

MULTI-POINT PRIMARY STANDARD FREEZE-POINT BLACKBODIES

The EOI series of primary standard blackbodies are pure elemental freezing point blackbody radiation sources for use as primary standards of spectral radiance. The ITS90 temperature scale is defined by the freezing points of pure elements. EOI freeze point blackbodies provide known spectral radiance at the ITS90 defined temperatures for gallium, indium, tin, zinc, aluminum, silver, gold and copper.

Configuration

The Multi-Point Primary Standard Blackbody system features Interchangeable Freeze Point Crucibles which minimize the investment required to cover the entire ITS90 range of freeze point temperatures.

The award winning EOI temperature controller provides automatic sequencing of melt and freeze, and a temperature display with freeze indicator. The crucible holder allows the use of easily interchangeable freeze point crucibles and provides for a continuous flow of Argon gas.



Controller

Each MPPS Series blackbody is supplied with a digital 19" rack mount controller. In the variable temperature mode, the temperature of the blackbody can be set with 0.1°C resolution and actual temperature is displayed to 0.01°C on the front panel of the controller.

Computer Interfaces

Complete computerized control of the system is available through built-in interfaces. The IEEE 488 and any one of the RS formats may be used at the same time.

Analog Output

An analog output is provided to interface with strip chart recorders or other analog recording devices.



Special Features:

- ◆ *Interchangeable Freeze Point Crucibles*
- ◆ *Reverse Cone Cavity Provides Highest Emissivity*
- ◆ *One System for Multiple Freeze Point Temperatures*
- ◆ *2 Year Warranty*

Emissivity

Each freeze point blackbody has a 0.25" diameter reverse cone cavity. The reverse cone configuration provides a highest effective emissivity, especially when compared to the more common straight cavity freezing. The cavity configuration and graphite material yield a 0.9997 ± 0.0003 effective emissivity.

Uncertainty

The uncertainty of the spectral radiance is a function of the emissivity of the conical cavity (geometry plus surface characteristics), wavelength, thermal gradient across the cavity wall, purity of the melt material, uniformity and stability. The calculated uncertainty of the spectral radiance of the EOI freeze point blackbodies is less than 0.1°C (< 0.01°C for Gallium).



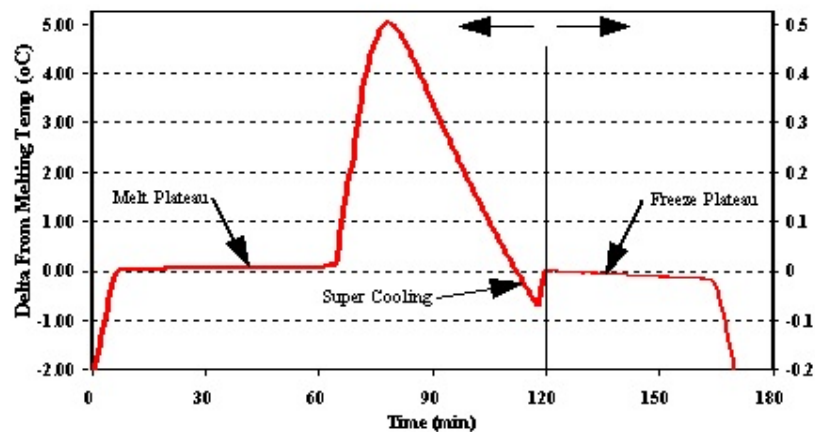
Standard Models

Model Number	Melt Material	Freeze Temp* (/C)	Melt Material Purity (%)
MPPS30	Gallium	29.7646**	99.999
MPPS150	Indium	156.5985	99.99
MPPS230	Tin	231.928	99.997
MPPS420	Zinc	419.527	99.999
MPPS660	Aluminum	660.323	99.999
MPPS960	Silver	961.78	99.999
MPPS1065	Gold	1064.18	99.999
MPPS1085	Copper	1084.62	99.90

*Freezing Temperature Defined by ITS90

**ITS90 defines the gallium temperature as the melting point. The gallium primary standard blackbody utilizes different construction techniques and is a stand alone system.

Typical Freezing Point Cycle



Operating Ambient

The MPPS blackbody is designed to operate over an ambient temperature range of 20 to 35°C. The MPPS temperature controller will operate over an ambient temperature range of 0 to 50°C. The graphite reverse conical cavity is surrounded by the pure melt material and takes on the temperature of the metal as it transitions from the liquid to frozen state. This transition or plateau remains constant at $\pm 0.02^\circ\text{C}$ or less. Freeze times are 20 to 40 minutes depending on the melt the time required to perform testing and calibration of the most sensitive infrared sensors, thermometers, imaging systems and radiometric devices.