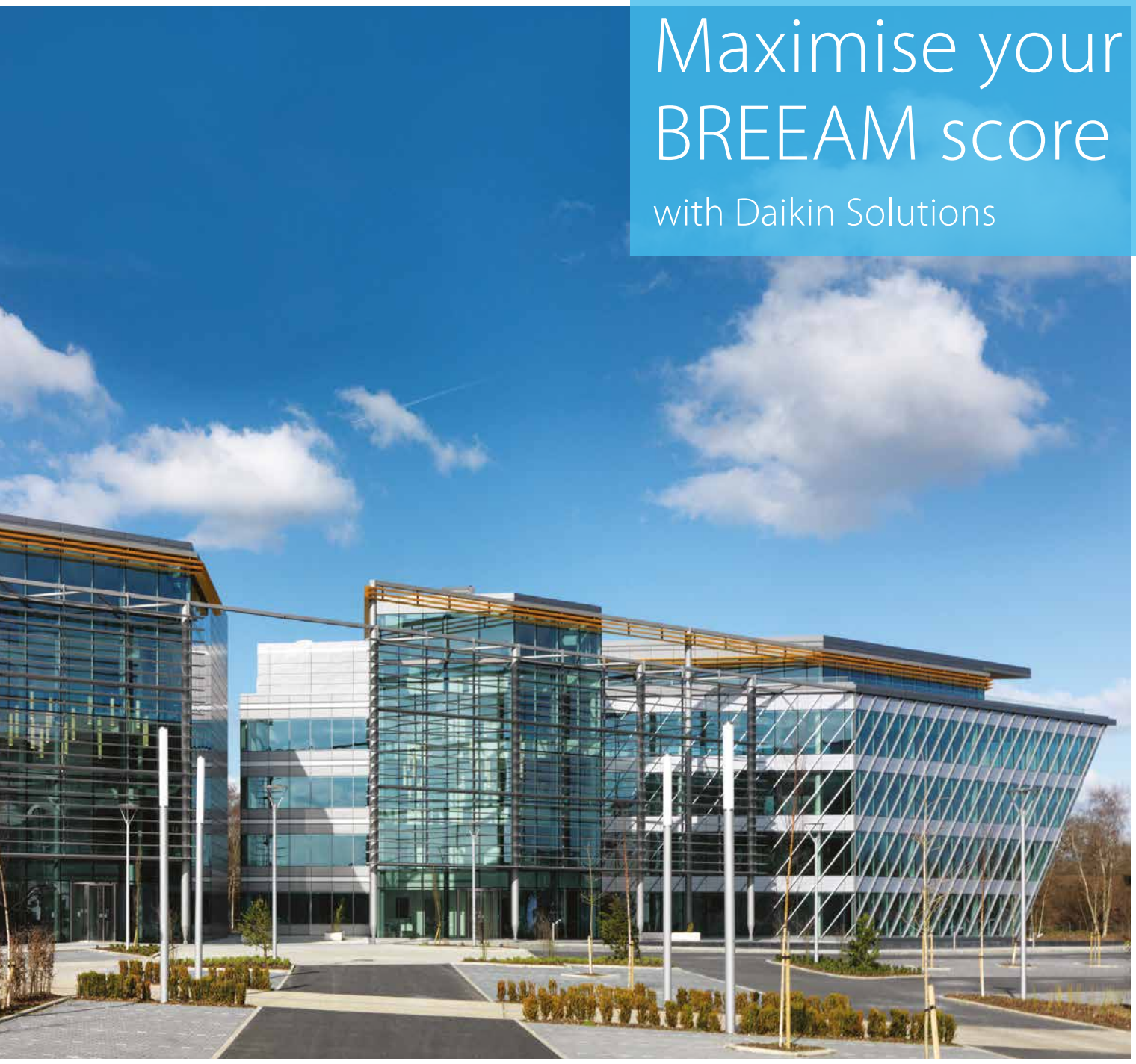
DAIKIN

BREEAM®

Maximise your BREEAM score

with Daikin Solutions



International New Construction 2016

Through Daikins total solution, 30% of the total score for BREEAM New Construction 2016 can be obtained*.

*Percentages are project dependant and can vary accordingly. Percentage values give an indication of the total amount of credits that can be obtained

BREEAM international New Contruction (2016) credits with Daikin support						Product groups		
Category[a]	**Weight factor[c]**	**Sub category[b]**	**Credit breakdown[d]**	**% of total BREEAM score[e]**	**Credit name that can be gained through Daikin[f]**	**VRV**	**Ventilation**	**Controls**
Management	12% UNIQUE	Man 01 Project brief and design	1 / 1	0.571%	Sustainability champion (design)	✔	✔	✔
			1 / 1	0.571%	Sustainability champion (monitoring progress)	✔	✔	✔
		Man 04 Commissioning and handover	1 / 1	0.571%	Commissioning and testing schedule and responsibilities	✔	✔	✔
			1 / 1	0.571%	Commissioning building services	✔	✔	✔
			1 / 1	0.571%	Handover	✔	✔	✔
		Man 05 Aftercare	1 / 1	0.571%	Seasonal commissioning	✔	✔	✔
Health and Wellbeing	15%	Hea 02 Indoor air quality	1 / 1	0.714%	Ventilation	✔	✔	
			1 / 1	0.714%	Potential for natural ventilation	✔	✔	
		Hea 04 Thermal comfort	1 / 1	0.714%	Thermal modelling	✔	✔	
			1 / 1	0.714%	Adaptability - for projected climate change scenario	✔	✔	
			1 / 1	0.714%	Thermal zoning and controls	✔	✔	✔
		Hea 05 Acoustic performance	3 /3	2.143%	Sound insulation/Internal Indoor ambient noise levels/ Reverberation times	✔	✔	
Energy	15%	Ene 01 Reduction of energy use and carbon emissions	9 / 12	8.571%	Energy performance	✔	✔	
		Ene 02a Energy monitoring (non residential)	1 / 1	0.714%	Sub metering of major energy consuming systems	✔	✔	✔
			1 / 1	0.714%	Sub metering of high energy load and tenancy areas	✔		✔
		Ene 04 Low carbon design	1 / 1	0.714%	Low and zero carbon feasibility study	✔		
Material	13.5% UNIQUE	Mat 03 Responsible sourcing of construction products	1 / 1	1.038%	Sustainable procurement plan	✔		
			3 / 3	3.115%	Responsible sourcing of construction products	✔		
		Mat 06 Material efficiency	1 / 1	1.038%	Material efficiency	✔		
Waste	8.50%	Wst 06 Functional adaptability	1 / 1	0.708%	Functional adaptability	✔		
Pollution	10%	Pol 01 Impact of refrigerants	1 / 2	1.538%	Impact of refrigerant	✔		
			1 / 1	0.769%	Ozone depletoin potential (ODP)	✔		
			1 / 1	0.769%	Leak detection	✔		
		POL 02 Nox emissions	1-2 / 2	1.538%	Nox emissions	✔		
		Pol 05 Reduction of noise pollution	1 / 1	0.769%	Reduction of noise pollution			✔
Innovation	10%	Wst 05 Innovation	1 / 1	1.000%	Exemplary level criteria	✔	✔	

a. Category: Management , Health and Wellbeing, Energy, Transport, Water, Materials, Waste, Land Use and Ecology, Pollution, Innovation
b. Sub category for each respective category
c. Weight factor represents the respecitve value of this category to the total BREEAM value. The sum of these factors is 100%. Effectively this means that a single credit can be worth more in categories such as Energy and Health and Wellbeing which represents more weight in the total score.
d. Credit breakdown for each subcategory. [Daikin credits / Total credits]
e. Name of respective credit
f. VRV + Ventilation + Controls: " productgroup which contributes to its respective credit.

How does Daikin support

Because HVAC-R equipment covers approximately 50% of total consumption, Daikin has trained **30 in-house Accredited Professionals/Sustainability Champions** across Europe who can **facilitate the achievement of BREEAM HVAC-R performance targets**. The earlier the involvement the more accurate the targeted BREEAM rating. For more information regarding our Sustainability Champions visit www.daikineurope.com/minisite/sustainability or ask your Daikin responsible.

Daikins **30 inhouse Accredited Professionals/Sustainability Champions facilitate follow up on BREEAM HVAC-R performance targets** when initial design changes. For more information regarding our Sustainability Champions visit www.daikineurope.com/minisite/sustainabilityor ask your Daikin responsible.

Our Daikin representive can provide more **detailed scheduling information regarding the commissioning** of all Daikin HVAC-R building services and control system (Daikin BMS system) towards the responsible project team member(s). Furthermore, if Daikins BMS system (iTM) is installed, the following procedures are being followed.
1) Commissioning 2) Checking accurancy of air flow,T_room, T_off coil and other key parameters 3) Running BMS in auto mode prior to handover 4) Fully trained facilities team

Providing know-how during the design phase to the commissioning manager in order **to help the commissioning** of the complex HVAC-R building systems including BMS system.

Daikins Sustainability Champion has a **full library of guides, operation manuals, maintenance requirements and training materials**. These can be included in the Building User Guide (BUG) which will cover all relevant building information.

Professional and fast commissioning of HVAC-R equipment prior to occupation. Further information is provided towards the Commissioning Manager in order to:
1) Testing of all building services under full load conditions, i.e. heating equipment in mid-winter, cooling/ventilation equipment in mid-summer, and under part load conditions (spring/autumn).
2) Where applicable, testing should also be carried out during periods of extreme (high or low) occupancy.

Design to minimise the concentration and recirculation of pollutants in the building: 1) Provide fresh air into the building in accordance with the criteria of the relevant standard for ventilation.
2) Design ventilation pathways as follows: Air intake and air exhausts are over 10m apart and intakes are over 20m from sources of external pollution or in accordance with BS EN13779:2007 Annex 2
3) HVAC system must incorporate suitable filtration to minimise external air pollution as defined in BS EN 13779:2007 Annex 3
4) Integration of **CO_2 sensors** to create demand-controlled ventilation is possible. Only needed for large and unpredictable occupancy patterns.
Integration of **air handling units** can be done on VRV system and or chiller systems. For more information regarding ventilation equipment, please ask your Daikin responsible.

The aim of 'the potential for natural ventilation criteria' is to ensure that a building is capable of providing fresh air using a natural ventilation strategy. For mechanically ventilated buildings to achieve this credit, the opening of windows should be possible. To avoid energy waste, **possible interlock** to indoor units can be made via the forced-off terminals T1 and T2.

For air conditioned buildings, summer and winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design2, Table 1.5; or other appropriate industry standard (where this sets a higher or more appropriate requirement/level for the building type)."
With a **varying evaporating and condensing temperature** based on ambient temperature, Daikin Indoor units are **providing higher thermal comfort levels and avoids cold drafts**.

Provided that the credit 'Thermal modelling' is achieved, this credit can be achieved by different Daikin solutions. E.g. a **VRV system** is flexible in heating/cooling which **allows a better adaptability for projected climate change scenarios**. Possibilities are:
- Providing BS box with extra ports which can be used when needed.
- Designing the outdoor system in line with expected changing load design.

Provided that the credit 'Thermal modelling' is achieved, this credit can be achieved by by providing a tailored made control solution.
With the **VRV Heat recovery, thermal zoning** with both cooling and heating requerements at the same time is possible.
The degree of occupant control can be freely chosen by the buildings management. For more information, please visit our sustainability website.
Interlocking different systems such as window contacts, thermostatic radiator valves is possible via the Daikin WAGO interface
Information regarding the temperature control strategy for the building and its users. Providing users a tailer made level of control. Heat recovery to provide indvidual contro of heating/cooling

Where a suitably qualified acoustician is appointed to define a bespoke set of performance requirements for all function areas in the building using the three acoustic principles defined in criterion 1, setting out the performance requirements for each and the testing regime required. Daikins portfolio considers **the widest range of units in terms of size and type to meet the requirement**. Proper selection, keeping in mind the criteria in HEA 05 Acoustic performance', can be easily done by our Sustainability Champion.

Thanks to Daikins heat recovery and heat pump systems a high level of credits can be achieved. This renewable technology guarantees the best seasonal efficiency & comfort. Energy calculation should be carried out based upon performance data. Around 8/9 credits should be targeted. For more information, please check our databooks, website or contact your Daikin representative.

Daikins BMS system provides the monitoring of energy usage of all HVAC-R equipment. In general, this accounts for 50% of total consumption (for a hotel this value adds up to 70%). All other submetering equipment can be integrated and monitored via the BMS. The intention is to **identify potential energy waste** and to **cross check performance in comparison with expected data**.

Daikin BMS system, called iTM, has a functionality called **Power Proportional Distribution** (PPD). This allows users to assign all relevant HVAC-R performance data to the correct tenant/department/function area. Separation of your bill has never been so easy.

A feasibility study has been carried out by the completion of the Concept Design stage (RIBA Stage 2 or equivalent) by an energy specialist to establish the most appropriate recognised local (on-site or near-site) low or zero carbon (LZC) energy source(s) for the building/development **Daikin supports in delilvering the info neccessary to do this study**.

Daikin is **the worlds first HVAC-R manufacturer which achieves a BES6001 certification**. For now we have two factories certified, Ostend factory did achieve a "Very good" score and our Tsjech factory achieved a "Good" rating. For a pdf copy of these certificates, please contact your Daikin responsible.

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See our sustainable website for more info.

Daikins VRV equipment is ideal to guarantee future flexibility:
- Major refurbishment is possible due to flexibility of indoor units.
- Providing BS box with extra ports which can be used when needed.
- Designing the outdoor system in line with expected changing load design.

Daikin uses different refrigerants dependent on type of application VRV/chillers/...
Our **DELC CO_2 is very low** thanks to the low refrigerant quantity used in our systems. Credits are calculated as follows:
- 1 credit: Where the systems using refrigerants have Direct Effect Life Cycle CO_2 equivalent emissions (DELC CO_2e) of ≥ 100 and ≤ 1000 kgCO_2e/kW cooling/heating capacity.
1 credit is possible due to low refrigerant volume.

The ozone depletion potential (ODP) of the refrigerants used in **our HVAC-R equipment has an ODP of 0**.

Daikins **F-gas leak reporting system and refrigerant containment system** allowing for recovery of refrigerants either to the outdoor unit or alternatively a separate recovery cylinder enable our systems to meet the requirements of Pol 1.

The amount of credits earned in this category is dependent on both the efficiency of the outdoor unit and the emission level of the country electricity grid. **Our highly efficient heat pumps offer the best possibility to score maximum credits**.

Daikins outdoor units operate at a low noise levels. Extra modes such as outdoor unit silent operation which decreases noise level up to 13 dB(A) during nighttime

In order to achieve this credit, 6 other credits accross all categories needs to be achieved (Hea 04, Ene 01, Ene 04, Wat 01, Mat 05, Pol 03). **Daikin can assure Hea 04, Ene 01 and Ene 04**.

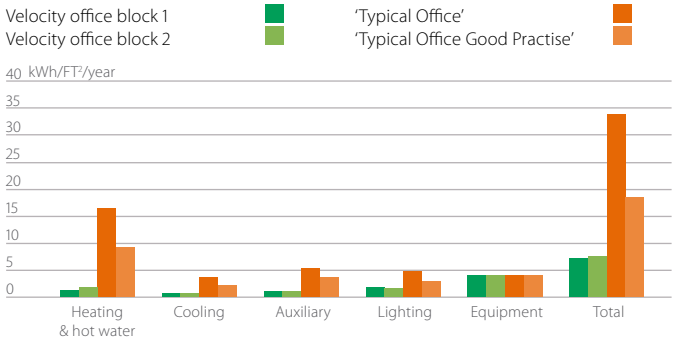
Daikin VRV Heat Recovery system as a big contributor to high Energy Performance of a stylish headquarter office

Cost effective occupation

Velocity, with its strong eco-credentials can demonstrate significant occupation cost savings when compared to a more typical office building in the UK.
The graph below demonstrates the difference in annual energy consumption, per unit floor area, for both Velocity office blocks when compared to the CIBSE* 'Typical Office' benchmark and 'Typical Office'. Good Practise' benchmark built to the Building regulations at the time. A CIBSE 'Typical Office Good Practise' is equivalent to those built between 2006 and 2010.

*Chartered Institute for Building Services Engineers

Energy use (per FT² per year)



Location

Velocity Brooklands, Weybridge,
KT13 0SL, United Kingdom

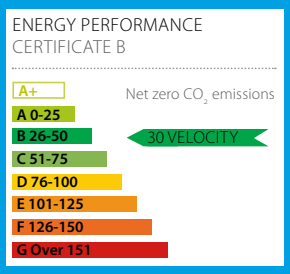
Building details

Total usable area: 9885 m²
Floors: ground floor + 4 floors
Building Height: 19,25m (3,850m floor to floor)
Construction year: 2012

Daikin systems installed

- 25 x VRV III Heat Recovery units
- 2 x VRV heat pump outdoor units
- 265 VRV indoor units (Ducted fan coil unit)
- 10 x DCS601C51 (Intelligent controller)

Energy Performance Certificate: B



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