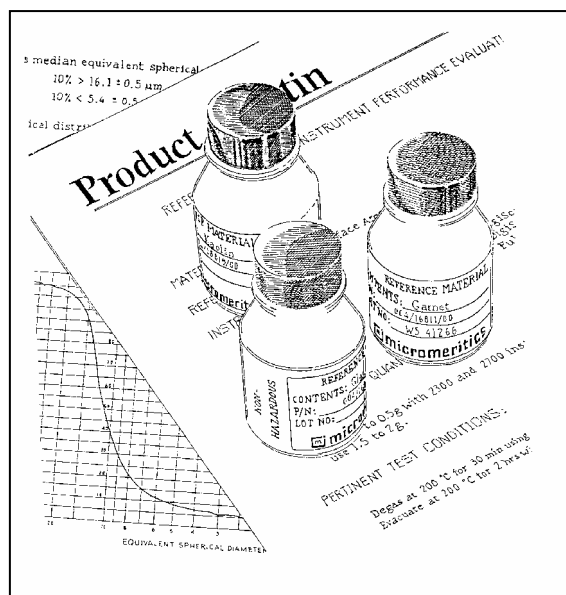


Reference Materials

The performance of an analytical instrument needs to be verified from time to time. Routine verification can follow a fixed schedule, be done as needed, or use a combination of these two approaches. The need may arise from a change of operators, unexpected results, unfamiliar material(s), equipment wear and tear, or other situations where performance verification is justified. Micromeritics products seldom require calibration *per se*; since they derive results from well-established techniques that measure basic parameters such as time, temperature, mass, pressure, etc. Nevertheless, Micromeritics instruments are not exempt from the need for periodic performance verification.

Analyzing a material with known, well-characterized properties is an excellent way to verify instrument performance. The reference materials listed in the table are offered by Micromeritics for this corroborative purpose. Each material has been carefully selected to be representative of the property for which it is recommended, to be non-hazardous, and to have an extended shelf life.

The material lot from which representative portions are taken is repeatedly analyzed. This is done with a number of instruments using different operators, and, in some cases, even using different techniques. Micromeritics reference materials are not standards. The extensive blind testing using independent labs, which is necessary for standards, was not done.



Each Reference Material Kit contains the sample stored in an air-tight plastic bottle and a procedural data sheet.

Micromeritics is confident, nevertheless, that an instrument giving a result within the limits specified with each reference material is operating satisfactorily.

Each reference material includes a procedural data sheet with a recommended test quantity appropriate for analysis, information on how best to prepare the material for analysis, and other essential information. The stated material properties include the limits of their accuracy.

Property	Nominal Property Data	Part Number	Applicable Instrument Models	
PARTICLE SIZE	Garnet Powder (15 g) Mass Median Diameter $\approx 11.6 \mu\text{m}$	004-16811-00	5000, 5000D, 5000E, 5000ET, 5100, 5120	
	Glass Powder (15 g) Mass Median Diameter $\approx 1.7 \mu\text{m}$	004-16814-00		
	Calcium Carbonate Powder (28 g) Mass Median Diameter $\approx 0.77 \mu\text{m}$ (traceable to N. I. S. T.)	004-16835-00		
	Garnet Powder (20 g) Mass Median Diameter $\approx 3.77 \mu\text{m}$ (traceable to N. I. S. T.)	004-16837-00		
	Garnet Powder (1 g) Volume Median Spherical Diameter $\approx 4.85 \mu\text{m}$ (traceable to N. I. S. T.)	004-16841-00	5200, 5205	
	Monosize Polymer Microspheres (7 mL) Nominal Diameter $\approx 1 \mu\text{m}$ Nominal Diameter $\approx 2 \mu\text{m}$ Nominal Diameter $\approx 3 \mu\text{m}$ Nominal Diameter $\approx 5 \mu\text{m}$ Nominal Diameter $\approx 10 \mu\text{m}$ Nominal Diameter $\approx 20 \mu\text{m}$ Nominal Diameter $\approx 40 \mu\text{m}$ Nominal Diameter $\approx 100 \mu\text{m}$	004-16840-00 004-16840-01 004-16840-02 004-16840-03 004-16840-04 004-16840-05 004-16840-06 004-16840-08	5380, 5382, 5390	
	MERCURY POROSIMETRY	Silica Alumina (15 g) Average Pore Diameter $\approx 0.0073 \mu\text{m}$ Pore Volume $\approx 0.56 \text{ cm}^3/\text{g}$		004-16822-00
MICROPORE	13X Molecular Sieve (10 g) Pore Size $\approx 10.5 \text{ \AA}$ using Ar adsorbate Pore Size $\approx 14 \text{ \AA}$ using CO ₂ adsorbate Pore Size $\approx 8.3 \text{ \AA}$ using N ₂ adsorbate	004-16826-00		2000 Micropore 2010 Micropore
	13X Molecular Sieve (10 g) Pore Size $\approx 10.5 \text{ \AA}$ using Ar adsorbate Pore Size $\approx 14 \text{ \AA}$ using CO ₂ adsorbate Pore Size $\approx 8.3 \text{ \AA}$ using N ₂ adsorbate	004-16843-00		2020 Micropore
	Y-Zeolite (2.5 g) Pore Size $\approx 7.4 \text{ \AA}$ using Ar adsorbate Pore Size $\approx 7.4 \text{ \AA}$ using N ₂ adsorbate	004-16844-00		2020 Micropore
ZETA POTENTIAL	Kaolinite (120 g) Mean Zeta Potential = -60 mV	004-16824-00		1202
CHEMISORPTION	Platinum Alumina Pellets (5 g) Active Metal Dispersion: $\approx 39.9\%$, 2000 and 2010 $\approx 48.6\%$, all others	004-16825-00		2000, 2010, 2020, 2700, 2705, 2800, 2810, 2900, 2910, 2920, 2950
	Silver Oxide (2 g) Hydrogen Consumption $\approx 96.4 \pm 3 \text{ cc/g}$	004-16836-00	2700, 2705, 2900, 2910, 2920, 2950	

Property	Nominal Property Data	Part Number	Applicable Instrument Models
SURFACE AREA and GAS POROSIMETRY	Alumina (15 g) Specific Surface Area: $\approx 0.5 \text{ m}^2/\text{g}$; 2360, 2370, 2375, 2380, 2385, N ₂ adsorbate $\approx 0.46 \text{ m}^2/\text{g}$; all others, Kr adsorbate	004-16816-00	2000, 2010, 2020, 2100, 2300, 2305, 2310, 2360, 2370, 2375, 2380, 2385, 2390, 2400, 2405, 2420, 2600, 2700, 2705, 2720, 2750, 2920, 2950, 3000, 3020
	Glass Powder (10 g) Specific Surface Area $\approx 5.3 \text{ m}^2/\text{g}$	004-16818-00	
	Silica Alumina Pellets (10 g) Specific Surface Area $\approx 198 \text{ m}^2/\text{g}$ Pore Volume $\approx 0.6 \text{ cm}^3/\text{g}$ Average Pore Diameter $\approx 115 \text{ \AA}$	004-16821-00	
	Carbon Black (10 g) Specific Surface Area $\approx 30.6 \text{ m}^2/\text{g}$	004-16833-00	

Current reference materials may not have the exact same property values listed in the table because supplies must be replenished from time to time. When this occurs, the new material will undergo the same, comprehensive analyses before becoming a reference material. Micromeritics reserves the right to add new reference materials, change specifications, and/or delete other materials as availability dictates.