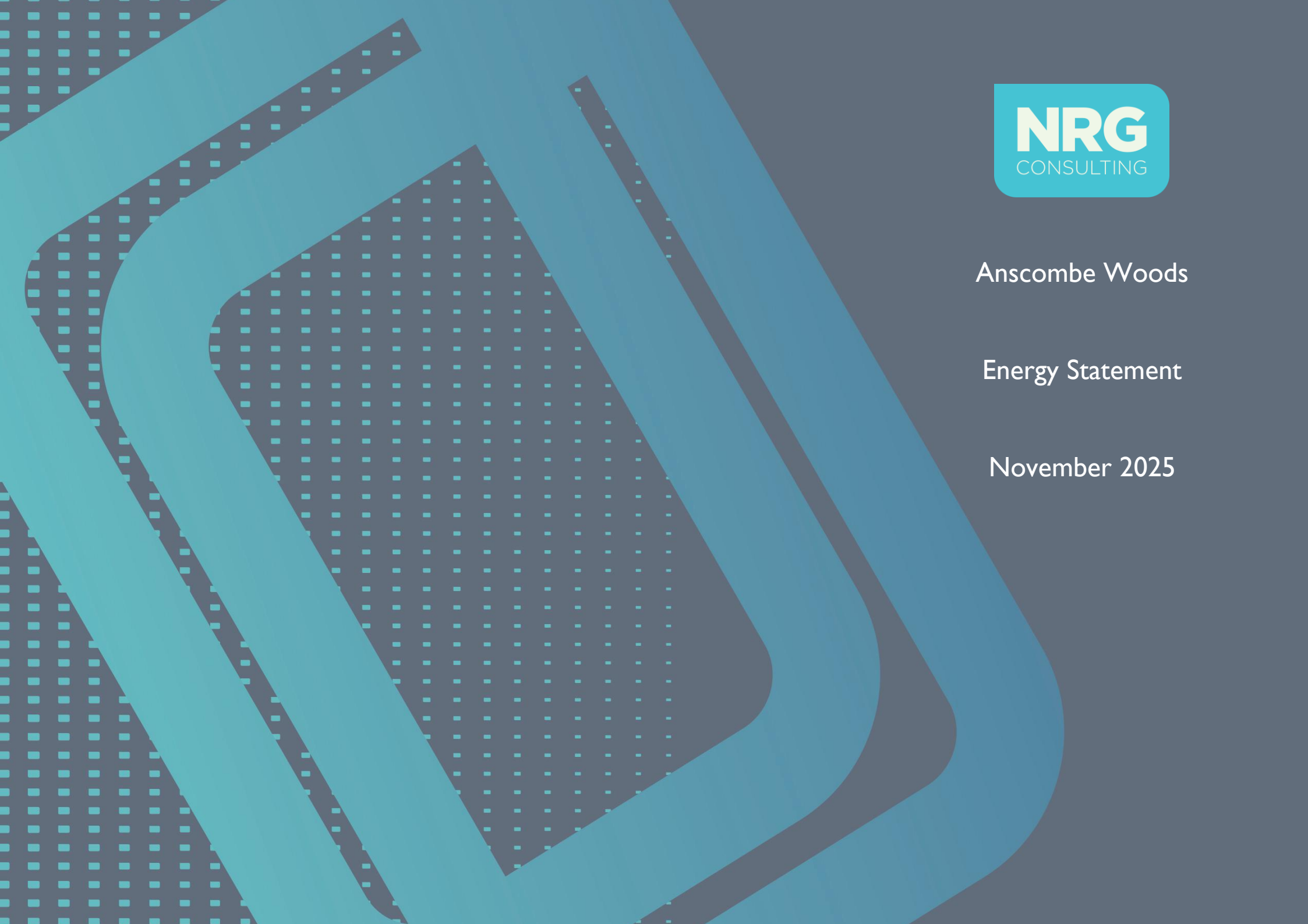

Anscombe Woods

Energy Statement

November 2025

CONTENTS

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Report Prepared For:	Antler Homes (Haywards Heath) Ltd
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1 Executive Summary

NRG Consulting have been commissioned to undertake an Energy & Sustainability Statement on a proposed development at **Anscombe Woods, Colwell Road, Haywards Heath, West Sussex, RH16.**

The proposed description of development is

The erection of two buildings to provide 6 no. 1 bed apartments and 2 no. 4 bed houses (total 8 units), with associated access, car parking, covered cycle parking, refuse store, and woodland management plan

This document illustrates a reduction in CO_2 emissions over Part L of the Building Regulations (2021) via:

Energy Efficiency

- U-Values have been set to maximise fabric efficiency and reduce energy demand.
- MVHR proposed for the apartments.
- High efficiency LED lighting to be supplied to all fittings
- A low Air Permeability target

Renewable Energy

The on-site provision of renewable energy has been prioritised and following a feasibility review, the following technologies will be provided:

- Air Source Heat Pump (Houses)
- Hot Water Heat Pumps (Apartments)

Overall, compliance with the requirements of the Local Authority have been exceeded and sustainable low carbon dwellings are proposed.

	CO_2 Emissions (Tonnes per Annum)
	Residential
Baseline: Part L 2021 of the Building Regulation (TER)	10.5
Final CO_2 Emissions of Proposed Development (DER)	4.5
CO_2 Savings over Part L 2021	56.92%

Table: Carbon Emissions Table

2 Policy Framework

The proposed development is classified as a **minor** development.

2.1 National Planning Policy Framework (NPPF) (2024)

Climate Change as a Material Consideration:

Paragraph 11: "Plans and decisions should apply a presumption in favour of sustainable development. For plan-making this means that: a) all plans should promote a sustainable pattern of development that seeks to: meet the development needs of their area; align growth and infrastructure; improve the environment; mitigate climate change (including by making effective use of land in urban areas) and adapt to its effects."

Paragraph 161: "The planning system should support the transition to net zero by 2050 and take full account of all climate impacts including overheating, water scarcity, storm and flood risks and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.

Paragraph 7: "The purpose of the planning system is to contribute to the achievement of sustainable development.

Emphasis on Renewable Energy Projects:

Paragraph 168: "When determining planning applications for renewable and low carbon development, local planning authorities should: a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions; and b) approve the application if its impacts are (or can be made) acceptable."

2.2 Local Planning Policy

Mid Sussex District Plan 2014-2031 (Adopted March 2018)

DP39: Sustainable Design and Construction

Strategic Objectives: 1) To promote development that makes the best use of resources and increases the sustainability of communities within Mid Sussex, and its ability to adapt to climate change. Evidence Base: Gatwick Sub Region Water Cycle Study; West Sussex Sustainable Energy Study, Mid Sussex Sustainable Energy Study.

All development proposals must seek to improve the sustainability of development and should where appropriate and feasible according to the type and size of development and location, incorporate the following measures:

- Minimise energy use through the design and layout of the scheme including through the use of natural lighting and ventilation;

- Explore opportunities for efficient energy supply through the use of communal heating networks where viable and feasible;

- Use renewable sources of energy;

- Maximise efficient use of resources, including minimising waste and maximising recycling/ re-use of materials through both construction and occupation;

- Limit water use to 110 litres/person/day in accordance with Policy DP42: Water Infrastructure and the Water Environment;

- Demonstrate how the risks associated with future climate change have been planned for as part of the layout of the scheme and design of its buildings to ensure its longer term resilience

DP40: Renewable Energy Schemes

Strategic Objectives: 1) To promote development that makes the best use of resources and increases the sustainability of communities within Mid Sussex, and its ability to adapt to climate change. Evidence Base: Gatwick Sub Region Water Cycle Study; Capacity of Mid Sussex District to Accommodate Development Study; Mid Sussex Landscape Capacity Study; Mid Sussex Sustainable Energy Study; West Sussex Sustainable Energy Study

Proposals for new renewable and low carbon energy projects (other than wind energy development – see below), including community-led schemes, will be permitted provided that any adverse local impacts can be made acceptable, with particular regard to:

• Landscape and visual impacts, including cumulative impacts, such as on the setting of the South Downs National Park and High Weald Area of Outstanding Natural Beauty, and the appearance of existing buildings;

• Ecology and biodiversity, including protected species, and designated and non-designated wildlife sites;

• Residential amenity including visual intrusion, air, dust, noise, odour, traffic generation, recreation and access. Assessment of impacts will need to be based on the best available evidence, including landscape capacity studies. Proposals for wind energy development involving one or more wind turbines will only be granted if:

• the development site is in an area identified as suitable for wind energy development in a Neighbourhood Plan; and

• following consultation, it can be demonstrated that the planning impacts identified by affected local communities have been fully addressed and therefore the proposal has their backing.

DP42: Water Infrastructure and the Water Environment

Development must meet the following water consumption standards:

• Residential units should meet a water consumption standard of 110 litres per person per day (including external water use);

• Non-residential buildings should meet the equivalent of a 'Good' standard, as a minimum, with regard to the BREEAM water consumption targets for the development type.

2.3 Part L of the Building Regulations (2021)

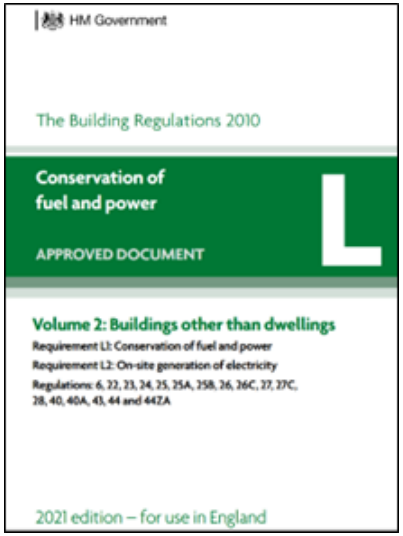
In July 2018 the then Department for Business Energy & Industrial Strategy (BEIS) published their proposed update to SAP 9.92 (Part L 2013), called SAP 10.

In June 2022, Part L 2021 of the Building Regulations came into force. As per the requirements, all new homes must produce 31% less CO_2 emissions than that of Part L 2013 in-order to achieve Building Regulation compliance.

One of the major changes in the regulations was the change in carbon factor of electricity to represent the decarbonisation of the National Grid and the push towards net-zero carbon developments.

Part L 2021 also introduced three targets for Part L compliance:

- TER Target Emission Rate
- TPER Target Primary Energy Rate
- TFEE Target Fabric Energy Efficiency



2.4 The Future Homes and Buildings Standard

In October 2019, the then Ministry of Housing, Communities and Local Government (MHCLG) issued a consultation on changes to Part L. Dubbed *The Future Homes Standard*, it was an aspiration to ensure all new homes will have low carbon heating and "world-leading levels of energy efficiency" by 2025 and was intended to be the primary driver in achieving the net-zero carbon commitment made by the Government.

On 13th December 2023, consultation documents were issued by the Department for Levelling Up, Housing and Communities for *The Future Homes and Buildings Standard*. While still at a consultation age, this document details potential scenarios in how new build dwellings and buildings in the UK will become *net-zero ready*. The published proposals however contain two options and the final choice will not be made until the end of 2025.

A separate consultation was published to discuss the withdrawal of the Standard Assessment Procedure (SAP) and replace it with a Home Energy Model (HEM).

Key points within the consultation document are:

- Removal of Gas Boilers from the Notional Dwelling Specification and;
- Fossil fuel-powered boilers in new buildings will be prohibited from 2025
- Further reduction in the carbon factor of electricity as the grid-decarbonises.
- Hybrid & hydrogen-ready boilers "will not meet the proposed standards"
- No major changes to M&E or Fabric requirements from Part L 2021.

Fuel	Part L 2013	Part L 2021	Part L 2025	Percentage Reduction
	($kg/CO_2/kWh$)	($kg/CO_2/kWh$)	($kg/CO_2/kWh$)	
Electricity	0.519	0.233	0.086	73.8%

Table: *Change in Carbon Factor for Electricity from Part L 2013 to Part L 2025*

3 Energy Calculations

3.1 Energy Calculations

To estimate the CO_2 emissions for the site, SAP calculations have been carried out by an accredited OCDEA Domestic Energy Assessor using Design SAP 10's online platform.

The baseline CO_2 emissions covered by Part L 2021 of the Building Regulations are expressed as the Target Emission Rate (TER) and the proposed actual emissions are the Dwelling Emission Rate (DER). These use the unit of measurement of kilograms of CO_2 per square-metre per annum ($kg/CO_2/m^2$). To calculate the overall proposed emissions, these figures can be multiplied by the size of the dwellings and/or site and this figure is presented in tonnes/annum. This is the figure expressed within this report.

This covers regulated carbon emissions from:

- Heating (and Cooling)
- Hot Water
- Lighting
- Auxiliary (Pumps and Fans)

3.2 Passive Design Measures

Passive measures utilised in the concept and development of the design include:

- High levels of insulation more than the Part L 2021 notional values.
- Orientation and site layout has been considered to reduce energy demand.
- Provision of cross-ventilation.
- A high-performance glazing system to reduce heat demand.

Construction Specification		
Element	**Part L1 Limiting U-Vales**	**Proposed U-Values (W/m^2K)**
Walls		
External Wall	*0.26 W/m^2K*	0.16 W/m^2K
Party Wall	*0.26 W/m^2K*	0 W/m^2K
Floors		
Ground Floor	*0.18 W/m^2K*	0.1 W/m^2K
Roof		
Main Roof	*0.16 W/m^2K*	0.1 W/m^2K
Openings		
Front Door	*1.6 W/m^2K*	1 W/m^2K
Windows	*1.6 W/m^2K*	0.8 W/m^2K
Air Permeability		
Houses: 5 $m^3/(hm^2)$ @50Pa	Flats: 3 $m^3/(hm^2)$ @50Pa	
Thermal Bridging		
Recognised Construction Details to suit construction and insulation		

Table: Proposed Fabric Specification

3.3 Active Design

The development will incorporate efficient building services to limit carbon emissions, including a zero-NO_x heating system, smart metering and the following measures:

Element	Proposed Details
Ventilation	**System 1 – Intermittent Extract Fans**
Ventilation Flow Rates	**N/A**
Heating	**Air Source Heat Pump**
Heating Controls	**Time and Temperature Zone Controls**
Heat Emitters	**Radiators**
Hot Water	**Hot Water Cylinder**
Hot Water Details	**250ltr (modelling purposes only)**
Lighting	**LED**
Cooling	**No**
WWHRS	**No**

Table*:* Proposed Mechanical and Electrical Specification - Houses

Element	Proposed Details
Ventilation	**System 4 – Mechanical Ventilation and Heat Recovery**
Ventilation Flow Rates	**SFP of 0.55w/l/s and 90% efficiency**
Heating	**Electric Panel Heaters**
Heating Controls	**Appliance Thermostat and Smart Controls**
Heat Emitters	**Radiators**
Hot Water	**Hot Water Heat Pump**
Hot Water Details	**170ltr (modelling purposes only)**
Lighting	**LED**
Cooling	**No**
WWHRS	**No**

Table*:* Proposed Mechanical and Electrical Specification - Apartments

3.4 Lighting

In-line with exceeding Part L minimum requirements, all residential light fittings will be Light Emitting Diodes (LEDs) with a luminous efficiency per circuit watt of at least 95 lumens/Watt.

All external lighting will have PIR sensors and dusk to dawn control.

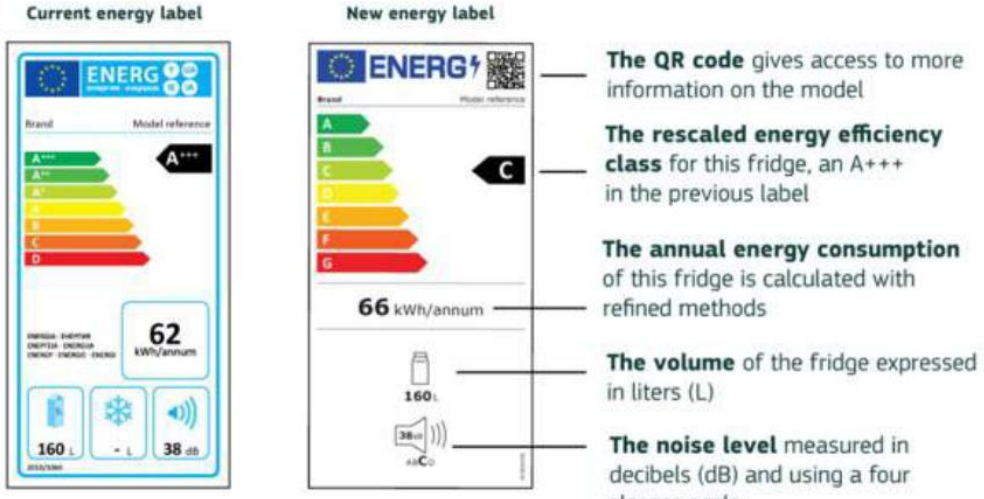
3.5 Unregulated Emissions

Unregulated energy use and their carbon emissions are from systems or processes that are harder to quantify than regulated emissions which are from fixed systems.

Unregulated energy is not counted within SAP for the purpose of Part L compliance. This is because the emissions from these items are variable and dependant on occupant behaviour and specification i.e. different levels of White Good provision and use and amount of small power equipment used.

For the proposed residential units, unregulated emissions consist of:

- Equipment (Small Power devices)
- Cooking
- External Lighting
- Appliances



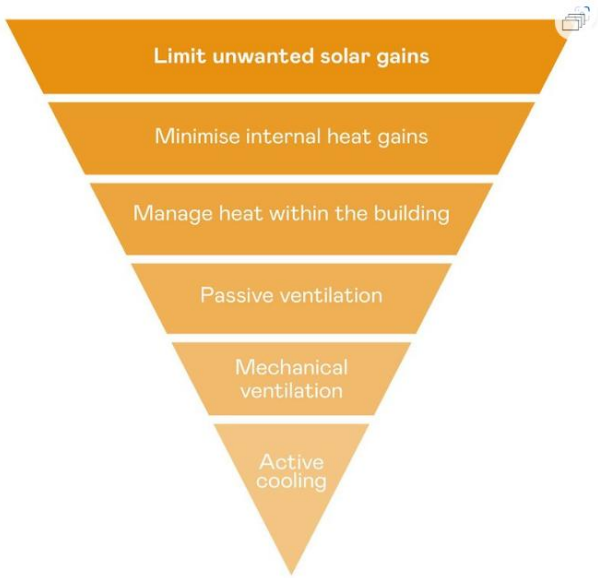
The energy labels for a fridge without freezer

3.6 Overheating

This development will be compliant with Part O of the Building Regulations and a full overheating assessment will be undertaken at RIBA Stage 4.

The scheme has been designed to avoid overheating with the early stages of the cooling hierarchy prioritised and with the following being major factors in mitigating potential risk:

- Individual heating is proposed thus no communal heat distribution to factor in.
- Windows are openable for the purpose of overheating management.
- Natural Ventilation is specified
- The site is not in a high-risk post code as per Part O.



Overheating Assessment

A full overheating assessment will be completed at RIBA stage 4

4 Renewable Energy

Renewable Energy is typically defined as:

"Energy derived from a source that is continually replenished, such as wind, wave, solar, hydroelectric and energy from plant material, but not fossil fuels or nuclear energy. Although not strictly renewable, geothermal energy is generally included."

As per Renewable Energy Directive (2018/2001/EU) aerothermal and hydrothermal technologies are also officially included within the definition.

Based on recent legislation including the *Clean Air Act* and *The Future Homes and Buildings Standards: 2023 consultation* as well as the location of the scheme, the following technologies have been discounted and are not discussed further:

- Wind Turbines
- Hydropower / Wave Technology
- Biogas / Biofuel / Biomass
- Hydrogen
- Hybrid Heat Pumps

The feasibility of remaining renewable and low carbon technologies has been undertaken based on the following parameters:

1. Practicality of installation of the technology
2. Energy demand profile for the project
3. Environmental impact & land use
4. Economic feasibility and overall payback (including available financial incentives)
5. Planning and regulatory issues i.e. conservation and heritage areas and aspects
6. Noise & aesthetic considerations

It should be noted that due to decarbonisation and the decrease in carbon factor for electricity, factors such as energy security and lowering running costs are deemed equal or more important to that of the offset of CO_2.

Photovoltaic Panels (PV)

The main benefit of PV has evolved in recent times from financial (Feed-In-Tariff era) to CO_2 offset (Part 2013) to currently providing a tangible saving on energy bills with a correctly sized and installed system. System costs have stabilised in 2025 after inflation rises and shipping costs and a domestic directly inverted system of 5kWp has a payback of around 5-7 years.

PV is best suited to large houses with a sufficient baseline energy demand in summer months that would then use the generated electricity within the dwelling. While there is a Smart Export Guarantee for kWh exported to the grid, it is significantly lower when compared to the cost of a kWh of electricity.

The CO_2 offset of PV in Part L 2025 is projected to be 36.76% less than Part L 2021 therefore carbon savings for the technology are set to diminish as the grid decarbonises.

The technology does benefits from having no noise implications and creates no additional land-use.

PV panels have not been specified here. It is important to respect the surroundings and maintain sympathetic aesthetics to the site and landlord supply PV does little to benefit the apartments. For the houses, PV achieves minimal carbon reduction under Part L 2021.

Solar Hot Water

Solar Hot Water can provide free hot water to a dwelling, mainly during the summer months thus it requires a high hot water demand to be at its most effective and offer a sufficient payback. However, when the dwelling is heated by a renewable source like an ASHP, this reduces the renewable energy generated due to an overlap in provision.

To avoid high pipework heat losses, it is recommended that pipe runs are as small as possible so usually the technology is recommended for houses and top floor dwellings only. The system also requires either a dedicated hot water cylinder or a dual-cylinder. In apartments where space is at a premium and an electric combi boiler is specified, this additional equipment would take up valuable storage space.

For this project, while not unviable, other technologies are preferred to achieve higher levels of carbon reduction within a quicker payback period along with the same aesthetic reasons as PV.

Ground Source Heat Pumps

Ground Source Heat Pumps (GSHP) differ from Air Source Heat Pumps in that they draw their heat from the ground rather than the air. This allows for both a more consistent temperature and higher efficiency given that in the winter months, the ground is warmer than the air. This allows the running costs of the system to be lower, although maintenance costs are higher.

To install a GSHP, you either need to install a ground-loop (s*linky)* system or to have deep boreholes installed during the piling phase of the scheme. The introduction of boreholes comes at significant capital cost, especially for schemes where raft or strip foundations are proposed so unless a significant amount of land is available then this can make the capital cost prohibitive.

GSHPs are more suited to very large dwellings and for dwellings where piling is required (which is unlikely to be the case here). Combined with the external units noisier and less aesthetic than air source and with a SCOP difference lower than in the past due to more advance in ASHP technology than GSHP, an Air Source Heat Pump is preferred.

Air Source Heat Pumps

Air Source Heat Pumps (ASHP) for domestic use are a fast-maturing technology and heat pumps are the primary policy driver for the commitment to meet net-zero by 2050. It is a renewable technology that produces circa 3 units of electricity for each unit consumed from the National Grid (300% efficiency / a coefficient of performance (COP) of 3). With the continued decarbonisation of the grid, associated carbon emissions with the system are projected to continually decrease in the near to medium term.

Domestic ASHP models have advanced in recent years, being integrated with smart technology features like app control, IoT integration and voice assistant compatibility. Noise levels have dropped to where they can be below the level where planning permission is required (permitted development) and their aesthetic has softened. They can also work at higher efficiency at lower temperatures than a decade ago, especially when paired with underfloor heating.

While efficiency at freezing temperatures is still an issue, this has been improving slowly over the past decade. Capital cost is still much higher than Gas or Electric boilers but it is hoped that economies of scale will improve the competitive in the short term.

Overall, an ASHP is the most feasible renewable technology for a standard house currently.

Exhaust Air Heat Pumps

Exhaust Air Heat Pumps (EAHP) are similar but provide heating, hot water and ventilation in a large all-internal unit. However, these are suited to Passivhaus style developments or small apartments as the units have a very low heat output (<2kW) so if not, need to be supplemented with electric panel heaters. They also have noise considerations and ease-of-maintenance is unknown as a new technology in England.

Based on the proposed apartments having MVHR and a smaller floor area, hot water heat pumps are more suitable due to the higher hot water demand.

Table: Renewable Energy Feasibility

Renewable Energy Tariffs

For new-build developments within England, there are no grants available for the installation of renewable technologies. Previous schemes such as the Feed-In-Tarriff (FiT) and Renewable Heat Incentive (RHI) are now closed to new applications.

The only scheme available is the Smart Export Guarantee for PV systems, administered through utility companies where a small payment for exported energy is paid.

Feasibility Conclusion

Following our review, the following have been integrated into the scheme:

- Air Source Heat Pump (Houses)
- Hot Water Heat Pump (Apartments)

4.1 Air Source Heat Pumps (Individual)

Air Source Heat Pumps (ASHPs) are designed to extract heat from the external air, a process that is effective even during colder conditions. Despite low temperatures, the air contains heat energy that can be utilised. Through a refrigerant system, ASHPs absorb this ambient heat at a lower temperature, use a compressor to increase its temperature, and subsequently transfer the elevated heat via a heat exchanger into the building's heating system. The functionality of ASHPs is based on refrigerant, which easily transitions between liquid and gaseous states. During the evaporation process, the refrigerant absorbs heat; when it is compressed and condensed back into a liquid, it releases heat.

Scheme Proposals

At this early stage, an indicative Air Source Heat Pump has been modelled for the purpose of Part L compliance based on the estimated kW output and by using a common manufacturer that performs averagely in the SAP software. This is due to a SAP default ASHP causing a disproportionately poor result that would not be reflective of the final schemes potential carbon savings.

A final make & model will be supplied during M&E design at RIBA Stage 3 / 4.

ASHP System Details	
Number of Heat Pumps	1
Size of Heat Pumps	Circa 7 kW (to be specified by system designer)
Provides	Space Heating and Hot Water
Make and Model	Vaillant aroTHERM (for SAP modelling purposes)
SCOP	TBC depending on model but in excess of 3 (300%)
External Unit Location	Rear Garden

Table: Proposed ASHP Specification

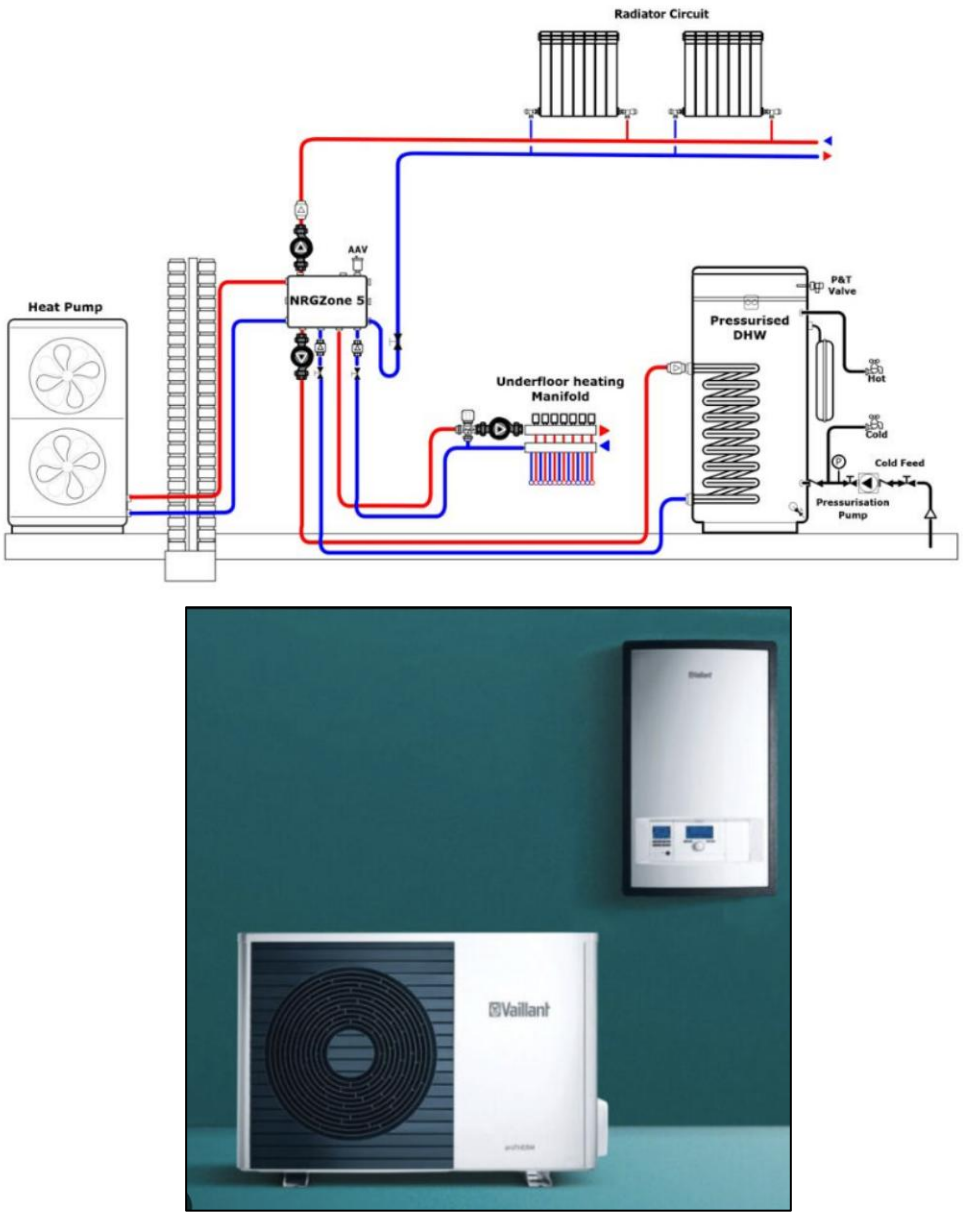


Figure: Proposed Site Plan

4.2 Hot Water Heat Pumps

Due to the logistical and suitable space challenges in providing external Heat Pump units for apartments, a Hot Water only Heat Pump (HWHP) system has been proposed.

New-build dwellings built to Part L 2021 requirements are highly-insulated and heating demand is often confined to small periods of winter only and thus hot water demand is larger when calculated over an entire year.

A HWHP system has the benefits of:

- Consumes five times less electricity than standard electric water heated cylinders.
- COP of between 2,85 and >3.2 and ErP label of A+
- Fully time and temperature programmable with boost, holiday and other functions.
- Internet-connected smartphone app connectivity via being RF enabled
- Very quiet: soundproof housing, variable speed fan and anti-vibration mounting pads
- Uses “natural” refrigerant (R290) with a GWP of 3 and an ODP of 0.
- Compact unit fitting standard service cupboards for simpler space design
- In-built legionella protection control function to ensure safe hot water supply

Hot Water Heat Pump System Details	
Number of HWHP	1 per Apartment
Make and Model	Dimplex Edel 170ltr
Dimensions	Ø520 x 1760 high + (300 to 556)

Table: Proposed HWHP Specification - Apartments

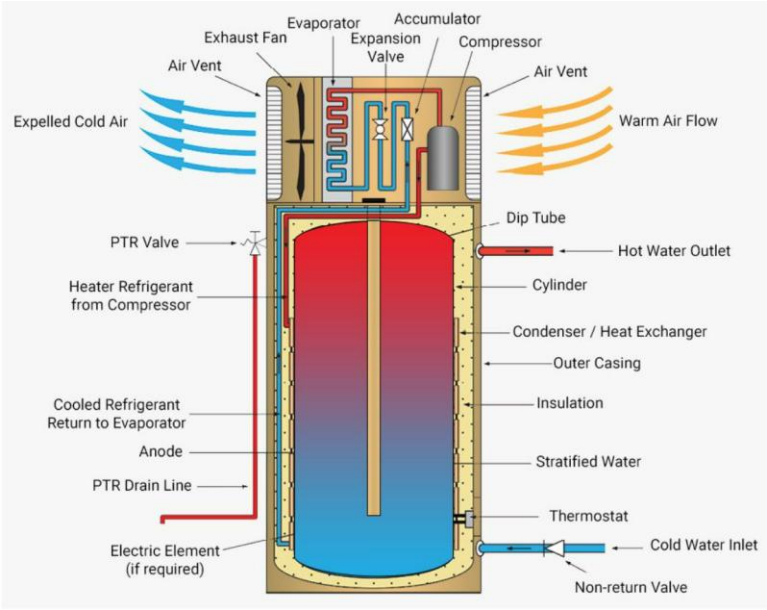
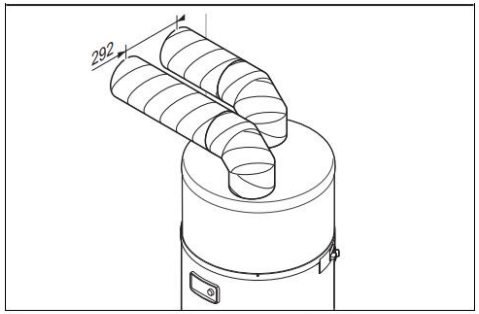


Figure: HWHP Specification



This installation type is particularly suitable for small rooms (supply or store room, etc.).

Figure : HWHP Specification

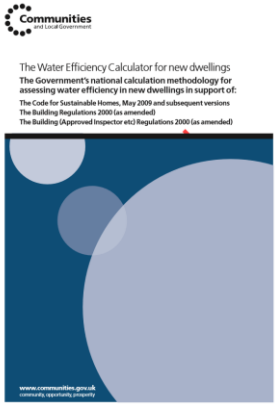
5 Water Efficiency

Part G of the Building regs requires that all developments must incorporate water conservation to ensure a maximum internal water consumption rate of 110 litres/per person/per day (with an additional external water allowance of 5 litres).

This target is the same as the optional target included within Part G of the Building Regulations which encourages the efficient use of potable water. The specification proposed has been produced using the calculation methodology used to assess compliance against the water performance targets in Building Regulations 17.K and is based on the Government's *"The Water Efficiency Calculator for new dwellings – September 2009"* (withdrawn in June 2016).

The current guidance and calculation methodology can now be found within *Approved Document G - Sanitation, hot water safety and water efficiency* (2015 edition with 2016 amendments):
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/504207/BR_PDF_AD_G_2015_with_2016_amendments.pdf

The proposed specification for the scheme can be found on the right-hand side of the page. For the Dishwashers and Washing Machines, default consumption figures have been used.



Proposed Sanitaryware Specification		
Element	**Specification**	**Unit of Measurement**
WC	***6/3 dual flush***	*Litres per Flush*
Basin Taps	***5***	*Litres per Minute*
Kitchen Sink Taps	***9***	*Litres per Minute*
Shower	***8***	*Litres per Minute*
Bath	***155***	*Capacity to Overflow*
Washing Machine	***8.17***	*Litres per Kilo (Dry)*
Dishwasher	***1.25***	*Litres per Place Setting*
Allowance for External Use	5	*(Litres / Person / Day)*
Total Consumption (Litres / Person / Day)		**109.7**

Table: Proposed Water Consumption (litres/person/day)

6 Sustainability Measures

6.1 Materials

When considering minimising the environmental impact of materials this requires the specification of materials with a low environmental impact across their lifetime. The BRE's Green Guide rating system focuses on the major building element build ups of the roof, external walls, internal walls, upper and ground floor and windows and rates each element from A+ to E across a range of environmental factors.

All timber products used on the project, including site as well as construction timber, will be legally harvested and traded timber. No products used in the development should be included on the CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) list.

Additionally, all timber and timber-based products should be procured from suppliers and manufacturers who can provide full Chain of Custody certification for their corresponding products.

Insulation

The insulation for the scheme has been generally specified as Mineral Wool or such based variants. Benefits of such insulation is:

- Offers ever decreasing thermal conductivity with new product launches.
- Achieves an A+ rating as per the BRE Green Guide.
- All major manufacturers are ISO14001 and BES6001 compliant.
- Has zero ozone depletion potential (ODP) and global warming potential (GWP).
- Possesses BBA certification and;
- Compliant with Part B of the Building Regulations.

Healthy Homes and Low VOC finishes

As well as minimising the wider environmental impact that the materials specified have, material selection will ensure a healthy local environment and good indoor air quality.

The project will specify low VOC paints, varnishes and adhesives.

Environmental performance declarations (EPDs)

Construction material manufacturers are now producing Environmental Performance Declarations (EPDs) which show the embodied carbon associated with the lifecycle of the product, in line with the life cycle assessment ISO standards.

Construction materials will be selected based on EPD declarations as practicable.

Embodied Carbon

A substantial part of the environmental impact associated with the development will be the embodied carbon of its materials. This includes carbon emissions due to raw material extraction, as well as emissions from the manufacturing process and transportation of the material up to its arrival onsite.

Although an in-depth embodied carbon assessment has not been undertaken there are some high-level considerations that can lead to a significant reduction in embodied carbon. These are:

- **Concrete** – No large-scale concrete elements in build.
- **Steel** – target >25% recycled content (if possible)
- **Brick** – inherently have low embodied carbon compared to other cladding materials (concrete, metal, etc). Locally sourced bricks and mortar will be prioritised.

Green Guide to Specification

The BRE Green Guide to Specification provides an environmental rating system for common building materials and components based on life cycle assessment (LCA). It evaluates the overall environmental impact of materials from manufacture to disposal, considering factors such as resource use, energy consumption, pollution, and waste generation.

Materials are rated on a scale from A+ (lowest environmental impact) to E (highest), helping designers make informed choices that reduce embodied impacts. While now largely superseded by more detailed life cycle carbon assessment methods, the Green Guide remains a useful reference for identifying lower-impact material options and supporting sustainable specification decisions.

The scheme achieves the following Green Guide ratings based on

Element	Green Guide
External Wall	806170615 – A+ Rated
External Wall	1206490022 – A+ Rated
Internal Wall	809760002 – A Rated
Ground Floor	820100048 – D Rated
Upper Floor	807280016 – B Rated
Roof	812410026 – A Rated
Windows	1213100004 – A Rated

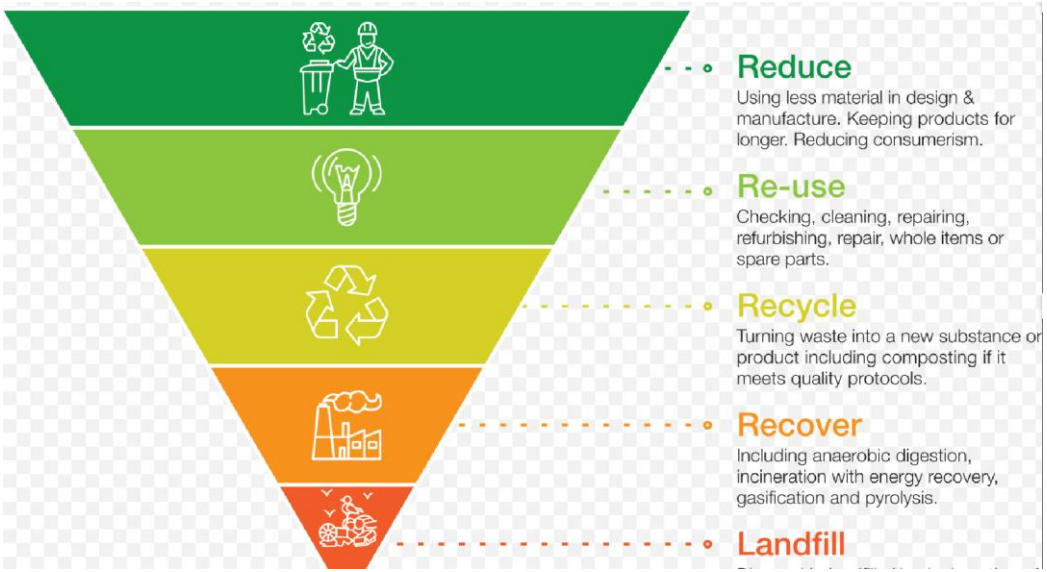
Overall, five main elements achieve between A+ and C.

6.2 Construction Waste Management

A Site Waste Management Plan (SWMP) will be implemented during construction which will aim to reduce waste generation and target a diversion rate from landfill of up to 95% for non-hazardous construction waste.

Opportunities will be investigated to minimise and reduce waste generation in line with the Waste and Resources Action Programme (WRAP) “Halving Waste to Landfill” initiative by:

- Liaising material suppliers to reduce the amount of packaging
- Implementing a ‘just in time’ material delivery system to avoid materials being stockpiled, which increases the risk of their damage and disposal as waste;
- Prioritising preassembled and prefabricated construction materials.
- Paying attention to material quantity requirements to avoid over ordering
- Segregating waste at source where practical;



7 Conclusion

An energy assessment has been undertaken on the proposed scheme in-line with the requirements of the Local Authority. These calculations illustrate a reduction in CO_2 emissions over the baseline of Part L via:

Energy Efficiency Measures

- Thermal insulation specified to achieve U-Values lower than the Part L 2021 notional.
- LED Lighting with high luminous efficacy (lm/W) will be provided to all fittings.
- MVHR proposed for the apartments.

Renewable Technologies

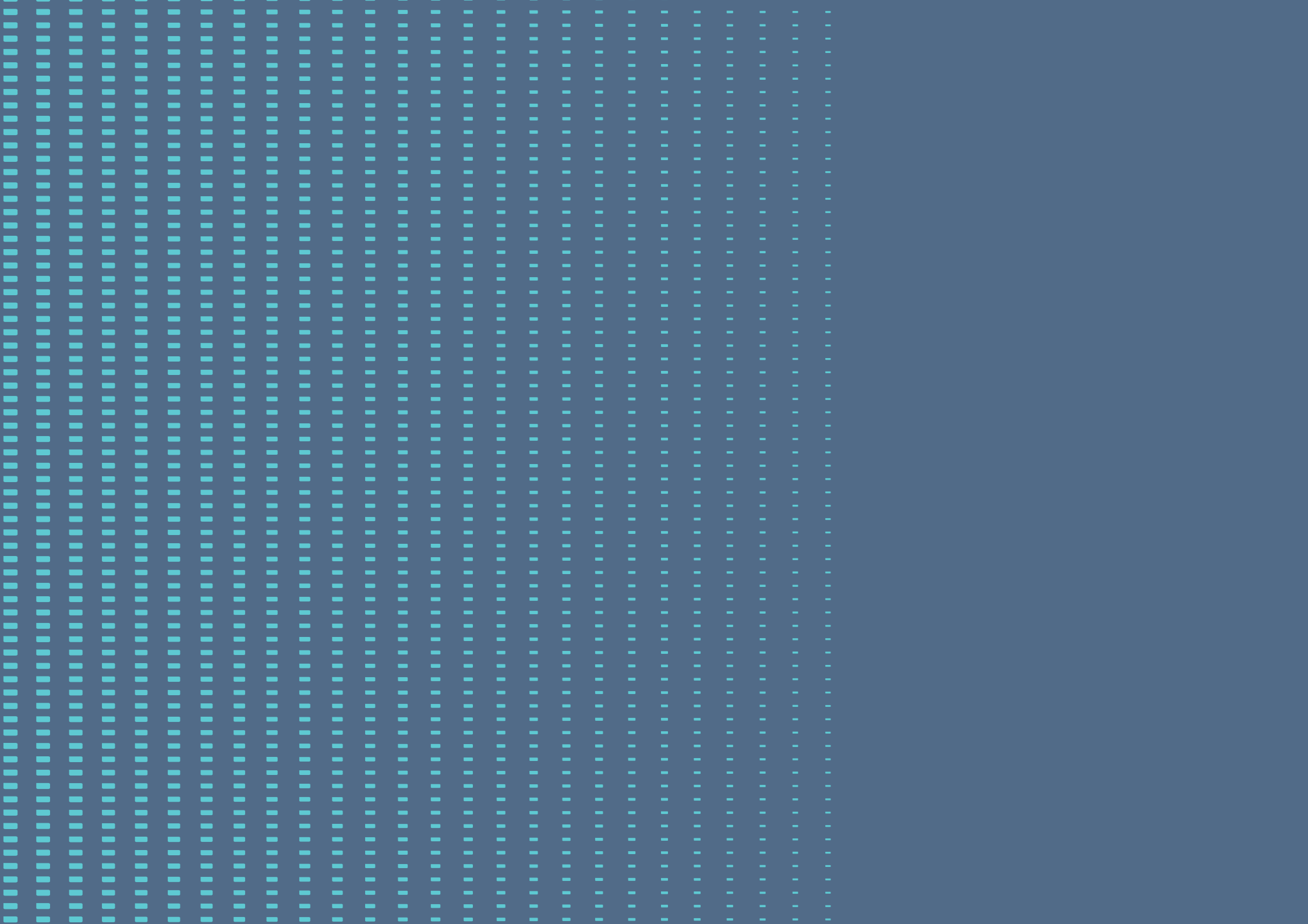
A feasibility on renewable technologies has been undertaken and the following systems are proposed for the scheme:

- Air Source Heat Pump
- Hot Water Heat Pumps

Overall, compliance with the requirements of the Local Authority have been exceeded and a sustainable low carbon dwelling is proposed.

	CO_2 Emissions (Tonnes per Annum)
	Residential
Baseline: Part L 2021 of the Building Regulation (TER)	10.5
Final CO_2 Emissions of Proposed Development (DER)	4.5
CO_2 Savings over Part L 2021	56.92%

Table: Carbon Emissions Table



Appendix 1

Project: Anscombe Woods Crescent

Plots	Floor Area	Target Emissions (TER) *Part L Baseline*	Total TER	Final Dwelling Emission Rate *(DER)*	Final DER Part L 2021
	m^2	$kg/CO_2/m^2/year$	$kg/CO_2/year$	$kg/CO_2/m^2/year$	$kg/CO_2/year$
House (Plot 1)	150	9.51	1,427	3.73	560
Flat (Plot 1)	51.5	12.56	647	5.86	302
Flat (Plot 2)	51	10.01	511	4.94	252
Total Site Area Assessed (m^2):	150		2,584		1,113
		$1m^2$ TER	*17.23*	*$1m^2$ DER*	*7.42*
Total Site Area (m^2):	612	Total	10,542	Total	4,542

Baseline			Overall Results - Part L 2021		
Baseline Emissions (TER) - Total Site	10,542	$kg/CO_2/year$	Final CO_2 Emissions	4,542	$kg/CO_2/year$
Unregulated Energy - Total Site	2,400	$kg/CO_2/year$	CO_2 Savings over Part L 2021	56.92	%

Overall Results - Carbon Savings		
Total CO_2 savings over Part L 2021	6,000	$kg/CO_2/year$

Appendix 2

Summary for Input Data

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Property Reference	Plot 1	**Issued on Date**	21/10/2025
Assessment Reference	001	**Prop Type Ref**	
Property			

SAP Rating	82 B	**DER**	3.73	**TER**	9.51
Environmental	96 A	**% DER < TER**			60.78
CO_2 Emissions (t/year)	0.52	**DFEE**	37.12	**TFEE**	38.40
Compliance Check	See BREL	**% DFEE < TFEE**			3.33
% DPER < TPER	21.59	**DPER**	38.91	**TPER**	49.62

Assessor Details	Mrs. Samantha Cable	**Assessor ID**	Q741-0001
Client	NRG Consulting , Ryan Thrower		

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Semi-Detached	
2.0 Number of Storeys	3	
3.0 Date Built	2025	
4.0 Sheltered Sides	1	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	165.52	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	24.40 m	58.90 m²	2.40 m
1st Storey:	21.20 m	55.80 m²	2.65 m
2nd Storey:	21.70 m	35.50 m²	2.52 m

8.0 Living Area	17.85	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall Brick	Cavity Wall	Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure	0.16	110.00	58.56	43.37	0.00	None	15.20	Enter Gross Area
External Wall Board	Cavity Wall	Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure	0.16	110.00	100.53	87.68	0.00	None	12.86	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Double plasterboard on both sides, twin timber f rame with/without sheathing board	0.00	20.00	54.23		None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Block	Plasterboard on timber frame	9.00	76.32
Stud	Plasterboard on timber frame	9.00	163.15

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Main Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.12	9.00	25.67	25.67	None	0.00	Enter Gross Area	0.00
Sloped Roof	External Slope Roof	Plasterboard, insulated slope	0.16	9.00	13.91	10.81	None	0.00	Enter Gross Area	3.10

Summary for Input Data

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10.2 Internal Ceilings

Description	Storey	Construction	Area (m²)
Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	55.80
Internal Ceiling 2	+1	Plasterboard ceiling, carpeted chipboard floor	35.50

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Ground Floor	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.12	None	0.00	75.00	58.90

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1		Plasterboard ceiling, carpeted chipboard floor	18.00	55.80
Internal Floor 2		Plasterboard ceiling, carpeted chipboard floor	18.00	35.50

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows/French/Bifolds	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40
Door	Manufacturer	Half Glazed Door	Double Low-E Soft 0.1			0.63		0.70	1.40
Roof Light	Manufacturer	Roof Light	Double Low-E Soft 0.1			0.63		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
D01	Door	External Wall Brick	West	2.10	
D02	Windows/French/Bifolds	External Wall Board	East	5.57	
W01	Windows/French/Bifolds	External Wall Brick	West	2.62	
W02	Windows/French/Bifolds	External Wall Brick	West	0.53	
W03	Windows/French/Bifolds	External Wall Board	West	2.16	
W04	Windows/French/Bifolds	External Wall Board	West	0.81	
W05	Windows/French/Bifolds	External Wall Brick	East	1.22	
W06	Windows/French/Bifolds	External Wall Board	East	2.16	
W07	Windows/French/Bifolds	External Wall Board	East	2.16	
W08	Windows/French/Bifolds	External Wall Brick	North	1.95	
W09	Windows/French/Bifolds	External Wall Brick	North	0.75	
W10	Windows/French/Bifolds	External Wall Brick	North	0.75	
W11	Windows/French/Bifolds	External Wall Brick	North	0.75	
W12	Windows/French/Bifolds	External Wall Brick	North	0.75	
W13	Windows/French/Bifolds	External Wall Brick	East	0.68	
W14	Windows/French/Bifolds	External Wall Brick	West	0.68	
W15	Windows/French/Bifolds	External Wall Brick	North	0.68	
W16	Windows/French/Bifolds	External Wall Brick	South	0.68	
W17	Windows/French/Bifolds	External Wall Brick	North	1.08	
RL1	Roof Light	Sloped Roof	East	1.03	0
RL2	Roof Light	Sloped Roof	East	1.03	0
RL3	Roof Light	Sloped Roof	East	1.03	0

14.0 Conservatory None

15.0 Draught Proofing 100 %

16.0 Draught Lobby No

17.0 Thermal Bridging Calculate Bridges

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E2 Other lintels (including other steel lintels)	Independently assessed	19.55	0.07	0.07	Yes
E3 Sill	Independently assessed	18.55	0.02	0.02	Yes
E4 Jamb	Independently assessed	53.70	0.02	0.02	Yes
E5 Ground floor (normal)	Independently assessed	24.40	0.07	0.07	Yes
E6 Intermediate floor within a dwelling	Independently assessed	21.22	0.00	0.00	Yes
R11 Upstands or kerbs of rooflights	Table K1 - Default	12.30	0.24	0.24	Yes
E11 Eaves (insulation at rafter level)	Independently assessed	12.10	0.02	0.02	No
E13 Gable (insulation at rafter level)	Independently assessed	4.53	0.04	0.04	No
E16 Corner (normal)	Independently assessed	23.15	0.04	0.04	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	9.60	-0.08	-0.08	No
E18 Party wall between dwellings	Independently assessed	12.65	0.04	0.04	No
E24 Eaves (insulation at ceiling level - inverted)	Table K1 - Default	3.20	0.15	0.15	No
P1 Party wall - Ground floor	Independently assessed	9.50	0.06	0.06	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	9.50	0.00	0.00	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	2.30	0.03	0.03	No
E12 Gable (insulation at ceiling level)	Independently assessed	6.40	0.04	0.04	No
R4 Ridge (vaulted ceiling)	Table K1 - Default	5.85	0.12	0.12	No

Y-value 0.04 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present: No

20.0 Fans, Open Fireplaces, Flues

Summary for Input Data

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Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	4	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	Yes	
Designed AP_{50}	5.00	$m^3/(h.m^2)$ @ 50 Pa
Test Method	Blower Door	

22.0 Lighting

No Fixed Lighting: No

Name	Efficacy	Power	Capacity	Count
Lighting 1	95.00	10.00	950.00	50

24.0 Main Heating 1	Database	
Percentage of Heat	100.00	%
Database Ref. No.	104432	
Fuel Type	Electricity	
In Winter	278.02	
In Summer	176.33	
Model Name	aroTHERM plus 7kW + AI	
Manufacturer	Vaillant Group UK Ltd	
System Type	Heat Pump	
Controls SAP Code	2207	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Enter value	
Flow Temperature Value	45.00	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Cold Water Source	From mains

Summary for Input Data

Bath Count	1	
Immersion Only Heating Hot Water	No	

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system + pump	9.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.61	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	
31.0 Thermal Store	None	
34.0 Small-scale Hydro	None	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement SAP rating	Environmental Impact
	£4,000 - £7,000	£103	B 83	A 97
	£8,000 - £10,000	£280	B 88	A 97
			0	0

Summary for Input Data

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Property Reference	Flat 1	**Issued on Date**	21/10/2025
Assessment Reference	001	**Prop Type Ref**	
Property			

SAP Rating	80 C	**DER**	5.86	**TER**	12.56
Environmental	96 A	**% DER < TER**			53.34
CO_2 Emissions (t/year)	0.28	**DFEE**	31.74	**TFEE**	45.71
Compliance Check	See BREL	**% DFEE < TFEE**			30.56
% DPER < TPER	7.56	**DPER**	62.07	**TPER**	67.15

Assessor Details	Mrs. Samantha Cable	**Assessor ID**	Q741-0001
Client	NRG Consulting , Ryan Thrower		

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	North	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Ground-floor flat	
Which Floor	0	
2.0 Number of Storeys	1	
3.0 Date Built	2025	
4.0 Sheltered Sides	1	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	289.21	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	31.90 m	51.45 m²	2.60 m

8.0 Living Area	26.20	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall	Cavity Wall	Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure	0.16	110.00	58.24	50.04	0.00	None	8.20	Enter Gross Area
Sheltered Wall	Cavity Wall	Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure	0.16	110.00	24.70	24.70	0.00	None	0.00	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Double plasterboard on both sides, twin timber f rame with/without sheathing board	0.00	20.00	6.37		None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Stud	Plasterboard on timber frame	9.00	68.38

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Precast concrete plank floor (screed laid on insulation), carpeted	30.00	51.45

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)

Summary for Input Data

Ground Floor	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.12	None	0.00	75.00	51.45

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows/French/Bifolds	Manufacturer	Window	Triple Low-E Soft 0.1			0.57		0.70	0.80

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
D02	Windows/French/Bifolds	External Wall	North	2.73	
W01	Windows/French/Bifolds	External Wall	North	0.95	
W02	Windows/French/Bifolds	External Wall	East	0.95	
W03	Windows/French/Bifolds	External Wall	South	0.95	
W04	Windows/French/Bifolds	External Wall	South	2.03	
W05	Windows/French/Bifolds	External Wall	South	0.60	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	

17.0 Thermal Bridging	Calculate Bridges	

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E2 Other lintels (including other steel lintels)	Independently assessed	5.95	0.07	0.07	Yes
E3 Sill	Independently assessed	5.95	0.02	0.02	Yes
E4 Jamb	Independently assessed	23.50	0.02	0.02	Yes
E5 Ground floor (normal)	Independently assessed	31.90	0.07	0.07	Yes
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	31.90	0.04	0.04	No
P1 Party wall - Ground floor	Independently assessed	2.45	0.06	0.06	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	2.45	0.00	0.00	No
E16 Corner (normal)	Independently assessed	23.40	0.04	0.04	No
E18 Party wall between dwellings	Independently assessed	2.60	0.04	0.04	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	13.00	-0.08	-0.08	No

Y-value	0.03	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500167
Configuration	2
Manufacturer SFP	0.55
Duct Type	Rigid
MVHR Efficiency	92.00
Wet Rooms	2
SFP from Installer Commissioning Certificate	Yes
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0
Number of passive vents	0
Number of flueless gas fires	0

Summary for Input Data

elmhurst energy

21.0 Fixed Cooling System	No	
22.0 Pressure Testing	Yes	
Designed AP_{50}	3.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	95.00	10.00	950.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	170.00	
Controls SAP Code	2603	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	
SAP Code	941	
Fuel Type	Electricity	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	No	
Cold Water Source	From mains	
Bath Count	1	

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Combi boiler or unvented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.61	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	
31.0 Thermal Store	None	
34.0 Small-scale Hydro	None	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Summary for Input Data

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
			0	0
			0	0
			0	0

Summary for Input Data

elmhurst energy

Property Reference	Flat 2	**Issued on Date**	21/10/2025
Assessment Reference	001	**Prop Type Ref**	
Property			

SAP Rating	83 B	**DER**	4.94	**TER**	10.01
Environmental	97 A	**% DER < TER**			50.65
CO_2 Emissions (t/year)	0.24	**DFEE**	23.69	**TFEE**	32.61
Compliance Check	See BREL	**% DFEE < TFEE**			27.37
% DPER < TPER	1.30	**DPER**	52.78	**TPER**	53.47

Assessor Details	Mrs. Samantha Cable	**Assessor ID**	Q741-0001
Client	NRG Consulting , Ryan Thrower		

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	North	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Top-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2025	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	182.29	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	21.90 m	50.90 m²	2.60 m

8.0 Living Area	27.95	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall	Cavity Wall	Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure	0.16	110.00	35.49	28.81	0.00	None	6.68	Enter Gross Area
Sheltered Wall	Cavity Wall	Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure	0.16	110.00	21.45	21.45	0.00	None	0.00	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Double plasterboard on both sides, twin timber f rame with/without sheathing board	0.00	20.00	21.32		None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Stud	Plasterboard on timber frame	9.00	92.30

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Main Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.10	9.00	50.90	50.90	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Summary for Input Data

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Precast concrete plank floor (screed laid on insulation), carpeted	40.00	50.90

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows/French/Bifolds	Manufacturer	Window	Triple Low-E Soft 0.1			0.57		0.70	0.80

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
D02	Windows/French/Bifolds	External Wall	South	2.73	
W01	Windows/French/Bifolds	External Wall	North	1.02	
W02	Windows/French/Bifolds	External Wall	North	1.37	
W03	Windows/French/Bifolds	External Wall	South	1.56	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	

17.0 Thermal Bridging	Calculate Bridges	

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E2 Other lintels (including other steel lintels)	Independently assessed	5.30	0.07	0.07	Yes
E3 Sill	Independently assessed	5.30	0.02	0.02	Yes
E4 Jamb	Independently assessed	17.00	0.02	0.02	Yes
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	21.90	0.04	0.04	Yes
E10 Eaves (insulation at ceiling level)	Independently assessed	19.55	0.06	0.06	No
E12 Gable (insulation at ceiling level)	Independently assessed	2.35	0.04	0.04	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	8.20	0.00	0.00	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	8.20	0.03	0.03	No
E16 Corner (normal)	Independently assessed	10.40	0.04	0.04	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	7.80	-0.08	-0.08	No
E18 Party wall between dwellings	Independently assessed	7.80	0.04	0.04	No

Y-value	0.03	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500167
Configuration	2
Manufacturer SFP	0.55
Duct Type	Rigid
MVHR Efficiency	92.00
Wet Rooms	2
SFP from Installer Commissioning Certificate	Yes
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0
Number of passive vents	0
Number of flueless gas fires	0

Summary for Input Data

elmhurst energy

21.0 Fixed Cooling System	No	
22.0 Pressure Testing	Yes	
Designed AP_{50}	2.50	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

22.0 Lighting

No Fixed Lighting	No				
	Name	**Efficacy**	**Power**	**Capacity**	**Count**
	Lighting 1	95.00	10.00	950.00	15

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	691	
In Winter	100.00	
In Summer	170.00	
Controls SAP Code	2603	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	
SAP Code	941	
Fuel Type	Electricity	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
Cold Water Source	From mains	
Bath Count	1	

28.1 Showers

Description	**Shower Type**	**Flow Rate [l/min]**	**Rated Power [kW]**	**Connected**	**Connected To**
Shower	Combi boiler or unvented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.61	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	
31.0 Thermal Store	None	
34.0 Small-scale Hydro	None	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Summary for Input Data

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
			0	0
			0	0
			0	0

Appendix 3

Edel RF Hot Water Heat Pump

Product Description

Edel heat pump cylinders comprise of a stainless steel inner vessel with a hot water heat pump mounted on top. The heat pump produces hot water very efficiently **by extracting heat from external air supplied via insulated ductwork,** which is available as an accessory. This highly efficient cylinder reduces the dwelling emissions in SAP making it possible to pass using electric space heating and an Edel heat pump cylinder. Edel cylinders feature RF connectivity and can be controlled remotely when connected to a DimplexHub.

Key Features

- Internet-connected smartphone app connectivity
- The Edel heat pump consumes 5 times less electricity than standard electric water heated cylinders
- Helps to pass Part L of building regulations when specifying electric heating
- Compact 630mm diameter units, available in 200L or 270L hot water capacity cylinder options
- Stainless steel tank with 5 year guarantee, no sacrificial anode requirement
- Very quiet in operation due to soundproof hood housing, variable speed fan and the rotary compressor being mounted on anti-vibration pads
- Patented high performance heat exchanger with defrost mode operation in UK climates

Internet Connectivity

App platform	Dimplex Control
Connectivity method	RF 868Mhz (Included)
Additional hardware	Requires 1 x 'DimplexHub'

Download on the App Store | GET IT ON Google Play

Use of Dimplex control is Control is subject to agreement of the GDHV Internet of Things (IoT) Terms and Conditions, Privacy Policy *and* Cookie Policy.

Technical Details

Heat pump performance		***Edel 200 UK RF***	***Edel 270 UK RF***
Model code		EDL200UK-630RF	EDL270UK-630RF
Item Code		101587	101594
Nominal volume	L	200	270
Air operating range	°C	-7 to +35	
Achievable hot water temperature via heat pump	°C	60	
Max. electrical power input (heat pump & immersion)	W	700 + 1200 = 1900	
Max. thermal power output (heat pump ONLY) at 45°C	W	1300	
Max. power output (heat pump & immersion) at 45°C	W	1300 + 1200 = 2500	
Air flow	m^3/h	320 to 400	
Sound pressure level at 2m	dB(A)	37 (speed1) / 40 (speed2)	
Refrigerant	/kg	R290/ 0.15	
Standing heat loss	kWh/24hr	1.61	1.77
Air ducting method		Separate inlet and outlet to exterior	
Heat up from cold (10°C)		7hr 15mins	9hr 48mins
Coefficient of performance		3.36	3.30
Dimensions & connections			
Dimensions	mm	630 x H 1460	630 x H 1780
Weight with packaging	kg	70	79
Weight without packaging	kg	56.5	63
Air duct diameter	mm	160	
Max. ducting pressure drop		220Pa at min. air flow rate $320m^3/hr$	
Water connections	Inch	M 3/4"	
Condensate tube	mm	18/24	
Electrical supply		230V 50Hz - 8A	
IP rating		IPX4	
MCB type C	Amp	16	
Hot water cylinder			
Material		Stainless steel	
Insulation		50mm PU foam with PVC outer	
Refrigeration heat exchanger		Double walled separation from potable water	
Max. operating pressure	bar	6	
Max. condensate production	L/h	0.3	
Integrated electric immersion heater	W	1200	
Max. temperature with immersion heater	°C	65	
Approvals			
Water regulations		G3 KIWA approval to EN12897	
T&P valve		Factory fitted	
Accessories		Inlet group, tundish, expansion vessel	
Guarantee (UK)		5 years tank (2 years other parts)	

Appendix 4

Technical information

Be ready for the energy change

Vaillant Comfort for your home

Air-to-water heat pumps

A safe investment in the future

State-of-the-art heating technology with minimal environmental impact

Vaillant is continuously advancing the development of heat pump technology. The Vaillant research and development teams constantly strive to develop the most efficient and quiet heat pumps on the market, thoroughly testing them in our own testing centres for durability and performance. For example, we have climate and hail chambers where we can test for robustness and reliability in extreme conditions. Vaillant also manufactures only in Europe, so we can guarantee you and your customers receive the high quality expected from a Vaillant appliance.

Vaillant offers a great new model in our portfolio of air-to-water heat pumps with the introduction of the aroTHERM plus. This award-winning heat pump is the first in our range to use natural refrigerant R290. This refrigerant, commonly used in many household appliances, has a very low Global Warming Potential (GWP) that offers many advantages over refrigerants traditionally used in heat pumps.

The new aroTHERM plus heat pump has technical features for improved efficiency, as well as higher flow temperatures, so it's perfect for new and existing heating systems (including hybrid). It's also impressively quiet in operation and has been accredited by Quiet Mark*.

*Models 3.5, 5, 7 and 12kW

Always the right choice

Reliability and performance of the highest standards ensure peace of mind for your customers. It's so quiet, they won't even know it's on.

High performance

The aroTHERM plus heat pump has been designed to deliver the very best performance with low running costs, making it suitable for radiators as well as underfloor heating. With a flow temperature of up to 75°C, the aroTHERM plus can deliver more usable hot water with high hot water comfort levels and removes the need for direct electric immersion to sterilise the water, protecting from legionella.

Higher energy-efficiency

With a SCOP of up to 5.03, the aroTHERM plus is extremely energy efficient, enabling high energy savings against certain fossil fuels.
The aroTHERM plus can also be combined with photovoltaic systems and integrated into smart power grids (SG-ready), so your customers can enjoy the benefits of variable electricity tariffs.

Super quiet

With sound power as low as 54 dB for easier planning and siting, the aroTHERM plus is suitable for use in densely built-up terraced housing estates.

Natural refrigerant

Already fulfilling the next NZEB requirements, the aroTHERM plus uses monobloc technology with a hermetically sealed refrigerant circuit using the natural refrigerant, R290, to deliver the one of the lowest GWP of 3.

Why R290?
R290 is a natural refrigerant with a very low GWP* of three. This offers the following advantages:

- future-proof, as not affected by the F-Gas Regulation
- higher flow temperature of up to 75°C
- higher hot water comfort and protection against legionella without electric auxiliary heating
- wider performance envelope with operating temperature ranging between -25°C and +46°C
- Already fulfilling the next NZEB requirements, the aroTHERM plus uses monobloc technology with a hermetically sealed refrigerant circuit using natural refrigerant R290 to deliver the one of the lowest GWP of 3
- Reduced refrigerant charge compared to R410a and R32

Natural refrigerants are already used in many areas of our daily lives, e.g. in refrigerators and heat pump tumble-driers

Natural refrigerant GWP 3

Model calculation
R290 (aroTHERM plus)
0.6 kg R290 x 3 GWP **= 1.8 kg CO_2**

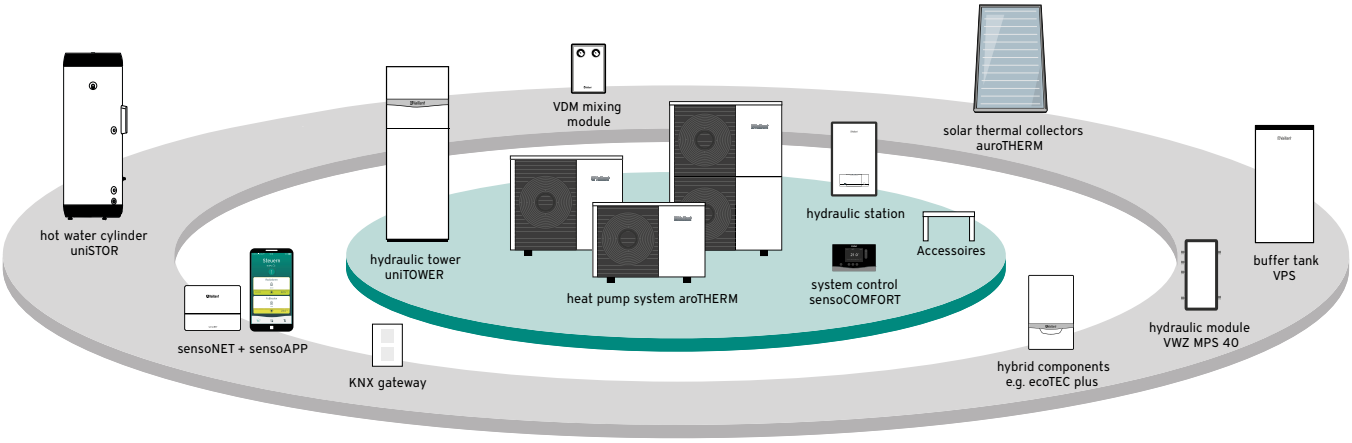
15 km journey by car

*Comparison of refrigerant GWP values:

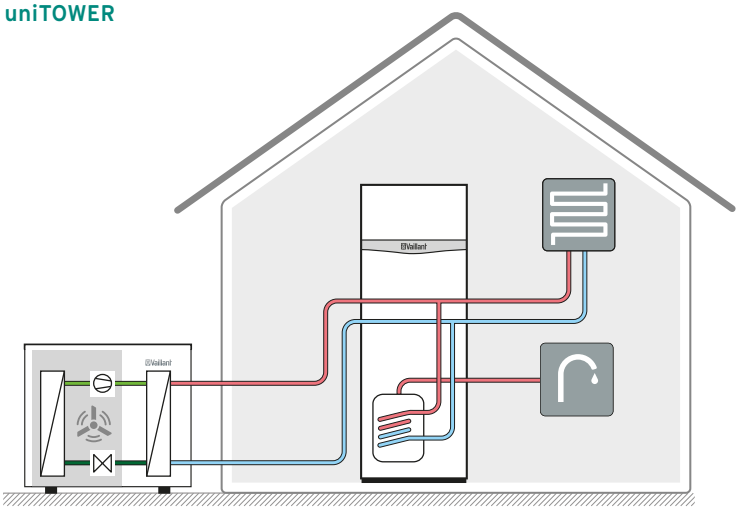
CO_2	1
R290	3
R32	675
R410a	2,088

Introducing the perfect partner

Your customers have widely differing wishes and needs. We offer the system components that enable you to fulfil them all – whether they wish to integrate photovoltaics, a solar-thermal system or smart home technology. All conveniently manageable with a single controller – the new sensoCOMFORT. This enables you to quickly commission the system and lets your customers change daily settings at the flick of a wrist.

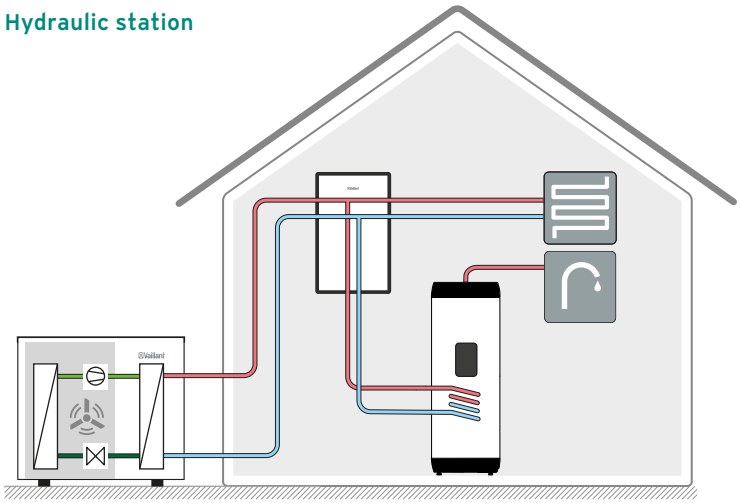


uniTOWER



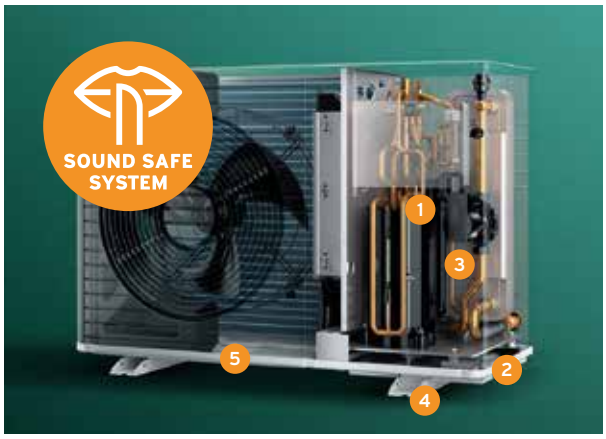
The uniTOWER is an integrated 190 litre cylinder with hydraulic components which can easily provide sufficient hot water for the needs of a family of five, including the use of rain showers. Thanks to its space-saving dimensions, the system is the perfect choice for new buildings. Installed indoors, the uniTOWER is about the size of a fridge freezer and saves valuable space in the room where it's installed.

Hydraulic station



In the case of higher hot water demand, the aroTHERM plus can be used together with a wall-mounted hydraulic station and a wide range of accessories, including the uniSTOR heat pump cylinders and buffer tanks.

Features and benefits



aroTHERM plus

1. Hermetically sealed – no refrigerant certification required
2. Floating floor design absorbs vibration and reduces noise
3. Vortex sensor for accurate performance analysis
4. Weatherproof material and paint make it an ideal choice for coastal areas
5. Integrated tray and trace heater to ensure clear condensation run

uniTOWER

1. 190-litre storage cylinder capacity, corresponds to up to 380-litres of usable hot water output
2. Hydraulic components already integrated, e.g. 15-litre expansion vessel
3. System accessory options, ready for integration, e.g. heating zone packs, 18-litre buffer or system separation plate heat exchanger
4. Modulating electric auxiliary heater with up to 6 kW
5. 3-way diverter valve
6. Electric wiring interface

Hydraulic module

1. Hydraulic components already integrated, including 10-litre expansion vessel
2. Modulating electric auxiliary heater with up to 6 kW
3. 3-way diverter valve
4. Continued use of existing hot water storage cylinders
5. Electric wiring interface

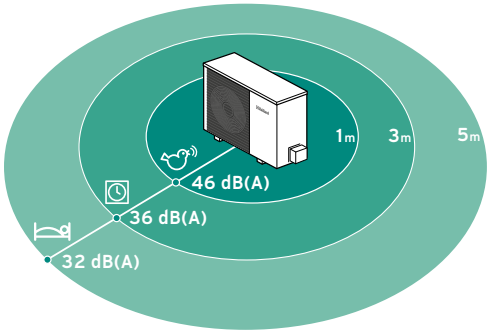
Heat pump interface

- Suitable for standard set-up and hybrid systems
- Heating system components can be placed to suit property layout
- Compatible with all Vaillant heat pump accessories including back-up heater, heat exchanger module and uniSTOR heat pump cylinders

SCOP and heating output

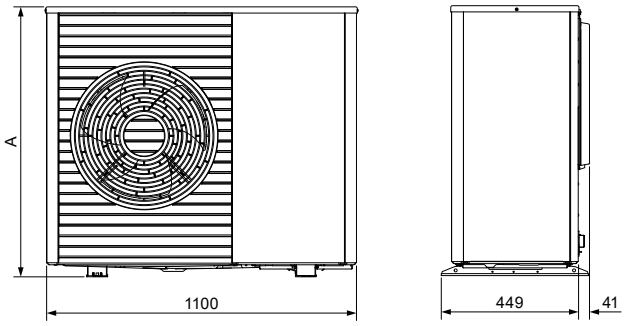
aroTHERM output		35°C flow		40°C flow		45°C flow		50°C flow		55°C flow	
		Output	SCOP	Output	SCOP	Output	SCOP	Output	SCOP	Output	SCOP
3.5kW	-5°C	4.2	4.41	4.1	4.03	4	3.65	3.9	3.37	3.8	3.10
	-3°C	4.6		4.4		4.3		4.2		4	
	0°C	4.7		4.7		4.6		4.5		4.4	
	2°C	4.9		4.9		4.9		4.7		4.6	
5kW	-5°C	6.3	4.48	6	4.13	5.6	3.77	5.5	3.41	5.4	3.06
	-3°C	6.8		6.4		6.1		5.9		5.8	
	0°C	6.9		6.7		6.6		6.4		6.2	
	2°C	7.1		7		6.9		6.7		6.5	
7kW	-5°C	8.2	4.36	8.1	4.13	8	3.91	7.5	3.65	7	3.39
	-3°C	8.8		8.6		8.4		7.9		7.4	
	0°C	9.5		9.3		9.1		8.6		8.1	
	2°C	10		9.8		9.6		9		8.5	
10kW	-5°C	9.9	5.03	9.7	4.58	9.4	4.13	9.1	3.85	8.8	3.58
	-3°C	10.7		10.3		10		9.6		9.2	
	0°C	11.9		11.6		11.3		10.7		10.2	
	2°C	12.8		12.5		12.1		11.5		10.9	
12kW	-5°C	13.1	4.88	12.8	4.55	12.5	4.21	11.7	3.92	10.8	3.63
	-3°C	13.9		13.4		12.9		12.1		11.2	
	0°C	15.2		14.6		14.1		13.2		12.3	
	2°C	16		15.5		14.9		13.9		13	

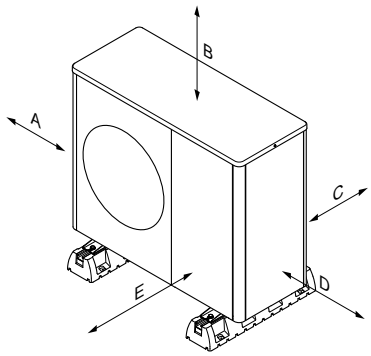
Sound power



Model	Sound Power Level A7/W55	Sound Pressure Level		
		1m distance	3m distance	5m distance
aroTHERM plus 3.5kW	54 dB	46 dB(A)	36 dB(A)	32 dB(A)
aroTHERM plus 5kW	54 dB	46 dB(A)	36 dB(A)	32 dB(A)
aroTHERM plus 7kW	55 dB	47 dB(A)	37 dB(A)	33 dB(A)
aroTHERM plus 10kW	60 dB	52 dB(A)	42 dB(A)	38 dB(A)
aroTHERM plus 12kW	60 dB	52 dB(A)	42 dB(A)	38 dB(A)

Dimensions and clearances



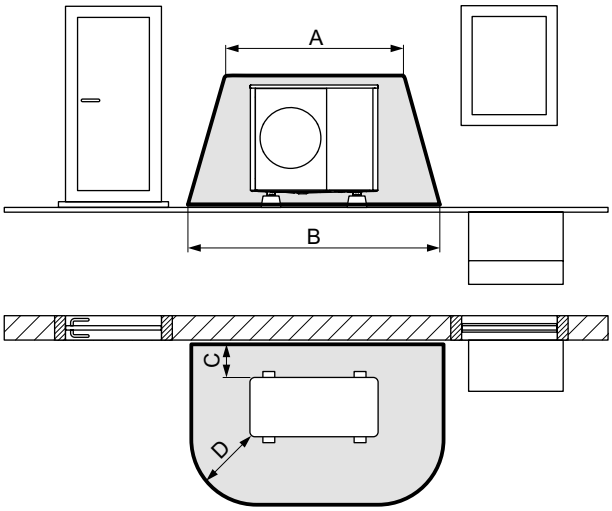


aroTHERM plus	Unit	Dimension A
3.5kW	mm	765
5kW	mm	765
7kW	mm	965
10kW	mm	1565
12kW	mm	1565

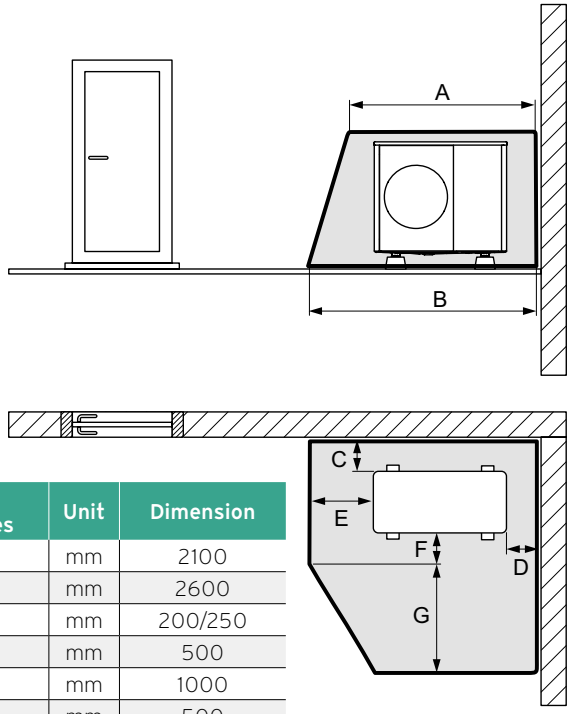
Minimum clearance	Unit	Heating mode	Heating and cooling mode
A	mm	100	100
B	mm	1000	1000
C	mm	200	250
D	mm	500	500
E	mm	600	600

R290 clearances

Clearances required for any drains, light wells or other openings



Minimum clearances	Unit	Dimension
A	mm	2100
B	mm	3100
C	mm	200/250
D	mm	1000

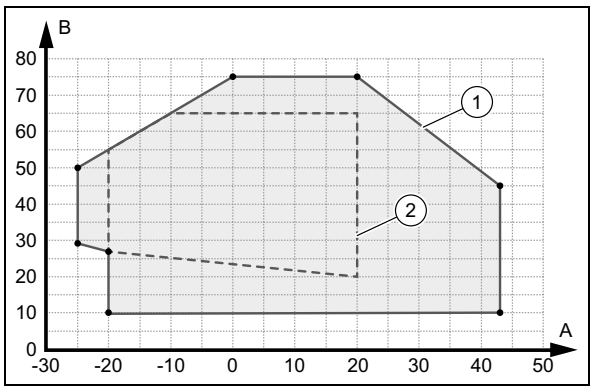


Minimum clearances	Unit	Dimension
A	mm	2100
B	mm	2600
C	mm	200/250
D	mm	500
E	mm	1000
F	mm	500
G	mm	1800

Application limits

heating mode

In heating mode, the product works at outdoor temperatures of -25 °C to 46 °C



A Outdoor temperature

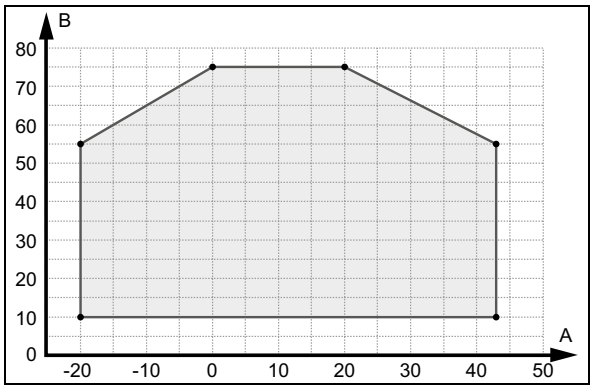
B Heating water temperature

1 Application limits, heating mode

2 Area of application, in accordance with EN 14511

DHW mode

For domestic hot water generation, the product works at outdoor temperatures of -20 °C to 46 °C.



A Outdoor temperature

B Heating water temperature

Technical specifications

aroTHERM plus	Unit	3.5kW VWL 35 / 6	5kW VWL 55 / 6	7kW VWL 75 / 6	10kW VWL 105 / 6	12kW VWL 125 / 6
General						
Width	mm	1,100				
Height	mm	765		965	1,565	
Depth	mm	450				
Weight, ready for operation	kg	114		128	194	
Connection, heating circuit		G 1 1/4"				
Rated voltage	V	230 V (+10%/- 15%), 50 Hz, 1~/N/PE				
Rated current, maximum	A	14.3		15.0	23.3	
Fuse size		16			25	
Fuse type	A	C/D				
RCD type		A				
eBUS (2-core communication cable)	mm2	0.75				
Maximum length eBUS cable (communication cable)	m	50				
IP rating		IP 15 B				
Fan, power consumption	W	40			50	
Fan quantity		1			2	
Fan, air flow , maximum	m^3 /h	2,300			5,100	
Heating pump, power consumption	W	2 - 50			3 - 87	
Heating circuit						
Heating water temperature, minimum/maximum	° C	20 - 75				
Basic length of the heating water pipe, maximum, between the outdoor unit and indoor unit	m	20				
Operating pressure, minimum	bar	0.50				
Operating pressure, maximum	bar	3.00				
Volume flow, minimum	l/h	400		540	995	
Volume flow, maximum	l/h	860		1,205	2,065	
Water volume, in the outdoor unit	l	1.5		2.0	2.5	
Water volume, in the heating circuit, minimum, thawing mode, activated/deactivated back-up heater	l	15 / 40		20 / 55	45 / 150	
Remaining feed pressure, hydraulic	kPa (mbar)	56.0 (560.0)		44.0 (440.0)	55.0 (550.0)	

aroTHERM plus	Unit	3.5kW VWL 35 / 6	5kW VWL 55 / 6	7kW VWL 75 / 6	10kW VWL 105 / 6	12kW VWL 125 / 6
Refrigerant circuit						
Fluid type		R290				
Fluid fill quantity	kg	0.6		0.9	1.3	
Refrigerant, Global Warming Potential (GWP)		3				
CO_2 equivalent	t	0.0018		0.0027	0.0039	
Permissable operating pressure	bar	31.5				
Compressor type		Rotary piston			Scroll compressor	
Compressor oil type		Specific polyalkylene glycol (PAG				
Compressor, control		Electronic				

Noise emissions, heating mode						
Sound power, EN 12102, EN 14511 LWA, A7/W35	dB(A)	51		53	58	
Sound power, EN 12102, EN 14511 LWA, A7/W45	dB(A)	53			58	
Sound power, EN 12102, EN 14511 LWA, A7/W55	dB(A)	54		55	60	

Efficiency		
Energy efficiency class 35°C	(A+++ to F)	A+++
Energy efficiency class 55°C	(A+++ to F)	A++
Combination with uniTOWER		
Energy efficiency class	(A+++ to F)	A++
Energy efficiency class for hot water supply	(A+ to F)	A

uniTOWER	Unit	VIH QW 190 / 6
Total storage cylinder capacity	l	188
Temperature hot water (max. – with auxiliary heating)	°C	55 - 75
Dimensions, unpacked (height/width/depth)	mm	1880 x 599 x 693
Weight, unpacked	kg	175
Auxiliary electric heater	kW	6kW (230V/50Hz) / 9kW (400V/50Hz)

Hydraulic station	Unit	VWZ MEH 97
Dimensions, unpacked (height/width/depth)	mm	720 x 440 x 350
Weight, unpacked	kg	15
Power electric backup heater	kW	6 kW (230V/50Hz) / 9 kW (400V/50Hz)

Description	Article number
aroTHERM plus with heat pump interface	
aroTHERM plus 3.5kW - VWL 35 / 6	0010037211
aroTHERM plus 5kW - VWL 55 / 6	0010037212
aroTHERM plus 7kW - VWL 75 / 6	0010037213
aroTHERM plus 10kW - VWL 105 / 6	0010037214
aroTHERM plus 12kW - VWL 125 / 6	0010037215
aroTHERM plus with hydraulic module	
aroTHERM plus 3.5kW - VWL 35 / 6	0010037206
aroTHERM plus 5kW - VWL 55 / 6	0010037207
aroTHERM plus 7kW - VWL 75 / 6	0010037208
aroTHERM plus 10kW - VWL 105 / 6	0010037209
aroTHERM plus 12kW - VWL 125 / 6	0010037210
aroTHERM plus with uniTOWER	
aroTHERM plus 3.5kW - VWL 35 / 6	0010037201
aroTHERM plus 5kW - VWL 55 / 6	0010037202
aroTHERM plus 7kW - VWL 75 / 6	0010037203
aroTHERM plus 10kW - VWL 105 / 6	0010037204
aroTHERM plus 12kW - VWL 125 / 6	0010037205

Compatible with

uniSTOR

sensoCOMFORT

VRC 700

Accessories	Article number
aroTHERM connection kit for ground install	0010027971
aroTHERM connection kit for ground install extension	0010027972
aroTHERM connection kit for wall install	0010027974
aroTHERM straight pipe connection kit	0010027976
750mm flexihose for air-to-water heat pump (pair)	0020165288
Snow Spacer	0010027984
Wall bracket for insulated wall	0020250224
Wall bracket for non-insulated wall	0020250225
Anti-vibration feet large	0020250226
Anti-vibration rubber feet small	0020252091
Coding resistor active cooling	0020269259
Discharge vessel	0020145563
aroTHERM 45 litre buffer	0010038365
aroTHERM heat exchanger module	0020222285
aroTHERM inline 6kW back-up heater	0020222286
VR 10 temperature sensor	306787
WH40 low-loss header (flow rates up to 3,000 litres per hour)	306720
WH95 low-loss header (flow rates up to 8,000 litres per hour)	306721
VR 32/B eBUS coupler (includes housing)	0020235465
VR 32 eBUS coupler	0020139895
Ball filter valve 28mm	0010038133
uniTOWER accessories	
uniTOWER decoupling module (small) for 3.5 - 7kW model	0010027982
uniTOWER decoupling module (large) for 10 and 12kW model	0010027973
uniTOWER 1" adapter connection kit	0020269275
18l Buffer cylinder for uniTOWER	0020269273
uniTOWER multi-zone kit - 1 direct zone	0020170507
uniTOWER extension set - 2 direct zones	0020170509
uniTOWER extension set - 1 mixed zone	0020170508
Circulation set without pump	0020170502
Circulation set with pump	0020170503
2l brine expansion vessel	0010030975

Description	Pack contents	Article number
VRC 700		
VRC 700 wired, weather compensating programmable room thermostat	-	0020236291
VRC 700f wireless, weather compensating, programmable room thermostat	-	0020259829
One wired heating zone and hot water system	VRC 700, VR 70	0020236292
One wireless heating zone and hot water system	VRC 700f, VR 70	0020259830
One wired heating zone and solar thermal hot water system	VRC 700, VR 70, VR 11	0020236295
One wireless heating zone and solar thermal hot water system	VRC 700f, VR 70, VR 11	0020259833
Two wired heating zones and hot water system	VRC 700, VR 70, VR 91	0020236293
Two wireless heating zones and hot water system	VRC 700f, VR 70, VR 91f	0020259831
Two wired heating zones and solar thermal hot water system	VRC 700, VR 70, VR 11, VR 91	0020259834
Two wireless heating zones and solar thermal hot water system	VRC 700f, VR 70, VR 11, VR 91f	0020259835
Three wired heating zones and hot water system	VRC 700, VR 71, two VR 91	0020236294
Three wireless heating zones and hot water system	VRC 700f, VR 71, two VR 91f	0020259832
VR 70 wiring centre for up to two zones	-	0020184844
VR 71 wiring centre for up to three zones	-	0020184847
VR 91 wired, additional room thermostat	-	0020171334
VR 91f wireless, additional room thermostat	-	0020231566
VR 40 two-in-seven multifunction module	-	0020017744
VR 11 solar collector NTC	-	306788
VR 10 immersion or contact sensor bare ends	-	306787
VR 32 eBUS coupler	-	0020139895
sensoCOMFORT		
sensoCOMFORT wired weather compensating programmable room thermostat	-	0010036819
sensoCOMFORT RF wireless weather compensating programmable room thermostat	-	0010036820
One wired heating zone and hot water system	sensoCOMFORT, VR 71	0010036821
One wireless heating zone and hot water system	sensoCOMFORT RF, VR 71	0010036826
Two wired heating zones and hot water system	sensoCOMFORT, VR 71, VR 92	0010036822
Two wireless heating zones and hot water system	sensoCOMFORT RF, VR 71, VR 92f	0010036827
Three wired heating zones and hot water system	sensoCOMFORT, VR 71, 2x VR 92	0010036823
Three wireless heating zones and hot water system	sensoCOMFORT RF, VR 71 and 2x VR 92f	0010036828
Four wired heating zones and hot water system	sensoCOMFORT, VR 71, VR 70, 3x VR 92	0010036824
Five wired heating zones and hot water system	sensoCOMFORT, VR 71, VR 70, 4x VR 92	0010036825
VR 10 immersion or contact sensor bare ends	-	306787
VR 32 eBUS coupler	-	0020139895
VR 70 wiring centre	-	0020184844
VR 71 wiring centre	-	0020184847
VR 92 wired additional room thermostat	-	0020260925
VR 92f wireless additional room thermostat	-	0020260940
sensoNET internet gateway	-	0020260963
VR 40 two-in-seven multifunctional module	-	0020017744
VR 32/B eBUS coupler (includes housing)	-	0020235465

Our experience is your guarantee

For over 140 years, Vaillant has been among the technology leaders when it comes to innovative heating solutions, with specific expertise in the area of heat pumps for more than 40 years. Our proprietary solutions - many of which are patented - have made this technology reliable, efficient and suitable for everyday life. More than 200,000 heat pumps installed around the world prove this in use each day. Benefit from our experience:

- Products developed in Germany and manufactured exclusively in the EU
- 100% test for each heat pump on the production line
- Toughest weather conditions simulated at our own test centres, in cold chambers with temperatures down to –25°C
- Vaillant heat pumps are among the quietest on the market
- High level of safety due to use of playground standards
- Quality management as per EN ISO 9001 and EN ISO 14001

Climatic chambers simulate all possible operating conditions

Optimisation of components in the acoustic lab

Renewable service and technical enquiries
For technical assistance:
Telephone: 0330 100 3540
Email: aftersales@vaillant.co.uk

General enquiries
If you have a general enquiry our friendly reception staff will happily point you in the right direction:
Telephone: 0345 602 2922

Training enquiries
Vaillant provides many different training courses. For more information:
Telephone: 0345 601 8885
Email: training@vaillant.co.uk

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