CNRM
国家标准物质资源共享平台

中国计量科学研究院
颗粒类标准物质

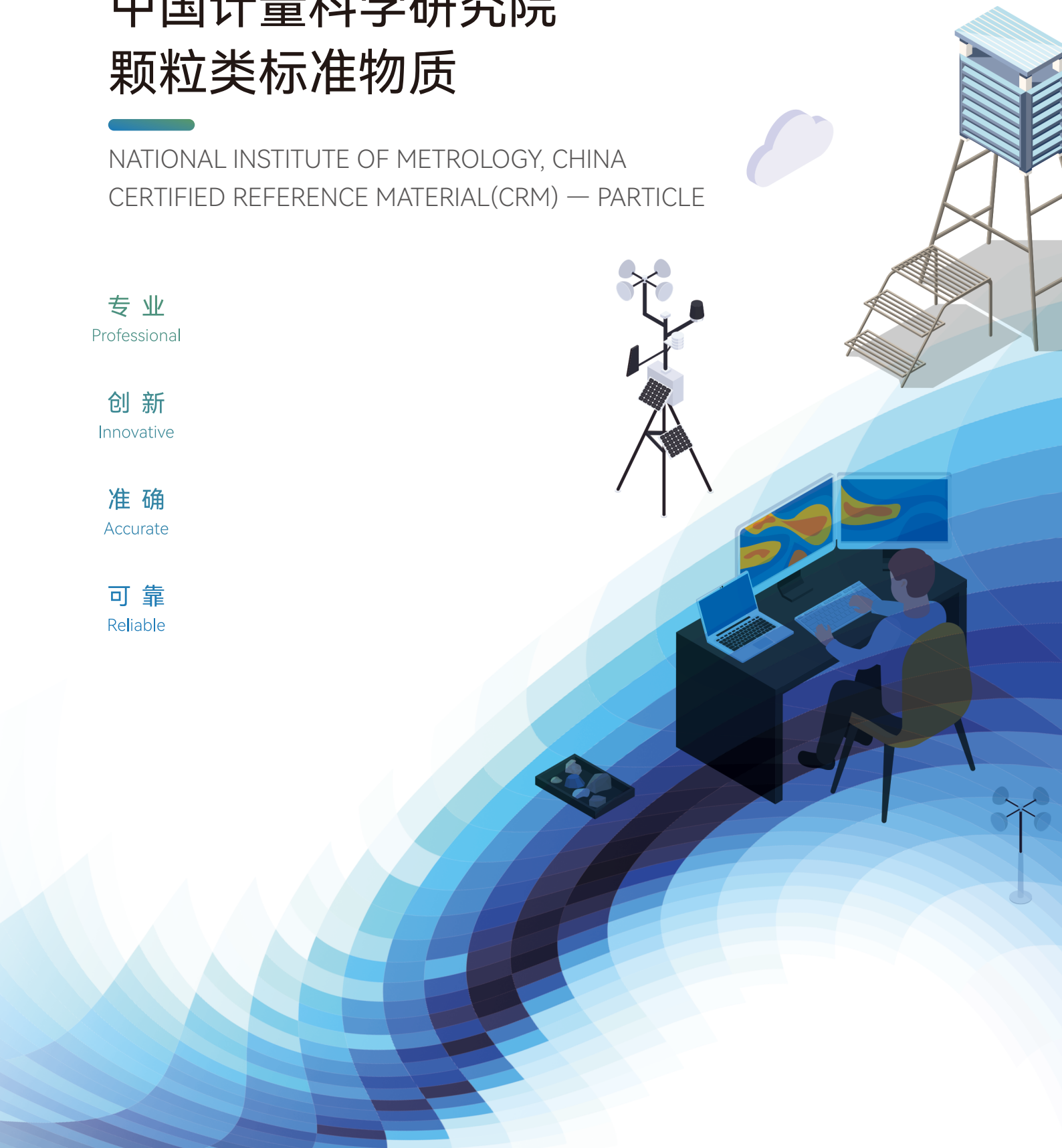
NATIONAL INSTITUTE OF METROLOGY, CHINA
CERTIFIED REFERENCE MATERIAL(CRM) — PARTICLE

专 业
Professional

创 新
Innovative

准 确
Accurate

可 靠
Reliable



环境监测类颗粒标准物质

Particle CRMs for Environmental Monitoring

中国计量科学研究院已研制GBW13642~GBW13649 $PM_{2.5}$颗粒物监测仪检测用系列标准物质与GBW13656~GBW13663 PM_{10}颗粒物监测仪检测用系列标准物质。

标准物质采用聚合法合成，化学性质稳定，玻璃化温度高、密度接近于水，可长时间悬浮于水中而不发生沉降，在水中分散性好；采用可溯源至国家长度基准的绝对定值法（显微镜+图像分析法）和经典气溶胶空气动力学当量直径测量法定值，测量结果溯源至SI单位，填补了国际空白，测量范围(1.0~18.0)μm，测量不确定度优于2.5%，k=2。

中国计量科学研究院以上述标准物质为基础，制定了JJF1659-2017 《$PM_{2.5}$质量浓度监测仪校准规范》，建立了$PM_{2.5}$质量浓度测量仪国家计量标准，保障了我国$PM_{2.5}$质量浓度测量的溯源性。

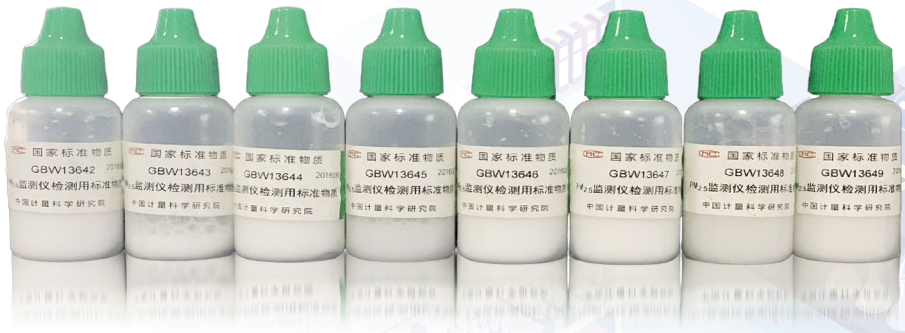
技术负责人联系方式：张文阁，010-64524973，zhangwg@nim.ac.cn

NIM China has developed a series of CRMs for the $PM_{2.5}$ particle monitoring instrument GBW13642~GBW13649, and CRMs for the PM_{10} particle monitoring instrument GBW13656-GBW13663.

The CRMs is synthesized by polymerization method, with stable chemical properties, high glass transition temperature, and density close to water. It can be suspended in water for a long time without settling and has good dispersibility in water. The absolute fixed value method (microscope+image analysis method) traceable to the national length benchmark and the classical aerosol aerodynamic equivalent diameter measurement method are used, and the measurement results are traced back to the SI units, filling the international gap. The measurement range is (1.0~18.0) μm, and the measurement uncertainty is better than 2.5%, k=2。

Based on these CRMs, NIM China has developed JJF1659-2017 "Calibration Specification for $PM_{2.5}$ Mass Concentration Monitoring Instruments" and established the national metrological standard for $PM_{2.5}$ mass concentration measuring instruments, which ensuring the traceability of $PM_{2.5}$ quality concentration measurement in China.

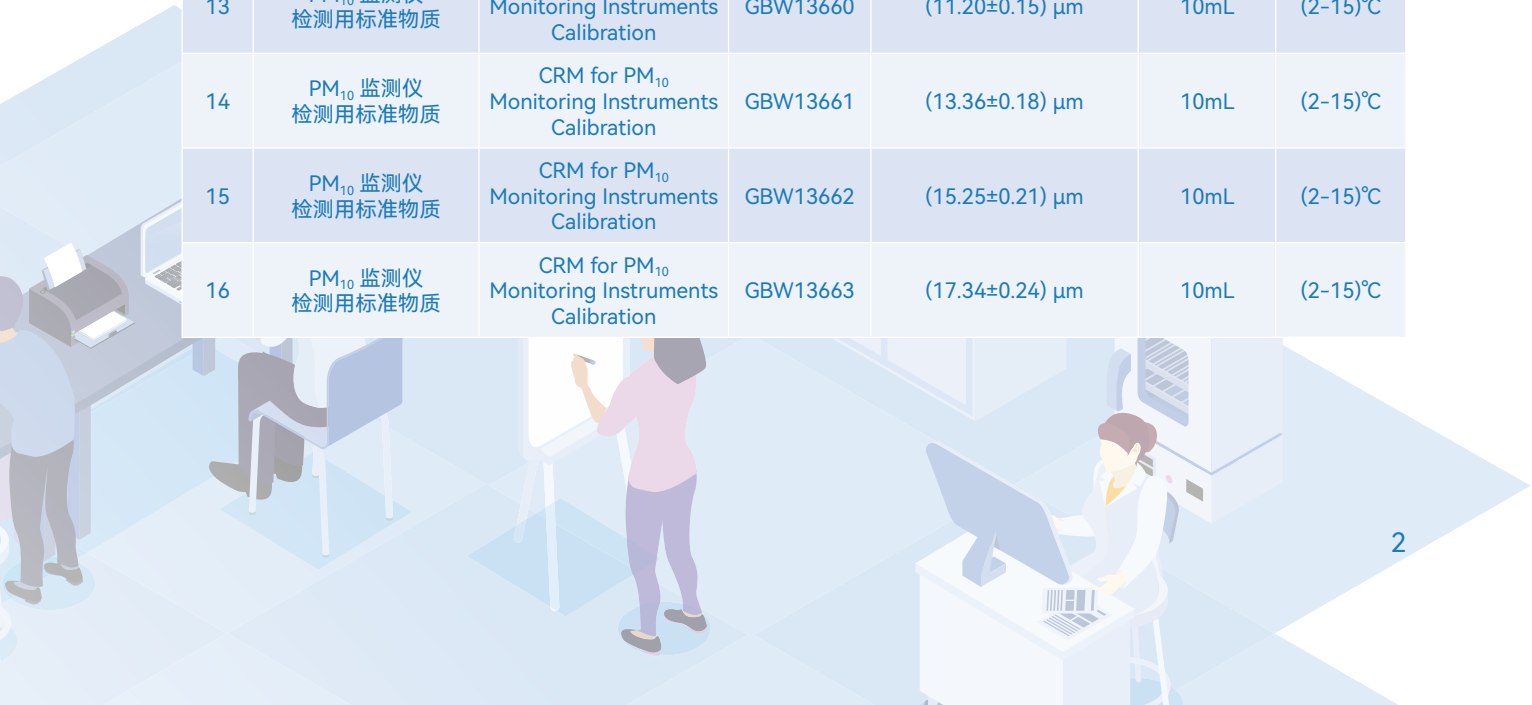
Technical advice contact: ZHANG Wenge, 010-64524973, zhangwg@nim.ac.cn



$PM_{2.5}$颗粒物监测仪检测用系列标准物质

CRMs for $PM_{2.5}$ monitoring instruments calibration

序号 No.	名称 Description	名称 Description	标准物质编号 Code	空气动力学直径 Aerodynamic diametenm (nm)	规格 Unit of Issue	备注 Other Information
1	$PM_{2.5}$ 监测仪检测用标准物质	CRMs for $PM_{2.5}$ Monitoring Instruments Calibration	GBW13642	(1491±38) nm	10mL	(2-15)℃
2	$PM_{2.5}$ 监测仪检测用标准物质	CRMs for $PM_{2.5}$ Monitoring Instruments Calibration	GBW13643	(1837±41) nm	10mL	(2-15)℃
3	$PM_{2.5}$ 监测仪检测用标准物质	CRMs for $PM_{2.5}$ Monitoring Instruments Calibration	GBW13644	(2217±45) nm	10mL	(2-15)℃
4	$PM_{2.5}$ 监测仪检测用标准物质	CRMs for $PM_{2.5}$ Monitoring Instruments Calibration	GBW13645	(2505±49) nm	10mL	(2-15)℃
5	$PM_{2.5}$ 监测仪检测用标准物质	CRMs for $PM_{2.5}$ Monitoring Instruments Calibration	GBW13646	(2813±52) nm	10mL	(2-15)℃
6	$PM_{2.5}$ 监测仪检测用标准物质	CRMs for $PM_{2.5}$ Monitoring Instruments Calibration	GBW13647	(3216±57) nm	10mL	(2-15)℃
7	$PM_{2.5}$ 监测仪检测用标准物质	CRMs for $PM_{2.5}$ Monitoring Instruments Calibration	GBW13648	(3748±64) nm	10mL	(2-15)℃
8	$PM_{2.5}$ 监测仪检测用标准物质	CRMs for $PM_{2.5}$ Monitoring Instruments Calibration	GBW13649	(4220±71) nm	10mL	(2-15)℃
9	PM_{10} 监测仪检测用标准物质	CRM for PM_{10} Monitoring Instruments Calibration	GBW13656	(3.02±0.05) μm	10mL	(2-15)℃
10	PM_{10} 监测仪检测用标准物质	CRM for PM_{10} Monitoring Instruments Calibration	GBW13657	(4.91±0.07) μm	10mL	(2-15)℃
11	PM_{10} 监测仪检测用标准物质	CRM for PM_{10} Monitoring Instruments Calibration	GBW13658	(7.29±0.10) μm	10mL	(2-15)℃
12	PM_{10} 监测仪检测用标准物质	CRM for PM_{10} Monitoring Instruments Calibration	GBW13659	(9.27±0.13) μm	10mL	(2-15)℃
13	PM_{10} 监测仪检测用标准物质	CRM for PM_{10} Monitoring Instruments Calibration	GBW13660	(11.20±0.15) μm	10mL	(2-15)℃
14	PM_{10} 监测仪检测用标准物质	CRM for PM_{10} Monitoring Instruments Calibration	GBW13661	(13.36±0.18) μm	10mL	(2-15)℃
15	PM_{10} 监测仪检测用标准物质	CRM for PM_{10} Monitoring Instruments Calibration	GBW13662	(15.25±0.21) μm	10mL	(2-15)℃
16	PM_{10} 监测仪检测用标准物质	CRM for PM_{10} Monitoring Instruments Calibration	GBW13663	(17.34±0.24) μm	10mL	(2-15)℃



工程特性类颗粒物标准物质

Particle CRMs of Engineering Properties

中国计量科学研究院已研制量值范围为15nm~100μm的单分散金颗粒、聚苯乙烯和MTD系列粒度标准物质。该系列标准物质的量值可溯源至国家长度计量标准，且通过国际比对和欧盟标准物质联合定值等证明结果准确可靠。标准物质具有数量平均粒径、中值粒径、体积平均粒径等多种特性量值，可满足不同原理粒度分析仪器的高准确校准需求。

其中，GBW12031、GBW(E)120128、GBW(E)120088标准物质可用于尘埃粒子计数器校准。GBW12017、GBW(E)120129~120133、GBW(E)120151~120153标准物质可用于激光粒度分析仪的校准。GBW12018、GBW12031、GBW(E)120091、GBW(E)120128等可用于动态光散射粒度分析仪的检定。GBW12041~12047系列标准物质与GB/T18854-2015中推荐的非球形校准品具有相同的折射率和形状因子，采用半计数法可实现对油液污染度分析仪的校准，克服传统宽分布MTD粒度标准物质粒径及计数不确定度大的缺陷，为液压传动行业中油液污染度的准确监测提供技术保障。

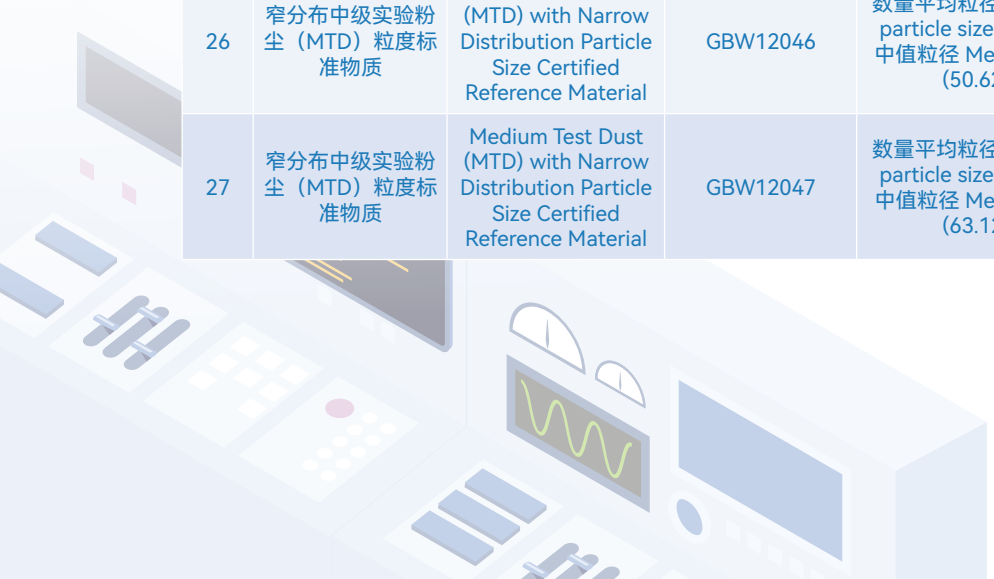
技术负责人联系方式： 刘俊杰，010-64524974，liujj@nim.ac.cn

NIM China has developed monodisperse gold particles, polystyrene and MTD series particle size reference materials with a certified value range of 15nm~100μm. The certified values can be traced to the national length measurement standards, and the results are proved to be accurate and reliable through international comparisons and joint determination of EU CRMs. The CRMs have a variety of characteristics such as number-based average particle size, median particle size, and volume-based average particle size, etc., which can meet the accurate calibration requirements of particle size analysis instruments of different principles.

Among them, CRMs code with GBW12031, GBW(E)120128, GBW(E)120088 can be used for the calibration of airborne optical particle counters. CRMs code with GBW12017, GBW(E)120129~120133, GBW(E)120151~120153 can be used for the calibration of laser diffraction particle size analyzers. CRMs code with GBW12018, GBW12031, GBW(E)120091, GBW(E)120128, etc. can be used for the calibration of dynamic light scattering particle size analyzers. GBW12041~12047 series CRMs have the same refractive index and shape factor as the non-spherical materials recommended in GB/T18854-2015 standard. And by using these series CRMs and half-counting method, particle counter for contamination monitoring in hydraulic system could be calibrated, which overcoming the large calibration uncertainty by using the traditional wide distribution MTD particle size CRMs caused by error of particle size measurement, and finally, particle contamination in the hydraulic system could be accurate monitored.

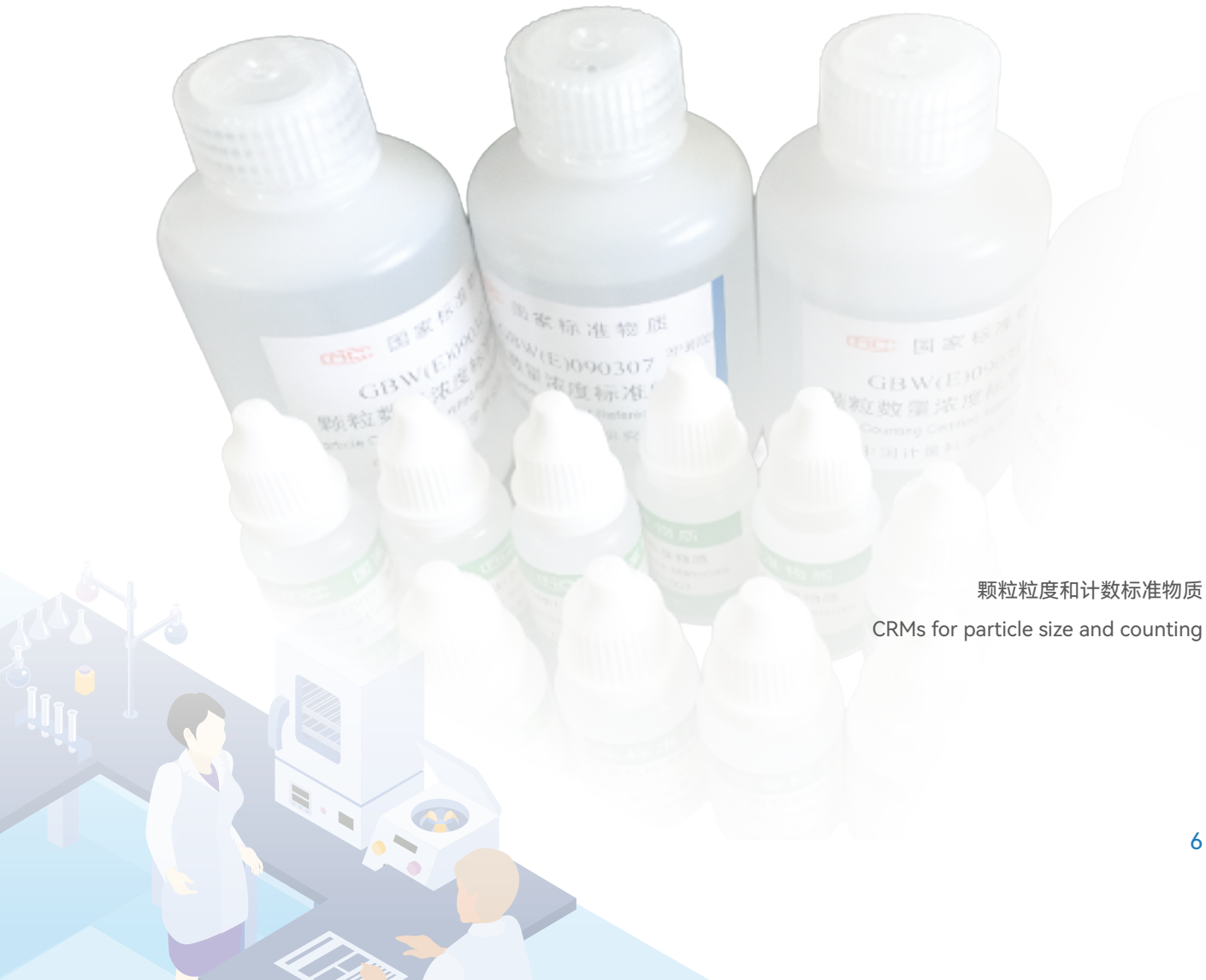
Technical advice contact: LIU Junjie, 010-64524974, liujj@nim.ac.cn

序号 No.	名称 Description	名称 Description	标准物质编号 Code	量值及不确定度 Certified Values and Uncertainty (k=2)	规格 Unit of Issue	备注 Other Information
17	微粒粒度标准物质（颗粒）	Particle Size Certified Reference Material	GBW12017	数量平均粒径 Number average particle size:(1040±10)nm 体积平均粒径 Volume average particle size:(1050±10)nm	10mL	(4~8)℃
18	微粒粒度标准物质（颗粒）	Particle Size Certified Reference Material	GBW12018	数量平均粒径 Number average particle size:(310.0±2.6)nm 体积平均粒径 Volume average particle size:(311.0±2.6)nm	10mL	(4~8)℃
19	微粒粒度标准物质（颗粒）	Particle Size Certified Reference Material	GBW12019	数量平均粒径 Number average particle size:(98.7±1.2)nm 体积平均粒径 Volume average particle size:(99.9±1.2)nm	10mL	(4~8)℃
20	微粒粒度标准物质（颗粒）	Particle Size Certified Reference Material	GBW12031	数量平均粒径 Number average particle size:(501±4.1)nm 体积平均粒径 Volume average particle size:(502±4.1)nm	10mL	(4~8)℃
21	窄分布中级实验粉尘（MTD）粒度标准物质	Medium Test Dust (MTD) with Narrow Distribution Particle Size Certified Reference Material	GBW12041	数量平均粒径 Number average particle size: (4.37±0.09)μm 中值粒径 Median particle size: (4.36±0.09)μm	15mg	(-10~60)℃
22	窄分布中级实验粉尘（MTD）粒度标准物质	Medium Test Dust (MTD) with Narrow Distribution Particle Size Certified Reference Material	GBW12042	数量平均粒径 Number average particle size: (7.73±0.10)μm 中值粒径 Median particle size: (7.66±0.10)μm	25mg	(-10~60)℃
23	窄分布中级实验粉尘（MTD）粒度标准物质	Medium Test Dust (MTD) with Narrow Distribution Particle Size Certified Reference Material	GBW12043	数量平均粒径 Number average particle size: (18.03±0.28)μm 中值粒径 Median particle size: (17.98±0.28)μm	35mg	(-10~60)℃
24	窄分布中级实验粉尘（MTD）粒度标准物质	Medium Test Dust (MTD) with Narrow Distribution Particle Size Certified Reference Material	GBW12044	数量平均粒径 Number average particle size: (29.15±0.43)μm 中值粒径 Median particle size: (29.16±0.43)μm	100mg	(-10~60)℃
25	窄分布中级实验粉尘（MTD）粒度标准物质	Medium Test Dust (MTD) with Narrow Distribution Particle Size Certified Reference Material	GBW12045	数量平均粒径 Number average particle size: (37.27±0.39)μm 中值粒径 Median particle size: (37.02±0.39)μm	300mg	(-10~60)℃
26	窄分布中级实验粉尘（MTD）粒度标准物质	Medium Test Dust (MTD) with Narrow Distribution Particle Size Certified Reference Material	GBW12046	数量平均粒径 Number average particle size: (50.75±0.69)μm 中值粒径 Median particle size: (50.62±0.69)μm	220mg	(-10~60)℃
27	窄分布中级实验粉尘（MTD）粒度标准物质	Medium Test Dust (MTD) with Narrow Distribution Particle Size Certified Reference Material	GBW12047	数量平均粒径 Number average particle size: (63.62±0.78)μm 中值粒径 Median particle size: (63.12±0.78)μm	400mg	(-10~60)℃



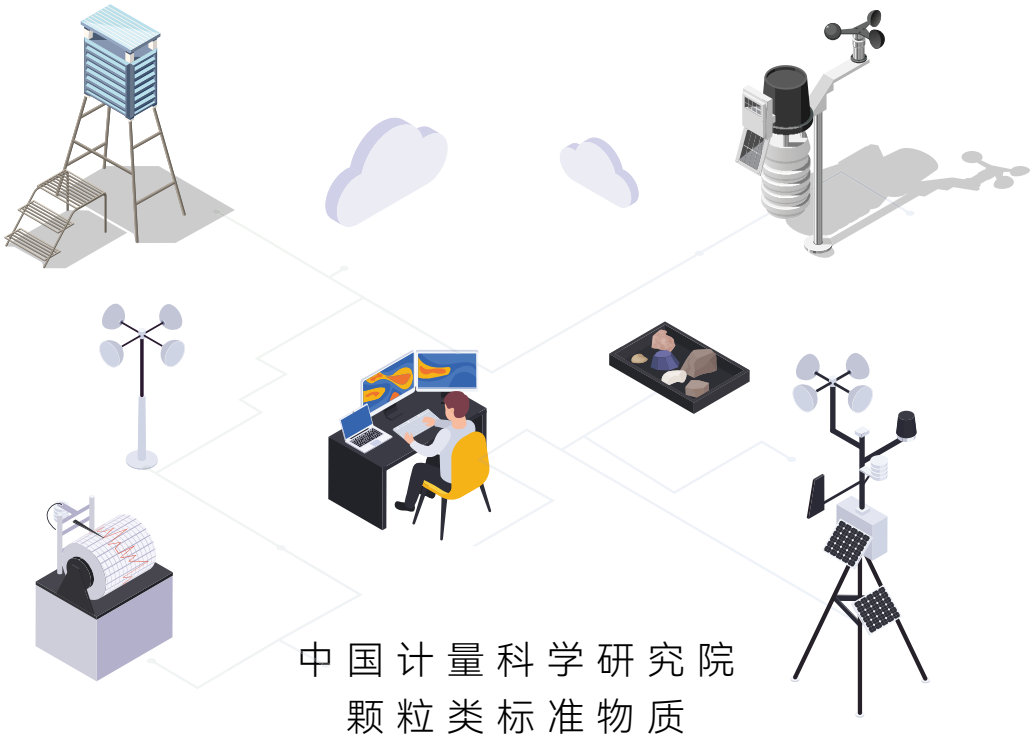
序号 No.	名称 Description	名称 Description	标准物质编号 Code	量值及不确定度 Certified Values and Uncertainty (k=2)	规格 Unit of Issue	备注 Other Information
28	微粒粒度标准物质（颗粒）	Particle Size Certified Reference Material	GBW(E)120086	数量平均粒径 Number average particle size:(776.2±6.5)nm 体积平均粒径 Volume average particle size: (777.4±6.5)nm	10mL	(4~8)℃
29	微粒粒度标准物质（颗粒）	Particle Size Certified Reference Material	GBW(E)120087	数量平均粒径 Number average particle size:(709.3±5.9)nm 体积平均粒径 Volume average particle size:(710.0±5.9)nm	10mL	(4~8)℃
30	微粒粒度标准物质（颗粒）	Particle Size Certified Reference Material	GBW(E)120088	数量平均粒径 Number average particle size:(412.7±3.8)nm 体积平均粒径 Volume average particle size:(413.5±3.8)nm	10mL	(4~8)℃
31	微粒粒度标准物质（颗粒）	Particle Size Certified Reference Material	GBW(E)120089	数量平均粒径 Number average particle size:(192.5±3.2)nm 体积平均粒径 Volume average particle size:(193.1±3.2)nm	10mL	(4~8)℃
32	微粒粒度标准物质（颗粒）	Particle Size Certified Reference Material	GBW(E)120090	数量平均粒径 Number average particle size:(79.5±1.9)nm 体积平均粒径 Volume average particle size:(81.5±1.9)nm	10mL	(4~8)℃
33	微粒粒度标准物质（颗粒）	Particle Size Certified Reference Material	GBW(E)120091	数量平均粒径 Number average particle size:(66.8±1.5)nm 体积平均粒径 Volume average particle size:(67.0±1.5)nm	10mL	(4~8)℃
34	微粒粒度标准物质	Particle Size Certified Reference Material	GBW(E)120128	数量平均粒径 Number average particle size:(607.5±4.8)nm 体积平均粒径 Volume average particle size:(608.3±4.8)nm	10mL	(4~8)℃
35	微粒粒度标准物质	Particle Size Certified Reference Material	GBW(E)120129	数量平均粒径 Number average particle size:(5.12±0.04)μm 体积平均粒径 Volume average particle size:(5.18±0.04)μm	10mL	(4~8)℃
36	微粒粒度标准物质	Particle Size Certified Reference Material	GBW(E)120130	数量平均粒径 Number average particle size:(10.10±0.06)μm 体积平均粒径 Volume average particle size:(10.15±0.06)μm	10mL	(4~8)℃
37	微粒粒度标准物质	Particle Size Certified Reference Material	GBW(E)120131	数量平均粒径 Number average particle size:(15.33±0.09)μm 体积平均粒径 Volume average particle size:(15.60±0.09)μm	10mL	(4~8)℃
38	微粒粒度标准物质	Particle Size Certified Reference Material	GBW(E)120132	数量平均粒径 Number average particle size:(26.29±0.18)μm 体积平均粒径 Volume average particle size:(26.46±0.18)μm	10mL	(4~8)℃

序号 No.	名称 Description	名称 Description	标准物质编号 Code	量值及不确定度 Certified Values and Uncertainty (k=2)	规格 Unit of Issue	备注 Other Information
39	微粒粒度标准物质	Particle Size Certified Reference Material	GBW(E)120133	数量平均粒径 Number average particle size:(49.7±0.5)μm 体积平均粒径 Volume average particle size:(50.6±0.5)μm	10mL	(4~8)℃
40	微米级 粒度标准物质	Particle Size Certified Reference Material	GBW(E)120151	数量平均粒径 Number average particle size:(2.030±0.014)μm 中值粒径 Median particle size:(2.039±0.014)μm 体积平均粒径 Volume average particle size:(2.050±0.012)μm	10mL	(10~40)℃
41	微米级 粒度标准物质	Particle Size Certified Reference Material	GBW(E)120152	数量平均粒径 Number average particle size:(19.77±0.13)μm 中值粒径 Median particle size:(20.37±0.14)μm 体积平均粒径 Volume average particle size:(20.12±0.17)μm	10mL	(10~40)℃
42	微米级 粒度标准物质	Particle Size Certified Reference Material	GBW(E)120153	数量平均粒径 Number average particle size:(103.4±1.4)μm 中值粒径 Median particle size:(102.9±1.4)μm 体积平均粒径 Volume average particle size:(104.4±1.1)μm	0.2g	(10~40)℃



颗粒粒度和计数标准物质

CRMs for particle size and counting



中国计量科学研究院
颗粒类标准物质

NATIONAL INSTITUTE OF METROLOGY, CHINA
CERTIFIED REFERENCE MATERIAL (CRM) — PARTICLE

中国计量科学研究院
National Institute of Metrology, China
国家标准物质研究中心

专业 Professional　创新 Innovative　准确 Accurate　可靠 Reliable

为测量提供标准！

www.ncrm.org.cn
电话：010-64524710
Email：crm-service@nim.ac.cn
地址：北京市朝阳区北三环东路18号

微信公众平台