

Australian Institute of Health & Safety (AIHS)

Submission to Standards CH-31 Committee

NATA Proposal – ‘Adoption of ISO 22262 Series

General Comments

1. The Australian Institute of Health & Safety (AIHS) does not support the proposal by NATA to retire AS 4964 in favour of adopting ISO 22262 Series, with annexes for “Australian conditions”. This paper provides an explanation for this position and detailed comments on the NATA submission.
2. This paper has been prepared by AIHS members and senior members of kindred professional associations including FAMANZ and AIOH who are trained and experienced asbestos risk management professionals with many years’ experience in both the application of asbestos analytical methodology to the prevention of asbestos related disease and its important position within Australia’s unique asbestos experience: usage patterns, control methodologies and systems and our regulatory regime. Even our demography can be an important factor in the selection of methods capable of delivering timely results to inform control review in our many remote workplaces.
3. The AIHS recognises that AS 4964 requires review and can be improved; but this is not in itself a justification for its replacement with the ISO 22262 series.
4. The AIHS supports a recommendation to review and update AS 4964 and acknowledges that further details on the analytical method would be beneficial. Notwithstanding copyright issues, these inclusions could draw significantly on other reference methods including HSE guide HSG248 and ISO 22262, but written for the Australian context accommodating our conditions as referred to above. A standard drafted specifically for Australian requirements would be far more beneficial in the long run than adoption of an international standard with a library of optional annexes to comply with Australian requirements.
5. The AIHS supports the use of ‘independently accredited’ laboratories for the analysis of asbestos in air and bulk asbestos containing materials. This is a requirement of model work health and safety regulations, Victorian health and safety regulations, Western Australian safety and health regulations, and various environmental regulations in many Australian state and territory jurisdictions. AIHS continues to advocate for this in all states and territories recognising that external, independent laboratory accreditation and proficiency testing programmes provide a critical role in quality assurance. The AIHS notes that NATA, amongst others accreditation bodies, provides this service for a fee.
6. The AIHS is not opposed in principle to the adoption of ISO standards.

However, the AIHS is opposed to a commercial laboratory accreditation body being a driver in the redirection or adoption of a laboratory standard, or significant change in laboratory method. This is potentially beyond the scope and extent of accreditation body expertise. Most significantly, it also blurs lines of independence between accreditation bodies and laboratories; and raises issues of potential conflict of interest.

Furthermore, the concept of adding Australian annexes to meet local conditions does not necessarily mean that the requirements within them will be followed. In general, annexes are used to provide additional or supplementary information. In many Australian Standards annexes are assigned nominal or optional status. Annexes should not be used to specify additional requirements to the test method. To use annexes in this way will lead to confusion in areas where the requirements of the main document and those in the annex are not fully aligned.

7. The ISO 22262 series does not deal with the analysis of soils and dusts (as AS 4964 does) and is the reason that annexes would be required for so called “Australian conditions”. This is a significant omission from regulatory and risk management points of view.
8. The use of scanning electron microscopy (SEM) and transmission electron microscopy (TEM) for the analysis of asbestos is evolving in Australia. A specific method for analysis by electron microscopy could be prepared by Standards Australia however this should not preclude the application of the test method currently in AS 4964.

Specific Technical Comments on the NATA Submission

As a general comment, the NATA submission provides potentially misleading and incorrect statements in its criticisms of AS 4964 and appears biased in favour of adopting the ISO 22262 series. The following comments have been provided to address some of the more serious erroneous statements.

1. NATA’s submission in support of replacing AS 4964 with ISO 22262 is largely based on a perceived deficiency that AS 4964 does not deal with all major forms of asbestos and scanning and transmission electron microscopy are not covered by the current Standard.

AS 4964 describes polarised light microscopy (PLM) supplemented with dispersion staining (DS) as the primary technique for identification of asbestos in building materials, soils, ores, and dusts. AS 4964 acknowledges the limitations of PLM / DS with respect to analysis of tremolite, actinolite, and anthophyllite, due to these minerals showing a wide range of optical properties preventing their unequivocal identification. Where fibrous materials cannot be unequivocally identified by PLM / DS, AS 4964 recommends confirmatory analysis by infrared spectroscopy (IR), x-ray diffractometry (XRD), SEM, or TEM; although it notes that only TEM can determine that ‘visible’ fibre bundles are composed of fibrils. AS 4964 does not go on to describe the confirmatory analytical methods in detail; however, this is not a valid reason for AS 4964 to be withdrawn.

It is noted that the vast majority of the asbestos minerals encountered in Australia are chrysotile (White Asbestos), amosite (Brown Asbestos), and crocidolite (Blue Asbestos). Anthophyllite, actinolite, and tremolite are rarely encountered¹. While AS 4964 recommends further confirmatory analysis for anthophyllite, actinolite, and tremolite, it allows them to be reported as unknown mineral fibres if further analysis is not required.

It is further noted that many analytical methods are not covered by Australian Standards (e.g. crystalline silica analysis) however NATA currently accredits laboratories to perform silica analytical work. The absence of an analytical method for asbestos using electron microscopy is not a justification in itself to abolish a standard.

2. In Section 1B of its submission, NATA makes a number of statements about AS 4964 that are incorrect.

(i) AS 4964 “*does not meet international best practice for the analysis of products containing asbestos*”.

The AIHS disagrees with this statement. As noted in the previous section, AS 4964 describes PLM / DS as the primary technique for identification of asbestos in building materials, soils, ores, and dusts. PLM / DS is the method of choice globally because of its simplicity, low cost, relevance, and satisfactory limits of detection.

As noted previously, AS 4964 acknowledges the limitations with respect to analysis of tremolite, actinolite, and anthophyllite by PLM and recommends confirmatory analysis by IR, XRD, SEM, or TEM.

Trace analysis is essential for conducting risk assessments for asbestos, particularly in soils, ores, and dusts. AS 4964 describes in detail the requirements for trace analysis. As noted in General Comments, Section 1, the procedures for trace analysis in ISO 22262 are wholly inadequate and are the primary reason for the inclusion of “Annex ZZ for Australian conditions” described by NATA.

Far from not meeting “*international best practice*”, the methods described in AS 4964 are widely used globally, and the procedures / methods for conducting trace analysis and the reporting of results far exceed those described in ISO 22262 and other equivalent standards.

(ii) The reporting requirements of AS 4964 are “*insufficiently precise for the Australian regulatory context and lead to variation in test report format and conclusions that cause market confusion*”.

¹ Chrysotile constituted 95% of total world production of asbestos with the balance being made up of amosite and crocidolite (and to a far far lesser extent anthophyllite). We are not aware of any deposits of actinolite and tremolite that were exploited on a commercial scale. In the experience of the experts involved in the preparation of this submission actinolite and tremolite are only encountered as contaminants in association with other materials. Scrapping PLM/DS (at very significant expense) for material that may only be encountered by commercial laboratories once a decade would be irresponsible, particularly when AS 4964 has a method of reporting these materials and when there are a myriad of other elongate mineral particles (e.g. erionite) that cannot currently be reported by either standard. See also 2(iii) below.

Section 9 of AS 4964 outlines requirements for the reporting of results that are prescriptive and detailed. The requirements include:

- Description of the analytical method
- Description of the sample (and any sub-samples), including weight and/or size in relation to the parent material from which it was taken, as to provide sufficient information to ensure that results can be correctly interpreted
- Description of the procedures chosen for sampling with respect to the requirements specified in the Standard for building materials, ores, and soils.
- Sample preparation procedures as described in the Standard
- Reporting of the results for trace analysis

The reporting requirements have been specifically designed to facilitate the risk assessment process. This is particularly relevant for the assessment of dusts, soils, and ores where trace analysis can assist with determining the potential for materials to release / generate airborne respirable asbestos fibres if disturbed.

In our experience the issues that have arisen with respect to reporting are:

- Some laboratories not reporting in accordance with the requirements of AS 4946; and
- NATA's failure to censure laboratories not reporting in accordance with the requirements of AS 4946 (despite the laboratory being accredited to AS 4964 for the analysis asbestos in soils and bulk materials).

It is not accurate to describe these issues as a 'deficiency' in AS 4946.

- (iii) In Section 1B of its submission, NATA states that: *"These deficiencies constitute a risk to the health and wellbeing of the Australian community and cause confusion.... No action will continue to risk exposure of the Australian community to this known carcinogen and risk the importation of non-compliant products in contravention of the 2003 prohibition of products containing any form of asbestos."*

NATA offers no evidence to support these statements.

Furthermore, we note there is scant scientific basis for these statements. There is no evidence that the use of AS 4964 as a method has resulted in an increased exposure risk. This statement is factually incorrect, emotive, and inflammatory. The additional attributes of analytical methods such as TEM/SEM does not mean that the method in AS 4964 is somehow technically inadequate or unsafe. The most important part of the analysis (optical or electron microscopy) is finding the fibres to analyse in the bulk material. This is an issue for both methods. PLM/DS examines the morphology of the extracted fibres and uses their optical properties to identify them. Electron microscopy examines the morphology but uses x-ray analysis to determine the elemental content and ratio to compare with the known asbestos materials. Electron microscopy can discriminate the anthophyllite, tremolite, and actinolite. Discriminating between the asbestos types by PLM/DS is problematic because their optical properties are similar (and can overlap). They can be identified as asbestos, but

unequivocal identification of the type of asbestos is difficult for the abovementioned reasons.

The AIHS considers that the correct application of AS 4964 for the assessment and reporting of asbestos in bulk materials, soils, and ores provides a satisfactory level of reporting for the management of risks associated with asbestos in Australia.

Consultation with some of the more experienced laboratories in this specific area indicates that there is no evidence to suggest any confusion for suppliers, importers, and regulatory agencies if the results of asbestos analysis are reported in accordance with the requirements of AS 4964.

With respect to the importation of products that are non-compliant due to their inclusion of asbestos, this is unrelated to AS 4964. The issues are complex and include confusion created by the poor drafting of the *Customs (Prohibited Imports) Regulations 1956*, which is outside the scope of the paper. However, the primary cause results from the failure of importers to maintain satisfactory due diligence over the process by adequately: (i) relaying the requirements to their overseas suppliers; and (ii) testing products in accordance with AS 4964 before they are landed in Australia.

3. Section 1C correctly notes that a normative Annex ZZ will be required to cover matters already specified in AS 4964 but goes on to imply problems with AS 4964 that are incorrect.

(i) Ensure that laboratory analysis will address all six types of asbestos.

As noted previously, AS 4964 deals with the major commercial asbestos types generally encountered in Australia. It makes recommendations for confirmatory analyses of asbestos minerals that cannot be unequivocally identified by PLM / DS.

It is incorrect of NATA to assume there are only six types of asbestos that have impacts on human health. There is a myriad of elongate mineral particles that continue to emerge in the literature, which are not currently dealt with by either AS 4964 or ISO 22262.

(ii) Provide clarification for the testing of soils, ores, aggregates, and dusts.

As previously noted, AS 4964 currently contains prescriptive requirements for the analysis and reporting of asbestos in these materials.

(iii) Improve the consistency and clarity of test reports.

As previously noted, AS 4964 currently contains prescriptive requirements for reporting. Retiring AS 4964 in favour of ISO 22262 will have no impact on this issue.

NATA would achieve far greater consistency and clarity of test reports by strictly enforcing the reporting requirements of AS 4964 for accredited laboratories.

- (iv) NATA asserts that the Limit of Detection (LOD) in AS 4964 ‘does not meet the regulatory framework’.

This assertion by NATA is an error. Many people have made the same mistake and NATA itself has made efforts to address this misunderstanding in their 2014 NATA news publication.

A comparison of the method in Sections 4.5 and 4.6 of ISO 22262-1 compared to section A4 of AS 4964 shows there is little real improvement in precision of the method unless SEM or TEM analysis is conducted.

- (v) Include details for sample prep . . .

As previously noted, AS 4964 currently contains prescriptive requirements for the sample preparation, testing, and reporting of results for soils, ores, aggregates, and dusts.

4. Section 1D – no comment
5. Section 1E – no comment
6. Section 2A Public health and safety

NATA states: “With the shift of manufacturing off-shore in the past three decades, many products and materials that potentially contain asbestos are imported into Australia. With this are the two related issues of Australia’s prohibition of asbestos being poorly understood by trading partners and the lack of fit-for-purpose test methodologies provided by Australia’s own standard. This latter issue is exacerbated by the lack of profile of the Australian Standard internationally and the result that few offshore testing laboratories are accredited for testing to AS 4964. Adoption of ISO 22262 will bring the Australian Standard for asbestos testing methodology in line with international best practice. This will reduce the risk of the Australian consumer coming into contact with asbestos containing materials (ACM) by improving the scope of testing performed. Adoption of the ISO standard will also be quicker than a substantial revision of AS 4964:2004”.

Any lack of understanding of Australia’s asbestos importation prohibitions by trading partners is surely an issue of communication with little if any relevance to analytical methods. The idea that our methods are not fit-for-purpose is in no way demonstrated in the NATA submission and the proposition that we are not in line with international best practice simply because we differ, with no clear argument put forward on precisely where ISO 2262 is superior, requires far more justification. There is great wisdom in the well-worn saying “if it ain’t broke, don’t fix it”, particularly when the “fixing” will entail great cost and disruption to a service, about which (in the experience of those at the coalface best placed to judge) consumers have no complaints. Generally, complaints relate to the cost and the imposition of what seem to be unnecessary or inconsistent requirements by NATA; issues aligned to the management of the accreditation system not the underlying methodology.

The AIHS does not believe the adoption of the ISO 22262 series will have any impact on improving compliance with Australia’s prohibition on asbestos from our trading partners. No evidence has been provided that these issues are related to a lack of suitable testing methodologies or the profile of Australian Standards internationally.

In several Australian jurisdictions, the work health and safety regulations are tied to AS 4964 and use terminology from the standard. Regulatory reform is often a drawn-out process with no guarantee that all jurisdictions will take a consistent approach. The AIHS is concerned that adoption of the ISO 22262 series will result in significant regulatory confusion.

We do not agree that a revision of AS 4964 will be slower than adoption of the ISO 22262 series and development of the required Annexes. In any event, time spent perfecting AS 4964 would surely be minimal compared with the time and cost associated with the adoption of a new standard across all Australian States and Territories. A change that should be subject to the quantitative scrutiny of an impact study, as would be the case with a regulatory change of this magnitude.

7. Section 2A Social and community impact

NATA lists an incident at the Perth Children's Hospital where imported materials installed in the construction were subsequently found to contain asbestos, the inference being this was associated with deficiency in testing by AS 4964. This was unrelated to AS 4964 and was the result of a failure of the importer to adequately test materials before supplying to the market.

NATA correctly states that *"An improved testing regime will improve confidence."* Again, this is unrelated to AS 4964. In our experience consumers generally have great confidence in NATA approved asbestos identification and fibre counting, and there is no indication of a crisis of confidence in the methodology amongst the experienced technical people who are most likely to care.

8. Section 2A Competition

In its submission NATA states *"AS 4964:2004 covers only polarised light microscopy. This will increase opportunities for testing by providing more techniques that can be taken up. The market will benefit by having a greater choice of technique for testing"* and *"there are no anticipated negative impacts on competition"*.

NATA, as a large accreditation service provider, is not in an independent position to be providing advice on the market. Contrary to NATA's assertion that this proposal will have minimal negative impacts on competition, the AIHS believes that this requirement will result in a contraction in the number of certified laboratories and a concentration of facilities belonging to larger commercial entities. Smaller laboratories will be squeezed out of the market due to prohibitively high costs of equipment purchase, set up, and maintenance reducing choice, competition, and availability for the testing of asbestos materials driving up the costs of testing².

² A laboratory set up for optical polarised light microscopy with dispersion staining (PLM/DS) with top of the range stereo and compound microscopes and including training analysts would be under \$60 to \$100K excluding premises. Optical microscopy is a relatively simple, straight forward, and well understood technique. Electron microscopy (EM) is neither inexpensive nor straightforward: sample preparation is far more complex, time consuming and therefore more expensive than that for PLM/DS. The equipment is also roughly 20 times the cost. Turnaround-time for EM is measured in days, for PLM/DS TAT can be as low as minutes, depending on the sample matrix. Total equipment and operator training costs could well exceed \$1,000,000 and the premises housing the equipment must be vibration free and temperature controlled all of which adds considerably to the expense.

9. In Section 2 Economic Impact

- (i) The NATA submission contains the following statement: *“Improvements to testing capacity will provide a greater assurance of compliance with safe work regulations and the prohibition of ACM importation. ISO 22262 is an internationally recognised standard allowing Commonwealth and State agencies to have access to better quality data. This will reduce the chances of delays for imports and improve traceability of decisions based on that data.”*

NATA offers no evidence to support these statements.

NATA overstates the positive impacts by implying there are issues with the use of AS 4964. AS 4964 is a perfectly adequate method for the testing of asbestos in most applications. For the reasons already stated, withdrawing AS 4964 in favour of ISO 22262 will not provide any net improvement in benefits relating to testing capacity, nor assurance of compliance with the State work health and safety regulations and *Commonwealth Customs (Prohibited Imports) Regulations 1956*.

Similarly, it will not impact the quality of the data and is unrelated to delays for imports or traceability of data.

- (ii) NATA understates the negative impact with: *“Investment in equipment by (accredited) testing laboratories will be required to meet the requirements of all parts of ISO 22262”*.

As noted previously, contrary to NATA’s assertion that this proposal will have no negative impacts on competition, the AIHS believes that retirement of AS 4964 in favour ISO 22262 will reduce competition and drive up prices. PLM / DS was chosen as the method of choice because of its simplicity, low cost, relevance, and satisfactory limits of detection. Apart from the far higher indirect costs of electron microscopy methods (higher set up and maintenance costs), the turnaround times are far longer and analytical costs more expensive. This will have a significant impact on consumers across all areas of the Australian market. The health and economic implications for remote sites, small business and domestic customers need to be considered with great care.

General Comments

1. Trace analysis is only briefly covered in ISO 22262

AS 4964 clearly details the requirements for, the method to conduct, and the reporting of trace analysis. This allows for a universal approach to trace analysis. Trace analysis is covered briefly and vaguely in ISO 22262-1, Section 7.2.3.5. This section does not fully detail the method for trace analysis beyond the use of two slides prepared with random test portions of the suitably treated sample. No information on the interpretation of results is provided. This is a significant omission for Australian conditions. The adoption of an annex to plug this gap may lead to different results or interpretation of results between the main standard as used internationally and the Australian annex.

2. The ISO 22262 series does appropriately deal with soils and dusts

The analysis and presentation of findings for the analysis of soils has not been fully detailed within ISO 22262.

At present in Australia there is confusion on whether samples from environmental studies should be analysed in accordance with the requirements of either the NEPM or AS 4964. This in itself is a confusing situation for clients and regulators who have to decipher results from different laboratories. Adding annexes to ISO 22262 that fully covers the Australian requirements for the analysis of asbestos in soil would create further confusing and controversy.

End of Submission