ADVECO

# L70

## Air Source Heat Pump

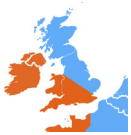
www.adveco.co

# Adveco L70 Air Source Heat Pump

The Adveco L70 is a high capacity air-to-water monobloc heat pump designed to provide hybrid domestic hot water (DHW) and heating for large scale commercial applications

- Reduce environmental impact
- Easy to install and manage
- 90kW maximum output
- 60°C domestic hot water provision

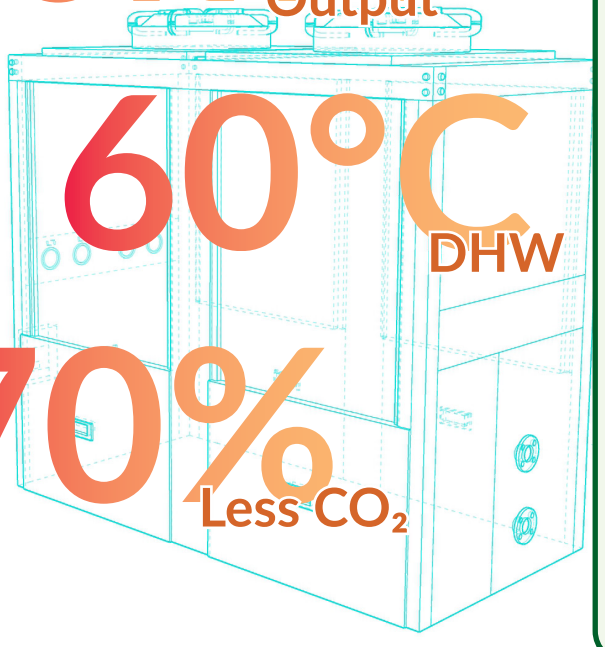
A+
A++



A+ rating under average Ecodesign conditions (811/2013). A++ under warmer Ecodesign conditions

## Designed & Built for the UK climate

# 90kW
Output



# 60°C
DHW

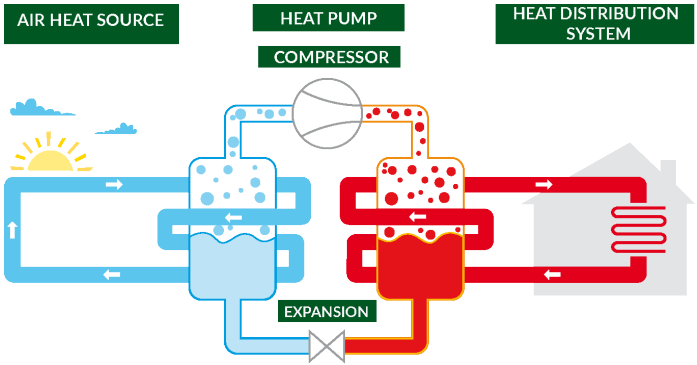
# 70%
Less $CO_2$

## L70 FEATURES

- High capacity output up to 90 kW for hot water and heating (rated 70kW at 5°C ambient temperature for typical UK operation)
- Reduce $CO_2$ by almost 70% compared to gas-fired for the Ecodesign Warmer European Temperature Zone and working water flow at 55°C
- Wide DHW output range from 25°C to 60°C
- Works in cascade for larger applications
- Specifically designed for the UK climate supporting ambient temperatures from -20°C to +35°C
- Automatic reverse cycle for built-in frost protection
- Compact monobloc design for efficient use of space and easy maintenance

# Understanding Air Source Heat Pumps

Air Source Heat Pumps (ASHP) use ambient air as a heat source for a refrigerant circuit to transfer heat to the building. This is achieved by altering the pressure in the circuit to benefit from the temperature to pressure relationship of fluids.




So long as the outside air temperature is above -20°C heat can be drawn out of the surrounding air to be transferred to a building's heating or hot water circuit. The UK's relatively mild winter temperatures help ensure a properly installed ASHP system can achieve excellent levels of efficiency and performance throughout the year.

ASHPs transfer greater thermal energy than electrical energy consued to operate thereby delivering a very efficient form of heating for commercial spaces and hybrid hot water systems .

Because ASHPs, such as the L70, absorb heat from the air, the technology is an excellent method for reducing carbon emissions across a commercial site.

# ASHP Efficiencies When Specifying Projects

ASHP 'efficiency' is calculated as the ratio between the electricity invested in order to run the ASHP and heat transferred from the evaporator to the condenser. This is known as the coefficient of performance or COP.

This COP can also be influenced by other factors including the energy needs and energy efficiency of a property, as well as the quality of hot water and heating system installation and setup.

Consideration also needs to be given to the UK's fluctuating seasonal temperatures and the geographic location. It is therefore better to consider an ASHP's seasonal COP (SCOP) for UK temperatures when specifying a system.

Calibrated for the UK climate, the L70 operates within ambient temperatures of -20 to +35°C. The seasonal coefficient, established in line with Ecodesign average European temperature zone with a reference low of -10°C, ranges from 3.39 for 35°C water temperature to 2.84 at 55°C.

# Reducing $CO_2$ From The Built Environment

The L70 ASHP offers a practical method for actively reducing the $CO_2$ emissions from a building project. A major contributor to the UK's carbon emissions, the built environment has increasingly come under Government scrutiny to drive change and achieve Net Zero by 2050. ASHPs are recognised as one of the key tools to help reduce $CO_2$ emissions and the L70 supports this effort for larger scale commercial projects.

When assessing the value of an ASHP in terms of reducing CO2 emissions, Adveco employs like for like calculations for 1 kWh of output, benchmarked against a gas-fired system. As a specialist in the provision of domestic hot water (DHW), we are especially conscious of the need to present meaningful figures that represent applications in the real world. When specifying ASHP, water temperatures of 35°C are typically cited, but this is insufficient for commercial applications. Even if a building has achieved Passivhaus standards through very high levels of insulation, unusual in new build commercial properties and highly unlikely in legacy structures undergoing refurbishment, 35°C is not hot enough to safely provide DHW. For this reason, Adveco recommends calculating emissions at a water temperature of 55°C where we can demonstrate an almost 70% reduction in $CO_2$ emissions.

For the UK, Adveco adheres to the Ecodesign established European temperature zones. For the large majority of the UK the relevant defined temperature zone is 'average', where the lowest annual reference temperature for the ASHP seasonal coefficient of performance (SCOP) is taken to be -10°C. For some Southern and Western UK regions, the 'warmer' Ecodesign temperature zone can be applied for calculation, where the lowest the reference temperature will fall to is 2°C.

| **Benchmark Gas-Fired System** | |
|---|---|
| 1 kWh Output / 0.96 efficency | 1.04 kWh Input |
| 1.04 kWh Input x 0.21 kg $CO_2$/kWh | 0.219 kg $CO_2$ |
| **Adveco L70, 55°C water temperature EcoDesign reference temperature 2°C (SCOP 3.47)** | |
| 1 kWh Output | 0.288 kWh Input |
| 0.288 kWh Input x 0.233 kg $CO_2$/kWh | 0.067 kg $CO_2$ |
| Carbon saving 1 – (0.067 kg/0.219 kg) | 69.4% |
| **Adveco L70, 55°C water temperature EcoDesign reference temperature -10°C (SCOP 2.84)** | |
| 1 kWh Output | 0.352 kWh Input |
| 0.352 kWh Input x 0.233 kg $CO_2$/kWh | 0.082 kg $CO_2$ |
| Carbon saving 1 – (0.082 kg/0.219 kg) | 62.6% |
| **Adveco L70, 35°C water temperature EcoDesign reference temperature 2°C (SCOP 3.65)** | |
| 1 kWh Output | 0.274 kWh Input |
| 0.274 kWh Input x 0.233 kg $CO_2$/kWh | 0.064 kg $CO_2$ |
| Carbon saving 1 – (0.064 kg/0.219 kg) | 70.7% |

# A Hybrid Approach

## *Improve Environmental Performance*

## *Reduce Running Costs*

ASHPs provide greatest efficiency when used within a low temperature system, this however becomes an issue when the technology is applied to the provision of domestic hot water (DHW) for commercial applications where temperatures of more than 60°C are required as a minimum. To achieve this an ASHP needs to generate temperatures of at least 65°C at which point the COP struggles to deliver and in colder ambient temperatures can fall to a 1:1 ratio.

Gaining true advantage from the ASHP in commercial DHW applications requires adopting a hybrid approach offering better compatibility with existing heating distribution systems and the thermal demands of higher heat loss buildings.

Hybrid systems combine the ASHP which generates the preheat with a range of other technologies, which can include:

- Plate heat exchangers (PHE) to ensure all heat energy generated by the ASHP is successfully transferred
- Buffer vessels for storing the heated water;
- Calorifiers and gas fired boilers or direct electric immersion to top up the heat to the required temperature.
- Secondary return and thermal disinfection line since the ASHP alone cannot currently achieve the necessary, regular, high temperature for sterilization of the system.

The availability of two heat sources to meet the demands of a property is extremely advantageous. It enables a heating or DHW system to operate at a higher temperature grade, as well as remaining effective at very low temperatures, leveraging full advantage from the ASHP.

Although the heat pump does not completely replace an existing heating system, these hybrid systems keep running costs low while helping businesses meet their goals for lowering $CO_2$ emissions.

# Applications

By employing the L70 ASHP to provide preheat for DHW applications - energy demands are reduced along with emissions. Key requirements for consultants and contractors working on both new build and refurbishment projects.

For facility and energy managers, the deployment of the L70 ASHP means operational costs can be greatly reduced as energy demands are offset. Built-in remote monitoring records operational characteristics, supports maintenance activities and informs facilities or energy managers of potential service issues to help ensure continuity of service.

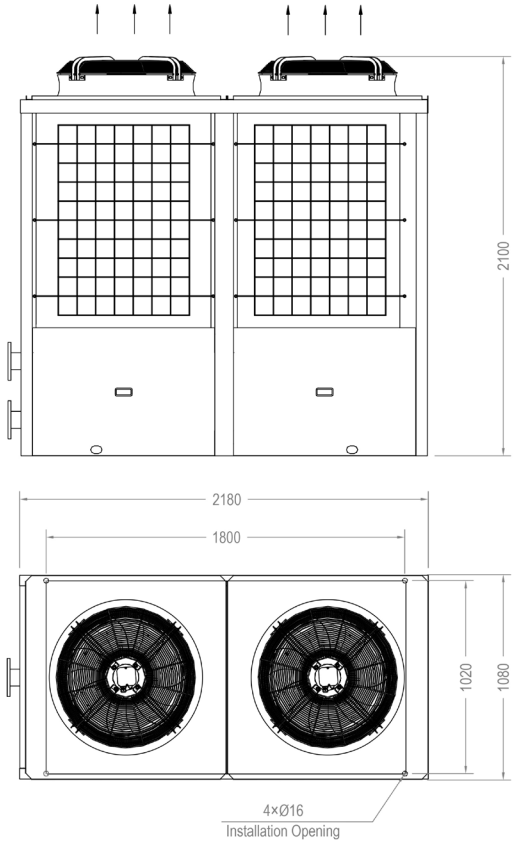
Designed for the UK climate, the L70 has undergone full environmental assessment to ensure optimum efficiency is delivered across the UK's varied seasonal climate. Each unit thoroughly tested prior to dispatch for installation.

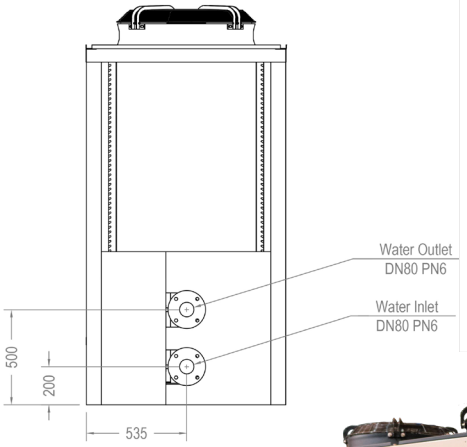
The L70 particularly lends itself to applications with regular DHW demand, such as for showers and washing. Hotels, schools, offices, leisure facilities, spas and swimming pools can all take advantage of the benefits of the Adveco L70 ASHP.

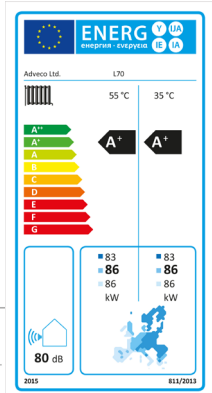
Controlled environmental testing to assure operational efficiency across seasonal UK temperature extremes

Prior to installation each L70 unit is thoroughly tested in purpose-built UK facilities

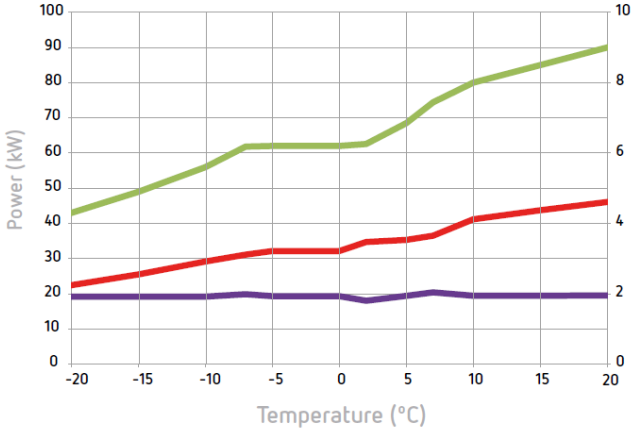
# L70 Dimensions



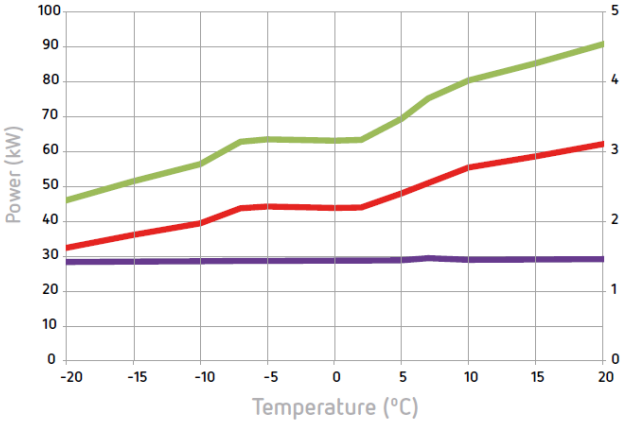




## L70 Performance
## At 35°C outlet temperature




## L70 Performance
## at 55°C outlet temperature




Power Output (kW)  Power Input (kW)  COP

| Technical Specifications | | Units | L70 |
|---|---|---|---|
| Dimensions HxWxD | | mm | 2100x2180x1080 |
| Power supply | | V/Hz/Phase | 400/50/3ph |
| Rated current | | Amps | 74 |
| Staged start up current | Single compressor<br>Dual compressors | Amps | 135<br>171 |
| Electrical Protection | | | |
| Coefficient of Performance (COP) | | | 3.65 (1)<br>3.47 (2)<br>3.11 (3)<br>2.83 (4) |
| Seasonal Coefficient of Performance (SCOP) | | | 4.08 (5)<br>3.82 (6)<br>3.39 (7)<br>2.84 (8) |
| Seasonal Space Heating Energy Efficiency (SSHEE) | | (ηs) | 160% (5)<br>149% (6)<br>133% (7)<br>112% (8) |
| Maximum working water pressure | | Bar | |
| Ambient operational temperature range | | °C | -20 to 35 |
| Water side operational temperature range | | °C | 25 to 60 |
| Refrigerant (R410A) fill mass | | kg | 2x 9.0 |
| Adveco M0223 Shunt Pump current consumption | | Amps | 3.5 |

*(1) Heating conditions: Water temperature 35°C. Ambient temperature 7°C.*
*(2) Heating conditions: Water temperature 35°C. Ambient temperature 2°C*
*(3 Heating conditions: Water temperature 35°C. Ambient temperature -7°C*
*(4) Heating conditions: Water temperature 35°C. Ambient temperature -10°C*
*(5 Water temperature 35°C. Ecodesign minimum reference temperature 2°C*
*(6) Water temperature 55°C. Ecodesign minimum reference temperature 2°C*
*(7) Water temperature 35°C. Ecodesign minimum reference temperature -10°C*
*(8) Water temperature 55°C. Ecodesign minimum reference temperature -10°C*

| Technical Specifications | | Units | L70 |
|---|---|---|---|
| Fan | Quantity | | 2 |
| | RPM | | 900 |
| | Power Input | W | 2 x 1100 |
| Sound | Sound power | d(B)A | 80 |
| | Sound pressure at 10m | d(B)A | 51.6 |
| Water side plate heat exchanger | Water pressure drop | kPa | 50 |
| Water flow rate | Minimum | m3/h | 10.0 |
| | Nominal | | 15.5 |
| Defrost type | | | Automatic reverse cycle |
| Dry mass | | kg | 800 |
| Clearance | | m | 1.0 |



ADVECO
HOT WATER SPECIALISTS

T | 01252 551 540 E | enquiries@adveco.co

Adveco Ltd. Unit 7 & 8 Armstrong Mall, Southwood Business Park, Farnborough, Hampshire GU14 0NR

# ADVECO L70 AIR SOURCE HEAT PUMP PRODUCT GUIDE

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