

FIBER OPTIC AUTOMATIC EMISSIVITY CORRECTING IR THERMOMETER



**INFRARED TEMPERATURE
ACCURACY TO $\pm 3^{\circ}\text{C}$**
Traceable to NIST Standards

THE ULTIMATE LABORATORY TEMPERATURE MEASUREMENT SYSTEM

APPLICATIONS

The Pyrofiber® automatic emissivity correcting IR thermometer is used for many Laboratory applications. This includes temperature measurement in refractories, ovens, furnaces and vacuum chambers and reactors. Virtually anywhere accurate IR temperature measurements are required in a laboratory environment. Custom sensor heads and probes are also available to suit your research needs.

- Material Testing
- Material Evaluation
- Research & Development
- Laboratory High Temperature Accuracy Applications
- Pilot Plant Evaluation

FEATURES

- Automatically Corrects For Emissivity
- Accuracy After Emissivity Correction: $\pm 5^{\circ}\text{F}$ ($\pm 3^{\circ}\text{C}$)
- 1ms Data Acquisition Rate
- 3 Temperature Models Available:
 - PF 905: 1100°F - 2730°F (600°C - 1500°C)
 - PF 1550: 480°F - 1470°F (250°C - 700°C)
 - PF Dual: Several Temperature Ranges Available
- Extended Ranges Available To 3000°C:
- Internal Data Notebook & PC Interface
- Analog & Digital Outputs
- Laboratory Process Control Solution

DESCRIPTION

The Pyrofiber® Lab Automatic Emissivity Measurement System (AEMS) uses the latest fiber optic and pulsed laser technology to precisely measure the true target temperature. While all infrared instruments measure a target radiance temperature, the Pyrofiber® Lab dynamically determines the emissivity value of a target resulting in unmatched temperature accuracy to $\pm 3^{\circ}\text{C}$. With the Pyrofiber® Lab, laboratory precision temperature measurements can be made.

The Pyrofiber® Lab electronic microprocessor control unit is housed in a rack mount enclosure and includes a LCD digital display, membrane keypad, and power supply. Ancillary components include primary optical sensor head, (Optional) secondary irradiance sensor head and fiber optic cables. The Pyrofiber® Lab can be operated from the instrument's keypad or remotely from a PC. The Pyrofiber's® microprocessor control measures radiance, emissivity, and reflective radiance values at an extremely fast 1ms data acquisition rate.

OPERATION

The Pyrofiber® Lab main sensor head reads the radiance emitted from a hot target. The Pyrofiber® then fires its pulse laser at the target. The reflected energy from the laser is then collected by the Pyrofiber's® main sensor head. Extraneous radiance from other sources (Tx) "wall shine readings", (Optional) can be collected from a secondary sensor head should the application require. The Pyrofiber® microprocessor control processes all the data collected (radiance, laser return & wall shine values) and displays the results on the Pyrofiber® LCD display. Auto mode displayed data includes corrected temperature (Tt) and emissivity values (E) accurate to $\pm 3^{\circ}\text{C}$.





TECHNOLOGY

The Pyrofiber® instrument uses a patented laser based infrared technology to determine the True Emissivity Correct Temperature (Te) of a target. The Pyrofiber® accomplishes this by automatically measuring the target diffuse reflectivity at the same location, temperature and wavelength as the radiance measurement to determine the precise target temperature.

The Pyrofiber® incorporates the passive characteristics of conventional infrared pyrometers along with an active reflectometer technique to determine the target emissivity. A low-powered pulsed GaAs laser is fired at the target measuring zone via a dedicated optical path (Laser Channel) and both the laser return signal and infrared signal are detected via a secondary optical path (Radiance Channel); the laser signal being (AC) on top of the (DC) target signal. Having monitored the laser outgoing energy and knowing the geometry involved (including target distance), the Pyrofiber® can determine the reflectivity and thus the emissivity of the target measuring zone. The wave band of the collected target radiance is limited to a narrow (10-50nm) band centered in the laser wavelength typically 905nm depending on the specific instrument or application.

More information about the Pyrofiber's® unique technology is available at PYRO's website: www.pyrometer.com

PYROFIBER® COMES COMPLETE WITH

- Standard Temperature Range
- 19" Rack Mount Enclosure
- Keypad
- Digital Display
- Electronics
- Operating Software
- Output: One Analog: 0-5VDC or 0-20mA
- Output: Digital: RS232
- Target Distance: To Suit Application
- Target Spot Size: To Suit Application
- Instruction Manual
- Statement of Calibration

PYRO'S AUTHORIZED REPRESENTATIVE

Selectable Readout:	°F, °C
PF 905 Standard Temperature Range:	1112°F - 2730°F (600°C - 1500°C)
PF 905 Optional Extended Temperature Ranges:	1292°F - 3632°F (700°C - 2000°C) 1482°F - 4532°F (790°C - 2500°C) 1562°F - 5432°F (850°C - 3000°C)
PF 1550 Standard Temperature Range:	482°F - 1472°F (250°C - 800°C)
PF 1550 Optional Extended Temperature Ranges:	1292°F - 3632°F (275°C - 900°C) 1482°F - 4532°F (300°C - 1100°C) 1562°F - 5432°F (350°C - 1150°C)
PF Lab Dual Temperature Range:	Several Temperature Ranges Are Available Between 482°F - 5432°F (250°C - 3000°C)
Calibration Ranges:	(4) Ranges Available
Accuracy:	±5°F (3°C)
Resolution:	1°F (1°C)
Repeatability:	±1°F (1°C)
Effective Wavelength PF 905:	0.905 μm ±0.015
Effective Wavelength PF 1550:	1.550 μm ±0.015
Effective Wavelength PF Lab Dual:	0.905 μm ±0.015 & 1.550 μm ±0.015
Bandwidth:	0.055 μm
Automatic Emissivity Measuring Range:	0.01 - 1.0 (Increments 0.01)
Acquisition Time:	1ms - 2000ms Selectable
LCD Display 40 Digit Readout of:	Target Emissivity Value (E) Uncorrected Temperature (Tu) Emissivity Corrected Temperature (Tt)
Operation Mode, Auto:	Provides Continuous Emissivity Value (E) & Corrected Temperature (Tt)
Operation Mode, Single & Interval:	Provides Emissivity Value (E), Uncorrected Temperature (Tu) & Corrected Temperature (Tt)
Operation Mode, High Speed:	Data is sent directly to a 720 reading capacity internal notebook. 40 digit readout of Emissivity Value (E), Uncorrected Temperature (Tu) & Corrected Temperature (Tt) can be reviewed after all data is stored in the notebook.
Operation Mode, High Speed Transmit:	Up to 70 readings/sec raw data is sent via COMM port to host PC for processing and data analysis of Emissivity (E), Uncorrected Temperature (Tu) & Corrected Temperature (Tt).
Standard Target Distance:	Sensor head can be arranged for fixed focus to accommodate any distance from 1.0' (0.3m) to 10.0' (3.0m) standard. Special heads and probes can be designed to accommodate most any target distance.
Standard Target Sizes Available:	0.59" (15mm) to 2.28" (58mm) Note: Target sizes are subject to target distance limitations.
Special Target Sizes:	Special sensor heads and probes can be designed to accommodate most any target size to as low as 0.010" (0.25mm)
Sample Rate:	1, 2, 4, 8, 21, 23, 37 Readings/sec Selectable
Maximum Equipment Operating Temperatures:	Electronic Enclosure 32°F - 125°F (0°C - 50°C) Sensor Head 32°F - 480°F (0°C - 250°C) Fiber Optic Cables 32°F - 250°F (0°C - 125°C)
Extended Operating Temperatures Available Upon Request	
Instrument Enclosure:	Standard 19" Rack Mount Enclosure
Auxiliary Output:	Single Analog Output: 0 - 5vdc or 0-20mA Option, Additional Analog Output Available Option, Opto Isolate Single Digital Output: RS232C Option, Opto Isolate - RS485
Power Supply:	115v/60Hz or 230v/50Hz