

BRITISH STANDARD 3898 : 1965

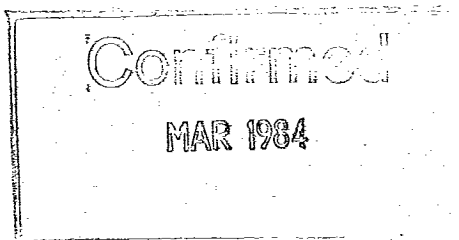
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SPECIFICATION FOR
**LABORATORY
HUMIDITY OVENS**
(INJECTION TYPE)

BRITISH STANDARDS INSTITUTION

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THIS BRITISH STANDARD, having been approved by the Committee on Conditioning Requirements for Testing, was published under the authority of the General Council on 20th June, 1965.

The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over 4000, fully indexed and with a note of the contents of each, will be found in the British Standards Yearbook, price 15s. The B.S. Yearbook may be consulted in many public libraries and similar institutions.

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

The following B.S.I. references relate to the work on this standard:
Committee references M/55 and M/55/1
Draft for comment D64/10542

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CO-OPERATING ORGANIZATIONS

The following Government departments and scientific and industrial organizations were represented on the Committee entrusted with the preparation of this British Standard:

British Laboratory Ware Association

British Plastics Federation

British Scientific Instrument Research Association

Electrical Research Association

Electronic Engineering Association

Ministry of Defence, Army Department

National Physical Laboratory (Ministry of Technology)

Printing, Packaging and Allied Trades Research Association

Scientific Instrument Manufacturers' Association

Society of Environmental Engineers

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BRITISH STANDARD SPECIFICATION FOR LABORATORY HUMIDITY OVENS (INJECTION TYPE)

FOREWORD

Many industrially important materials absorb water vapour to a greater or less extent; when tests are made on such materials it is usual for the material to be subjected to specified conditions of temperature and relative humidity (r.h.)*. For exposure to nominally constant temperature and r.h. it is convenient to use an enclosure in which the r.h. is controlled by means of saturated salt solutions, and a British Standard for laboratory humidity ovens of this type has been published†:

There are many test specifications which call for the temperature, the r.h., or both, to be varied in a prescribed manner during the conditioning treatment. For this purpose it is customary to obtain the desired r.h. by using a humidity-sensitive device to control the admission of moisture to the conditioning enclosure from an external source. (This type of equipment may also be used for conditioning at nominally constant temperature and r.h.)

This British Standard applies to laboratory humidity ovens of the injection type, and covers essential performance and constructional requirements. As far as is practicable the performance requirements have been specified quantitatively. Owing to the multiplicity of possible sizes and designs of oven, however, no means has been found of defining the limits of the working space in a simple manner, as is done in B.S. 3718†, and manufacturers are therefore required to supply information on this point. Similarly, widely different rates of cooling are prescribed in various test specifications and the user should arrange with the supplier or manufacturer for the rate of cooling to suit his particular requirements.

The performance requirements specified apply to the unloaded oven, and are intended to ensure that a humidity oven complying with this British Standard is well designed. The performance obtainable when the oven is loaded will depend on the nature and disposition of the load, and for loads presenting special problems it is recommended that the manufacturer of the oven should be consulted.

NOTE. Where metric equivalents have been given, the figures in British units are to be regarded as the standard. The metric conversions are approximate. More accurate conversions should be based on the tables in B.S. 350, 'Conversion factors and tables'.

* See B.S. 1339, 'Definitions, formulae and constants relating to the humidity of the air' for terms used in this context.

† B.S. 3718, 'Laboratory humidity ovens (non-injection type)'.

SPECIFICATION

SCOPE

1. This British Standard specifies performance and constructional requirements for humidity ovens of the forced-circulation type in which the desired relative humidity of the air is obtained by using a humidity-sensitive device to control the admission of moisture from an external source. It does not apply to ovens in which the relative humidity is controlled by the use of saturated salt solutions.

The standard specifies the performance of humidity ovens between lower limits which are mainly determined by the ambient conditions, and upper limits of 95 per cent r.h. and 60°C. These ranges cover the requirements prescribed in most test specifications.

NOTE. Some form of cooling is essential for ovens operating at, or just above, ambient temperature, as well as for ovens operating below ambient temperature.

The standard covers ovens so constructed or modified that tests may be carried out on specimens inside the oven, provided that the oven has been tested for compliance with the requirements of the standard *after* any modifications have been made.

Recommendations for the use and maintenance of humidity ovens of the type specified, which should be followed in detail to obtain the required performance, are given in an Appendix to this British Standard.

SECTION ONE: PERFORMANCE REQUIREMENTS

DEFINITIONS

2. For the purposes of this British Standard, the following definitions apply:

Working space. The space extending upwards from the lowest shelf (or suitably constructed false bottom) within which the requirements of this specification are satisfied. (See Clause 4.)

Oven temperature. The temperature at the centre of the working space.

Temperature variation. The difference at any moment between the temperature at the centre of the working space and at any other point in the working space.

Temperature fluctuation. The difference between the average maximum and average minimum temperature at any one point in the working space.

r.h. fluctuation. The difference between the average maximum and average minimum relative humidity at any one point in the working space.

Average maximum value.* The arithmetic mean of the successive maximum values (of temperature or r.h.) occurring during a specified period.

Average minimum value.* The arithmetic mean of the successive minimum values (of temperature or r.h.) occurring during a specified period.

Mean value.* The arithmetic mean of the average maximum value and the average minimum value determined over the same specified period.

* See Appendix K for the procedure for determining these values.

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CONDITIONS OF TEST

3. The oven shall be tested unloaded but with the shelves, if any, in position.
The operating voltage during the tests shall be within the range for which the oven is designed (see Subclause 22 (4)).

In the course of each of the 72-hour tests described in Appendices C and D there shall be changes in ambient temperature, such that there are at least two periods of not less than 6 hours each at a temperature above the average, alternating with at least two periods of not less than 6 hours each at a temperature below the average, the difference between the higher and lower temperatures being not less than 5 degC.

In carrying out the tests, attention should be paid to the recommendations of Appendix J, Clause J1, as appropriate.

If any modifications are made to the oven after the tests, for example in order to enable specimens to be tested inside the oven, the oven shall no longer be deemed to comply with the requirements of this British Standard unless it has been tested again in its modified form.

WORKING SPACE

4. The boundaries of the working space of the oven, as defined in Clause 2, shall be stated by the manufacturer.

TEMPERATURE VARIATION

5. When the oven is operating at any nominally constant temperature within its operating range, the mean temperature variation shall not exceed ± 0.5 degC, when measured by the method described in Appendix B.

TEMPERATURE FLUCTUATION

6. When the oven is operating at any nominally constant temperature within its operating range, the difference between the average maximum and average minimum temperatures at any one point within the working space, during any 30-minute period in the course of the 72-hour test described in Appendix C, shall not exceed 0.5 degC.

r.h. FLUCTUATION

7. The difference between the average maximum and average minimum relative humidities at the test point in the working space, during any 30-minute period in the course of the 72-hour test described in Appendix D, shall not exceed 2 per cent r.h.