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**Method for
Specifying the performance
of electronic
measuring equipment**

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British Standards Institution



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Committee reference TLE/8. Draft for comment 70/35984

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- | | |
|--|---|
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Department of Trade and Industry (British Calibration Service)
National Physical Laboratory (Department of Trade and Industry)



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Foreword

This British Standard has been prepared under the authority of the Telecommunications Industry Standards Committee. It is based on Publication 359, 'Expression of the functional performance of electronic measuring equipment', of the International Electrotechnical Commission.

Appendix A draws attention to the concept of BS 89, 'Direct acting electrical indicating instruments', on which were based earlier documents on electronic measuring equipment (e.g. BS 4733, 'Characteristics of signal generators', and BS 4734, 'The performance of amplitude modulated signal generators'). Using this concept, the method dealing with the effect of influence quantities outside the reference conditions appears to be ill suited for specifying the performance of electronic measuring equipments. These are generally characterized by more than one performance characteristic, for which the number of influence quantities is, as a rule, greater than for the indicating electrical instruments covered by BS 89.

Therefore, for electronic measuring equipment, the present standard adopts the concept of operating error under operating conditions, the latter being constituted by a set of values (ranges) of influence quantities and influencing characteristics. Using the concept, the manufacturer must specify limits of operating error, valid over the entire set of operating conditions, and he may specify separately limits of intrinsic error, valid over the more restricted reference conditions. Within both the reference and operating conditions, the influence quantities and influencing characteristics may assume any combination of values given by the manufacturer, and the error found in a performance characteristic must always lie within the stated limits of error for the relevant conditions.

The adoption of operating conditions as the basis for specifying an operating error makes it desirable to recommend ranges of influence quantities known as rated ranges of use. For this purpose, three usage groups are provided to suit equipment designed for use under different circumstances.

The adoption of this method by the industry should lead to easier and better comparison of equipment specifications by the user.

British Standard Method for

Specifying the performance of electronic measuring equipment

1. Scope

1.1 This standard applies to electronic equipment for measuring electrical quantities, and the accessories used with it. In general, electronic equipment also includes apparatus for observing quantities but not measuring them.

This standard also applies to any separable electronic part of an equipment which measures non-electrical quantities by electrical means, provided that the relationship between the non-electrical quantity and the electrical one is known and that it is possible to specify separately the performance characteristics of the electronic part of the equipment.

For electronic measuring equipment covered by other British Standards, the requirements of those standards shall have precedence where they conflict with this standard.

1.2 This standard is intended to specify the terminology and definitions related to the functional performance of electronic measuring equipment; to unify methods used in making and verifying statements on the functional performance of such equipment; to specify values and ranges for the determination or specification of the functional performance; to give guidance when establishing new standards.

NOTE. The titles of the British Standards referred to in this standard are listed on the inside back cover.

2. Definitions

The following definitions apply for the purposes of this standard.

2.1 Electronic measuring equipment. One or more pieces of apparatus which, by means of incorporated electronic devices, serve to measure electrical quantities, or to supply electrical quantities for measurement purposes.

NOTE 1. Electronic devices are parts or assemblies of parts which use electron or hole conduction in semi-conductors or in vacuum, or ion conduction in gases.

NOTE 2. Measuring apparatus containing no active electronic components, such as cavity frequency meters and slotted lines, are also considered to be electronic measuring apparatus.

2.1.1 Accessory. A device (probe, cable etc.) or an apparatus (modulator, attenuator, plug-in unit etc.) which is associated with the equipment.

2.2 Performance characteristic. One of the quantities assigned to an apparatus in order to define by values, tolerances, ranges etc., the performance of the apparatus.

NOTE. The term 'performance characteristic' does not include influence quantities. (See Note to 2.3)

2.3 Influence quantity. Any quantity, generally external to an apparatus, which may affect the performance of the apparatus.

NOTE. Where a change of a performance characteristic affects another performance characteristic, it is referred to as an influencing characteristic (see 2.5.5).

2.4 Values related to quantities

2.4.1 Rated value. The value (or one of the values) of a quantity to be measured, observed, supplied or set, which the manufacturer has assigned to the apparatus.

2.4.2 Rated range. The range of a quantity to be measured, observed, supplied or set, which the manufacturer has assigned to the apparatus.