PYSER – SGI

ASBESTOS MICROSCOPY

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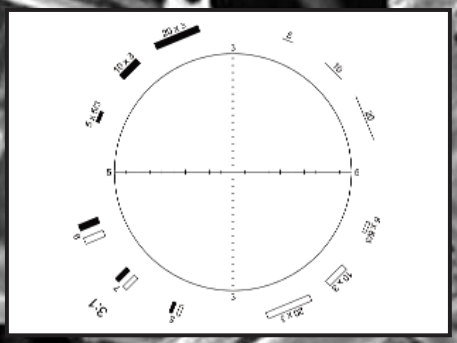
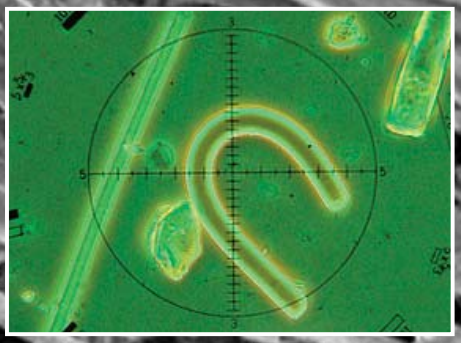




Asbestos Microscopes and Accessories

Pyser-SGI has been supplying microscopes and accessories into Asbestos Laboratories for over 40 years

- PS12 Stage Micrometer with UKAS Certificate of Calibration - For calibrating microscope and eyepiece graticule
- Walton and Beckett Eyepiece Graticules – 3 versions – For counting and sizing of fibres.
- HSE/NPL Phase Contrast Test Slide with Certificate – For checking the resolution of the phase contrast microscope.
- Phase Contrast Microscope – For analysis/counting of fibres
- Polarisation Microscope – For identifying fibre types
- Stereo Microscopes – For initial examination of materials

PS12 Stage Calibration Standard

The PS12 stage calibration standard has a 0.1mm length scale in 50 x 2-micron divisions. The scale is centred on a glass disc, mounted in a stainless steel slide 75mm x 24mm x 2mm thick. A unique serial number is engraved into the stainless steel slide mount. Each slide is supplied in a polished wooden presentation/storage box to distinguish it as a traceable standard of high value.

Being 0.1mm long, this scale is ideally suited for calibration of any microscope being used for asbestos analysis with a Walton & Beckett graticule.

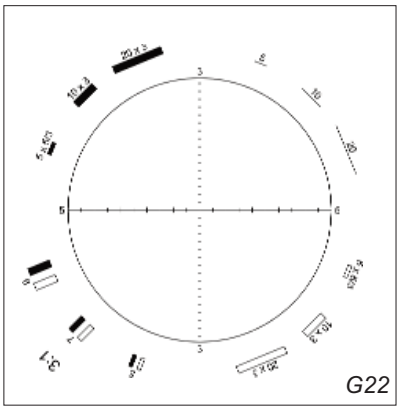
For most asbestos laboratories there is a need for traceability of calibration, therefore Pyser recommend that the PS12 is supplied with a UKAS certificate of calibration. This calibration is traceable back through the National Physical Laboratory (The UK's National Metrology Institute) and then onto the International Committee of Weights and Measures (CIPM), so is universally accepted around the world.

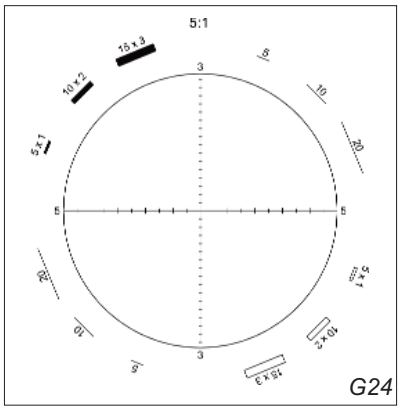
Walton and Beckett Eyepiece Graticules

When counting asbestos samples, it has been found that limiting the area of evaluation to that defined by the grid on an eyepiece graticule can give significantly higher operator concentration values than when the full field of view of the microscope is used. The published work by S T Beckett et al in 1976 recommended that the graticule grid method of counting be adopted for asbestos analysis and that steps be taken to reach national or, preferably, international agreement on a standard form of graticule. The Walton and Beckett graticule was designed specifically for the evaluation of fibrous dust and was adopted worldwide.

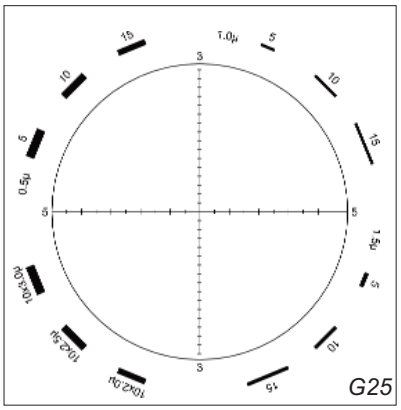
The Walton and Beckett graticules are used for counting fibrous dust and are particularly useful where the majority of fibres to be counted are shorter than 5 microns. The circle is divided into four by two diametrical lines scaled in units of 5 and 3 microns. 3 and 5 microns are the critical measurements of fibre lengths and diameter used in fibre counting. Unlike the usual globes of other particle graticules the Walton and Beckett has a series of shapes to compare objects with. These shapes have been designed for comparison with fibres, especially since they incorporate aspect ratios of 3:1 (G22) or 5:1 (G24) essential for such analysis.

Based on the G22, the G25 is produced to a new design by the Institute of Occupational Health in 1996.


G22



G24


G25

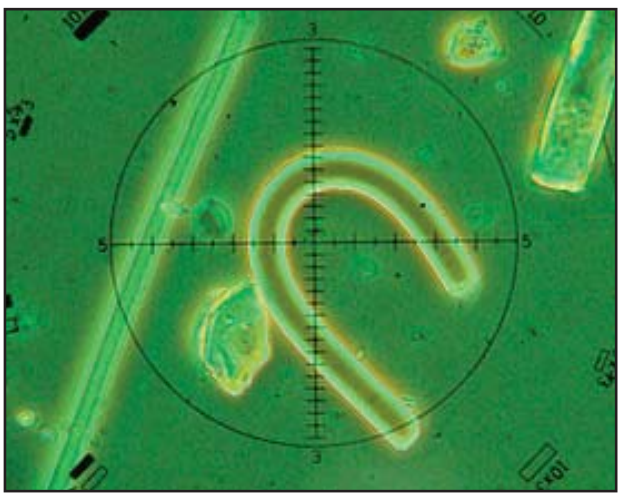
Calibration Factors for Walton and Beckett Graticules.

The circle on the Walton and Beckett graticule must represent 100 microns at the stage of the microscope when used with a 40x objective lens.

The microscope needs to be calibrated to ensure that the Walton and Beckett graticule will give true measurements when it is fitted – see example below.

To calibrate your instrument, fit the microscope with an eyepiece scale (for example, our part NE1) and the appropriate stage micrometer (see the article on our part PS12 on facing page). An exact calibration factor can then be calculated.

For example, using a 40x objective, a circle in the eyepiece requires a diameter of 4000 microns (4mm) to coincide with or read a 100-micron circle on the stage. The calibration is therefore defined as 4. Our standard Walton and Beckett graticules are made with a calibration factor of 4, however it is important to check the exact calibration as microscopes do vary. We can make these graticules with calibration factors to suit the actual calibration of your microscope. When placing your order please state the diameter of the graticule required and, if a special calibration is required, provide the calibration



S84 HSE/NPL MKIII Test Slide for Calibration in Asbestos Analysis

The S84 test slide is made in the UK under licence from the National Physical Laboratories and is used to verify the resolution of phase contrast microscopes used for the analysis of asbestos fibres.

It is an epoxy replica of a master slide produced and certified by that laboratory. The replicas are mounted on microscope slides of 1.2mm thickness with cover glass of 0.17mm thickness. The slide is recommended by the Asbestos International Association in their publication, "Recommended Technical Method No. 1", and many other publications around the world.

The use of the HSE/NPL slide is also required in the method adopted by the Health and Safety Commission to determine compliance with UK asbestos control limits. It has been adopted worldwide as the standard for testing phase contrast microscopes.

The slide comprises 7 bands, with 20 lines in each, and the width of the lines decreases in each band. These lines will show up under phase contrast microscopy. The microscope used for asbestos counting and analysis must be capable of viewing band 5 and partially viewing band 6.

Phase Contrast Compound Microscope

This is probably the most important of the microscopes as it is the instrument that allows the size and concentration of asbestos fibres to be analysed.

The most widely used method of measuring airborne asbestos is to collect the fibres on a membrane filter and then count them by phase contrast microscopy. The counting procedure is detailed in numerous documents around the world with the original description in a publication by the Asbestos Research Council (A.R.C. 1971) and in the B.O.H.S. (1968) standard.

The Pyser B-500pl is probably the most comprehensive and cost effective solution to your phase contrast requirements. It is fitted with both infinity corrected brightfield and phase contrast objectives and supplied with standard and Walton and Beckett eyepieces making it suitable not only for the analysis of asbestos, but also for other examinations in the laboratory. The B-500pl satisfies the requirements of HSE for identifying band 5 on the test slide.

The Pyser B-500pl

Specifications: B-500pl

Body:	Die cast aluminium
Head:	Binocular or Trinocular with 30º inclined eyepieces, 360º rotating
Eyepieces:	Paired WF10x/22mm with high-point view. Paired WF12.5x with Walton & Beckett graticule
Objectives:	Infinity corrected Plan Achromatic 4x, 10x, 40x, 100x (oil), Phase contrast PH40X with phase ring, Quintuple reversed nosepiece
Stage:	Dual layer mechanical stage, 175x145 mm with low level controls
Focussing:	Coaxial coarse and fine focusing system with focusing stop mechanism
Condenser:	Abbe N.A. 1.25 with centring system, phase ring and green filter
Illumination:	High efficiency system with halogen 20W dichroic lamp, adjustable with Köhler illumination

Polarising Microscope

This microscope allows the identification of individual fibre types using polarisation of light to give distinct colours. The McCrone dispersion staining objective, which enhances the colours and allows better identification of the fibres is sometimes fitted to this microscope.

The Pyser B-600 polarising microscope is a research standard instrument with advanced features to enhance the image quality.

The Pyser B-600

Specifications: B-600

Body:	Die cast aluminium
Head:	Trinocular, 30° inclined, 360° rotating with adjustable interpupillary distance
Eyepieces:	Paired WF10X/22mm with diopter adjustment
Bertrand lens:	Swing-out type, centrable, 360° rotating.
Polarising attachment:	Blue filter, 0°-90° rotating analysing filter, λ slip (first class red), 1/4 λ slip, quartz wedge
Objectives:	Plan IOS POL (strain-free) 4x/0.10, 10x/0.25, 40x/0.65, 60x/0.85 on reversed quadruple nosepiece with centring mechanism for all objectives
Focusing system:	Coaxial coarse and fine
Stage:	160mm diameter, 360° rotating with stop knob and 0.1° vernier
Condenser:	Abbe 1.2 N.A., with iris diaphragm, focusable and centrable, with rotating polarising filter (swing-out type).
Illumination:	12V/50W halogen bulb in external case. Centrable bulb and brightness control.

Stereo Microscopes

For the initial examination of asbestos fibre samples a stereo microscope is recommended. This microscope has two separate optical paths and so views an image with perspective, making it ideal for looking at 3D specimens.

The simplest design is the Pyser XES-70C-2L stereo microscope with 20x and 40x magnification, selectable by rotating the objective turret. With the benefit of dual lighting, this microscope also has single control focussing and is simple to operate.

Specifications: XES-70C-2L

Body:	Die cast aluminium
Head:	45º inclined binocular head with adjustable interpupillary distance from 55mm to 75mm
Eyepiece:	Paired W10x with ±5 diopter adjustment on one eyepiece
Objective:	Rotating turret with 2x and 4x objectives
Stage/Stand:	Removable and interchangeable white/black and frosted glass plate 94.5mm diameter with spring clips
Focussing:	Rack and pinion
Illumination:	Incident and transmitted halogen lamps, independently switchable

If you need a more advanced microscope with zoom magnification then Pyser offers the XES-80T-2L. This microscope has a trinocular head to allow cameras to be connected – often useful when preparing reports. The zoom control allows users to increase or decrease the magnification so that the specimen can be viewed in detail.

Specifications: XES-80T-2L

Body:	Die cast aluminium
Head:	45º trinocular head with adjustable interpupillary distance from 55mm to 75mm. C-mount camera adaptor included
Eyepiece:	Paired W10x with ±5 diopter adjustment on one eyepiece
Objective:	Zoom range 1:4 (7.5x to 35x as standard) Auxiliary objectives available to expand magnification range.
Stage/Stand:	Removable and interchangeable white/black and frosted glass plate 94.5mm diameter with spring clips
Focussing:	Rack and pinion
Illumination:	Incident and transmitted halogen lamps, independently switchable

Item Ref.	Description	Diameter/Head Type	Order Code
PS12	Micrometer Scale 0.1mm in 0.002mm divisions PS12 with UKAS certificate PS12 with NPL Certificate		05A01043 05A01043/NAM 05A01043/NPL
G22	Walton/Beckett for Asbestos 3-1 Ratio. All with calibration factor of 4. Other diameters and/or other calibration factors	 16mm 19mm 21mm 24mm 26mm 27mm Others	 01A16062 01A19062 01A21062 01A24062 01A26062 01A27062
G24	Walton/Beckett For Asbestos 5-1 Ratio. All with calibration factor of 4. Other diameters and/or calibration factors	 16mm 19mm 21mm Others	 01A16063 01A19063 01A21063
G25	Walton/Beckett (1996). All with calibration factor of 4. Other diameters and/or calibration factors	 16mm 19mm 21mm Others	 01A16085 01A19085 01A21085
S 84	HSE/NPL Test Slide for Phase Contrast Calibration in Asbestos Analysis *HSE recommend that the S84 is re-tested every 3 years*		02F00490
B-500pl	Pyser B-500pl Phase Contrast Compound Microscope	 Binocular Trinocular	 780-510 780-511
B-600pol	Pyser B-600pol Polarising Microscope	Trinocular	780-620
XES-70	Pyser XES-70C-2L Stereo Microscope with 2x/4x objectives. Also available with 1x/3x objectives	 Binocular	 730-308
XES-80T	Pyser XES-80T-2L Stereo Zoom Microscope	Trinocular	735-143

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