INDUSTREX Process Control Strips

INDUSTREX Process Control Strips provide a certified quality control tool to enable users to control film processing systems, in accordance with ASTM E 999 and EN ISO 11699–2 standards.

INDUSTREX Process Control Strips are pre-exposed with a 10-step wedge to X-ray radiation. They are 6 x 24 cm, and they come in READY-PACK II packages, 25 per box. Each box is accompanied by a certificate. The batch number is part of the actual image on the film strip, allowing for positive identification and traceability to the certificate. A control chart is included in each box of Process Control Strips. (Figure 1, on page 2, shows the strip after processing.)

Use the control chart on page 3 to monitor the quality of your processing system by plotting your own measured density of step 0 (D_0) and the deviations of your calculated speed and contrast indexes (S_X and C_X) from the reference speed and contrast indexes (S_r and C_r) provided on the certificate.

Be sure to start a fresh chart each time you open a new box of strips, as the reference indexes may vary slightly.

Draw your own tolerance lines as a visual reference so you can act as needed whenever your process strays outside these limits.

Storage Conditions

Unopened READY-PACK II pouches should be stored at a temperature of 10 to 24 ˚C (50 to 75 ˚F) and a relative humidity range of 30 to 50 %, properly shielded from X-rays, gamma rays, or penetrating radiation.

Certificate

The certificate that is provided with each box of product contains the following information:

- Film
- Type of processing (automatic or manual)
- Chemicals
- Expiration date
- Processing cycle and temperature
- Brand name and type of pre-exposed strips
- Reference values for speed index (S_r) and contrast index (C_r) and the step numbers for calculating the corresponding indexes

Parameters for Processing System Evaluation

After processing the strip, the following densities must be measured:

- D_0 = Density of step 0 (see Figure 1)
- D_X = Density of reference speed step X
- D_X+4 = Density of reference contrast step (X+4)

With these values, the speed index S_x will be calculated as follows:

$S_x = D_X - D_0$

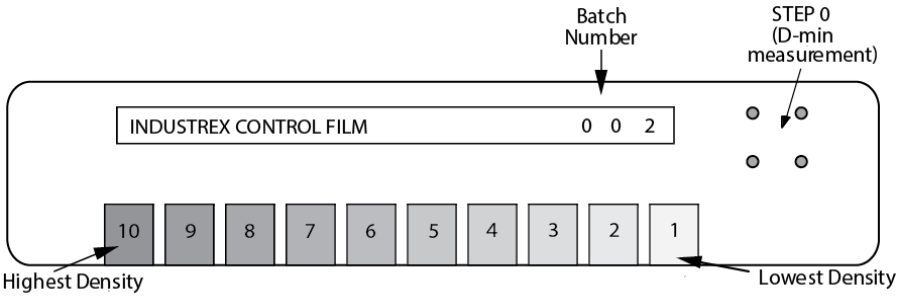
Contrast index: $C_X = (D_X+4 - D_X) * S_r/S_X$

S_r is the reference speed index mentioned in the certificate. A trend chart can be established to follow the evolution of the processing system by plotting S_X versus S_r and C_X versus C_r.

For more information, EN ISO 11699-2 gives details of the procedure for user control of the film processing systems by processing pre-exposed strips. A processing system is in compliance if the test results meet these conditions:

- The value of D_0 shall be less than 0,3
- The speed index shall not vary from the specified reference speed index S_r by more than ± 10 %
- The contrast index shall not vary from the specified reference contrast index C_r by more than – 10 % or +15 %

Figure 1: INDUSTREX Process Control Strip



Using INDUSTREX Process Control Strips

Verification of Compliance with a Classified Film System

INDUSTREX Process Control Strips shall be used for verifying compliance when processing INDUSTREX films in INDUSTREX chemicals.

Users may apply "mixed film systems" in which the film manufacturer is different from the manufacturer of the processing chemicals and specified development conditions. The user shall process certified INDUSTREX Process Control Strips according to EN ISO 11699-2, if demonstration of conformity to the INDUSTREX film classification is desired when processing INDUSTREX films using processing chemicals and development conditions from another manufacturer.

The measured index values in the "mixed film system" shall fulfill all the above processing system compliance conditions when using the values of the certified INDUSTREX Process Control Strips reference indexes.

Image Stability

Less than optimum fixer or washing conditions may cause image deterioration due to a high residual thiosulfate component in the processed radiographs.

To evaluate washing, perform the following test:

CARESTREAM X-OMAT Hypo Estimator Test Kit (CAT No. 196 5847) provides a relatively simple method for estimating the amount of thiosulfate retained in a processed radiograph. Place one drop of the Hypo Test Solution in a blank area of the recently processed film, for example step 0. Allow the solution to stand for two minutes, then blot off the excess solution. Since INDUSTREX Process Control Strips are produced on a double-sided film, repeat this process on the other side of the processed strip, directly opposite the first spot (the estimate is derived from the sum of the two spots). Immediately compare the stain with the density patches on the Hypo Estimator. Follow the instruction sheet provided inside the kit.

Storage conditions can have a pronounced influence on radiograph permanence. The film storage environment should be limited to the range of 16 to 27 ˚C (60 to 80 ˚F) and 30 to 50 % RH.

For more information, if needed:

- ASTM E1254 gives details of storage conditions.
- For processed films, ISO 18911 and ISO 18902 provide recommended storage conditions and specifications for their enclosure materials.

Method to Assess Consistency of Processing

EN ISO 11699-2 Annex A (normative) provides an additional procedure to enable users to assess consistency of processing. The objective is to achieve a routine quality control, not to establish absolute conformance with a classified film system. The frequency shall be adapted to the requirements of the inspection application. INDUSTREX Process Control Strips can be used in this additional procedure.

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INDUSTREX PROCESS CONTROL STRIPS

Control Strips box
BATCH N°

Processor
Type

	Name	Temperature	Replenishment
Developer			
Fixer			

Reference values	Date
	Date of test
	Fresh Dev./repl
	Fresh Fix./repl
Do Base + Fog	0,30 0,25 0,20 0,15
S Speed index step X	+0,30 +0,20 +0,10 - 0,10 - 0,20 -0,30
C Contrast Index step x+4	+ 0,30 + 0,20 + 0,10 - 0,10 -0,20 -0,30

CarestreamNDT

INDUSTREX PROCESS CONTROL STRIPS
BATCH N°511
Expiration date : 2022-09

CERTIFICATE
(in accordance with EN ISO 11699-2 standard)

Automatic Processing

Immersion time : 100 sec +/ - 5 sec
Developer : **INDUSTREX SINGLE PART**
Developer temperature 26 °C

Film type	Reference speed index Sr	Step X	Reference contrast index Cr	Step X + 4
INDUSTREX MX125	**2.01**	4	**1.11**	8

Automatic Processing

Immersion time : 100 sec +/ - 5 sec
Developer : **INDUSTREX DX**
Developer temperature 26 °C

Film type	Reference speed index Sr	Step X	Reference contrast index Cr	Step X + 4
INDUSTREX MX125	**1.88**	4	**1.07**	8

Manual Processing

Immersion time : 300 sec +/ - 5 sec
Developer : **INDUSTREX SINGLE PART**
Developer temperature 20 °C

Film type	Reference speed index Sr	Step X	Reference contrast index Cr	Step X + 4
INDUSTREX MX125	**2.01**	4	**1.11**	8

NOTICE: 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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Publication History:

Rev 1: Dec 2020 - Initial release in TI DB. This content was previously released as TI-2518, *Using INDUSTREX Process Control Strips*.
Rev A (PLI): Rev 1 is released into PLI. Going forward, releases will follow PLI (letter) revisioning.
Rev B: Updated the control strip certificate to include the INDUSTREX DX Developer and a renewed expiration date.