

SVENSK STANDARD

SS-EN ISO 11699-2:2018



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Non-destructive testing – Industrial radiographic films – Part 2: Control of film processing by means of reference values (ISO 11699-2:2018)



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Denna standard ersätter SS-EN ISO 11699-2:2011, utgåva 1

The European Standard EN ISO 11699-2:2018 has the status of a Swedish Standard. This document contains the official version of EN ISO 11699-2:2018.

This standard supersedes the SS-EN ISO 11699-2:2011, edition 1

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EUROPEAN STANDARD

EN ISO 11699-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2018

ICS 37.040.25

Supersedes EN ISO 11699-2:2011

English Version

Non-destructive testing - Industrial radiographic films - Part 2: Control of film processing by means of reference values (ISO 11699-2:2018)

Essais non destructifs - Films utilisés en
radiographie industrielle - Partie 2: Contrôle
du traitement des films au moyen de valeurs
de référence (ISO 11699-2:2018)

Zerstörungsfreie Prüfung - Industrielle
Filme für die Durchstrahlungsprüfung - Teil
2: Kontrolle der Filmverarbeitung mit Hilfe
von Referenzwerten (ISO 11699-2:2018)

This European Standard was approved by CEN on 3 August 2018.

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COMITÉ EUROPÉEN DE NORMALISATION
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Contents

Page

European foreword	vii
Introduction	viii
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Manufacturing of pre-exposed film strips for control of the processing system	2
4.1 Size	2
4.2 Selection of film strip type.....	2
4.3 Examples of production of pre-exposed film strips.....	2
4.4 Measurement fields and determination of reference values	3
4.5 Pre-exposed film strip certificate	4
4.6 Storage of pre-exposed film strips	5
5 User verification of compliance with a classified film system	5
5.1 Film systems of same manufacturer of films and processing chemistry.....	5
5.2 Film systems of different manufacturer's films and processing chemistry (mixed systems)	5
5.3 Processing conditions.....	5
5.3.1 Automatic processing.....	5
5.3.2 Manual processing.....	6
5.4 Processing of pre-exposed film strips.....	6
5.5 Evaluation of the pre-exposed film strips	6
5.5.1 Calibration of densitometer.....	6
5.5.2 Parameters for processing system evaluation.....	6
5.5.3 Control of fixing and washing.....	6
6 Interpretation of results	7
6.1 General	7
6.2 Limits for D_0	7
6.3 Speed index (S_x)	7
6.4 Contrast index (C_x).....	7
7 Checking intervals	7
8 Test report	7
9 Compliance with film system classification	8
Annex A (normative) Method for processing control	9

European foreword

This document (EN ISO 11699-2:2018) has been prepared by Technical Committee ISO/TC 135 "Non-destructive testing" in collaboration with Technical Committee CEN/TC 138 "Non-destructive testing" the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2019, and conflicting national standards shall be withdrawn at the latest by March 2019.

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Endorsement notice

The text of ISO 11699-2:2018 has been approved by CEN as EN ISO 11699-2:2018 without any modification.

Introduction

This document specifies a procedure for the control of the film processing systems by users by processing pre-exposed strips.

These strips are pre-exposed by X-rays and are accompanied by a certificate from the film strip manufacturer.

The user processes the pre-exposed strips in his film processing system and records the results. In this document, [Clause 4](#) shows the responsibility of the film strip manufacturer. The user is responsible for [Clauses 5 to 8](#), which show compliance with the chosen film system classification.

Non-destructive testing — Industrial radiographic films —

Part 2: Control of film processing by means of reference values

1 Scope

This document specifies a procedure for the control of film processing systems.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 11699-1, *Non-destructive testing — Industrial radiographic films — Part 1: Classification of film systems for industrial radiography*

ISO 18901, *Imaging materials — Processed silver-gelatin-type black-and-white films — Specifications for stability*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

3.1

film system

combination of film and film processing which is carried out in accordance with the instructions of film manufacturer and/or the manufacturer of the processing chemicals

[SOURCE: ISO 11699-1:2008, 3.1]

3.2

film system class

film system (3.1) classification according to the limiting values given in ISO 11699-1:2008, Table 1

3.3

film strip

piece of film material on which different steps of constant optical density are exposed

3.4

pre-exposed film strip

film strip (3.3) that is pre-exposed by X-rays so as to present at least ten different optical density steps after processing

3.5

net density

diffuse optical density without base and fog density

4 Manufacturing of pre-exposed film strips for control of the processing system

4.1 Size

The film strips shall have a minimum exposed area of 15 mm × 100 mm. The pre-exposed film strips contain areas of constant optical densities in increasing optical density steps. These steps are used for optical density measurements and a blank area for base plus fog density and life expectancy test.

4.2 Selection of film strip type

The selected type of film used for the film strips shall have a response to processing which is representative for the set of films which are classified according to ISO 11699-1. Films of film system class C3 or C4 are recommended for exposure of film test strips.

4.3 Examples of production of pre-exposed film strips

The exposure arrangement is shown in [Figure 1](#). The film strip design is described in [Figure 2](#) and [Table 1](#). A different design and material may be used if it provides the same optical density steps.

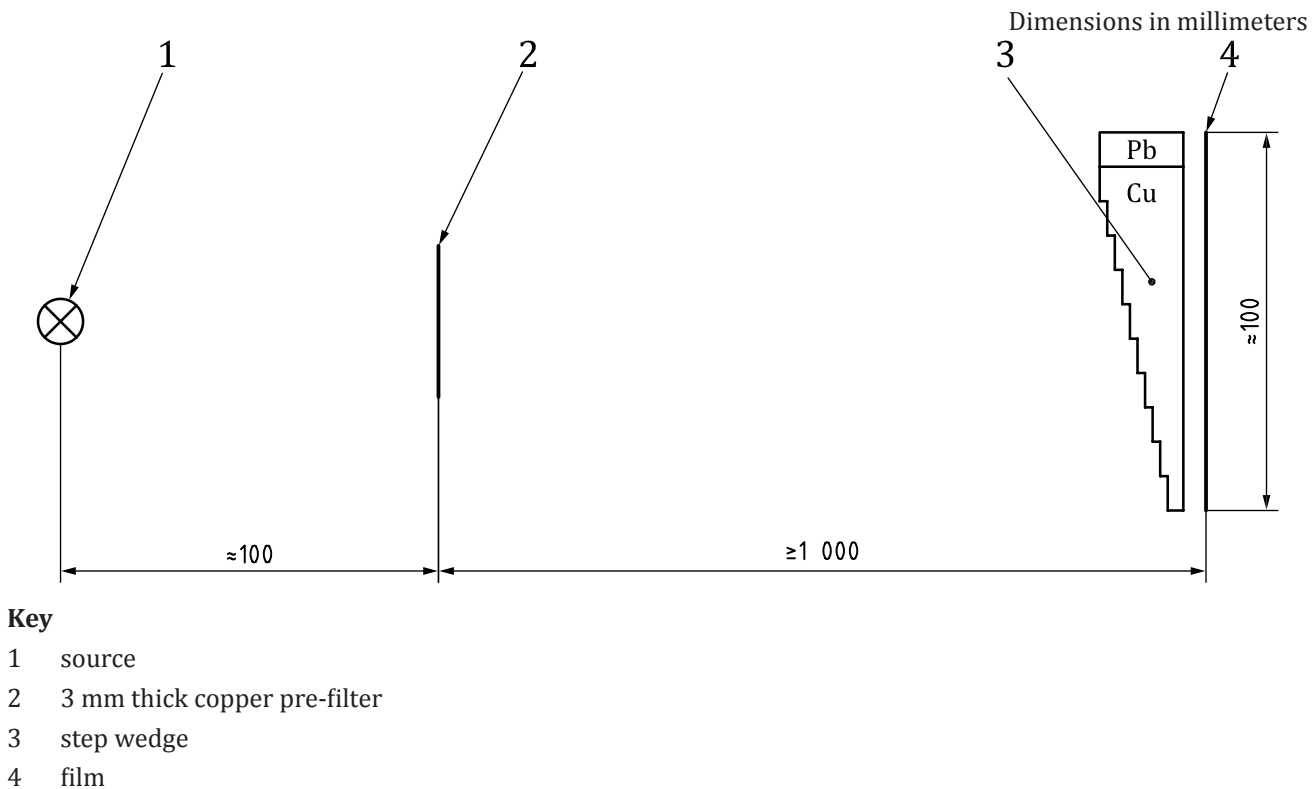
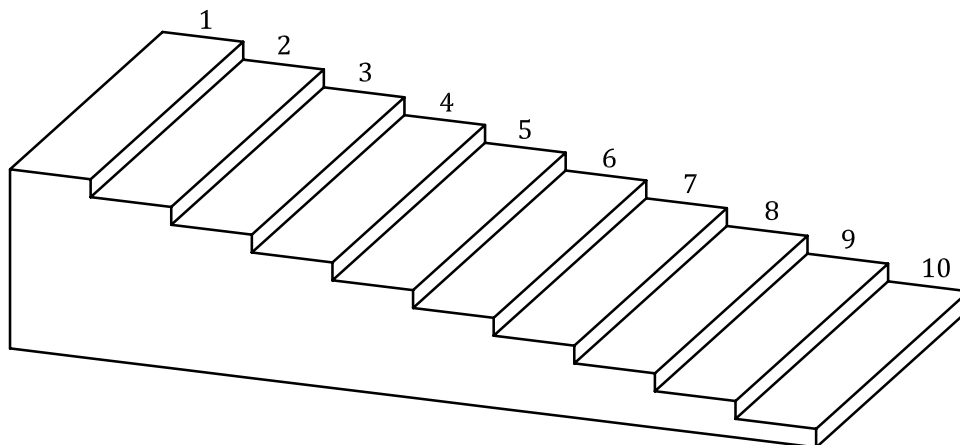


Figure 1 — Example of an exposure arrangement

The successive optical density steps on the film strip shall be exposed in order to obtain density increments of about 0,3 after processing, for example by a step wedge as described in [Table 1](#) and [Figure 2](#).

Appropriate precautions against scattered radiation shall be taken. The radiation source shall be a constant potential X-ray tube operated at approximately 150 kV. The exposure time shall be chosen to obtain a net density of approximately 2 at one of the first six steps (going from low to high densities) of the film strip after processing the pre-exposed film strip at the processing conditions used for film system classification according to ISO 11699-1.



Key

1 to 10 See [Table 1](#).

Figure 2 — Design of step wedge

Table 1 — Height of steps; material: fine-grained copper

Step No.	Height for 150 kV mm
1	11,7
2	10,8
3	10,0
4	9,3
5	8,7
6	8,2
7	7,7
8	7,3
9	6,9
10	6,5

4.4 Measurement fields and determination of reference values

The steps for determination of reference values shall be as follows (see [Figure 3](#)):

Step *X*: the step with a net density close to $D = 2$.

Step $X + 4$: the step with a higher density which is four steps from *X*.

To obtain the reference values, at least five pre-exposed film strips shall be processed in a classified film system. The resulting densities shall have a maximum variance of $\Delta D = \pm 0,1$.

The reference values are obtained as follows:

— Reference speed index, S_r :

The average value of the net densities of step *X* is calculated. The speed index reference, S_r , is equal to this average value, rounded to two decimals.