

## FUJIFILM INDUSTRIAL RADIOGRAPHIC FILM IX25, IX50, IX80, IX100, IX150, IX29 AND IX59

Fujifilm industrial X-ray films feature revolutionary new film technology. The combination of the latest in emulsion making science and computerized manufacturing processes assure consistent batch-to-batch performance; optimum image quality and compatibility with all NDT chemistries and current brand tank / automatic processing conditions.

The Fujifilm family of films incorporate unique speed, and grain technologies thus permitting their use over a wide range of applications with consistent high quality regardless of the material examined and the source of radiation employed.

### TYPES AND FEATURES

An appropriate choice is made among the eight types of Fujifilm Industrial Radiographic Film according to the material and thickness of specimens, the kilovoltage or energy of radiation, and the required accuracy of inspection.

Film	Applications and Features	Relative Speed*				Class of Film**		
		X-rays 100kV <sup>(1)</sup>	X-rays 200kV <sup>(2)</sup>	Ir-192 <sup>(2)</sup>	Co-60 <sup>(2)</sup>	ASTM E1815	EN 584-1	ISO 11699-1
<b>IX25</b>	<ul style="list-style-type: none"> <li>• Micro-electronic parts, Castings — low to medium atomic number metals</li> </ul> Fujifilm's finest grain, high contrast ISO Class C1, ASTM Class SPECIAL film having maximum sharpness and discrimination characteristics. It is suitable for new materials, such as carbon fiber reinforced plastics, ceramic products, and micro electronic parts. IX25 is generally used in direct exposure techniques or with lead screens. IX25 is recommended for automated processing only.	20	17	15	10	SPECIAL	C1	C1
<b>IX50</b>	<ul style="list-style-type: none"> <li>• Electronic parts</li> <li>• Graphite epoxy composites</li> </ul> An ultra-fine grain, high contrast ISO Class C3, ASTM Class I film having excellent sharpness and high discrimination characteristics. It is suitable for use with any low atomic number material where fine image detail is imperative. Its ultra-fine grain makes it useful in high energy, low subject contrast applications where high curie isotopes or high output x-ray machines permit its use. Wide exposure latitude has been demonstrated in high subject contrast applications. IX50 is generally used in direct exposure techniques or with lead screens.	35	30	30	30	I	C3	C3
<b>IX80</b>	<ul style="list-style-type: none"> <li>• Welds — low to medium atomic number metals</li> <li>• Aircraft construction and maintenance</li> <li>• Graphite epoxy composites</li> </ul> An extremely fine grain, high contrast ISO Class C4, ASTM Class I film suitable for detection of minute defects. It is applicable to the inspection of low atomic number materials with low kilovoltage x-ray sources as well as inspection of higher atomic number materials with high kilovoltage x-ray or gamma ray sources. Wide exposure latitude has been demonstrated in high subject contrast applications. IX80 is generally used in direct exposure techniques or with lead screens.	55	55	55	55	I	C4	C4
<b>IX100</b>	<ul style="list-style-type: none"> <li>• Welds — medium to higher atomic no. metals</li> <li>• Castings — medium to higher atomic no. metals</li> </ul> A very fine grain, high contrast ISO Class C5, ASTM Class II film suitable for the inspection of light metals with low activity radiation sources and for inspection of thick, higher density specimens with high kilovoltage x-ray or gamma ray sources. Wide exposure latitude has been demonstrated in high contrast subject applications. Although IX100 is generally used in direct exposure techniques or with lead screens, it is suitable for use with fluorescent or fluorometallic screens.	100	100	100	100	II	C5	C5

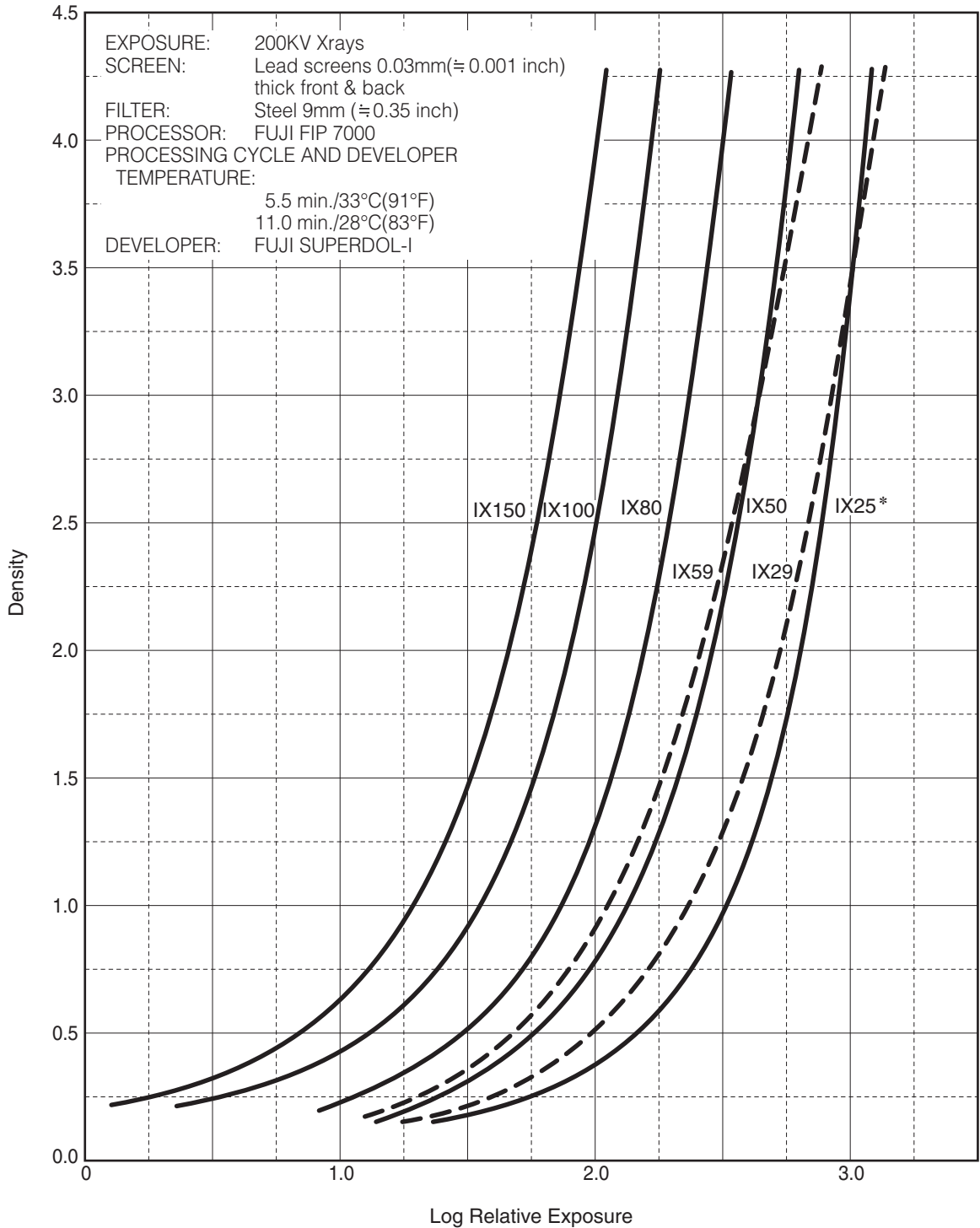
\* Speed as compared to that of type IX100 used as a standard 100 (1) without screens, (2) with lead screens,      \*\* Automatic Film Processing

Film	Applications and Features	Relative Speed*				Class of Film**		
		X-rays 100kV <sup>(1)</sup>	X-rays 200kV <sup>(2)</sup>	Ir-192 <sup>(2)</sup>	Co-60 <sup>(2)</sup>	ASTM E1815	EN 584-1	ISO 11699-1
<b>IX150</b>	<ul style="list-style-type: none"> <li>● Heavy, multi-thick steel parts</li> <li>● Low curie isotope and low-output x-ray exposures</li> </ul> A high speed, fine grain, high contrast ISO Class C6, ASTM Class III film suitable for inspection of a large variety of specimens with low-to-high kilovoltage x-ray and gamma ray sources. It is particularly useful when gamma ray sources of high activity are unavailable or when very thick specimens are to be inspected. It is also useful in x-ray diffraction work. IX150 is used in direct exposure techniques or with lead screens.	170	170	170	170	III	C6	C6
<b>IX29</b>	<ul style="list-style-type: none"> <li>● Castings and other multi-thickness subjects</li> </ul> An ultra-fine grain, medium-high contrast ASTM Class W-A film suitable to inspect wide ranged thickness subjects such as precision cast parts with X-ray or gamma ray sources. IX29 can be used in direct exposure techniques or with lead screens, or in applications involving fluorometallic screens.	22	22	22	22	W-A	—	—
<b>IX59</b>	<ul style="list-style-type: none"> <li>● Castings and other multi-thickness subjects</li> </ul> An extremely fine grain, medium contrast ASTM Class W-B film suitable to inspect multi-thick, low-atomic number metal, and steel cast parts. IX59 can be used in direct exposure techniques or with lead screens, or in applications involving fluorometallic screens.	45	45	45	45	W-B	—	—

\* Speed as compared to that of type IX100 used as a standard 100 (1) without screens, (2) with lead screens,      \*\* Automatic Film Processing

**CHARACTERISTIC CURVE**

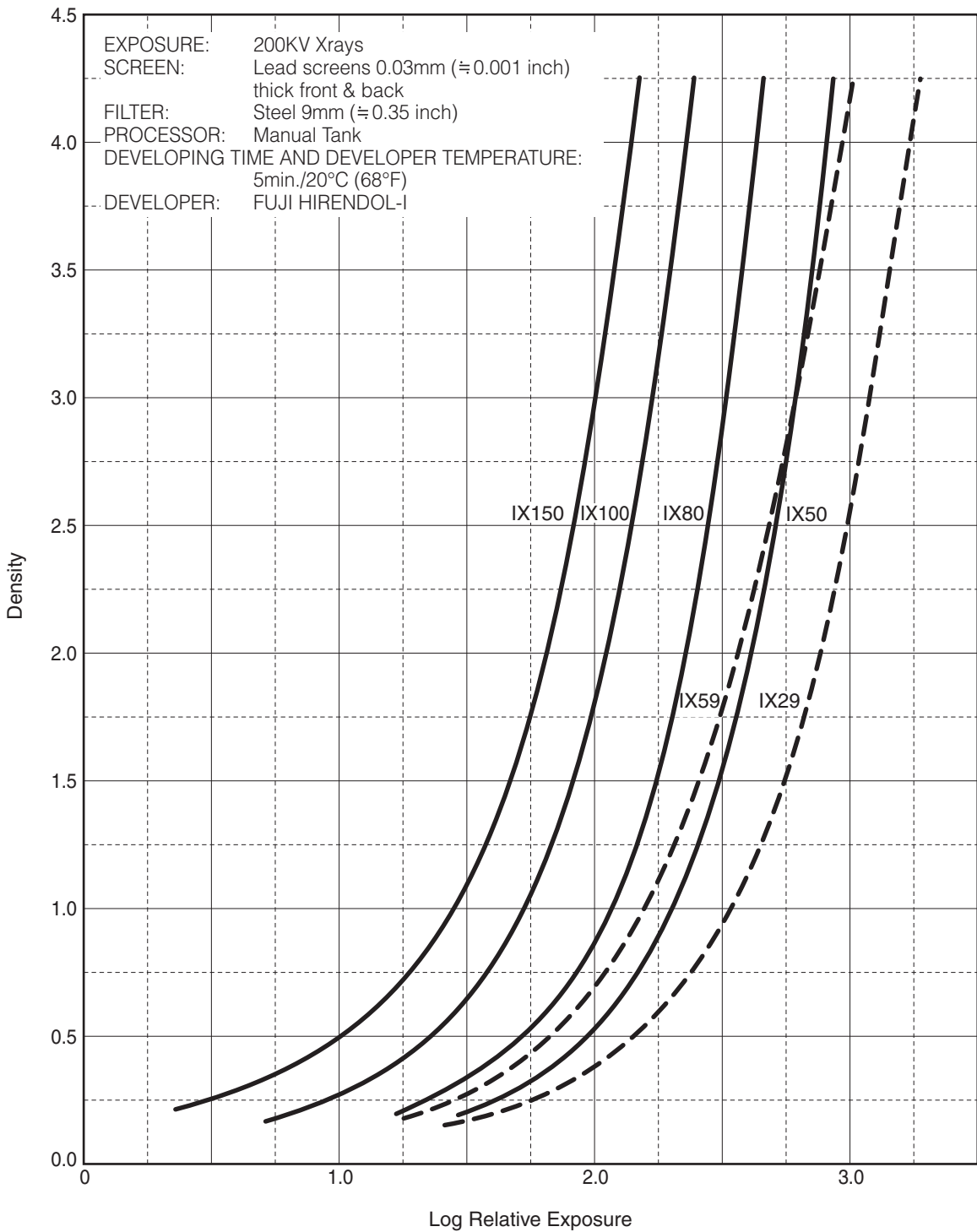
**Automatic Processing**



\* With 5-minute or short cycle processing, higher drying temperature (+5°C ~ +10°C) is recommended.

**CHARACTERISTIC CURVE**

**Manual Processing**



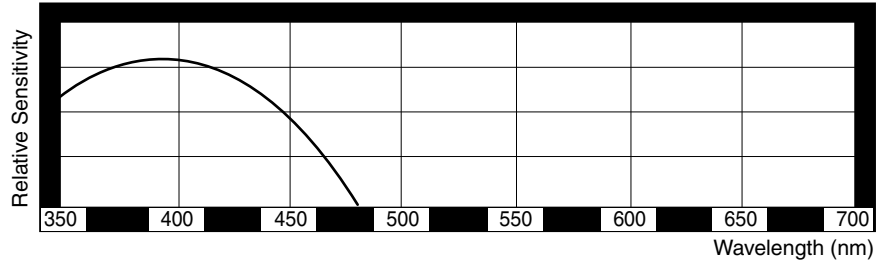
**BASE USED**

Polyester 0.175 mm thick, blue tinted base.  
 A polyester base is used having excellent strength and safety being suitable also for automatic processing

**COLOR SENSITIVITY**

Blue sensitive

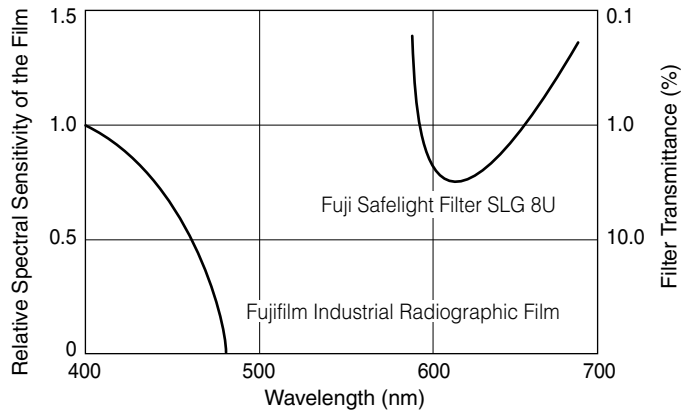
Spectral Sensitivity Curve



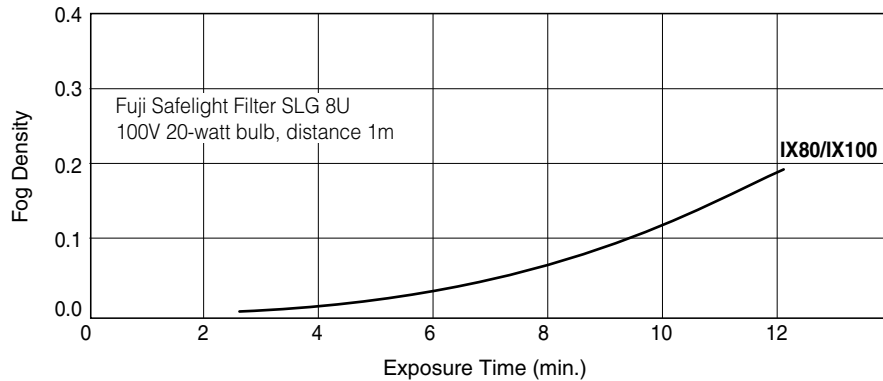
**SAFELIGHT**

This film should be handled under the Fuji Safelight Filter SLG 8U (red-orange) in a lamp with 15-or-20-watt bulb at a distance of not less than 1 meter (3.3 feet).

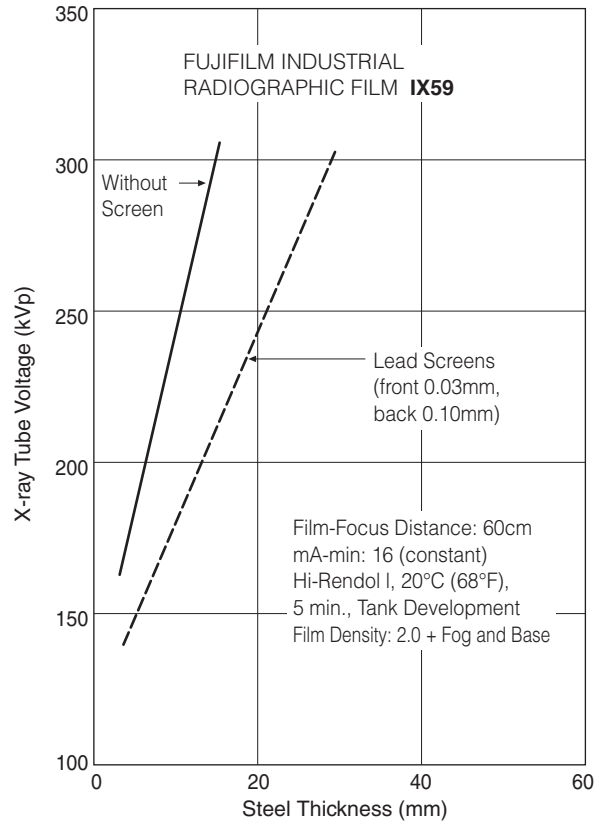
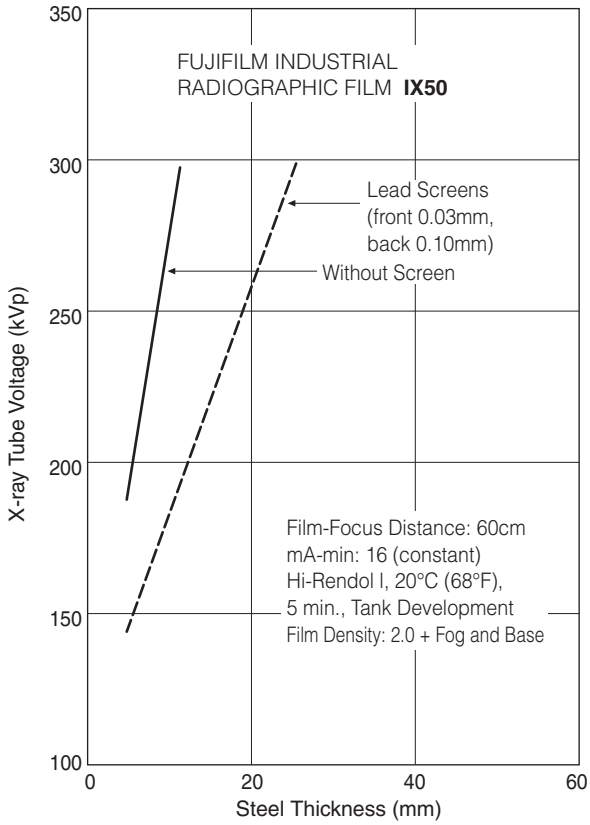
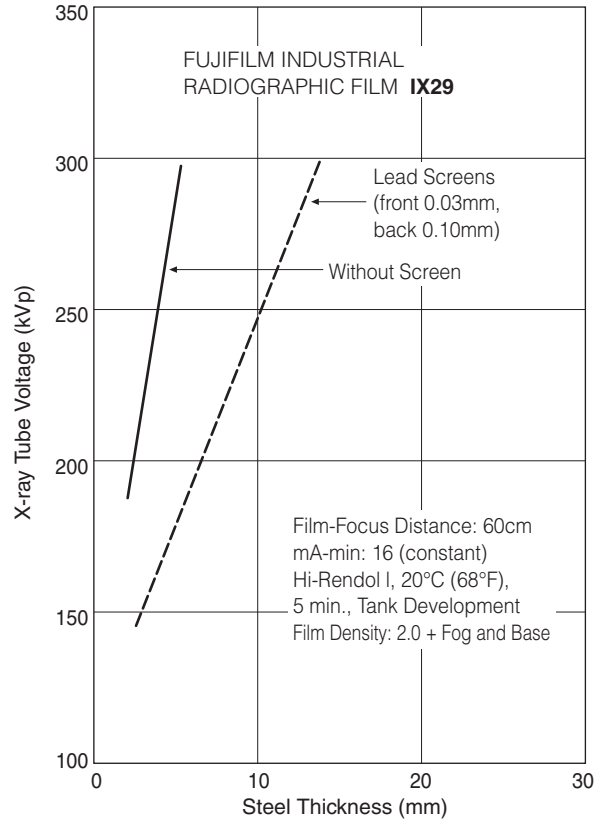
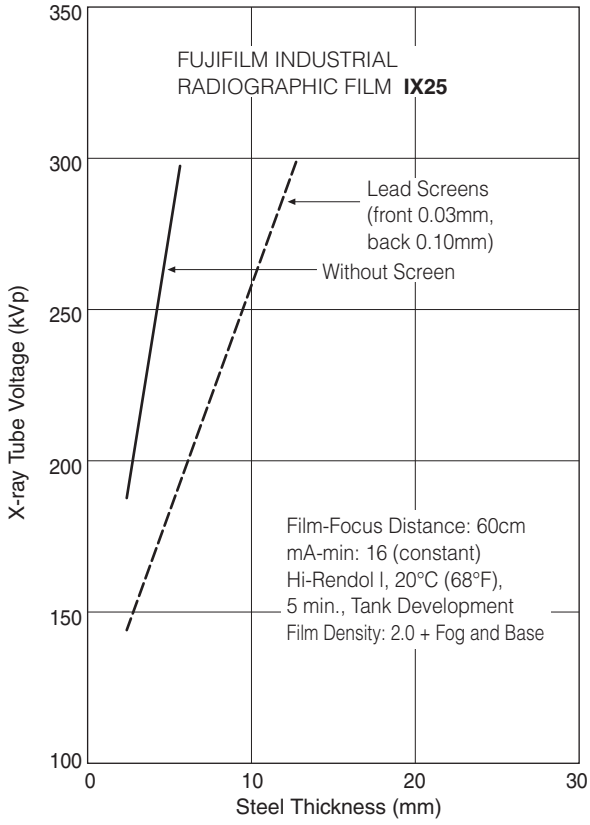
Spectral Absorption Curve of the Fuji Safelight Filter SLG 8U



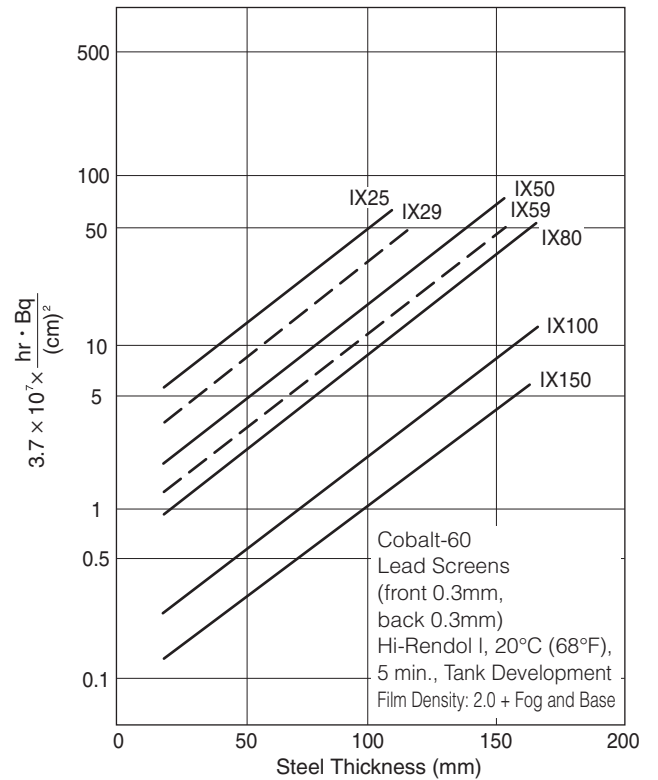
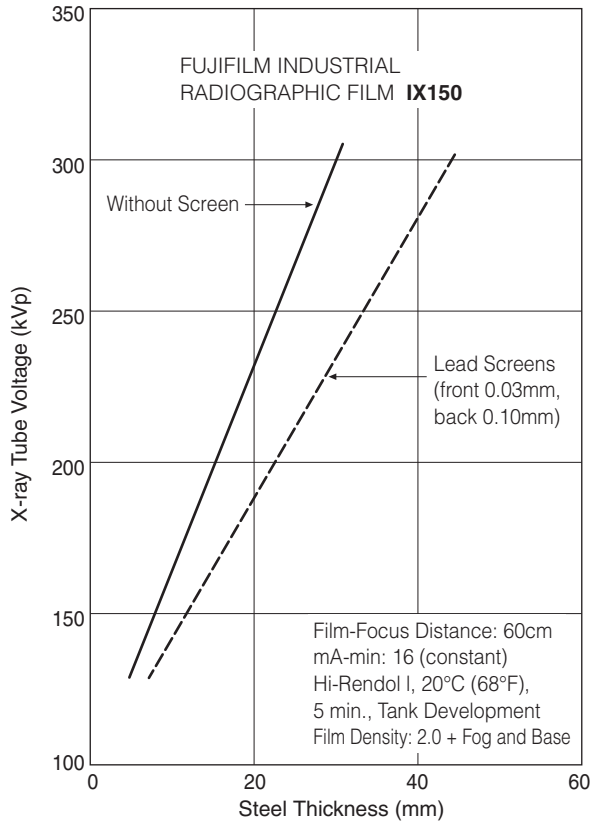
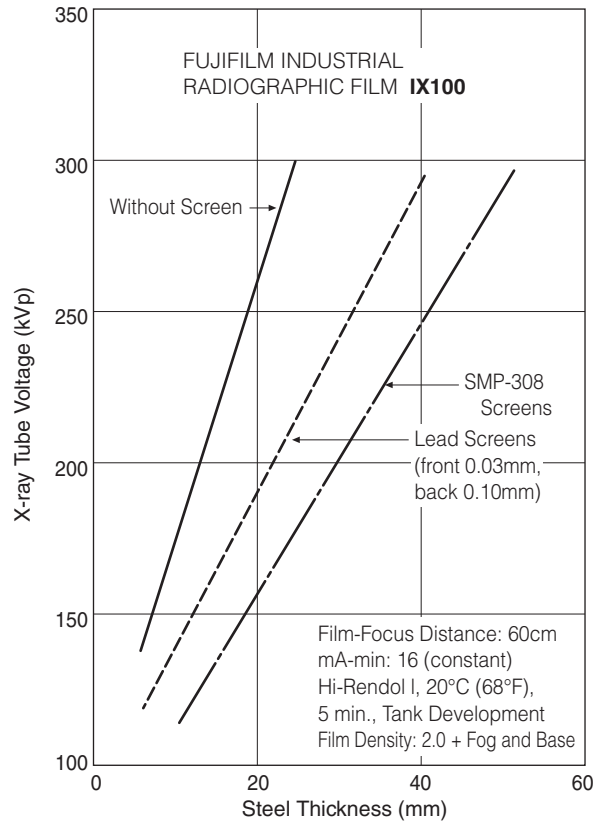
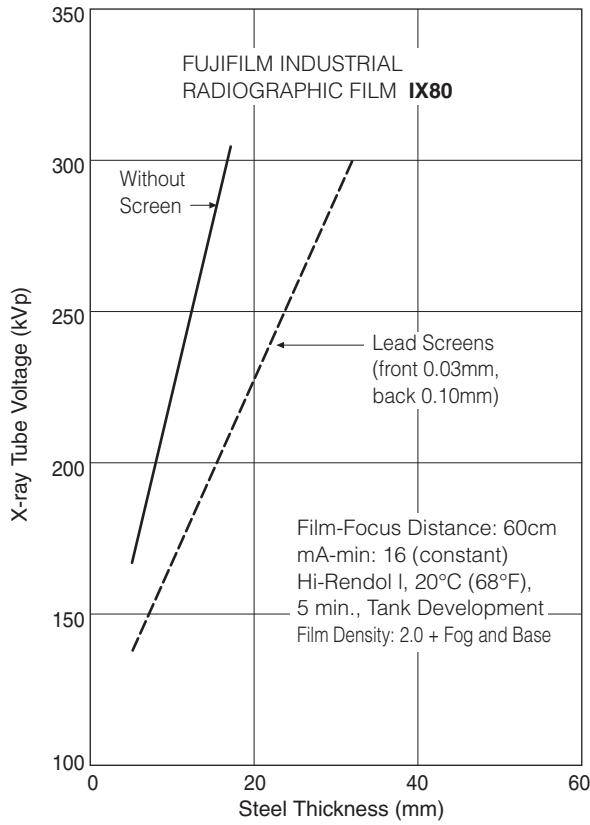
Safelight Tolerances of IX80 and IX100 Films



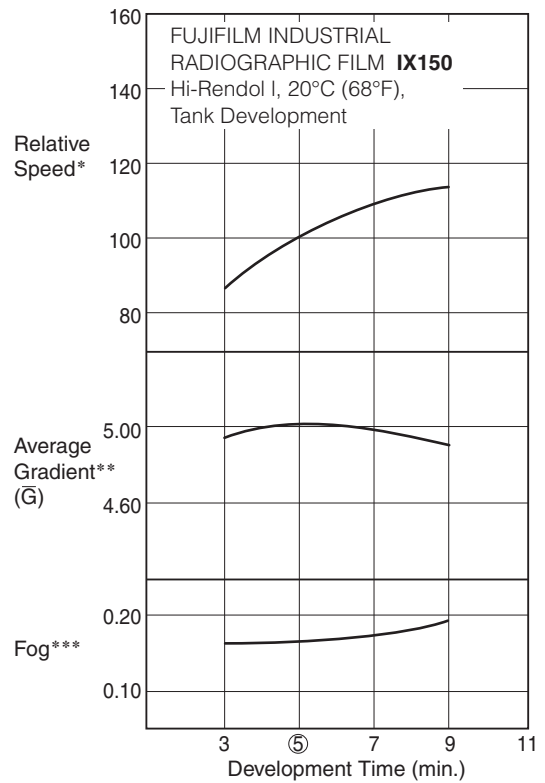
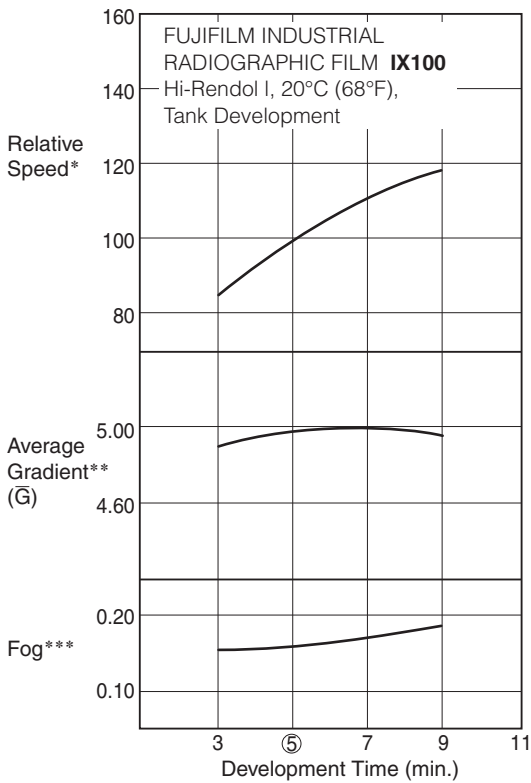
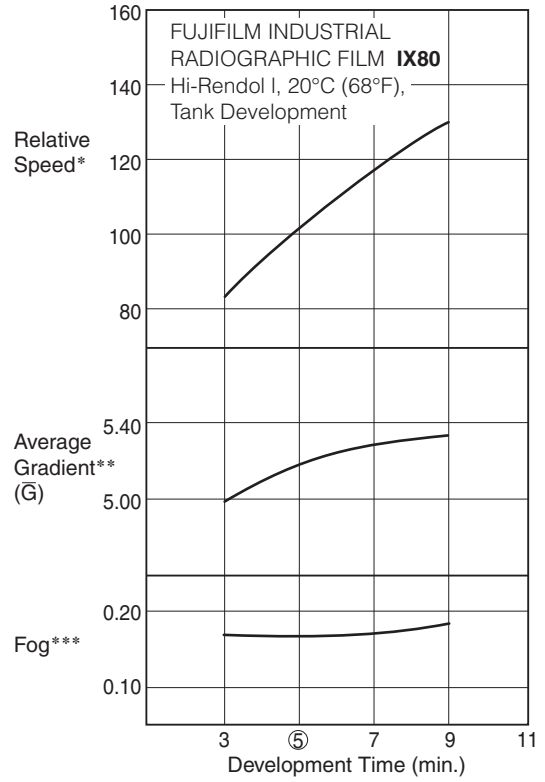
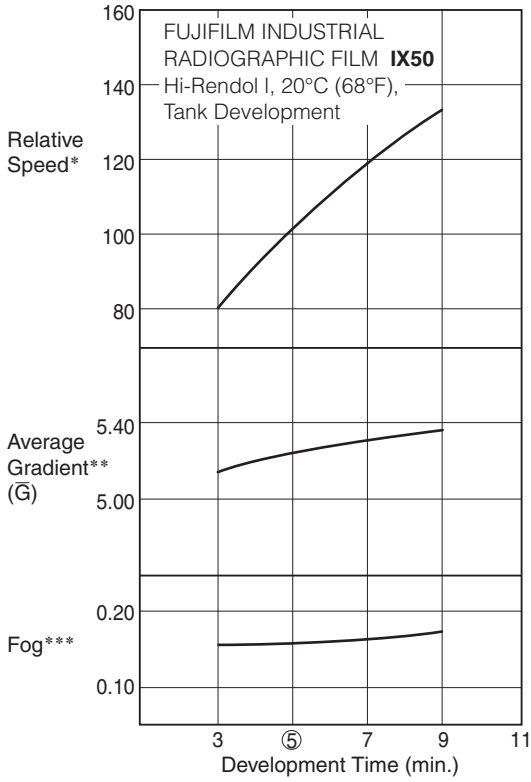
**EXPOSURE CHART**



**EXPOSURE CHART**



**DEVELOPMENT RATE**



\*Relative Speed: Relative value at a density of 2.0 above fog and base density on the value of 100 when developed for five minutes.

\*\*Average Gradient ( $\bar{G}$ ): Gradient of line between the density points of 1.5 and 3.5 above fog and base density on the characteristics curve.

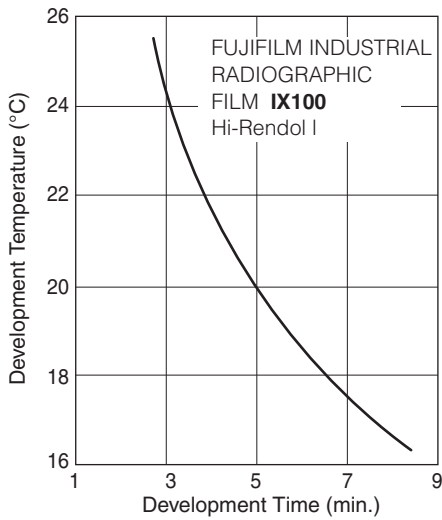
\*\*\*Fog: Fog and base density.

**MANUAL  
PROCESSING  
(Standard  
Conditions)**

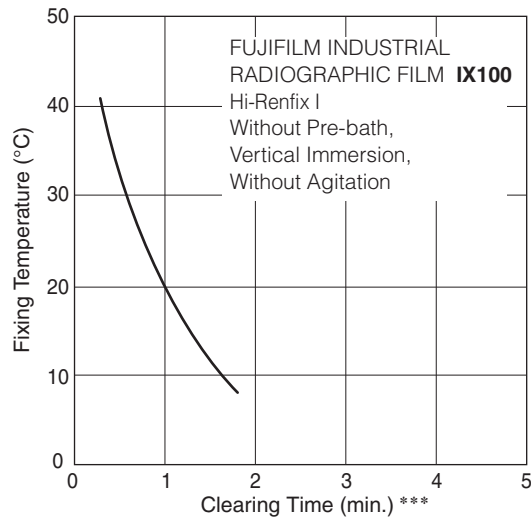
Process	Processing Solutions	Temperature	Time
Development	Hi-Rendol I (or Rendol)	20°C (68°F)	5 min.
Stop Bath	Fuji Stop Bath FS-2 (Acetic Acid 3% Solution)	18°C to 22°C (64°F to 72°F)	30 sec.
Fixing	Hi-Renfix I (or Renfix)	18°C to 22°C (64°F to 72°F)	5 to 10 min.
Washing*	Running Water 2 to 4 liters/min.	18°C to 22°C (64°F to 72°F)	50 min.
Drying	Fuji Driwel (Wetting Agent)	18°C to 22°C (64°F to 72°F)	30 sec.
	—	ca. 50°C (ca. 122°F)	—

\* To shorten washing time, use Fuji Quick Washing Agent QW. Washing times are 30 seconds for prewashing, 2 minutes for QW bath and 5 minutes for the running water wash.

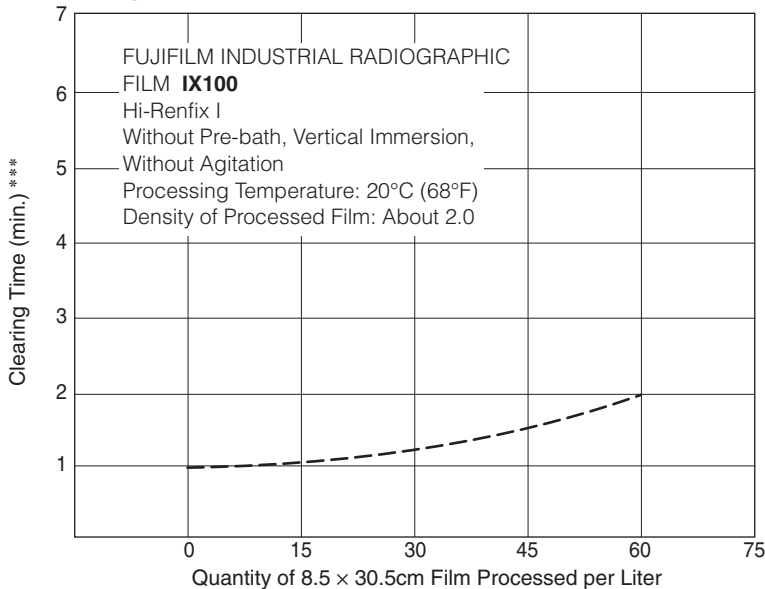
**Development Time-Temperature Curve\*\***



**Fixing Time-Temperature Curve**



**Fixing Rate**



\*\* Conditions required for the derivation of densities equal to those of standard processing.

\*\*\* Clearing Time: Time from immersion of film into fixing solution to disappearance of milk white color from the emulsion.

**AUTOMATED  
PROCESSING  
(Standard  
Conditions)**

## Fuji FIP7000

Processing Time (dry-to-dry)		5 minutes
Developer Temperature: Superdol I		30°C (86°F) for 60 sec. immersion (5 minutes) 23°C (73°F) for 110 sec. immersion (11 minutes)
Fixer Temperature: Super FI		31°C (88°F)
Replenishment Rate* for 4 8.5 × 30.5 cm Films	Developer	65 ml
	Fixer	200 ml
Wash Water Temperature		31°C (88°F)
Water Flow Rate		10 liters per minute
Drying Temperature		About 45°C (113°F)

\* Replenisher volume is determined based on the 2.0 film density.



**FUJIFILM**

---

**FUJIFILM Corporation**

7-3 Akasaka 9-chome, Minatoku, Tokyo 107-0052, Japan

Ref. No. 産 IX-12-2009.02 F1079