

NIST Traceable

Sieve Calibration Standards

125 μ m

Part Number: **SS401**
 Nominal Weight: **1.0g x 5 bottles**

INSTRUCTIONS FOR USING THE GLASS MICROSPHERE METHOD OF SIEVE CALIBRATION

- Place the 200mm or 8 inch sieve to be calibrated with the collecting pan on a 0.01g resolution balance and tare.
- Select the appropriate calibration standard for the sieve and record the initial weight of the microspheres. Shake the full contents of the bottle over the surface of the sieve.
- Challenge the sieve using one of the generic methods shown below until the end-point is reached (recommended run times are shown).

SIEVE SHAKING METHODS



By Hand
(for sieves above 45 μ m)

Use a vigorous swirling action to disperse the standard over the sieve surface. 2-3 cycles per second for 1 min is recommended.



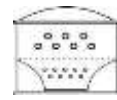
Mechanical Sieve Shaking
(for sieves above 45 μ m)

Shaking times may vary from 1-3 minutes depending on the sieve shaker. Empty and check the pan each minute to determine the end-point



Air Jet Sieve
(for sieves 20-1000 μ m)

A vacuum of 2000-2200Pa for 3 minutes is adequate for most sizes above 30 μ m. The end-point is when the retained fraction is constant.



Sonic Sieve
(for sieves 20-1000 μ m)

Run time typically 1 minute. An amplitude of 30 is sufficient to fluidize most standards but increase if necessary.

- When complete, tap the frame a few times to dislodge near mesh beads and empty the undersize fraction from the pan into a collecting vessel (these microspheres can be kept for future analysis by microscope if the maximum aperture size of the sieve needs to be determined).
- Reassemble the sieve and pan and tap a few more times by hand. If beads still fall through the mesh, the shaking time needs to be increased because the end-point has not yet been reached. Empty the pan again if necessary.
- Without resetting the tare on the balance**, re-weigh the sieve and pan together with the retained microspheres. Record the weight.
- Enter the initial weight and the retained weight into the Whitehouse Scientific Sieve Aperture Size Calculator* to display your sieves aperture size. *available to use for free on our website home page WhitehouseScientific.com
- Alternatively, from the retained weight, calculate the percentage of microspheres passing the sieve and use the calibration graph below to determine the mean aperture size.

Notes:

- For sieves below 100 μ m a 5% difference in weight passing usually only corresponds to a 1 μ m difference in aperture size, which makes this method one of the most accurate ways of calibrating a sieve.
- To clean the sieve, invert it and lightly brush the underside with a soft bristle brush or use an ultrasonic bath.
- Never use a wire brush or sharp object to remove trapped beads.**
- For larger diameter sieves, multiple bottles can be used (please see the FAQ page of our web site: WhitehouseScientific.com/faqs).

Certificate of Analysis

NIST TRACEABLE

SIEVE CALIBRATION STANDARD

SODA-LIME GLASS MICROSPHERES

1. Electroformed Sieve Analysis

Sieve Size (μ m)	Weight Fraction (%)	Cumulative % Undersize
150.5	0.3	99.7
125.4	44.4	53.3
104.5	53.7	1.7
87.4	1.7	0

2. Interpolated Data

% Passing	Aperture Size	% Passing	Aperture Size
20	111.6	55	125.1
25	113.5	60	127.9
30	115.6	65	130.7
35	117.5	70	133.5
40	119.4	75	136.4
45	121.3	80	139.4
50	123.2		

5 random samples from the spinning riffler
 Average sample recovery 99.8%
 Mean Standard Deviation = +/-0.15% - for 98% of the distribution

Notes:

- It is against our Quality Policy to reissue specific certificates. Please make a digital copy of this certificate to avoid issues if lost. Generic reference copies can be downloaded from the 'Certificate Bank' in the 'Literature' section of our website: WhitehouseScientific.com
- These standards are single use. Do not attempt to reuse, or use after the expiry date shown as it will invalidate the certificate.
- The Electroformed Sieves used to certify the sieve standards were calibrated by optical microscopy using a Stage Reference Graticules by NIST (test No.821/263573-00) and (NPL) National Physical Laboratory, UK (Reference No. 08A038/970127/106-66).
- For full details of methodology see the 'Literature' section of our website WhitehouseScientific.com to download relevant technical papers.
- This certificate is only valid when used in conjunction with Whitehouse Scientific labelled bottles/standards.
- 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.

3. Calibration Graph



Issued by:



Dr G R Rideal
 Founder & Senior Analyst

WHICH STANDARD SHOULD I USE? – Table 1

The aperture size of every sieve manufactured from 20 to 3350 microns can be certified to NIST traceability. Our standards are named after the 30 most popular sieves (R40/3) but can also be used for the 30 intermediate sizes. If you are unsure of the standard you should be using just check the table below (table 1). The ‘primary’ sieve size is highlighted in bold, the sieve on either side can also be calibrated using the same Sieve Standard.

Table 1: Selecting the Correct Standard

Sieve Size		
-	20 µm	-
-	25 µm	-
-	32 µm	-
36 µm	38 µm	40 µm
-	45 µm	50 µm
-	53 µm	56 µm
-	63 µm	-
71 µm	75 µm	80 µm
-	90 µm	-
100 µm	106 µm	112 µm
-	125 µm	-
140 µm	150 µm	160 µm
-	180 µm	-
200 µm	212 µm	224 µm
-	250 µm	280 µm
-	300 µm	315 µm
-	355 µm	-
400 µm	425 µm	450 µm
-	500 µm	-
560 µm	600 µm	630 µm
-	710 µm	-
800 µm	850 µm	900 µm
-	1.00mm	-
1.12mm	1.18mm	1.25mm
-	1.40mm	1.55mm
1.60mm	1.70mm	1.80mm
-	2.00mm	-
2.24mm	2.36mm	2.50mm
-	2.80mm	3.15mm
-	3.35mm	-
-	3.55mm	-
-	4.00mm	-
-	4.50mm	-
-	4.75mm	-
-	5.00mm	-

TOLERANCES – Table 2

Please note that although the sieve may not conform to the exact nominal size, it is still in specification if the variation about the mean is accordance with table 2.

Table 2: Recommended Tolerances – Microscopy (ISO 3310-1:2016 and ASTM E-11)

Nominal Sieve size	Mesh #	ISO Tolerance @ mean	ASTM Tolerance @ mean	ISO Max single aperture	ASTM Max single aperture	ISO Max SD =D84%	ASTM Max @ D95%	ISO Count for microscopy
20µm	635	17.9 – 22.1µm	17 – 23µm	33µm	35µm	24.7µm	29µm	2 x 300
25µm	500	22.8 – 27.2µm	22 – 28µm	40µm	41µm	30.2µm	34µm	2 x 300
32µm	450	29.6 – 34.4µm	29 – 35µm	49µm	50µm	37.9µm	42µm	2 x 300
38µm	400	35.4 – 40.6µm	35 – 41µm	56µm	57µm	44.4µm	48µm	2 x 300
45µm	325	42.2 – 47.8µm	42 – 48µm	65µm	66µm	51.9µm	57µm	2 x 250
53µm	270	49.9 – 56.1µm	49 – 57µm	75µm	76µm	60.6µm	66µm	2 x 250
63µm	230	59.6 – 66.4µm	59 – 67µm	87µm	89µm	71.3µm	77µm	2 x 250
75µm	200	71.3 – 78.7µm	70 – 80µm	101µm	103µm	84.1µm	91µm	2 x 250
90µm	170	85.8 – 94.2µm	85 – 95µm	119µm	122µm	100.1µm	108µm	2 x 200
106µm	140	101.3 – 110.7µm	100 – 112µm	137µm	141µm	117.1µm	126µm	2 x 200
125µm	120	119.8 – 130.2µm	118 –132µm	160µm	163µm	137.2µm	147µm	2 x 200
150µm	100	144.0 – 156.0µm	142 – 158µm	188µm	192µm	163.7µm	174µm	2 x 200
180µm	80	173.2 – 186.8µm	171 – 189µm	223µm	227µm	195.3µm	207µm	2 x 200
212µm	70	204.2 – 219.8µm	202 – 222µm	259µm	263µm	228.9µm	242µm	2 x 160
250µm	60	241.1 – 258.9µm	238 – 262µm	302µm	306µm	268.8µm	283µm	2 x 160
300µm	50	290 – 310µm	286 – 314µm	358µm	363µm	321.2µm	337µm	2 x 160
355µm	45	343 – 367µm	339 – 371µm	420µm	425µm	378.7µm	396µm	2 x 160
425µm	40	411 – 439µm	406 – 444µm	498µm	502µm	451.8µm	471µm	2 x 120
500µm	35	484 – 516µm	480 – 520µm	581µm	585µm	530.0µm	550µm	2 x 120
600µm	30	581 – 619µm	575 – 625µm	691µm	695µm	634.0µm	660µm	2 x 100
710µm	25	688 – 732µm	680 – 740µm	811µm	815µm	748.4µm	775µm	2 x 100
850µm	20	824 – 876µm	815 – 880µm	964µm	970µm	893.6µm	925µm	2 x 80
1.00mm	18	0.97 – 1.03mm	0.96 – 1.04mm	1.13mm	1.14mm	1.05mm	1.08mm	2 x 80
1.18mm	16	1.14 – 1.22mm	1.14 – 1.23mm	1.32mm	1.33mm	1.24mm	1.27mm	2 x 80
1.40mm	14	1.36 – 1.44mm	1.35 – 1.45mm	1.56mm	1.57mm	1.46mm	1.51mm	2 x 80
1.70mm	12	1.65 – 1.75mm	1.64 – 1.76mm	1.88mm	1.89mm	1.77mm	1.82mm	2 x 50
2.00mm	10	1.94 – 2.06mm	1.93 – 2.07mm	2.20mm	2.22mm	2.08mm	2.14mm	2 x 50
2.36mm	8	2.29 – 2.43mm	2.28 – 2.44mm	2.59mm	2.61mm	2.45mm	2.52mm	2 x 40
2.80mm	7	2.72 –2.88mm	2.71 – 2.90mm	3.06mm	3.07mm	2.91mm	2.98mm	2 x 40
3.35mm	6	3.25 –3.45mm	3.24 – 3.46mm	3.64mm	3.66mm	3.47mm	3.55mm	2 x 40
3.55mm	-	3.44 - 3.66mm	-	3.89mm	-	3.705mm	-	2 x 40
4.00mm	5	3.87 - 4.13mm	3.87 - 4.37mm	4.37mm	4.37mm	4.175mm	-	2 x 30
4.5mm	-	4.36 - 4.64mm	-	4.90mm	-	4.690mm	-	2 x 30
4.75mm	4	4.60 - 4.90mm	4.60 - 4.90mm	5.16mm	5.16mm	4.949mm	-	2 x 30
5.00mm	-	4.84 - 5.16mm	-	5.43mm	-	5.210mm	-	2 x 30