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Imaging materials - Photographic film - Determination of folding endurance

Imaging materials -- Photographic film -- Determination of folding endurance

Matériaux pour l'image -- Films photographiques -- Détermination de la résistance au pliage

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INTERNATIONAL STANDARD

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Imaging materials — Photographic film — Determination of folding endurance

Matériaux pour l'image — Films photographiques — Détermination de la résistance au pliage

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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 18908 was prepared by Technical Committee ISO/TC 42, *Photography.*

This first edition cancels and replaces ISO 8776:1988, of which it constitutes a minor revision.

This International Standard is one of a series of standards dealing with the physical properties and stability of imaging materials. To facilitate identification of these International Standards, they are assigned a number within the block from 18900 – 18999 (see annex A).

Annexes A and B of this International Standard are for information only.

Introduction

Photographic film should have sufficient folding endurance to permit satisfactory performance when used in the equipment for which it is intended under the atmospheric conditions likely to be encountered in practice.

Photographic film is essentially a laminate of two or more different materials, generally a plastics support and the photosensitive emulsion. The latter is usually made of image forming chemicals suspended in gelatin or an other polymeric binder.

The folding endurance of photographic film is affected adversely by both reduced temperature and reduced relative humidity. In most applications, folding endurance loss at low relative humidity is encountered more frequently than loss at a low temperature. Moreover, a marked change in film flexibility may occur with only a very small change in relative humidity below a level of about 25 %. This means that folding endurance tests on photographic film should be carried out only in an atmosphere that is accurately controlled with respect to both temperature and relative humidity.

The folding endurance of film is very dependent on the sample thickness decreasing with an increase in thickness of either the base or the emulsion. For this reason, the thickness of the film layers have to be considered when comparing the behaviour of different films. The temperatures and relative humidities to which the film has been subjected between manufacture and testing may also affect the folding endurance even though the sample is reconditioned to a standard temperature and humidity.

Gelatin is generally more brittle than film base, so that photographic film having a gelatin layer on only one side is usually more brittle if bent with the gelatin-side out (that is, gelatin under tension). This can affect the folding endurance, depending on the direction of the first fold.

The folding endurance of photographic film may vary in different directions if the base is oriented more in one direction than another. There is generally no directional effect in the emulsion.

This International Standard covers the MIT folding endurance test in which the film is subjected to a rapid and repeated folding action until it breaks.

Different types of failure occur when film is flexed. Failure may consist of very fine cracks in the emulsion (without a break in the support) which are objectionable when the photograph is viewed. Failure may also consist of cracks in the support or a complete break.

The wedge brittleness test, standardized in ISO 18907 (see [2] in the bibliography), can generally detect the presence of emulsion cracks after a single flex. However, emulsion cracks are not visible during the MIT test. They may occur after relatively few flexes and result in subsequent flexing of only the film base itself with consequent higher folding endurance. For this reason, the MIT fold test may not necessarily be in agreement with ISO 18907. The two tests may also disagree because the apparent brittleness (or lack of flexibility) and fatigue resistance can also be dependent upon the manner in which the photographic film is mechanically treated with respect to both the degree and the speed of straining. There are a number of folding endurance tests in addition to the MIT folding endurance test, as described in ISO 5626 (see [1] in the bibliography). Films may be rated differently according to the different tests.

Imaging materials — Photographic film — Determination of folding endurance

1 Scope

This International Standard specifies a method for determining and quantitatively expressing the folding endurance of photographic film. The method is based on the MIT folding-endurance tester described in annex B. It is an analytical test and is not intended to simulate practical use conditions.

This International Standard is applicable to film with or without a gelatin backing. It may also be applied to either raw or processed film, although the flexibility level of a given film can be quite different after processing.

Equipment similar to that described in this International Standard may be used provided that a correlation has been established between the results obtained using such equipment and the results obtained using the equipment described.

2 Term and definition

For the purposes of this International Standard, the following term and definition applies.

2.1
folding endurance
measure of fatigue resistance after multiple flexing

3 Principle

Folding, backwards and forwards in a standardized manner, of a sample of film subjected to a longitudinal stress until it breaks.

4 Apparatus

4.1 Test chamber

An air-conditioned cabinet or walk-in room shall be used for both conditioning and testing. The temperature shall be controlled to within ± 1 °C. The relative humidity shall be controlled to within ± 1 % at relative humidities below 30 % and to within ± 2 % at higher humidities. The linear air velocity shall be at least 150 mm/s.

If a walk-in conditioned room is used, the air velocity shall be adequate to maintain the conditions specified. The number of personnel permitted in the room during testing shall be limited and precautions taken to prevent the operator's breath reaching the film.

4.2 Test apparatus

The MIT folding-endurance tester (see Figure 1) shall hold the sample in a vertical position under a predetermined tension between two clamps. The upper clamp is stationary and the lower clamp oscillates through an angle of