



X-HEAT[®]
Space Heating Technology



TECHNICAL DATA
Nano-Heat[®]

WWW.XHEAT.CO.UK

Get In Touch



Call: [0845 6880112](tel:08456880112)



Email: info@adremit.co.uk

Our Address

Puravent, Adremit Limited, Unit 5a, Commercial Yard,
Settle, North Yorkshire, BD24 9RH

ABOUT YOUR NANO-HEATER

Nano-Heat is a reliable source of heat where natural gas or propane is being used, there is no flame and the surface of the heater operates below the ignition temperature of both fuels. Infrared heat is produced by the heaters and is absorbed by organic objects within range. All heaters are produced to provide safe flameless heat and tested for performance before being dispatched.

Plug & Play

Nano-Heat is supplied pre-wired with only a 5amp fused spur supply required. Simply terminate live neutral and earth and your nano-heater is ready to use. A industry standard 1/2" gas connection is supplied with the heater.

APPLICATIONS FOR USE:



Warehousing



Train Stations



Livestock Sheds



Assembly Areas



Welding Bays



Machine Shops





Sports Halls



Museums

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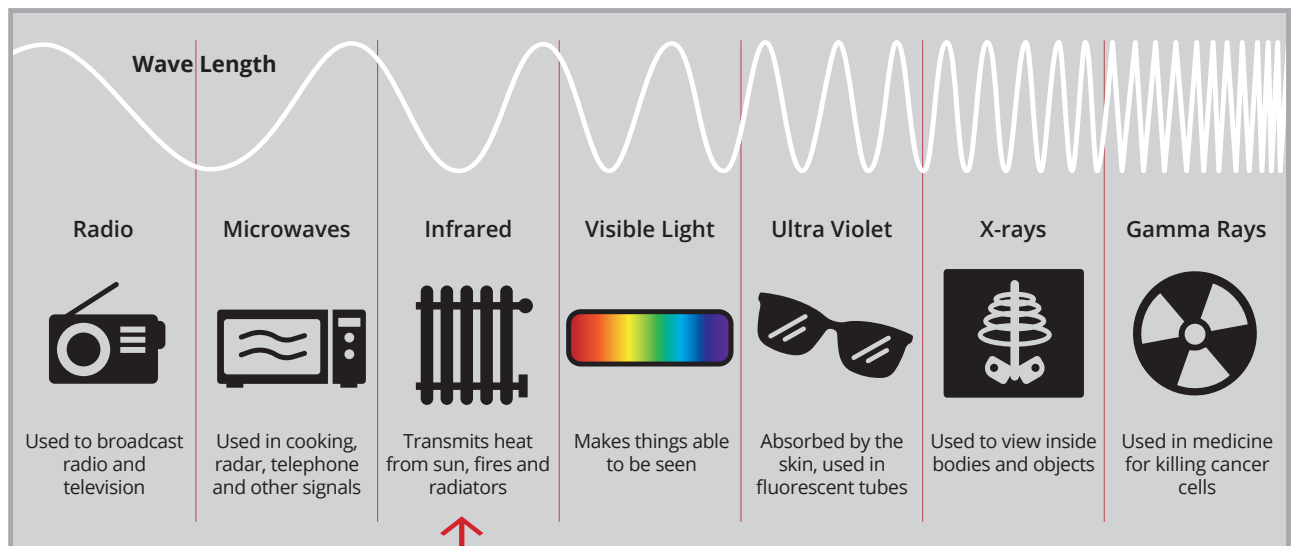
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THE SPECTRUM

Interest in infrared energy as an industrial tool has increased in recent years with many new and unusual applications. Infrared energy like light is electromagnetic wave energy, that travels in straight lines at 186,000 miles per second, casts shadows, may be transmitted, absorbed or reflected by matter, may be focused or dispersed by lenses or prisms of proper material, in fact it has many of the same properties as light waves except it has a longer wave length.

Nano-Heat produces a longer wavelength and is farthest from light, it is more easily absorbed by people, Nano-Heat is a low intensity far infrared emitter they are excellent for heating at a much lower cost than conventional combustion applications.

TYPES OF ELECTROMAGNETIC RADIATION



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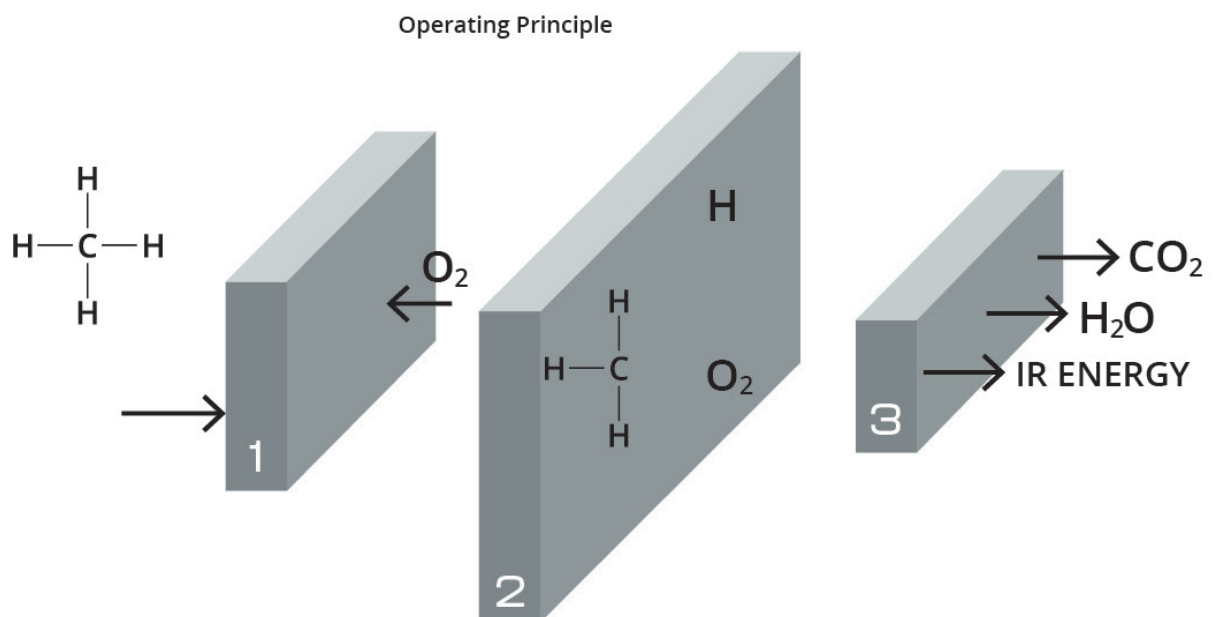
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HOW IT WORKS?

1. Fuel enters the rear of the heater which is a gas tight stainless steel pan.
2. The fuel is dispersed by means of a dispersion tube which assists this process.
3. The fuel passes through a fabric pad which acts as both an insulator but also aids dispersion of the gas acting in resistance on the flow.
4. Fuel then comes into contact with the support bed i.e. Catalytic pad which is pre heated to the desired temperature by the internal heating element.
5. Oxidation occurs when the fuel and oxygen from the surrounding air meet within the support bed. The support bed has two levels of protection firstly a fibre scrim and secondly a wire mesh which are both held in place by a gas tight stainless steel trim.



As can be seen the underlying principle of operation relies on heating of a body (the support) which then emits the stored energy as radiation at an appropriate wavelength. To proceed further, a brief discussion of radiant heat emissivity is required.

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RADIANT HEAT

Radiant heat, also known as thermal radiation, is the transfer of electromagnetic energy which describes the heat exchange of energy by photons. Radiant heat is a mechanism for heat transfer which does not require a medium in which to propagate.

Radiant body emissions are normally discussed in terms of black body radiation. As the temperature of the body increases the body remains in thermodynamic equilibrium meaning that the energy absorbed is balanced by that emitted and the wavelength and amount of energy emitted to maintain this equilibrium. The peak wavelength of the emitted radiation can be calculated using Wien’s displacement law. This shows that as the body temperature increases, the wavelength decreases. Table 1 gives the wavelength associated with different temperatures for black body radiation.

For radiation to be absorbed by people, the radiation needs to be at mid to long wavelength infrared.

Table 1: Association of IR wavelengths with different temperatures for black body radiation (Leading Infrared Heater Manufacturers and Suppliers, 2021)

| Region | Abbreviation | Wavelength (µm) | Frequency (THz) | Photo Energy (meV) | Temperature Range (°C) |
|---------------------------|--------------|-----------------|-----------------|--------------------|---------------------------------|
| Near-infrared | NIR | 0.75 - 1.4 | 214 - 400 | 886 - 1653 | 3,591 - 1,797 |
| Short-wavelength Infrared | SWIR | 1.4 - 3 | 100 - 214 | 413 - 886 | 1,797 - 693 |
| Mid-wavelength Infrared | MWIR | 3 - 8 | 37 - 100 | 155 - 413 | 693 - 89 |
| Long-wavelength Infrared | LWIR | 8 - 15 | 20 - 37 | 83 - 155 | 89 - -80 (Negative temperature) |
| Far infrared | FIR | 15 - 1000 | 0.3 - 20 | 1.2 - 83 | -80.15 - -270.15 |

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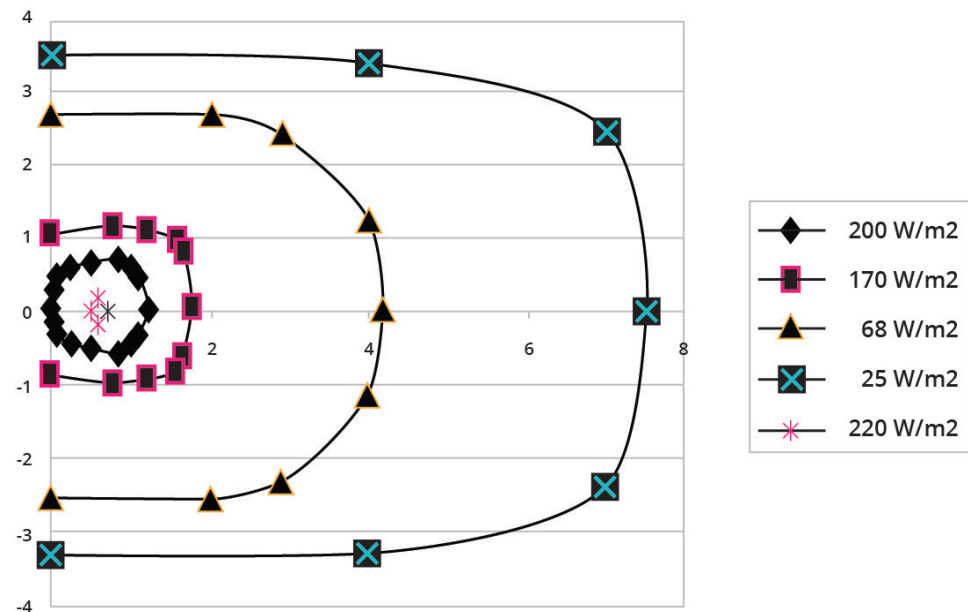
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HEAT MAP

Heat on floor in relation to distance.
Nano-Heat 10 kW

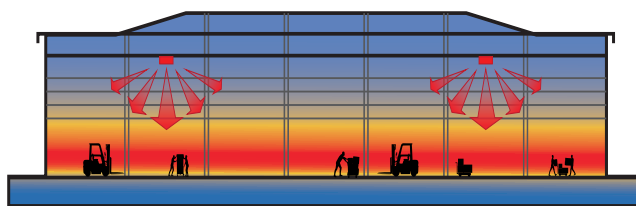
Position apparatus Pt (0;0)
Installation height = 2.5m
Inclination = 30°



*Measured with flux metre

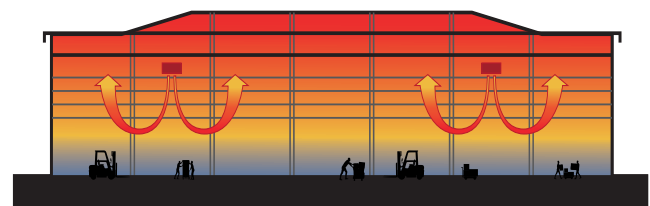
RADIANT VS CONVECTION

Nano-Heat System



Providing warmth where and when needed

Conventional Heating System



Hot air rises

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HYDROCARBON FUEL CRITERIA

Natural Gas – G20 at 20mbar supply pressure (appliance cat 2H)

| | |
|--------------------------------|--------|
| Maximum supply pressure (Pmax) | 25mbar |
| Minimum supply pressure (Pmin) | 20mbar |
| Gas connection | ½" |

Propane – G31 at 37mbar supply pressure (appliance cat 3P)

| | |
|--------------------------------|--------|
| Maximum supply pressure (Pmax) | 37mbar |
| Minimum supply pressure (Pmin) | 18mbar |
| Gas connection | ½" |



SAFETY CONTROLS

1. Low temperature sensor will activate if the temperature of the catalyst falls below the minimum operational temperature immediately de-energising the gas valve and going into cool down mode.
2. Over heat sensor will activate if the internal ambient temperature rises above the maximum threshold resulting in an over temperature fault. Gas valve and pre heat element will immediately de-energise putting the system into cool down mode.
3. The fan has a built in thermal overload switch which if activated will de energise the gas valve and pre heat element signalling fan failure.

SERVICING TOOLS REQUIRED

- CO2 Air quality analyser
- TTL-232R-3V3-AJ jack cable
- Thermal imaging camera
- Manometer
- 5mm spanner
- 8mm spanner
- Philips screw driver
- 3mm flat head screw driver
- 2 x adjustable spanner
- Soft brush 1"

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TECHNICAL ENERGY SPECIFICATION

| | NG | LPG |
|----------------|--------------------|-----------------------|
| Heat Input | 7.5 - 10.5 kW | 7.5 - 10.5 kW |
| Appliance Type | A3 | A3 |
| Appliance Cat. | I2H G20 | I3P G31 |
| Dimensions | 620 x 720 x 140 | 620 x 720 x 140 |
| Weight | 18kg | 18kg |
| Gas Ps mb | Max 13mb - Min 7mb | Max 27mb - Min 15.5mb |
| Gas Connection | ½" | ½" |
| Wh Running | 125w | 125w |
| Volts | 240 | 240 |
| Consumption | 0.69 - 0.95 | 0.45 - 0.76kg/hr |
| Co2 % | 0.5% - 2% | 0.5% - 2% |
| NOx | Class 5 | Class 5 |
| CO | 0 ppm | 0 ppm |

VENTILATION

The surface of the catalyst requires at least 10m³/hr air per kW (Zero carbon monoxide and zero Nitrous oxides are produced) This reaction produces three by products they are heat, trace water and trace carbon dioxide. No flu is required to operate this appliance.

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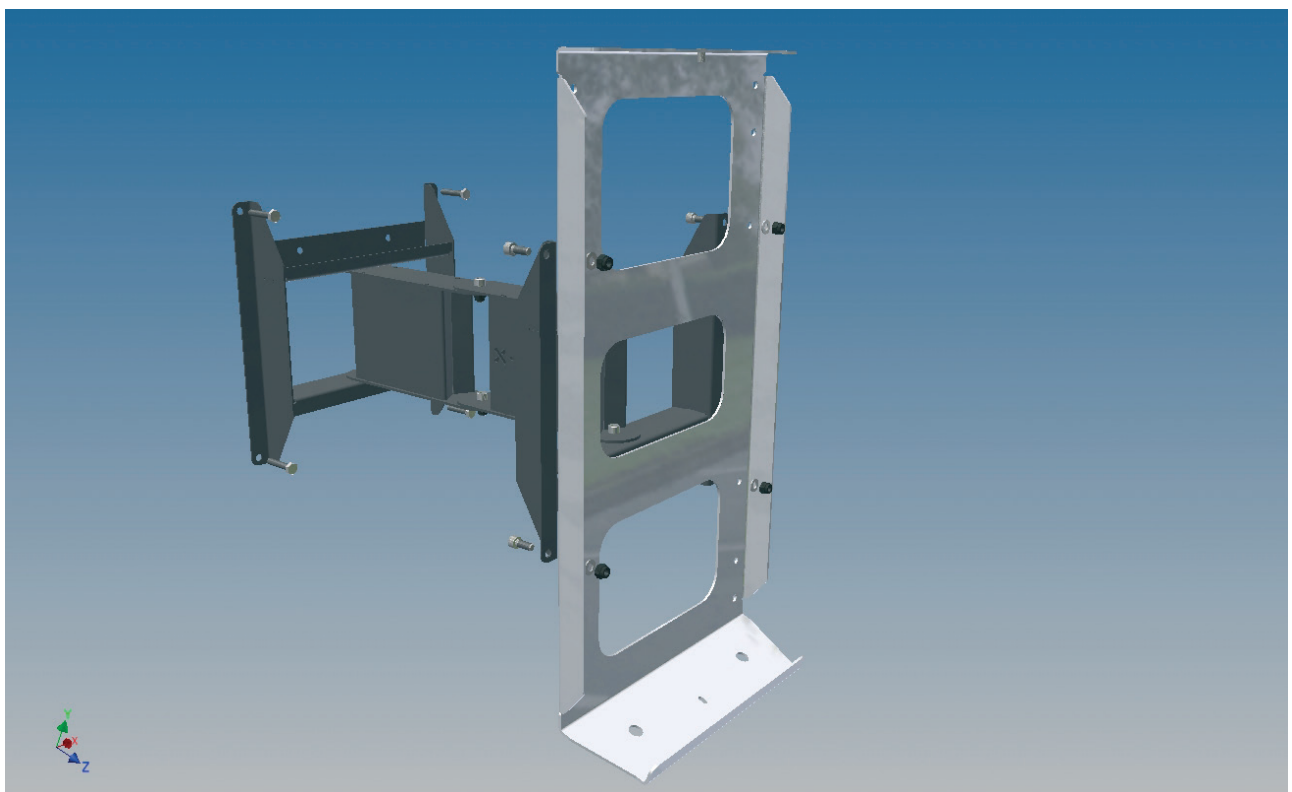
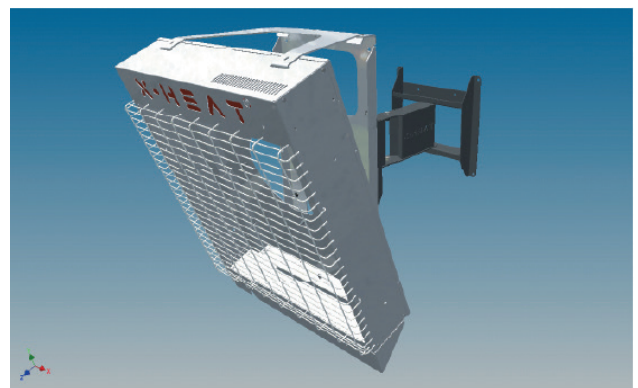
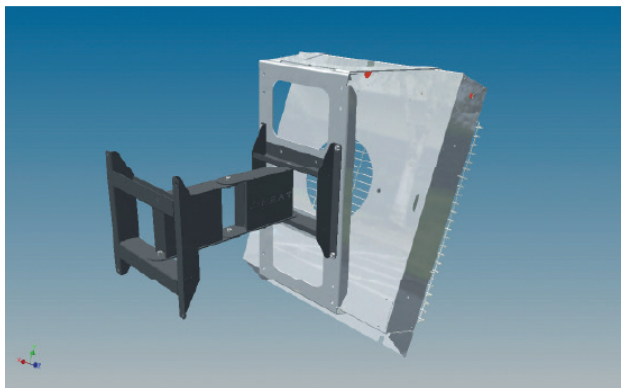
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INSTALLATION CRITERIA

Nano-Heat has been designed as a zonal heater to heat people. Installation of this unit can be mounted to any structurally sound wall at heights of 2.5m – 3.5m from the ground at an angle of 20° - 30°. The unit can be wall mounted using the bracket provided as in the diagram below.



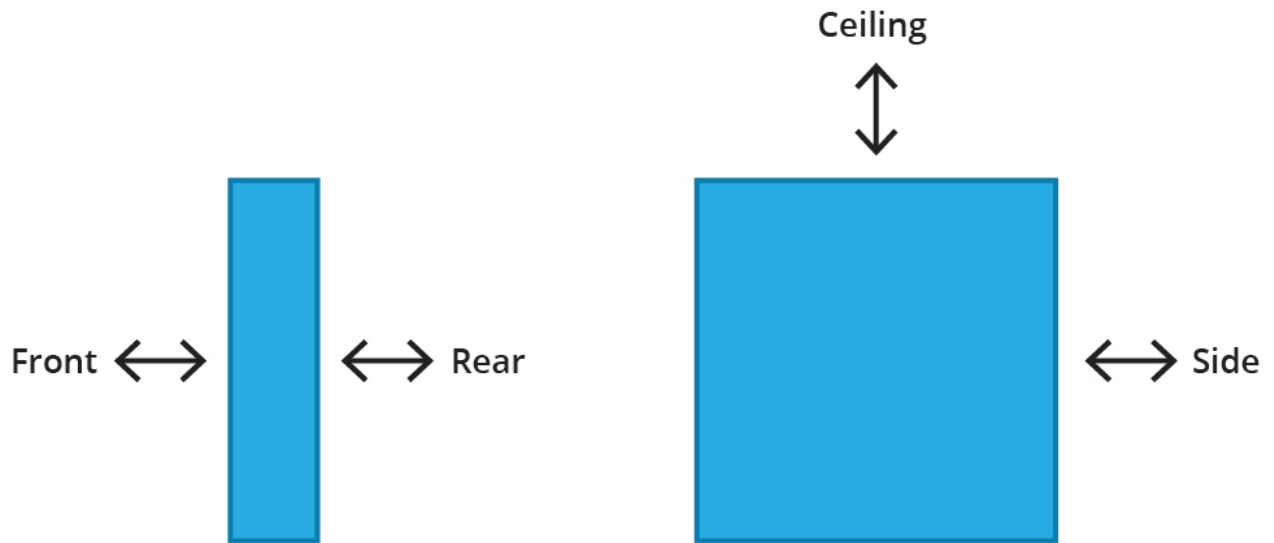
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INSTALLATION CRITERIA



| | Front | Rear | Ceiling | Side |
|----------------|--------|-------|---------|-------|
| Nano-Heat 10kW | 1500mm | 100mm | *300mm | 300mm |

**Minimum clearance to combustible materials with a stainless steel reflector fitted.*

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USEFUL TECHNICAL INFORMATION

- Nano-Heat provides a safety factor that can not be obtained with a flame, lamps, or tubes. Direct heating by flame in the presence of any combustible materials is unthinkable.
- Nano-Heat emits infrared energy meaning they heat people and not air , you realise a much faster sensible heat gain.
- Nano-Heat operate without leaving the carbon deposits normally associated with combustion equipment meaning lower servicing costs.
- Due to the low energy requirements nano-heat provides a significantly shorter payback time
- Nano-Heat operates silently, reducing noise pollution improving the working environment.
- Nano-Heat systems are thermostatically controlled for space heating applications providing greater energy savings
- Research shows that medium to long wave infrared heat can improve the wellbeing of people increasing blood flow and reducing aches and pains
- All of X-Heats products must pass rigid inspection to assure quality and performance is maintained as well the highest standard of safety
- Nano-Heat is the result of extensive laboratory and field testing all products are designed according to strict engineering requirements.

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