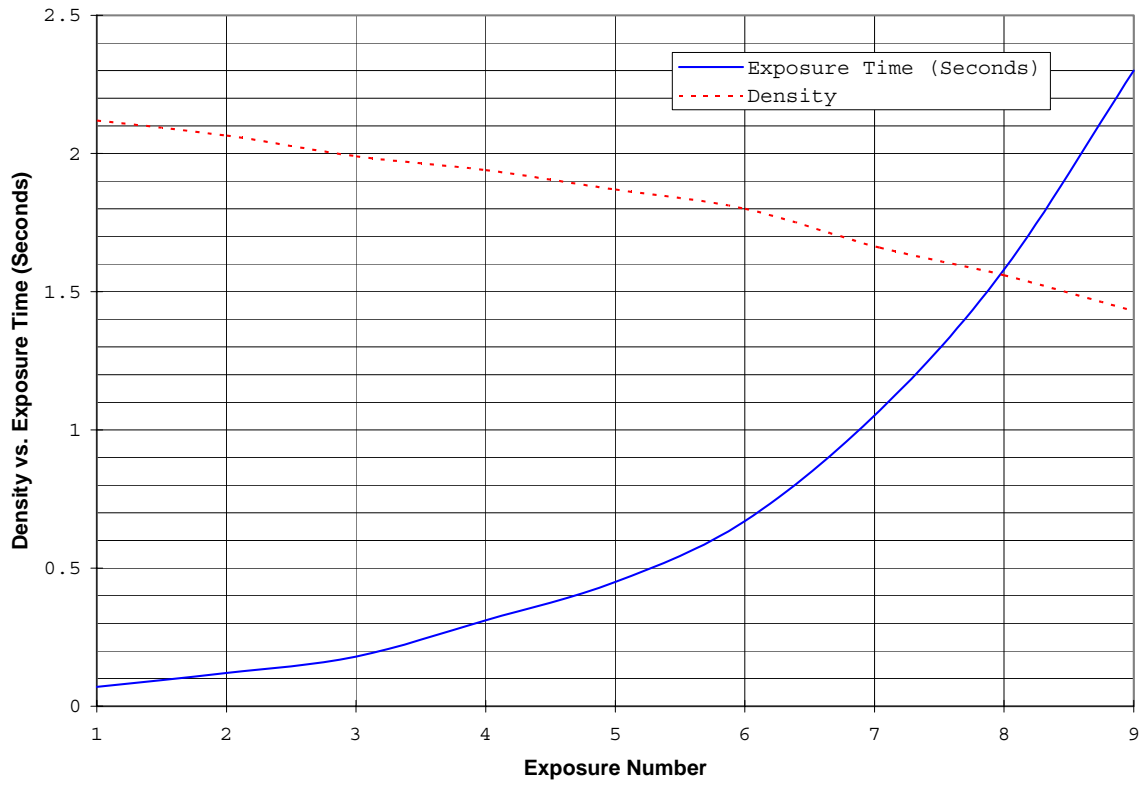
TI2291L 02-02
MTF, For Publication

KODAK MIN-R 2000 Film / 4316
Exposure: 28 kVp; KODAK RP X-OMAT Chemistry



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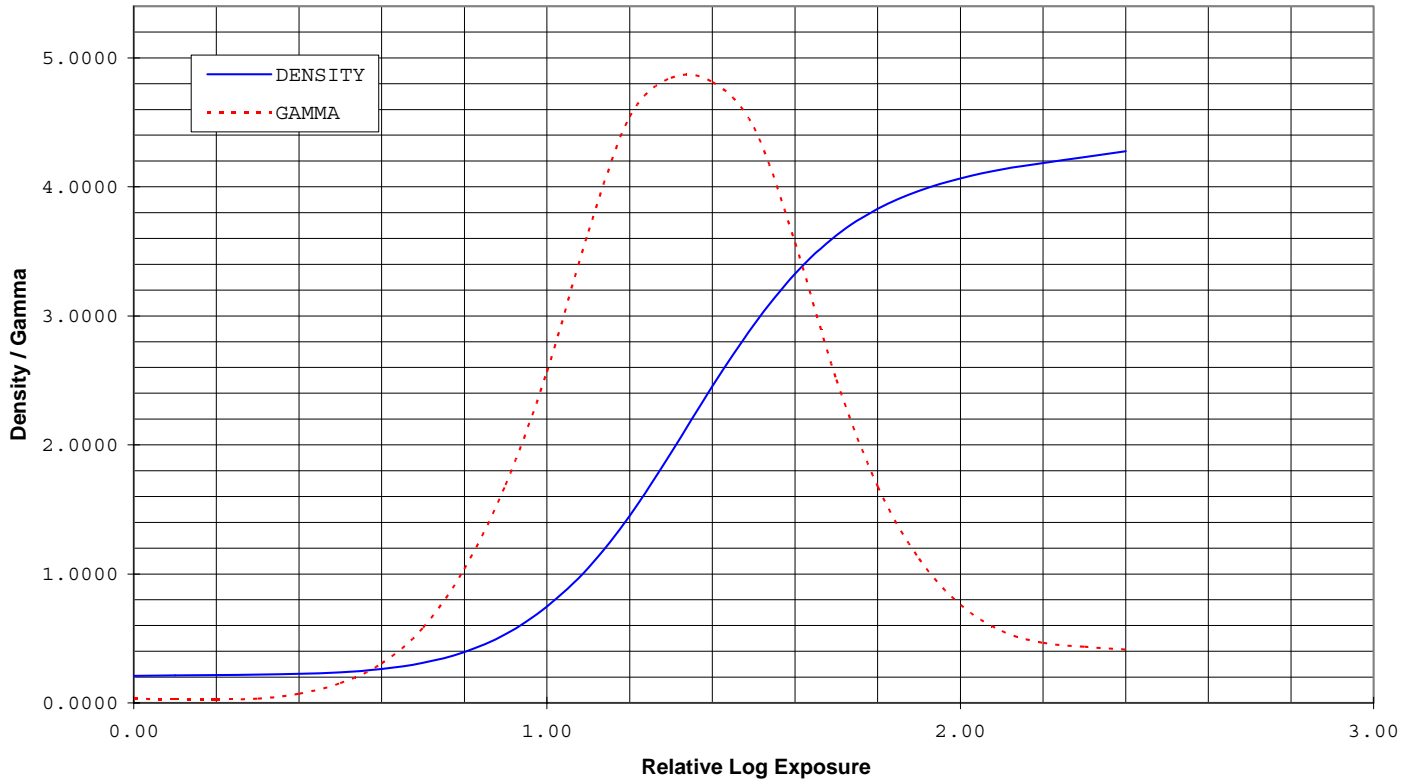
TI2291M 4-02
RECIPROCITY, For Publication
KODAK MIN-R 2000 Film / 4316
KODAK RPX-OMAT Chemicals, 35 C (95 F),
KODAK X-OMAT 460 RA Processor



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TI2291N 4-02
INVERSE/SQUARED SENSITOMETRY, For Publication

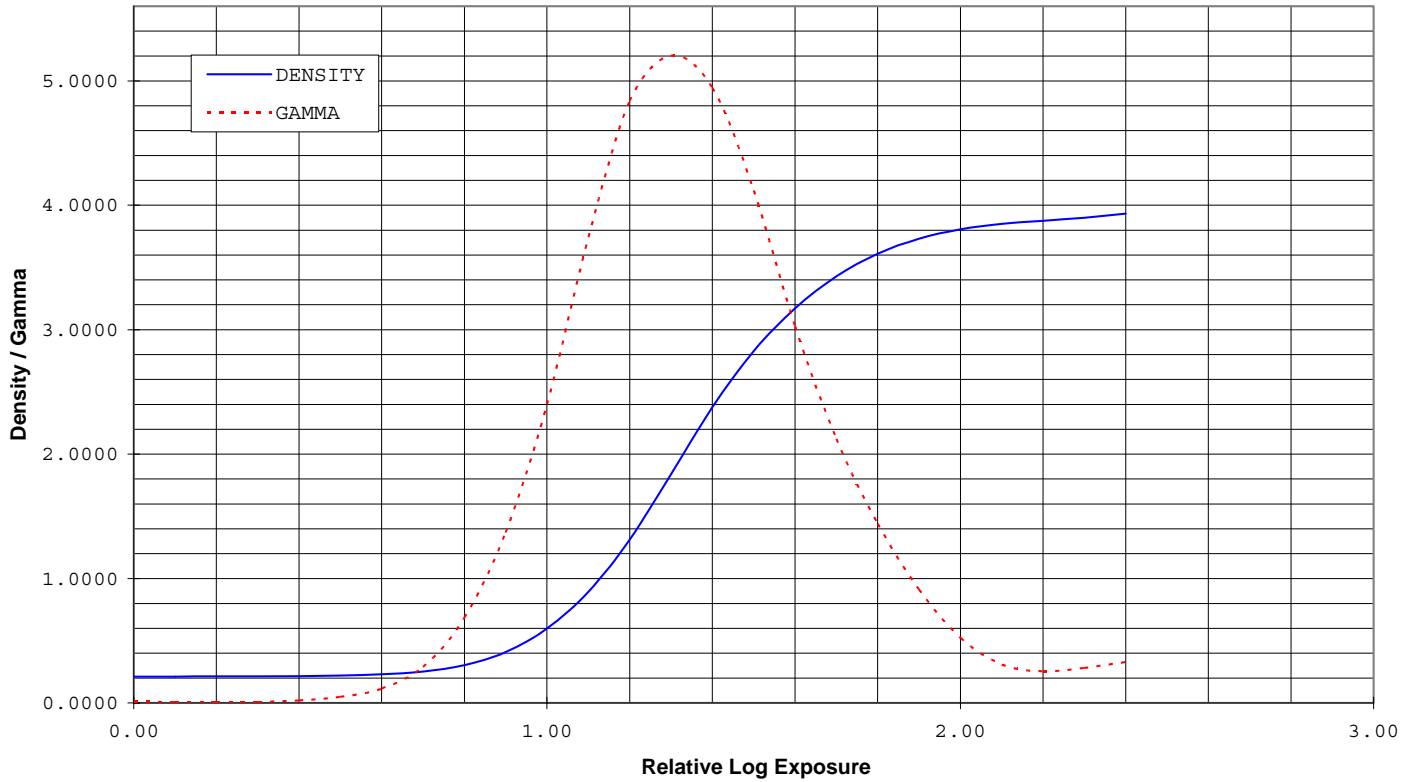
KODAK MIN-R 2000 Film / 4316
Fresh flooded KODAK RP X-OMAT Chemicals, 35C (95F);
KODAK X-OMAT 480 RA Processor



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TI2291O 4-02
INVERSE/SQUARED SENSITOMETRY, For Publication

KODAK MIN-R 2000 Film / 4316
Fresh flooded KODAK X-OMAT EX II Chemicals, 35C (95F);
KODAK X-OMAT 480 RA Processor



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