



MIKRON[®]

Blackbody Radiation Calibration Sources
From -40°C to 3000°C traceable to NIST

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THE INFRARED PROS

Mikron Blackbody Radiation Calibration Sources

Mikron has been designing and building blackbody calibration sources since 1970. These precision instruments have been installed in several national standards institutions, and are used across industry and research for the calibration of infrared thermometers, radiometers, heat flux meters, thermal imaging systems and spectrographic analyzers. Our parallel manufacture of infrared thermometers and thermal imaging systems has contributed much to Mikron's knowledge and expertise in the field of infrared radiometric measurement. This expertise is embodied in the ground-breaking innovation and breadth of product performance described in the following pages.

The sequence of products in this catalog is broadly arranged in ascending order of maximum source temperature, with overall capability from -40° to 3000°C , but also includes models which are distinguished by their portability or some unique feature, other than temperature range. In addition, we have included descriptions of special purpose, custom designed models for which Mikron is noted, such as large area sources, sources for airborne application and for use in vacuum environments. All our blackbody calibration sources, whether standard or custom, are designed for the highest emissivity possible, commensurate with emitter size and cavity configuration; excellent emitter surface uniformity; and superior accuracy. After testing and a burn-in period, accuracy is determined radiometrically, with NIST traceable certification where applicable.

In a separate, but related, blackbody calibration source category, the catalog also describes Mikron's unique family of fixed temperature, Freezing Point of Metal sources. These high precision instruments provide calibration assurance hitherto only obtainable from National Standards Institutes. In combination with our M190 series of Calibration Transfer Standards, also described, Mikron is able to provide the industrial user and researcher with a complete hierarchy of calibration traceability, from working units in the field, through secondary and transfer standards to primary, Freezing Point Standards.

MIKRON M340

-20.0°C to 150.0°C

The M340 is a portable blackbody calibration source covering the range from sub-zero to 150.0°C with 0.1°C resolution. The thermoelectric heating/cooling mechanism is utilized to achieve a compact and easy-to-use blackbody source. The M340 has unusually high temperature stability and a fast slew rate to reach final set points. Source temperature is closely controlled by a self-tuning PID controller which displays temperature in a digital readout.



M340

Precision Low Temperature

Specifications:

Temperature Range: -20.0° to 150.0°C or -4°F to 302°F

†Uncertainty, thermometric: $\pm 0.05^{\circ}\text{C}$, **Uncertainty, radiometric :** $\pm 1^{\circ}\text{C}$ at 8-14 μm

Temperature Resolution: 0.1° degree

Stability: 0.1°C per 8 hour period

Emitter Diameter: 51mm (2.0")

Source Non-uniformity: $\pm 0.1^{\circ}\text{C}$ for 45mm (1.8") of center diameter at 37.0°C

Emissivity (effective): $+0.99$

Temperature Sensor: Precision platinum RTD: 1/3 DIN

Method of Control: Digital self-tuning PID controller

Warm-up Time: 6 minutes from ambient to -15°C or 100°C

Operating Ambient Temperature: 5 to 40°C (40 to 104°F)

Power Requirements: 115VAC $\pm 5\%$ 50/60Hz
300 watts max. (230VAC optional)

Dimensions: 167mm H x 280mm W x 280mm D

Weight: 7kg (15.5 lbs.)

Optional Features:

RS232C or RS485 communication output



M310

General Purpose

MIKRON M310

Ambient $+5^{\circ}\text{C}$ to 350°C (optional 450°C)

The M310 is a highly compact portable blackbody calibration source with a built-in digital indicating controller that can be set at any temperature between ambient $+5^{\circ}\text{C}$ to 350°C . Once set, the source temperature is controlled to within 0.5°C by an internal RTD sensor. The unit has an emissivity of $+0.99$.

The M310 is easy to transport to a calibration location, either in laboratory or in the plant. It has a dedicated PID controller which displays temperature on a digital readout.

† Accuracy calibration performed radiometrically, the uncertainty of spectral emissivity and transfer standard are already included.

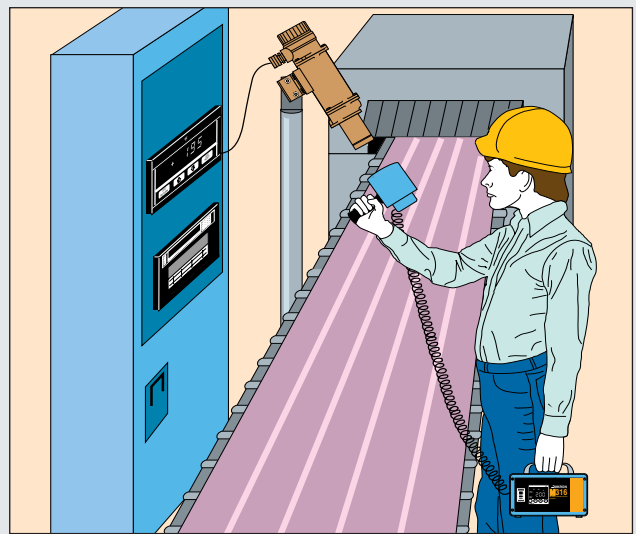
* Models may differ from picture shown.

Specifications:

Temperature Range: Ambient +5°C to 350°C or 662°F
†Accuracy: ±0.25% of reading ±1°C
Temperature Resolution: 1 degree
Stability: 0.5°C per 8 hour period
Emitter Diameter: 76mm (3.0")
Emissivity (effective): 0.99
Temperature Sensor: Precision platinum RTD: 1/3 DIN
Method of Control: Digital self-tuning PID controller
Warm-up Time: 30 minutes from ambient to 300°C
Operating Ambient Temperature: 0° to 44°C (30° to 110°F)
Power Requirements: 115VAC ±10% 50/60Hz
600 watts max. (230VAC optional)
Dimensions: 167mm H x 210mm W x 280mm D
Weight: 6kg (13.2 lbs.)

Optional Features

RS232C or RS485 communication output



M315

General Purpose

MIKRON M315

Ambient +5°C to 350°C (optional 450°C)
The M315 is a higher temperature 2-piece version of the M310. The calibration source and the digital indicating controller are contained in separate housings to allow greater flexibility in positioning the instrument within an installation, e.g. long path calibration.

Specifications:

Temperature Range: Ambient +5°C to 350°C or 662°F
†Accuracy: ±0.25% of reading ±1°C
Temperature Resolution: 1 degree
Stability: 0.5°C per 8 hour period
Emitter Diameter: 76mm (3.0")
Emissivity (effective): +0.99
Temperature Sensor: Precision platinum RTD: 1/3 DIN
Method of Control: Digital self-tuning PID controller
Warm-up Time: 30 minutes from ambient to 300°C
Operating Ambient Temperature: 0° to 44°C (30° to 110°F)
Power Requirements: 115VAC ±10% 50/60Hz
600 watts max. (230VAC optional)
Dimensions:
Blackbody Source or Control Module:
167mm H x 210mm W x 280mm D
Weight:
Blackbody Module: 4.5kg (9.5 lbs.)
Control Module: 2.5kg (5.5 lbs.)

Optional Features:

RS232C or RS485 communication output



M316

Portable

MIKRON M316

Ambient +5°C to 300°C
The 2-piece M316 features maximum portability and flexibility for field calibration or verification without need to remove the sensor from its location. The calibration source is contained within a compact, lightweight, hand-held housing, permitting the operator to position the source more easily in hard to reach locations. The indicating controller is carried via handle or a convenient shoulder strap.

Specifications:

Temperature Range: Ambient +5°C to 300°C or 572°F
†Accuracy: ±0.5% of reading ±1°C
Temperature Resolution: 1 degree
Stability: 0.5°C per 8 hour period
Emitter Diameter: 57mm (2.25")
Emissivity (effective): +0.99
Temperature Sensor: Precision platinum RTD: 1/3 DIN
Method of Control: Digital PID controller
Warm-up Time: 10 minutes from room temperature to 200°C
Operating Ambient Temperature: 0° to 50°C (32° to 122°F)
Method of Mounting:
Blackbody Module: a. handle grip
b. 1/4-20 tapped hole for tripod mount
Control Module: Bench mount or shoulder strap for field use
Power Requirements: 115VAC ± 10% 50/60Hz 300 watts max (230VAC optional)
Dimensions:
Blackbody Module: 203mm H x 89mm W x 98mm D
Control Module: 102mm H x 178mm W x 127mm D
Weight:
Blackbody Module: 0.82kg (1.8 lbs.)
Control Module: 1.2kg (2.7 lbs.)

† Accuracy calibration performed radiometrically, the uncertainty of spectral emissivity and transfer standard are already included.
* Models may differ from picture shown.



M320

Dual Cavity

MIKRON M320

Ambient +10°C to 350°C

This unique unit features dual emitters providing calibration sources for 2 temperature points within the calibration range, thus eliminating the waiting period between temperature measurements encountered with single emitter units.

Specifications:

Temperature Range Each Cavity: Ambient +10°C to 350°C or 662°F

†**Accuracy:** ±0.25% of reading ± 1°C

Temperature Resolution: 1 degree

Stability: 0.5°C per 8 hour period

Emitter Diameter: Two 76mm (3.0")

Emissivity (effective): +0.99

Temperature Sensor: Precision platinum RTD

Method of Control: 2 digital self-tuning PID controllers

Warm-up Time: 30 minutes from ambient to 200°C

Operating Ambient Temperature: 0° to 44°C (30° to 110°F)

Power Requirements: 115VAC ±10% 50/60Hz 1200 watts max. (230VAC optional)

Dimensions:

Blackbody Module: 167mm H x 280mm W x 280mm D

Control Module: 167mm H x 210mm W x 280mm D

Weight:

Blackbody Module: 10kg (22 lbs.)

Control Module: 2.5kg (5.5 lbs.)

Optional Features:

RS232C or RS485 communication outputs

MIKRON M300

200°C to 1150°C

This blackbody calibration source features a unique uniformly heated spherical cavity with a high emissivity of +0.995. The M300 will deliver any temperature between 200°C and 1150°C. A convenient microprocessor-based, self-tuning digital PID controller holds the selected temperature to within 0.5°C assuring high accuracy calibration of infrared thermometers, thermal imaging equipment, etc.

Specifications:

Temperature Range: 200° to 1150°C or 392° to 2102°F

†**Accuracy:** ±0.25% of reading ±1°C

Temperature Resolution: 1 degree

Stability: 0.5°C per 8 hour period

Heated Cavity Shape: Spherical

Emitter Diameter: 51mm (2.0")

Emissivity (effective): +0.995

Sensor: Precision thermocouple

Method of Control: Digital self-tuning PID controller

Communication Output: Optional RS232C, RS422, RS485

Warm-up Time: 1 hour from room temperature to 1000°C

Operating Ambient Temperature: 0° to 44°C (32° to 110°F)

Cooling: Fan cooled, air inlet on back panel

Power Requirements: 208VAC ±10% 50/60Hz 2.0kw max. (230VAC optional)

Dimensions: 64cm H x 50cm W x 55cm D

Weight: 80kg (175 lbs.)

Optional Features:

RS232C, RS422 or RS485 serial communication output

Optional Accessories:

Water cooled aperture wheel assembly

Universal mounting flange



M305

General Purpose Medium Temperature

MIKRON M305

100°C to 1000°C

The M305 blackbody calibration source design achieves significant weight and size reduction over the M300 with only minor sacrifices in specification and performance, making it an ideal unit where portability is required or space is limited. The spherical cavity yields an emissivity of +0.995 over the temperature range of 100 to 1000°C with an aperture of 25mm. An integrally mounted PID controller completes this versatile calibrator.

Specifications:

Temperature Range: 100° to 1000°C or 210° to 1832°F

†**Accuracy:** ±0.25% of reading ±1°C

Temperature Resolution: 1 degree

Stability: 0.5°C per 8 hour period

Emitter Diameter: 25mm (1.0")

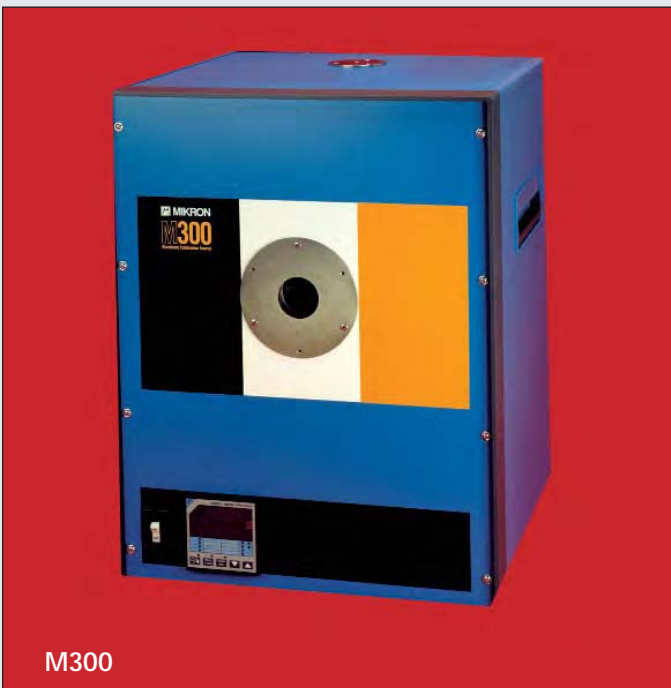
Heated Cavity Shape: Spherical

Emitter Solid Angle: 20°

Emissivity (effective): +0.995

† Accuracy calibration performed radiometrically, the uncertainty of spectral emissivity and transfer standard are already included.

* Models may differ from picture shown.



M300

Large Aperture

Sensor: Precision thermocouple
Method of Control: Digital self-tuning PID controller
Communication Output: Optional RS232C, RS422, RS485
Warm-up Time: 40 minutes from ambient to 800°C
Operating Ambient Temperature: 0° to 44°C
 (32° to 110°F)
Cooling: Fan cooled, air inlet on back panel
Power Requirements: 115VAC ±10% 50/60Hz
 1.0kw max. (230VAC optional)
Dimensions: 270mm H x 430mm W x 370mm D
Weight: 25kg (55 lbs.)

Optional Features:
 RS232C, RS422 or RS485 serial communication output
Optional Accessories:
 Water cooled aperture wheel assembly



M360/360A

Precision Medium Temperature

MIKRON M360/360A

M360: 50°C to 1100°C
 M360A: 50.0°C to 750.0°C

The M360 blackbody calibration source uniquely combines portability with wide temperature range, high emissivity and remarkable resolution. The source and the controller are housed in separate modules which allows the source to be positioned in a location remote from the controller such as next to environmental test chamber, or to be used in tests which involve long path lengths. Each module is fitted with a carrying handle and can be comfortably carried to manufacturing plant or field research locations.

The M360A model differs from the M360 only in its higher accuracy, resolution and stability specification. The enhanced performance of the M360A is achieved through the use of a special controller with output characterization capability.

Specifications:

Temperature Range: Model M360: 50° to 1100°C or 122° to 2012°F; Model M360A: 50.0° to 750.0°C or 122° to 1382°F

Accuracy:

Model M360: ±0.2% of reading ±1°C;
 Model M360A: ±0.1% of reading ±0.4°C

Temperature Resolution: Model M360: 1degree

Model M360A: 0.1degree

Stability: Model M360: 0.5°C per 8 hour period;

Model M360A: 0.1°C per 8 hour period

Heated Cavity Shape: Spherical

Emitter Diameter: 25.0mm (1.0")

Emitter Solid Angle: 20°

Emissivity (effective): +0.995

Uniformity of Temperature: To within ±0.1% of controller setting

Temperature Sensor: Model M360: Precision Thermocouple
 Model M360A: Precision Platinum
 RTD: 1/3 DIN

Method of Control: Digital self-tuning PID controller

Communication Outputs: Optional RS232C, RS422, RS485

Slew Rate: 15°C/minute

Cooling: Fan cooled

Warm-up Time: 40 minutes from ambient to 700°C

Operating Ambient Temperature: 0° to 44°C (32° to 110°F)

Power Requirements: 115VAC ±5% 50/60Hz 1.0kw max.
 (230VAC optional)

Dimensions:

Blackbody Module: 305mm H x 273mm W x 368mm D

Control Module: 167mm H x 280mm W x 280mm D

Weight:

Blackbody Module: 15kg (33 lbs.);

Control Module: 5.0kg (11 lbs.)

Optional Features:

RS232C, RS422 or RS485 serial communication output

Optional Accessories:

Water cooled aperture wheel assembly

Universal mounting flange



M335

High Temperature (Fast Response)

MIKRON M335

300°C to 1500°C

The M335 Blackbody Calibration Source is a general purpose high temperature source which provides a very quick heat-up time of only 20 minutes to reach 1400°C. A self-tuning digital PID Controller with adjustable set point holds the temperature to within 1°C. An independent over temperature alarm and control system prevents heating element burnout; an internal fan keeps the cabinet surface at safe, comfortable temperature.

Specifications:

Temperature Range: 300° or 1500°C (572° - 2732°F)

Accuracy: ±0.4% of reading ±1°C

Temperature Resolution: 1degree

Stability: 1°C per 8 hour period;

Emitter Diameter: 16.5mm (0.65")

Heated Cavity Shape: Closed end tube 16mm (0.625") dia x 150 mm (5.90") long with 75 mm (2.95") heated length

Emissivity (effective): +0.99

Sensor: Precision platinum thermocouple

Method of Control: Digital self-tuning PID controller

Communication Output: Optional RS232C, RS422, RS485

Warm-up Time: 30 minutes from ambient to 1200°C

Operating Ambient Temperature: 0° to 44°C (32° to 110°F)

Cooling: Fan cooled, air inlet on back panel

Power Requirements: 115VAC ±10% 50/60Hz
 2.0kw max. (230VAC optional)

Dimensions: 29cm H x 49.5cm W x 55cm D

Weight: 28kgs (62 lbs.)

Optional Features:

RS232C, RS422 or RS485 serial communication output

Optional Accessories:

Water cooled aperture wheel assembly

† Accuracy calibration performed radiometrically, the uncertainty of spectral emissivity and transfer standard are already included.

* Models may differ from picture shown.



M330

High Temperature

MIKRON M330

300°C to 1700°C

The M330 blackbody calibration source can deliver any temperature between 300° and 1700°C. A closed end tube with a 25mm aperture diameter is heated by specially manufactured elements which provide excellent uniformity. A self-tuning digital PID controller with adjustable set point holds the temperature to within 0.5°C at 1600°C, assuring high accuracy calibration. An independent over temperature alarm and cutout system prevents heating element burnout. An internal fan keeps the cabinet surface at a safe, comfortable temperature.

Specifications:

- Temperature Range:** 300° to 1700°C or 572° to 3092°F
- Accuracy:** ±0.25% of reading ±1°C (for temperatures above 600°C)
- Temperature Resolution:** 1 degree
- Stability:** 1°C per 8 hour period
- Emitter Diameter:** 25mm (1.0")
- Emitter Solid Angle:** 12.5°
- Emissivity (effective):** +0.99
- Heated Cavity Shape:** Closed end tube 45mm ID x 300mm long with 125mm heated length
- Sensor:** Precision platinum thermocouple
- Method of Control:** Digital self-tuning PID controller
- Communication Output:** Optional RS232C, RS422, RS485
- Operating Ambient Temperature:** 0° to 44°C (32° to 110°F)
- Power Requirements:** 208VAC ±10% 50/60Hz 3.0kw max. (230VAC optional)
- Cooling:** Fan cooled, air inlet on back panel
- Dimensions:** 64cm H x 50cm W x 55cm D
- Weight:** 80kg (175 lbs.)

Optional Features:

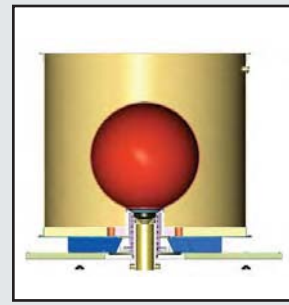
- RS232C, RS422 or RS485 serial communication output
- Optional Accessories:**
- Water cooled aperture wheel assembly
- Universal mounting flange

† Accuracy calibration performed radiometrically, the uncertainty of spectral emissivity and transfer standard are already included.
 * Models may differ from picture shown.



M350

Heat Flux Meters Calibration Source



Simplified cross section of Model 350

MIKRON M350

300°C to 1100°C

The Model M350 blackbody source is specifically designed for direct and unambiguous calibration of heat flux meters up to 200KW/m² or radiant flux density. A 60mm diameter opening allows the insertion of heat flux sensors deep into water cooled sight tubes to directly expose the sensor to 180° of radiance emitted from a spherical shaped cavity. For best results M350 is designed for vertical mounting, to minimize the air eddy currents within the cavity, and to insure a high degree of radiance uniformity. The large interior diameter of cavity of 300mm ensures that spectral radiance to the surface of sensor is near perfect approximation to Planck's law. The large opening of water cooled sight tube can easily accept popular heat flux sensors manufactured by Schmidt-Boelter, Gordon or others. An independent water flow meter with alarm and cutout system insures that the sight tube is adequately cooled before the insertion of heat flux sensors.

A fully digital high accuracy self tuned PID controller with adjustable set point holds the temperature within 0.25°C of set point assuring high stability and accuracy. The controller and all necessary safety components are enclosed in a 19" rack mount.

Specifications:

- Temperature Range:** 300.0° to 1100.0°C corresponding to radiant flux of up to 200KW/M²
- Accuracy:** ±0.25% of reading ±1°C
- Temperature Resolution:** 0.1°C
- Stability:** 0.25°C per 8 hour period
- Heated Cavity Shape:** Spherical 300mm (12") diameter
- Aperture Diameter for Insertion of Heat Flux Sensor:** 60mm (water cooled)
- Emissivity (effective):** +0.995
- Sensor:** Precision Platinum Thermocouple
- Method of Control:** Digital Self-tuning PID Controller in 19" Rack Mount Enclosure
- Communication Output:** RS232C
- Operating Ambient Temperature:** 0° to 44°C
- Power Requirements:** 208 VAC ±5% 50/60Hz 4.0kw max. (230VAC optional)
- Cooling:** Enclosure: Fan Cooled, Sight Tube: Water Cooled
- Dimensions:** 67cm H x 72cm W x 72 cm D
- Weight (Source):** approx. 100kg (220 lbs.)
- Weight (Controller):** approx. 20kg (44 lbs.)
- Optional Features:**
- RS422 or RS485 serial communication output
- Optional Accessories:**
- Sensor holder and spacer
- Stand 1.2 meters high for mounting M350



M390/395

Ultra High Temperature

MIKRON M390/395

up to 3000°C

The M390/395 series is an ultra high temperature blackbody calibrator without parallel in its capability to produce very high temperature, high emissivity emitters and at the same time stabilize at the required temperature within a few minutes of switch-on. The graphite tube has an emitter diameter of 25mm (1.00") cavity and an emissivity of +0.99. Target temperature is sensed by a rapid response Mikron infrared fiber optic thermometer which drives a PID controller to regulate the cavity temperature precisely to the desired set points. Remote set point setting is achieved via an RS232C communication port. All safety features to protect equipment and operator are easily accessible.

Model	Temperature Range	Resolution
M395	Room Temp +10°C to 2300°C (4170°F)	0.1
M390L	300° to 2000°C (570° to 3630°F)	0.1
M390A-2	600° to 2300°C (1110° to 4170°F)	1.0
M390C-2	600° to 3000°C (1110° to 5340°F)	1.0

Specifications:

†Accuracy: ±0.25% of reading ±1°C

Heated Cavity Shape: Closed end graphite tube 150mm (6.0") long with 64mm (2.50") heated length

Emitter Diameter: 25mm (1.0")

Emissivity (effective): +0.99: Model M395: +0.995

Cooling: Cavity electrodes are water cooled, hose connections on rear, 3 lpm (1 gpm)

Heating Element Type: Graphite tube with argon gas purge, 225 lph (8cfh)

Temperature Sensor: Mikron "Infraducer"

Method of Control: Digital self-tuning PID controller

Communication Output: Optional RS232C, RS422, RS485

Warm-up Time: 5 minutes from ambient to 2300°C

Operating Ambient Temperature: 0° to 44°C (32° to 110°F)

Power Requirements: Single phase 208/230VAC ±10% 50/60Hz 15kw, M390 C-1 24kw

Dimensions: 171cm H x 56cm W x 82cm D

Weight: Approx. 182kg (400 lbs.)



M380

Primary Standard

MIKRON M380 Series

Primary Standard Freezing Point Blackbody Calibration Source

The M380 Series provides fixed point primary calibration standards for checking transfer standards at discrete temperatures from 29.76° to 1084.62°C, thus bringing the precision and assurance of National Standards to every user, economically and with unprecedented simplicity of operation.

M380 Series includes eight models, each dedicated to a particular metal freezing point. The available software, in conjunction with one of Mikron's M190 Transfer Standards, facilitates clear and unambiguous determination of the freezing point, which lends itself to automation or use by semi-skilled operators.

Model	Metal Material	Freeze Temp.*	Uncertainty
M380-CU	Copper	1084.62°C	0.50°C
M380-AU	Gold	1064.18°C	0.40°C
M380-AG	Silver	961.78°C	0.40°C
M380-AL	Aluminum	660.32°C	0.30°C
M380-ZN	Zinc	419.53°C	0.30°C
M380-SN	Tin	231.93°C	0.20°C
M380-IN	Indium	156.60°C	0.20°C
M380-GA	Gallium	29.76°C**	0.05°C

*assigned value of ITS 90 **Melt temperature

Specifications:

Emitter Diameter: 6.0mm for copper, gold, silver, aluminum and zinc. 12.0mm for tin, indium and gallium

Emitter Solid Angle: 15°

Emissivity (effective): +0.998

Freeze Metal Purity: + 99.999% (Certificate of purity of metal will be supplied.)

Freeze Point Plateau Duration: 10 minutes or longer

Ambient Temperature: 18° to 28°C

Power Requirements: 115VAC ±5% 50/60Hz 1.0KW max.

(230VAC optional by separate step down transformer)

Dimensions: 213mm H x 280mm W x 380mm D

Weight: 10kg (22 lbs.) approx.

† Accuracy calibration performed radiometrically, the uncertainty of emissivity and transfer standard are already included.

* Models may differ from picture shown.



M315X/345X

Large area low temperature blackbody source.

Large Area Calibration Sources

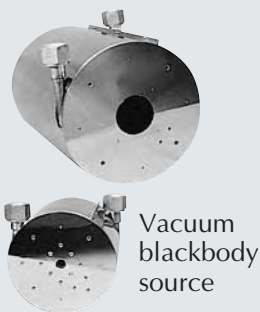
The large area, flat sources have been designed for use in calibrating thermal imaging systems, aerial mapping and surveillance equipment and long path spectrophotometers. They have emitter in size from 100x100mm to 300x300mm and place special demands on the designer in regard to emissivity and uniformity. Most of these systems have included peltier effect cooling to reduce the time taken to change the source temperature in laboratory or field use. Please see a separate brochure for details.

Custom Models

The blackbody calibrator specifications in this catalog describe standard, production instruments used routinely in industrial process, aerospace and research environments. However, with the increasing application of infrared measurement technology in the electronics, medical, military and other demanding fields, the need for special blackbody sources has grown commensurately. Mikron has been able to respond to even the most esoteric requirements, including airborne systems, ultra large area sources, ultra-high resolution calibrators and systems to operate in a vacuum. One selection of these non-standard instruments for vacuum operation is illustrated here and we will be pleased to receive your specifications with a view to offering a proposal to meet your special requirements.

Calibration Sources for Vacuum Operation

Where calibration must take place in a vacuum environment or where the source is being used to simulate a condition such as would be encountered in outer space, Mikron has expertise which can be employed to solve the unique problems of maintaining structural integrity and providing forced cooling under such conditions.



Vacuum blackbody source

Calibration Traceability and Transfer Standards

In order to establish the degree of uncertainty in carrying out a calibration procedure, it is essential to establish calibration traceability of the equipment being used to National Standards. This is achieved through a hierarchy of primary and secondary transfer standards, with the national standards institutes at the top of the tree. The devices which provide the



M190

Precision Transfer Standard

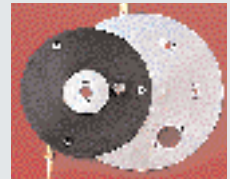
traceable links between national or "primary" standards and the working units in the fields are known as "transfer standards". Transfer standards consist of Mikron Model M190-TS infrared temperature measuring instruments which are accurately calibrated against the primary blackbody source and are contained in a specially designed case. These instruments are to be used only for calibration purposes, and should be returned to Mikron for checking at 12-month intervals. Please see separate brochure for details.

Optional Accessories:

Water Cooled Aperture Wheel Assembly

Frequently used in application requiring specific radiating apertures or for verifying field of view of infrared thermometers, radiometers or infrared imaging equipment.

Water or gas cooling capabilities of this assembly ensure minimum contribution of back-ground radiation. Precision machining of aperture wheel allows perfect optical alignment.



To order specify
PN 14002

Aperture Size
50mm, 25mm, 12.5mm, 6.25mm,
3.12mm, and 2mm

PN 14002-1

25mm, 12.7mm, 10mm, 7.6mm,
5mm and 2.5mm

Universal Mounting Flange

This flange has been machined with numerous mounting holes to accept different style sensor heads. Three stand-offs provide a safe distance between the sensor head and the emitter's aperture. To order specify PN 11668.

Warranty

Every blackbody source is covered for all defective material and workmanship for one full year after shipment. Heating elements for model M390/395 are excluded from this warranty.

Certificate of Calibration

Each blackbody will be furnished with certificate of calibration traceable to NIST.

Made in U.S.A.

The M300 Series is designed and built by Mikron, the leading innovator in technology of infrared radiometry. Manufacturing facility is located in Oakland, New Jersey, USA.

Note: Due to constant improvement in technology of engineering and manufacturing of blackbody sources, these outlined specifications would be subject to change without notice.