

Technical Taskforce

Information Sheet 2010 05

The use of Light Reflectance Values (LRVs) in achieving visual contrast

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Over recent years there has been a growing awareness and understanding of the important roles that colour, lighting and contrast play in the creation of everyday environments that are not only visually stimulating, but which also enhance the usability of the space.

This need for visual clarity is not entirely new. As far back as 1992, Approved Document M (AD M 1992) made reference to stair nosings needing to be “distinguishable through contrasting brightness” while in the 2001 edition of BS 8300 the expression “contrasting colour and luminance” was used for ways of assisting blind and partially sighted people when moving around a building and identifying features and facilities within it.

How colour, light and contrast are used however, is not just an issue for people with poor vision – appropriate lighting designs and colour schemes can enhance the experiences of everyone using the built environment.

When identifying differences between adjacent colours, differences in the nature of the colour or its intensity are usually sufficient for people with good vision. For most blind and partially sighted people however, differences in colour alone are not sufficient to determine visual contrast and they are more reliant on distinguishing visual differences by variations in the light reflectance value (LRV) of adjacent colours. This is true in most cases but especially when identifying smaller objects such as door handles or letters on signs against larger background surface.

The 2004 edition of the Approved Document to Part M (AD M 2004) and an amendment to BS 8300 in 2005 (BS 8300:2001/A1:2005) identified a way of expressing guidance on visual contrast by reference to differences in LRV, where LRV was defined as “the total quantity of visible light reflected by a surface at all wavelengths and directions when illuminated by a light source”.

Following the guidance in AD M 2004 and BS 8300:2001/A1:2005, adequate visual contrast can be achieved by providing a difference in light reflectance values between adjacent surfaces of 30 points on a 100 point scale (with jet black equivalent

to zero and a perfect white 100). However, it is worth remembering that, for all practical purposes, readings of zero and 100 are considered to be unachievable. There is also evidence to suggest that in certain well-lit environments LRVs of as little as 20 points may be acceptable. Differences of less than 20 points however are not appropriate.

So how is LRV measured and how can designers be confident that, when a value has been determined, it is reliable? Traditional sources of information about the visual characteristics of building materials and products such as literature, websites and colour swatches are susceptible to inaccurate and variable colour representation, and can only be considered as a visual guide. Whatever degree of colour accuracy is claimed, it cannot be used to determine whether there is sufficient visual contrast between installed building elements or against surrounding surfaces and it seems that provision of accurate LRV data will be required in future.

Currently this requires that manufacturers use a reflectance spectrophotometer to provide objective LRV assessment but there is a need for a standardised test method. Specifiers must be able to assess products on known like-for-like criteria, using the same measurement technique and under the same lighting conditions.

British Standard BS 8493:2008+A1:2010 “Light reflectance value (LRV) of a surface. Method of test” describes how the LRV can be measured for a range of different surfaces, such as those of piled carpets, painted surfaces, materials with opaque coatings, and reflective finishes. It can also be used for materials with non-opaque coverings such as veneered timber doors finished with a wood stain and metallic products such as brushed stainless steel door furniture. Although the proposed test needs to be conducted on samples with a flat surface, it is thought that results will apply equally to products such as door handles with the same surface finish but a circular or oval cross section.

Given the importance for everyone to be able to identify the presence of features and facilities within an environment, an ability to compare LRVs across a wide range of different manufacturers’ products will be of enormous value.

To illustrate a comparison between a colour and its LRV and to help designers make an initial assessment of suitable combinations, BS 8493 includes an Annex showing the LRV of colours using the proposed method from the range in BS 4800 “Schedule of paint colours for building purposes”. It emphasises that it is not promoting exclusive use of BS 4800 colours in order to constrain manufacturers or designers, as the method can be used to determine the LRV of a surface of any colour.

From the rather general guidance given in AD M 1992, great strides have been made in quantifying how to provide a level of visual contrast that meets the needs of a wide range of users. It is hoped that the BS 8493 standardised test method will be accepted as a valuable tool for determining accurate and comparable LRV data and extend that process still further.

It is not that long ago that conflicting advice about visual contrast put the architectural ironmongery community and designers into acute anguish with at least one authoritative source proposing that ‘plastics’ would provide the only acceptable answer. Thankfully that is not the case.

Further information

Dulux Trade Colour & Contrast CD:

<http://www.icipaints.co.uk/support/specifications/colour/accessibility/regulations.jsp>

Muraspec DDA and Colour Contrast seminar:

<http://www.muraspec.com/content.asp?PageID=189>

Note

BS 8300:2001 and the Amendment in 2005 (BS 8300:2001/A1:2005) were replaced by an updated version of BS 8300 in 2009 (BS 8300:2009). This new BS updates the guidance on LRVs described in the earlier versions and includes details of the test methodology for determining LRVs as laid out in BS 8493.

BS 8300:2009+A1:2010 amends and replaces BS 8300:2009.

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