

KODAK INDUSTREX DR50 Film



FEATURES / CUSTOMER PRODUCT SPECIFICATIONS

- For critical radiography, especially with high voltage x-rays and gamma rays
- Can be used with direct x-rays or with lead foil screens
- Excellent for use in multi-film techniques
- For manual or machine processing
- Very high contrast, high definition, excellent sensitivity
- Very fine grain

THICKNESS

Base / Support	0.18 mm (7.20 mils)
Emulsion	25 microns (1.00 mil); 12.5 microns each side
Overcoat	10 microns (0.04 mil); 5 microns each side
Total	0.21 mm (8.24 mils)

CLASSIFICATION

KODAK INDUSTREX 43I Processor KODAK INDUSTREX Single Part Developer Replenisher, 8 minutes at 79°F (26°C)	
EN-584-1	C2
ASTM 1815-96	Class I
ISO 11699-1	T1

EXPOSURE CONDITIONS: 8 mm Copper Filtration, HLV 3.5 mm Copper (220 kv), Lead screens.

AVAILABLE PACKAGING FORMATS

Sheet Film

Interleaved: Each film is supplied individually enclosed in a white folder for extra protection during handling procedures. For most sizes, the unit pack is 100 sheets provided as 2 x 50 sheets. The film can be loaded into metal or plastic cassettes or into exposure holders, with or without lead screens.

Non-Interleaved: This form of packaging is generally supplied in packs of 100 sheets, and is for use when film is to be loaded into metal or plastic cassettes, or exposure holders, with or without lead screens.

Pb Contactpak: This pack consists of a film sandwiched between two 27-micron thick lead screens sealed in a lighttight, water-resistant, flexible package. A vacuum inside the pack provides superb film/screen contact. The package is laser-scored for easy opening. The film type is identified on the package as well as embossed on the film itself. The package has a butt edge which is invaluable for accurate positioning in difficult situations where the image needs to fall right up to the edge of the pack. Product in this packaging is clean to use, is water and oil resistant and is available for exposure immediately.

READY-PACK II Film: These films are individually vacuum sealed in lighttight, water-resistant, flexible packages. The package is laser-scored for easy opening. The film type is identified on the package as well as embossed on the film itself. The package has a butt edge which is invaluable for accurate positioning in difficult situations where the image needs to fall right up to the edge of the pack.

Roll Film

READY-PACK (DR50-381): The film is supplied in a long, lighttight roll sandwiched between two yellow-black paper polyethylene layers. The rolls are of 60- or 100-metre lengths in a variety of widths. The film is provided in a dispenser box and is cut to length by the user in a darkroom. There is a double-butt edged format available in 16, 35 and 70 mm.

LEAD PACK (DR50-382): The film is supplied sandwiched between two 27-micron thick lead screens inside a long, lighttight paper and polyethylene sleeve. The rolls are 100 metres long and are cut to length by the user in a darkroom.

NIF bulk roll (DR50-359): The film is supplied on a cardboard core in rolls 150 metres long in three widths: 60 mm, 70 mm and 100 mm. The film must be loaded into a cassette in a darkroom.

SAFELIGHT RECOMMENDATIONS

Use a red safelight filter (i.e. KODAK 1, 1A, or 2 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.

Note: Other safelight filters (i.e. KODAK 6B, 8, and GBX-2 Safelight Filter) which block radiation at 550nm and shorter wavelengths are also suitable for use.

STORAGE AND HANDLING

Handle film carefully to avoid physical strains such as pressure, creasing, or buckling.

It is important to realize that meeting the chemical and physical requirements does not by itself ensure that records will not deteriorate. It is essential to provide proper storage conditions. ASTM E 1254 gives details of storage conditions.

Unexposed

50 to 70°F (10 to 21°C), 30 to 50% RH. Properly shield from x-rays, gamma rays, or other penetrating radiation.

Exposed

Keep cool, dry, and properly shielded from penetrating radiation. Process as soon as possible after exposure.

Processed

60 to 80°F (15 to 27°C), 30 to 50% RH.

RELATIVE EXPOSURE

KODAK INDUSTREX Films for Various Processing Conditions

EXPOSURE CONDITIONS: 8 mm Copper Filtration, HVL 3.5 mm Copper (220 kV), Lead screens

KODAK INDUSTREX Films	KODAK INDUSTREX Processor KODAK INDUSTREX Chemicals
	8 min 79°F (26°C)
DR50*	1.0
SR45	0.9
M100	0.6
MX125	0.4
T200	0.3
AA400	0.16

* DR50 Film in 8 min 79°F (26°C) cycle is assigned a relative exposure of 1.

RELATIVE EXPOSURE FOR VARIOUS ENERGY LEVELS

For each exposure condition, DR50 Film is assigned a relative exposure of 1.00.

KODAK INDUSTREX Processor, 8 minute 79°F (26°C) cycle.

INDUSTREX Films	ISO 120Kv*	EN 220Kv†	Iridium‡	Cobalt§
DR50	1.0	1.0	1.0	1.0
SR45	0.65	1.0	0.9	0.9
M100	0.45	0.6	0.5	0.5
MX125	0.35	0.4	0.3	0.3
T200	0.20	0.3	0.2	0.15
AA400	0.15	0.16	0.10	0.10

* In accordance with ANSI PH 2.8 - ISO 7004 standard. Without lead screens

† In accordance with ANSI PH 2.8 - ISO 7004 standard - EN 584-1 Lead screens

‡ 8 mm Copper filtration. 100/200 microns lead screens

§ 100/200 microns lead screens

AUTOMATIC PROCESSING

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

EXPOSURE CONDITIONS: 200/220 kV, ISO/ANSI/EN Conditions, KODAK INDUSTREX Chemicals

Film Characteristics (Sensitometric)

Processor Cycle	Base + Fog	Relative Exposure	Contrast†
8 min 79°F (26°C)*	0.19	1.0	6.00
11.5 min 82°F (28°C)	0.20	0.75	6.00
8 min 82°F (28°C)	0.19	1.0	6.00
10.5 min 86°F (30°C)	0.20	0.75	6.00

* 8 min, 79°F (26°C) automatic cycle is assigned a relative exposure of 1.

† Contrast calculated between net densities of 1.5 and 3.5.

Recommended Replenishment Rates

KODAK INDUSTREX Developer Replenisher or KODAK INDUSTREX Single Part Developer Replenisher:	100 mL (3.38 fluid ounces) / 35 x 43 cm (14 x 17 inch) sheet
KODAK INDUSTREX LO Fixer and Replenisher:	180 mL (6.09 fluid ounces) / 35 x 43 cm (14 x 17 inch) sheet
KODAK INDUSTREX Fixer and Replenisher:	220 mL (7.44 fluid ounces) / 35 x 43 cm (14 x 17 inch) sheet

Washing and Drying

Washing: Follow the processor manufacturer's recommendation for wash flow rate, or adjust flow to achieve the equivalent of the wash tank capacity every five minutes, or twelve tank volumes per hour. Insufficient wash flow can adversely affect the life expectancy of processed radiographs. Wash flow rate should be increased if chemical spot tests or other analytical methods reveal a high level of retained chemicals in the processed film. For best results, the wash tank should be drained daily and left empty when not in use.

Drying: Follow the processor manufacturer's recommendation for dryer settings. In general, the dryer should be set to a temperature slightly above (3°C/5°F) the lowest temperature required to eliminate any signs of tackiness in films exiting the dryer.

MANUAL PROCESSING

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

Develop with rack and tank, using properly replenished solutions.

	Temperature	Recommended Time (Minutes)	Agitation
KODAK INDUSTREX Single Part Manual Developer and Replenisher or KODAK Rapid X-Ray Developer and Replenisher	68°F (20°C) 75°F (24°C)	5 3*	Intermittent (5 seconds every 30 seconds)

* Development times of less than 5 minutes may produce poor uniformity and should be avoided.

Note: Remove film and hanger 5 seconds before end of development. DO NOT allow excess developer to drain back into the tank.

Stop, Fix and Wash Steps

	Temperature	Recommended Time	Agitation
KODAK Indicator Stop Bath, diluted 3.5% acetic acid solution*, or running water rinse	60 to 85°F 16 to 30°C	30 seconds	Moderate
KODAK Rapid Fixer, KODAK INDUSTREX Manual Fixer, or KODAK INDUSTREX LO Fixer and Replenisher	60 to 85°F 16 to 30°C	3 to 6 minutes, or twice the clearing time	Vigorous for 15 seconds, then intermittent (5 sec every 30 sec)
Running water wash† (8 volume changes per hour)	60 to 85°F 16 to 30°C	10 to 30 minutes	

* Stop baths check development, prevent most spots or streaks, and prolong the life of the fixing bath.

† KODAK Hypo Clearing Agent may be used to reduce washing time and conserve water. KODAK PHOTO-FLO Solution may be used after washing to minimize water spots and drying marks.

Dry in a dust-free area at room temperature or in a suitable drying cabinet. Temperature not to exceed 120°F (50°C).

KODAK INDUSTREX DR50 Film

Recommended Replenishment Rates

Maintain chemical activity and solution level in the developer tank by adding 90 mL (3 fluid ounces) of replenisher according to instructions for each 14 x 17-inch (35 x 43 cm) film processed. Stir vigorously after each addition. Replenish the fixer tank at the rate of 180 mL (6 fl oz) per 35 x 43 cm (14 x 17 in) sheet of film processed.

Film Characteristics (Sensitometric)

Development Conditions	Base + Fog	Relative Exposure*	Contrast†
5 min 68° (20°C)	0.20	1.5	5.10
3 min 75° (24°C)‡	0.20	1.4	5.00

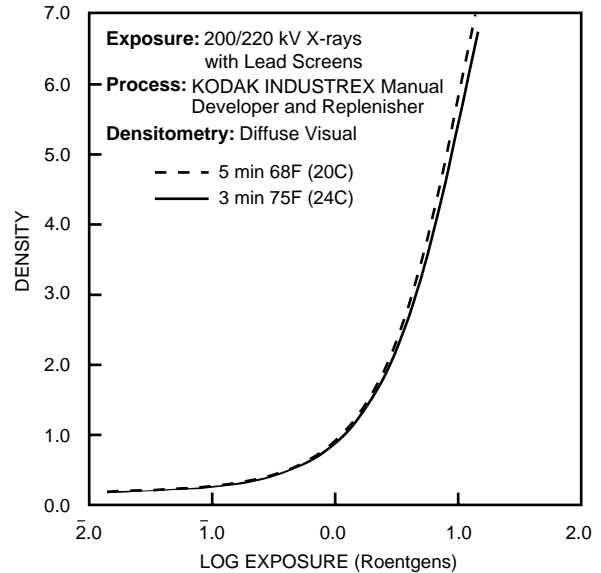
* 8 min 79°F (26°C) automatic cycle is assigned a relative exposure of 1.

† Contrast calculated between net densities of 1.5 and 3.5.

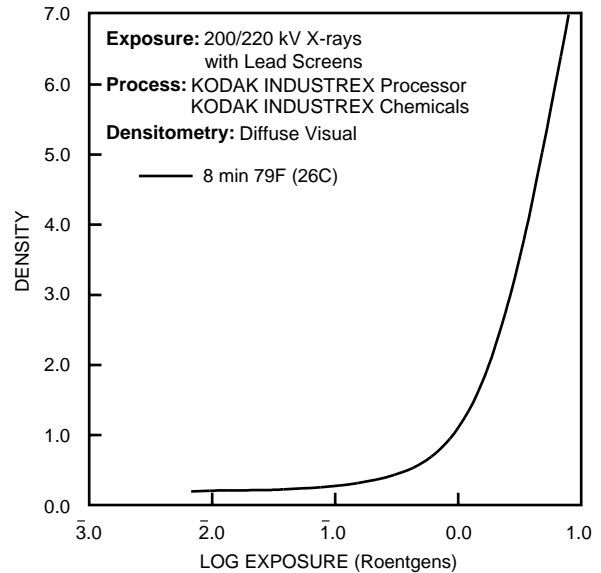
‡ Temperatures greater than 75°F (24°C) and processing times of less than 5 minutes may produce inconsistent results.

CURVES

Characteristic Curves, Manual Processing



Characteristic Curves, Machine Processing



NOTICE: While the sensitometric data in this publication are typical of production coatings, they do not represent standards which must be met by Kodak. 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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