

Standards for sunglasses and fashion spectacles in Australia and the rest of the world

This report contains the views of the author and does not, without explicit endorsement, reflect the views of any organisation.

Executive summary

This submission has been prepared in support of a response to the Consultation Regulation Impact Statement “Supporting business through improvements to mandatory standards regulation under the Australian Consumer Law” recommending that, for sunglasses and fashion spectacles, the appropriate proposal is Option 1: *Status quo*.

This is based on the observation that the operation of Standards Australia Committee SF-006 Eye and face protection works appropriately in the protection of the Australian public and the maintenance of standards appropriate to Australian conditions.

For any opinion on Option 2, it would be necessary to know the proposed criteria and mechanisms for the rating of an overseas standard as “trusted”.

If the evaluation of “trusted” were delegated to Committee SF-006, as the best-informed body in the country on the subject, the outcome would be unlikely to be changed since the appropriate requirements of the ISO standards have already been incorporated into AS/NZS 1067, but with some increased protection given Australian conditions.

Option 3. There is no evidence that compliance with the mandatory standard is overly onerous or costly (being less than 0.15% of the value of the sunglass market). An important and significant requirement in AS/NZS 1067.1 has already been removed from the mandatory in the name of ease of compliance for business. The wisdom of this, in public health practice and Australian conditions, specifically, is doubtful. If testing has been carried out for any standard, then all that is required is some recalculation and an inspection of the labelling.

While minimising the effort that business might have to make in compliance with mandatory standards is commendable, but it is a step too far if this is at the cost of compromising the valid protection needs of the Australian public in Australian conditions.

Background

The Australian Government (The Treasury) have issued Consultation Regulation Impact Statement “Supporting business through improvements to mandatory standards regulation under the Australian Consumer Law”.

The options being canvassed are:

- Option 1 – Status quo
- Option 2 – Amend the ACL to allow the Commonwealth Minister to more easily declare trusted overseas standards
- Option 3 – Amend the ACL to more easily allow businesses to comply with the latest versions of voluntary Australian and overseas standards

Sunglasses and fashion spectacles are the subject of a product safety requirement,¹ which is based mostly on the Australian/New Zealand Standard.² These are explicitly referred to in the Impact Statement and it is noted that the AS/NZS standard has more stringent requirements than all other jurisdictions. In allowing the Commonwealth Minister to declare tested overseas standards, sunglasses and fashion spectacles the risk is introduced that sunglasses and fashion spectacles with inferior properties are permitted and an avoidable risk is introduced.

It should be noted that Standard Australia Committee SF-006 produced the test methods standard³ as a direct text adoption of ISO 12311.⁴ The consequence of this is that there is no need for retesting to comply with AS/NZS 1067, thus avoiding the technical barrier to trade that this would entail. Only the application or different compliance values needs to occur.

In this response, the significant differences between AS/NZS 1067 and the other standards in the world will be documented, viz. ISO 12312-1⁵ (which has been adopted in Europe as EN ISO 12312-1 and then as national standards, e.g. BS EN ISO 12312-1, DIN EN ISO 12312-1, and in Brazil⁶); ANSI Z80.3⁷ in the USA and SANS in South Africa.⁸ The rationale for the requirements of AS/NZS 1067 that differ will be discussed.

Exposure to ultraviolet radiation in Australia

Ultraviolet exposure is associated with a considerable number of conditions of the eyes and lids.⁹

The major difference between AS/NZS and other standards is in the definition of the long wavelength limit of ultraviolet. International practice in ultraviolet hazard evaluation defines ultraviolet as extending to 400 nm.¹⁰ Australia is well known to have higher UV exposures due to its range of latitudes, clearer atmosphere and reduced proximity to the sun in summer.¹¹

Standards

Development

Standards Australia Committee SF-006 is responsible for AS/NZS 1067 as well as other eye and face protection standards. Committee CS-053 was previously responsible for AS/NZS 1067 but was absorbed into SF-006 about two years ago. Consistent with Standards Australia policy, SF-006 has a combination of representation from industry, regulatory authorities (including ACCC), consumer organisations and experts.

AS 1067:1971¹² was the second sunglass lens standard published in the world after BS 2724:1956.¹³ It was revised as AS 1067:1983,¹⁴ to include requirements for frames. It was further revised into two parts,^{15,16} to separate the safety and other performance requirements, on the advice of the Treasury representative on CS-053, to facilitate adoption of part 1 as a Consumer Product Safety Standard. The first European Standard EN 1836 was published in 1997 and the 2003¹⁷ revision of AS/NZS 1067 made AS/NZS consistent with EN 1836 in test methods but the compliance values for some measures were varied. After the publication of ISO 12311 and ISO 12312-1,^{4,5} SF-006 identical text adopted 12311 as AS/NZS 1067.2:2016³ and modified text adopted ISO 12312-1 as AS/NZS 1067.1:2016.²

This paper will concentrate on the rationale for the differences between AS/NZS 1067.1 and ISO 12312-1:2013 and, also, with ANSI Z80.3 and SANS 1644 to illustrate the issues in the other standards if they were to be “trusted”.

Australia has been represented on ISO working groups on sunglasses since the very beginning of drafting, including as a joint ISO /European that eventually became European only and wrote EN 1836.

The other national and international committees are not balanced in the same way as Standards Australia committees are. ISO is dominated by manufacturers from European countries. In addition, Standards Australia committees work on a basis of consensus in balanced committees. ISO pays lip service to consensus, but the reality is that many convenors simply work on the majority vote of an unbalanced committee.

Enforcement

Australia is the only country in which a sunglass standard is directly enforced.

In Europe, the imperative is to comply with the EU regulation.¹⁸ The easiest way to show compliance with the Directive is compliance with EN ISO 12312-1. Sunglasses are rated Category I and manufacturers self-certify and CE mark their product. There are a significant number of non-complying sunglasses carrying the CE mark.¹⁹

In the USA, only the drop ball test, applied to all ophthalmic lens products, is mandated by the FDA.²⁰

In Brazil there are no mandatory requirements of sunglasses.²¹

The situation in South Africa is not known.

Differences in standards

Ultraviolet requirements

SF-006 and CS-053 before it, have been consistent in using the 400 nm limit from the very first edition of in 1971. (BS 2724:1956 did not stipulate any UV wavelength limits). The push to retain 380 nm comes from the ophthalmic industries since an untinted lens claimed to have “100% UV protection” will have a visibly yellow tint if the long wavelength limit is 400 nm but not if it is 380 nm. Since sunglass lenses are tinted, this slight coloration is, in reality, irrelevant. The extension of the long wavelength limit to 400 nm has the support of other experts on ISO TC94 SC6.²²

Exclusion of the region from 380-400 nm is to ignore around 1/3rd of the radiation in the UV region (depends on atmospheric conditions and latitude).²³

AS/NZS 1067 sets more stringent requirements for the UV-B region than in any other standard. This is consistent with the greater UV risks for Australians. Compared with AS/NZS 1067, for some categories of sunglasses or fashion spectacles, ISO 12312-1 allows transmission just over three times the amount of UV-B, ANSI Z80.3 allows up to five times more and SANS 1644 allows up to just over three times more.

While the requirements in the UV-A are numerically the same in AS/NZS 1067 and ISO 12312-1, the difference in long wavelength limit means that ISO 12312-1 is a less stringent standard because the transmission of lenses is, almost inevitably, higher in the 380-400 nm region. ANSI Z80.3 and SANS 1644 also have less stringent requirements than ISO12312-1.

Consequently, it is an inescapable conclusion that the inclusion of sunglasses complying with other standards and not AS/NZS 1067.1 will lead to an increase of ultraviolet dose to eye in Australia. This is an avoidable risk.

Coloration requirements – detection of traffic signals

One of the essential principles in personal protection, including of eyes, is to avoid introducing other risks. For instance, there is a robustness or impact test in each standard that ensures that lenses are not easily broken and represent an additional hard to the eyes. In the same way, there is a concern to preclude sunglass lenses that significantly affect the detection of traffic signals. Highly coloured lenses can comply with the standards but are required to be marked with a warning that they are not suitable for driving or road use. In the 2003 revision of AS/NZS 1067, the previous requirements on colour were, in the spirit of harmonisation, rewritten to use the same method as measurement as EN 1836. A comparison had been made between this and the previous method²⁴ and it had been established that the transmittance for blue signals (such as those used on emergency vehicles) in AS 1067 was significantly more stringent in AS 1067 than EN 1836. The requirement in AS/NZS 1067:2003 was rounded down by way of a compromise but was still 75% more stringent than the EN 1836 requirement (0.70 as against 0.40). In ISO 12312-1, the value was revised to make the value 0.60, but still less stringent than the AS/NZS 1067 value. Committee SF-006 reconfirmed the 0.06 value in AS/NZS 1067.1:2016 edition. ANSI Z80.3 specified the limits in a rather different way. The comparison made of the, then, applicable standards indicated ANSI Z80.3 was quite restrictive compared with BS 2724. At the time AS 1067 had no restrictions based on green signals. The current ANSI Z80.3 has, probably, about the same effect as the current AS/NZS 1067 for green signals. SANS 1422

uses the same test method as the original (pre-2003) AS 1067 but applies less stringent limits and applies only to gradient tint lenses. Comparison of compliance for other signals with other standards is difficult to gauge because non-compliance is a rare event in samples in the Australian market.

It has been shown that even sunglasses complying with AS 1067 can cause traffic signal naming issues, especially for people with the colour vision deficiency.^{25,26}

Consequently, it is clear that the inclusion of sunglasses complying with ISO 12312-1 standards and not AS/NZS 1067.1 would lead to reduction of the safeguards in Australia regarding blue signals.

This is another avoidable risk. This requirement does not exclude sunglasses from the market, it simply allows those that are of concern to carry a driving warning for the user.

Transmittance matching

Ensuring that, within manufacturable practicability, the amount of light transmitted by each of a pair of sunglass lenses is another requirement to avoid introducing a new hazard. The effect of unequal tints between lenses gives rise to a tendency to misjudge the distance of objects moving across the line of sight. This was of concern for driving. The difference may also be cosmetically noticeable.

The requirement in the original AS 1067 was a density difference not greater than 0.06. In the writing of AS/NZS 1067 to be harmonised with EN 1836, the requirement was rewritten in transmittance. The limit in EN 1836 was a difference of 20% whereas the AS 1067 limit translated as 15%, so 15% was set in AS/NZS 1067. In ISO 12312-1, the requirement was made 15%, so there is, at present, no concern. ANSI Z80.3 sets a density difference maximum of 0.08 (=20%), so is less stringent. SANS 1644 has the 0.06 limit as in AS 1067.

Consequently, there is currently no concern in this respect for sunglasses complying with ISO 12312-1 and SANS 1644. However, it seems inevitable that, in the next edition of ISO 12312-1, the limit will be changed to 20% for gradient tint lenses.

This raises the issue as to how changes in a “trusted” standard will be monitored to avoid changes beyond the control of Australian authorities that diminish the protections for the Australian public. ISO 12312-1 does not have any such labelling despite the Australian delegation repeatedly proposing it.

Labelling

AS/NZS 1067 requires the fashion spectacles and sunglasses to be accompanied by some general information about the level of UV protection. ISO 12312-1 and ANSI Z80.3 make no mention of ultraviolet in the labelling and SANS 1644 only mentions it for the Special Purpose Type (B) category.

In a study commissioned by the ACCC²⁷ into consumer purchasing decisions, the following key finding was reported (their emphasis);

“Protection is highly important when choosing sunglasses... The level of UV protection is amongst the most important purchase decision factors – 82% consider this to be extremely or very important when deciding which sunglasses to purchase. Glare reduction is also a critical factor for most.”

59% of respondents to the survey had some awareness of the categories of sunglasses and the description of the level of UV protection. If there is no guidance on UV protection provided with the sunglasses, how is the buyer to know? It is not necessarily a case of the darker the better.

In addition, AS/NZS 1067.1 and ISO 12312-1 have the methods and criteria by which to evaluate claims of superior protection, for instance “100% UV protection”. ANSI Z80.3 and SANS 1644 do not. Further, of all the standards, only AS/NZS 1067.1 has a definition of “UV400” and the means and criteria by which to justify such a claim.

Harmonisation and eye protection standards

Standards Australia committee SF-006 members are well aware of other practices, and take note of the requirements of other standards, especially ISO. Standards Australia is well represented on ISO TC94 SC6 Eye and face protection and the Australian viewpoint has always been taken seriously, especially when European and North American practices differ. Australians convene two working groups, WG 4 Occupational eye protection and WG5 Sports eye protection, and one project group WG2 PG2 Physical optics test methods.

SF-006 has always pursued harmonisation wherever possible. This is particularly so in the adoption of test methods but is less easily achieved in the setting of compliance values. This does mean that sunglasses and eye protection do not need to be retested to show compliance with AS/NZS 1067. The measured values are simply assessed against the different criteria. There is no need for product to be retested to be marketed in Australia.

SF-006 created AS/NZS 1067:2016 as an identical adoption of ISO 12311. Although errors in ISO 12311 have necessitated amendment subsequently. SF-006 has also identically adopted all the eye and face protection test method standards as AS/NZS ISO 18526.1-4. The process of identical adoption of the sports eye protection standards is in train, to be AS/NZS ISO 18527.1-3. The concerns about the 380-400 nm UV region have been partially addressed in these standards and SF-006 chose to be pragmatic since UV protection is not the primary concern in writing these standards. SF-006 has also identical text adopted AS/NZS ISO 12312-2 Filter for eclipse viewing. It is likely that ISO 19818-1 Laser eye protection will also be identical test adopted. SF-006 is in the process of considering ISO 16321.1-3, the occupational eye protection standards.

What happened before or without a mandatory standard?

Before

Unfortunately, there is no systematic assessment of the influence of enforcing sunglass and fashion spectacle compliance in Australia. An informal observation is that ACCC ordered product recalls for failures of performance of sunglasses have dwindled and that the vast majority of recalls ordered in recent years have been for inadequate or inaccurate labelling and the enforcement of the standard has, obviously, worked.

In 1968 and during the processes of writing the first AS 1067, Clark²⁸ reported on the performance of sunglass lenses. It difficult to interpret the data presented in terms of modern standards and it should also be noted that the majority of lenses in those days were glass (which is an inferior UV absorber), but an estimate would be that about 10% failed UV-B requirements and 18% failed UV-A requirements. In a 1981 study of ophthalmic tints,²⁹

12.5% failed ultraviolet requirements and 8.6% failed the coloration limits of AS 1067. In a 1985 study of children's and toy sunglasses,³⁰ 36% of the children's and 33% of the toy sunglasses failed the ultraviolet requirements of AS 1067. Only a small minority of children's sunglasses pass the whole standard. In 1993, before the methods and criteria for claims of UV protection were in AS/NZS 1067, there was widespread inaccurately claiming of protection.³¹

In 2003 and after 8 years operation of the mandatory standard, the, then, chair of Standards Australia, published a thorough summary of the needs for such a mandatory standard.³² The rationale that he presented still holds.

Other jurisdictions

As explained above, while the European regulations do mandate compliance, the sunglass industry is deemed self-regulating and the success of this in keeping non-complying product off the market is debateable.¹⁹

Surveys in other jurisdictions have returned such information as 43% failure in UVA transmittance,³³ 27% failure in ultraviolet protection,³⁴ 1% failure in UV protection but 100% UV protection was falsely claimed for them,³⁵ 7.9% failures in UVB and 4.2% in UV-A,³⁶ 10% UV failures³⁷ and 100% failures in UV A and B.³⁸ As a consequence, appropriate UV protection is nowhere near being assured without enforcement.

Cost of testing and reduction of mandatory requirements (Option 3)

The Australian sunglass market is around \$300m pa. After enquiry of the three independent testing laboratories, it seems that the costs of testing are less than 0.15% of this market value. Testing is required in Australia is not required and does not involve testing that would already have been carried out for ISO 12312-1 and/or ANSI Z80.3. Only some recalculation is required.

The current mandatory requirement¹ excludes one major tests, the resistance to solar radiation. It is already known that solar radiation reduced the impact resistance of ophthalmic lenses³⁹ and the amount of UV protection provided.⁴⁰ Given the higher UV irradiances in Australia, the exclusion of this requirement from the mandatory requirements exposes Australians to an increased secondary risk in the name of reducing testing costs. It is also a requirement that is included in ISO 12312-1 and ANSI Z80.3 so it is considered a significant need except in the mandatory standard and SANS 1644.

The role and responsibilities of Standards Australia Committee SF-006

Standards Committee SF-006 has always considered the wider picture represented by standards in other jurisdictions and has sought to harmonise whenever appropriate. Increasingly, test methods have been harmonised. But where the compliance values are more stringent than those prevailing in other standard are considered inadequate or inappropriate, including for Australia conditions, the committee would make no apology for the higher protection levels that it maintains. There are no performance requirements in AS/NZS 1067 that do not also appear in ISO 12312-1 and ANSI Z80.3, just, in some instances, more stringent requirements in response to local conditions or demonstrable needs.

Summary

AS/NZS 1067

- 1 contains only performance requirements for which there is a demonstrable and universally accepted need;
- 2 contains some requirements that are more stringent than other standards, given the Australian environment;
- 3 requires provision of the information that advises on sunglass selection with the information that the Australian public requires
- 4 has been consistent from the first edition in the quality expected of the protection of the public and the minimisation of secondary hazard; and
- 5 is written by a committee with balanced interests.

In jurisdictions where compliance is not mandated there are extensive evidence of inferior levels of ultraviolet protection.

There is some evidence, but no explicit studies, that the mandatory standard has improved compliance with the standards.

“Trusting” other standards could lead to diminution of the protection required in specifically Australian conditions and loss of the explicit information on UV protection.

There is no guarantee of the maintenance of the requirements of other standards.

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