

# INDUX R4, INDUX R5 and INDUX R7

## INDUSTRIAL X-RAY FILMS

### General information

**INDUX R4, R5 and R7** are the industrial radiographic films intended for non-destructive material testing using X- or gamma radiation.

**INDUX R4** is a medium-speed, high-contrast, extremely fine-grain film, corresponds with the class C3 classification according to EN ISO 11699-1 standard and according to ASTM E1815 standard with class I.

**INDUX R5** is a standard-speed, high-contrast, very fine-grain film, corresponds with the class C4 classification according to EN ISO 11699-1 standard and according to ASTM E1815 standard with class I.

**INDUX R7** is high-speed, high contrast, fine-grain film, corresponds with the class C5 classification according to EN ISO 11699-1 standard and according to ASTM E1815 standard with class II.

All films are suitable for radiography with or without lead screens and meet requirements for the most standard applications.

### Applications

**INDUX R4** should be used at low voltages for the radiography of thin-to-medium thick-walled light metal parts/ products. At higher voltages the film is suitable for the testing of thick-walled light metal or thin-walled steel parts/products. With high-energy gamma rays the film is suitable for the radiography of thick-walled dense metal parts/products.

**INDUX R5** is suitable for the radiography of medium-walled steel or thick-walled light metal parts/products.

**INDUX R7** should be used at low voltages for the radiography of medium-walled light metal or thin-walled steel parts/products. At higher voltages the film is suitable for the testing of thick-walled light metal or medium-walled steel parts/products. With high-energy gamma rays the film is suitable for the radiography of thicker-to-thickest dense metal parts/products.

### Packaging forms

**daylight packaging (FOMAPAK)** – one-sheet vacuum-sealed packaging with lead screens of 0,025 mm thickness

Sizes: 6x10, 6x12, 6x16, 6x20, 6x24, 6x30, 6x40, 6x48, 10x10, 10x12, 10x16, 10x20, 10x24, 10x30, 10x40, 10x48, 18x24, 30x40 cm in boxes and other sizes according to an agreement with manufacturer.

The vacuum-sealed packaging FOMAPAK ensures optimum contact of film surface with lead screens, simple handling, and is light-tight, airtight and waterproof.

### darkroom packaging (KB)

Sizes: 6x24, 6x40, 6x48, 10x12, 10x20, 10x24, 10x40, 10x48, 10x72, 18x24, 30x40 cm in boxes and other sizes according to an agreement with manufacturer.

### Rollfilm packaging

- rollfilm with lead screen
- bare rollfilm (BLR)

for more details see the technical data sheet of ROLLFILM

Other sizes are subject to an agreement with the manufacturer.

### Film base

INDUX R4, R5 and R7 are manufactured on a dimensionally stable bluish polyester base of 0,175 mm thickness.

### Screens

Screens-packed kinds (FOMAPAK) content lead screens 0,025 mm thick, backed by a paper of 70 - 90 g/sqm of basic weight, on both film sides.

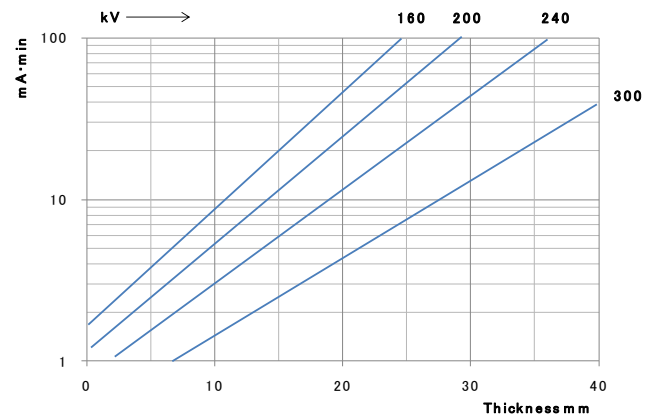
### Darkroom illumination

The film is processed at yellow-orange safety illumination with wavelength of 590 nm. Length of exposure and a distance of the processed material from the illumination source should be tested.

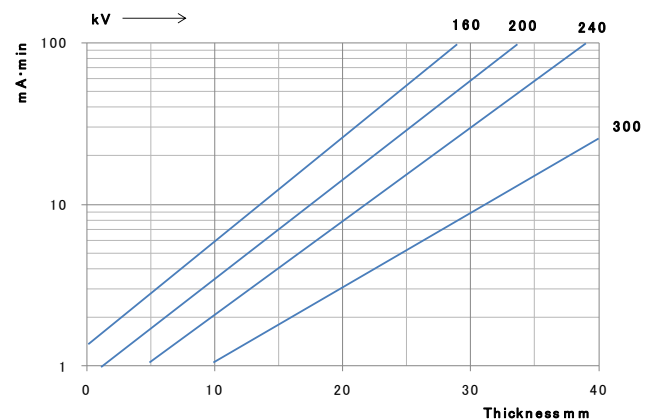
### Exposure charts for steel

For optical density  $D=2$ , front and back lead screens 0,025 mm thick, automatic processing, FOMADUX LP-D Developer, 8 minute processing cycle at 28 °C (corresponds with 2 minutes of developing time).

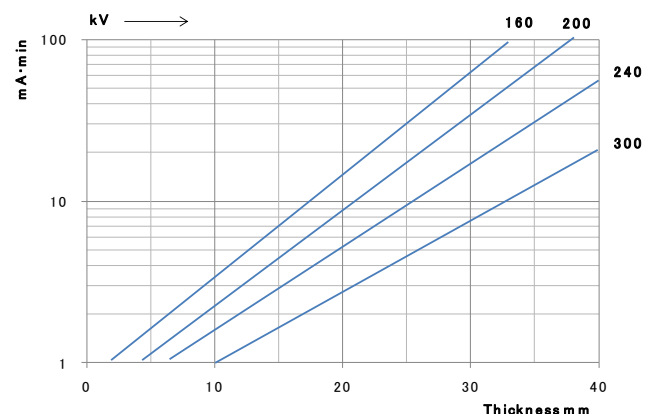
### X-rays (SFD = 100 cm) INDUX R4



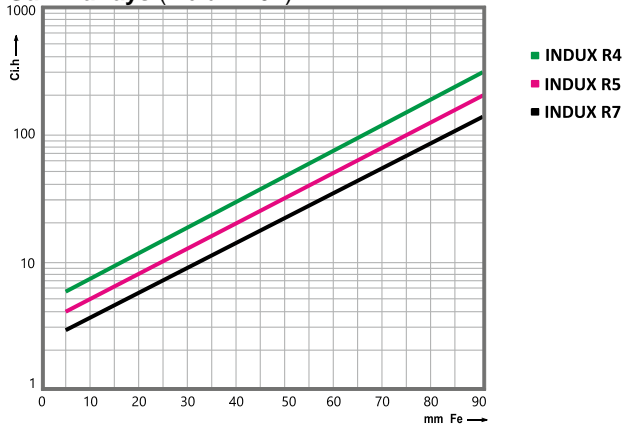
### X-rays (SFD = 100 cm) INDUX R5



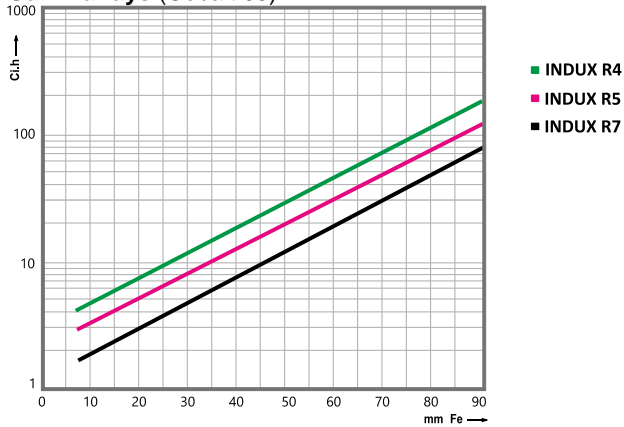
### X-rays (SFD = 100 cm) INDUX R7



### Gamma rays (Iridium 192)



### Gamma rays (Cobalt 60)



#### Processing

INDUX R4, R5 and R7 are intended both for the manual and automatic processing.

#### Recommended chemicals for the manual processing:

FOMADUX LP-T Developer  
(5 minutes of developing time at 20 °C, dilution 1 + 3)  
FOMAFIX Rapid Fixer  
FOTONAL Wetting Agent

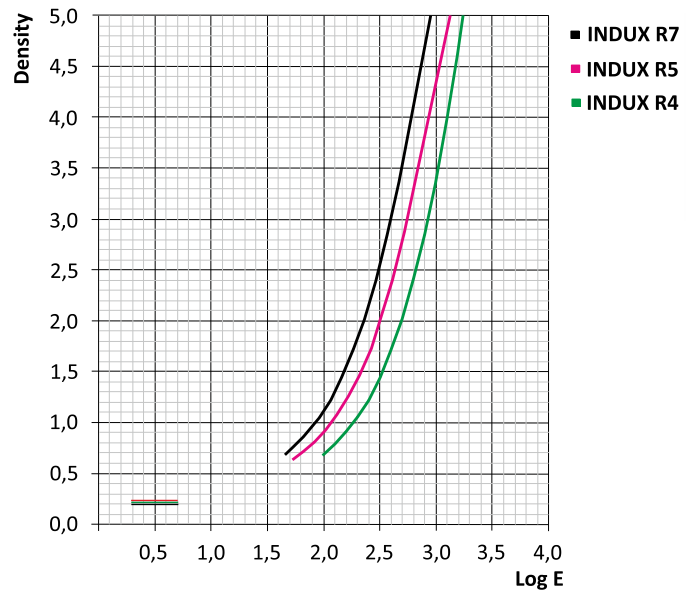
#### Recommended chemicals for the automatic processing:

FOMADUX LP-D Developer-Replenisher  
(2 minutes of developing time at 28 °C)  
FOMA LP-DS Developer Starter  
FOMADUX MIX - Hardening Fixer – part A (fixer) + part B (hardener)

FOMA industrial X-ray films INDUX R4, R5 and R7 can also be processed in FOMA ECO chemie (FOMADUX LP-ECO, FOMADUX FIX – ECO) intended for both automatic and manual processing or in corresponding processing chemicals of other manufacturers.

### Sensitometric characteristics

220 kV / 10 mA / 8 mm Cu, automatic developing, FOMADUX LP-D Developer, 8 minute processing cycle at 28 °C (corresponds with 2 minutes of developing time).



#### Archiving of processed films

The manufacturer guarantees the archival permanence of minimum 50 years when complying with conditions following:

- films must be perfectly fixed and washed
- films must be stored at a relative humidity of 30 to 60% out of reach of harmful gases.

#### Storage of unexposed films

Unexposed films should be stored in the vertical position in the original packaging in a cool, dry place (temperature ranging from 10 to 25 °C, relative humidity from 40 to 60 %), out of reach of harmful vapours, gases and ionizing radiations.

After opening the film bag, you must re-close it with two folds to secure it against opening. This prevents air moisture from entering the film bag.

Exposed films should be processed as soon as possible.

*By using and processing of the product Indux R4, R5 and R7 arise wastes, which is necessary to environmentally liquidate according to valid legislation.*

#### Wastes:

- packaging foil : PET / AL / PE or PAPER / PE / PAPER
- Pb foil
- waste developers
- waste fixers

Information according to Article 33 of REACH: The product INDUX contains lead. This substance is included in the list of substances (for possible inclusion in Annex XIV). After handling, hygiene rules must be followed. More information at [www.foma.cz](http://www.foma.cz)

The product has been produced and marketed in conformity with a quality system according to the international standard ISO 9001.