

Specification for

Artificial daylight for the assessment of colour —

Part 1: Illuminant for colour matching
and colour appraisal

Co-operating organizations

The Illumination Industry Standards Committee under whose supervision this Part of BS 950 was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

- Association of Public Lighting Engineers
- British Electrical and Allied Manufacturers' Association
- British Glass Industry Research Association
- British Railways Board
- Electric Lamp Industry Council*
- Electric Light Fittings Association*
- Electricity Council, the Central Electricity Generating Board and the Area Boards in England and Wales
- Gas Council
- Glass Manufacturers' Federation*
- Illumination Engineering Society*
- Independent Lamp Manufacturers' Export Group*
- Institution of Electrical Engineers
- Institution of Municipal Engineers
- London Transport Board*
- Medical Research Council
- Ministry of Aviation
- Ministry of Defence, Navy Department
- Ministry of Labour, H.M. Factory Inspectorate
- Ministry of Public Building and Works*
- Ministry of Technology — Building Research Station*
- Ministry of Transport
- National Physical Laboratory (Ministry of Technology)*
- Post Office
- Royal Institute of British Architects
- Society of British Gas Industries
- Society of Glass Technology*

The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

This Part of BS 950, having been approved by the Illumination Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council on 24 February 1967

- British Colour Council
- British Leather Manufacturers' Research Association
- Oil and Colour Chemists' Association
- Research Association of British Paint, Colour and Varnish Manufacturers
- Society of Dyers and Colourists
- Society of Leather Trades' Chemists
- Society of Motor Manufacturers and Traders Ltd.
- Textile Institute

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Preface

This British Standard is published under the joint authority of the Illuminating Industry Standards Committee and the Photographic Industry Standards Committee, and is concerned with the spectral composition of illuminants corresponding to phases of daylight for producing conditions of artificial daylight.

The standard is divided into two Parts. Part 1 specifies an illuminant of given chromaticity and spectral distribution with a correlated colour temperature of 6 500 °K, which is suitable for colour matching and colour appraisal.

Part 2 states the viewing requirements applicable only to the **graphic arts reproduction industry** where a greater red content is required in the spectrum of the illuminant and for which, accordingly, a correlated colour temperature of 5 000 °K has been selected.

NOTE Where metric equivalents are stated 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 BS 350, "Conversion factors and tables".

Foreword

This Part of the specification is concerned with an illuminant having the spectral composition based on a phase of daylight. As no artificial light source is likely to have this precise spectral composition the tolerances which light sources must meet in order to be suitable for colour matching and colour appraisal are defined.

The earlier edition was based on Standard Illuminant C, which had the disadvantages 1) that it is difficult to provide with it high illumination levels over large areas; 2) that its ultra-violet content is inadequate for present-day colour matching in view of the prevalence of fluorescent brightening agents and fluorescent pigments; 3) that its chromaticity is on the purple side of the full radiator locus. New measurements on daylight in this country, and elsewhere, have recently become available (Judd, MacAdam and Wyszecki, *J. Opt. Soc. Amer.* **54**, 1031, 1964) and the standard is now based on this work instead of on Standard Illuminant C. These measurements, and others of a different type made in recent years at a number of laboratories in this country, indicate that the chromaticity of daylight most frequently occurring is similar to that adopted in the earlier specification, but on the green side of the full radiator locus. The correlated colour temperature of this region is close to 6 500 °K, and the reconstituted spectral distribution for this colour temperature has been taken from the work of Judd *et al.* to provide the standard. The same distribution has recently been recommended by Experts' Committee E.1.3.1 of the CIE¹⁾ as Standard Illuminant D6500 (see Appendix A).

A feature of these measurements has been the close similarity of curves from north sky observations on the one hand, and total sky observations, with or without sunlight, on the other, provided that these conditions refer to similar chromaticities (Henderson and Hodgkiss, *Brit. J. Appl. Phys.* **14**, 125, 1963; **15**, 947, 1964).

This specification requires that artificial sources for colour matching shall satisfy two conditions. The first is that the chromaticity of the light shall lie within certain limits, and the second is that the differences between its spectral distribution and that specified shall be within certain limits.

As regards chromaticity the tolerance area is on the green side of the full radiator locus, in accordance with most determinations of the chromaticity of natural daylight.

Colour matches under sources conforming to this specification will hold in most phases of daylight. As in most cases materials may also be used under artificial light, especially that from incandescent tungsten lamps, colour matches should be checked under two sources (see Appendix B).

¹⁾ Commission Internationale de l'Eclairage.