



Installation Design Pack

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About this pack

This document outlines the complete scope of works relating to the design and installation of an air source heat pump system.

All relevant work has been done in accordance with the Microgeneration Certification Scheme (MCS) standards for design (MIS3005-D) and installation (MIS3005-I). Every system is bespoke for each property and is capable of providing domestic heating and hot water services all year round.

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Overview

Permissions and funding

Permitted development:	Not granted. Planning permission is required due to boundary proximity.
Funding scheme:	Boiler Upgrade Scheme (BUS)

Heat pump system details


	Outdoor unit	Indoor unit	Hot water cylinder
Model:	EDLA11		R32 UK.PPC 180
Manufacturer:	Daikin	-	Daikin
Description:	Class 11 LT Monobloc	-	180L Pre-plumbed hot water tank [R32]
Unit Height:	870mm unit on 150mm feet (1020total)	-	1676mm
Width:	1380mm	-	550mm
Depth:	460mm	-	550mm
Weight:	147kg	-	58kg

Property details


Building status:	On-going renovation	Existing heating source:	Gas
Number of storeys:	1	Existing hot water:	Vented cylinder
External walls:	Mixed construction	Electric phase:	Single-phase
Roof(s):	Pitched roof insulated	Main fuse size:	60 A
Windows:	Double glazing	Location of existing distribution board:	Hall
Primary pipework:	22mm copper	Solar thermal:	Not present
Emitter type:	Radiators	Solar PV:	Planned installation
Number of zones:	1		
Radiator pipe size:	Standard bore		

Installation: Units

Outdoor unit

Notes	Picture																						
<p>Heat pump is outside and parallel to the bedroom external wall [left elevation]. The unit is to be placed on a wall bracket. Installer to use drip tray and pipe condense away. Customer to clear area of prior to install. Flow and return pipework to go across external wall low level before entering under the floor and going to cylinder location. Pipework to be lagged and sleeved when entering the property with all pipework lagged.</p> <p>Main fuse is in kitchen cupboard. New sub distribution board installed next to hot water cylinder. Three-isolators to be sited next to the heat pump. Comms cable to follow primary pipework. Route is dependent on accessibility and cable run to BS 7671 IET wiring regulations</p> <p>Heat pump location close to boundary. Only location for the heat pump with low noise output due to customer installing barrier. Other locations fails noise at higher level. Wall bracket also used to reduce distance to boundary</p>																							
<p>For any additional works we require from you, please go to Customer's Responsibility section.</p>	<p>Site information:</p> <table border="1"> <tr> <td>Location description:</td> <td>Outside bedroom</td> </tr> <tr> <td>Mount description:</td> <td>Wall mounted</td> </tr> <tr> <td>Condense soakaway:</td> <td>Drip tray provided</td> </tr> <tr> <td>Site accessibility:</td> <td>Side of property</td> </tr> <tr> <td>Working height:</td> <td>1m</td> </tr> </table> <p>Length of primary pipework (one-way): <input type="text" value="8m"/></p> <p>Additional equipment:</p> <table border="1"> <tr> <td>Base for unit:</td> <td>1500mm x 750mm</td> </tr> <tr> <td>Lifting equipment:</td> <td>Not required</td> </tr> <tr> <td>Scaffolding:</td> <td>Not required</td> </tr> <tr> <td>Drip tray:</td> <td>Not required</td> </tr> <tr> <td>Trunking colour:</td> <td>White</td> </tr> <tr> <td>Heating kit:</td> <td>Provided (single phase)</td> </tr> </table> <p>Isolators to be mounted next to the heat pump on all power supply cables</p>	Location description:	Outside bedroom	Mount description:	Wall mounted	Condense soakaway:	Drip tray provided	Site accessibility:	Side of property	Working height:	1m	Base for unit:	1500mm x 750mm	Lifting equipment:	Not required	Scaffolding:	Not required	Drip tray:	Not required	Trunking colour:	White	Heating kit:	Provided (single phase)
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Trunking colour:	White																						
Heating kit:	Provided (single phase)																						

Hot water storage

Notes	Picture
<p>Existing hot water cylinder to be removed in the airing cupboard. Cylinder to be installed in an unvented configuration. Everything to be installed compact. Pipework lagged in insulation [Armaflex]. Everything to be lagged in 19mm insulation [Armaflex]. All local pipework including, cold water mains [15mm minimum], Domestic Hot Water [22mm minimum] and Space heating [22mm minimum] is already at the location. Customer to clear cupboard prior to installation. Discharge installed to G3 standard following primaries back.</p>	 <p>Site information:</p> <p>Location description: <input type="text" value="Airing cupboard"/></p> <p>Space available for units & pipework: <input type="text" value="Space available for all units"/></p> <p>Configuration</p> <p>Existing configuration: <input type="text" value="Vented"/></p> <p>Proposed configuration: <input type="text" value="Unvented"/></p> <p>Hot water temperature: <input type="text" value="50°C"/></p> <p>Disinfection cycle: <input type="text" value="Provided via immersion power supply"/></p> <p>Additional equipment:</p> <p>Expansion vessel: <input type="text" value="18L vessel"/></p> <p>Safety discharge pump: <input type="text" value="Not required"/></p> <p>Destratification pump: <input type="text" value="Not required"/></p> <p>Other: <input type="text" value=""/></p>


Safety discharge:

Unvented systems must be installed to G3 regulations with a safety discharge pipe leading to an appropriate location (usually drain or outdoors).

All additional equipment must be located in the vicinity of the hot water cylinder.

Indoor equipment

Heating control interface [Daikin HCI]

Notes	Picture
<p>Daikin HCI to be installed in AC with existing Tado controls utilised.</p>	

Site information:

Location description:	Hall
Mounting frame required:	No

4-core cable from outdoor unit to Daikin HCI.

Additional equipment:

Item:	Description:	Location:
Dedicated DB	Dedicated distribution box	TBC
Tado [existing]	Existing Thermostat	Hall



Installation: Piping & Cabling

Installation details

Existing system decommissioning and installation of new pipework, cables and units to be completed in one fix. No 2nd fix required.

A dedicated electrical distribution board may be installed in the property to supply the heat pump system. Electrical cable connections to be specified by a qualified electrician following all applicable

Installer to connect and commission system as per schematics provided on GoCanvas App.

Piping schematics number:

41

Electrical schematics number:

44

Piping notes

Heat pump type: Monobloc

Primary pipework refers to the pipes connecting the outdoor unit with the indoor equipment / space heating circuit.

Primary pipe type: Copper
 Diameter (O.D.): 28mm
 Trenching: Not required

All external pipes to be covered in lagging and trunking where appropriate.

Please note that the heat pump systems must be connected to an unvented/pressurised space heating circuit.

Hot water storage connection information:

Installer to complete connections listed below for the hot water storage. All pipework connecting to existing systems must be local (<1m) to the hot water storage location. Please see Customer's responsibility section for any additional work required.

Local cold water supply pipe [22mm]: ✓
 Local hot water supply pipe [22mm]: ✓
 Primary coil flow & return [28mm]: ✓


Secondary coil flow & return:
 Secondary return:
 Space heating flow & return: ✓



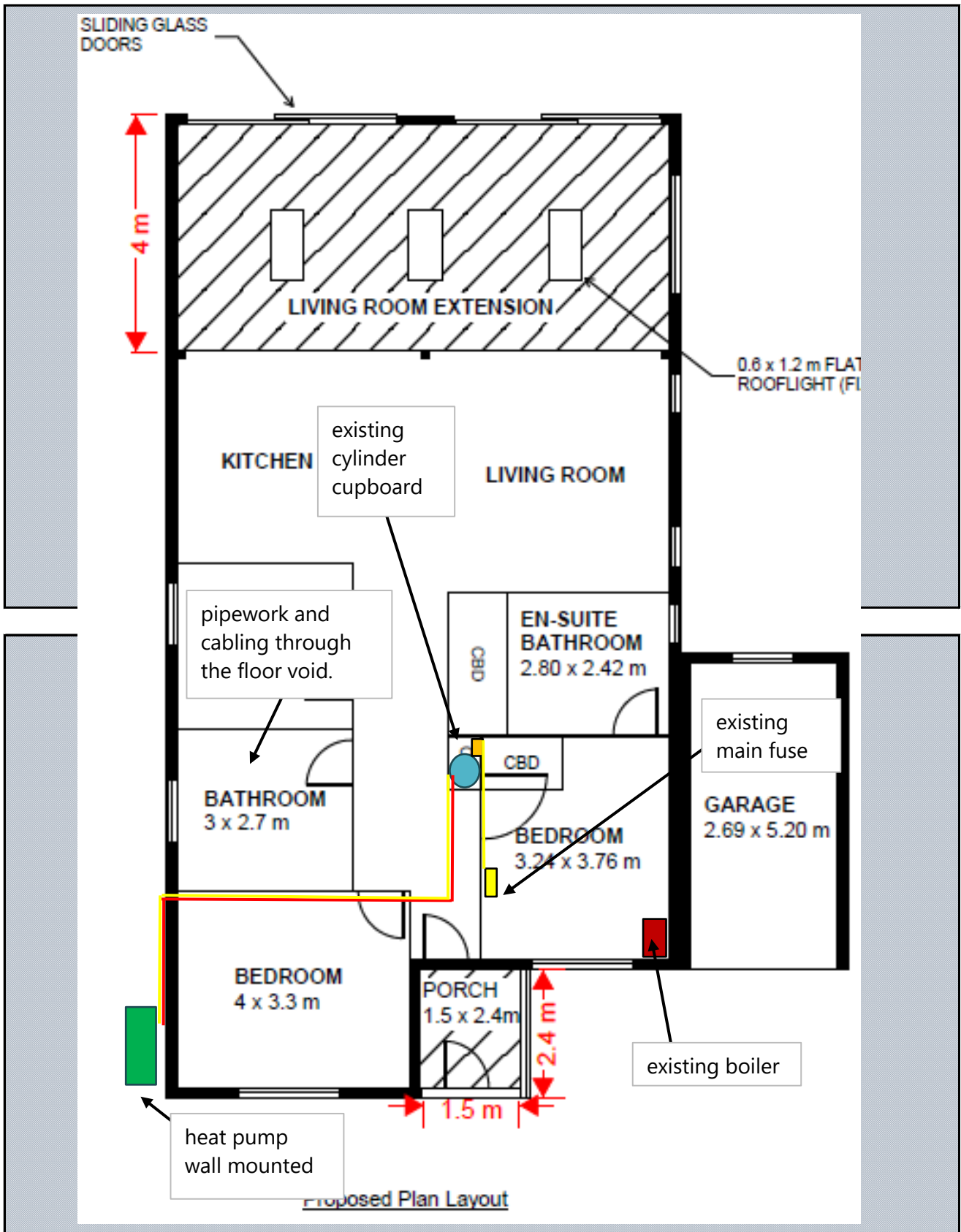
Customer's Responsibility

Please complete the following before the agreed installation date:

- Customer to lift floorboards to provide access for the installation of pipes/cables. Please see "Floorplans & Pictures" section for the specific route.
- Customer to clear installation space of all items and equipment. This must be completed before the first day of installation.
- Customer to upgrade the radiators in the property. New units must be sized according to the "Emitter Output Report" section of this report.
- Customer to install 1.8m solid wooden door/fence as a sound barrier to neighbouring window

By signing this box, you acknowledge that you have read through the <i>Customer's Responsibility</i> section, and understand that you are responsible for completing or providing all the items listed above before the date of installation.	Date		Signature	
	06 February 2024 11:58 GMT			
Please be aware: Should these items not be completed on the first day of installation there may be additional charges incurred.				

Floorplans & Pictures



Existing System

Existing heat source

Notes	Picture	
boiler to be decommissioned and removed		
Fuel type:		Gas
Existing plant removal:		Installer to remove
Flue removal:		No. On roof
Combination boiler reconstruction to hot water cylinder:	Not required	

Existing hot water storage

Notes	Picture	
Hot water cylinder to be removed and taken away.		
Existing unit removal:		Installer to remove
Header tank removal:		Only decommission
Disconnection of solar thermal pipework:	No solar thermal pipework	

Emitter Output Report

This section provides information regarding the minimum heat output that your emitters must be able to provide in order to heat the property and meet MCS standards.

- If your property has radiators, this report also contains an estimate of the existing performance of your units, and provides the information you need to size new ones if necessary.
- If rooms in your property have, or will have, underfloor heating (UFH), the UFH must have a minimum output that equals the heat loss in each room, while operating at the stated design mean water temperature given below.

The operating temperature of the emitters is called the mean water temperature (MWT). The emitter output table below provides information for three different MWTs. When sizing new radiators, we always recommend using the lowest MWT to increase operational efficiency and decrease costs.

Within each temperature group there are two sub-columns:

- 1) MCS output required: Radiator outputs in the industry are usually only provided for specific conditions (this is called DeltaT50 or DT50 radiator output). In these columns you can find the DT50 outputs that your emitters must be sized to for each room.
- 2) Existing units cover: This is a performance estimate for your existing radiators, when they operate at a specific MWT. This is given as a percentage. For example, 60% means that the existing radiator(s) provide only 60% of the required heat in that room.

Designed Mean Water Temperature:

50°C

Current emitter output in property (DT50):

0W

Recommended emitter output in property (DT50):

18402W

For a MWT of 50°C, the emitter output in the property must be increased by:

18402W

To meet MCS standards, the combined output of all radiators in the property must be equal to, or greater than, the Recommended property output.

This applies to the combined output of the property, not each room individually. However, we strongly recommend that each radiator is sized according to the room by room information provided below for a more uniform heat distribution throughout the building.

Noise Assessment

This assessment is prepared in accordance to MCS 020, The Planning Standard for air source heat pumps. This is to establish that the proposed location of the air source has a noise level lower than 42 dB (A) and would not require planning permission from the local authorities.

For the purpose of the calculation procedure the following notes have been issued:

- 1) Assessment position means an external point that is one metre away from the centre point of any door or window of a habitable room of a neighbouring property, measured perpendicularly to the plane of that door or window.
- 2) Habitable room means any room other than a bathroom, shower room, water closet or kitchen;
- 3) Neighbouring property means any building used for any of the purposes of Class C Town and Country Planning (Use Classes) Order 1987 (as amended) (includes dwelling houses, hotels, residential institutions and houses in multiple occupation). In instances where the air source heat pump would be installed on a block of flats, neighbouring property includes flats within the same block of flats (excluding the flat of the "owner(s)" of the air source heat pump).

Noise assessment calculation

Air source heat pump model:	EDLA11
Assessment position:	Neighbouring property
Relevative assessment property position:	Left Elevation
Assessment position - door or window:	Window
Distance to assessment position (m):	3

○ Sound Power Level

Sound Power is the total acoustical energy emitted by a sound source and is an absolute value. It is not affected by the environment or the location of the listener.

From manufacturers data, obtain the A-weighted sound power level of the heat pump. The highest sound power level specified should be used (the power in "low noise mode" should not be used).

Manufacturers data states the sound power levels are (dB(A)):

62



○ Sound Pressure Level

Sound pressure is what we hear. It is a pressure disturbance at a specific point in the atmosphere whose intensity is influenced not only by the sound power of the source, but also by the surroundings and the distance from the source to the point at which the sound is heard.

○ Determination of "Directivity"

The sound pressure level increases with the number of reflecting surfaces. A reflective surface is any surface (including the ground) within 1 metre of the air source heat pump.

Use "Sound Pressure level" and "Determination of directivity" to establish the directivity "Q" of the heat pump noise.

	Distance from heat pump (m)													
	1	1.5	2	3	4	5	6	8	10	12	15	20	25	30
Q2	-8	-11	-14	-17	-20	-21	-23	-26	-28	-29	-31	-34	-36	-37
Q4	-5	-8	-11	-14	-17	-19	-20	-23	-25	-26	-28	-31	-33	-34
Q8	-2	-5	-8	-11	-14	-16	-17	-20	-22	-23	-25	-28	-30	-31

Directivity:
Distance reduction (dB(A)):

Q4
-14.00

○ Barriers between the heat pump and the assessment position

A correction should be made for attenuation due to barriers between the air source heat pump and an assessment position. A correction will be necessary if an installer is unable to see an assessment position from the top edge of the air source heat pump. Use the following instructions to determine whether a correction is appropriate:

- 1) For a solid barrier (e.g. a brick wall or a fence) that completely obscures an installer's vision of an assessment position from the top edge of the air source heat pump attenuation of -10 dB may be assumed;
- 2) Where a solid barrier completely obscures an installer's vision of an assessment position from the top or side edges of the air source heat pump, but moving a maximum distance of 25cm in any direction to the air source heat pump allows an assessment position to be seen, attenuation of -5 dB may be assumed;
- 3) If it is possible for an installer to see any part of an assessment position from the top or side edges of an air source heat pump no attenuation may be assumed.

Barrier (wall/fence) between heat pump and assessment position:
Sound pressure level from the heat pump at the assessment position (dB(A)):

Yes
38.00



○ Background noise level

The MCS Planning Standard assumes a background noise level of 40 dB (A) for the purposes of the air source heat pump calculation procedure. A different value for background noise should not be used as part of this calculation procedure.

Background noise level (dB(A)):	40.00
Differential Noise (ASHP-Background, (dB(A))):	2.00
Decibel correction adjustment (dB(A)):	2.1

Resulting noise level

Noise Level dB(A)	Noise Assessment Summary
42.1	<p>The result is higher than the permitted noise development limit of 42 dB(A). Therefore, the air source heat pump will not comply with the permitted development noise limit for this assessment position and will not be permitted development (subject to compliance with other permitted development limitations/conditions and parts of the MCS 020 standard.) This installation may still go ahead if planning permission is granted by the local planning authority.</p>

Heat Pump System Performance Estimate



Installer Project Reference

Client Name

Installation Address Line 1

Installation Address Line 2

Installation Address Line 3

Installation Postcode

Energy Performance Certificate (EPC) Information

Does this estimate relate to a new build or proposal for extension or reduction in size of an existing building?

Yes

Estimate based on draft EPC

Energy required to heat property kWh

Energy required for hot water kWh

New Renewable System Information

Type of System*

Manufacturer Name

Manufacturer Model

MCS Certification Number*

Flow Temperature* °C

MCS SCoP Heating*

MCS SCoP Hot Water*

Renewable System Provides

*This calculator is not designed to be used for Solar Assisted Heat Pumps

*Available from the MCS Product Directory

* Determined by the temp. of the water leaving the HP when supplying space heating at the external design temp.

* SCoP - Seasonal Coefficient of Performance. This value is based on the MCS HP SCoP Table below

* If providing space heating and DHW then default value from SAP2012 (1.75). If DHW only see methodology in MIS3005

Hot Water Immersion Use* * based on 50C up to 60C, 3kW

Size of Hot Water Cylinder ltr

Existing Heating System

Existing heating system fuel*

Hot Water heated by*

Age of existing system

Efficiency of existing system %

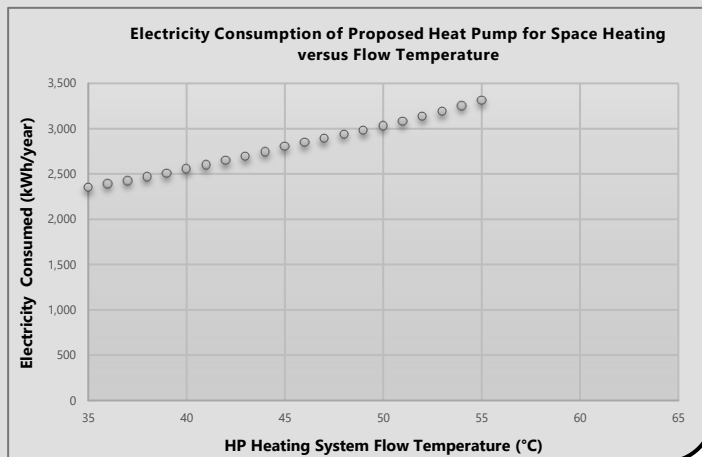
* If new build model the most likely alternative fuel

* If new build model the most likely alternative fuel

Estimated System Performance / Comparison

Energy Requirement for the building	Heating	Hot water	Total	
Net Energy required to heat property	10,788	2,635	13,423	kWh
Existing System Consumption	12,400	3,366	15,766	kWh
New HP System Estimated Consumption				
Full Heat Pump System (if selected above)				
HP System Electricity Consumption	3,030	1,615	4,645	kWh
Hybrid System (if selected above)				
HP System Electricity Consumption				kWh
Hybrid system other consumption				kWh
Hybrid Total Consumption	-	-	-	kWh

Note: There are different types of hybrid system. This calculation presumes a hybrid where both sources of heat supply the same hydraulic circuits (heating and hot water) according to the proportion selected above.



Flow temperature	SCoP
35°C	4.59
36°C	4.52
37°C	4.45
38°C	4.37
39°C	4.3
40°C	4.22
41°C	4.15
42°C	4.07
43°C	4
44°C	3.93
45°C	3.85
46°C	3.79
47°C	3.73
48°C	3.67
49°C	3.62
50°C	3.56
51°C	3.5
52°C	3.44
53°C	3.38
54°C	3.32
55°C	3.26
56°C	-
57°C	-
58°C	-
59°C	-
60°C	-
61°C	-
62°C	-
63°C	-
64°C	-
65°C	-

Cut and paste the heat pump's SCOP values for the relevant product from the MCS Product Directory ([here](#)) into the table to the left. Include SCOP data for the entire temperature range (35 °C - 65 °C) even if the SCOP is listed as '0'.

SCoP Definition

SCoP = Seasonal Coefficient of Performance:

MCS SCoP is a theoretical indication of the anticipated efficiency of a heat pump aggregated over a year using standard climate data across Europe. It indicates the units of total heat energy generated (output) for each unit of energy (electricity) consumed (input). It is slightly different to ErP SCOP as it contains efficiency losses due to controls and brine pumps (for a GSHP). As a guide a heat pump with a MCS SCoP of 3 generates 3 kWh of heat energy for every 1 kWh of electrical energy it consumes.

This also means that 2/3rds of the heat output could be eligible for RHI payments. MCS SCoP is based on stringent factory based tests for equipment but does not specifically include the energy consumption of heating circulating pump(s) nor does it model the transient conditions typically experienced in practice in the consumers home and hence the overall final system efficiency is likely to be different from the MCS SCoP.

Important Information:

This performance estimate should be accompanied by the Key Facts which explain the factors that can affect the performance of a heat pump.

Any technical variation to the specification could affect the performance of the Heat Pump System in which case the MCS Contractor MUST update and re-issue this document and advise the customer of their Consumer Rights.



Installation & Design Agreement

Between:

CB Heating Ltd
Stephenson Rd W
-
Clacton-On-Sea
Essex
CO15 4TL

And:

Amin Dadgari
40 Selhurst Road

Brighton
West Sussex
BN2 6WF

I confirm that I have read sections:

- | | | |
|--------------------------------------|---------------------------------|---|
| i Overview & Design | iv Floorplans & Pictures | vii Noise Assessment |
| ii Installation Sections | v Existing System | viii System Performance Estimate |
| iii Customer's Responsibility | vi Emitter Output Report | ix Disclaimers |

By signing:

- You confirm that the system locations stated within the methodology of installation section are correct to your preferences
- You confirm that you are aware that the installation at your property will proceed in accordance with the methodology stated on the installation section
- You confirm that you have recognised your [customer] requirements on the design feasibility page and agree with the completion before the installation dates, or within a reasonable time frame liaised between you and your designated administrator.
- You confirm you have understood the emitter report and any upgrades that are required/recommended. Upgrades are not an obligation before installation of a heat pump system.
- You confirm you have read the disclaimers and recognise implications that may arise.
- You are aware that there may be additional £500 Design consultancy charge, where a new installation-design consultancy begins. A new consultancy period is defined at the point where the installation-design pack has been composed and signed. Amendments required to details within the installation-design pack are advised to be done within the consultancy period to ensure the agreement of involved parties [Customer/CB Heating/HPIN Installer].

Name
Amin Dadgari

Signed

Dated
06 February 2024 11:58 GMT



Disclaimers

- Consent to agreed installation** Upon signing the design agreement, you confirm that you have reviewed the contents outlined in the Installation-Design pack provided by CB Heating Limited and give consent to the right of works to be carried out in accordance with the methodology that has been outlined in the installation notes of the installation-design pack document by a Heat Pump Installation Network approved installer.
- Radiator upgrades** The design outlined in the installation – design pack document states the leaving water temperatures that the system should operate on the coldest day of the year. The difference between the room temperature and emitter temperature value is the differential temperature (DT). Manufacturers state outputs in terms of DT50 on their specifications. CB Heating Ltd recommends that emitters are upgraded to the DT50 outputs for the relevant leaving water temperature on the emitter output report to ensure MCS standards are upheld.
- Operational consistency** Operational consistency of the electrical consumption and heating output of the air source heat pump system will vary based on the temperature, operational schedule times, and heating requirements of the dwellings occupant. Operational performance may not reflect the design of the system.
- System performance estimate** System performance estimates (SPE) are based on the BREDEM-12 Energy analysis methodology used to produce Energy Performance Certificates. The Rated seasonal coefficient of performance of the heat pump at the designed leaving water temperature is used with the data from the last Energy Performance certificate of a dwelling to produce an estimate. Alternative data from heat loss calculations are utilised if a Energy performance certificate is not available.
- Removal of existing gas boiler/appliance**
- i) We will be responsible for disconnecting, removing the appliance and capping the supply to your existing appliance/boiler only. This will be done to comply with Gas Safe Regulations.
 - ii) We CANNOT remove your gas meter and/or supply, you will need to contact you gas provider for this who may charge for this service.
- Existing pipework - performance**
- i) I acknowledge that CB Heating Ltd cannot guarantee the performance of the space heating circuit with existing pipework. This may result in the rooms within the property failing to meet their desired temperatures.
 - ii) I understand that CB Heating Ltd cannot account for any lack of lagging on existing pipework, and system efficiency loss because of heat dissipating from unlagged existing pipework.
- Existing pipework - defects and maintenance**
- i) I understand that CB Heating Ltd cannot be held liable for any defects that may arise with existing pipework or components not installed or worked on during the installation.
 - ii) I acknowledge that CB Heating Ltd is not responsible for the servicing, maintenance, or replacement of existing pipework.



Unvented cylinders

- i) I understand that CB Heating Ltd has advised that hot water cylinders in a pressurized (unvented) configuration require an annual service to ensure safe operation of the hot water cylinder.
- ii) I understand that switching from an unpressurized (vented) hot water system to a pressurized (unvented) hot water system may result in a reduced flow rate.
- iii) I understand that a pressurized (unvented) hot water system is incompatible with shower pumps and some power shower systems.

Permitted development rights and planning permission

- i) I understand that it is my responsibility to apply for Planning Permission with my local planning authority for the installation of an air source heat pump in the stated location where permitted development rights are not granted. In the event of uncertainty, I understand that it is my responsibility to apply for a lawful development certificate to confirm the granted development.
- ii) I understand that CB Heating Ltd is not responsible for my planning application.

Installation outside permitted development

- i) I understand that the installation of an air source heat pump in a location where permitted development rights are not granted is not the liability of CB Heating Ltd.
- ii) I acknowledge that the relocation or removal of the air source heat pump system where planning permission is required, and not obtained, will be my responsibility and CB Heating LTD is not liable for any costs involved.