

New test needed to assess the quality and safety of sunglasses

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Revision of standards is needed to test sunglasses quality and establish safe limits for the lenses' UV filters, according to research published in the open access journal *Biomedical Engineering OnLine*.

Exposure to the sun may deteriorate your [sunglasses](#) over time and the [lenses](#) may become lighter and so alter the category under which they are classified. It may also diminish the impact resistance of lenses (how 'shatterproof' the lens is). Current national and regional standards require that sunglasses provide levels of UV protection linked to the luminous transmittance, which decides the category of the lenses.

The aging test, used in Europe, Brazil, New Zealand and Australia, calculates the extent to which the lenses' category deteriorates as a result of exposure to the sun. The test exposes sun glasses to a sun simulator for 50 hours at 30cm from a 450 W lamp. The lamp exposure is equivalent to two days in a natural environment on a summer's day, or four days in winter.

Liliane Ventura, the corresponding author, from São Carlos School of Engineering, University of São Paulo, Brazil, said: "50 hours of exposure to the sun simulator equates to 23.5 hours of exposure to natural sun in Sao Paulo in Brazil. Most Brazilians replace their sunglasses every two years. To test the sunglasses are safe to wear for these two years, with the assumption they are worn for a period of two hours a day, they should be tested for 134.6 hours at a distance of 5cm. Although our calculations are mainly based on Brazilian cities, other countries may

also benefit, especially those located at similar latitudes."

Exposure will vary among world latitudes, with tropical countries being of most concern, as UV indexes are extremely high in summer and remain high in the winter. Therefore, sunglasses worn in the southern hemisphere may need replacing more often than in those worn in the northern hemisphere.

Liliane Ventura adds: "We need adequate lamp power, exposure time, distance from the bulb and controlled temperature. To overcome the current limitations one may either increase the time the lenses are exposed to the lamp or decrease the distance of the lenses from the lamp. We could also consider using a higher power lamp, switching from a 450W to 1600 W lamp."

A Brazilian national survey indicated that most Brazilians wear the same pair of sunglasses for a minimum of two years for a period of two hours a day. Therefore, the standard must guarantee that the sunglasses are safe over this period.

The study calculations were carried out in 27 Brazilian state capitals and data for 110 national capitals in the [northern hemisphere](#) were also included. Calculating the equivalence of the simulator to natural light is an estimate because when an individual wears sunglasses, the lenses are not directly exposed to the sun, as they are usually worn in the vertical position.

Lenses should provide adequate UV filters, because insufficient protection could lead to pathological modifications to the cornea and to the internal structure of the eye. This could cause edema (swelling of the eye which can distort vision), pterygium (growth of pink, fleshy tissue on the white of the eye that can interfere with vision), cataract (clouding of the lens of the eye) and retina damage.

More information: Mauro Masili et al. Equivalence between solar irradiance and solar simulators in aging tests of sunglasses, *BioMedical Engineering OnLine* (2016). [DOI: 10.1186/s12938-016-0209-7](https://doi.org/10.1186/s12938-016-0209-7)

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