Thermo SCIENTIFIC

Part of Thermo Fisher Scientific

December 8, 2008

DRI-CAL™ PARTICLE SIZE STANDARDS
NIST Traceable Mean Diameter

1. DESCRIPTION These size standards are part of a series of uniform polymer microspheres with calibrated mean diameters traceable to the Standard Meter through the National Institute of Standards and Technology (NIST) and provide an accurate source for traceable particle size calibration. Diameters from 5 to 100 micrometers (µm) are conveniently packaged as dry powders in dropper-tipped bottles to enable dispensing the microspheres directly into the sampling chamber. The certified mean diameter is traceable to NIST, calibrated by optical microscopy. Other values are for information only and should not be used as calibration values.

2. PHYSICAL DATA	Catalog Number: DC-10, Nominal 10 µm
Certified Mean Diameter:	10.0 µm ± 0.4 µm
Standard Deviation:	1.0 µm
Coefficient of Variation:	10%
Microsphere Composition:	Polystyrene DVB (Divinylbenzene, 4-8%)
Microsphere Density:	1.05 g/cm^3
Index of Refraction:	1.59 @ 589 nm
Approximate Concentration:	1.8 x 10^9 #/gram

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CERTIFICATE OF CALIBRATION AND TRACEABILITY

This certifies that the calibrated mean diameter of this product was transferred by optical microscopy from a stage micrometer calibrated by the National Institute of Standards and Technology (SRM 2800 SN411). NIST Standard Reference Materials 1690, 1692, 1960, and 1961 were used to validate the accuracy and traceability of the calibration methods.

Catalog Number: DC-10 DRI-CAL™ Particle Size Standards

Certification Date:	December 8, 2008
Certified Batch:	DC-10-010
Certified Mean Diameter:	10.0 µm
Expanded Uncertainty:	± 0.4 µm, k = 2

Ellen B. Layendecker, Metrology Director

Packaging Lot # 36091

Expiration Date: NOV '12

Specialty Diagnostics Group | 46360 Fremont Blvd. | Fremont, CA 94538 | (510) 979-5000 (510) 979-5002 fax | www.thermo.com/particletechnology

3. MEASUREMENT METHODOLOGY The certified diameter of this product was transferred by optical microscopy from a stage micrometer, a glass slide with a scale with line spacing calibrated by NIST in micrometers. The uncertainty is calculated from the calibration transfer uncertainty and the random error of the measurements per NIST Technical Note 1297. The uncertainty listed is the expanded uncertainty with a coverage factor of 2 (k=2). To validate the accuracy of our optical methods, NIST certified microsphere standards were measured by the same method. The estimated size distribution (standard deviation) was obtained by electrical resistance analysis. The coefficient of variation is the standard deviation as a percentage of the mean diameter.

4. CERTIFICATE Except for the purposes of record keeping, this certificate may not be reproduced. Rebottling or relabeling voids the warranty and invalidates the certification and traceability of these products. The Certified Batch is the master batch of material that is measured and certified with an NIST traceable mean diameter.

5. OPERATING INSTRUCTIONS For ease of use, these standards are packaged as dry powders in dropper-tipped bottles to enable dispensing the microspheres directly into the sampling chamber. They must be thoroughly dispersed in the bottle to assure statistically consistent samples. To disperse the particles, gently invert the bottle several times. Do not shake the bottle, as the small bubbles formed may introduce statistical artifacts. Dispense immediately after dispersion using the dropper tip.

6. SAFETY AND HANDLING PRECAUTIONS Avoid aerosol production in the workplace while handling these products, or wear a suitable filter respirator when necessary. Avoid inhalation or ingestion of the particles. These products should only be used by trained scientific personnel. A Material Safety Data Sheet is included with each package.

7. STORAGE AND DISPOSAL Keep the bottle tightly sealed to avoid contamination. Store them upright to prevent clogging the tip with particles. Refrigeration is not required for storage. In case of spills, wash or wipe the area thoroughly. **Caution: surfaces covered with dry spheres may be very slippery.** Read the MSDS for any special disposal procedures. Each bottle has a limited shelf life and should not be used after its expiration date.

8. LIMITED WARRANTY These products are intended for laboratory use by trained scientific personnel. Determination of their suitability for a specific end-use is the responsibility of the user, who assumes all liability for loss or damage arising out of the use of the product. Rebottling or relabeling voids the warranty and certification. Microgenics Corporation's warranty is limited to replacement of defective products if returned with our authorization within 60 days of purchase date..

THE FOREGOING WARRANTY SHALL BE IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL MICROGENICS CORPORATION BE LIABLE FOR INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES.

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3. MEASUREMENT METHODOLOGY The certified diameter of this product was transferred by optical microscopy from a stage micrometer, a glass slide with a scale with line spacing calibrated by NIST in micrometers. The uncertainty is the sum of the calibration transfer uncertainty and the random error of the measurements. To validate the accuracy of our optical methods, NIST certified microsphere standards were also measured. The size distribution (standard deviation) was obtained by optical microscopy or electrical resistance analysis. The Coefficient of Variation is the standard deviation as a percentage of the mean diameter.

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5. OPERATING INSTRUCTIONS For ease of use, the microspheres are packaged dry, in a dropper-tipped bottle. They must be thoroughly dispersed to assure statistically consistent samples. To disperse the particles, gently roll or invert the bottle several times. Do not shake the bottle as this will introduce static which will interfere with the dispersion. Before using, be sure no clumps are visible inside the bottle. Dispense immediately after dispersion using the dropper tip, or remove the tip and use a microspatula. Clean all sampling implements before inserting into the bottle to prevent contamination of the contents. Repeated sampling from the dropper tip may cause statistical variation over time. These products are not suitable for dispersion in aqueous media.

6. SAFETY AND HANDLING PRECAUTIONS Avoid aerosol production in the workplace or wear a suitable filter respirator. Avoid inhalation or ingestion of the particles. These products should only be used by trained scientific personnel. A Material Safety Data Sheet is included with each package.

7. STORAGE AND DISPOSAL Keep the bottle tightly sealed to avoid contamination. Store at room temperature. Each bottle has a limited shelf life and should not be used after its expiration date. In case of spills, wash or wipe the area thoroughly. Surfaces covered with dry microspheres may be slippery. Dispose of any waste residue according to prescribed federal, state, and local guidelines.

8. LIMITED WARRANTY These products are intended for laboratory use by trained scientific personnel. Determination of their suitability for a specific end-use is the responsibility of the user, who assumes all liability for loss or damage arising out of the use of the product. Rebottling or relabeling voids the warranty and certification. Microgenics Corporation's warranty is limited to replacement of defective products if returned with our authorization within 60 days of purchase date.

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