All-Russian Research Institute for Optical and Physical Measurements (VNIIOFI), Moscow, Russia

HIGH TEMPERATURE BLACKBODY BB3500M

BB3500M (and its prototypes and modifications), developed at VNIIOFI, Russia, is wellknown and the most precise high-temperature blackbody used as a standard blackbody for radiometry, photometry and radiation thermometry worldwide, for instance at NIM (China), NPL (UK), PTB (Germany), NIST (USA), VNIIOFI (Russia) and other National Metrological Institutes. Special type of graphite (pyrolytic graphite) allows BB3500M to operate at temperatures as high as up to 3500 K. With emissivity as high as 0.9995 (that was confirmed by investigations of NIST, PTB and VNIIOFI) BB3500M reproduces real blackbody radiation in wide spectral range, which differs from the exact Planck radiation by only 0.05%. High reliability of BB3500M is approved by its long-term operation in the world-leading NMIs: almost 25 years at PTB and VNIIOFI, more than 20 years at NIST, NPL and NIM.



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Appearance and cross-section of BB3500M

The main application of BB3500M is spectral irradiance in the range from 200 nm to 2500 nm. 10 of 12 participants of the key comparison CCPR-K1a "Spectral Irradiance 250 – 2500 nm" use BB3500M (or its prototypes) as a standard source. BB3500M is also used for realizing spectral radiance, luminous intensity and other radiometric and photometric units.

BB3500M in the NIM Spectral Irradiance Facility





BB3500M is well-known and wide-use in radiation thermometry society as a standard variable-temperature blackbody from 1200 K to 3500 K, as well as a furnace for fixed points from Cu (1358 K) to HfC-C (3458 K). Due to its flexible construction the same BB3500M unit can be used both as a variable-temperature blackbody and as a fixed-point furnace with just minor tuning.

DELIVERY SET

- Blackbody source in water-cooled housing with adjustable mount
- Spare radiating cavities (optionally)
- Power supply
- Temperature control system with optical feedback including lens head, optical fiber, detector, amplifier and voltmeter.
- Vacuum pump with accessories
- Ar flowmeters with valves and tubing
- Water tubing
- Aids and tools for assembling and installing radiating cavity
- Software for operating BB3500M
- Set of diaphragms and holders for fixed-point cells (optionally)
- Fixed-point cells Cu, Co-C, Pt-C, Ru-C, Re-C, MoC-C, WC-C, HfC-C (optionally)

Temperature Range	1200 – 3400 K (3500 on request)
Emissivity	0.9995±0.0005
Material of radiating cavity	pyrolytic graphite
Shape of radiating cavity	cylindrical
Cavity inner diameter / depth	38 / 200 mm
Cavity opening	24 mm
Resolution of temperature setting	0.01 K
Life-time of a cavity at T=3000 K	≥ 500 h
Cooling, rate	Plant water, 20 l/min
Cavity environment, rate	Ar purge, 3 l/min
Power supply	
Input voltage	~380 V, 3 phases
Output max. current / voltage	DC 800 A / 34 V
Max consuming power	24 kW
Cooling, rate	Air and plant water, 5 l/min

TECHNICAL SPECIFICATIONS

