Whitehouse Scientific
Setting the Standard since 1983

NIST Traceable

Sieve Calibration Standards

180µm

Part Number: SS403
Nominal Weight: 1.5g x 5 bottles

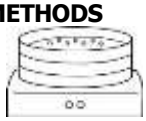
INSTRUCTIONS FOR USING THE GLASS MICROSPHERE METHOD OF SIEVE CALIBRATION

- 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 45µm)

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

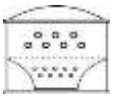


Mechanical Sieve Shaking
(for sieves above 45µm)

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 20-1000µm)

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



Sonic Sieve
(for sieves 20-1000µm)

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:
(a) For sieves below 100µm a 5% difference in weight passing usually only corresponds to a 1µm difference in aperture size, which makes this method one of the most accurate ways of calibrating a sieve.
(b) 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.
(c) For larger diameter sieves, multiple bottles can be used (please see the FAQ page of our web site: WhitehouseScientific.com/faqs).

Certificate of Analysis

Whitehouse Scientific
Whatever the particle sizing method...we have the perfect solution! www.WhitehouseScientific.com

NIST TRACEABLE

SIEVE CALIBRATION STANDARD

SODA-LIME GLASS MICROSPHERES

1. Electroformed Sieve Analysis

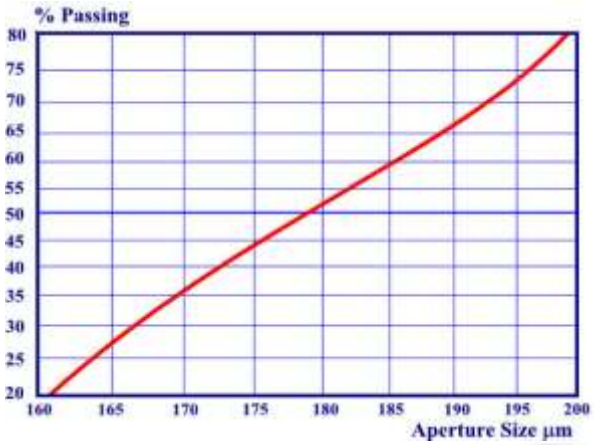
Sieve Size (µm)	Weight Fraction (%)	Cumulative % Undersize
212.9	0.1	99.9
178.0	51.2	48.8
150.5	46.1	2.6
125.4	2.6	0

2. Interpolated Data

% Passing	Aperture Size	% Passing	Aperture Size
20	160.9	55	181.9
25	163.9	60	185.6
30	166.8	65	188.9
35	169.9	70	192.2
40	172.6	75	195.9
45	175.6	80	199.2
50	**178.6**		

5 random samples from the spinning riffler
Average sample recovery 99.9%
Mean Standard Deviation = +/-0.07% - for 98% of the distribution

3. Calibration Graph



Issued by:

Dr G R Rideal
Founder & Senior Analyst

Notes:
1. 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
2. These standards are single use. Do not attempt to reuse, or use after the expiry date shown as it will invalidate the certificate.
3. 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).
4. For full details of methodology see the 'Literature' section of our website WhitehouseScientific.com to download relevant technical papers.
5. This certificate is only valid when used in conjunction with Whitehouse Scientific labelled bottles/standards.
6. Whitehouse Scientific Ltd does not accept responsibility for losses, financial of otherwise which may occur as a result of the interpretation or use of the information contained within this certificate.

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