Air conditioning inspection report

Santander
20 Stepney Street
Llanelli
SA15 3UR

Report number
6356-5930-1124-5414-0142

Valid until
2 December 2029

Executive summary

Executive Summary

1. Statute reference to legislation

The primary aim of the report is to give the building owner, or operator, information about the performance of the systems and plant and to identify opportunities to save energy and cut operating costs. This report identifies any operating anomalies; no-cost/low-cost savings and capital investment opportunities; the size and appropriateness of refrigeration plant about cooling loads and the effectiveness of current maintenance regimes.

1a. Purpose of Survey

Included within this report will be a description of the air conditioning services, system efficiencies and approximate sizing of the system compared to industry guidelines and suggested improvements, which could be made to increase the system efficiency.

The following report has been prepared to discuss the findings of an air conditioning system inspection commissioned by Santander on a property for which they own/occupy. The subject of this report is Santander Llanelli, Santander, 20 Stepney Street, Llanelli SA15 3UR.

Building Regulations Approved Document Part L 2nd tier documentation provides guidance suggesting that the plant should not be more than 20% oversized. This should be adopted as means of comparison to stay in line with current standards.

2. Building Structure

Santander located in Llanelli is a three storey traditional brick built building with a pitched roof. The windows are double glazed with blinds to help with solar gains. the building also has a large glass shop front. The lighting is LED.

The air conditioned areas of the building include: Whole Building.

Based upon some basic site measurements, the building comprises a net internal air-conditioned area of approximately 178m2.

3. Business Hours

Opening hours:

Monday - 9:30am - 3pm

Tuesday - 9:30am - 3pm

Wednesday - 9:30am - 3pm

Thursday - 9:30am - 3pm

Friday - 9:30am - 3pm

Saturday - 9:30am - 12:30pm

Sunday - Closed

4. Assets

The following systems were noted as being installed:

1 Daikin VRV (Variable Refrigerant Volume) Systems

There are no mechanical ventilation systems or heat recovery units supplying the air-conditioned areas of this building.

5. GWP (Global Warming Potential) and Refrigerant Data

The client should be aware of the EU HFC (Hydrofluorocarbons) "Phase Down" which is now in progress and has the overall aim of reducing the availability of HFCs by 79% by 2030. Many of the refrigerants used in modern day air conditioning have very high GWPs (Global Warming Potential) 2-3000 times higher than CO2; R404a (GWP = 3,922 kgCO2e), R410A (GWP = 2,088 kgCO2e), R134a (GWP = 1,430 kgCO2e) and R407c (GWP = 1,774 kgCO2e). When considering future installations where possible opt for systems with lower GWPs such as R32 (GWP = 675 kgCO2e).

The types of refrigerant used in the air conditioning systems in this building include: R410A (1 system, 11.40kg).

There are no systems in this building which are operating on the phased out, ozone depleting refrigerant R22.

The total GWP of the refrigerant within the air conditioning systems is equivalent to 24 tonnes of CO2.

The average GWP CO2e per kg of refrigerant in this building is 2,088 kgCO2e/kg.

Environmental managers should aim to get the above figures as low as possible, and this can be achieved by opting for systems which contain refrigerants with a much lower GWP. For example: By replacing systems which operate on R410A (GWP 2,088) with R32 systems (GWP 675) represents a reduction of 68% CO2e. This is often further improved to circa 74%, as R32 systems often require a smaller refrigerant charge (up to 20% less) than like for like R410A systems.

Under current legislation 1 of the systems requires an annual F-Gas/ODS Log Book as the refrigerant charges within these systems has an equivalent CO2 GWP of between 5 to 50 tonnes.

6. Sampling Statement

During the assessment the following 1 of 1 cooling plants were selected for a more detailed inspection in-line with the sampling approach outlined in the CIBSE TM44 guidelines:

VOL001 SYS001: 1 Daikin VRV System Serving Whole Building

The associated controls and required number of linked terminal units that these cooling plants serve were also inspected.

The following sampling methodology was applied as outlined in the CIBSE TM44:

Packaged systems (Including split systems, multi splits, VRF/ Vs, CCUs and DX units) - A representative sample of the systems to include a minimum of 10% of the total number of packaged units with a minimum of 3 units and an equal number of terminal units. With at least one of each different make of system.

Centralised systems - 100% of the main chiller plant.

Centralised systems - A minimum of 2% of the linked terminal units when they are of a similar design with a minimum of 5 units.

Centralised systems - 100% of the main AHU plant, up to and including the first 10 units or 30% whichever number is greater.

7. Terminal Units

The terminal units are ceiling cassette units.

8. AHU Systems

There are no mechanical ventilation systems or heat recovery units supplying the air-conditioned areas of this building.

9. Maintenance of the systems

The maintenance team are qualified and knowledgeable of the equipment on-site and carries out all of their duties in line with manufacturers and industry guidelines. Following the site survey, it was evident that the HVAC equipment on site is maintained to a satisfactory level.

10. Overall Operation of the systems

The condenser units were found to be in good condition and operating. There was no evidence of any refrigerant leaks around the compressors, the refrigerant pipework was well insulated and the heat exchanger coils were found to be in a good clean condition.

The above points are expanded upon, and further suggestions are made in the recommendations section. Whilst there is no requirement to carry out the recommendations, the inspection and report will benefit the owner or manager only if its findings are acted upon.

11. Number of people using the building

The number of occupants expected within the air-conditioned areas is in the region of 30 persons.

Key recommendations

Efficiency

Consider sub-metering the individual items of HVAC plant on site and then record the energy consumption figures to enable areas of excessive consumption to be identified.

Maintenance

The controller/s showed the following operational schedules: Cooling & Heating: The schedules on the controllers were not being utilised. Ensure schedules on controls are set up, or methods are in-place to prevent systems operating outside of occupancy hours. Consider setting up "off only schedules" which would mean systems only activate manually when switched on by the occupants. The possibility of installing occupancy movement sensors could also be considered.

Controls

The system controller should be programmed to display the correct time & date.

It is recommended that a seasonal set-points strategy is introduced to maximise system efficiency. Winter set-points should be 19°C in heating only mode. Summer set-points should be 24°C in cooling only mode. Spring / Autumn set-points should be 21°C - 22°C in auto mode.

Management

Consider placing notices alongside the local system controllers to advise occupants on the method of control for efficient operation of the AC system.

An F-Gas Log Book should be compiled by the client and should include the refrigerant data of all of the applicable systems. This legal document should be held on-site & kept up to date.

The client should be aware of the new F-Gas labelling legislation which came into force on 1st January 2017. Systems installed after this date are required to be clearly labelled with the following information: The type of refrigerant within the system, the weight of the refrigerant in the system, the GWP of the system refrigerant and the total GWP of the system.

Ensure that a copy of all PPM documentation is kept on-site and up to date.

Ensure an up to date asset list, with clear details of plant locations, is compiled and held on-site. An asset list has been created as part of this report, this can be utilised by the client.

Subsystems inspected

VOL001/SYS001 Whole Building

Volume definitions	VOL001
Description	1 Daikin VRV System Serving Whole Building
Effective rated cooling output	28 kW
Area served	Whole Building
Inspection date	3 December 2024
Cooling plant count	1
AHU count	0
Terminal units count	9
Sub system controls count	6

Pre-inspection records requested

Essential records

These records were not available:

- Itemised list of installed air conditioning and refrigeration plant including product makes, models and identification numbers
- Cooling capacities, with locations of the indoor and outdoor components of each plant
- Description of system control zones, with schematic drawings
- Description of method of control of temperature
- Description of method of control of periods of operation.
- Floor plans and schematics of air conditioning systems.

Desirable records

These records were reviewed:

- Reports from earlier inspections of air conditioning systems, and for the generation of an energy performance certificate

These records were not available:

- Records of maintenance operations carried out on refrigeration systems, including cleaning indoor and outdoor heat exchangers, refrigerant leakage tests, repairs to refrigeration components replenishing with refrigerant
- Records of maintenance operations carried out on air delivery systems, including filter cleaning and changing, and cleaning of heat exchangers
- Records of calibration and maintenance operations carried out on control systems and sensors, or BMS systems and sensors
- Records of sub-metered air conditioning plant use or energy consumption
- For relevant air supply and extract systems, commissioning results of measured absorbed power at normal air delivery and extract rates, and commissioning results for normal delivered delivery and extract air flow rates (or independently calculated specific fan power for the systems)

Optional records

These records were not available:

- An estimate of the design cooling load for each system (if available). Otherwise, a brief description of the occupation of the cooled spaces, and of power consuming equipment normally used in those spaces
- Records of any issues or complaints that have been raised concerning the indoor comfort conditions achieved in the treated spaces
- Where a BMS is used the manager should arrange for a short statement to be provided describing its capabilities, the plant it is connected to control, the set points for the control of temperature, the frequency with which it is maintained, and the date of the last inspection and maintenance
- Where a monitoring station, or remote monitoring facility, is used to continually observe the performance of equipment such as chillers, the manager should arrange for a statement to be provided describing the parameters monitored, and a statement reviewing the operating efficiency of the equipment

Cooling plants

Cooling plant 1

Unit Identifier	VOL001/SYS001 Whole Building
Component Identifier	VOL001/SYS001/CP1 Daikin-VRV-Whole Building-System 001

Equipment Inspected

Rated Cooling Capacity (kW)	28
Description (type/details)	VRV
Location of Cooling Plant	Roof
Manufacturer	Daikin
Model/Reference	REYQ10M8W1B
Refrigerant Charge (kg)	11
Refrigerant Type	R410A
Serial Number	UNREADABLE
Year Plant Installed	2007
Areas/Systems Served	Whole Building

Note below any discrepancy between information provided by client and on site information collected, or any information of additional relevance to the cooling plant/system:

There was no site asset list provided by the client. Ensure an up to date asset list, with clear details of plant locations, is compiled and held on-site. An asset list has been created as part of this report, this can be utilised by the client.

Approved sections

CS2.1 Is the refrigeration plant operational?

Yes

The refrigeration plant was found to be operational.

No recommendations required.

CS2.2/a Is the area around the refrigeration plant clear of obstructions & debris?

No

As the cooling plant could not be accessed during the inspection it is not possible to comment.

No recommendations required

CS2.2/b Is the general condition of refrigeration and any associated central plant in good order?

Yes

This cooling plant was found to be in a good condition.

CS2.2/c Is the condenser placed clear from warm air discharge louvres?

No

As the cooling plant could not be accessed during the inspection it is not possible to comment.

No recommendations required

CS2.3/a Are compressors operational or can they be brought into operation?

Yes

Although the refrigeration plant could not be directly accessed it is safe to assume that the compressor was operating correctly.

No recommendations required.

CS3.1/a Is the heat rejection plant operational?

Yes

Although the cooling plant could not be directly accessed, an acceptable and sustained temperature difference recorded from the linked terminal unit indicated that the heat rejection fan was operating.

No recommendations required.

CS3.1/b Are condenser heat exchangers undamaged/ un-corroded and clean?

No

As the cooling plant could not be accessed during the inspection it is not possible to comment.

Safe access should be provided to all of the plant to facilitate regular maintenance and future inspections. No recommendations required

CS3.2/a Is the area around the heat rejection plant clear of obstructions & debris?

Yes

As the cooling plant could not be accessed during the inspection it is not possible to comment.

No recommendations required

CS3.2/b Is the condenser free of any possibility of air recirculation?

No

As the cooling plant could not be accessed during the inspection it is not possible to comment.

No recommendations required

CS4.1 Is the insulation on circulation pipe work well fitted and in good order?

No

As the cooling plant could not be accessed during the inspection it is not possible to comment.

No recommendations required

Appropriately Sized Cooling Plant

Installed Cooling Capacity (kW)	28
Occupant Density (m2/person)	5.93
Total Floor Area served by this plant(m2)	178
Total Occupants served by this plant	30

Maximum Instantaneous Heat Gain (W/m2)	130
The Installed Size is Deemed	More than expected

Notes and Recommendations

The current version of the Building Regulations Approved Document Part L documentation provides guidance suggesting that the plant should not be more than 20% oversized. This should be adopted as means of comparison to stay in line with current standards.

The Maximum Instantaneous Heat Gain figure has been based on the '5th edition' BSRIA or CIBSE rule of thumb guides however; visual observations that may affect this, such as window sizes, ceiling heights, occupant densities and any other observed or abnormal heat loads have also been considered.

The Installed Cooling Capacity figure includes all systems within the same area.

Based on the aforementioned 'Maximum Instantaneous Heat Gains' (130W/m²) it is estimated that this area requires approximately 23.1kW of cooling. (178m² x 130W/m² / 1000 = 23.1kW)The calculated comfort cooling load suggests that although the system is oversized it has the ability to operate at part-load which will generally negate the issue of over sizing. It should be noted the general scope of this inspection does not include a detailed building cooling load profile and this would need to be carried out before making any judgement on the sizing suitability of the cooling equipment. The estimated cooling load is based on a ‘rule of thumb’ and may not reflect the actual cooling load. It is normally acceptable for a margin of error of ±20% as per the latest guidelines from CIBSE.

Refrigeration

Pre Compressor(°C)	29
Post Compressor(°C)	41
Ambient(°C)	5
The Temperature is Deemed	As expected
Refrigerant Type	R410A
Assess the refrigeration compressor(s) and the method of refrigeration capacity control	Cooling Capacity = 28.00kW; Input Power = 9.00kW; System EER (Energy Efficiency Ratio) = 3.11; Cooling Energy Label Class = C. SEER data not confirmed although it would be expected to be around 40% higher than the EER, which would be 4.35. This system has an excellent level of capacity control as it is installed with an inverter. Inverters enable cooling load to accurately match internal demand, usually between 25% - 100% of capacity. This system would therefore be able to operate down to circa 7.0kW (25% of system capacity).

Are there any signs of a refrigerant leak?

No

A visual observation around the main refrigeration components was carried out there was no evidence of refrigerant leakage.

Montreal/ODS/F-Gas controlled?

Yes

The system is installed with 11.4kg of R410A and as such it has a GWP (Global Warming Potential) which is equivalent to 23.8 tonnes of CO2.

As the system has a GWP equivalent to between 5 and 50 tonnes of CO2 it is a legal obligation to keep an F-Gas log book on this system and have it checked for leaks on an annual basis.

Notes and Recommendations

The "air on" temperature recorded onto the evaporator / internal unit has been used to represent the pre-compressor temperature. . The system was operated in heating mode. No recommendations required

The "air off" temperature recorded at the internal unit has been used to represent the post-compressor temperature. No recommendations required

Temperature samples taken from this cooling plant indicate it was operating correctly. No recommendations required.

Regular Maintenance

Is there evidence of regular maintenance?

Yes

Planned Preventative Maintenance (PPM) documentation was not available to review; however, from conversations with members of staff and observations made on the systems it is clear that regular maintenance is carried out at this site.

Is the maintenance undertaken by suitably competent people and in accordance to industry guidelines?

Yes

Maintenance is carried out on the systems by Refcom registered contractors Arcus. There are 2 maintenance visits per annum.

Metering Comparison to appropriate energy benchmarks

Is metering installed to enable monitoring of energy consumption of refrigeration plant?

No

Recorded meter reading: N/A

Consideration should be given to the savings that could be made by installing meters to monitor the energy consumption of individual items of plant. By monitoring and recording these energy readings at regular intervals the client will be provided with definitive data that will allow them to identify areas where energy consumption is excessive and where fiscal & energy savings could be made.

Is the refrigeration plant connected to a BEMS that can provide out of range alarms?

No

The system is not linked to a BMS or centralised controller.

Are there any records of air conditioning plant usage or sub-metered energy consumption with expected hours of use per year for the plant?

No

N/A Details of any sub-metering has been answered in previous fields.

Is the energy consumption or hours of use excessive?

No

For more details on hours of operation of this system, refer to the linked system controller section.

Water Cooled Chillers (Cooling Towers & Evaporative Condensers)

Is the water flow through cooling towers or evaporative coolers even and efficient, and there is no loss of water?

No

Not applicable, no water cooling tower or evaporative coolers are linked to this system.

Is there a management regime in place to ensure that water is regularly checked and treated to ensure that there is no Legionella risk?

No

Not applicable, it is not necessary to put a regime in place as the HVAC system does not have a Legionella risk.

Humidity Control

Is there separate equipment installed for humidity control?

No

There is no humidity control equipment linked to this system.

Terminal units

Terminal unit 1

Unit	VOL001/SYS001 Whole Building
Component	VOL001/SYS001/TU1 Whole Building-Ceiling Cassette
Description of unit	Ceiling Cassette
Cooling plant serving terminal unit	VOL001/SYS001/CP1 Daikin-VRV-Whole Building-System 001
Manufacturer	Daikin
Year installed	2007
Area served	1st Floor Small Office
Discrepancies noted	There was no site asset list provided by the client. Ensure an up to date asset list, with clear details of plant locations, is compiled and held on-site. An asset list has been created as part of this report, this can be utilised by the client.

CS4.1 Insulation

Is the pipework adequately insulated?

Yes

Internal refrigerant pipe work connected to this terminal unit was enclosed and not accessible during the inspection.

The assessor made the following notes and recommendations:

- No recommendation required.

Is the ductwork adequately insulated?

No

There is no ductwork associated with this type of terminal unit.

The assessor made the following notes and recommendations:

- No recommendation required.

CS4.2 Unit condition

Are the terminal units in good working order?

Yes

The terminal unit was seen to be in a good condition. The filters were inspected and found to be in a clean condition.

The assessor made the following notes and recommendations:

- No recommendations required No recommendation required.

CS5.1, CS5.2 Grilles and air flow

Do air delivery openings provide good distribution?

Yes

The terminal unit was seen to be positioned well enough to provide an adequate level of cooling throughout the conditioned space.

The assessor made the following notes and recommendations:

- No recommendation required.

Is there evidence of tampering with diffusers?

No

The air grilles on the terminal unit were inspected and found to be in a good condition and show no evidence of tampering.

The assessor made the following notes and recommendations:

- No recommendation required.

Are chilled and hot water being supplied to terminals simultaneously?

No

Not applicable, this terminal unit is not linked to a water loop of any kind.

The assessor made the following notes and recommendations:

- No recommendation required.

Are there are any records of occupant complaints regarding air distribution?

No

The assessor was not informed of any occupant dissatisfaction with the distribution from the terminal unit during the inspection.

The assessor made the following notes and recommendations:

- No recommendation required.

CS5.3, CS5.4, CS5.5 Diffuser positions

Is there potential for air to short-circuit from supply to extract?

No

The terminal unit was observed to be positioned well enough to allow good air circulation across the coils. There were no blockages to air paths and no significant risk of air re-circulation.

The assessor made the following notes and recommendations:

- No recommendation required.

Is the position of partitioning or furniture adversely affecting performance?

No

The position of the terminal unit is not affected by furniture or partitioning and there is no potential for the re-circulation of air from this unit.

The assessor made the following notes and recommendations:

- No recommendation required.

Is the control and operation adequate?

Yes

The terminal unit is linked to a local system controller which is sufficient to provide an adequate level of control and further details of any controller short falls can be found in the 'System Controls' section of this report.

The assessor made the following notes and recommendations:

- No recommendation required.

Terminal unit 2

Unit	VOL001/SYS001 Whole Building
Component	VOL001/SYS001/TU2 Whole Building-Ceiling Cassette
Description of unit	Ceiling Cassette
Cooling plant serving terminal unit	VOL001/SYS001/CP1 Daikin-VRV-Whole Building-System 001
Manufacturer	Daikin
Year installed	2007
Area served	Banking Hall
Discrepancies noted	There was no site asset list provided by the client. Ensure an up to date asset list, with clear details of plant locations, is compiled and held on-site. An asset list has been created as part of this report, this can be utilised by the client.

CS4.1 Insulation

Is the pipework adequately insulated?

Yes

Internal refrigerant pipe work connected to this terminal unit was enclosed and not accessible during the inspection.

The assessor made the following notes and recommendations:

- No recommendation required.

Is the ductwork adequately insulated?

No

There is no ductwork associated with this type of terminal unit.

The assessor made the following notes and recommendations:

- No recommendation required.

CS4.2 Unit condition

Are the terminal units in good working order?

Yes

The terminal unit was seen to be in a good condition. Small levels of dust were found on the terminal unit filters which should be removed at the next PPM.

The assessor made the following notes and recommendations:

- No recommendations required No recommendation required.

CS5.1, CS5.2 Grilles and air flow

Do air delivery openings provide good distribution?

Yes

The terminal unit was seen to be positioned well enough to provide an adequate level of cooling throughout the conditioned space.

The assessor made the following notes and recommendations:

- No recommendation required.

Is there evidence of tampering with diffusers?

No

The air grilles on the terminal unit were inspected and found to be in a good condition and show no evidence of tampering.

The assessor made the following notes and recommendations:

- No recommendation required.

Are chilled and hot water being supplied to terminals simultaneously?

No

Not applicable, this terminal unit is not linked to a water loop of any kind.

The assessor made the following notes and recommendations:

- No recommendation required.

Are there are any records of occupant complaints regarding air distribution?

No

The assessor was not informed of any occupant dissatisfaction with the distribution from the terminal unit during the inspection.

The assessor made the following notes and recommendations:

- No recommendation required.

CS5.3, CS5.4, CS5.5 Diffuser positions

Is there potential for air to short-circuit from supply to extract?

No

The terminal unit was observed to be positioned well enough to allow good air circulation across the coils. There were no blockages to air paths and no significant risk of air re-circulation.

The assessor made the following notes and recommendations:

- No recommendation required.

Is the position of partitioning or furniture adversely affecting performance?

No

The position of the terminal unit is not affected by furniture or partitioning and there is no potential for the re-circulation of air from this unit.

The assessor made the following notes and recommendations:

- No recommendation required.

Is the control and operation adequate?

Yes

The terminal unit is linked to a local system controller which is sufficient to provide an adequate level of control and further details of any controller short falls can be found in the 'System Controls' section of this report.

The assessor made the following notes and recommendations:

- No recommendation required.

Terminal unit 3

Unit	VOL001/SYS001 Whole Building
Component	VOL001/SYS001/TU3 Whole Building-Ceiling Cassette
Description of unit	Ceiling Cassette

Cooling plant serving terminal unit	VOL001/SYS001/CP1 Daikin-VRV-Whole Building-System 001
Manufacturer	Daikin
Year installed	2007
Area served	Whole Building
Discrepancies noted	There was no site asset list provided by the client. Ensure an up to date asset list, with clear details of plant locations, is compiled and held on-site. An asset list has been created as part of this report, this can be utilised by the client.

CS4.1 Insulation

Is the pipework adequately insulated?

Yes

Internal refrigerant pipe work connected to this terminal unit was enclosed and not accessible during the inspection.

The assessor made the following notes and recommendations:

- No recommendation required.

Is the ductwork adequately insulated?

No

There is no ductwork associated with this type of terminal unit.

The assessor made the following notes and recommendations:

- No recommendation required.

CS4.2 Unit condition

Are the terminal units in good working order?

Yes

The terminal unit was seen to be in a good condition. Small levels of dust were found on the terminal unit filters which should be removed at the next PPM.

The assessor made the following notes and recommendations:

- No recommendations required No recommendation required.

CS5.1, CS5.2 Grilles and air flow

Do air delivery openings provide good distribution?

Yes

The terminal unit was seen to be positioned well enough to provide an adequate level of cooling throughout the conditioned space.

The assessor made the following notes and recommendations:

- No recommendation required.

Is there evidence of tampering with diffusers?

No

The air grilles on the terminal unit were inspected and found to be in a good condition and show no evidence of tampering.

The assessor made the following notes and recommendations:

- No recommendation required.

Are chilled and hot water being supplied to terminals simultaneously?

No

Not applicable, this terminal unit is not linked to a water loop of any kind.

The assessor made the following notes and recommendations:

- No recommendation required.

Are there are any records of occupant complaints regarding air distribution?

No

The assessor was not informed of any occupant dissatisfaction with the distribution from the terminal unit during the inspection.

The assessor made the following notes and recommendations:

- No recommendation required.

CS5.3, CS5.4, CS5.5 Diffuser positions

Is there potential for air to short-circuit from supply to extract?

No

The terminal unit was observed to be positioned well enough to allow good air circulation across the coils. There were no blockages to air paths and no significant risk of air re-circulation.

The assessor made the following notes and recommendations:

- No recommendation required.

Is the position of partitioning or furniture adversely affecting performance?

No

The position of the terminal unit is not affected by furniture or partitioning and there is no potential for the re-circulation of air from this unit.

The assessor made the following notes and recommendations:

- No recommendation required.

Is the control and operation adequate?

Yes

The terminal unit is linked to a local system controller which is sufficient to provide an adequate level of control and further details of any controller short falls can be found in the 'System Controls' section of this report.

The assessor made the following notes and recommendations:

- No recommendation required.

System controls

Control for VOL001/SYS001 Whole Building

CS8.1 Is the zoning appropriate in relation to anticipated cooling demand?

Yes

The controller is located within the conditioned area. One system with a single controller installed to serve a single zone. No specific zoning required.

CS8.2 Note the current indicated weekday and time of day on controllers or BMS against the actual time.

The date & time on the system controller have been setup incorrectly. It was showing 03:01 at 13:21 on Thursday on Tuesday.

The assessor made the following notes and recommendations:

- It is recommended that the time & date are programmed to allow any time schedules to operate correctly and efficiently.

CS8.3/a Note the set on and off periods (for weekday and weekend if this facility is available with the timer).

The controller/s showed the following operational schedules: Cooling & Heating: The schedules on the controllers were not being utilised.

The assessor made the following notes and recommendations:

- Ensure schedules on controls are set up, or methods are in-place to prevent systems operating outside of occupancy hours. Consider setting up "off only schedules" which would mean systems only activate manually when switched on by the occupants. The possibility of installing occupancy movement sensors could also be considered.

CS 8.3/b Is there a shortfall in timer capabilities?

No

The system controller is installed with a fully programmable 7-day timer.

The assessor made the following notes and recommendations:

- No recommendation required

CS8.4 Identify and assess zone heating and cooling temperature control sensors. Are the sensor types and locations appropriate in relation to heating and cooling emitters, heat flows or likely temperature distributions in the zone or space?

Yes

The temperature sensor is located within the internal unit. The temperature sensors are likely to give an adequate reflection of space temperature throughout the conditioned space.

CS8.5 Note the set temperature in each zone for heating and cooling in relation to the activities and occupancy of zones and spaces in relation to the manager’s intent.

The system controller was found to be in heating mode and set to maintain a space temperature of 32 degC.

The assessor made the following notes and recommendations:

- It is recommended that seasonal set points are introduced on this system to minimise energy waste. The following set points will optimise efficiency: the Winter set point should be circa 19 degC with the unit set to 'heating' mode. The Summer set point should be circa 24 degC operating in 'cooling' mode. In Spring/Autumn the controller should be set to 'auto' mode with a set point range of 21 degC - 22 degC.

CS8.6 Note whether a 'dead band' is, or can be, set between heating and cooling.

There is no potential for simultaneous heating and cooling within the area.

The assessor made the following notes and recommendations:

- No recommendation required

CS8.7 Do the sub system controls integrate effectively with the overall system control strategy?

Yes

There are no integration issues with this system controller.

The assessor made the following notes and recommendations:

- No recommendation required

CS8.8 Assess the means of modulating or controlling air flow rate through the air supply and exhaust ducts.

There is a 2 speed fan selector installed to the system controller to modulate the air flow rate.

The assessor made the following notes and recommendations:

- No recommendation required

PS3.6 Are guidance notices visible or controls available to inhibit use of cooling equipment whilst windows are open or cooling/heating is on?

No

There are no guidance notices in place to advise occupants on the correct operation of the AC system.

The assessor made the following notes and recommendations:

- It is recommended that notices are placed adjacent to the system controller which advise occupants of the recommended temperature set points and as a reminder to switch off the systems before leaving an area unoccupied.

Control for VOL001/SYS001 Whole Building

CS8.1 Is the zoning appropriate in relation to anticipated cooling demand?

Yes

The controller is located in an adjacent space One system with a single controller installed to serve a single zone. No specific zoning required.

CS8.2 Note the current indicated weekday and time of day on controllers or BMS against the actual time.

The date & time on the system controller have been setup incorrectly. It was showing 13:31 at 13:39 on Sunday on Tuesday.

The assessor made the following notes and recommendations:

- It is recommended that the time & date are programmed to allow any time schedules to operate correctly and efficiently.

CS8.3/a Note the set on and off periods (for weekday and weekend if this facility is available with the timer).

The controller/s showed the following operational schedules: Cooling & Heating: The schedules on the controllers were not being utilised.

The assessor made the following notes and recommendations:

- Ensure schedules on controls are set up, or methods are in-place to prevent systems operating outside of occupancy hours. Consider setting up "off only schedules" which would mean systems only activate manually when switched on by the occupants. The possibility of installing occupancy movement sensors could also be considered.

CS 8.3/b Is there a shortfall in timer capabilities?

No

The system controller is installed with a fully programmable 7-day timer.

The assessor made the following notes and recommendations:

- No recommendation required

CS8.4 Identify and assess zone heating and cooling temperature control sensors. Are the sensor types and locations appropriate in relation to heating and cooling emitters, heat flows or likely temperature distributions in the zone or space?

Yes

The temperature sensor is located within the internal unit. The temperature sensors are likely to give an adequate reflection of space temperature throughout the conditioned space.

CS8.5 Note the set temperature in each zone for heating and cooling in relation to the activities and occupancy of zones and spaces in relation to the manager's intent.

The system controller was found to be in heating mode and set to maintain a space temperature of 26 degC.

The assessor made the following notes and recommendations:

- It is recommended that seasonal set points are introduced on this system to minimise energy waste. The following set points will optimise efficiency: the Winter set point should be circa 19 degC with the unit set to 'heating' mode. The Summer set point should be circa 24 degC operating in 'cooling' mode. In Spring/Autumn the controller should be set to 'auto' mode with a set point range of 21 degC - 22 degC.

CS8.6 Note whether a 'dead band' is, or can be, set between heating and cooling.

There is no potential for simultaneous heating and cooling within the area.

The assessor made the following notes and recommendations:

- No recommendation required

CS8.7 Do the sub system controls integrate effectively with the overall system control strategy?

Yes

There are no integration issues with this system controller.

The assessor made the following notes and recommendations:

- No recommendation required

CS8.8 Assess the means of modulating or controlling air flow rate through the air supply and exhaust ducts.

There is a 2 speed fan selector installed to the system controller to modulate the air flow rate.

The assessor made the following notes and recommendations:

- No recommendation required

PS3.6 Are guidance notices visible or controls available to inhibit use of cooling equipment whilst windows are open or cooling/heating is on?

No

There are no guidance notices in place to advise occupants on the correct operation of the AC system.

The assessor made the following notes and recommendations:

- It is recommended that notices are placed adjacent to the system controller which advise occupants of the recommended temperature set points and as a reminder to switch off the systems before leaving an area unoccupied.

Control for VOL001/SYS001 Whole Building

CS8.1 Is the zoning appropriate in relation to anticipated cooling demand?

Yes

The controller is located in an adjacent space One system with a single controller installed to serve a single zone. No specific zoning required.

CS8.2 Note the current indicated weekday and time of day on controllers or BMS against the actual time.

The date & time on the system controller have been setup incorrectly. It was showing 13:31 at 13:39 on Sunday on Tuesday.

The assessor made the following notes and recommendations:

- It is recommended that the time & date are programmed to allow any time schedules to operate correctly and efficiently.

CS8.3/a Note the set on and off periods (for weekday and weekend if this facility is available with the timer).

The controller/s showed the following operational schedules: Cooling & Heating: The schedules on the controllers were not being utilised.

The assessor made the following notes and recommendations:

- Ensure schedules on controls are set up, or methods are in-place to prevent systems operating outside of occupancy hours. Consider setting up "off only schedules" which would mean systems only activate manually when switched on by the occupants. The possibility of installing occupancy movement sensors could also be considered.

CS 8.3/b Is there a shortfall in timer capabilities?

No

The system controller is installed with a fully programmable 7-day timer.

The assessor made the following notes and recommendations:

- No recommendation required

CS8.4 Identify and assess zone heating and cooling temperature control sensors. Are the sensor types and locations appropriate in relation to heating and cooling emitters, heat flows or likely temperature distributions in the zone or space?

Yes

The temperature sensor is located within the internal unit. The temperature sensors are likely to give an adequate reflection of space temperature throughout the conditioned space.

CS8.5 Note the set temperature in each zone for heating and cooling in relation to the activities and occupancy of zones and spaces in relation to the manager's intent.

The system controller was found to be in heating mode and set to maintain a space temperature of 26 degC.

The assessor made the following notes and recommendations:

- It is recommended that seasonal set points are introduced on this system to minimise energy waste. The following set points will optimise efficiency: the Winter set point should be circa 19 degC with the unit set to 'heating' mode. The Summer set point should be circa 24 degC operating in 'cooling' mode. In Spring/Autumn the controller should be set to 'auto' mode with a set point range of 21 degC - 22 degC.

CS8.6 Note whether a 'dead band' is, or can be, set between heating and cooling.

There is no potential for simultaneous heating and cooling within the area.

The assessor made the following notes and recommendations:

- No recommendation required

CS8.7 Do the sub system controls integrate effectively with the overall system control strategy?

Yes

There are no integration issues with this system controller.

The assessor made the following notes and recommendations:

- No recommendation required

CS8.8 Assess the means of modulating or controlling air flow rate through the air supply and exhaust ducts.

There is a 2 speed fan selector installed to the system controller to modulate the air flow rate.

The assessor made the following notes and recommendations:

- No recommendation required

PS3.6 Are guidance notices visible or controls available to inhibit use of cooling equipment whilst windows are open or cooling/heating is on?

No

There are no guidance notices in place to advise occupants on the correct operation of the AC system.

The assessor made the following notes and recommendations:

- It is recommended that notices are placed adjacent to the system controller which advise occupants of the recommended temperature set points and as a reminder to switch off the systems before leaving an area unoccupied.

Assessor's details

Assessor's name	Richard Brown
Email	info@greenzonesurveys.com
Assessor ID	EES/029946
Employer/Trading name	Green Zone Surveys (UK) Ltd
Employer/Trading address	Second Floor, Cobalt Business Exchange, Cobalt Park Way, Newcastle Upon Tyne NE28 9NZ
Accreditation scheme	Elmhurst Energy Systems Ltd
Accreditation scheme telephone	01455 883 250
Accreditation scheme email	enquiries@elmhurstenergy.co.uk

Inspection certificate

See the air conditioning inspection certificate for this property. (/energy-certificate/7061-4910-9674-2264-6807)