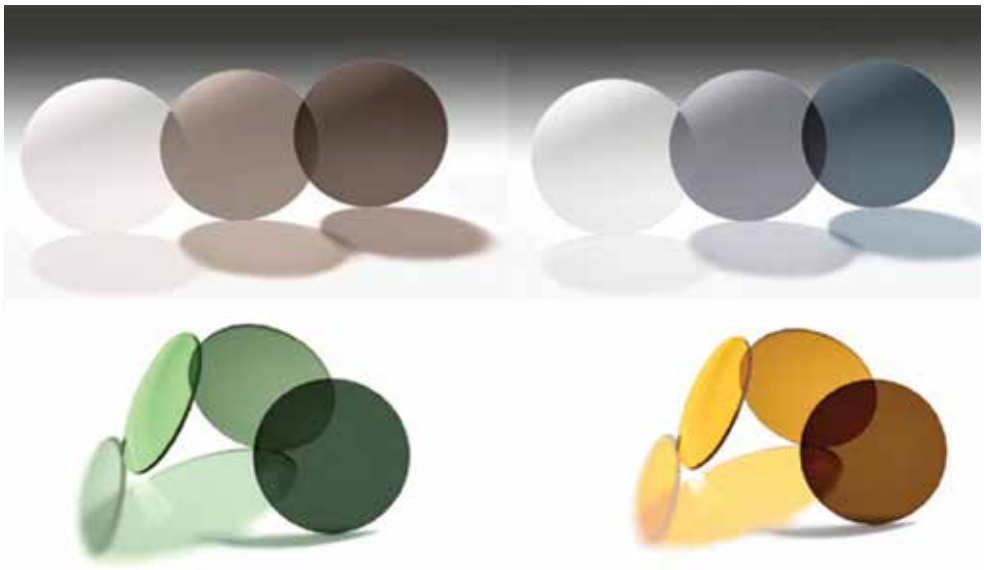
# New British Standards

**Ronald Rabbetts**

discusses revised and new British Standards relating to lens transmittance



**Practices and prescription houses that tint lenses are advised to purchase the revised lens transmittance standard BS EN ISO 8980-3**

For spectacle lenses, *BS EN ISO 14889 Ophthalmic optics – Spectacle lenses – Fundamental requirements for uncut spectacle lenses* is the master standard to which all spectacle lenses must comply. In turn, this calls up the various specification standards, such as *BS EN ISO 21987 – Ophthalmic optics – Mounted spectacle lenses.* In this revision of ISO 14889, the text of the clauses relating to the requirements for lens transmittance for driving and road use has been transferred to the lens transmittance standard, BS EN ISO 8980-3, and has been replaced by the cross references to the specific clauses in the revised BS EN ISO 8980-3.

This standard, titled *Ophthalmic optics – Spectacle lenses – Uncut finished spectacle lenses: Part 3 – transmittance specifications and test methods*, has been significantly revised. Although this is still titled uncut finished spectacle lenses since this is the generic name for this series of five standards, the scope has, however, been enlarged to include mounted lenses. It covers lenses that are dyed in the prescription house or optical practice and not just photochromic lenses or those lenses tinted by the major manufacturers. The scope also specifically mentions the purpose of attenuating solar radiation.

Table 2 (in the standard) specifies the maximum solar UV transmittance as a function of the luminous transmittance. The previous emphasis on tint categories, copied from the sunglass standard, has now been 'demoted' since most ophthalmic tints are described by a manufacturer's code. This often includes the luminous transmittance. (The term 'luminous transmittance' has been used within the BS EN ISO standards for at least 15 years, replacing the old BS term 'luminance transmittance factor.) Thus, for example, a typical dark tinted prescription lens intended for use as a sunglass might have a luminous transmittance, $\tau_V$, of 25 per cent. This is now described as a medium tint, rather than a category 2 tint, and, compared with the 2003 edition, the allowable transmittance of solar UV-A for this example has been halved to half the luminous transmittance ($\tau_V$). The allowable solar UV-B transmittance has been altered from $0.125\times\tau_V$ to the greater of 1 per cent absolute or $0.05\times\tau_V$.

## Driving requirements

The requirements to which tints must comply for driving and road use include the limit for the luminous transmittance to be not less than 75 per cent for driving in twilight or at night. This value was changed from 80 per cent many years ago when early resin photochromic lenses would not fade back to the 80 per cent value. Since general wear photochromic lenses have improved greatly since then, this clause applies to fixed tint lenses and specialised photochromic lenses, such as Drivewear, that are not intended to be worn except in bright conditions.

Now that most emergency vehicles use flashing blue LEDs instead of filtered halogen lamps, the spectral emittance peaks at a shorter wavelength (about 460nm) compared with the filtered light (a much broader spectral emittance peaking at about 510nm). Some of the brown-coloured blue-blocking tints are so effective at cutting out light up to nearly 500nm that the visibility of the blue LED light is severely reduced. The previous requirement that the spectral transmittance in the wavelength range 500-650nm shall not be less than $0.2\times\tau_V$ has now been widened to start at 475nm, thus allowing considerably more of the blue LED light to be transmitted. Tint manufacturers have been allowed three years to develop new tints to satisfy this clause. This mostly applies to coppery-brown tints that are claimed to reduce haze, and, although developed for sports and leisure use, passed the previous requirement for driving and road use, and so were advertised as being suitable for driving.

## New Standards

The two new standards are *BS EN ISO 12311 Personal protective equipment – Test methods for sunglasses and related eyewear* and *BS EN ISO 12312-1 Eye and face protection – Sunglasses and related eyewear: Part 1 – Sunglasses for general use*. These replace the former

European Standard, *BS EN 1836 Personal eye equipment – Sunglasses and sunglare filters for general use and filters for direct observation of the sun*. Although this contained some test methods for sunglasses, it cross-referred to the individual PPE test method standards, BS EN 167 and 168. The new pair of standards is completely self-contained. Part 2 of ISO 12312 on filters for direct observation of the sun, ie eclipse viewing, is in preparation, and should be published in a year or two. In these PPE documents, the 'lenses' of an afocal sunglass are referred to as 'filters'.

Through close liaison between the two committees drafting ISO 8980-3 and ISO 12312-1 (including two UK members who sit on both committees), the transmittance requirements in ISO 8980-3 and ISO 12312-1 are identical with the exception of two items. Because clear glass lenses have poor UV absorption, they are excluded from the UV requirement in ISO 8980-3 – glass lenses are hardly used in the UK, so this has virtually no impact here, but they are used much more in Europe. Secondly, to prevent very coloured lenses interfering with the visibility and recognition of traffic light signals, the transmittance of a filter or lens has to comply with four requirements based on an arithmetic analysis of the spectral transmittance.

The requirement for the relative visual attenuation coefficient (quotient) for recognition/detection of blue incandescent signal lights (Q blue) has been tightened up in the sunglass standard while the spectacle lens standard continues with the previous value. The argument in favour of tightening is that this helps an anomalous colour deficient person recognise the colour of green traffic signals. The converse argument for retaining the previous value is that there appear to be no accident statistics blaming lens tints, and the many useful coloured tints available for spectacle lenses. The requirement also requires relatively expensive equipment to verify accurately. Hence practice and small prescription laboratories should check with their dye suppliers whether the tint complies, providing the dye is used in accordance with instructions.

All four of these standards take the traditional ophthalmic optical and sunglass wavelength range for UV-A of 315-380nm. It must be remembered that other authorities, eg medical and the CIE, use the range 315-400nm. This difference can lead to confusion, for example Rabbetts and Taylor (2005).

The author recommends that practices or prescription houses tinting lenses should purchase the revised lens transmittance standard BS EN ISO 8980-3. All these British Standards may be obtained from BSI (http://shop.bsigroup.com/). Manufacturers and prescription houses may order them through the FMO, while members of the College of Optometrists may obtain them through the Library section on the College website (www.college-optometrists.org).

**Reference**

Rabbetts, R and Taylor, A. The ultraviolet confusion unravelled, *Optician*, 2005; 230(6023), October 14, 18, 21-22.

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**Ronald Rabbetts** has retired from private practice