Whitchurch Road
Waverton
Chester
CH3 7PB
ENGLAND

Whitehouse Scientific

Tel: +44 (0) 1244 33 26 26
Fax: +44 1244 (0) 33 50 98
email: rideal@WhitehouseScientific.com

www.WhitehouseScientific.com

Certificate of Analysis

SAND SCREEN PORE SIZE MEASUREMENT

1. Filter Reference: 14 x 88

2. Client: Tubular Perforating Manufacturing Ltd

Calibration Method:

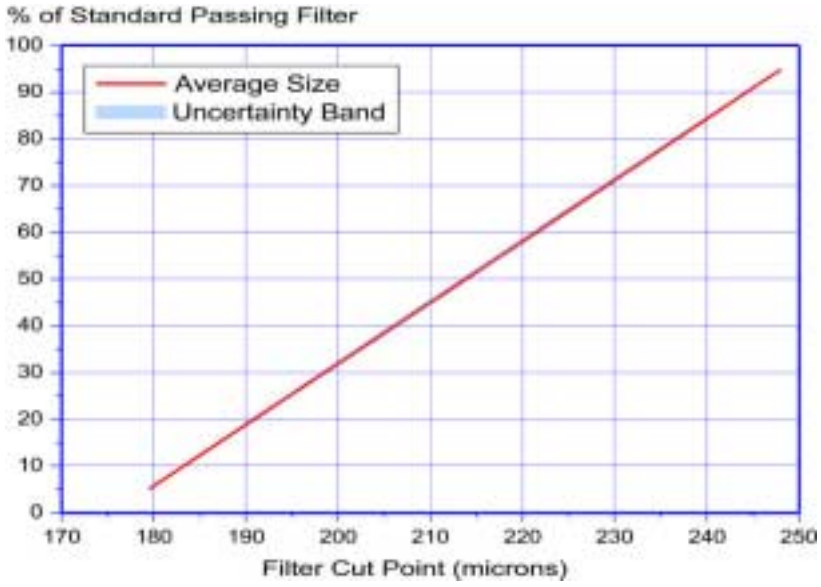
Clamp a disc of the filter to be tested in the Perspex filter holder of the Automatic Sonic Filter Tester. Tare and add approximately 0.4g of the calibrating microspheres. Record the weight of microspheres before transferring to the test machine. Run under the conditions specified below and reweigh to calculate the percentage of microspheres passing the filter. From the percentage passing, use the graph or equation below to determine the cut point (pore size[1]) of the filter under test.

3. Test Conditions

a) Microsphere Size Range: 180 – 248 µm

b) Filter Tester Settings: ramp up time 0.1 minute, amplitude 30, run time 1 minute, ramp down 0.1min

4. Microsphere Calibration Graph:



5. Microsphere Calibration Equation:

Filter Cut Point = 175.65 + 0.769 X – 0.00011X^2, where X = % passing

6. Analysis Results:

Initial Wt: 0.414g, Wt Retained: 0.208g, Percent Passing: 50%, **Filter Cut Point[1]: 214µm**
Maximum Pore Size[2]: 235µm

Issued by: Dr G R Rideal – Senior Analyst

Notes:
1. Filter cut point is defined as the size above which there is a better than 97% chance of particle capture.
2. Maximum pore size. For Dutch weave sand screens this has been shown to be about 10% above the cut point. See web site www.whitehousescientific.com.
3. The electroformed sieves used to measure the particle size of the microspheres were calibrated by optical microscopy using reference graticules from NIST (821/263573-00) and NPL (08A038/970127/106-66). For full details of see web site www.whitehousescientific.com.
4. Whitehouse Scientific Ltd does not accept responsibility for losses, financial or otherwise which may occur as a result of the interpretation or use of the information contained within this certificate.
5. Whitehouse Scientific is the leading European particle size certification laboratory for the Community Bureau of Reference (BCR), Brussels (Laboratory News – August 1996).

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