



# Graticules for Asbestos Analysis

## What is Asbestos?

Asbestos are natural mineral substances (silicate minerals) resistant to heat, electricity and chemical corrosion. It has been generally used in construction materials due to their insulating and heat resistance characteristics. Asbestos fibres are highly toxic and have been proven dangerous for health causing diseases in the long term. For this reason, more than 50 countries worldwide have banned the use of asbestos.

According to HSE statistics, Asbestos still kills around 5,000 workers every year in the UK. Asbestos remains a big issue as it will be likely present in any home or building built or refurbished before the year 2000. Asbestos becomes dangerous when fibres are released once materials are damaged or disturbed.

Under the Control of Asbestos Regulations 2012 (Following EU Directive 2009/148/EC), there is a responsibility to identify and risk assess the presence of asbestos type and condition in buildings as any maintenance work would require either a licensed contractor or trained workers under controlled requirements.

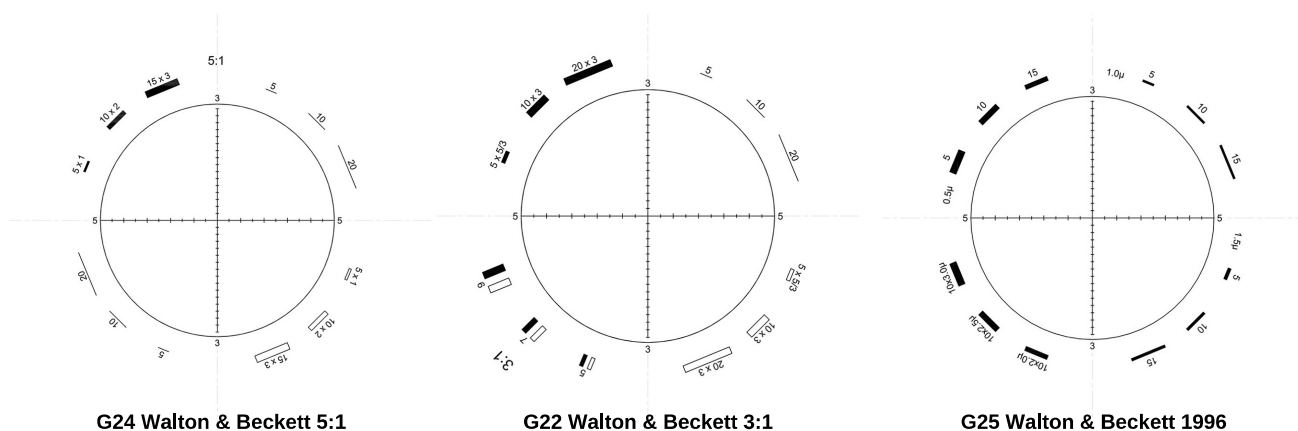
There are several laboratories specialised in asbestos analysis that will be solicited for sample analysis, risk assessments, project management, training, etc.

## 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.

# Graticules for Asbestos Analysis



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 3 and 5 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.

## 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.

### Calculating the calibration factor

First calibrate your instrument with an eyepiece scale (NE1 for example) and the appropriate stage micrometer (PS12).

**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 at the stage. The calibration factor is then defined as 4.

Calibration Factor or D Value = (Actual Length in mm on the reticle X 100) / Magnified Length in  $\mu\text{m}$

**Example:**  $(4\text{mm} \times 100) / 100 = 4$

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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 factor.

## 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.

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 Graticules Optics 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.



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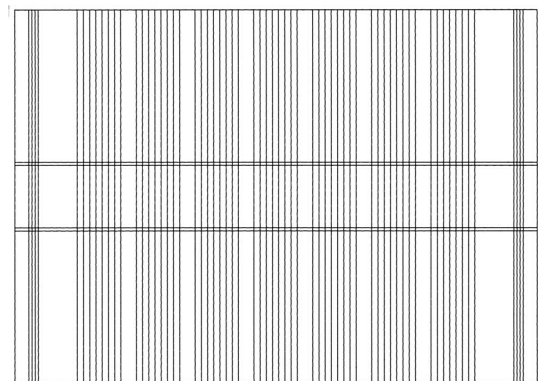
## S84 HSE/NPL MKIII Test Slide for Calibration in Asbestos Analysis

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.





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## Electron Microscopy Grid

In some countries it is required to analyse asbestos using a Scanning Electron Microscope.

Graticules Optics TEM grids are recognised around the world for their superior quality. We have been manufacturing specimen support grids for electron microscopes for several decades using the extensive knowledge of processes and techniques from our micropattern production. In 1994 the acquisition of Brandsma BV grids production (Known as Embra grids) allowed us to extend our existing Maxtaform range of grids and meet the majority of requirements.

All Graticules Optics grids (except the value range) are 100% inspected so you know that any grid you take from the vial will be usable.

