Proficiency Module Syllabus

P403 – Asbestos Fibre Counting (PCM) (including Sampling Strategies)

Aim

To provide candidates with theoretical and practical knowledge in the techniques of fibre counting of asbestos air samples using phase contrast microscopy (PCM).

Prior Knowledge

Candidates for this course are expected to be aware of the contents of HSG 248 Asbestos: the analysts' guide for sampling, analysis and clearance procedures, and in particular Appendix 1: Fibres in air: sampling and evaluation of by phase contrast microscopy. Candidates will preferably have prior experience of analysing fibre count samples and may already be participating in a quality control scheme.

Learning Outcomes

Candidates will be able to describe and carry out the approved methods for correctly setting up air sampling equipment and for fibre counting, and have an understanding of the accuracy and limitations of these methods and the requirements for quality control.

Content

The syllabus is structured into four sections:

		Time Allocation
1	**Setting up of Microscope**	**10%**
2	**Filter Preparation, Fibre Counting and Set Up of Air Sampling Equipment**	**30%**
3	**Calculation of Results, Quality Control, Reporting and Communication**	**10%**
4	**Practical Work**	**50%**

Note: Reference is made in this syllabus to HSE guidance and other documentation. This list may not include the most up-to-date relevant publications from HSE and other sources and is intended as guidance for candidates only.

1 Setting up of Microscope (10%)

1.0.1 Describe the theory of phase contrast microscopy.

1.0.2 Use of light microscopy, setting up of Koehler or Koehler type illumination, calibration of stage micrometer and use of test slides.

1.0.3 Demonstrate and use of the Walton Beckett graticule, stage micrometer and NPL test slide.

1.0.4 Candidates must be given the opportunity to set up various makes of microscope used in this work as well as to count slides of known quality such as those used in the RICE scheme.

2 Filter Preparation, Fibre Counting and Set Up of Air Sampling Equipment (30%)

2.0.1 Selection and set up of air sampling trains for monitoring of airborne fibre concentrations. Calibration of air sampling trains and minimisation of sampling error.

2.0.2 Air sampling strategies, e.g. requirements and locations for leak testing, background testing, reassurance sampling and personal monitoring.

2.0.3 Handling and preparation of filters, and counting of fibres in accordance with the recognised counting rules, i.e. the WHO method as specified in HSG248 (1).

2.0.4 Discussion of the limitations of the methods together with understanding of accuracy, precision and systematic differences.

3 Calculation of Results, Quality Control, Reporting and Communication (10%)

3.0.1 Calculation of airborne fibre concentrations from fibre count data and comparison of results with appropriate standards.

3.0.2 Examination of the reliability of results in relation to quality control schemes such as UKAS, RICE and ISO and European Standards for Good Laboratory Practice (GLP).

3.0.3 Necessity for internal quality schemes, i.e. counting of blank filters and counting audits.

3.0.4 Describe the requirements for formal reporting of and communication of analytical results.

4 Practical Work (50%)

Practical work must be carried out to provide candidates with all practical knowledge in carrying out the following:

- setting up and calibration of air sampling trains,
- air sampling strategies for leak testing, background sampling, reassurance sampling and personal exposure monitoring,
- preparation of microscope slides following sampling,
- microscope set-up and an understanding of the counting rules,
- fibre counting for a range of fibre densities and types.

Relevant Documents

(1) HSG248 Asbestos: The analyst's guide for sampling, analysis and clearance procedures

Suggested Further Reading:

Royal Microscopical Society Microscope Handbooks
- No 01 : An Introduction to the Optical Microscope, Savile Bradbury
- No 23 : Basic Measurement Techniques for Light Microscopy, Savile Bradbury

Course Length

This course will require approximately 11 hours of study time, of which at least 9 hours will be taught (teaching and formative practical assessment) and 2 hours will be independent (in the candidates' own time).

Examinations and Assessment

Candidates are required to pass all of the following parts (A, B and C below) to be awarded the module.

A Formative Practical Assessment

The formative practical assessment is carried out by the training provider during the course. It enables candidates to demonstrate their ability to:

- set up an air sampling train and to successfully adjust the sampling flow rate using a calibrated rotameter/flowmeter,
- correctly mount and clear filters, prepare slides, set up the microscope and achieve an adequate level of understanding of the fibre counting rules,
- understand the full range of air sampling strategies that may be required in relation to asbestos work.

Further information about the formative practical assessment is published in the following document on the BOHS website: http://www.bohs.org/education/examinations/proficiency-modules/

- Formative Practical Assessment: Guidance for Tutors and Candidates

B Written Theory Examination

This is a closed-book examination comprising 20 short-answer questions to be answered in one hour. The examination covers sections 1 to 3 of the syllabus in proportion to the time allocation given on the front page of the syllabus. The examination is overseen by a BOHS invigilator.

C Practical Examination

This is an open-book practical examination which requires candidates to count eight prepared microscope slides that are supplied by BOHS. Candidates will be expected to achieve at least an equivalent to RICE category B performance or better on all slides with a one slide exception.

Candidates are permitted to access relevant reference material but not electronic databases, computers, tablets or mobile phones. Communication between candidates is not permitted. The examination is overseen by a BOHS specialist invigilator.

Further information about the practical examination is published in the following document on the BOHS website: http://www.bohs.org/education/examinations/proficiency-modules/

- Practical Examination Requirements

Certification

Candidates who pass all the parts (A, B and C) within 12 months will be awarded a ***Proficiency Certificate in Asbestos Fibre Counting (PCM) (including Sampling Strategies).***