INTERNATIONAL STANDARD

ISO 9022-7

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Optics and photonics — Environmental test methods —

Part 7: **Resistance to drip or rain**

Optique et photonique — Méthodes d'essais environnementales —

Partie 7: Résistance au ruissellement ou à la pluie

Reference number
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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 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 9022-7 was prepared by Technical Committee ISO/TC 172, *Optics and photonics*, Subcommittee SC 1, *Fundamental standards*.

This second edition cancels and replaces the first edition (ISO 9022-7:1994), which has been technically revised, and ISO 9022-7:1994/Cor.1:2001. Clause A.3 has been added to provide detail information about the rain gauge.

ISO 9022 consists of the following parts, under the general title *Optics and photonics — Environmental test methods*:

— *Part 1: Definitions, extent of testing*

— *Part 2: Cold, heat and humidity*

— *Part 3: Mechanical stress*

— *Part 4: Salt mist*

— *Part 5: Combined cold, low air pressure*

— *Part 6: Dust*

— *Part 7: Resistance to drip or rain*

— *Part 8: High pressure, low pressure, immersion*

— *Part 9: Solar radiation*

— *Part 10: Combined sinusoidal vibration and dry heat or cold*

— *Part 11: Mould growth*

— *Part 12: Contamination*

— *Part 13: Combined shock, bump or free fall and dry heat or cold*

— *Part 14: Dew, hoarfrost, ice*

— *Part 15: Combined digitally controlled broad-band random vibration and dry heat or cold*

— *Part 16: Combined bounce or steady-state acceleration and dry heat or cold*

— *Part 17: Combined contamination, solar radiation*

— *Part 18: Combined damp heat and low internal pressure*

— *Part 19: Temperature cycles combined with sinusoidal or random vibration*

— *Part 20: Humid atmosphere containing sulfur dioxide or hydrogen sulfide*

— *Part 21: Combined low pressure and ambient temperature or dry heat*

Introduction

Optical instruments are affected during their use by a number of different environmental parameters which they are required to resist without significant reduction in performance.

The type and severity of these parameters depend on the conditions of use of the instrument (for example, in the laboratory or workshop) and on its geographical location. The environmental effects on optical instrument performance in the tropics and subtropics are totally different from those found when they are used in the Arctic regions. Individual parameters cause a variety of different and overlapping effects on instrument performance.

The manufacturer attempts to ensure, and the user naturally expects, that instruments will resist the likely rigours of their environment throughout their life. This expectation can be assessed by exposure of the instrument to a range of simulated environmental parameters under controlled laboratory conditions. The severity of these conditions is often increased to obtain meaningful results in a relatively short period of time.

In order to allow assessment and comparison of the response of optical instruments to appropriate environmental conditions, ISO 9022 contains details of a number of laboratory tests which reliably simulate a variety of different environments. The tests are based largely on IEC standards, modified where necessary to take into account features special to optical instruments.

It should be noted that, as a result of continuous progress in all fields, optical instruments are no longer only precision-engineered optical products, but, depending on their range of application, also contain additional assemblies from other fields. For this reason, it is necessary to assess the principal function of the instrument to determine which International Standard is to be used for testing. If the optical function is of primary importance, then ISO 9022 is applicable, but if other functions take precedence then the appropriate International Standard in the field concerned should be applied. Cases may arise where application of both ISO 9022 and other appropriate International Standards will be necessary.

Optics and photonics — Environmental test methods —

Part 7:
Resistance to drip or rain

1 Scope

This part of ISO 9022 specifies methods for the testing of optical instruments and instruments containing optical components under equivalent conditions, for their ability to resist drip or rain.

The purpose of testing is to investigate to what extent the optical, thermal, mechanical, chemical and electrical performance characteristics of the specimen are affected by drip or rain. Contamination of drip or rain water due to impurities in the air shall be ignored for the purposes of this part of ISO 9022.

2 Normative references

The following referenced documents are indispensable for the application 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 9022-1:1994, *Optics and optical instruments — Environmental test methods — Part 1: Definitions, extent of testing*

3 General information and test conditions

At the beginning of exposure, the temperature of the water shall be below that of the specimen. During exposure the specimen shall be mounted in the possible operating positions on a rotary table which rotates at a speed of 1 r/min to 2 r/min about its axis perpendicular to the sprinkling area. Prior to testing, the required rain or drip rate shall be measured and set in the centre of the sprinkling area occupied by the specimen.

Measurement of the rain rate or drip rate shall be performed using a rain gauge of the type designed by Prof. Hellmann. See A.3 for detailed information. If various measuring areas exist and/or several measurement are performed, the mean value for all measurements shall lie within the limits specified in Tables 1 to 3 for the required rain rates.

4 Conditioning

4.1 Conditioning Method 72 — Drip

The drip shall be produced with the test apparatus shown in Figure 1. This size of the test apparatus and the dispenser plate (see Figure 2) shall be determined by the size of the specimens. Specimens requiring a dispenser plate of more than 1 m^2 may be tested in sections. The required water level above the dispenser plate shall be regulated by a float valve and/or overflows (see Figure 1). Decalcified or fully desalted water shall be used to prevent blockage of the fine holes in the dispenser plate. The distance between the specimen