

P403 Practical Examination Slides

Reference Count & Maintenance Guidance

1 Introduction

Each set of slides for examinations will contain two each of slides designated as $<<63.7$, <63.7 , >63.7 and $>>63.7$ fibres/mm². These represent an appropriate diversity of fibre densities to fully test the candidates' abilities.

2 Routine QC Examination checks

The marking scheme produces a Quality check sheet so that the details of the slide set and its make up can be quickly confirmed. This is checked along with an inspection of the results, looking for anomalies in the results from each exam by specialist examiner. This procedure may require data on past slide performance (see section 4 below).

3 Determination of Reference Count

The slides supplied previously by HSL were recovered from the RICE interlaboratory quality scheme and thus their reference value (R) was well established on the basis of many counts. However, slides recovered from other sources or specially manufactured need to establish a reliable reference count before they can be used for examination purposes. It was agreed by the Faculty Examination Committee that to give a reasonable level of confidence (95%) in the reference value, this would require a minimum of nine verified counts from competent counters.

The normal procedure is to send the slides for reference value determination to 11 different asbestos fibre counters who have a record of attaining a 'Grade A' performance in the RICE inter laboratory quality schemes. From the 11 results, an average value is calculated and then the A band width calculated. Then, any of the 11 results that fall outside the A band width are rejected and the average recalculated along with a new A band width.

Again, any value falling outside the A band width is rejected. This iterative process normally needs to be applied once. It is essential that the average value which is the reference count (R) value is based on a minimum of nine valid counts. Experience has shown that this can normally be achieved by using 11 initial counts.

4 Slide Performance Review

The performance of all slides in use for the P403 examination, is carried out annually at the end of each calendar year. The marking system produces a slide performance review which gives a summary of each individual slide.

Where a slide is giving a >60% pass result for band A and an evenly balanced performance about the Reference count value, this is regarded as a fully satisfactory performance.

If the A pass rate is <60% but combined with a very low failure rate <10% and an evenly balanced performance about the Reference count value, then a high B band pass rate is also acceptable.

Slides with high failure rates >30% need more attention as per examples below:

- a) If a slide is showing a 54% failure rate on low counts and only 24% pass at Grade A, the slide is also showing a bias to low count results. It would be wise to carry out a visual inspection with a grade A counter to check for clouding and/or delamination and also to carry out a check count. Depending on the inspection results, the slide could be rejected or submitted for a new reference count.
- b) If a slide is showing a 46% failure rate on low counts and only 28% pass at Grade A, the slide is also showing a bias to low count results. It would be wise to carry out a visual inspection with a grade A counter to check for clouding and/or delamination and also to carry out a check count. Depending on the inspection results the slide could be rejected or submitted for a new reference count.
- c) If a slide is showing a 31% failure rate on low counts and only 47% pass at Grade A, the slide is also showing a bias to low count results. It would be wise to carry out a visual inspection with a grade A counter to check for clouding and/or delamination and also to carry out a check count. Depending on the inspection results the slide could be rejected or submitted for a new reference count.
- d) If a slide is showing a 37% failure rate on low counts and only 34% pass at Grade A, the slide is also showing a bias to low count results.

It would be wise to carry out a visual inspection with a grade A counter to check for clouding and/or delamination and also to carry out a check count.

Depending on the inspection results the slide could be rejected or submitted for a new reference count.

5 Slide Inspection Requirements

In addition to the slide performance annual data review, ALL slides in use for the P403 examination must be visually inspected at least once every 12 months. This visual inspection should check that the slide is visually intact with no external damage. Then the slide should be examined for clarity, any focusing issues and clarity of fibres by a RICE grade A qualified fibre counter. They should look for any issues such as delamination in the slide and advise rejection from examination use where appropriate.

6 Broken Slide and Reference Count Value Determination

If a slide is broken during an examination the Specialist Invigilator will contact the BOHS head office and advise them of the slide number which is no longer useable for the examination.

BOHS will advise the Specialist Invigilator of the category of the slide concerned. The Specialist Invigilator will then try and obtain a similar slide from the course provider (for example laboratory quality assurance slide). This slide must be returned with the remaining slides to BOHS along with any independent counting data for the replacement slide.

To determine a reference count under the broken slide procedure will require the slide to be counted by three independent people who are normally regarded as having a grade A performance in the RICE scheme.

The reference value (R) and its A and B band widths that this produces can then be used to mark the relevant candidate's performance. If the candidate(s) concerned are B band or better for this slide, then the result can be declared valid for that slide.

If, however, any candidate is outside band B for this slide then a further three independent counts by another three counters having a grade A performance in the RICE scheme are required. The Reference (R) value produced from these six counts along with its band A and B widths can then be applied. Any candidate falling outside this latter band B result will incur an error on this slide.

7 Calculation of Band Widths

If the reference count is denoted by R, the following formulae will give the performance limits which define the target bands A, B and C:

a) High density samples ($R \geq 63.7 \text{ fibres.mm}^2$) Target band A: $0.65R$ to $1.55R$

- Target band B: $0.50R$ to $0.65R$ [band -B] and $1.55R$ to $2.00R$ [band +B]
- Target band C: less than $(\sqrt{R}-2.34)^2$ [band -C] and greater than $(\sqrt{R}+3.30)^2$ [band +C]

b) Low density samples ($R < 63.7 \text{ fibres.mm}^2$)*

- Target band A: $(\sqrt{R}-1.57)^2$ to $(\sqrt{R}+1.96)^2$
- Target band B: $(\sqrt{R}-2.34)^2$ to $(\sqrt{R}-1.57)^2$ [band B] and $(\sqrt{R}+1.96)^2$ to $(\sqrt{R}+3.30)^2$ [band +B]

c) Target band C: less than $(\sqrt{R}-2.34)^2$ [band C] and greater than $(\sqrt{R}+3.30)^2$ [band +C]

* For samples $< 63.7 \text{ fibres mm}^2$ the lower limit is set to zero if the component within the brackets $(\sqrt{R}-n)$ is less than 0 [Zero] or Negative. i.e. where \sqrt{R} is ≤ 1.57 then A and B low will be zero and where \sqrt{R} is ≤ 2.34 then B low will be zero