

Photography — Medical radiographic cassettes/screens/films and hard-copy imaging films — Dimensions and specifications

The European Standard EN ISO 4090:2004 has the status of a British Standard

ICS 37.040.25

National foreword

This British Standard is the official English language version of EN ISO 4090:2004. It is identical with ISO 4090:2001. It supersedes BS ISO 4090:1991 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee CPW/42, Photography, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN ISO title page, the EN ISO foreword page, the ISO title page, pages ii to vi, pages 1 to 30, an inside back cover and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

This British Standard, having been prepared under the direction of the Consumer Products and Services Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 7 September 2001

© BSI 17 May 2004

ISBN 0 580 37402 5

Amendments issued since publication

Amd. No.	Date	Comments
15149	17 May 2004	Implementation of the European Standard

English version

Photography - Medical radiographic cassettes/screens/films and
hard-copy imaging films - Dimensions and specifications (ISO
4090:2001)

Photographie - Cassettes/écrans/films radiographiques
médicaux et films d'imagerie copie-papier - Dimensions et
spécifications (ISO 4090:2001)

Fotografie - Systeme von
Kassetten/Verstärkungsfolien/Filmen und
Aufzeichnungsfilmen für die medizinische Radiologie -
Maße und Festlegungen (ISO 4090:2001)

This European Standard was approved by CEN on 26 February 2004.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Foreword

The text of ISO 4090:2001 has been prepared by Technical Committee ISO/TC 42 "Photography" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 4090:2004 by CMC.

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 October 2004, and conflicting national standards shall be withdrawn at the latest by October 2004.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

The text of ISO 4090:2001 has been approved by CEN as EN ISO 4090:2004 without any modifications.

INTERNATIONAL STANDARD

**ISO
4090**

Third edition
2001-08-15

Photography — Medical radiographic cassettes/screens/films and hard-copy imaging films — Dimensions and specifications

*Photographie — Cassettes/écrans/films radiographiques médicaux et films
d'imagerie copie-papier — Dimensions et spécifications*



Reference number
ISO 4090:2001(E)

AVA Documents
Document Sharing Hub

Contents

Page

Foreword.....	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Conditions for measurement of dimensions	2
5 Radiographic cassettes	2
6 Mammography cassettes.....	8
7 Screens	13
8 Films.....	14
9 Package marking	16
Annex A (informative) Traditional sizes of medical films in rolls.....	18
Annex B (normative) Squareness.....	20
Annex C (informative) Test for light-tightness	21
Annex D (informative) Test for screen-film contact (Radiographic cassettes).....	22
Annex E (normative) Test for screen-film contact (Mammography cassettes)	24
Annex F (informative) Metric conversion of inch nominal sizes	27
Annex G (informative) Dimensional stability of film	28
Annex H (informative) Quantity packaging.....	29
Annex I (informative) Sizes of inch origin — Film dimension exceptions.....	30
Figures	
Figure 1 — Cassette outside dimensions	6
Figure 2 — Mammography cassette dimensions for field radiation detector	12
Figure 3 — Corner rounding limits of film.....	14
Tables	
Table 1 — Preferred radiographic cassette sizes of metric origin	3
Table 2 — Preferred radiographic cassette sizes of inch origin.....	4
Table 3 — Recognized radiographic cassette sizes of metric origin	4
Table 4 — Recognized radiographic cassette sizes of inch origin	5
Table 5 — Preferred mammography cassette sizes.....	9
Table 6 — Recognized mammography cassette sizes	9
Table 7 — Cutting and tolerance rules for screen sizes of metric origin and new sizes	13
Table 8 — Preferred hard-copy film sizes of metric origin.....	15

Table 9 — Preferred hard-copy film sizes of inch origin 15

Table 10 — Recognized hard-copy film size of metric origin.....15

Table 11 — Recognized hard-copy film sizes of inch origin 15

Table 12 — Cutting and tolerance rules for film sizes of metric origin and new sizes 16

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 4090 was prepared by Technical Committee ISO/TC 42, *Photography*.

This third edition cancels and replaces the second edition (ISO 4090:1991) which has been technically revised.

Annexes B and E form a normative part of this International Standard. Annexes A, C, D and F to I are for information only.

Introduction

This International Standard is based on a combination and revision of the following five documents:

- ANSI/NAPM ITI. 49-1995, *Photography (Films) — Medical radiographic cassettes/screens/films — Dimensions and specifications*
- IEC 60406:1997, *Cassettes for medical X-ray diagnosis — Radiographic cassettes and mammographic cassettes*
- IEC 60658:1979, *Radiographic intensifying screens for medical use — Dimensions*
- ISO WD1/4090, *Photography — Film Dimensions — Medical radiography*
- ISO WD2/15264, *Photography — Medical hard copy imaging film — Dimensions and specifications*

The aim of this International Standard is to bring together all standardized information about dimensions and related specifications of photographic materials in the form of sheets and related products (screens and cassettes); all of which are intended for use in medical radiography. The worldwide community using radiographic equipment will benefit by having all this information in a single text.

This text of this International Standard is not intended to change the contents of the aforementioned documents, but only to bring them together and to resolve the discordance existing between the different standards or standard projects. The existence of a single International Standard for sheet films and related products will resolve existing differences by converting inch sizes to metric sizes.

Inch nominal sizes and inch dimensions are not found in this International Standard. Informative annex F describes the transition from inch to metric dimensions for the reader. Conversion to metric specifications has resulted in a potentially confusing situation. Use of the same nominal dimension (20×40 and 20×25 , for example) might imply to the reader that the aims and tolerances should be identical. In some cases, where one size is of inch origin and the other is of metric origin, this is not true. Therefore, TC 42 agreed that it would be best to separate tables into sizes of metric origin versus sizes of inch origin.

By combining the existing documents and the dimensional tables, the reader can now easily compare sizes of films, screens and cassettes — all in a glance. Combination has also facilitated a significant comparison of preferred and recognized sizes, as well as a reconciliation of whether films and screens properly fit inside their corresponding cassettes. This comparison has resulted in a significant improvement in the agreement between sizes, as well as component “fit”.

This International Standard refers to mammography cassettes as either preferred sizes or recognized sizes. All new mammography cassettes must conform to the dimensions given as “preferred”. The dimensions given for recognized sizes are listed in order to inform the reader regarding an older style of mammography cassettes. Although the older style cassettes are no longer preferred (no longer the industry standard), use of this style throughout the world is expected to continue for some time. So, they are listed here as “recognized” only.

Medical radiographic films in roll form are not a part of this International Standard. Use of roll films appears well established and stable, but does not justify a new, stand-alone standard. In order to assist the reader, information regarding roll films is listed in informative annex A.

Annexes G, H and I provide information on the dimensional stability of film, quantity packaging and sizes of inch origin (film dimension exceptions), respectively.

Photography — Medical radiographic cassettes/screens/films and hard-copy imaging films — Dimensions and specifications

1 Scope

This International Standard specifies the nominal sizes, aim dimensions with tolerances, weights, and certain tests for medical radiographic cassettes, screens, and films. It includes medical hard-copy imaging films in the form of sheets, such as laser films and video.

This International Standard also includes information regarding the appropriate marking of these products, and special attention is given to cassettes/screens/films used for mammography.

This International Standard does not include films in roll format (see informative annex A).

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 554:1976, *Standard atmospheres for conditioning and/or testing — Specifications*.

IEC 61267:1994, *Medical diagnostic X-ray equipment — Radiation conditions for use in the determination of characteristics*.

3 Terms and definitions

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

3.1

preferred mammography sizes

current industry standard, reflecting modern industry trends

NOTE Aim and tolerance dimensions are different for preferred sizes versus recognized sizes.

3.2

recognized mammography sizes

former industry standard, listed because this older format is expected to be used in clinical applications worldwide for some time to come

4 Conditions for measurement of dimensions

The dimensions and tolerances specified in this International Standard shall apply at the time of manufacture (except where specifically stated otherwise), when measured under atmospheric conditions of $(23 \pm 2)^\circ\text{C}$ and $(50 \pm 5)\%$ relative humidity, as specified in ISO 554.

All measuring instrument calibrations should be conducted at a temperature of 20°C , as specified in ISO 1:1975, *Standard reference temperature for industrial length measurements*, and a relative humidity of 50 %.

5 Radiographic cassettes

5.1 Dimensions

5.1.1 Nominal sizes, aim and tolerance dimensions

Nominal sizes, aim and tolerance dimensions and weight for preferred radiographic cassette sizes shall conform to the values given in Tables 1 and 2.

Nominal sizes, aim and tolerance dimensions and weight for recognized radiographic cassette sizes shall conform to the values given in Tables 3 and 4.

The materials and design of the cassette shall ensure that, under normal conditions of use, the shape and dimensions comply with the limits for the outer dimensions (OD) and inner dimensions (ID) given in Tables 1, 2, 3 and 4, over a relative humidity range from 30 % to 85 % and a temperature range from 10°C to 40°C .

5.1.2 Denomination

Radiographic cassettes are denoted by the nominal size expressed in numerical values (in centimetres) without adding the measurement unit "cm".

EXAMPLE Cassette 18×24 (eighteen by twenty-four) denotes a radiographic cassette for a film with nominal size $18\text{ cm} \times 24\text{ cm}$.

Table 1 — Preferred radiographic cassette sizes of metric origin

Nominal size cm	Film size mm			Screen size mm			Cassette ID mm			Cassette OD mm			Thickness mm	Weight without screen g
	Min.	Aim	Max.	Min.	Aim	Max.	Min.	Aim	Max.	Min.	Aim	Max.	Aim and tolerance	Max.
13 × 18	127 × 177	128 × 178	129 × 179	127 × 177	130 × 180	131 × 181	131,5 × 181,5	132 × 182	133 × 183	156,5 × 206,5	157,5 × 208,5	158,5 × 208,5	15 ⁺¹ ₋₂	500
18 × 24	177 × 237	178 × 238	179 × 239	177 × 237	180 × 240	181 × 241	181,5 × 241,5	182 × 242	183 × 243	206,5 × 266,5	207,5 × 267,5	208,5 × 268,5	15 ⁺¹ ₋₂	800
18 × 43	177 × 429	178 × 430	179 × 431	177 × 429	180 × 432	181 × 433	181,5 × 433,5	182 × 434	183 × 435	206,75 × 458,5	207,75 × 459,5	208,75 × 460,5	15 ⁺¹ ₋₂	1 000
20 × 40	197 × 397	198 × 398	199 × 399	197 × 397	200 × 400	201 × 401	201,5 × 401,5	202 × 402	203 × 403	226,5 × 426,5	227,5 × 427,5	228,5 × 428,5	15 ⁺¹ ₋₂	1 000
24 × 30	237 × 297	238 × 298	239 × 299	237 × 297	240 × 300	241 × 301	241,5 × 301,5	242 × 302	243 × 303	266,5 × 326,5	267,5 × 327,5	268,5 × 328,5	15 ⁺¹ ₋₂	1 200
30 × 40	297 × 397	298 × 398	299 × 399	297 × 397	300 × 400	301 × 401	301,5 × 401,5	302 × 402	303 × 403	326,5 × 426,4	327,5 × 427,5	328,5 × 428,5	15 ⁺¹ ₋₂	1 900
30 × 90 (see note)	297 × 896	298 × 897,5	299 × 899	297 × 897	300 × 900	301 × 901	301,5 × 901,5	302 × 902	303 × 903	326,5 × 926,5	327,5 × 927,5	328,5 × 928,5	16,5 ⁺¹ _{-3,5}	—
30 × 120 (see note)	297 × 1 196	298 × 1 197,5	299 × 1 197	297 × 1 197	300 × 1 200	301 × 1 201	301,5 × 1 201,5	302 × 1 202	303 × 1 203	326,5 × 1 226,5	327,5 × 1 227,5	328,5 × 1 228,5	16,5 ⁺¹ _{-3,5}	—
Dental radiography (Extra-oral)														
13 × 30	127 × 297	128 × 298	129 × 299	127 × 297	130 × 300	131 × 301	131,5 × 301,5	132 × 302	133 × 303	156,6 × 326,5	157,6 × 327,5	158,6 × 328,5	15 ⁺¹ ₋₂	800
15 × 30	147 × 297	148 × 298	149 × 299	147 × 297	150 × 300	151 × 301	151,5 × 301,5	152 × 302	153 × 303	176,5 × 326,5	177,5 × 327,5	178,5 × 328,5	15 ⁺¹ ₋₂	800
NOTE	These sizes may be formed from three smaller sheets attached together. The resultant sheet may be folded to facilitate shipping.													