

**The British Occupational Hygiene Society  
Faculty of Occupational Hygiene**

**PROFICIENCY MODULE SYLLABUS**

**P403: Asbestos Fibre Counting (PCM)  
(including Sampling Strategies)**

**Aim:** To provide 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) 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:** Ability to describe the approved methods for correctly setting-up of air sampling equipment and for fibre counting and have an understanding of their limitations and the requirements for quality control.

Content:	Topic	Time Allocation
	1 Setting up of Microscope	10%
	2 Filter Preparation and Fibre Counting	30%
	3 Calculation of Results and Quality Control	10%
	4 Practical Work	50%
	5 References	
	6 Examination/Assessment	

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

**1 Setting up Microscope (10%)**

Use of light microscopy, setting up of koehler or koehler type illumination, calibration of stage micrometer test slides.

Describe the theory of phase contrast microscopy, with particular attention being paid to the microscope specifications outlined in the guidance material. Demonstrate and allow students to practice the use of the Walton Beckett graticule, stage micrometer and NPL test slide. Students 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 Air Sampling Equipment Set Up (30%)**

Make students familiar with setting-up of air sampling equipment, air sampling strategies e.g. requirements and locations for leak testing, background testing, reassurance sampling and personal monitoring, preparation of filters and counting of fibres in accordance with the recognised counting rules, the WHO method as specified in HSG248 (1). Discuss the limitations of the methods together with examination of accuracy, precision and systematic differences.

**3 Calculation of Results and Quality Control (10%)**

Examine the reliability of results in relation to quality control schemes such as UKAS, RICE and ISO and European Standards for GLP and internal schemes i.e. counting of blank filters and counting audits.

#### 4 Practical Work (50%)

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

- microscope set-up
- slide preparation
- fibre counting for a range of fibre densities and types
- Set-up of air sampling equipment.

#### 5 References

- (1) HSE Guidance 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

It is envisaged this course will be conducted over 2 days which includes the examination and the practical assessment.

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

#### 6 Examination/Assessment

There are two elements:

1. 20 short answer questions to be answered in 60 minutes.
2. A practical assessment - conducted by a BOHS approved practical assessor who is independent of the course provider. This practical assessor will bring some elements of the assessment material as appropriate and the course provider is responsible for providing suitable facilities, including all safety provisions, for the practical assessment.

During the assessment, examination candidates may have access to any relevant reference material, excluding computers, palm tops and/or mobile phones, but will not be permitted to communicate with other candidates. Practical assessors are not allowed to discuss the results with candidates, and can exclude candidates from assessments for disruptive or unsafe actions.

The practical assessment examination comprises two or more elements:

- a one-to-one exercise between the candidate and the practical assessor, which will usually involve a practical exercise(s)
- other(s) will involve the candidate counting 8 slides, many formerly from the RICE scheme, provided to BOHS by HSL. The results will be assessed using a detailed marking schedule. It may be necessary for the practical assessor to interrupt candidates during this section in order to complete the one-to-one exercise.

The practical assessment will contain the essential elements as detailed below:

- A practical demonstration of the candidate's ability to set-up an air sampling pump (with a correctly mounted sampling head and clean filter) and the setting of a designated flow rate using a calibrated rotameter/flowmeter
- A practical demonstration of the candidate's ability mount filters, prepare slides and set up the microscope
- Counting 8 slides, many formerly from the RICE scheme, and provided to BOHS by HSL. The results will be assessed using a detailed marking schedule
- The candidate's ability to carry out all the relevant calculations and a working

knowledge of the counting method will be assessed.

Full details of the practical assessment requirements are provided as a separate document GC.2 P403 Practical Requirements.

Successful completion of the above including at least an equivalent to RICE category B performance or better on all slides with a one slide exception will lead to a:

**PROFICIENCY CERTIFICATE  
in ASBESTOS FIBRE COUNTING (PCM)  
(including Sampling Strategies)**