

Changes to the Australian and New Zealand Standards for sun protective products including clothing, sunglasses and shade fabrics

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Abstract.

Sun protective products are important tools for skin cancer prevention and eye protection. They are designed on the premise of limiting the amount of ultraviolet radiation (UVR) reaching the skin or eye. Four standards cover all five sun protective products recommended to reduce exposure to solar UVR. The Cancer Councils in Australia and New Zealand recommend: **Slip** on sun protective clothing; **Slop** on sunscreen; **Slap** on a hat; **Seek** shade and **Slide** on sunglasses; relate to products which should meet the requirements of Australian Standards or Australian and New Zealand Standards. Most of these standards have been recently revised and published. The following standards have been revised or are being considered for revision:

Eye and face protection – Sunglasses and fashion spectacles AS/NZS 1067.1 and 1067.2, published in 2016 and became a mandatory safety standard in Australia in October 2017. It includes category ratings and suitability for driving.

Sun protective clothing – Evaluation and classification AS/NZS 4399, published in 2017. It includes both clothing and hats, body coverage and the Ultraviolet Protection Factor (UPF) rating.

Knitted and woven shade fabrics AS 4174, published in 2018. It includes a human protection rating called Ultraviolet Effectiveness (UVE)

Sunscreen products – Evaluation and Classification, AS/NZS 2604, published in 2012. It covers the Sun Protection Factor (SPF) rating, and requires broad-spectrum sunscreens providing UVA and UVB protection.

People involved in sun protection should be aware of these changes and update any guidance materials that refer to these standards. It is intended that the changes to the above standards and their implementation in testing at ARPANSA will be presented.

Introduction

Standards are important guidance materials that set out recommended classifications, performance and labelling of products to ensure safety, consistency and reliability of products, systems and services. Sun protective products are integral to skin cancer prevention by limiting the amount of solar ultraviolet radiation (UVR) that reaches the skin and eyes. Four standards cover all 5 sun protective products recommended to reduce solar UVR: clothing and hats, sunscreen, sunglasses and shade fabrics. Standards for sun protective products commenced with AS 1067 Sunglasses and fashion spectacles, which was first introduced in 1971 in Australia, then revised and adopted by New Zealand in 2003 and revised again in 2016 as AS/NZS 1067.1 and 1067.2. (Standards Australia and Standards New Zealand, 2016). The AS/NZS 4399 Sun Protective Clothing standard followed in 1996 and was revised in 2017 (Standards

Australia and Standards New Zealand, 2017). The AS 2604 Sunscreen products – Evaluation and Classification standard was first introduced in 1983, revised and adopted by New Zealand in 1993 as AS/NZS 2604, then revised in 1998 and again in 2012 (Standards Australia and Standards New Zealand, 2012). The AS 4174 Knitted and Woven shade fabrics standard, in 1994 was originally for synthetic shade cloth for horticultural purposes and only in its latest revision in 2018 was human shade protection incorporated into the standard (Standards Australia, 2018). It remains the only sun protective product standard not yet adopted by New Zealand

Guidance material, produced by Government and non-government organisations promoting sun protective practices, regularly reference the standards for sun protective products. The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) tests sun protective products, except for sunscreen, to these standards and provides guidance to the public referencing these standards.

Significant changes made in the recent revisions, and the implementation in testing by ARPANSA will be discussed.

Discussion

Sun Protective Clothing Standard AS/NZS 4399:2017

Sun protective clothing – Evaluation and classification includes clothing, hats, gloves and accessories and a revised Ultraviolet Protection Factor (UPF) rating and classification system, shown in Table 1, and changes to labelling. Figure 1, shows the minimum level of body coverage that is now required to claim a UPF rating. Hats now require a minimum brim width of 6 cm for bucket hats and children's broad brim hats and 7.5 cm for adult broad brim hats, gloves are required to cover the back of the hand. Whilst women's one-piece swimsuits' UPF labelling is design dependant.

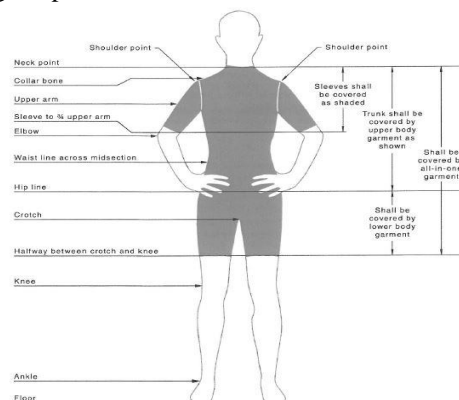







Figure 1. Body Coverage requirements of AS/NZS 4399:2017.

Table 1. Revised UPF classification Scheme of AS/NZS 4399:2017.

UPF	Classification
15	Minimum
30	Good
50, 50+	Excellent

Sunglass standard AS/NZS 1067:2016 *Eye and face protection* – Sunglasses and fashion spectacles Part 1: Requirements and Part 2: Test Methods was an adoption of ISO 12311:2013 with some minor modifications, including UV testing to 400nm, not 380nm which is in the ISO standard. Labelling of sunglasses and fashion spectacles has revised wording for each category and pictogram labels. Colour values for traffic signals are different. Category 4 sunglasses now require lateral protection and a halving of the UVA transmission down to 0.25%. The AS/NZS 1067:2016 standard became a mandatory safety standard in Australia in October 2017 with a transition period up to 1 July 2019, with the release of Consumer Goods (Sunglasses and Fashion Spectacles) Safety Standard 2017. The revised wording and pictograms to be displayed on sunglasses are shown in Table 2.

Table 2. Revised wording and pictograms on sunglass labels (AS/NZS 1067.1:2016).

Lens Category	Description	Additional wording	Pictogram
0: Fashion spectacles	Very limited reduction of sunglare, Some UV protection		
1: Fashion spectacles	Limited protection against sunglare, Some UV protection	Not Suitable for driving in twilight or at night;	
2: General Purpose sunglasses	Good protection against sunglare, Good UV Protection	or not suitable for driving at night or	
3: General Purpose sunglasses	High protection against sunglare, Good UV protection	under dull light conditions	
4: Very dark special purpose sunglasses	Very high protection against extreme sunglare, e.g. at sea, over snowfields, on high mountains or in desert. Good UV protection	Not Suitable for road use and driving	

Shade Fabrics AS 4174:2018 *Knitted and woven shade fabrics*, formerly called synthetic shade cloth, now includes performance requirements, classification and labelling of

human shade protection fabrics. Human shade protection fabric can now be classified according to the Ultraviolet Effectiveness (UVE %) rating, shown in Table 3. Revision of the cover factor designation and colour codes and designation of breaking strength and bursting force.

Table 3 Ultraviolet effectiveness (UVE) classification system for human shade protection fabric (AS 4174:2018).

UVE (%)	Protection Category
80.0 to 90.9	Effective
91.0 to 94.9	Very Effective
95.0 +	Most Effective

Sunscreen standard AS/NZS 2604:2012 *Sunscreen products* – Evaluation and Classification, , increases the Sun Protection Factor (SPF) rating up to SPF 50+, and requires sunscreens to be broad-spectrum providing protection for both UVA and UVB. This Standard requires testing on people by exposing a persons’ skin to determine the SPF, which, due to variability in skin types and lamp output, results can be difficult to reproduce reliably. ARPANSA is currently investigating reliable and reproducible *in vitro* sunscreen test methods, not yet described in the current sunscreen standard.

ARPANSA provides a testing service for sun protective clothing, hats, sunglasses, shade fabrics and tint films to the old standards, and by mid-2018 will test and report to the new clothing, sunglass and shade fabric standards.

Conclusions

All five sun-protection methods are now covered by standards in the Australasian region and have recently been revised. ARPANSA will be testing to the new standards by mid-2018, investigating reliable and reproducible *in vitro* sunscreen test methods and revising guidance material that refer to these standards.

References

- Standards Australia and Standards New Zealand. 2016. AS/NZS 1067.1 *Eye and face protection* – Sunglasses and fashion spectacles Part 1: Requirements. Accessed SAI Global <https://infostore.saiglobal.com>, 4 October 2016
- Standards Australia and Standards New Zealand. 2017. AS/NZS 4399 *Sun protective clothing* –Evaluation and classification. Accessed SAI Global <https://infostore.saiglobal.com>, 5 October 2017
- Standards Australia and Standards New Zealand. 2012. AS/NZS 2604 *Sunscreen products* – Evaluation and Classification. Accessed SAI Global <https://infostore.saiglobal.com>, 3 June 2012
- Standards Australia 2018 AS 4174 *Knitted and woven shade fabrics*. Accessed SAI Global <https://infostore.saiglobal.com>, 14 February 2018
- Consumer Goods (Sunglasses and Fashion Spectacles) Safety Standard 2017 (Commonwealth of Australia)

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