

Implementation of Energy Performance in Buildings Regulations

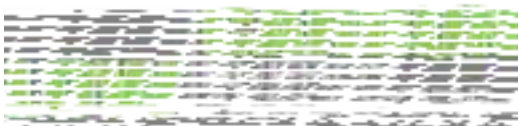
Jacqueline Balian

CIBSE



Overview

- Producing EPCs
- Energy assessors and becoming accredited
- Producing certificates
- Lodging certificates
- Accreditation bodies
- Quality Assurance
- How right can a certificate be?
- Air Conditioning Inspections

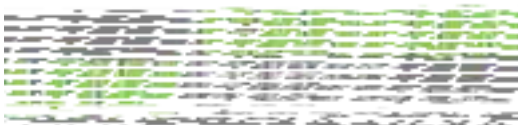


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Producing EPCs

- EPCs are in two parts:
 - The Certificate
 - The accompanying Recommendations Report
- To produce an EPC requires
 - Gathering of information and data
 - This can be done by means of a full survey or by gathering data by some quality assured means
 - Entering the data into the calculations software
 - Using the software to calculate the Asset Rating



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Certificate Details : energy performance certificate

Accredited assessor and scheme

Unique reference number

Asset Rating

Description of building

Energy Performance Certificate
Non-Domestic Building

Jubilee House
High Street
Anytown
A1 2GD

Certificate Reference Number: 1234-1234-1234-1234

This certificate shows the energy rating of the building. It includes the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/rqtd.

Energy Performance Asset Rating

More energy efficient

A 0-25

B 26-50

C 51-75

D 76-100 **492** This is how energy efficient the building is.

E 101-125

F 126-150

G Over 150

Less energy efficient

Technical information

Main heating fuel	Gas
Building environment	As Constructed
Total useful floor area (m ²)	207
Building complexity	2010 levels

energy performance certificate : recommendation report

Recommendation Report

Report Reference Number: 0311-9640-8437-2700-5096

Jubilee House
High Street
Anytown
A1 2CD

Building Type(s): OFFICE

ADMINISTRATIVE INFORMATION	
Issue Date:	09 Jan 2008
Valid Until:	08 Jan 2018 (*)
Total Useful Floor Area (m ²):	2900
Calculation Tool Used:	iSBEM v3.0 a using calculation engine SBEM v3.0 a_dev (JAN08)
Property Reference:	123456789001

ENERGY ASSESSOR DETAILS	
Assessor Name:	John Smith
Employer/Trading Name:	EnergyWatch Ltd
Employer/Trading Address:	Alpha House, New Way, Birmingham, B2 1AA
Assessor Number:	ABC12345
Accreditation scheme:	ABC Accreditation Ltd
Related Party Disclosure:	

3. Recommendations

is selected by the energy assessor performance of the building. The readings: short payback, medium payback

payback of less than 3 years:

Recommendation	Potential impact
Chiller efficiency is low. Consider upgrading chiller plant.	HIGH
Consider replacing heating boiler plant with high efficiency type	HIGH
Consider replacing T8 lamps with retrofit T5 conversion kit. (rewired)	HIGH
Introduce HF (high frequency) ballasts for fluorescent tubes. Reduced number of fittings required	LOW
Add time control to heating system	LOW
Add optimum start/stop to the heating system	LOW

payback of between 3 and 7 years:

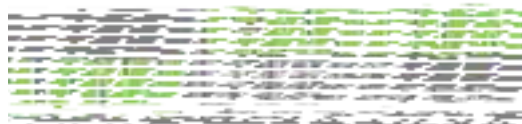
Recommendation	Potential impact
...	HIGH
...	HIGH
Add local time control to heating system	LOW
Add local temperature control to the heating system	LOW
Add weather compensation controls to heating system	LOW

c) Recommendations with a long payback
This section lists recommendations with a payback of more than 7 years.

Unique reference number

Recommendations

Accredited assessor and scheme



The National Calculation Methodology

- NCM is the UK approach to meeting the whole building energy calculation requirements of EPBD and Part L
- It calculates the 'Integrated energy performance of buildings'
- Based on a Dutch model
- Allows calculation by approved software
 - Dynamic simulation models
 - SBEM/iSBEM



SBEM

- SBEM (Simplified Building Energy Model)
- Developed for the CLG by BRE
- Can be used on buildings of any size
- Offered with basic interface – iSBEM
- Suitable for use with the majority of buildings
- Allows compliance checking against Part L of Building Regulations and production of Asset Ratings for Energy Performance Certificates
- Designed to produce consistent evaluations of energy performance under standard operating conditions



SBEM cont..

- SBEM requires the input of the following:
 - Fabric elements
 - Geometry
 - Building services
 - Building use
 - Renewable options
- Uses locked data bases for:
 - Weather data
 - Activity data

Other interfaces to SBEM

The following software interfaces to SBEM are approved by CLG¹:

- Carbon checker
- Designbuilder
- digitalenergy
- ECAT
- Hevacomp
- IES

1 – as listed on www.ncm.bre.co.uk/software.jsp on 11th April 2008



Dynamic simulation

- Dynamic simulation modelling can also be used for energy calculations – the following software is approved by CLG¹
 - IES VE
 - Hevacomp Design Simulation
 - EDSL TAS

1 – as listed on www.ncm.bre.co.uk/software.jsp on 11th April 2008

Advantages of SBEM

- iSBEM is a simple interface, ideal for simple buildings or those requiring few zones
- Quicker for simple existing buildings, possibly not best suited to complex buildings

Advantages of DSM

- offers more sophisticated modelling e.g. easier geometric handling
- can be used for design as well as energy rating
- handles some technologies, such as CHP, better,
- requires greater user expertise

The question is....

- Will all the different DSM approaches give similar results?
- Will DSM results be broadly equivalent to SBEM?

And then there's - user error

- CIBSE produced TM33 to allow users to ensure their software is producing broadly reasonable results
- Looked at ISO work and BestTest from US
- These indicated that differences between results from different calculation engines can be large
- But differences between different users, using same software, can be even larger

Requirement for accreditation

- Only competent energy assessors who are members of an approved accreditation scheme can provide EPCs
- To be competent you must meet **all** aspects of the NOS
 - Surveying
 - Building services
 - Software



Qualifying as an Energy Assessor

2 routes: Qualification or APEL

Qualification available based on NVQ

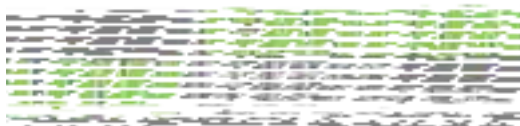
- Requires no experience/knowledge – starts from scratch
- Fairly expensive (£3000+?)
- Time consuming



Qualifying as an Energy Assessor

APEL: Approved prior experiential learning

- An assessment of previous experience and learning
- The route offered by CIBSE
- Based on completing an application form supported by evidence

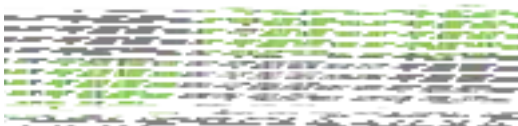


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Lodging a certificate

1. EA Qualifies
2. Gets commission
3. Goes to accrediting body with postcode and exact location
4. Opens a case and gets 2 unique reference numbers (one for the certificate and one for the report)
5. Carries out onsite survey/gathers data
6. Carries out calculation using appropriate software
7. Produces Asset Rating and Report

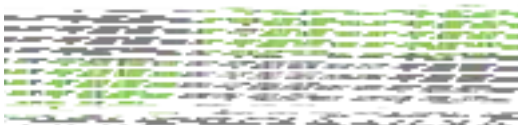


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Lodging a certificate (2)

8. Pays lodgment fee
9. Uploads output of calculations and report to accreditation body register
10. Checks information is complete
11. Submits
12. If report passes QA checks, certificate lodged with central register
13. Ratified certificate returned to EA to pass to client

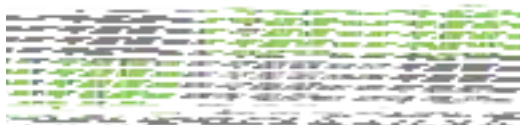


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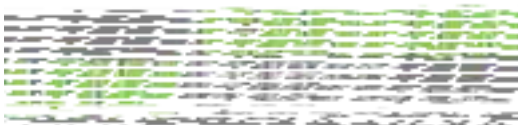
Accredited schemes

APPLICANT	ON CONSTRUCT	NON – DOMESTIC	DEC	AIR CON
NES	✓	✓	✓	-
BRE	✓	✓	✓	-
CIBSE	✓	✓	✓	✓
Elmhurst	✓	✓	✓	-
Northgate	✓	✓	✓	-
Stroma	✓	✓	✓	-
RICS	✓	✓	✓	✓
Knauf	✓	-	-	-
CIAT	✓	-	-	-
EPC Ltd	✓	✓	✓	✓
Quidos	✓	✓	✓	✓
BESCA	-	✓	✓	✓



Low Carbon Energy Assessors

- Individuals accredited by CIBSE Certification are known as Low Carbon Energy Assessors
- They will be able to do more than simple 'carbon counting'
- They will be able effectively to help clients minimise the carbon emissions of their buildings, both in design and operation

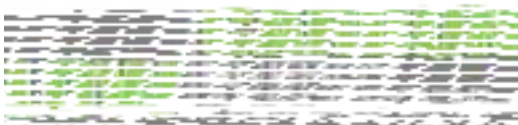


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Taking the APEL route with CIBSE

1. Pass Low Carbon Consultant examination
2. Pass an assessment in software use (EPCs or DEC)s
3. Fill in an APEL form
4. Supply 2 years' CPD records
5. Supply details of PI Insurance
6. Supply a certificate and report for assessment (DEC)
7. Supply two certificates and reports for assessment (for EPC accreditation)

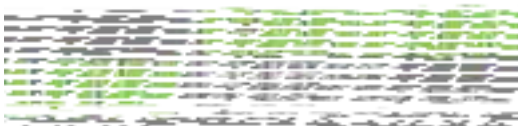


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Quality Assurance

- Automated QA will be carried out within lodgment software
- Accrediting authorities will also probably look at certificates which are:
 - Unusual in terms of the grade achieved for their building type
 - Are produced by EAs about whom a complaint has been upheld
 - Fall close to a grade boundary
- CLG will monitor all accrediting bodies to ensure they operate uniform levels of QA

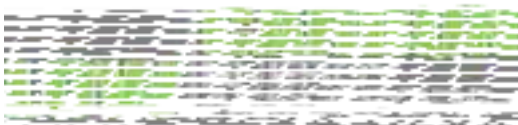


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Quality Assurance

- 100% of certificates must be within 10% of the 'truth' and 95% must be within 5%.
- CIBSE Certification will appoint a QA manager to set 'truth model' and ensure consistency
- He will be conscious that many subjective assumptions will have to be made by EAs

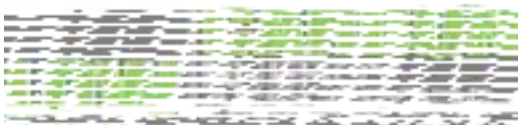


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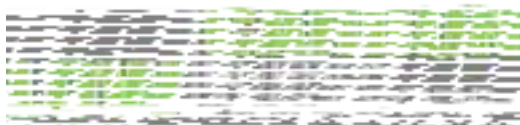
Where are we now?

- APEL applications forms and CPD forms are available via CIBSE Certification website
- CIBSE lodgment software is up and running
- Training is now available from CIBSE Certification and from software providers including:
 - Design-builder
 - EDSL (Tass)
 - Hevacomp
 - IES (IES-VE)
 - Wensley and Lawz (iSBEM training)



Where are we now?

- Accreditation likely to take a month
- Assessment costs £300 then £300 pa
- First 23 fully accredited
- 64 undergoing final checks
- Estimates of number of EAs needed vary from 1000 to 4000
- From July up to 10,000 EPCs could be needed every month

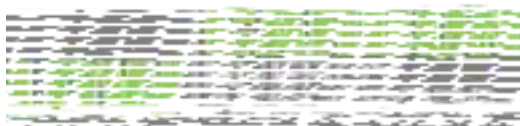


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Air Conditioning

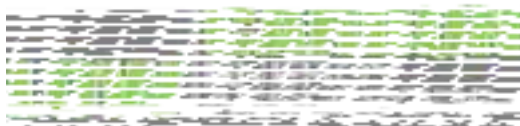
- The Cinderella who will soon be in the limelight...



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Air Conditioning Inspections

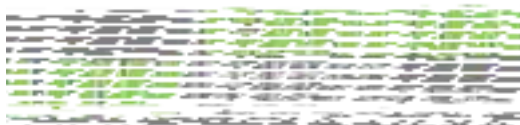


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What's the issue?

- Article 9 of the Energy Performance in Buildings Directive requires inspections of air conditioning systems over 12kW rated output.
- the Energy Performance of Buildings (Certificates and Inspections) (England and Wales) Regulations 2007 (SI 991:2007 implement Articles 7 – 9 of the Directive (in England and Wales)



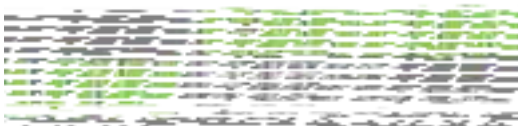
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Requirement

Part 4 of the Regulations requires:

- regular inspection of air conditioning systems over 12kW
- must include an assessment of the capacity and efficiency of the system in relation to the load, together with recommendations for its possible replacement, improvement, or alternative solutions
- preparation of a report on the inspection



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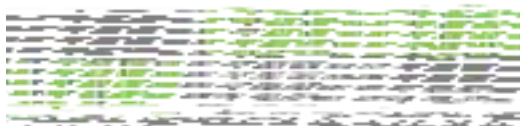


The Regulations (1)

Part 4, Regulations 20 – 24 apply

20 (1) This Part applies to a-c systems with an effective rated output of more than 12kW

20 (2) Where the relevant person has the power to control the temperature of more than one individual air-conditioning unit in a building, each unit shall be considered to be a component of a single air-conditioning system for the purposes of paragraph (1)

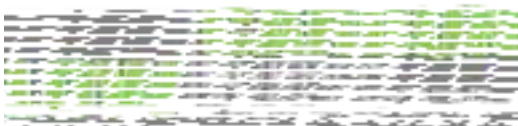


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The Regulations (2)

(3) In this Part "effective rated output" means the maximum calorific output specified and guaranteed by the manufacturer of the system as being deliverable during continuous operation while complying with the useful efficiency indicated by the manufacturer.



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The Regulations (3)

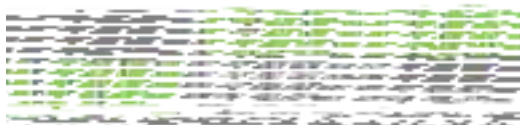
21. Inspections of air-conditioning systems

Systems must be inspected by the relevant date and then every 5 years:

systems installed after 1.1.2008 must be inspected within 5 years of installation

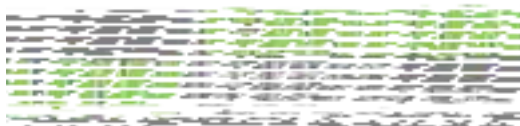
Existing systems over 250kW must be inspected by 4.1.2009

Existing systems over 12kW by 4.1.2011



The Regulations (4)

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.



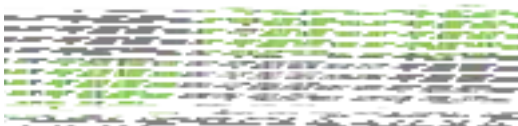
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The Regulations (5)

The inspection report must include the following:

- (a) the address of the building in which the system is located;
- (b) the name of the energy assessor;
- (c) the name and address of the energy assessor's employer, or, if he is self-employed, the name under which he trades and his address;
- (d) the date on which the inspection occurred; and
- (e) the name of the approved accreditation scheme of which the energy assessor is a member.

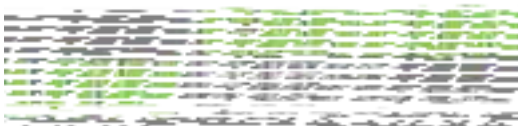


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Regulation 22 - outputs

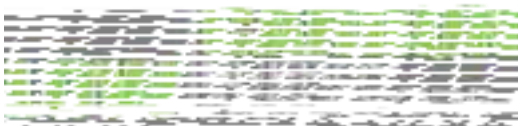
- regular inspections
- systems of “effective rated output of more than 12kW”
- “assessment” of efficiency and sizing
- provision of advice
- provision of a report



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How do we do it?

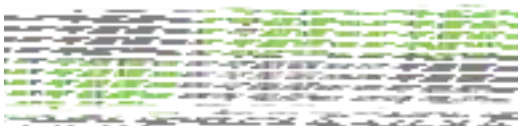


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Background

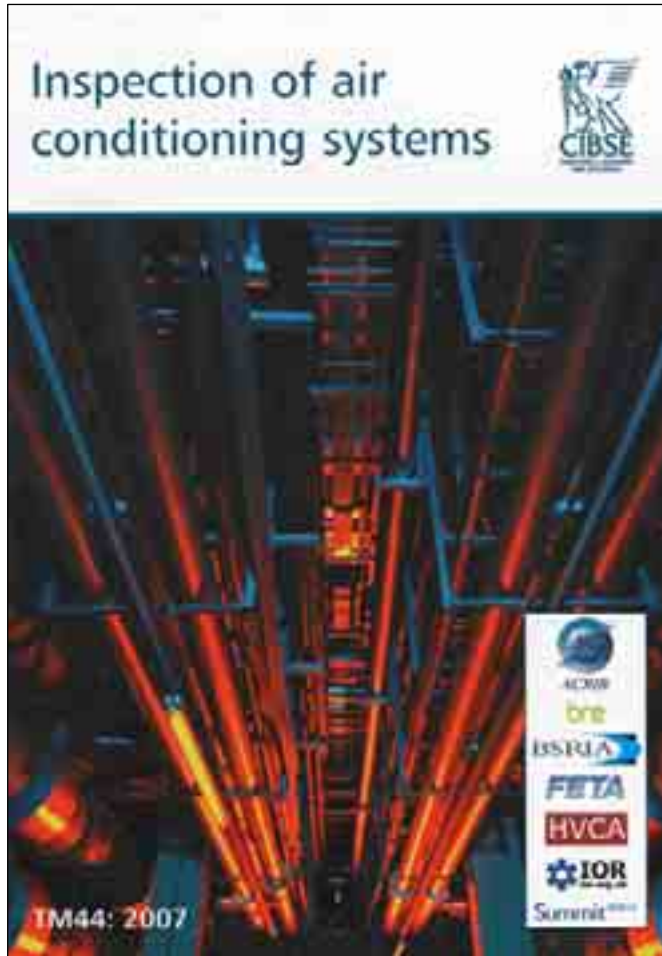
- a joint working group led by CIBSE with ACRIB/IOR, BSRIA, FETA, HVCA and with support from CLG developed guidance on Article 9 implementation
- CIBSE TM 44 published in July
- Gives guidance on assessment methodology and reporting



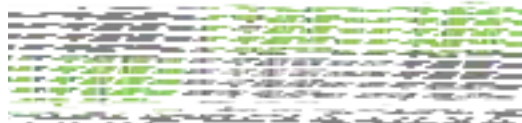
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Air conditioning inspections

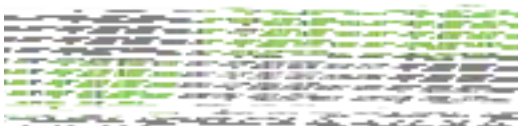


- Methodology for inspections of AC systems >12kW
- gives guidance on assessment and reporting
- requires accredited inspectors



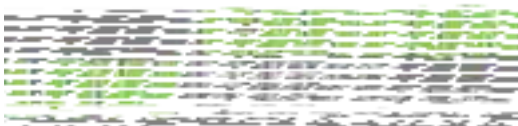
Air conditioning systems with over 12kW rated cooling output could comprise:

- Individual, split or multi-split systems
- Centralised systems
- Distributed heat pump systems
- Rated cooling output of a system may exceed 12kW where a number of individual units of less than 12kW rated output have common control



Overall approach

- Simplicity of inspection, minimising costs and disturbance to operation
- Providing useful advice to owner / operator
- Simplest level to identify poor performers
- Minimise burden where systems are well maintained
- Non-invasive 'observation' basis
- Minimise risks and potential liabilities to inspector

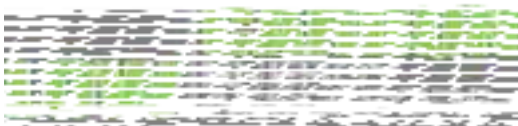


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Inspection methodology

- Two track approach
 - simple systems – simple inspections
 - complex systems – a more detailed inspection
- Broadly, systems with air distribution ductwork (rather than flexible pipes) will require the more detailed inspection



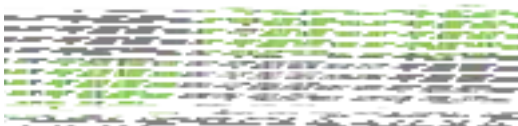
Process

three key stages in the inspection

1 off- site paperwork and energy data (if available)

2 on site examination

3 report and proposals for possible improvements

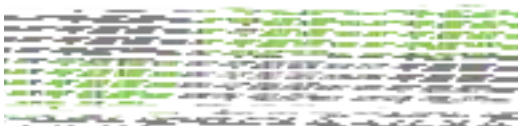


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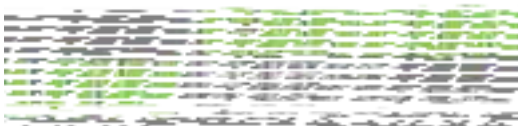
Documentation

- Plant and system descriptions & commissioning records
 - Plant types, sizes, locations
 - Factors such as Specific Fan Power
- Building log-book
- Relevant details from energy performance certification
- Energy / hours run records
 - Could help indicate control problems



Sources of data prior to inspection

- Building Logbook (required by Part L, see Section 3, current ADL2)
- Display energy assessments, which also require knowledge of what is in the building
- Assembling data is a separate task from preparing air conditioning inspection reports

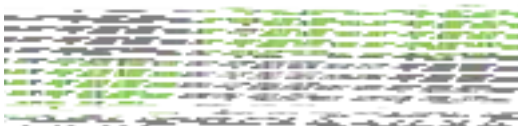


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Inspection – basic procedure

- Review documentation
- Compare maintenance with industry good practice
- Inspect system components
- Assess controls and settings
- Estimate cooling load
- Review potential for improvement or alternatives
- Report findings and advice

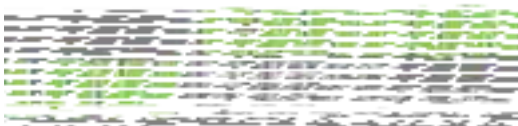


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Wider Issues

- Making owners/occupiers aware of the legal requirement to inspect – how might they be made aware of the introduction of this duty?
- Raising awareness of the Regulations amongst potential inspectors



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Useful weblinks

The Energy Performance Regulations can be found at:-

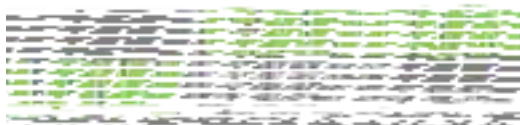
<http://www.opsi.gov.uk/si/si2007/20070991.htm>

The Departmental Circular can be found at:-

http://www.communities.gov.uk/pub/193/Circular0207TheEnergyPerformanceofBuildingsCertificatesandinstructionsEnglandand7_id1509193.pdf

The HIP Regulations can be found at:-

<http://www.opsi.gov.uk/si/si2007/20070992.htm>



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