

# AMICUS LT

## LOW TEMPERATURE AIR SOURCE HEAT PUMPS



- Heating capacity ranging from 22 to 464kW
- Designed to supply low temperature heating systems
- Suitable for hybrid systems including LTHW and DHW applications
- COP up to 4.61
- SCOP up to 4.13
- Stage compressors
- Integral controls including:
  - BMS fault and remote on/off signal
  - MODBUS protocol compatibility
  - Indirect water heater control with DHW priority
  - Anti-legionella programme

# Lochinvar Amicus LT

## Low temperature air source heat pumps

Amicus LTS air to water heat pumps are two pipe low temperature units capable of providing heating and/or Domestic hot water at up to 60°C.

### Amicus LTS versions

These are in standard noise configuration using high efficiency fans and scroll compressors, they can produce both heating and DHW via the activation of an external three port valve with both heating and Domestic hot water having different setpoints if required. Each unit can defrost using a reverse cycle to save the energy use of an electrical de-frost system. The heat pump can operate with a setpoint of 50°C setpoint down to -7°C external air making them ideal for low temperature radiator circuits or underfloor heating. Domestic hot water would be supplied in conjunction with an immersion heater or in a bivalent system using gas fired water heaters.

Amicus LTS are available as RV versions allowing the unit to provide cooling during the summer months while also supplying domestic hot water if required via the activation of an external three port valve.

### Control and protection devices

All units are supplied with the following control and protection devices: Return user water temperature sensor installed on the user inlet water temperature pipe, antifreeze protection sensor installed on the user outlet water temperature pipe, high pressure switch with manual reset, low pressure switch with automatic reset, high pressure safety valve, compressor thermal overload protection, fans thermal overload protection, pressure transducer (used to optimize the defrost cycle and the fan speed depending on the ambient conditions), flow switch and weather compensated air sensor.

### Microprocessor

All units are supplied standard with microprocessor controls. The microprocessor controls the following functions: regulation of the water temperature, antifreeze protection, compressor timing, compressor automatic starting sequence and alarm reset. The control panel is supplied with a display showing all operational icons. The microprocessor is set for automatic defrost (when operating in severe ambient conditions) and for summer/winter change over. The microprocessor also manages the anti-Legionella programme, integration with other heat sources (electric heaters, boilers, solar panels etc), control of a three-port modulating valve (for diverting to DHW or heating) and both the heating circuit and DHW circuit water pumps.



## Standard ancillaries

### Project Support

All Amicus heat pumps include commissioning as standard and an allocated Lochinvar project engineer to provide installation assistance. including up to three site visits.

### Serial Interface Card RS485

This interface card enables the controller to communicate with other devices using Modbus protocol.

### Condensate Discharge Tray

The condensate discharge tray is installed under the finned heat exchanger, it is used to collect the condensate generated during operation. The drip tray is supplied complete with an electric heating system in order to protect the tray from freezing in severe working conditions.

### Anti-Freeze Kit

The antifreeze kit includes an electric heater and heating cable wrapped around the user heat exchanger and the water pipes. it is controlled by the microprocessor.

## Optional ancillaries

### Anti-Vibration Dampers

To be installed between the unit base and the support structure to prevent the transmission of vibration and noise, to the building.

### Electronic Soft Start-Factory Fitted

The soft starter reduces the peak starting current down to a maximum of 40% of the nominal peak value.

### Hydraulic Kit-Factory Fitted

This kit includes a water pump, centrifugal type, suitable for hot and cold water operation. The pump is directly controlled by the microprocessor. Also included in the hydraulic circuit are a safety valve and a fill and drain point with isolating valve.

### Low GWP option

Amicus LTS models can be supplied with a low GWP refrigerant, R454B which has a GWP of only 467 which is 78% lower than R410A.

### Cascade control

The Cascade controller ensures when more than one heat pump is fitted the load is shared, it also acts as an interface between the heat pumps and on site BMS system.

### Coastal Protection

This treatment is used to protect the evaporator from excessive coastal corrosion and should be specified whenever a heat pump is sited within a mile of coastal waters.

### Matched domestic hot water plate heat exchangers and storage vessels

Plate heat exchangers are specially designed to work with the 5K  $\Delta T$  from the air source heat pump with low temperature losses between the primary and secondary side. Storage vessels are available from 300-3000 litres.

*For more information: [www.lochinvar.ltd.uk/lst-direct-storage-vessels](http://www.lochinvar.ltd.uk/lst-direct-storage-vessels)*

### Thermal stores

A suitable sized LBT thermal store will be quoted on all projects and are available from 300-10,000 litres. (Insert link to LBT webpage) Alternatively, if there is a requirement to pre-heat the domestic hot water our HSV thermal store can be used, this features a stainless steel domestic hot water pre-heat coil and is available from 600 to 2000 litres.

*For more information: [www.lochinvar.ltd.uk/hsv-thermal-store](http://www.lochinvar.ltd.uk/hsv-thermal-store)*

### Immersion heaters

Whether used for breakdown cover or back-up in bivalent systems we can supply a large range of immersion heaters as both inline types to support the heating function and for fitting into the domestic hot water storage vessel. Inline immersion heaters are available from 12-120kW, and domestic hot water immersion heaters are available from 6-90kW.

### Boost heat pumps

For systems requiring higher temperatures Lochinvar can supply an additional boost heat pump, this can boost outlet temperatures up to 78C. this system is ideal when replacing old gas fired boilers and the radiators are not being replaced. Amicus boost is available in ten models with outputs of 30 to over 250kW.

*For more information: [www.lochinvar.ltd.uk/amicus-boost-water-source-heat-pumps](http://www.lochinvar.ltd.uk/amicus-boost-water-source-heat-pumps)*

### Bivalent systems

Lochinvar can supply a full Bivalent package alongside Amicus heat pumps including:

- Solar thermal
- Cavalier Electric water heaters
- Gas fired water heaters
- Gas condensing boilers

## Technical data tables LTS versions

Model		LAHP-252 LTS	LAHP-292 LTS	LAHP-412 LTS	LAHP-432 LTS	LAHP-492 LTS	LAHP-602 LTS	LAHP-702 LTS	LAHP-802 LTS	LAHP-902 LTS	LAHP-1002 LTS	LAHP-1202 LTS	LAHP-1402 LTS
<b>Efficiency data - part I2</b>													
Heating capacity (EN14511) <sup>1</sup>	kW	22.2	29.6	37.3	47.1	50.8	61.2	67.3	74.9	93.2	104.9	114.9	137.1
Total power input (EN14511) <sup>1</sup>	kW	5.3	7.1	8.8	11.5	11.8	13.3	15.1	17.2	21.2	24.5	27.8	30.9
COP (EN14511) <sup>1</sup>	W/W	4.11	4.16	4.23	4.11	4.32	4.61	4.46	4.36	4.40	4.29	4.13	4.44
<b>EcoDesign data<sup>2</sup></b>													
EcoDesign energy label rating	LT	A++											
Seasonal efficiency low temperature	%	150.1	151.4	150.9	151.1	153.6	162	158.4	155.8	151.7	150.8	150.2	151
SCOP low temperature		3.83	3.86	3.85	3.85	3.92	4.13	4.04	3.97	3.87	3.85	3.83	3.85
Cooling data (RV units only) <sup>3</sup>													
Cooling capacity (EN14511) <sup>3</sup>	kW	18.8	25.4	30.5	39.7	44.1	52.6	57.4	65.4	79.1	90.2	104	117
Total power input (EN14511) <sup>3</sup>	kW	6.5	8.5	11.0	13.9	16.3	18.2	21.3	22.8	26.5	31.2	35.1	38.9
EER (EN14511) <sup>3</sup>	W/W	2.89	3.01	2.77	2.86	2.71	2.89	2.69	2.87	2.98	2.89	2.96	3.01
<b>General data</b>													
Refrigerant		R410A											
Power supply	V/Ph/Hz	400/3+N/50											
Fans	no	2											3
Compressors/Circuits	no	2/1											
Sound power level <sup>4</sup>	dB(A)	73	74	74	75	76	76	77	78	82	83	85	86
Sound pressure level <sup>5</sup>	dB(A)	41	42	42	43	44	44	45	46	50	51	53	54
Weight	Kg	560	560	670	690	720	1060	1060	1070	1120	1160	1240	1560

Model		LAHP-1602 LTS	LAHP-1802 LTS	LAHP-2002 LTS	LAHP-2302 LTS	LAHP-2502 LTS	LAHP-2504 LTS	LAHP-3004 LTS	LAHP-3204 LTS	LAHP-3504 LTS	LAHP-4004 LTS	LAHP-4504 LTS	LAHP-5004 LTS
Efficiency data - part I2													
Heating capacity (EN14511) <sup>1</sup>	kW	151.0	167.9	182.8	210.6	241.3	229.4	271.4	296.7	339.0	364.9	407	463.7
Total power input (EN14511) <sup>1</sup>	kW	34.4	40.2	45.5	49.4	54.8	55.8	63.9	71.5	83.7	88.8	104.1	115.1
COP (EN14511) <sup>1</sup>	W/W	4.39	4.18	4.02	4.26	4.40	4.11	4.25	4.15	4.05	4.11	3.91	4.03
EcoDesign data <sup>2</sup>													
EcoDesign energy label rating	LT	A++											
Seasonal efficiency low temperature	%	151.3	150.9	150.4	153.6	155.6	150.2	151.1	150.3	153.5	152.4	151.9	151.5
SCOP low temperature		3.86	3.85	3.84	3.92	3.97	3.83	3.85	3.83	3.91	3.89	3.87	3.86
Cooling data (RV units only) <sup>3</sup>													
Cooling capacity (EN14511) <sup>3</sup>	kW	129	147	159	181	202	199	229	257	287	320	366	413
Total power input (EN14511) <sup>3</sup>	kW	44.1	50.8	58.7	65.7	73.2	72.3	80.5	89.6	106.0	120.0	135.0	151.0
EER (EN14511) <sup>3</sup>	W/W	2.93	2.89	2.71	2.75	2.76	2.75	2.84	2.87	2.71	2.67	2.71	2.74
General data													
Refrigerant			R410A										
Power supply	V/Ph/Hz		400/3+N/50										
Fans	no	3					4	6				8	
Compressors/Circuits	no	2/1					4/2						
Sound power level <sup>4</sup>	dB(A)	87	87	87	89	91	88	89	90	90	90	92	92
Sound pressure level <sup>5</sup>	dB(A)	55	55	55	57	59	56	57	58	58	58	60	60
Weight	Kg	1580	1600	1620	1790	1820	3170	3220	3270	3320	3660	3720	3780

1) external air+7C 30/35 flow

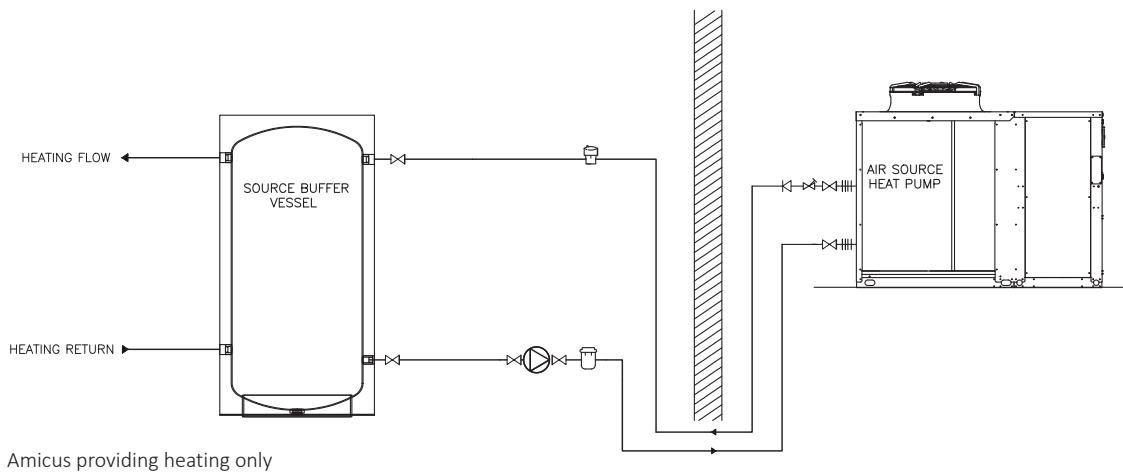
2) average conditions according to EU/811/2013

3) Cooling external air +35C 12/7 flow

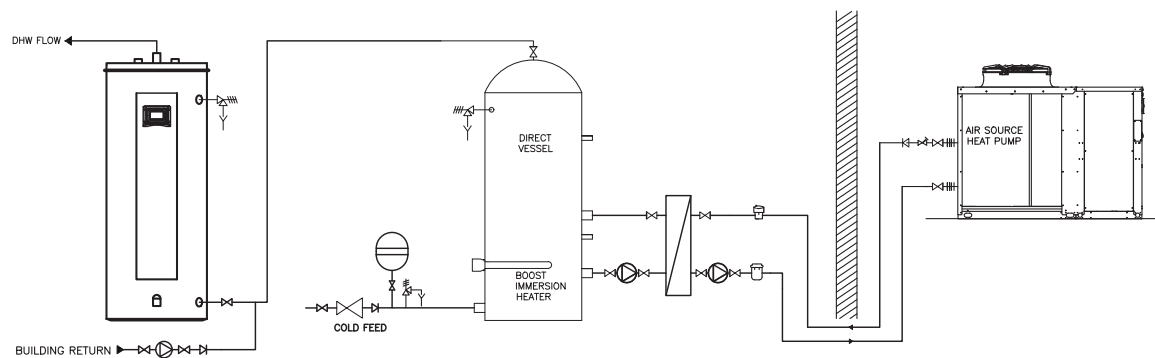
4) Sound power level in accordance with ISO 3744

5) Sound pressure level at 1 mt from the unit in free field conditions direction factor Q=2, calculated in accordance with ISO 3744

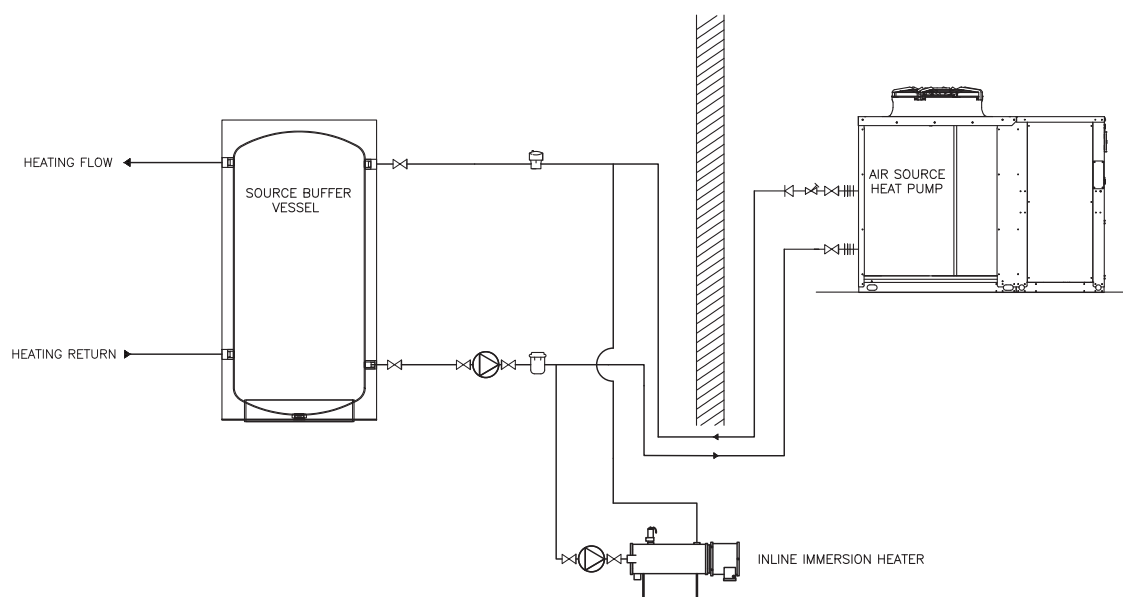
## Typical Schematic Drawings Hybrid Systems



Amicus providing heating only



Amicus providing pre-heat to Cavalier electric water heater



Amicus providing heating only with in-line immersion heater support

## Installation

### General

The Amicus air source heat pump should be sited in an area which:

- Can bear the weight of the unit.
- Has enough space around the unit to allow the correct airflow across the source heat exchanger.
- Is not too windy.
- Does not present a noise nuisance to users of the building and neighbours.



### Dimensions

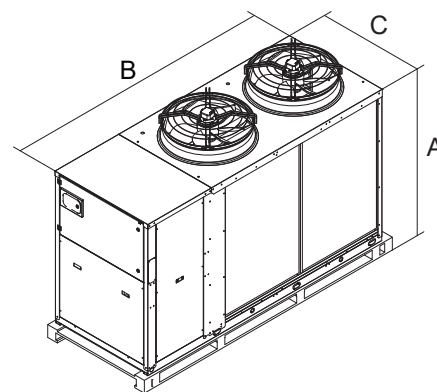
Dimensions			LAHP-252 LTS	LAHP-292 LTS	LAHP-412 LTS	LAHP-432 LTS	LAHP-492 LTS
Height	A	mm	1470	1470	1670	1670	1670
Length	B	mm	1910	1910	2200	2200	2200
Width	C	mm	900	900	900	900	900
Weight	Kg		560	560	670	690	720

Dimensions			LAHP-602 LTS	LAHP-702 LTS	LAHP-802 LTS	LAHP-902 LTS	LAHP-1002 LTS	LAHP-1202 LTS
Height	A	mm	1820	1820	1820	1820	1820	1820
Length	B	mm	2905	2905	2905	2905	2905	2905
Width	C	mm	1150	1150	1150	1150	1150	1150
Weight	Kg		1060	1060	1070	1120	1160	1240

Dimensions			LAHP-1402 LTS	LAHP-1602 LTS	LAHP-1802 LTS	LAHP-2002 LTS	LAHP-2302 LTS	LAHP-2502 LTS
Height	A	mm	1820	1820	1820	1820	2220	2220
Length	B	mm	3965	3965	3965	3965	3965	3965
Width	C	mm	1150	1150	1150	1150	1150	1150
Weight	Kg		1560	1580	1600	1620	1790	1820

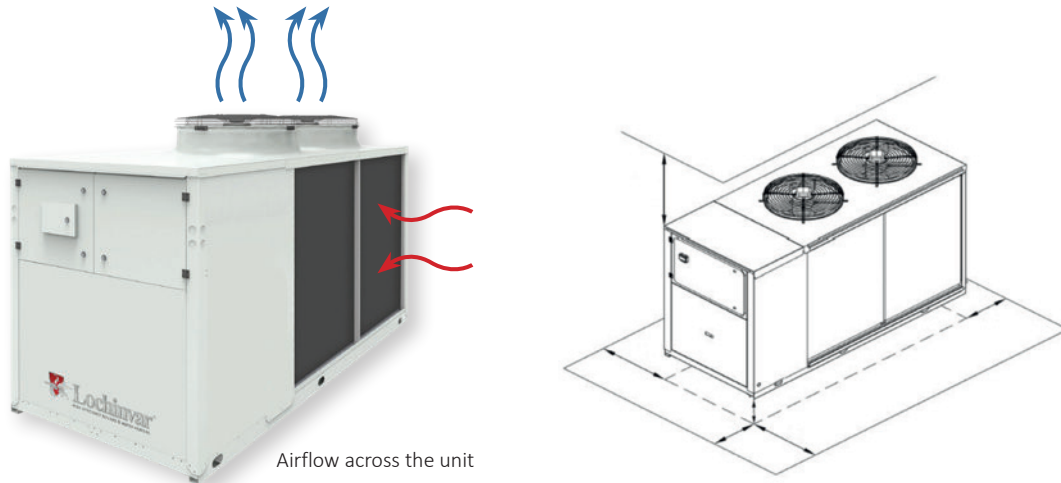
Dimensions			LAHP-2504 LTS	LAHP-3004 LTS	LAHP-3204 LTS	LAHP-3504 LTS
Height	A	mm	2350	2350	2350	2350
Length	B	mm	4265	4265	4265	4265
Width	C	mm	2210	2210	2210	2210
Weight	Kg		3170	3220	3270	3320

Dimensions			LAHP-4004 LTS	LAHP-4504 LTS	LAHP-5004 LTS
Height	A	mm	2350	2350	2350
Length	B	mm	4805	4805	4805
Width	C	mm	2210	2210	2210
Weight	Kg		3660	3720	3780



## Positioning on site

Amicus air source heat pumps require minimum clearances around them to enable the fan which is fitted on top of the unit to draw sufficient air through the source heat exchanger (evaporator) which can be fitted either just to one side of the unit or both sides depending on size and model type. Clearances also prevent exhaust air recirculation which can create operational problems for the units.



## Clearances

Legend	Unit	LAHP-252 LTS	LAHP-292 LTS	LAHP-412 LTS	LAHP-432 LTS	LAHP-492 LTS	LAHP-602 LTS	LAHP-702 LTS	LAHP-802 LTS	LAHP-902 LTS	LAHP-1002 LTS	LAHP-1202 LTS	LAHP-1402 LTS
A	mm	1000	1000	1500	1500	1500	2000	2000	2000	2000	2000	2000	2000
B	mm	800	800	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
C	mm	800	800	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
D	mm	800	800	1000	1000	1000	1000	1000	1000	2000	2000	2000	2000
E	mm	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
F	mm	350	350	350	350	350	350	350	350	350	350	350	350

Legend	Unit	LAHP-1602 LTS	LAHP-1802 LTS	LAHP-2002 LTS	LAHP-2302 LTS	LAHP-2502 LTS	LAHP-2504 LTS	LAHP-3004 LTS	LAHP-3204 LTS	LAHP-3504 LTS	LAHP-4004 LTS	LAHP-4504 LTS	LAHP-5004 LTS
A	mm	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
B	mm	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
C	mm	1000	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
D	mm	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
E	mm	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
F	mm	350	350	350	350	350	350	350	350	350	350	350	350

## Design criteria

Lochinvar can provide assistance in sizing your Amicus heat pump, in order to help we will require the following minimum information:

1. Heat loss of the building
2. Design outside air temperature
3. Flow temperature for the heating system
4. Domestic hot water load or number of outlets so we can help size the hot water load
5. Minimum number of heat pumps required
6. Will this be a standalone or bivalent system?
7. What will be the secondary heat source required for bivalent systems?

## Case study The Maldron Hotel in Glasgow

A brand new 4-star hotel in central Glasgow is benefitting from a comprehensive Lochinvar heating and hot water package of heat pump, boilers, storage vessel, and water heaters.

Such a large, modern structure demanded a state-of-the-art heating and hot water solution – and the owners were also keen to achieve high efficiency performance with minimal carbon emissions while still delivering the high volumes of hot water on demand needed by such a busy and high spec hotel.

As a result, Lochinvar was specified to provide a package consisting of air source heat pump and buffer vessel supported by two TTW water heaters delivering heating and hot water at minimal energy use and low carbon footprint, but still with fast recovery rates to meet demand.



## Hybrid

The **Amicus LT heat pump** is ideal for operating as part of a hybrid system, such as the one specified by the Maldron Hotel team.

The heat pump delivers low temperature hot water and operates at a coefficient of performance (COP) above four so providing the client with significant energy savings and reduced carbon emissions.

It works in tandem with the **TTW floor standing water heaters**, which are circulating-type models with heat exchangers constructed from stainless steel so are ideal for providing high volumes of hot water on demand at any time of the day and night – a key requirement for most hotels.

The Lochinvar **EFB condensing boilers** that serve the hotel's air handling plant and over door air curtains. As well as being highly energy efficient, are classified as ultra-low NO<sub>x</sub>, which is another benefit for a client keen to minimise environmental impact. They produce NO<sub>x</sub> emissions below 24mg/kWh, which means all EFB models qualify for the maximum two credits awarded for air quality on BREEAM-rated projects. They also incorporate a high-quality, stainless-steel heat exchanger, which is supported by an extended warranty.

Another demand on the specification, which was led by the hotel chain's consultant Sam McVicker from Caldwell Consulting Engineers in Belfast, was the need for the products to be compact to fit into restricted plant space. This proved to be another benefit of the Lochinvar packaged approach as it afforded the installation team, headed by Michael McGoldrick of FG Mechanical Building Services on behalf of the main contractor McAleer and Rushe, maximum flexibility when it came to manoeuvring and positioning the equipment.

[www.lochinvar.ltd.uk/project-glasgow-hotel-gets-5-star-heat-treatment-from-lochinvar](http://www.lochinvar.ltd.uk/project-glasgow-hotel-gets-5-star-heat-treatment-from-lochinvar)

Energy label, product fiche and ErP data table are available at [www.lochinvar.ltd.uk](http://www.lochinvar.ltd.uk)

For further information on the Amicus LT heat pumps, including ICM & user instructions and our full warranty terms and conditions, please visit our website: [www.lochinvar.ltd.uk](http://www.lochinvar.ltd.uk)



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*Lochinvar Ltd reserves the right to change specifications without prior notice*

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