# AHCA Position Paper 001: Reliability of Asbestos Fibre Air Monitoring Results Without Metrological Traceability

"If the result of an analysis cannot be trusted, then it has little value and the analysis might as well have not been carried out (Eurachem Guide 2014)".

## The Issue

The Asbestos and Hazardous Materials Consultants Association (AHCA) has concerns regarding the practice of using unproven volume measurements (of air) to calculate airborne asbestos fibre concentration results, these results are then issued as fibres per millilitre (f/mL). The issue arises when the equipment used in the sample train has a lack of metrological traceability to understand the measurement uncertainty and accuracy of the analytical result. This generally occurs when the calibration of the sample train is not under the control and supervision of a National Association of Testing Authorities (NATA) Australia accredited facility.

Metrological traceability is a property of the measurement result whereby the result can be related to a reference through a documented unbroken train of calibrations, each contributing to an established measurement uncertainty (NATA 2020). Some examples of measurement uncertainty include:

- Sampling pumps undergoing unaccredited calibration to the manufacturers standard (decrease in backpressure with increase in flowrate), or pumps not being calibrated at all on an ongoing basis vs NATA accredited facilities as per industry standard (increase in backpressure with increase flowrate to a defined calibration schedule).
- Sampling pumps auto switch on/off (programable setting) not being calibrated by means set out by the Australian Institute of Occupational Hygiene (AIOH) equipment calibration technical paper.
- Secondary flow meters are not being calibrated to a verified primary standard volume (Soap Bubble Tube).
- Facilities accredited by NATA are providing the microscope "Factor" (a calculated numerical value specific to an individual microscope) to unaccredited 3rd party clients, and thereafter to end clients for comparison with available guidance. This facilitates the issue of results that have not followed procedures designed to provide traceability and confidence in the preparation of the analytical result.
- Personnel not trained for volume measurement by the NATA accredited facility who are responsible for the control of sampling and analysis.

Please refer to the process for metrological traceability flow chart **Figure 1 Appendix A**.

The consequence of having one or more of the steps in **Figure 1** not being followed leads to unreliable airborne asbestos fibre concentrations being compared to the concentration of <0.01 f/ml, recognised as the mandatory required WHS regulations clearance standard.

This means for works requiring control monitoring and clearance monitoring as per state/territory WHS regulations (i.e., during Class A (friable) asbestos removal works) the air monitoring results would be considered invalid and would not meet WHS Regulations.

If the result of an analysis cannot be trusted, then it has little value, and the analysis might as well have not been carried out (Eurachem Guide 2014).

## The Concern

Though more emphasis has been placed on facilities by NATA to monitor and control metrological traceability for field sampling (with a strong focus on airborne fibre concentrations for asbestos and SMF fibres), unaccredited facilities which sit outside of NATA Accreditation are issuing inaccurate asbestos airborne fibre concentrations on test reports.

In the opinion of the AHCA the practice of undertaking asbestos air monitoring with the absence of metrological traceability leads to the publishing of results that are ultimately false and misleading. This practice must be addressed and through this position paper the AHCA as an industry association is hoping to drive and encourage the industry to maintain scientifically robust practices for the safety of all stakeholders.

## Current Guidance and Legislation

SafeWork Australia (2020) state in section 3.11 of the *Model Code of Practice How to Safely Remove Asbestos (2020),* air monitoring must be conducted in accordance with the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres, 2nd Edition [NOHSC: 3003 (2005)] (the membrane filter method). In the WHS regulations and model code of practice there is no documented mandate for the air monitoring/sampling train to be NATA accredited or demonstrate documented metrological traceability, only NATA accredited analysis of the membrane filter is referred to.

The NATA Specific Accreditation Criteria (SAC) Asbestos Sampling and Testing (2022) provides clear guidance on the need for metrological traceability and prohibits the false reporting of airborne fibre concentrations, however the document is only applicable to NATA accredited facilities, therefore NATA has no governance over unaccredited facilities which issue asbestos results. However, on the 22nd April 2024 NATA released a statement providing comment on this current industry issue, highlighting the potential human health risk that must be considered. The NATA statement is attached as **Appendix C** to this position paper.

## Unaccredited Air Monitoring

The key issues associated with unaccredited air monitoring are demonstrated through the absence of internal and external auditing of the sample train and sampling process, with no reliability in the sample volume captured, this is due to no traceability to establish the accuracy of flow meters and increased uncertainty of the stable performance of sampling pumps.

The sample volume is a key component of the airborne asbestos fibre concentration calculation. If the sample volume captured is without metrological traceability any estimated asbestos airborne fibre concentration cannot be relied upon and must not be used for comparison against the mandatory required WHS regulations clearance standard (<0.01 f/mL).

The Eurachem Guide (2014) states “For an analytical result to be fit for its intended use it must be sufficiently reliable that any decision based on it can be taken with confidence. Thus, the method performance must be validated and the uncertainty on the result, at a given level of confidence, estimated”.

SafeWork Australia must have confidence in airborne asbestos fibre air monitoring results to satisfy the requirements of section 3.11 of the *Model Code of Practice How to Safely Remove Asbestos (2020)*.

In industry, unaccredited air monitoring for many analytes including asbestos is widespread, with the main issue being, many stakeholders are unknowingly receiving and using inaccurate airborne asbestos fibre air monitoring results to confirm the suitability of asbestos removal controls and reoccupy areas following asbestos works. AHCA believes industry must remove this misrepresentation of data.

## AHCA Position and Recommendations

To eliminate the misuse of data by unaccredited 3rd parties and their clients the AHCA respectively put forward and propose the following position and recommendations:

### Changes to WHS laws and codes

- Safe Work Australia to amend the model WHS regulations to require air monitoring to be undertaken demonstrating documented metrological traceability, by an accredited facility or amend the 'competent person' definition.
- Safe Work Australia to amend the model Code of Practice for How to Safely Remove Asbestos to include guidance on establishing measurement uncertainty for the volume of air sampled and demonstrating metrological traceability.

### Improving competency and training

- Ensure persons who carry out air monitoring are trained in how to demonstrate metrological traceability.

### NATA role

- NATA to not endorse any air monitoring result that has not followed procedures for metrological traceability.
- NATA accredited facilities cease issuing reports in fibres per field, to eliminate the misuse of the data by unaccredited 3rd party clients.
- NATA to undertake a thorough review of the audit process, increasing scrutiny on how facilities present air monitoring sample results.

### Educating duty holders

- Industry and regulators issue guidance to PCBU's and those who commission asbestos removal work about how to identify that air monitoring is conducted appropriately so that the results can be relied upon.
- Equipment hire companies to rent calibrated air monitoring equipment, demonstrating metrological traceability and/or under NATA accreditation. Or state the equipment is not calibrated.

### WHS Regulators

- WHS Regulators to include requirements for the volume of air sampled and demonstrating metrological traceability as a condition of an asbestos assessor's license and if the assessor is found not to comply the regulator can suspend or cancel a license.
- Require clearance certificates to include how metrological traceability was established for the volume of air sampled.
- WHS Regulators issue guidance to competent persons and licensed assessors about the process to ensure metrological traceability for air monitoring sample trains.

### Industry Stakeholders

- Stakeholders including (but not limited to) government departments & organisations, trade unions to mandate air monitoring and analysis results be undertaken by a facility accredited by NATA for volume measurement (air monitoring) and fibre counting (Phase Contrast Microscopy (PCM) in accordance with the *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres, 2nd Edition [NOHSC: 3003 (2005)] (the membrane filter method)*.

**Please Note:** Whilst the focus of this paper is in relation to airborne asbestos fibre air monitoring, the principle of accurately establishing the volume of air sampled and demonstrating metrological traceability applies to the sampling of all analytes where the volume measurement of the air sampled is critical to the analytical result.

including but not limited to: Respirable Dust, Respirable Crystalline Silica, Inhalable Dust, Diesel Particulates, Welding Fumes, VOC's, PAH's.

The following technical guidance is available and recommended by the AHCA:

- Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres, 2nd Edition [NOHSC: 3003 (2005)] (the membrane filter method);
- National Association of Testing Authorities (NATA) SAC 07 Life-Sciences ISO IEC 17025 Annex Asbestos sampling and testing; and
- AIOH Equipment Calibrations Technical Papers: Flow Measuring Equipment: Calibration Requirements, Air Sampling Pumps: Equipment Calibration Requirements.
- AHCA Position Paper (AHCAPP001) **Appendix B** Check List.

AHCA has developed a checklist (**Appendix B**) to assist industry stakeholders in confirmation that air monitoring, analysis and associated results are fit for purpose.

## Conclusion

This document is made with the intention to support the WHS regulations across all states and territories to give guidance and help prevent the misrepresentation of data being used across the asbestos industry.

Air monitoring for asbestos is specified within the WHS regulations within clauses 473, 474, 475 and clause 482. Where air monitoring for asbestos is undertaken then the membrane filter method described in '*Guidance note on the membrane filter method for Estimating Airborne Asbestos Fibres [NOHSC: 3003 (2005)]* is to be used.

Appendix A delineates a procedure for calibrating flowmeters against a primary calibration device that is calibrated against a primary standard. Additionally, 'Part 10.1.1 Sampling Pump' stipulates the need for choosing a sampling pump that is capable of maintaining the required flowrate with a variation with ±10% for the entire sample duration.

Given the risks associated with exposure to asbestos as well as the additional prescriptive requirements surrounding control air monitoring at friable asbestos removal sites, competent persons undertaking the air monitoring should minimise their sampling uncertainty in order to estimate airborne asbestos fibres as accurately as possible. This can only be achieved by utilising secondary flowmeters that have been calibrated against a primary standard and utilising calibrated pressure gauges when calibrating sampling pumps, as described within the membrane filter method. Where this assurance is not being conducted, then we cannot accept that the air monitoring is being conducted in accordance with the membrane filter method and therefore in breach of the WHS regulations.

## References

Australian Institute of Occupational Hygiene. 2018, *Air Sampling Pumps Equipment Calibration Requirements Technical Paper,* Australian Institute of Occupational Hygiene, Melbourne.

Australian Institute of Occupational Hygiene. 2018, *Flow Measuring Equipment Calibration Requirements Technical Paper,* Australian Institute of Occupational Hygiene, Melbourne.

Eurachem Guide. 2014, *The Fitness for Purpose of Analytical Methods – A Laboratory Guide to Method Validation and Related Topics*, Eurachem Working Group, United Kingdom.

National Association of Testing Authorities (NATA). 2022, *General Accreditation Criteria*, *Metrological Traceability Policy*, National Association of Testing Authorities, Melbourne.

National Association of Testing Authorities (NATA). 2020, *Specific Accreditation Criteria, Life-Sciences ISO IEC 17025 Annex Asbestos sampling and testing*, National Association of Testing Authorities, Melbourne.

National Occupational Health and Safety Commission. 2005, *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres, 2nd Edition [NOHSC: 3003 (2005)]*, National Occupational Health and Safety Commission, Canberra.

Safe Work Australia. 2020, *Model Code of Practice How to Safely Remove Asbestos*, SafeWork Australia, Canberra.

# Appendix A: Metrological traceability flow chart.

## Appendix A: Metrological Traceability Flow Chart

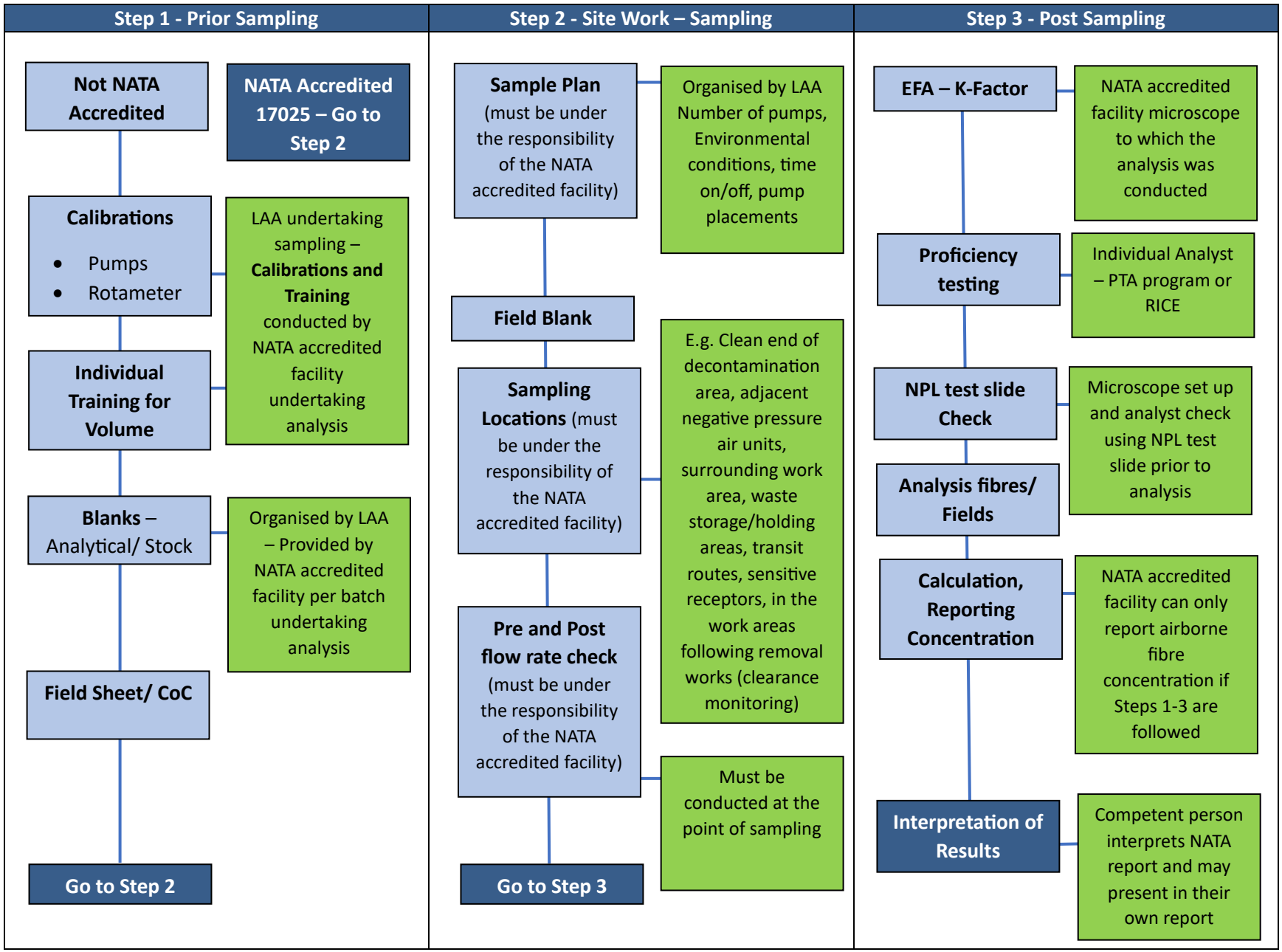


**Figure 1**

Note: NATA (2022) states, the facility may only issue asbestos fibre concentration results under its scope of accreditation if it takes responsibility for the sample collection, including volume measurement (i.e. its scope of accreditation includes ‘volume measurement’) addressing all relevant accreditation criteria (e.g. personnel training and competency, equipment calibration and maintenance, etc.). This is regardless of the employment status of the personnel. A Competent person is recognized as per the WHS regulations. i.e Licensed Asbestos Assessor for Class A removal works.

# Appendix B: NATA accredited air monitoring stakeholder metrological traceability check list.

## Appendix B: NATA Accredited Air Monitoring Stakeholder Metrological Traceability Check List

| Ask yourself these questions | Y | N | Notes/Comments |
|---|---|---|---|
| Is the air monitoring being undertaken by a NATA accredited facility? | | | |
| Is the NATA accredited facility scope active and current at https://nata.com.au/find-organisation/ ? | | | |
| Have the calibration certificates for pumps and rotameters been reviewed prior to works? | | | |
| Are the calibration certificates for pumps and rotameters current and in date? | | | |
| Have the consultant (the sampler) training records and competencies (LAA license) been reviewed? | | | |
| If the asbestos is deemed to be friable is an LAA conducting the air monitoring? | | | |
| If the asbestos is deemed to be friable is clearance air monitoring being conducted by the LAA? | | | |
| Are pump flow rates being checked at the sample location at the start and end of the sample period? | | | |
| Does the air monitoring report have the NATA logo present, with the NATA accreditation number displayed, are results reported as fibres/ml concentrations? | | | |

## Appendix C: Reporting asbestos fibre concentrations in air. National Association of Testing Authorities (NATA). April 2024.

**Reporting asbestos fibre concentrations in air.**

NATA offers accreditation for the determination of asbestos fibre concentration in air in accordance with the *Guidance Note Membrane Filter Method For Estimating Airborne Asbestos Fibres* 2nd Edition NOHSC3003-2005 or another method may be used*.

*NATA acknowledges that the current methodology required to be used by legislation is the *Guidance Note Membrane Filter Method For Estimating Airborne Asbestos Fibres* 2nd Edition NOHSC3003-2005

NATA accredited facilities can issue results as fibres per field when they do not have volume measurement data that has been generated by a NATA accredited facility. This is not recommended however because fibres per field data cannot be used to make a decision on whether the concentration of fibres in the air complies with work health and safety regulations.

NATA is aware that accredited facilities are asked to provide Effective Filter Area (EFA), graticule and Microscope K factor calibration calculations to customers and that this information is then used to calculate fibres per millitre. Calculation of asbestos fibre concentration without the assurance of the functioning of equipment or the competence of personnel performing the collections that comes with NATA accreditation for these activities poses a potential public health risk.

*The NATA Specific Accreditation Criteria (NATA SAC) for asbestos sampling and testing provides the following criteria:*

- *Test reports for airborne fibre concentrations must be issued in accordance with the test method requirements. Test reports for asbestos fibre counting must include the results reported 'x" fibres per 'y' fields. Where the facility is not accredited for volume measurement, results cannot be reported as fibres per milliltre.*

NATA is writing to applicant and accredited facilities to advise that the potential for a public health risk needs to be taken into consideration before issuing fibres per field results and Effective Filter Area (EFA), graticule and Microscope K factor calibrations where the volume measurement is not covered by NATA accreditation.

If you have questions on this matter please contact Neil Shepherd Sector Manager Life Sciences neil.shepherd@nata.com.au