



Department of  
**Finance and  
Personnel**  
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Improving the energy efficiency of our buildings

**A guide to air-conditioning inspections for buildings  
(Guidance Booklet No. 3)**

**The Energy Performance of Buildings (Certificates and Inspections)  
Regulations (Northern Ireland) 2008 – SR 2008/170, amended by SRs  
2008/241; 2009/369 & 2013/12**

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# Foreword

This document is not a statement of the law, but is intended to help anyone who manages or controls air-conditioning plant understand how the EU Directive on the Energy Performance of Buildings and the local implementing Regulations work in practice; how to apply the Regulations; what their responsibilities are; and when air-conditioning inspections are required.

Air-conditioning inspections promote the improvement of the energy performance of buildings and form part of the implementation in Northern Ireland of the European Directives 2002/91/EC and 2010/31/EU on the Energy Performance of Buildings. These Directives have been implemented in Northern Ireland by The Energy Performance of Buildings (Certificates and Inspections) Regulations (Northern Ireland) 2008 SR 2008/170, as amended by SRs 2008/241; 2009/369 & 2013/12 (referred to collectively throughout this document as the EPC Regulations).

This guide describes the scope and requirements of the EPC Regulations applying to air-conditioning plant and provides guidance on who is affected and how the requirements are applied. The guide is intended for anyone who manages or is responsible for air-conditioning plant. While it aims to explain how the requirements will work in practice, any interpretation of the EPC Regulations is offered only as a guide, as the Department cannot provide legal advice. Therefore, it is important to read and understand the EPC Regulations as well. In cases of doubt independent legal advice should be sought.

This document is part of a series explaining the requirements relating to Energy Performance Certificates, Display Energy Certificates, air-conditioning inspections and accompanying reports in Northern Ireland.

# Chapter 1

## Introduction

### 1.1 Why air-conditioning inspections are required

Having your air-conditioning system inspected by an Energy Assessor is designed to improve efficiency and reduce energy consumption, operating costs and carbon emissions for your system. Energy inspections will highlight improvements to the operation of your existing systems or opportunities to replace older, less energy efficient systems or oversized systems with new energy efficient systems.

As the replacement of refrigerant is restricted in older systems (as established under other legislation), there is an additional incentive to improve or replace older systems with more modern energy efficient units.

Building owners and managers who control air-conditioning systems have statutory obligations and duties of care in the operation and maintenance of air-conditioning systems. The energy inspections discussed in this guide are in addition to the normal activities associated with the ownership and operation of air-conditioning systems.

Inspection, maintenance and cleaning programmes maintain the ability of the system to provide healthy and comfortable environments for building occupants, limiting the escape of refrigerant gases and ensuring the safety of equipment. The practices and procedures needed to achieve these aims should be applied more frequently than the assessment for energy efficiency described here.

### 1.2 When air-conditioning inspections are required

All air-conditioning systems with an effective rated output of more than 12 kW must be regularly inspected by an Energy Assessor. The inspections can be no more than five years apart. The regulations require the first inspection of affected air-conditioning systems to be carried out as follows:

- for all systems first put into service on or after 30<sup>th</sup> December 2008, the first inspection must take place within five years of the date when the system was first put into service;
- for other air-conditioning system, where the effective rated output is more than 205kW the first inspection must have taken place by 4<sup>th</sup> January 2010;
- for other air-conditioning systems, where the effective rated output is more than 12kW the first inspection must have taken place by 4<sup>th</sup> January 2011; and

- from 4<sup>th</sup> January 2011, if the person in control of the air-conditioning system changes and the new person in control is not given an inspection report, the new person must ensure the air-conditioning system is inspected within three months of the day s/he assumes control of the system.

### 1.3 Registering air-conditioning inspection reports

From 18<sup>th</sup> February 2013 air-conditioning inspection reports must be lodged on the national register managed on behalf of England, Wales and Northern Ireland by Landmark. This is the official register for storing all Energy Performance Certificates, Display Energy Certificates and reports. As well as providing a central source of EPC / DEC / report information, the register is a consumer protection measure, allowing building owners and tenants to verify the authenticity of documents. Documents and data are held on this register for 20 years, and air-conditioning system inspections are required every 5 years, so more than one air-conditioning report may be available per building.

### 1.4 Fluorinated greenhouse gas inspections

Fluorinated greenhouse gases are among the Kyoto Protocol groups of gases for which the EU has committed itself to reduce emissions. EU Regulation 842/2006 on certain fluorinated greenhouse gases (the F-Gas Regulation) is the legal instrument by which emissions reductions are to be delivered. The aim of EC Regulation is to minimize emissions mainly through leak prevention and repair. Specific provisions include leak checking obligations and require that personnel and companies be appropriately certified if they undertake work on equipment such as air-conditioning.

### 1.5 Systems requiring an air-conditioning inspection

Only air-conditioning systems with an effective rated output of more than 12 kW are affected by the EPC Regulations.

The effective rated output is the maximum calorific output in kW stated by the manufacturer of the system as deliverable during continuous operation while complying with the useful efficiency indicated by the manufacturer.

One or more air-conditioning units within a building controlled by a single person are considered to comprise a single air-conditioning system for the purposes of the EPC Regulations.

The person who controls the operation of the system is the person who controls the technical functioning of the system, not someone who can just alter the temperature, or

whose only responsibility is to adjust the controls.

For the purposes of the EPC Regulations, a building is defined as:-

*“a roofed construction having walls, for which energy is used to condition the indoor climate, and a reference to a building includes a reference to a building unit”.*

A building unit is defined as:-

*“a section, floor or apartment within a building which is designed to be used separately”.*

A building unit designed or altered to be used separately is where the accommodation is made or adapted for separate occupation. This could be indicated by the accommodation having its own access, separate provision of heating and ventilation or shared heating and ventilation but with the ability of the occupier to independently control those services. For a non-dwelling the unit could be deemed to be separate even if some facilities (i.e. kitchen and toilet facilities) were shared.

An air-conditioning system is defined as:-

*“a combination of all components required to provide a form of air treatment in which the temperature is controlled or can be lowered, and includes systems which combine such air treatment with the control of ventilation, humidity and air cleanliness”.*

This includes both fixed self-contained systems, such as split systems and centralised systems. Mechanical ventilation systems that provide no mechanical cooling themselves, but serve spaces that are cooled by other means, are included. Any components contained in an air-conditioning system that are only intended to provide heating are excluded. Air-conditioning systems that provide refrigeration for process applications, such as server rooms, would also require an inspection if that part of the system allows an inspection to be carried out.

## 1.6 Other requirements of the Energy Performance of Buildings Directive

Other aspects of the Energy Performance of Buildings Directive may apply to a building.

An Energy Performance Certificate (EPC) is required when a building is constructed, sold or rented out. This requirement came into operation on a phased basis from since 30<sup>th</sup> June 2008, depending on building type.

From 18<sup>th</sup> February 2013, an EPC given to a new buyer or tenant of a building which has a useful floor area of more than 500m<sup>2</sup> and which is frequently visited by the public must be displayed in the building in a prominent place clearly visible to the public who visit the building.

A Display Energy Certificate (DEC) is required by occupiers of public buildings with a total useful floor area greater than 500 m<sup>2</sup> (from 9<sup>th</sup> July 2015, the applicable floor area will reduce to 250 m<sup>2</sup>) which are frequently visited by the public.

EPCs and DEC's must also be lodged on the national register.



# Chapter 2

## What are air-conditioning inspections?

### 2.1 What does an air-conditioning inspection cover?

The inspection involves examining the refrigeration and air movement equipment that are part of air-conditioning systems, and their controls. It also involves examining any documentation that helps to understand the systems, or indicates the extent to which the systems have been maintained. The Energy Assessor is also required to estimate whether the system is suitably sized for the cooling loads in the treated spaces, and to provide advice on ways in which the performance of the system might be improved.

Access is required to equipment that may be located in plant rooms, or outside the building, including rooftops or other locations with limited provision for access. In all cases the building owner or manager should agree the means for safe access with the Energy Assessor, following a health and safety risk assessment of the individual situation. The Energy Assessor may need to be accompanied by the responsible building manager or maintenance agent at all times.

Some additional access may be needed, for example, to the inside of Air Handling Units (AHUs) or ducts. This must be provided and supervised by the responsible building manager or maintenance agent with due regard to the safety of the Energy Assessor and to building occupants. This would require the system to be turned off to allow safe access, so arrangements may need to be made for this outside working hours to avoid disruption to business. Similarly, the Energy Assessor may need to access a sample of components, such as fan coil units, which may be hidden above suspended ceilings. Again, access should be provided by the building manager.

Building owners and managers should not expect the air-conditioning inspection to identify hazards or unsafe aspects of the installation, operation or maintenance of systems that should be identified and addressed by other arrangements, nor should they expect the Energy Assessor to fix any problem identified as part of the inspection.

If owners or managers require these services then they should ensure that the need is clearly specified in the invitation to undertake the work, assure themselves that the Energy Assessor is competent to undertake such additional work, and ensure that such aspects are clearly expressed in their contract or agreement with the Energy Assessor.

Air-conditioning inspections carried out for the purposes of the EPC Regulations are not specifically designed to assess the risks to public health, although the Energy Assessor is required to inform building owners or managers of a potential issue. The

aim of the air-conditioning inspection is to address energy performance, but the Energy Assessor is also required to confirm that the relevant person has undertaken the necessary checks to ensure there is no legionella risk.

## 2.2 What can I expect in the report?

The purpose of the inspection and report is to ensure that building owners or managers are provided with information regarding the efficiency of the air-conditioning systems that they control, together with advice on how the energy efficiency or effectiveness of these systems might be improved and to identify opportunities to save energy and to reduce operating costs.

The inspection report should include at least the following details:-

- the likely efficiency of the system and any suggestions made for improvement;
- any faults identified during the inspection and suggested actions;
- the adequacy of equipment maintenance and any suggestions for improvement;
- the adequacy of the installed controls and control settings and any suggestions for improvement;
- the current size of the installed system in relation to the cooling load and any suggestions for improvement; and
- a summary of the findings and key recommendations.

There is no legal requirement to act on the recommendations. However acting on the advice in the inspection report and rectifying faults or making appropriate improvements, where this is cost effective, will contribute to the efficient running of the air-conditioning systems, as well as reduced carbon emissions and lower operating costs.

In some cases the costs of providing both heating and cooling may be reduced, where for example the two systems are unnecessarily in use at the same time due to inappropriate controls or settings.

In many cases it will be clear that the building and systems are already well understood, documented and commissioned, with records available showing that the equipment has been regularly maintained to a good standard. In such cases the scope of an energy inspection could be reduced in extent and the inspection report kept brief, with the main content advising on opportunities for load reduction or on alternative solutions not previously considered.

However, in other cases the Energy Assessor may find it necessary to suggest relatively basic maintenance, such as cleaning or repairs, to equipment whose efficiency has evidently suffered through neglect. Cleaning operations or adjustments

to controls do not form part of the inspection procedure, even where they might be carried out simply and with significant immediate effect in improving efficiency. The inspection is not intended, or expected, to involve any physical work of this nature as this could change the level of professional risk to the Energy Assessor. Authority to carry out such work would need to be given as part of a separate arrangement by the building owner or manager, provided the Energy Assessor has the necessary competence to do the work. However, the building owner, manager or their representative may well be able to carry out some alterations themselves as the energy inspection is carried out, provided they agree with the Assessor's observations.

Most reports are likely to contain advice with a combination of simple low or no cost measures and measures where some investment may be required either to apply the measures themselves, or to investigate in more detail the potential to apply measures. The manager should also be provided with, or informed how to obtain, access to advice on the ongoing management of the systems, particularly advice contained in existing free publications such as the Carbon Trust's ***Good Practice Guides***.

## 2.3 What a report must contain

The inspection report must include an assessment of the air-conditioning efficiency and the sizing of the system compared to the cooling requirements of the building, and contain appropriate advice on possible improvements to the system, replacement of the system and alternative solutions.

The inspection report must also include, but is not limited to, the following information:

- the address of the building in which the system is located;
- the name of the Energy Assessor;
- the name and address of the Energy Assessor's employer, or the name under which the Assessor trades and his address;
- the date on which the inspection occurred; and
- the name of the approved accreditation scheme of which he is a member.

All inspection reports produced on or after 18<sup>th</sup> February 2013 must contain a valid report reference number. This number can only be generated once the report is lodged on the central register.

# Chapter 3

## 3. Obtaining an air-conditioning inspection

### 3.1 Who is responsible?

The person who controls the operation of an air-conditioning system must:

- ensure an inspection has been carried out in accordance with the requirements and timetable of the EPC Regulations;
- keep the most recent inspection report made by an Energy Assessor; and
- give any inspection report kept to any person taking over his / her responsibilities with respect to the control of the air-conditioning system.

If the control of an air-conditioning system is passed to another person and that person has not been given an inspection report by the previous operator, the system must be inspected within three months of the new operator taking over control of the system.

### 3.2 Control of air-conditioning systems

The person who **controls** the **operation** of the system is the person who controls the **technical functioning** of the system, not someone who does no more than adjust the temperature or whose only responsibility is to adjust the controls.

The owner of the system will usually control the operation of the system even where day to day operation is contracted out to another. Where a tenant takes total responsibility for a building and its services (e.g. full repairing and insuring lease), then the tenant will control the system.

Where the operation and management of the system is carried out on a day-to-day Facilities Management (FM) basis, or a servicing company provides routine servicing and maintenance, the contract may specify the FM or servicing company as the controller of the system, with responsibility for ensuring that inspections are carried out. Depending on the terms of such a contract the FM or servicing company may accordingly become responsible under the EPC Regulations also. Even in such cases, however, the landlord or tenant retains a parallel duty to ensure the air-conditioning inspection has been done.

Where air-conditioning systems are installed locally by a tenant, the responsibility will lie with the tenant as owner of the system.

### 3.3 Responsibilities for conducting air-conditioning inspections

An energy inspection of an air-conditioning system must be carried out by an Accredited Energy Assessor who is a current member of an approved accreditation scheme.

The Energy Assessor must provide a written report of the inspection to the person who has control of the operation of the air-conditioning system as soon as practicable after the inspection date but only after the report has been entered on the central Register. Only inspection reports which have been produced and lodged by air-conditioning Energy Assessors are valid reports.

In certain circumstances data gatherers, working under the supervision of the Energy Assessor, enable the Assessor to produce reports for larger and sometimes more complex buildings and portfolios of buildings. Data gatherers must have a contractual relationship with the Assessor, or the company employing the Assessor, to provide professional assistance to gather the information needed to carry out an energy assessment of a building for the purpose of issuing an air-conditioning inspection report. The Assessor must be in a position to verify the data and supervise how and by whom it is collected. For the purposes of effective quality control and assurance, the Energy Assessor must not sanction any practice that is contrary to the quality of the air-conditioning report. Accreditation schemes have been provided with guidance on this.

### 3.4 Energy Assessor accreditation

Accreditation schemes are responsible for managing air-conditioning Energy Assessors and for the quality of air-conditioning inspections by ensuring their Energy Assessors are competent and possess the appropriate skills to conduct energy assessments. To become a member of an accreditation scheme, Energy Assessors will need to:

- demonstrate their competence, either by having a recognised qualification from an awarding body **or** approved prior experience and learning equivalent to the National Occupational Standard requirements;
- maintain appropriate professional indemnity cover;
- update their skills and knowledge regularly;
- participate in the accreditation schemes' quality assurance procedures; and
- abide by accreditation schemes' advice and guidance.

Approved accreditation schemes for Energy Assessors for air-conditioning may be

found on the Department of Finance and Personnel website at [www.epb.dfpni.gov.uk](http://www.epb.dfpni.gov.uk) .

### 3.5 Responsibilities with respect to other inspection or certification procedures

The Energy Assessor's report must be kept in a safe place so that it can be used to inform subsequent inspections. It is recommended that the inspection report should be kept in the building log-book, together with ongoing maintenance and/or energy records.

Newer, extended or renovated buildings may already be provided with a building log-book satisfying the requirements of Part F of the Building Regulations to provide the owner with information about the building, its fixed services and their maintenance requirements. Building log-book toolkits are available from a variety of sources. These provide guidance and example templates for the preparation of a building log book, and also on its subsequent use by the building manager. The building log-book would be the most suitable place to keep records of the air-conditioning inspection, together with other such inspection results e.g. fluorinated greenhouse gas inspections. Where a log-book does not exist, it would be useful to begin a file to keep these records.

The information that would be helpful to keep in the building log-book, or in a separate file if a formal log-book is not available, includes:

- the preparatory details for packaged cooling systems or for centralized cooling systems. Further information may be found in sections 2.2 and 2.3 of the Chartered Institute of Building Service Engineers TM44, *Inspection of air-conditioning systems: a guide to EPBD compliance*;
- a copy of the full signed report from the air-conditioning inspection produced by the Energy Assessor;
- the recommendation report and any data used to prepare an EPC for the building (where one has been required);
- the advisory report produced to accompany a Display Energy Certificate (if one is required); and
- the reports from any other regular inspections (such as inspections for refrigerant leakage) involving the building's air-conditioning or heating systems.

This information may then be provided for subsequent energy inspections, and may help to minimize the time needed to carry out such inspections.

# Chapter 4

## 4. Applying the EPC Regulations in practice

### 4.1 Determining the size of your air-conditioning system

The effective output of an individual air-conditioning unit or system may be given on the rating plate attached to the unit. It may also be stated in the operating and maintenance manual or it may be available from the manufacturer's website. Alternatively, where the system is covered by a maintenance contract, the capacity should be known by the contractor and should be reported in the maintenance records they supply.

The guidelines below are an approximate indication of typical figures for installed capacity for various spaces and may help you determine whether your system is within the scope of the EPC Regulations. Cooling requirements depend on a wide range of circumstances, including the fabric, location and orientation of the building towards the sun, as well as the activities and number of people in the building. Older systems are also likely to have higher rated outputs for a given floor area. Where more specific figures are needed these should be calculated taking account of the particular circumstances of the building and its use.

The guidelines below are for offices and shops. If it is not clear to you whether your building reaches the threshold you must determine the installed capacity of your system by appropriate inspection, calculation and enquiries. In more specialised buildings the wide range of factors which influence system capacity means that these systems should be determined by a suitably qualified person on a case by case basis if the information is not already available.

Activity	Likely area requiring more than 12 kW of cooling
Air-conditioned general office spaces Assuming typical levels of electrical equipment and 8-10 m <sup>2</sup> per person	200 m <sup>2</sup>
Air-conditioned offices with high levels of IT and electrical equipment	100 m <sup>2</sup>
<i>Office, call centre or dealing with floors with high occupant densities of 6 m<sup>2</sup> or similar, and high levels of IT, communications or lighting loads may well fall within the scope of smaller areas</i>	
Retail spaces with average levels of display lighting	250 m <sup>2</sup>
Retail spaces with high levels of display lighting and illuminated cabinets	150 m <sup>2</sup>

## 4.2 Control and contractual arrangements for air-conditioning units and the requirements for air-conditioning inspections – examples

### 4.2.1 Control of equipment

Air Conditioning System (150 kW)	Floor 5	
	Floor 4	
	Floor 3	
	Floor 2	110kW
	Floor 1	

The central air conditioning system for the building is 150 kW.

Tenant 1 occupies floors 1 and 2 and has additionally installed their own systems of 110 kW.

The Landlord is the relevant person for the control of the central (150 kW) system. The tenant is the relevant person for the control of the additional system (110 kW) on floors 1 and 2.

The landlord is responsible for ensuring there is an inspection report for the central system and the tenant is responsible for ensuring there is an inspection report for the equipment they have installed.

In this example each party controls not more than 250 kW and a first inspection should have happened by 4<sup>th</sup> January 2011.

### 4.2.2 Multiple small systems in a building

Restaurants and bars										120 kW
Reception										

Hotel has 50 rooms. Each room has a cooling capacity of 3 kW. The system is under the control of the hotel chain. The total under single control is 270 kW, 105 kW in rooms and 120 kW for the reception rooms and restaurants.

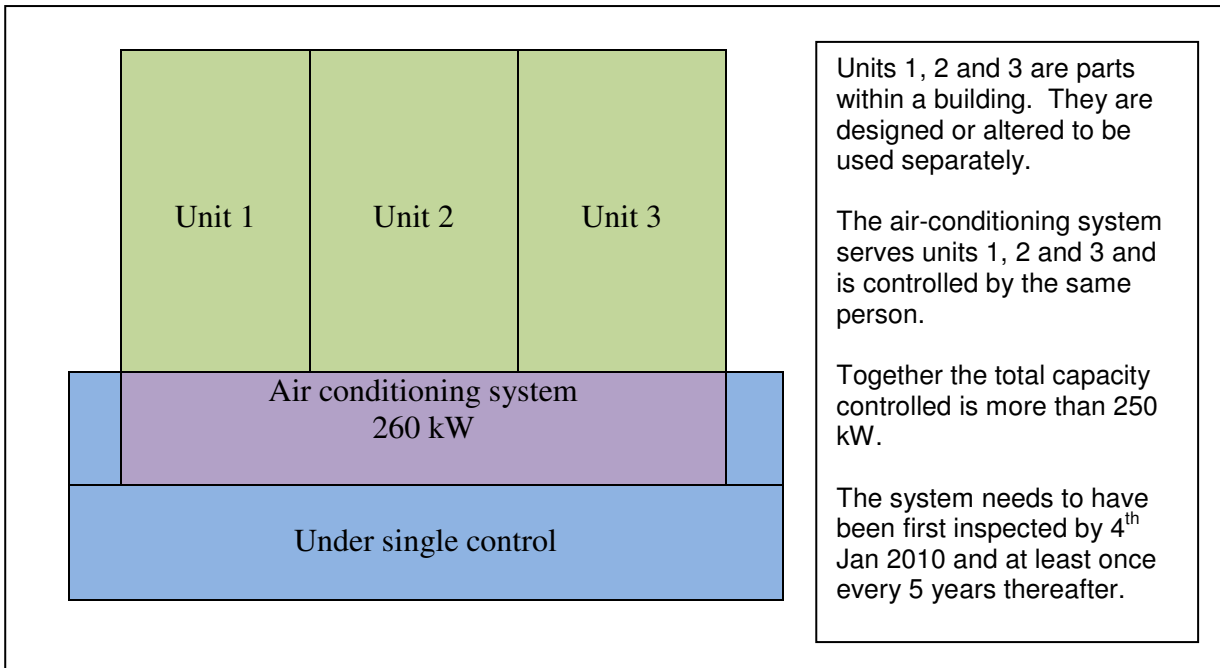
The system needs to have been first inspected by 4<sup>th</sup> Jan 2010 and at least once every 5 years thereafter.



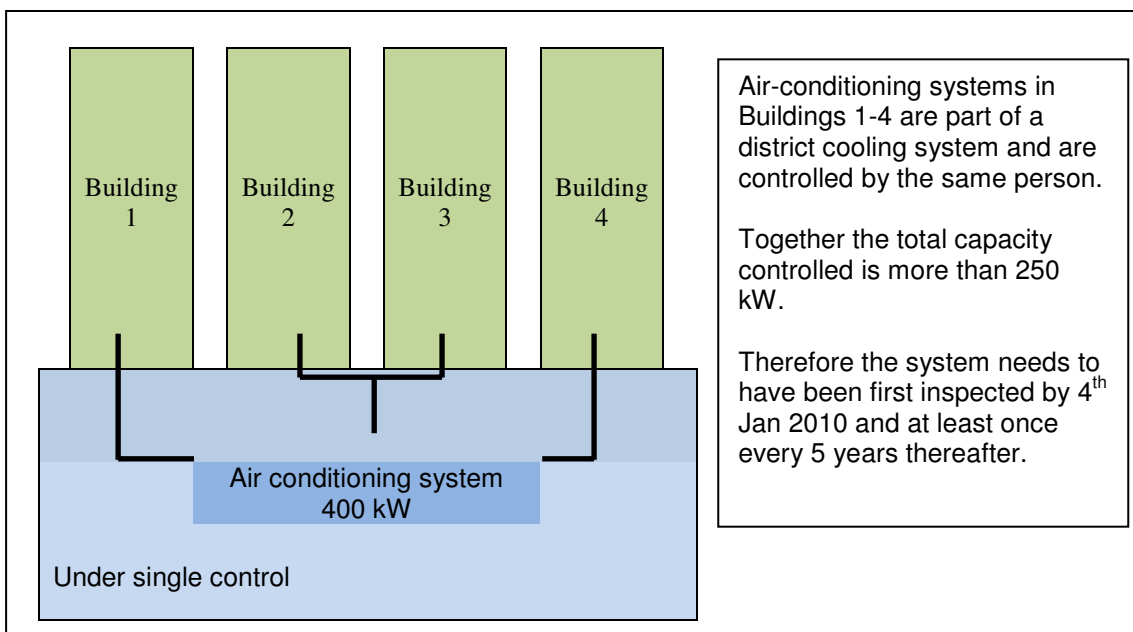
under the control of the hotel chain) means that the combined cooling capacity is greater than 12kW, so an air-conditioning inspection and report is required.

### 4.3 Control of air-conditioning units in buildings or parts of buildings and the requirements for air-conditioning inspections - examples

#### 4.3.1 Equipment under single control in parts of a building



#### 4.3.2 Equipment under single control in separate buildings



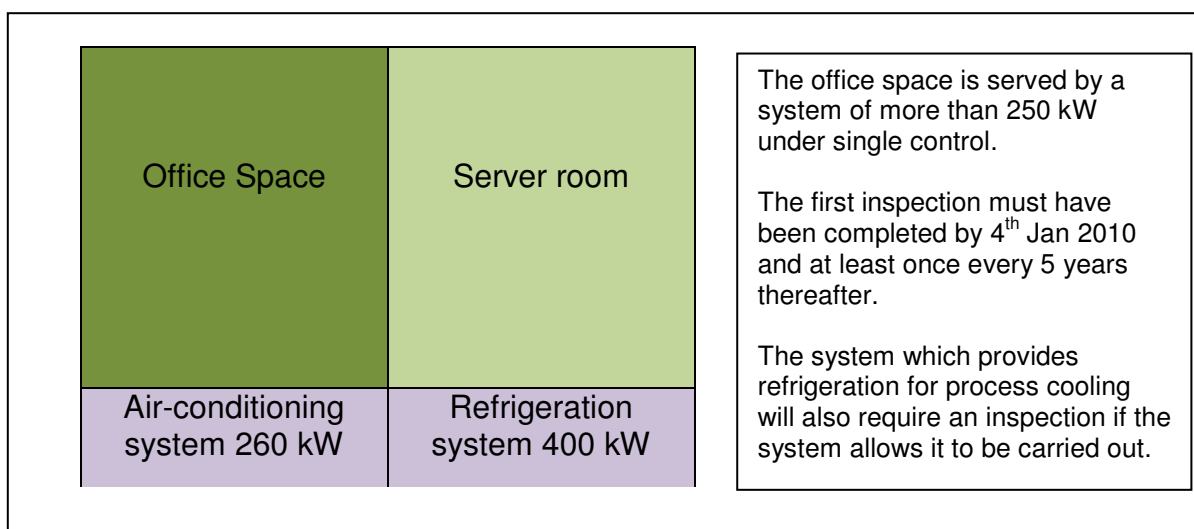
Where an individual building benefits from the refrigeration plant of an air-conditioning system, under single control, the building owner or manager is responsible for

obtaining an air-conditioning inspection report, if the local cooling plant in the building is greater than 12kW.

The buildings are not covered by the air-conditioning plant under single control unless the systems in these buildings are a permanent part of the air-conditioning system.

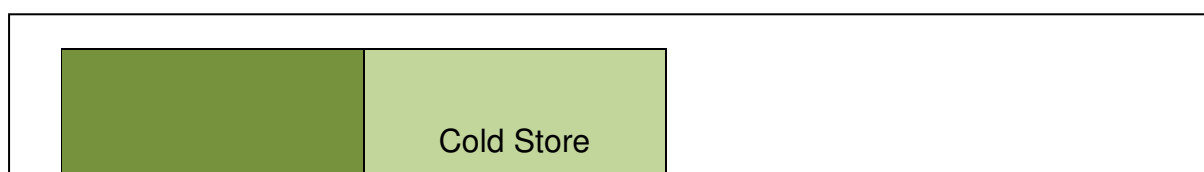
## 4.4 Cooling capacity and process applications - examples

### 4.4.1 Refrigeration provided solely for process applications



Air-conditioning systems are defined as a combination of all the components required to provide a form of air treatment in which the temperature is controlled or can be lowered, and include systems which combine such air treatment with the control of ventilation, humidity and air cleanliness. Although a system may provide process cooling at a specified level, or provide conditioning to spaces for a specific purpose, the Energy Performance of Buildings Directive is designed to manage and reduce energy consumption. Air-conditioning systems that provide refrigeration for process applications, such as cold storage or server rooms, would also require an inspection if that part of the system allows an inspection to be carried out.

### 4.4.2 Cooling capacity and refrigeration combined for process applications and comfort



The retail space and cold store is served by a system of more than 250 kW under single control. Even though the cold store is a process application, the air-conditioning system also conditions space for the benefit of occupants in the retail space. The system needs to have been first inspected by 4<sup>th</sup> Jan 2010 and at least once every 5 years thereafter.

**4.4.3 Cooling capacity, where occupants cooling capacity**

**4.4.3 Cooling capacity, where occupants benefit from additional cooling capacity**

Air-conditioning System 240 kW  (Whole building)	Floor 5	Air-conditioning System 100 kW (Trading Floor only)
	Floor 4	
	Trading Floor	
	Floor 2	
	Floor 1	

The building is served by a single system of not more than 250 kW under single control. But the addition of an air-conditioning system of 100 kW installed to serve the trading floor brings the total under single control to more than 250 kW. The system needs to have been inspected by 4<sup>th</sup> Jan 2010 and at least every 5 years thereafter.

The occupants on the trading floor are using the machines rather than solely running the process. Therefore any additional air-conditioning capacity benefits the occupants and is included in the air-conditioning capacity to be inspected.

# Chapter 5

## 5. Assessing the energy performance of an air-conditioning system

### 5.1 The inspection process

The air-conditioning inspection process will examine the refrigeration equipment and air moving systems that are part of an air-conditioning system, including their controls. Any documentation which helps to understand the system, or indicates the extent to which the system has been maintained, will also be examined. The Energy Assessor is also required to estimate whether the system is suitably sized for the cooling loads in the treated spaces, and to provide advice on ways in which improvement might be made to the energy efficiency of the system.

Access will be required to equipment that may be located in plant rooms or outside the building, including on rooftops or in other positions with limited provision for access. In all cases the building owner or manager should agree the means for safe access in conjunction with the Energy Assessor. The Assessor may need to be accompanied by the responsible building manager or maintenance agent at all times.

The building owner or manager should not expect the Energy Assessor to routinely alert them to all hazards or aspects of the installation, operation or maintenance of systems that are unsafe. If the owner or manager requires this service then they should ensure this need is specified clearly in their invitation to tender for the work and assure themselves that the Assessor is competent to undertake such additional inspections.

The purpose of the inspection and resulting report is to ensure that the building owner or manager is provided with basic information that gives an indication of the likely efficiency of the air-conditioning system, together with some initial advice on how energy efficiency might be improved. The report has to be lodged on the central register managed by Landmark on behalf of England, Wales and Northern Ireland. A copy should be kept in a safe place by the building owner or manager and may be used to inform subsequent inspections.

There is no statutory requirement to act on the recommendations in the air-conditioning inspection report, but the building owner or manager will benefit if the findings are acted upon.

## 5.2 The scope of an inspection

### 5.2.1 Refrigeration

Refrigeration equipment and its associated heat exchange systems are checked briefly. The inspection looks primarily for indicators of damage or lack of maintenance that would significantly reduce their efficiency from their “as new” state and does not provide high level detail.

Effective heat rejection is necessary to maintain the efficiency of the refrigeration system. If outdoor heat rejection equipment is damaged, or its access to adequate flow of air is otherwise reduced by blockage due to dirt or debris, its effectiveness in rejecting heat is reduced and its temperature will be unnecessarily high. This has the effect of reducing refrigeration efficiency, and reducing the cooling capacity of the system. It may cause the refrigeration equipment to turn off and on under the action of its own high temperature or pressure cut-out, often without satisfying the building cooling load.

Similarly, effective indoor heat exchange is necessary to maintain the efficiency of the refrigeration system. If this heat exchange equipment is damaged, or its access to adequate airflow is otherwise reduced, its effectiveness in transferring heat to the refrigeration system is reduced and its temperature will be unnecessarily low. This consequent reduced temperature at the indoor unit increases the temperature difference that the refrigeration system has to maintain, which has the effect of reducing the cooling capacity of the system. It may cause the refrigeration equipment to turn off and on under the action of its low temperature or pressure cut-out, often without satisfying the building cooling load.

### 5.2.2 Air moving systems

Where installed as part of the system to provide cooling, an air movement system is an important factor in the assessment. The contribution that fans make to the total annual energy consumption of the combined cooling system is likely to be higher than that of the refrigeration plant itself, and there may be a greater potential for improvement.

The effectiveness of how air is delivered can play a part in determining the overall efficiency of the air-conditioning system. Where delivery systems are ineffective, plant that is otherwise efficient may operate for longer periods than necessary. However the reverse may also be true, in that some delivery systems may interact unfavourably with occupants or control sensors, leading to reduced operation and consequent lack of adequate cooling. Improving some systems, even at good efficiency, could increase annual energy use.

Important factors to observe are the condition of, damage to, or blockage of filters and

heat exchangers, and the fan type and method of control. Ventilation air delivery systems need free access to outdoor air. Where grilles, screens or pre-filters are obscured by damage or debris, additional energy will be needed to overcome the extra resistance caused by the restriction to flow, or the system may under-perform in other ways due to reduced air flow rates.

Where systems provide cooled air, admitting air from locations where the local air temperature may be higher than ambient will add to the energy required to achieve cooling to the required temperature. Such locations might include positions near busy roads, in car parks, or where exhaust air from the building could be drawn into the air inlet.

### 5.2.3 Controls

System controls are assessed in more detail. There could be considerable scope to identify inefficiency due to inappropriate control methods, incorrect control settings and poorly located sensors, and there could be much potential for improvement at low cost. Although discovered 'faults' might be as simple as time-switches or cooling or heating thermostats being incorrectly set, the Energy Assessor would not reset them but will report to the building owner or manager.

An investigation of the realised effectiveness of system controls over any significant period of operation would be outside the scope of a simple inspection regime, but a series of physical observations of their layout and operation could give an indication of potential inefficiency, ineffectiveness or misuse.

It might not be possible to investigate some aspects of the layout and operation of controls, particularly in more complex systems. However, sufficient of the following important issues should be accessible to a brief examination:

- the set temperatures to which the treated spaces are to be conditioned;
- the time periods during which they are to be conditioned;
- the appropriateness of the control zones, control sensors and their locations;
- the potential for cooling to be operated at the same time as heating;
- the method of refrigeration capacity control; and
- the method of air flow rate control.

Where systems are controlled by a Building Management System (BMS), it may be necessary for the building manager to arrange for relevant aspects of this information to be extracted from the BMS prior to the inspection.

## 5.3 Documentation

The quality, extent and accessibility of relevant information provided before an air-conditioning Energy Assessor visits an installation has important consequences for the effectiveness, including the cost, of an the inspection. Experience has shown that information is often missing and Energy Assessors have to spend time trying to locate relevant documentation. This is not an effective use of the Assessor's time on-site and without information it is difficult to estimate properly the cost of an inspection.

The air-conditioning Energy Assessor will ask the building owner or manager to provide a list of relevant records, to have sight of the principal ones before visiting the site and for site records to be made readily available. Any available documentation for the air-conditioning system must be provided prior to the inspection. This could include, for example, catalogue information and details provided during installation, commissioning and maintenance of the system. The quality and accessibility of relevant information provided before an inspection takes place may reduce the time taken to complete the inspection and may also then reduce its cost.

## 5.4 Maintenance

Evidence of any existing planned maintenance schedule or of other recent maintenance activities will be sought. Where documentation clearly shows that equipment and systems are already the subject of regular good practice checking and maintenance procedures, a number of aspects of the energy inspection and provision of advice may be reduced in scale or omitted.

## 5.5 Advice on improvement options

Three levels of energy efficiency are likely to be found when systems are assessed:

- systems where efficiency is clearly impaired due to faults, neglect or misuse;
- systems where efficiency is likely to be lower than the current minimum provisions due to aspects of design or use; and
- systems that are acceptably efficient.

Correspondingly, there are three broad levels of advice the building owner or manager may receive:

- advice on the rectification of faults in the system that are impairing its efficiency as designed;

- improvement advice to bring existing systems broadly to a standard of 'inherent' efficiency consistent with the current minimum provisions of building regulations or standards; and
- best practice improvement advice to raise standards even where systems are fully compliant with the current minimum provisions of building regulations or standards.

Given the need for simplicity and consistency, the inspection will mostly provide a combination of aspects of the first 2 types of advice only. However, best practice aspects may be provided on a generalised basis by providing reference to other published guidance sources.

There is a further category of advice which may be given. Some systems may be older and operate with refrigerants which are being phased out, or having their use and supply restricted, under regulations relating to ozone depleting substances. In these cases the Assessor may give advice on possible options for future system adaptation to use other refrigerants, or complete replacement. This advice will need to be supplemented by a more detailed assessment when modifications or replacement are to be undertaken.

More detailed information about the inspection process and good practice inspection and maintenance guidance may be found in the Chartered Institute of Building Service Engineers TM44 guidance: *Inspection of air-conditioning systems – a guide to the Energy Performance of Buildings Directive compliance*, or similar equivalent guidance. A summary of good practice is provided in the Annex to this guide.



# Chapter 6

## 6. Consumer protection and enforcement

### 6.1 Checking the authenticity of an air-conditioning inspection report or an Energy Assessor

An air-conditioning report must be produced by an accredited air-conditioning Energy Assessor. The Assessor must make a copy of the inspection report available to the client, or to the person who controls the system, as soon as practicable after the inspection date but only after the report has been lodged on the central register. The Assessor may also make a copy of the report available to the Accreditation Scheme of which s/he is a member.

All air-conditioning Energy Assessors must be members of an accreditation scheme. To check that an Energy Assessor is a member of an accreditation scheme, a search facility is available on the central register website ([www.niepcregister.com](http://www.niepcregister.com)). If a person does not have access to the internet s/he can ask the Energy Assessor for the name of the accreditation scheme of which they are a member and for their membership number. This information will enable the building owner or manager to confirm with the accreditation scheme that the Energy Assessor is accredited and fit and proper to practice as an Energy Assessor.

From 18<sup>th</sup> February 2013 it is a statutory requirement for the Energy Assessor to lodge all air-conditioning inspection reports on the central (non-domestic) register. When the report is lodged it will be allocated a unique reference number. From this date only air-conditioning reports which are produced and lodged on the central register are valid reports. Reports produced before this date may have been lodged on the central register voluntarily, but would remain valid even if they were not lodged on the central register, as there was no such statutory lodgement requirement prior to this date.

Statutory lodgement has been introduced to protect the consumer and to ensure that only accredited air-conditioning Energy Assessors undertake inspections and prepare subsequent reports. Statutory lodgement also enables the building owner or manager to verify the identity of the Assessor and enables accreditation schemes to monitor the standards of reports which have been produced. Statutory lodgement also enables lost and mislaid reports to be replaced easily at no additional cost to the building owner or manager.

The building owner or manager will be able to check the validity of the report by accessing an online copy and downloading it from the central register using the unique report reference number. A copy of the report may also be downloaded using the

building address, should the reference number be lost, unless the building is one for which an opt-out is in place.

## 6.2 Complaints

Complaints about the availability or quality of an air-conditioning inspection report or about an Energy Assessor or energy assessment should be directed to the following:

1. ***Failure to have an air-conditioning inspection report*** - contact the building occupier or the enforcement authority, which is District Council Building Control, except in relation to District Councils' own buildings in which case it is the Department of Finance & Personnel. The enforcement authority has the power to act on your complaints;
2. ***Quality or accuracy of the air-conditioning inspection report and its recommendations*** - contact the Energy Assessor who produced the report. If the Assessor is no longer practicing, or you are not satisfied with the response you have received, you should contact the accreditation scheme of the Energy Assessor who produced the report. Contact details of both can be found on the report; and
3. ***Complaints regarding an Energy Assessor or any aspects of the energy assessment*** - contact the Energy Assessor in the first instance. If the Assessor is no longer practicing or you are not satisfied with the response you have received you should contact the accreditation scheme of the Energy Assessor who produced the inspection report. Contact details of both can be found on the report.

The accreditation scheme must investigate the complaint and where necessary provide the appropriate redress. Where it is found that the information on the air-conditioning inspection report is incorrect a new inspection report must be issued and the information on the central register amended. This procedure should be followed at no cost to the complainant. In the event that the complaint cannot be resolved satisfactorily, the accreditation scheme will refer the matter to an independent third party for adjudication.

If the building owner or manager suspects that the air-conditioning inspection report has been produced fraudulently, then the matter should be referred to the police.

## 6.3 Penalties for not having an air-conditioning inspection report

District Councils are responsible for enforcing the requirements relating to air-conditioning inspection reports, except in relation to their own buildings, for which the Department of Finance & Personnel is the enforcement authority. Failure to commission, keep or provide an air-conditioning inspection report when required by the EPC Regulations means you may be issued with a penalty charge notice. The enforcement authority may act on complaints or undertake investigations. They may request you to provide them with a copy of the air-conditioning inspection report. If asked, you must provide this information within seven days of the request or be liable to a penalty charge notice for failing to do so. A copy of an air-conditioning inspection report may be requested by the enforcement authority at any time up to six months after the last day for compliance with the obligation to make it available.

The penalty for failing to have an air-conditioning inspection report is fixed at present at £300.

Tenants of a building where a central air-conditioning system is under the control of the building owner or manager would not be liable for a penalty charge for a breach of the duties.

A further penalty of £200 may be issued for failure to provide, within 7 days, a copy of the air-conditioning inspection report when requested by an enforcement authority.

If you are issued with a penalty charge notice and you believe it should not have been issued you can request a review. If you are not satisfied with the outcome of the review you may appeal to the county court within 28 days beginning with the day after that on which the penalty charge notice was given by the enforcement authority.

If you want to sell or let a building with an air-conditioning system which should have been inspected, then it is very likely that the legal advisors to the prospective tenant or buyer will require sight of the report during the legal processes prior to signing the contract. Failure to have a report where one is required may have a negative impact on the transaction process.

## Summary Good Practice Guide to operating your air-conditioning system energy efficiently

### Maintaining your air-conditioning system

Regular maintenance checks will help ensure your air-conditioning system is operating as efficiently as possible. Energy consumption can increase by as much as 60 per cent as a result of poor maintenance and dirty components.

Your maintenance checklist should include:

**Condensers** - check that condensers are unobstructed and always ensure condensing and evaporating devices are clean and well maintained.

**Refrigerant charge and leakage** - check regularly the refrigerant charge for air-conditioning and comfort cooling plant and examine joints etc for signs of leakage. Some refrigeration systems may also be subject to routine leakage testing requirements under the F-gas regulation (EC Regulation No. 842/2006 on Certain Fluorinated Greenhouse Gases).

**Pipework insulation** - damaged insulation on refrigerant pipework will consume more energy to maintain the required temperature. Replace any damaged sections and pay specific attention to pipework located outside a building.

**Fans, filters and air ducts** - blocked filters lead to reduced airflow and increased operating costs. Check and clean fans, filters and air ducts and consider fitting gauges that indicate when the replacement of filters is required.

**Thermostat calibration** - calibrate thermostats annually to ensure they respond correctly to actual temperatures.

**Stay safe** - keep heat exchangers and cooling towers clean and treated to save energy and prevent health problems such as Legionella.

### Operating your air-conditioning system efficiently -

- set controls correctly to reduce the need for cooling thus reducing the operating cost of your air-conditioning system;
- turn cooling thermostats up. Set the temperature 'switch on' to around 25–27°C and ensure heating switches off at around 19°C so that the two systems do not operate simultaneously;
- match air flow rates to demand. Excessive draughts can cause joint stiffness, headaches and a dry nose and throat. Ask your maintenance technician for options to improve the internal environment;
- switch off unnecessary electrical equipment (e.g. computers and lights) when not required;
- let the building cool overnight. Ensure blinds are down at the end of the working day and open secure vents overnight, where possible;
- place heat-emitting equipment in a separate, naturally ventilated area. Colder areas on the north side of buildings are ideal;

- service computer server rooms separately from the main system and cool only to the maximum temperature at which the equipment can operate effectively. Building occupants should be able to override these temperatures but controls should be reset when the area is vacated;
- keep windows closed when air-conditioning is on. Blinds can be angled to reduce solar heat gains whilst reflecting light on to walls and ceilings to reduce demand for electric lighting;
- use external shading to reduce the amount of light/heat entering a space. 'Louvres' can be retrofitted to buildings to provide shade during summer whilst allowing lower winter sun to penetrate the area;
- encourage staff involvement by demonstrating how they can be more in control of their own environment. Explain how thermostats operate and give guidance on recommended operating temperatures and on how to set heating or cooling units correctly. Display instructions on individual units and ensure that remote controls are accessible; and
- keep a log-book detailing control settings, maintenance information and any records of the commissioning process. A comprehensive log-book helps users to develop a better understanding of a building's operation and management.

**Monitor energy usage** - monitor your energy consumption by examining your energy bills and any other meters which have been installed. Some energy suppliers are able to provide "real time" consumption data for buildings.

**Invest in new equipment** – this is a big decision for most businesses. Tax relief may be available in the form of Enhanced Capital Allowances (ECAs). You also need to think about whether the proposed work means you will need to make more improvements as part of the consequential improvement requirement in the Building Regulations.

The Consequential Improvement requirement applies to proposed work in buildings over 1000m<sup>2</sup> and includes

- an extension;
- the initial provision of any fixed building services (heating, air-conditioning, and mechanical ventilation or air handling); and
- an increase to the installed capacity of any such fixed building service.

If any of these applies, then you will have to carry out such further improvements to the building as a whole that are necessary to ensure that it complies with the requirements of the Building Regulations. For more information refer to the Building Regulations at <http://www.dfpni.gov.uk/index/buildings-energy-efficiency-buildings/building-regulations/content-building-regulations-newpage-3.htm>, specifically Technical Booklets F1 and F2.

## Annex B

### Further information

#### **Department of Finance and Personnel**

Website: [www.epb.dfpni.gov.uk](http://www.epb.dfpni.gov.uk)  
General EPB Email: [info.epb@dfpni.gov.uk](mailto:info.epb@dfpni.gov.uk)  
General EPB Enquiry Number: 028 9051 2700

#### **For the National register**

Landmark Information Group Limited  
[www.niepcregister.com](http://www.niepcregister.com)

**For information about energy efficiency, practical advice and grants**  
*The Carbon Trust* [www.carbontrust.co.uk](http://www.carbontrust.co.uk)