

Air conditioning inspection report

Nationwide Bldg Soc 4a High Street WESTON-SUPER-MARE BS23 1HZ	Report number 0984-4200-3502-9335-2104
	Valid until 16 May 2027

Executive summary

ACI Reports Ltd. has been commissioned to undertake an inspection of the air conditioning systems and associated controls at:-

Nationwide Building Society
4A High Street
Weston Super Mare
BS23 1HZ

The subject building is a 60s cavity wall building with display glazing and located in a high street area, and operates as a bank comprising of bank and cashier areas, office, staff room and WC. Opening hours are Monday, Tuesday Thursday and Friday 9am to 4pm, Wednesday 10am to 4.30pm, Saturday 9am to 12pm and closed on Sundays.

The Inspection and Report were undertaken in accordance with CIBSE's methodology, Inspection of Air Conditioning Systems TM44: 2012 Edition by an inspector accredited to the National Occupational Standard and accredited by Sterling Certification.

The primary aim of the report is to give the building owner, or operator, information about the performance of the system and plant and to identify opportunities to save energy and cut operating costs.

This Report identifies any operating anomalies; no-cost/low-cost savings; capital investment opportunities; the size and appropriateness of refrigeration plant in relation to cooling loads and the effectiveness of current maintenance regime.

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 inspection and report will benefit the owner or manager only if its findings are acted upon.

Whilst some items with regard to Health and Safety may have been noted, this should not be taken as a complete Report on Health and Safety. Similarly, whilst some items may refer to replacement of life expired plant, this should not be taken as a complete life cycle replacement report.

The building has 11 conditioned areas The cooling plant is located to the rear of building on the flat roof to which there was no access. The Terminal units consist of wall and ceiling mounted units and cassettes. The systems are controlled via individual hard wired remote controllers.

For the purpose of the report elements of the installed Air Conditioning system were inspected as part of the sampling strategy in accordance with CIBSE TM44 guidelines. or the purpose of the report, elements of the installed Air Conditioning system were inspected were accessible as part of the sampling strategy in accordance with CIBSE TM44 guidelines.

Access to the external plant was restricted. Their location was presumed to be to the rear of the building with no direct access at the time of the inspection; Calculations, capacities and refrigerant charges have been estimated, taken from external manufactures documentation in relation the indoor units. Consider gathering further data to establish the exact installed capacity in relation to current requirements. The minimum sampling requirement for packaged system is 10% or a minimum of 3 systems. In order to provide a comprehensive overview of the installed system, the following internal systems were inspected, and an operational test was performed on the external units.

The total installed cooling capacity is approximately 30kW.

The age and installation of the equipment was estimated at 2005 as per the date on the equipment, the

exact date would need to be confirmed with installation documentation..

Equipment Inspected:

Toshiba x 1 VRF serving the banking hall and Office
Toshiba x 1 Wall Mounted Unit Serving The Banking hall and office
Toshiba x 2 Ceiling cassettes serving the Banking hall and office
Toshiba x 3 Hard Wired Controller serving The Banking hall and office

Essential system documentation including an asset register, cooling capacities, method of control and schematics were not available at the time of the inspection, for the purpose of the report documentation was prepared on site.

The equipment inspected was not working.

Maintenance documentation was not available at the time of the inspection, there appears to be a maintenance regime in place that is appropriate for current operation

The systems in the subject property are affected by the F-Gas Regulations, records should be available for F-Gas charge weights, F-Gas recovery and equipment should be labelled where applicable. SYS 001 contains independent refrigerant circuits of more than 3kg of refrigerant which is more than the equivalent GWP value of 5 tonnes of CO² and should have records available for annual leak checks. This is in accordance with the F-Gas Regulation (EC) 517/2014 which came into effect on 1st January 2015 and uses the 4th IPCC assessment values. The threshold level for leak checking different refrigerants varies dependent upon the GWP value of the refrigerant that is used; refer to relevant Legislation tables. At the time of the assessment, leak test record dates were available. Equipment is labelled appropriately

A number of opportunities are outlined within the report that should be considered to maximise efficiency. While there is no mandatory requirement to carry out any recommendations, acting upon the advice within the report may lead to a reduction in energy consumption and operating costs.

Key recommendations

Efficiency

Consider installing a VRF system to reduce the number of individual circuits. Heat recovery VRF systems are available and could be an effective and efficient alternative to the single split system currently installed. Heat removed from areas with constant cooling requirements may be recycled to heat other parts of the building.

Maintenance

A maintenance regime was verbally confirmed as being in place. No records were available at the time of the inspection. Consider making records available. The system was not working

The external equipment and terminal units were not working consider a maintenance regime or replacing the systems.

Controls

Consider reviewing the control of cooling equipment system functions where available; (a) Controls are set to the correct time and day; (b) Temperature Set points and Dead Bands are appropriately selected. (c) Weekday and weekend set on and off periods are set. (d) Equipment cannot operate when the building is not occupied.

The control of the systems is adequate for current operations but could be improved to gain maximum efficiency. Review on an ongoing basis to take advantage of evolving.

Consider providing guidance notices and educating to staff on the general use of the systems and operating environment.

Consider installing controls / interlock to prevent heating and cooling systems from running simultaneously.

Management

Consider introducing a 'Monitoring and Targeting' regime to help identify where and when excessive energy is being consumed. Actions from this will create energy savings.

Subsystems inspected

VOL001/SYS001 Banking Hall and Office

Volume definitions	VOL001
Description	1 x Toshiba MMYMAP1204FT8E serving x 2 ceiling cassette
Effective rated cooling output	30 kW
Area served	Banking Hall and Office
Inspection date	17 August 2022
Cooling plant count	1
AHU count	0
Terminal units count	3
Sub system controls count	3

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
- 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

These records were not available:

- 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
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Cooling plants

Cooling plant 1

Unit Identifier	VOL001/SYS001 Banking Hall and Office
Component Identifier	VOL001/SYS001/CP1 Banking hall and Office

Equipment Inspected

Rated Cooling Capacity (kW)	30
Description (type/details)	VRF
Location of Cooling Plant	Rear of building on the roof no access
Manufacturer	Toshiba
Model/Reference	MMYMAP1204FT8E
Refrigerant Charge (kg)	23
Refrigerant Type	R410A
Serial Number	not determined
Year Plant Installed	2005
Areas/Systems Served	Banking hall and office

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:

no discrepancies

Approved sections

CS2.1 Is the refrigeration plant operational?

No

The refrigeration plant was not operational , there was no access to the roof to check the plant.

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

Yes

The area around the equipment is assumed free of obstructions and debris. There was no access to the plant.

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

Yes

The refrigeration plant is assumed in good condition as no access was possible to the roof, the plant is not operational.

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

Yes

The condenser is assumed free and positioned correctly of any warm air recirculation. No access to the plant.

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

No

The compressors were not operational at the time of inspection.

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

No

The heat rejection plant was not working.

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

Yes

The condenser heat exchanger are assumed undamaged and clean as there was no access to the plant. Clean heat exchangers as part of maintenance procedure

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

Yes

The area around the heat rejection plant is assumed clear of obstructions and debris. No access to the plant.

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

Yes

The condenser is assumed free and positioned correctly of any warm air recirculation. No access to the plant.

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

Yes

The refrigerant pipework insulation is assumed to be fitted well and is in good condition. No access to the plant.

Appropriately Sized Cooling Plant

Installed Cooling Capacity (kW)	30
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Occupant Density (m2/person)	15.58
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Total Floor Area served by this plant(m2)	187
Total Occupants served by this plant	12
Maximum Instantaneous Heat Gain (W/m2)	160
The Installed Size is Deemed	As 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.

This calculation refers to one Daikin single split system. This area has a total of 4 occupants and has an approximate total square area of 30m2. The upper heat gain for this area is estimated at 160W/m2. Therefore $160\text{W/m}^2 \times 30\text{m}^2 = 4800\text{W}/1000 = 4.8\text{kW}$

This calculation refers to one Toshiba VRF serving the Banking Hall and Office . This area has a total of 12 occupants and has an approximate total square area of 187m2. The upper heat gain for this area is estimated at 160W/m2. Therefore $160\text{W/m}^2 \times 187\text{m}^2 = 29920/1000 = 29.92\text{kW}$.

Refrigeration

Pre Compressor(°C)	0
Post Compressor(°C)	0
Ambient(°C)	23
The Temperature is Deemed	As expected
Refrigerant Type	R410A
Assess the refrigeration compressor(s) and the method of refrigeration capacity control	Variable inverter.

Are there any signs of a refrigerant leak?

No

No visible signs of leaks. Regularly check for sign of oil stains.

Montreal/ODS/F-Gas controlled?

Yes

The systems in the subject property are affected by the F-Gas Regulations; records should be available for F-Gas charge weights, F-Gas recovery, F-Gas Testing were applicable and equipment should be labelled. This is in accordance with the F-Gas Regulation (EC) 517/2014 which came into effect on 1st January 2015 and uses the 4th IPCC assessment values. The threshold level for leak checking different refrigerants varies dependent upon the GWP value of the refrigerant that is used; refer to relevant Legislation tables.

Notes and Recommendations**Regular Maintenance*****Is there evidence of regular maintenance?***

No

A maintenance regime was verbally confirmed as being in place no evidence was seen and the system is not working..

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

No

A maintenance contractor could not be determined. the system is not working.

Metering Comparison to appropriate energy benchmarks***Is metering installed to enable monitoring of energy consumption of refrigeration plant?***

No

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

No

No BEMS.

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

No records available to indicate usage or sub-metered energy consumption. Consider sub-metering to enable monitoring of the air conditioning plan.

Is the energy consumption or hours of use excessive?

No

No Data available.

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.

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.

Humidity Control

Is there separate equipment installed for humidity control?

No
Not applicable.

Terminal units

Terminal unit 1

Unit	VOL001/SYS001 Banking Hall and Office
Component	VOL001/SYS001/TU1 Banking Hall and Office
Description of unit	Ceiling Cassette
Cooling plant serving terminal unit	VOL001/SYS001/CP1 Banking hall and Office
Manufacturer	Toshiba
Year installed	2005
Area served	Banking Hall and office
Discrepancies noted	No Discrepancies.

CS4.1 Insulation

Is the pipework adequately insulated?

Yes

The pipework where visible appeared adequately insulated.

Is the ductwork adequately insulated?

No

Not applicable.

CS4.2 Unit condition

Are the terminal units in good working order?

No

The terminal Unit was not working. Continue regular maintenance inspections, review maintenance seasonally to ensure that filters, grilles and diffusers are free from debris. Follow the manufacturers recommended maintenance guide to prolong the longevity and ensure optimum performance. Follow best practice guidelines, CIBSE / HVCA SMG 2000 / Guide M

CS5.1, CS5.2 Grilles and air flow

Do air delivery openings provide good distribution?

Yes
The air delivery openings provide good distribution.

Is there evidence of tampering with diffusers?

No
There is no evidence of the diffusers being altered in any way.

Are chilled and hot water being supplied to terminals simultaneously?

No
Not applicable.

Are there any records of occupant complaints regarding air distribution?

No
There were no records of occupant complaints

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

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

No
Grilles are positioned correctly and there is no potential to short circuit.

Is the position of partitioning or furniture adversely affecting performance?

No
Grilles are positioned well away from any obstructions.

Is the control and operation adequate?

No
The units are not working.

Terminal unit 2

Unit	VOL001/SYS001 Banking Hall and Office
Component	VOL001/SYS001/TU2 Banking Hall and Office
Description of unit	Ceiling Cassette
Cooling plant serving terminal unit	VOL001/SYS001/CP1 Banking hall and Office

Manufacturer	Toshiba
Year installed	2005
Area served	Banking Hall and Office
Discrepancies noted	No Discrepancies.

CS4.1 Insulation

Is the pipework adequately insulated?

Yes

The pipework where visible appeared adequately insulated.

Is the ductwork adequately insulated?

No

Not applicable.

CS4.2 Unit condition

Are the terminal units in good working order?

No

The terminal Unit was not working. Continue regular maintenance inspections, review maintenance seasonally to ensure that filters, grilles and diffusers are free from debris. Follow the manufacturers recommended maintenance guide to prolong the longevity and ensure optimum performance. Follow best practice guidelines, CIBSE / HVCA SMG 2000 / Guide M

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No

Grilles are positioned correctly and there is no potential to short circuit.

Is the position of partitioning or furniture adversely affecting performance?

No

Grilles are positioned well away from any obstructions.

Is the control and operation adequate?

No

The units are not working.

Terminal unit 3

Unit	VOL001/SYS001 Banking Hall and Office
Component	VOL001/SYS001/TU3 Banking Hall and Office
Description of unit	wall mounted unit
Cooling plant serving terminal unit	VOL001/SYS001/CP1 Banking hall and Office
Manufacturer	Toshiba
Year installed	2005
Area served	Banking hall and Office
Discrepancies noted	No Discrepancies.

CS4.1 Insulation

Is the pipework adequately insulated?

Yes

The pipework where visible appeared adequately insulated.

Is the ductwork adequately insulated?

No

Not applicable.

CS4.2 Unit condition***Are the terminal units in good working order?***

No

The terminal Unit was not working. Continue regular maintenance inspections, review maintenance seasonally to ensure that filters, grilles and diffusers are free from debris. Follow the manufacturers recommended maintenance guide to prolong the longevity and ensure optimum performance. Follow best practice guidelines, CIBSE / HVCA SMG 2000 / Guide M

CS5.1, CS5.2 Grilles and air flow***Do air delivery openings provide good distribution?***

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No

Grilles are positioned correctly and there is no potential to short circuit.

Is the position of partitioning or furniture adversely affecting performance?

No

Grilles are positioned well away from any obstructions.

Is the control and operation adequate?

No

The units are not working.

System controls

Control for VOL001/SYS001 Banking Hall and Office

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

Yes

Zoning is appropriate in relation to cooling demand.

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

The time and day were not displayed

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

Not set

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

No

Timer not on.

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

Located on return

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.*

18C

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

Not applicable.

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

Yes

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

As expected.

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 were no notices present at the time of inspection. Consider providing guidance notices and educating to staff on the general use of the systems and operating environment.

Control for VOL001/SYS001 Banking Hall and Office

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

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Zoning is appropriate in relation to cooling demand.

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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.

22C

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

Not applicable.

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

Yes

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

As expected.

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

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Assessor's details

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Inspection certificate

[See the air conditioning inspection certificate for this property. \(/energy-certificate/2490-6438-3020-1205-3095\)](#)
