

KODAK Personal Monitoring Film



- Designed for recording X-ray, gamma, and beta radiation.
- A single film with a fast emulsion on one side of the film base and a slow emulsion on the other.
- The fast emulsion has a matte surface, on which the embossed dot is seen as a protrusion; the slow emulsion has a glossy surface, on which the embossed dot appears as a depression.
- A single piece of film capable of recording radiation exposure over a wide range from less than 10 milliroentgens to approximately 500 to 800 roentgens of high-energy X-rays or gamma rays, depending upon badge holder filtration.
- Packaging is a paper packet with inner folders surrounding the single film.

Safelight

Use a KODAK LED Safelight (660 nm red) or a KODAK 13 Safelight Filter in a suitable Safelight lamp equipped with a 15-watt bulb. Keep the film at least 4 feet (1.2 metres) from the Safelight.

Storage and Handling

Order stocks of monitoring films in small quantities, and replenish the stocks frequently. Replenishing stocks frequently avoids the buildup of density due to natural background radiation, and also avoids any possible damaging effects of long-term storage.

Unopened Packages

Store in a cool, dry place properly shielded from X-rays, gamma rays, or other penetrating radiation.

Opened Packages

Store in a cool, dry place properly shielded from penetrating radiation and away from such gases as formalin vapors, hydrogen sulfide, ammonia, and hydrogen peroxide.

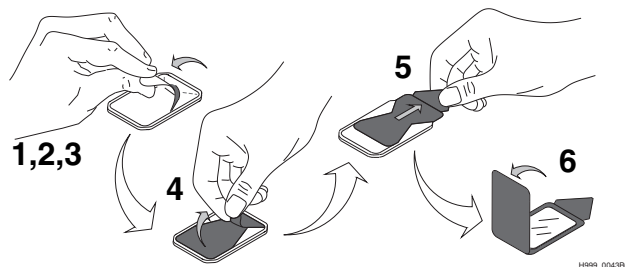
Processed Films

Store at 60 to 80° F, 30 to 50% RH.

Long term storage conditions should be lower than 13° C (55° F). High temperatures or high relative humidity levels may degrade certain characteristics.

To avoid moisture condensation on film which has been held in cold storage, allow the sealed bag to reach room temperature before opening it. For best results, remove the film from cold storage the day before its use.

Opening Film Packages



1. Hold the paper packet with one hand.
2. Orient the packet so that the text, **KODAK Personal Monitoring Film Type 2**, faces you right side up.
3. Separate the perforation with the opposite hand.
 - Detach the top of the perforation with your forefinger and thumb.
 - Pull the perforated tab toward you.
 - You will see the black folder inside the packet.
4. Grasp the triangle tab on the top of the black folder.
 - Pull the tab up to the edge of the packet.
 - Tear open the top portion of the paper packet.
5. Slide the black folder out of the packet. Discard the packet.
6. Lift open the black folder to extract the film.

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Sensitometric Parameters

Approximate Sensitivities

All films processed rack-and-tank in KODAK Rapid X-ray Developer at 68° F (20° C) for five minutes.

Heavily Filtered 50 kV X-rays:

Film/ Components	Roentgens for Net Diffuse Density					High Reference*	
	0.05	1.0	2.0	3.0	4.0	Exp (R)	Net Density
Both Emulsions	0.0015	0.022	0.061	0.12	0.23	0.42	5.0
Slow Emulsion	0.013	0.44	2.0	6.1	22	95	5.0

Gamma Rays of Iridium-192

Film/ Components	Roentgens for Net Diffuse Density					High Reference*	
	0.05	1.0	2.0	3.0	4.0	Exp (R)	Net Density
Both Emulsions	0.027	0.58	1.7	3.3	6.1	12	5.0
Slow Emulsion	0.48	13	50	150	470	2500	5.0

*High-reference exposure is defined in ANSI PH2.10-R1985 in two ways:

1. **No saturation:** If the slope of the characteristic curve below a density of 5.0 does not become less than 1.0, then the exposure value on the curve corresponding to a net density of 5.0 is the high-reference exposure.
2. **Saturation:** If the film density saturates and characteristic curve levels off below a density of 5.0, then the high-reference exposure is taken at a point on the shoulder of the characteristic curve where a line drawn tangent to the curve has a slope of 1.0.

Processing

Note: Automated processing is **not** recommended for Personal Monitoring Film.

Manual Processing (Rack-and-Tank)

Use fresh or properly replenished solutions.

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

Development

KODAK Developer	Time (Minutes)				
	75° F (24° C)	70° F (21° C)	68° F (20° C)	65° F (18.5° C)	60° F (15.5° C)
INDUSTREX Single Part Developer Replenisher	3 1/2	4 1/2	5	6	10

Use the following agitation procedure:

1. Load the films on a processing hanger such as the KODAK Dental Processing Hanger or in a processing basket such as the Bar-Ray Products Inc. Photo-Dosimetric Basket (for large scale processing).
2. Lower the films completely into the developer and agitate for five seconds, tapping the film holder against the tank to dislodge air bells clinging to the film.
3. Each minute thereafter, agitate for a few seconds until development is completed.

Rinse

Immerse films in KODAK Indicator Stop Bath or KODAK Stop Bath SB-1a for 30 to 60 seconds at 60 to 75° F (16 to 24° C) with moderate agitation.

If stop bath cannot be used, rinse for at least 2 minutes in clean running water at 60 to 75° F (16 to 24° C).

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Fix

Use KODAK INDUSTREX LO Fixer or KODAK Rapid Fixer to 10 to 15 minutes at 60 to 75° F (16 to 24° C). Agitate films vigorously when first immersed and at least every 2 minutes until fixation is completed.

Normal Washing

Wash films for 30 to 40 minutes in running water at 60 to 75° F (16 to 24° C). Water flow should be sufficient for eight changes per hour in a single tank.

Note: Although the rinse, fix, and wash solutions can be used within the 60 to 75° F (16 to 24° C) temperature range given, it is always best to maintain the temperature of these solutions as close to that of the developer as possible.

More Rapid Washing

KODAK Hypo Clearing Agent can be used to reduce washing time and conserve water when processing Personal Monitoring Film.

1. First, remove excess fixer by rinsing the film in water for one minute.
2. Then, bathe the film in Hypo Clearing Agent for two minutes with moderate agitation.
3. Wash for five minutes using a water flow sufficient to give at least one complete change of water in five minutes.

Treatment of sensitized materials with hypo clearing agents, or with hypo eliminator, will remove residual thiosulfate ion and silver thiosulfate complexes; but materials so treated may be susceptible to attack by oxidizing species.

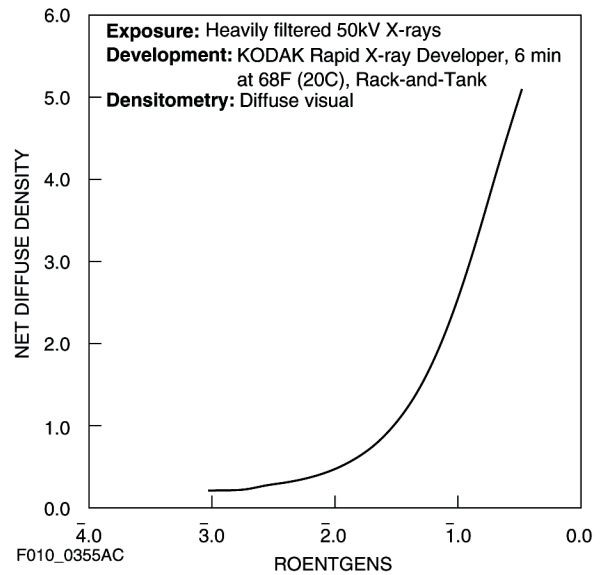
Drying

Dry in a dust-free place in a current of air at temperatures less than 120° F (49° C). Any tendency toward the formation of drying marks can be minimized by treating films in diluted KODAK PHOTO-FLO Solution after washing, or by wiping the surfaces carefully with a damp KODAK Photo Chamois or a soft, viscose sponge.

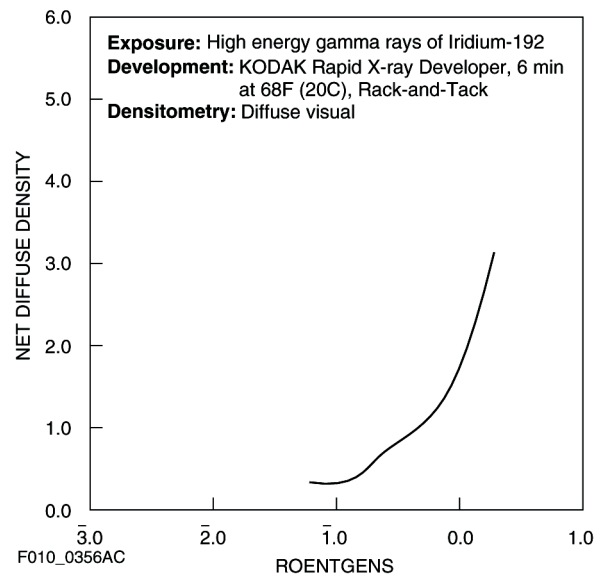
Note: The KODAK materials described in this publication used with KODAK Personal Monitoring Film, Type 2 are available from those dealers normally supplying KODAK products. Other materials may be used, but equivalent results may not be obtained.

Curves

Characteristic



Characteristic



NOTICE: While the sensitometric data in this publication are typical of production coatings, they do not represent standards which must be met by Carestream Health, Inc. Varying storage, exposure, and processing conditions will affect results. The company reserves the right to change and improve product characteristics at any time.

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