C 19-1

Certificate of Traceability

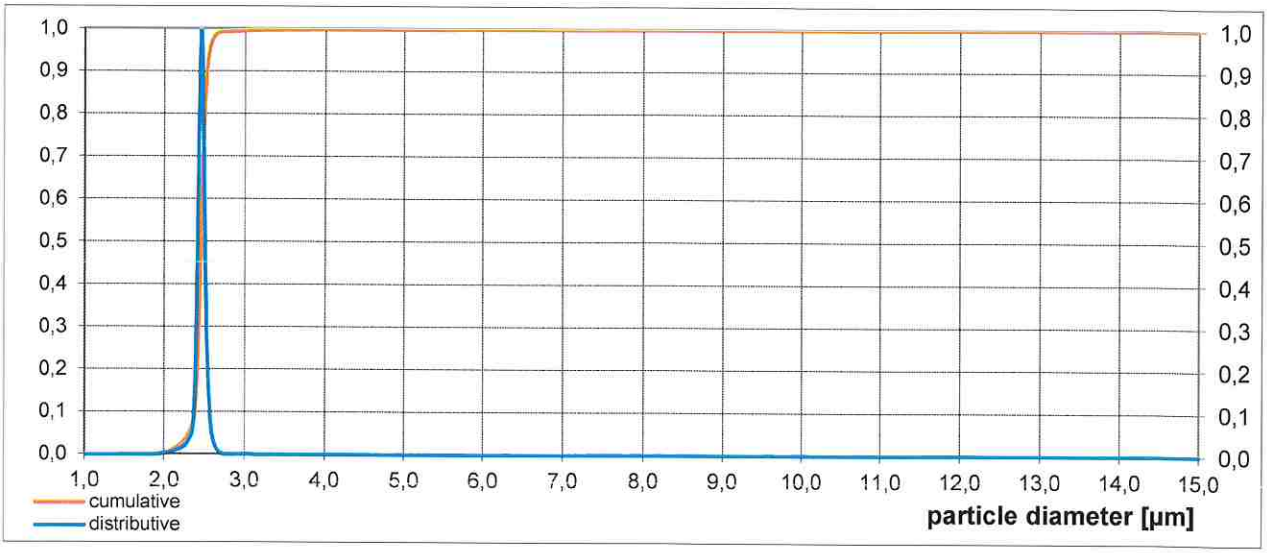
PIN: 11025-20

Applied Microspheres

MicroStandards™ – 11000 series

Size standard for the calibration and validation of particle sizing instruments traceable to the International System of Units (SI)*, including NIST traceability

Nominal diameter:	2,50 µm
Certified mean diameter:	2,49 µm
Expanded uncertainty (k=2):	0,048 µm
Relative standard deviation (CV):	0,8 %
Particle solids content:	2,0 % (by gravimetric analysis)



Product data

Product Identification Number:	11025-20
Material:	Polymer particles in aqueous suspension
Chemical composition:	Polystyrene or poly(styrene-co-divinylbenzene), surfactants (< 0,1 %), preservatives (< 0,05 %)
Production lot number:	CS0008.212
Packaging lot number:	CS0008.2121
Packaging date:	19.05.2021
Expiration date:	31.05.2024

Physical data

Nominal density:	1,05 g / cm^3
Refractive index:	1,59 @ 25 °C
Surface characteristics:	*Not applicable*
Parking area:	*Not applicable*

Signed:

Dr. Cornelia Hunger, Chief Metrology Officer

** For details on traceability and methods, please see the product description and metrology section on page 2*

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Product description

The MicroStandards™ particle size standard products from Applied Microspheres (AM) consist of a series of monodisperse polymer microspheres with calibrated mean diameters, traceable to the standard reference meter of the International System of Units (SI). Traceability is obtained through the National Institute of Standards and Technology (NIST) of the United States of America and the Danish National Metrology Institute (DFM). DFM is an ISO/IEC 17025 accredited organisation. The MicroStandards™ particle size standards from AM provide accurate and traceable size calibration for particle size analysis. They are supplied as aqueous suspension in concentrations optimal for long-term stability and ease of dilution.

Metrology note

The certified mean diameters of AM's particle size standard products are calibrated by validated particle-size analysis instruments including Electrical Sensing Zone (ESZ), Photon Correlation Spectroscopy (PCS), Differential Centrifugal Sedimentation (DCS) and Single Particle Optical Sizing (SPOS). Imaging technologies of Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM), and Optical Microscopy (OM) are applied using the NIST standard reference materials 1963A, 1690, 1691 and reference materials certified by the Danish National Metrology Institute (DFM). Atomic Force Microscopy (AFM) is performed by DFM under DANAK accreditation no. 255, following DS/EN ISO/IEC 17025. DANAK (Danish Accreditation and Metrology Fund) is one of the signatories to the EA multilateral agreement and the ILAC multilateral agreement for the mutual recognition of calibration certificates.
This calibration certificate meets the highest international metrological standards. As a result, MicroStandards™ by AM are traceable to the International System of Units (SI).
The uncertainty is estimated in accordance with ISO/IEC Guide 98-3:2008 (GUM:1995) and EA-4/02. The expanded uncertainty is calculated with a coverage factor of 95 % (k = 2).

Instructions for use

For an optimal performance of this particle size standard, homogeneity of the particle distribution has to be ensured. To disperse the particles, gently invert the bottle several times, until no sediment is visible. Do not shake! Then hold the bottle in an ultrasonic bath for 30 seconds. Dispose the first drop prior to use in order to avoid contamination.

Safety

These products are to be used by trained personal only. Avoid inhalation and work in a well-ventilated environment. In case of aerosolization of this product, wear a suitable filter respirator. Avoid ingestion and wash hands after use. In case of skin contact, wash the contaminated skin area with ample water. Seek medical attention in case of accidental ingestion or inhalation.

Storage and disposal

Store the bottle in upright position and keep well sealed when not in use. Never touch the dropper tip and prevent any contact with chemicals. Avoid contamination and prevent exposure to direct sunlight. Store at 4 – 30 °C. Do not freeze the particles. To dispose, evaporate the liquid phase and dispose bottle and dried contents with general laboratory waste.

Limited warranty

This product is to be used under laboratory conditions by trained scientific operators only. Incorrect use and handling can result in wrong measurements or unreliable data, in which case the certified properties may be lost. Deviations from recommended storage conditions or handling instructions can reduce the stability.
The analysis of measurement data as well as the determination of suitability for a specific application is the responsibility of the user. The warranty of the manufacturer is limited to replacement of defective products if returned with prior authorisation, within 60 days from delivery.

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