



Enlighten the Unseen

BLACKBODY SERIES

High performance infrared reference sources for
superior measurement accuracy



hgh-infrared.com

> Advanced optical test solutions for optronic equipment

With its more than 40 years of expertise in electro-optical tests and measurement, HGH provides proven and technologically advanced systems to support laboratories, universities, manufacturers and maintenance centers worldwide. Designed to answer the most demanding customer requirements, the HGH blackbody series offer the widest range of high-end infrared reference sources.

Featuring the highest available **stability of regulation and uniformity**, HGH blackbodies are perfectly adapted for the characterization and performance validation of an extensive range of IR sensors, such as high-resolution cameras for thermography, long range thermal imagers, pyrometers and IR radiometers, IR cores.

HGH blackbodies feature an emissive head with precise temperature control managed through an intuitive interface by a 2U electronic unit. A user-friendly touch screen control panel allows precise temperature selection and stabilization thanks to real-time PID control algorithm.

Each blackbody is supplied with a **complete testing report** validating all major specifications. The testing report particularly includes a **uniformity map** of the emissive surface or useful aperture.

> Calibration

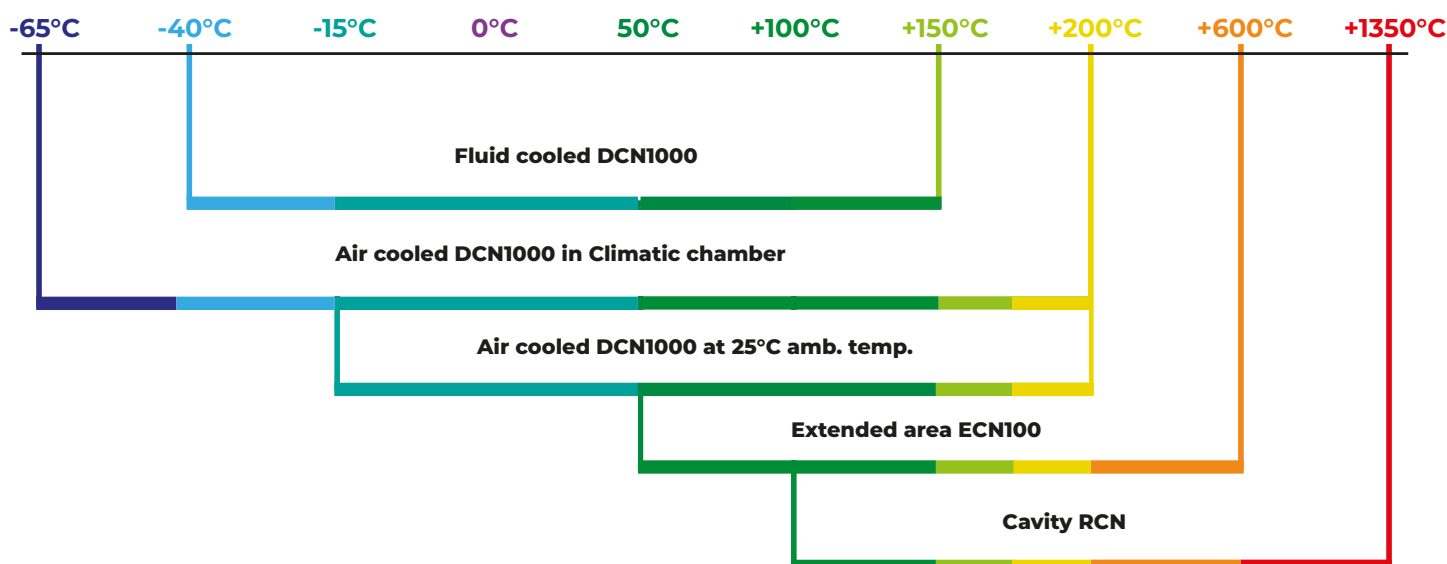
HGH Blackbodies are delivered with an individual **radiometric** certificate of calibration over **MWIR** and **LWIR** traceable to International Primary Standards, ensuring reliable performances to the thermal imagers tested.

Exclusive compensation is applied to the blackbody temperature for a better ease of use (**Displayed temperature = Radiated Temperature**).

> Main features

- Overall design ensuring total safety of the operator
- Control through colored touchscreen panel
- Built In Test Equipment (BITE)
- Real time display of temperature data and intuitive interface
- Remote control via Ethernet link
- Software Development Kit (SDK) available for easy remote control integration
- Supplied with INFRATEST Platform control software

> Temperature range selection table



Thermal Imagers



Detectors / IR Cores Production line



Thermographic camera calibration



Multi axes systems



Maintenance of EO Systems



LOW TEMPERATURE EXTENDED BLACKBODIES

Air cooled DCN1000 (Up to 200°C)



> Introduction

Air cooled DCN1000 blackbodies operate either in **absolute and differential mode**. Featuring the highest available stability of regulation and slew rate on the market, they are particularly well adapted for the characterization and performance validation of wide range of IR sensors, such as high resolution cameras for thermography and long range thermal imagers.

HGH provides targets and INFRATEST software for a wide range of automated tests: NETD, temporal noise, fixed pattern noise, MTF, FoV, distortion, spatial resolution, MRTD, DRI ranges, TOD, etc.

> Advantages

- Extended areas up to 300 mm x 300 mm
- Absolute and differential mode
- Silent operation
- Absolute temperature range from -15°C to +200°C
- High thermal uniformity and emissivity
- Compact emissive head

> Exclusive climatic chamber compatibility option

The operating temperature range of air cooled DCN1000 H4, N7 or N12 can be extended up to -55°C to +85°C for testing conditions into climatic chamber without lowering any performance.

> Technical data

	DCN1000 H2	DCN1000 H4	DCN1000 N7	DCN1000 N12
Emissive area	50 mm x 50 mm	100 mm x 100 mm	180 mm x 180 mm	300 mm x 300 mm
Temperature range (at 20°C ambient) - Absolute - Differential	-15°C to +150°C (option: -15°C to + 200°C) -35°C to +130°C		-5°C to +150°C (option: -5°C to +180°C) -25°C to +130°C	-5°C to +150°C -25°C to +130°C
Thermal uniformity at ambient ±5 °C Thermal uniformity at 50°C	0.01°C 0.1°C		0.01°C 0.2°C	
Emissivity / Apparent emissivity after compensation	0.98 ± 0.02 / 1.00 (option: 0.99 ± 0.01 / 1.00)			
Stability	0.5 mK over [0;65°C] , 2mK outside			
Temperature measurement accuracy	Differential mode : ±0.01°C absolute mode : ±0.03°C			
Display resolution	0.0001°C (actual temperature and set point display)			
Slew rate	>0.5°C/s heating ; >0.25°C/s cooling		>0.5°C/s heating ; >0.2°C/s cooling	
Stabilization time @ 2mk	30 seconds			
Remote control	Ethernet, RS232 and IEEE488 interface			
Power supply	90-260 VAC, 1 ph., 50/60 Hz			
Operating ambient temperature	Control unit: + 5°C to +45°C - Head: -20°C to +70°C (-55°C to +85°C in option)			
Max. power consumption	800 W		1600 W	
Head dimensions W x H x D	115x198x111 mm	192x215x120 mm	235x257x202 mm	355x377x201 mm
Head weight	2 kg	5 kg	12.5 kg	27 kg
Electronic unit size	2U x 19"			
Electronic unit weight	6.5kg		8.5kg	
Double head option	YES		NO	

**Above information is subject to change without notice*

LOW TEMPERATURE EXTENDED BLACKBODIES

Fluid cooled DCN1000 (From -40°C up to 150°C)



> Introduction

Fluid cooled DCN1000 blackbodies operates either in **absolute and differential mode**. Featuring a very low and stable temperature of regulation and a very high uniformity they are particularly well adapted for the characterization and performance validation of a wide range of IR sensors, such as high resolution cameras for thermography, and long range thermal imagers.

A very low minimum temperature is achieved thanks to heat dissipation ensured by refrigerated liquid supplied by a separate cooling liquid unit and circulated through a jacket at the back of the blackbody head.

> Advantages

- Extended areas up to 300 mm x 300 mm
- Absolute and differential mode
- Fanless source
- Absolute temperature range from -40°C to +150°C
- Highest thermal uniformity
- Compact emissive head

> Technical data

	DCN1000 L4	DCN1000 L7	DCN1000 L12
Emissive area	100 mm x 100 mm	180 mm x 180 mm	300 mm x 300 mm
Temperature range (at 20°C ambient) - Absolute - Differential	-40°C to +150°C -60°C to +130°C		
Thermal uniformity at ambient ±5 °C	0.01°C		
Thermal uniformity at 50°C	0.1°C	0.15°C	
Emissivity / Apparent emissivity after compensation	0.98 ±0.02 (Option: 0.99 ±0.01) / 1.00		
Stability	0.5 mK over [0;65°C] , 2mK outside		
Temperature measurement accuracy	differential mode : 0.01°C absolute mode : 0.03°C		
Display resolution	0.0001°C (actual temperature and set point display)		
Slew rate	> 0.4°C/s heating ; > 0.2°C/s cooling		
Stabilisation time	30 seconds		
Operating temperature	Control unit: +5°C to + 45°C ; Head: -20°C to +70°C		
Remote control	Ethernet, RS232 and IEEE488 interface		
Max power consumption - Control Unit - Refrigerated Unit	800 W 2300 W	1600 W 2500 W	1600 W 5000 W
Head dimensions W x H x D	192x210x120 mm	247x410x112 mm	370x531x112 mm
Head weight	5 kg	10 kg	20 kg
Electronic unit size	2U x 19"		
Electronic unit weight	6.5 kg	8.5 kg	
Double head option	YES	NO	

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DCN1000 ACCESSORIES, OPTIONS & SPECIAL FEATURES



> Exclusive ambient temperature compensation function

When the room temperature gets higher than the emissive surface temperature (climatic chamber operation), the 2 to 3 % reflected radiation might no longer be negligible compared to the emitted radiation.

HGH developed a unique function available in standard on all **DCN1000 and Twin1000 blackbodies** adjusting in real time the temperature of the emissive surface, keeping the apparent radiated temperature equal to the displayed temperature whatever the operating conditions.

> Double Head configuration

Save space into your cabinet with the cost-effective optional double head configuration on small DCN1000 blackbodies: one unique controller independently driving 2 identical emissive heads with same performances as single head configuration.

NEW! The blackbody head 1 can also be operated in differential mode versus the blackbody 2 absolute temperature: the perfect configuration for simulating target and background.

> Targets

Any DCN1000 can be equipped with a target holder including a highly accurate temperature sensor measuring in real time the temperature of the assembled target, thus allowing positive or negative differential mode regulation of the emissive surface.

Targets can be added, as well as the INFRATEST software, thanks to which a wide range of tests can be automated: NETD, temporal noise, fixed pattern noise, MTF, FoV, distortion, spatial resolution, MRTD,

Contact HGH for target pattern selection.

> Anti-condensation/ Frost System

HGH offers multiple solutions to avoid condensation on the emissive surface when the temperature of the blackbody surface gets below the dew point. Based on a dry chamber principle between tested camera and emissive surface, these solutions includes adaptable sleeves, dry box and dry chamber.

Contact HGH to select the most appropriate solution to your application.



LOW TEMPERATURE EXTENDED BLACKBODIES

TWIN1000 SERIES



> Introduction

Twin1000 double extended area blackbodies are absolute infrared reference sources and can be used as low temperature infrared reference sources. They consist of a head with two **independently regulated** surfaces.

Their temperatures are controlled via a single electronic unit with PID adjusted regulator.

Two emissive surfaces temperatures are controlled with high precision and stability at temperatures below or above ambient temperature. The two emissive surfaces temperatures are measured in real time thanks to high precision calibrated Pt sensors.

Twin1000 blackbody is ideally suited for applications requiring calibration temperatures to jump from one to another within a second.

> Advantages

- Compact head
- Easily integrated in production testing line
- One electronic unit for two emissive areas
- Two independent emissive areas for the price of one blackbody

> Technical data

	TWIN1000 CN	TWIN1000 CF
Size of the two emissive areas	42 mm x 42 mm	
Emissivity / Apparent emissivity after calibration	0.98 ± 0.02 / 1.00	
Temperature range	+10°C to + 90°C	-5°C to +150°C
Thermal uniformity at ambient/ at 50°C	0.01°C / 0.1°C	
Stability	0.5 mK over [0;65°], 2mK outside	
Slew rate	0.5°C/s heating > 0.25°C/s cooling	
Stabilization time 2mK	30 seconds	
Display resolution	0.0001°C (actual temperature and setpoint display)	
Temperature measurement accuracy	± 0.03°C	
Operating temperature	Control unit: + 5°C to +45°C - Head: -20°C to +70°C	
Head dimensions (H x W x D)	90 mm x 112 mm x 80 mm	90 mm x 105 mm x 55 mm
Head weight	< 1 Kg	
Electronic unit size	2U x 19"	
Electronic unit weight	6.5 kg	
Remote control	Ethernet, RS232 and IEEE488 interface	
Power supply	90-260 VAC, 1ph., 50/60 Hz	
Maximum Power Consumption	600 W	

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LOW TEMPERATURE BLACKBODIES FOR PRODUCTION LINE

PCN SERIES



> Introduction

Designed for production lines of thermal cameras, IR cores and IR sensors, the PCN blackbody range provides the first low temperature IR reference sources **fully compatible with industrial constraints** while offering the performance level of laboratory sources.

A rackable controller simultaneously drives the temperature of one or two emissive heads.

Compact structure of the heads allows an easy integration in product lines. PCN emissive heads enable the widest range of environment temperatures on the market, even with **climatic chambers operation**.

> Advantages

- Compact and robust emissive heads
- Possible double head configuration
- Optimized for **uncooled sensor** testing and calibration
- Easy mechanical and software integration
- Suitable for climatic chamber operation

> Technical data

	PCN 4	PCN 7
Emissive area	100 mm x 100 mm	180 mm x 180 mm
Temperature range at ambient 20°C	0°C to 100°C	5°C to 100°C
Thermal uniformity at ambient ±5 °C / at 50 °C	0.01°C/ 0.1°C	0.01°C/ 0.2°C
Emissivity / Apparent emissivity after compensation	0.98±0.02/ 1.00	
Stability	3 mK	
Temperature measurement accuracy	±0.03°C	
Display resolution	0.001°C	
Remote control	Ethernet	
Power supply	90-260 VAC, 1ph. 50/60 Hz	
Operating ambient temperature	Head: -20°C to +70°C - Control Unit: +5°C to +45°C	
Max. power consumption	Single head = 800 W Double head = 1500 W	
Electronic unit size	2U x 19"	

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HIGH TEMPERATURE EXTENDED BLACKBODIES

ECN100 SERIES



> Introduction

ECN100 blackbodies are extended area reference sources covering a wide range of wavelengths, from near IR to far IR. They provide infrared radiation with an unparalleled emissivity, uniformity and stability for the test and calibration of NIR to LWIR sensors with the highest accuracy.

These large uniform reference sources enable:

- Calibration of thermal imagers over their full field of view
- Non-uniformity correction of infrared cameras
- Simultaneous test of several sensors during manufacturing process
- Measurement of the size of source effect on cameras

A robust structure of the emissive head enables lab or field condition operation.

External mechanical parts are maintained to temperatures below 50°C, thus preserving safe operation.

> Advantages

- Temperature range from ambient to +600 °C
- Large emissive area with high uniformity
- Heat protective structure and handling for safe operation

> Technical data

	ECN100 H6	ECN100 H12	ECN100 N20
Emissive area	150 x 150 mm ²	300 x 300 mm ²	500 x 500 mm ²
Temperature range	50°C to 600°C	50°C to 550°C	50°C to 300°C
Emissive area uniformity	0.75°C at 300°C	2°C at 300°C	3.5°C at 300°C
Emissivity / Apparent emissivity after compensation	Minimum 0.93 over 3 - 5 µm / 1.00 Minimum 0.96 over 8 - 14 µm / 1.00		0.98 ±0.02 / 1.00
Stability	0.02°C		0.05°C
Temperature measurement accuracy	± 0.5°C		
Display resolution	0.01°C		
Warm-up time from ambient to Tmax	60 min	75 min	
Head dimensions W x H x D	423 x 467 x 247mm	567 x 677 x 340mm	694 x 820 x 300mm
Head weight	20 kg	40 kg	55 kg
Electronic unit size	2U x 19"		
Electronic unit weight	6.5 kg		
Max power consumption	2500 W	6000 W	5000 W
Power supply	200-260 VAC, 1 ph. 50/60 Hz		
Remote control	Ethernet, RS-232, IEEE 488		
Operating temperature range (head)	-10°C to +70°C		

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HIGH TEMPERATURE CAVITY BLACKBODIES

RCN SERIES



> Introduction

RCN series high temperature cavity blackbodies are reference sources covering a wide range of wavelengths, from visible to far IR.

The cavity structure leads to **incomparable uniformity** and emissivity.

These large spectral reference sources suit for calibration of near-IR and IR sensors such as thermal imagers, pyrometers, SWIR to LWIR cameras, sample emissivity or transmission measurement, reference source for atmospheric spectral transmission measurement, etc.

> Advantages

- High temperature reference source up to 1350 °C
- Aperture diameter up to 50 mm
- Optimized cavity shape ensuring **high spatial and angular uniformity** and emissivity
- Aperture / filter wheel
- Overall design ensuring total safety of the operator

> Exclusive Coolspeed Technology

All RCN blackbodies come with the CoolSpeed technology. Based on an innovative internal structure, CoolSpeed cuts in **half the cooling duration of cavity blackbodies**, without altering its technical features such as high emissivity, high uniformity, high speed warm up and high stability.

With an average cooling rate of -6°C/min., from 1200°C to ambient, and a maximum rate of -12°C/min. at 700°C, CoolSpeed provides high flexibility to users, especially in applications environments such as Research and Development projects and production lines.

> Technical data

	RCN1250 N1	RCN1350 N1	RCN1050 N2	RCN1250 N2
Aperture diameter	25 mm		50 mm	
Temperature range	50°C to 1250°C	50°C to 1350°C	50°C to 1050°C	50°C to 1250°C
Cavity uniformity	2°C at 900°C over 25mm		4°C at 900°C over 38mm	
Emissivity / Apparent emissivity after calibration	> 0.99 +/- 0.01 over [3-5 μm] and 0.98 +/- 0.02 over [8-12 μm] / 1.00			
Aperture / filter wheel	12 position manual		N.A.	
Stability	Better than 0.1°C			
Temperature sensor accuracy	± 1.5°C up to 600°C ± 0.25% T above			
Display resolution	0.01°C			
Warm-up time from ambient to Tmax	75 min.			
Head dimensions W x H x D	283 x 300 x 405 mm			
Head weight	16 kg			
Electronic unit size	2U x 19"			
Electronic unit weight	8 kg			
Max power consumption	1800 W			
Power supply	90-260 VAC, 1 ph., 50/60 Hz			
Remote control	Ethernet, RS232 and IEEE488			

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SUPPORTS & SERVICES

For all your Blackbodies

HGH provides comprehensive testing services and unsurpassed technical support. Whether you have an inquiry, a repair, need a radiometric calibration or rental blackbody, our team is ready to support you.

We are dedicated to keeping your blackbodies tuned, calibrated and running flawlessly.

> Service Plans

FIRST service plan

Your blackbody returns to our laboratory every year or every two years for a check-up of all parameters. A radiometric calibration service is included.
Get a reliable follow up of your blackbody year after year

ESSENTIAL service plan

Your blackbody returns to our laboratory every year or every two years for a full check-up, including preventive maintenance with replacement of defective or non-compliant parts. A radiometric calibration is performed.
Enhance your peace-of-mind with a blackbody always 100% operational

PREMIUM service plan

During the annual/biennial visit or in case of failure of your blackbody, an equivalent blackbody with its calibration certificate will be sent to you within a week. **The best of service continuity**

> Measurement Services by HGH Laboratory

HGH measurement services are designed to help ensure your blackbody meets global standards while maintaining the accuracy and quality of its temperature

measurement. Measurement service is provided even if your blackbody is not HGH.

Radiometric calibration

International Primary Standard traceable radiometric calibration certificate of an infrared reference source in MWIR and LWIR From 0°C to 1300°C.

Uniformity map

Supply of the map of the infrared source including the location of minimum and maximum point and the calculation of the standard deviation.

> Rental Services

Not ready to purchase a blackbody? If you have a short-term or one-time project, take advantage of our rental program and experience for yourself how HGH blackbody can help increase your productivity or

developing your R&D while moderating costs. HGH blackbodies can be rented by the week or by the month with discounted rates for longer periods.



ELECTRO OPTICAL TEST SOLUTIONS



Enlighten the Unseen

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