HEITRONICS
Infrarot Messtechnik

Blackbody Radiation Source SW15

Technical Information

03/2016

Portable, battery-powered 100°C radiation source for calibration of Infrared Radiation Thermometers

Blackbody radiation sources are used as radiation sources with a definite spectral distribution for the determination of physical parameters by means of photometrical, radiometrical and pyrometrical measurements. The energy emitted into the half-space is only dependent on the temperature of the blackbody radiation source. For testing and calibrating of Infrared Radiation Thermometers a blackbody radiation source is indispensable.

The mathematical coherence between radiation and temperature is given by the law of Stefan Boltzmann:

$$M_S = \sigma T^4 \left[\frac{W}{cm^2}\right]$$

The half-space energy emitted per unit area for a small wavelength interval Δλ is given by Planck's law:

$$M_{\lambda S} = \frac{c_1}{\lambda^5 [\exp(c_2 / \lambda T) - 1]} \left[\frac{W}{cm^2 \mu m}\right]$$

The context between the parameters connected by Planck's law like temperature, wavelength and specific spectral radiation is shown in fig. 1). Actual radiation sources of the same dimension and temperature emit only part of the energy emitted by a blackbody radiation source. The ratio of the specific radiation of an actual radiation source compared with a blackbody radiation source is the emissivity

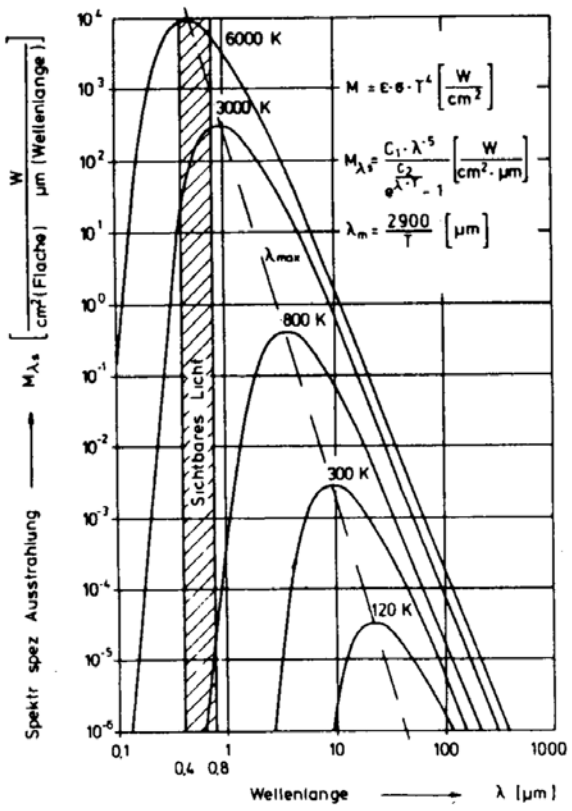
$$\varepsilon = \frac{M}{M_S}$$

A hole of a small diameter and a great length in a homogeneously tempered metallic mass nearly represents a "blackbody". By an emissivity of the black painted wall of the bore ε >0,7 a total emissivity of ε $ 0,99 is achieved. *)

*)Report in Journal Applied Optics, Nov. 1970, Vo. 9, Nr. 11, "The normal emittance of circular cylindical cavaties" by E.M. Sparrow and R.P. Heinisch.

Calibration assistance for Infrared Radiation Thermometers, 100°C - radiation source

Net independent with battery-pack and charger



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Radiator temperature	100 °C ± 0.5 °C
Emissivity	≥ 0.996
Aperture of cavity	Ø 20 mm (37 mm deep)
Operating voltage	12 VDC ± 15 %
Warm-up time	approx. 10 minutes
Power requirements	approx. 4 W
	(approx. 12 W during warm-up period)
Temperature increase of radiator housing	approx. 20 °C
Connection to Infrared Radiation Thermometer	slip-on fitting for lens Ø 26 mm
Indication of operating status	LED on radiator housing
	Warm-up period: continuous light
	Calibration temperature stabilized: flashing light
Recommended ambient temperature for calibration	15 °C … 35 °C
Permissible ambient temperature	0 °C … 40 °C
Storage temperature	- 20 °C … 70 °C
Dimensions	Ø 45 mm x 95 mm (length)
Weight	350 g

BATTERY CASE E50

Voltage	12 VDC
Battery type	NiMH-Akku 12 V, 3.3 Ah
Charging time	approx. 5 hours
Operating time for fully charged batteries	approx. 7 hours
Permissible ambient temperature	0 … 50 °C
Dimensions	220 x 120 x 80 mm
Weight	1 kg

CHARGER LG

Mains voltage	100 - 240 V, 50/60 Hz
Output	(12 VDC) max. 800 mA, 9.6 VA
Permissible ambient temperature	10 … 35 °C
Storage temperature	-20 … 70 °C
Dimensions	120 x 50 x 60 mm
Weight	400 g

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