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IPC Irwin Radiant Heater

Part Number RAD1000

User Instructions



INTRODUCTION.

The IPC Irwin Radiant Heater is a modern compact and safe heat source for heat & radiation experiments. Please see the 'Suggestions for Experiments and Investigations' section below.

DESCRIPTION.

The heater comprises a base and cage containing a custom made infra-red heating lamp of the dull emitter type. The lamp does not visibly glow as almost all the energy provided is converted into heat, for this reason, a cage has been placed around the lamp to prevent pupils touching the lamp. The unit is powered from the mains electricity (240VAC, 50Hz) and there is an illuminated rocker switch on the base to indicate when the power is on, the heating lamps itself is rated at 300W.

INSTRUCTIONS.

To operate the heater simply plug the unit into a suitable mains (240VAC, 50Hz) supply socket and switch on using the on/off switch. **Please note:** the heater will slowly increase in temperature and takes approx. 30 minutes to reach its maximum temperature, and so this time lag should be taken into account when planning lessons.

IPC Irwin

Holker School, Cark in Cartmel, Grange over Sands, Cumbria LA11 7PQ, United Kingdom

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Caution.

As this apparatus is mains operated and emits heat, it should never be run for more than 1Hr at a time or left switched on unsupervised. After prolonged use the metal safety cage will become hot, so it is important to leave it in a safe place to cool before moving to storage.

SPECIFICATIONS.

Electrical Supply	= 220-240VAC, 50-60Hz
Fuse Ratings	= UK Mains Plug: 3A
Dimensions	= 150 x 150 x 205mm overall.
Mass	= 1.25kg
Infra-Red Lamp Wattage	= 300W
AC Current	= 1.3A (Max.)

Please Note: This Equipment is for Education, Training, or research Purposes Only.

IMPORTANT - ELECTRICAL SAFETY NOTICE

Only connect the product to single phase mains electrical supply (with neutral nominally at each potential), also check that the supply voltage and frequency are within the products stated range. Before connecting to the mains electrical supply, examine the information on the products rating label (the value of the fuse fitted to the product is also stated), ensure that the mains plug, or outlet circuit is fitted with an appropriate fuse of higher value.

WARNING: THIS PRODUCT MUST BE EARTHED

This product is designed for Electrical Safety Class 1.

If a mains plug is not fitted, connect the wires to a Standard UK, 3-pin plug as follows:-

Green/Yellow wire to the terminal marked: E (Earth) or coloured Green or Green/Yellow.

Brown wire to terminal marked: L (Live) or coloured Brown.

Blue wire to terminal marked: N (Neutral) or coloured Blue.

LIVE PARTS SHOULD NEVER BE EXPOSED UNLESS THE PRODUCT HAS BEEN SWITCHED OFF AND ISOLATED FROM THE MAINS ELECTRICITY SUPPLY.

Suggestions for Experiments and Investigations that can be Performed.

Use four thermometers, one with a blackened bulb, one with a silvered bulb, one with a white bulb and the fourth in standard mode. The thermometers should be situated around the unit at equal distances and a note taken of the temperature from each thermometer to demonstrate and expand on the how different surfaces absorb or reflect heat.

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Further investigations.

The Second Law of Thermodynamics states that heat will always move from a hot object to a cooler one. Heat transfer is the movement of thermal energy as it transfers from one object to another or between an object and its surroundings. Thermal energy will naturally work towards a state of balance or equilibrium. This is known as thermal equilibrium, where two objects or an object and its surroundings achieve the same level of heat energy (thermal energy).

It is important that the student does not to confuse Heat and Temperature. An understanding that Heat refers to the energy present in the molecules of an object and the type of particles. Temperature is a measure of the average kinetic energy of the molecules in an object and is not affected by the number or size of the molecules. Heat and temperature are directly related to each other, but not the same thing.

To summarise, heat is energy. Temperature is a measurement of that energy.

Radiometers are available which shows the energy inherent in infrared radiation. It has a sealed glass envelope, like a clear light bulb, containing a partial vacuum. Inside the envelope, four square vanes, with a black side and a white side, balance on a needle bearing. When you shine a light on the radiometer, the black side warms more than the white side. Air molecules bounce off both sides, but the heat energy from the black side makes them push harder. This spins the vanes in the direction of the white side. Place the radiometer in bright sunlight and see how fast it spins. Then move it away from direct sunlight and observe that it moves more slowly.

Also, students can use infra-red thermometers and become familiar with digital readings.

More Student Notes to Reinforce the above Concepts.

Students can use cloth items, such as shirts or towels, of various colours. Lay them on a sturdy, level surface in the bright sunlight. After 15 to 20 minutes, feel each one and note which is the warmest. As dark colours reflect the least sunlight, they absorb the most heat. Light colours reflect the most sunlight and therefore stay cooler.

Declaration of Conformity (In Accordance with EN ISO 17050-1:2010).

Manufacturer: **IPC Irwin, Holker School, Cark-in-Cartmel, Grange-over-Sands, Cumbria, LA11 7PQ, United Kingdom.**

Product/Part No: **Radiant Heater (230V AC, 50Hz main voltage)/RAD1000**

This conformity certificate approves the compliance of the product with the essential safety requirements of the following UK Standards and Regulations:

SI 2005 No.1803	General Product Safety Regulation (implements Directive 2001/95/EC).
SI 2016/1101	Electrical Equipment (Safety) Regulation (implements Directive 2014 /35/EU.
EN 61010-1: 2010	Electrical Requirements for Laboratory Test & Measurement Equipment.

EN 61000-6-1: 2019	EMC, Generic Standards, Immunity for Residential, Commercial and Light Industrial Environments.
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EN 61000-6-3: 2019

EMC, Generic Standards, Emission for Residential, Commercial and Light Industrial Environments.

SI 2012 No. 3032

Restriction on Hazardous Substances (RoHS) in Electrical and Electronic Equipment Regulation, (implements Directive 2011/65/EU).



Mark can be used only in the case of conformity assessment according to all relevant UK Standards and Regulations.

EU Declaration of Conformity (In accordance with European Parliament and Council Decision No: 768/2008/EC Annex III).

This conformity certificate approves the compliance of the product with the essential safety requirements of the following EC/EU Directives (Manufacturer, Product/Part No: as above).

2001/95/EU

General Product Safety Directive.

2014/35/EU

Low Voltage Directive (LVD).

2014/30/EU

Electromagnetic Compatibility (EMC) Directive.

2011/65/EU

Restriction on Hazardous Substances Directive (RoHS).

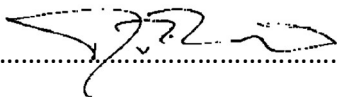
European harmonised Standards used for conformity assessment and declaration:

EN 61010-1: 2010

Electrical Requirements for Laboratory Test & Measurement Equipment.



Mark can be used only in the case of conformity assessment according to all relevant EC/EU Directives.

Dickon Knight (Director):  Date of Issue: 24th May 2023.

In the event of any correspondence concerning this product, please contact your supplying agent quoting the catalogue number and serial number shown on the apparatus rating label, together with the voltage and frequency of the mains electrical supply. This will help us to process your enquiry quickly. Any spare parts which may be required are supplied on the understanding that the replacement of those requiring the exposure of live electrical connections **will** be undertaken by an electrically qualified person.

Thank you for choosing this IPC Irwin product, which has specifically been designed for education and we know it will bring you good service long into the future. This is just one product of a wide range of UK designed and manufactured products to enhance a STEM education, please see www.ipcirwin.com website for more details on the products and service we provide to support teaching and learning in science and technology.

IPC Irwin also provide Portable Appliance Testers and a Calibration service, for more details please go to www.ipcirwin.com or call our sales and technical support line on 015395 58555.

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