

# FUJIFILM INDUSTRIAL RADIOGRAPHY FILM DATA SHEET

## IX50XD / IX80XD / IX100XD

New industrial x-ray film developed by FUJIFILM's leading technology brings efficiency and stability to your every day inspection needs. XD film provides excellent image quality coupled with high product stability for NDT radiographic inspection in all industry segments.

### Types and Features

| Film    | Features and Major Applications   | Relative Exposure Factors* |       |       |      | Film System Classification** |            |           |
|---------|---|----------------------------|-------|-------|------|------------------------------|------------|-----------|
|         |   | 100kV                      | 200kV | Ir192 | Co60 | ISO 11699-1                  | ASTM E1815 | JIS K7627 |
| IX50XD  | <b>Ultra fine grain film with very high contrast and medium speed</b> <ul style="list-style-type: none"> <li>•Aerospace components</li> <li>•Weldings (low to medium atomic number metals)</li> <li>•Castings (low to medium atomic number metals)</li> <li>•Electronic components</li> </ul> | 2.3                        | 2.4   | 2.2   | 2.2  | C3                           | I          | T2        |
| IX80XD  | <b>Very fine grain film with very high contrast and medium speed</b> <ul style="list-style-type: none"> <li>•Weldings (low to medium atomic number metals)</li> <li>•Castings (low to medium atomic number metals)</li> <li>•Aerospace components</li> </ul>                                  | 1.6                        | 1.5   | 1.5   | 1.5  | C4                           | I          | T2        |
| IX100XD | <b>Fine grain film with high contrast and high speed</b> <ul style="list-style-type: none"> <li>•Weldings (medium to higher atomic number metals)</li> <li>•Castings (medium to higher atomic number metals)</li> <li>•Aerospace components</li> </ul>  | 1.0                        | 1.0   | 1.0   | 1.0  | C5                           | II         | T3        |

\* Define relative exposure of IX100XD as 1.0.

\*\* Classification based on development under Fujifilm's recommended processing conditions.

Manual processing: 20°C 5minutes

Automatic processing: 26°C 100seconds / 23°C 120seconds

# Film Selection Guide

Film selection depends on material, specimen thickness, X-ray equipment power and gamma-ray sources types which can be referred in standards such as ISO 17636-1, ASTM E94.

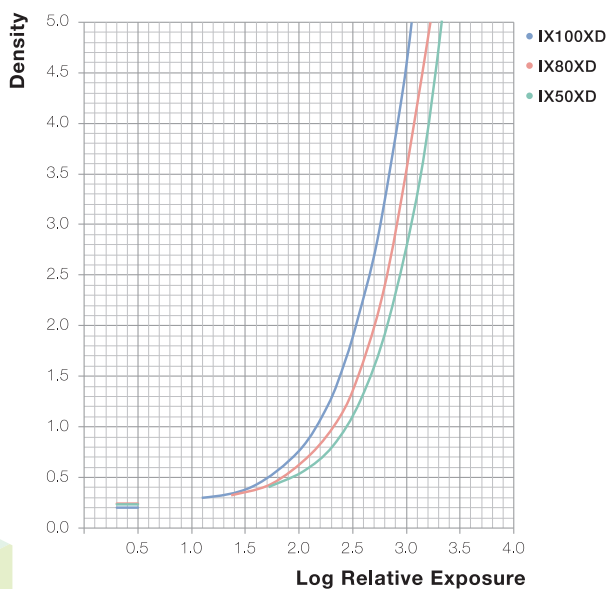
| Material and Thickness [mm] |          | X-ray Tube Voltage [kV] |         |         |         |         | Ir-192 | Co-60 |
|-----------------------------|----------|-------------------------|---------|---------|---------|---------|--------|-------|
|                             |          | below 50                | 50-80   | 80-120  | 120-150 | 150-300 |        |       |
| Aluminium and Titanium      | 0-6      | 50, 80                  | 50      | 50      |         |         |        |       |
|                             | 6-13     | 50, 80                  | 50, 80  | 50, 80  | 50      |         |        |       |
|                             | 13-25    | 80, 100                 | 50, 80  | 50, 80  | 50, 80  | 50      |        |       |
|                             | 25-50    | 100                     | 80, 100 | 50, 80  | 50, 80  | 50      | 50     |       |
|                             | 50-100   |                         | 100     | 80, 100 | 80, 100 | 80, 100 | 80     |       |
|                             | over 100 |                         |         |         | 100     | 80, 100 | 80     |       |

| Material and Thickness [mm] |          | X-ray Tube Voltage [kV] |       |        |         |             | Ir-192  | Co-60       |
|-----------------------------|----------|-------------------------|-------|--------|---------|-------------|---------|-------------|
|                             |          | below 50                | 50-80 | 80-120 | 120-150 | 150-300     |         |             |
| Iron and Steel              | 0-6      |                         |       | 100    | 80, 100 | 50, 80      | 50      | 50          |
|                             | 6-13     |                         |       |        | 80, 100 | 50, 80, 100 | 50, 80  | 50          |
|                             | 13-25    |                         |       |        |         | 80, 100     | 80, 100 | 50, 80      |
|                             | 25-50    |                         |       |        |         | 100         | 100     | 50, 80, 100 |
|                             | 50-100   |                         |       |        |         |             | 100     | 80, 100     |
|                             | over 100 |                         |       |        |         |             |         | 100         |

# Characteristic Curve

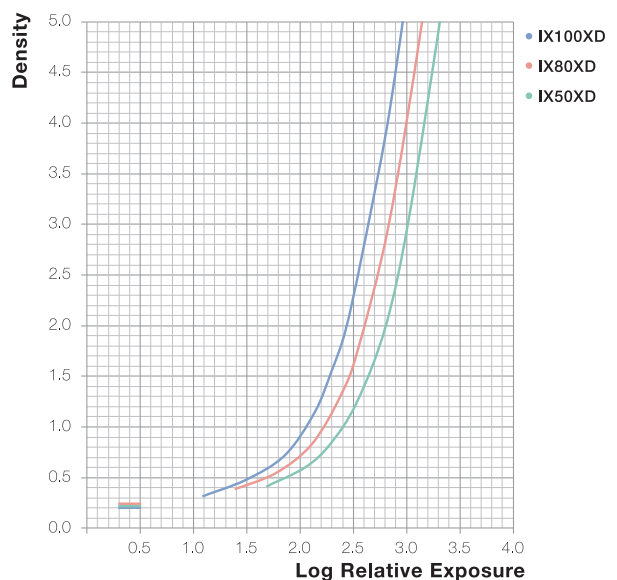
## Manual processing

- Exposure: X-ray 220kV
- Screen: Pb screen 0.03mm Front and back
- Processing: Manual 20°C 5minutes
- Developer: Hi-RENDOL I



## Automatic processing

- Exposure: X-ray 220kV
- Screen: Pb screen 0.03mm Front and back
- Processing: Automatic 23°C 120seconds
- Developer: SUPERDOL I

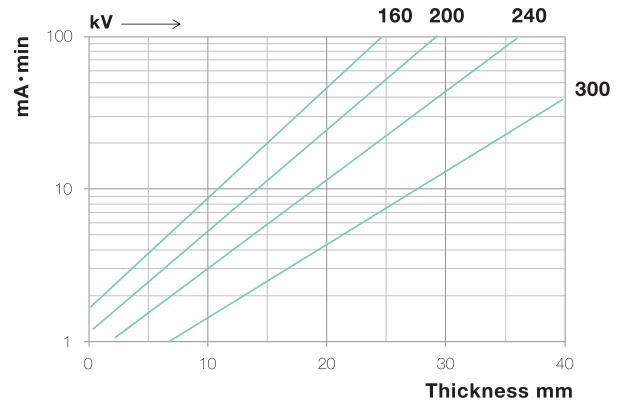


# Exposure diagram

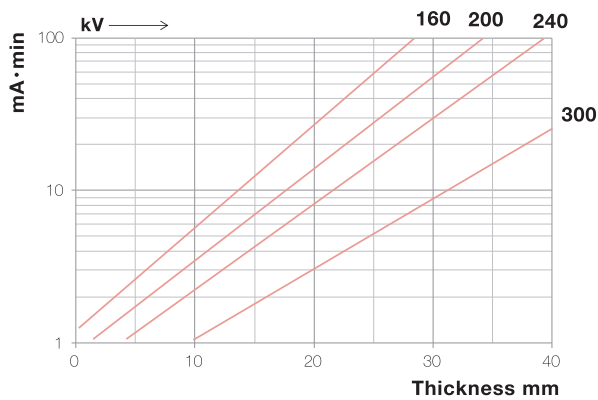
## X-ray

- Steel (Fe)
- Density: 2.0
- Screen: Pb 0.03mm Front and back
- SFD: 1000mm
- Processing: Automatic 23°C 120seconds
- Developer: SUPERDOL I

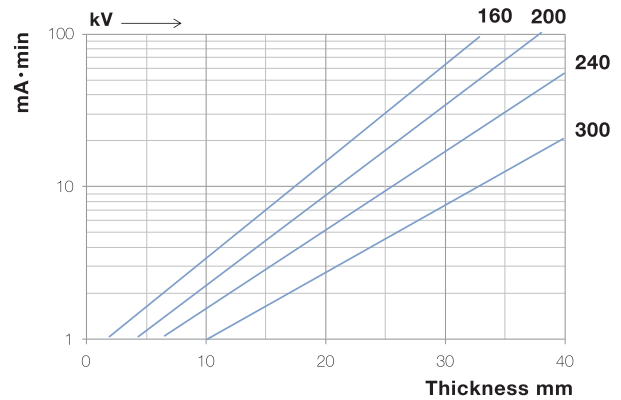
### IX50XD



### IX80XD

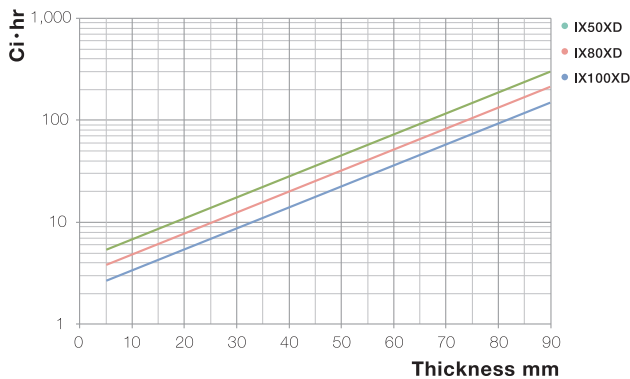


### IX100XD



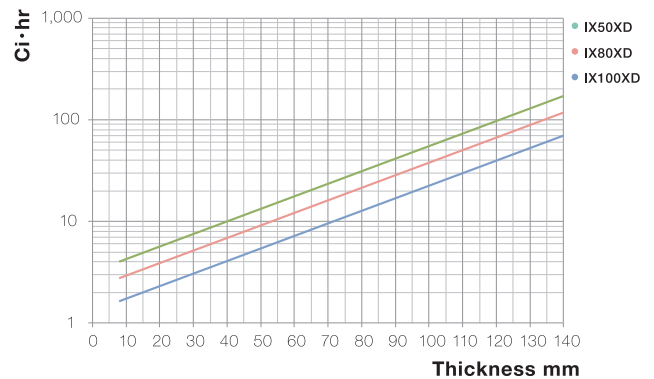
## Ir-192

- Steel (Fe)
- Density: 2.0
- Screen: Pb 0.03mm Front and back
- SFD: 1000mm
- Processing: Automatic 23°C 120seconds
- Developer: SUPERDOL I



## Co-60

- Steel (Fe)
- Density: 2.0
- Screen: Pb 0.03mm Front and back
- SFD: 1000mm
- Processing: Automatic 23°C 120seconds
- Developer: SUPERDOL I



# Processing conditions

## Automatic Processing

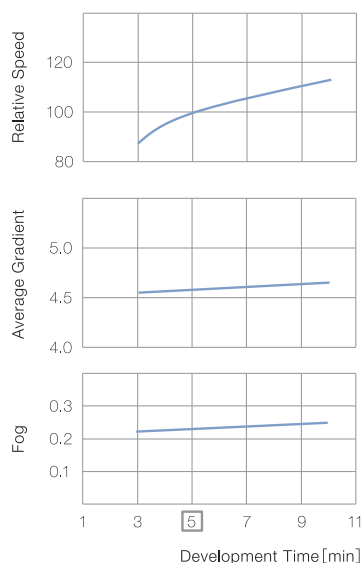
|   |                         |               |               |
|---|-------------------------|---------------|---------------|
| Developer                                     | SUPERDOL I              | Audel         |               |
| Development Temperature                       | 23 °C (73 °F)           | 26 °C (79 °F) | 28 °C (82 °F) |
| Development Immersion Time                    | 120 seconds             | 100 seconds   | 100 seconds   |
| Fixing Temperature                            | 31 °C (88 °F)           |               |               |
| Replenishment Rate for 8.5 × 30.5 cm, 4 films | Developer               | About 65 ml   |               |
|   | Fixer                   | About 200 ml  |               |
| Wash Water Temperature                        | Less than 31 °C (88 °F) |               |               |
| Drying Temperature                            | About 45 °C (113 °F)    |               |               |

## Manual Processing

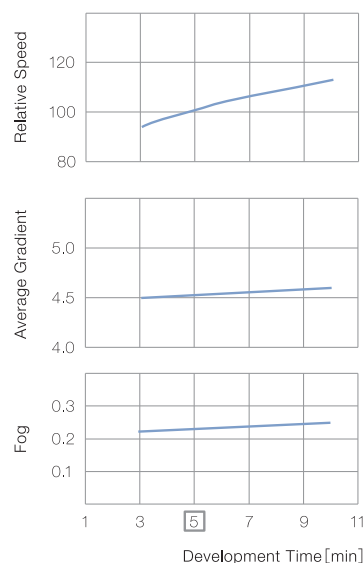
| Process    | Chemical                     | Temperature               | Time            |
|------------|------------------------------|---------------------------|-----------------|
| Developing | Hi-RENDOL I                  | 20°C (86°F)               | 5 minutes       |
| Stop bath  | (Acetic Acid 3% solution)    | 18 to 22 °C (64 to 72 °F) | 30 seconds      |
| Fixing     | Hi-RENFIX I                  | 18 to 22 °C (64 to 72 °F) | 5 to 10 minutes |
| Washing    | (Running water 2 to 4 L/min) | 18 to 22 °C (64 to 72 °F) | 50 minutes      |
| Drying     | DRIWEL (Wetting agent)       | 18 to 22 °C (64 to 72 °F) | 30 seconds      |
|            | -                            | About 50°C (about 122 °F) | -               |

## Processing Speed

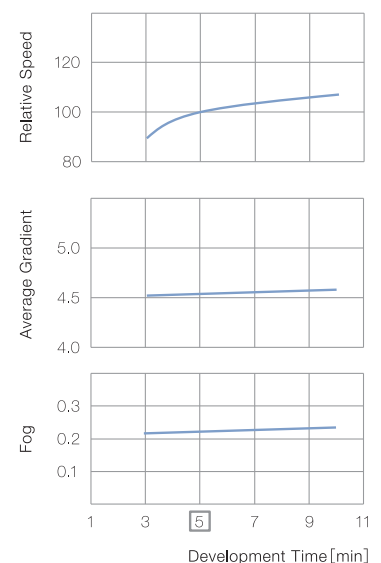
### IX50XD



### IX80XD



### IX100XD



#### Relative Speed:

Define the density of 2.0 above fog and base density as 100 (5 minutes development)

#### Average Gradient:

Gradient of line between the density points of 1.5 and 3.5 above fog and base density on the characteristic curve

#### Fog:

Fog and base density

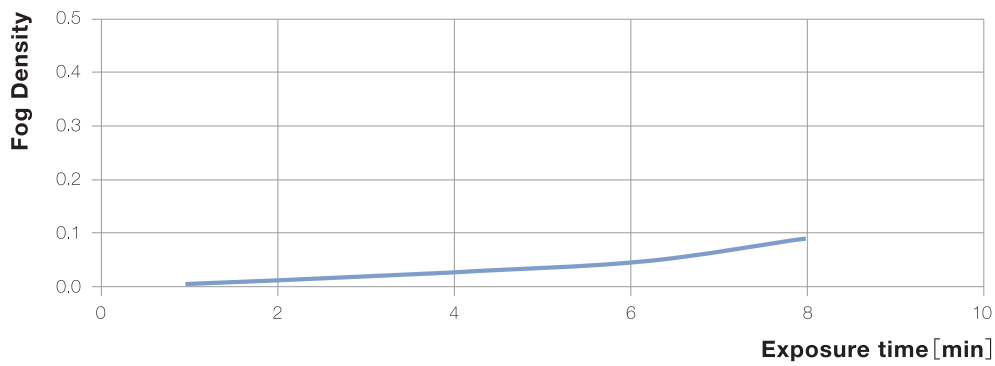
## Film Base

Blue tinted polyester base with thickness of 0.175 mm, with excellent durability suitable for both manual and automatic processing.

## Safelight

Films to be handled under lamp(15 or 20 watt bulb) with safelight filter, at a distance of at least 1 meter or further.

### Safelight Tolerances of Film



- Safelight filter: Fujifilm Safelight Filter SLG 8U
- Lamp: 100 volt, 20 watt
- Distance: 1 meter

Fog density is the increasing amount of density caused by safelight exposure.

**FUJIFILM**

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