TECHNICAL bulletin

August 2011

WELCOME TO THE STROMA CERTIFICATION TECHNICAL BULLETIN AUGUST 2011

In this issue you will find information on:

Air conditioning energy assessment conventions September 2011

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Air Conditioning Inspectors

SEPTEMBER 2011 AIR-CONDITIONING ENERGY ASSESSMENT CONVENTIONS

The Energy Performance of Buildings (Certificates & Inspections) (England & Wales) Regulations 2007 requirement for Air Conditioning Inspections has been in place since 4th January 2009. As a reminder the requirement for these inspections is mandatory for buildings with an Air Conditioning System over 12kW, and has to be carried out every five years.

Regarding compliance and enforcement, an increasing number of companies are reacting to the need for air conditioning inspection reports, which is good to see as compliance in the early days was poor. The reaction by these companies may well be triggered by local Trading Standards Officers issuing enforcement notices, which sounds promising and is good news for all Air Conditioning Inspectors.

For the past year the Air Conditioning Conventions Working Group, chaired by the Department of Communities and Local Government, have been working to refine the Air Conditioning Inspection process. The outcome of this has been 3 new conventions which are contained within this Bulletin.

Furthermore CIBSE TM44 Working Group, which Stroma have been part of have redrafted TM44, scheduled for release within the next couple of months. The updated version will clarify the methodology further, hopefully removing some of the ambiguous areas that were previously present. The new TM44 will also contain crucial Quality Assurance information, which ACEAs will be audited and assessed against, making this document more critical.

Below are the Conventions which must be implemented on any air-conditioning report/certificate by 1st September 2011. All Air Conditioning Inspection Reports/Certificates produced, where the inspection has taken place post 1st September 2011, shall be assessed against these Conventions.

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AC CL 1.3 Refrigeration Temperature Measurement

L3 & L4 Convention

CIBSE TM44 Inspection items PS2.3 (Table 2.3) and CS2.3 (Table 3.3) state; 'Check that refrigeration plant is capable of providing cooling by assessing the temperature difference, and observing the refrigeration sight glass, and/or refrigerant temperature or pressure gauges (where readily visible).'

The temperature difference may be assessed by practical observation of whether the system is delivering cooling indoors or rejecting heat outside. Additional information may also be obtained by observing the refrigerant sight glass or the temperature and pressure gauges (where readily visible). Whenever they are available, the pre and post compressor temperatures should be entered in the Air Conditioning Inspection Report. The evidence to support the conclusion that the system is or is not delivering cooling must always be entered in the notes and recommendations section within the report.

AC CL 1.5 Sub System Hierarchy

An air conditioning sub system is a group of components whose combined performance delivers cooling and/or ventilation to a space. For example, a chiller(s), air handling unit(s) and the terminal units delivering the cooling (via whatever medium) and the ventilation air (where provided) comprise a sub system.

An understanding of all the sub systems on a site will aid the Energy Assessor (EA) to give relevant and specific advice to the client.

A clear description of the sub systems on a site will assist accreditation schemes to quality assure reports.

L3 & L4 Convention

The following methodology is to define an identification reference of an air conditioning system that is standard, consistent and easily recognisable for all inspections.

VOL

The client is often not technical and identifies departments by function. This is replicated in the Volume Identifier (VOL ID). For example, in many old hospitals the outpatients department is spread over a number of areas in a number of buildings. An office block may have different departments on different floors.

The VOL ID enables Energy Assessors (EAs) to replicate this logical group of air conditioning equipment, by function, or location within a building, or a group of equipment spread across multiple buildings.

Each volume will be assigned a VOL ID in the form VOL001, VOL002, ...VOLnnn

Examples:

VOL001 = Outpatients

VOL002 = Dermatology

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VOL003 = Optics

VOL001 = Gresham Building

VOL002 = Turner Building

VOL003 = Eastern Building

SYS

The System Identifier (SYS ID) identifies an air conditioning sub system. This SYS ID will contain all the components that are within the air conditioning sub system. This will assists the EA to identify components that may be affected by suggested changes to components within a sub system.

For example if two packaged split units are serving the same room, the performance of one will affect the performance of the other in that if one was switched off, the remaining unit would have to serve a higher load. In this case the two independent split systems would be described as being in the same air conditioning sub system and would both have the same SYS ID, even if their controls are not linked.

If the same two packaged split units are serving two separate rooms, the performance of one will not affect the performance of the other. In this case the two independent split units would be described as being in different air conditioning sub systems and would have a different SYS ID.

A common arrangement is to have a selection of packaged split units and a centralised air conditioning system. The splits could be grouped as one system or itemised individually and the centralised system would be one system – the EA can decide what an appropriate representation would be.

Each System will be assigned a SYS ID in the form SYS001, SYS002, ...SYSnnn

Examples:

SYS001 = Two Split Packaged Units in Canteen – openable windows (no AHU)

SYS002 = One Split Packaged Unit in the Ground Floor Reception + air supply from AHU1

SYS003 = 24 VRF Packaged Units serving 200 bedrooms + air supply from AHU2 (heating only)

COMPONENT

The components of an air conditioning system are those items on which there is a series of questions in the Air Conditioning Inspection Report.

Cooling Plant	Cooling Plant
Air Handling Plant	Air handling units
Terminal units	Grilles, Diffusers, Fan-Coils, VAV Boxes etc.
Controls	Control for Chillers, AHUs and Terminal Units

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If there are 3 air handling units in system 1 (SYS001) they can be referenced as AHU1, AHU2 and AHU3. If there is a second system with air handling units they can be referenced as AHU1, AHU2 and AHU3, or AHU4, AHU5 and AHU6 - the EA can decide.

Each air conditioning component has a unique reference by a combination of the VOL/SYS/Component id.

Example:

VOL002/SYS121/AHU14

See further examples in Appendix 1: AC CL 1.5 Appendix 01

AC CL 1.7 Sampling Rules

L3 & L4 Convention

To revise the text of CIBSE TM44 section 1.7.2 on sampling. The following text replaces the text in the printed edition of TM44.

Revised text for TM44 section on sampling.

1.7.2 Sampling

The primary purpose of the air conditioning inspection is to assess the relative energy efficiency of the installation and to identify where there may be scope for energy savings. For larger installations it is not cost effective to inspect every component and so in these cases it may be appropriate to inspect a sample number of components of certain types.

The following rules apply to the preparation of any sampling programme for any air conditioning installation.

Central Plant

All central chiller plant must be inspected.

For central air handling plant a minimum of ten units or 30%, whichever number is the greater, must be inspected. The requirement also applies to any central air handling plant which does not directly deliver cooling but which is a part of a system which is capable of delivering cooling.

Wherever possible, the air volume and set points should be determined for all air handling units and sampling is not permitted.

Packaged systems

Where an installed system consists of a series of packaged cooling plant components (including 'Versatemp' type units), then a 10% sample of the total number of outdoor units must be inspected, with a minimum of 3 units being sampled. In addition an equal number of indoor units must be inspected.

Indoor units for packaged systems may include fan coil units and cassettes.

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Terminal Units for Centralised Systems

A 2% sample of the total number of terminal units must be inspected, with a minimum of 5. For very large systems where consistent conditions are found a maximum of 20 units may be applied.

Terminal units for centralised systems may include VAV terminals, fan coil units or chilled beams, local heat recovery and ventilation units.

An air conditioning EA must take a representative sample of the installation on site, having regard to the age and size/capacity of the components. While the minimum number of components must always be inspected, an EA may choose to include a larger sample to improve the quality of the Air Conditioning Inspection Report being provided.

If different makes of units are present on site then at least one of each make must be inspected.

If observations of any unit type are found to be inconclusive (where the inspection has identified a problem or area of concern) then further units must be sampled where more units of that type are available.

These sampling rules should ensure that a reasonable minimum number of plant items are inspected. The sampling required for larger items of plant is more stringent, reflecting the fact that these items of plant will demand a greater proportion of the energy used and are also more likely to contain more refrigerant, depending upon the nature of the equipment.

The EA must confirm the sampling size chosen, the reasons for selecting that sample size and that a representative inspection has been carried out. A clear record of the sampling applied and the justification for any selections should be prepared by the EA and will be used in an audit of their work. Where a sample inspection has been carried out this must be recorded in the Air Conditioning Inspection Report Certificate.

AC CL 1.5 Appendix 01

Sub system examples

Asset Register 1:

Asset No:	Equipment	Building	Department
XBU900023	Trox Fan coil unit	Empress	Office
XBU900024	Trox Fan coil unit	Empress	Office
XBU900025	Trox Fan coil unit	Empress	Office
XBU900026	Trox Fan coil unit	Empress	Stores
XBU900027	Trox Fan coil unit	Empress	Stores
XBU900028	Mitsubishi Split	Empress	Office
XBU900029	Mitsubishi Split	Empress	Stores
XBU900030	Airdale Chiller	Pembroke	Sales Floor
XBU900031	Colman Modulcel AHU	Empress	Office
XBU900032	Colman Modulcel AHU	Pembroke	Sales Floor
XBU900033	Gilbert Swirl diffuser	Pembroke	Sales Floor
XBU900034	Gilbert Swirl diffuser	Pembroke	Sales Floor
XBU900035	Gilbert Swirl diffuser	Pembroke	Sales Floor
XBU900036	Gilbert Swirl diffuser	Pembroke	Sales Floor
XBU900037	Weatherite AHU	Empress	Stores

Sub System Hierarchy

Client "sees" the air conditioning systems on a building basis but wants one report as the site is quite small.

VOL001 Empress Building

VOL002 Pembroke Building

Maintenance "sees" the air conditioning systems on an engineering basis and each component by asset number.

SYS001 Packaged unit serving 4 pipe FCUs in office

SYS002 Packaged unit serving 2 pipe FCUs in Stores

SYS003 Constant Air volume system to swirl diffusers on the sales floor

Energy Assessor needs to identify all the air conditioning sub systems in order to be able to comment on the energy efficiency of each one.
(Note: colour coded to map asset register entries)

VOL001/SYS001/XBU900028	Packaged cooling	To offices in Empress Building
VOL001/SYS001/XBU900031	AHU	To offices in Empress Building
VOL001/SYS001/XBU900023	FCU Terminal unit	To offices in Empress Building
VOL001/SYS001/XBU900024	FCU Terminal unit	To offices in Empress Building

VOL001/SYS001/XBU900025	FCU Terminal unit	To offices in Empress Building
VOL001/SYS001/controls	Controls for this air conditioning sub system	
VOL001/SYS002/XBU900029	Packaged cooling	To stores in Empress Building
VOL001/SYS002/XBU900037	AHU	To stores in Empress Building
VOL001/SYS002/XBU900026	FCU Terminal unit	To stores in Empress Building
VOL001/SYS002/XBU900027	FCU Terminal unit	To stores in Empress Building
VOL001/SYS002/controls	Controls for this air conditioning sub system	
VOL002/SYS003/XBU900030	Central chiller	To sales floor in Pembroke Building
VOL002/SYS003/XBU900032	AHU	To sales floor in Pembroke Building
VOL002/SYS003/XBU900033	Swirl diffuser	o sales floor in Pembroke Building
VOL002/SYS003/XBU900034	Swirl diffuser	To sales floor in Pembroke Building
VOL002/SYS003/XBU900035	Swirl diffuser	To sales floor in Pembroke Building
VOL002/SYS003/XBU900036	Swirl diffuser	To sales floor in Pembroke Building
VOL001/SYS003/controls	Controls for this air conditioning sub system	

Asset Register 2:

Asset No:	Equipment	Room
XBU900023	Daikin Packaged Split	G8
XBU900024	Daikin Packaged Split	G8
XBU900025	Daikin Packaged Split	G9
XBU900026	Daikin Packaged Split	G9
XBU900027	Daikin Packaged Split	Foyer
XBU900028	Mitsubishi Split	Offices
XBU900029	Mitsubishi Split	Offices
XBU900030	Mitsubishi Split	Offices
XBU900031	Mitsubishi Split	Offices
XBU900032	Mitsubishi Split	Offices
XBU900033	Trox Fan coil unit	Director
XBU900034	Trox Fan coil unit	Director PA
XBU900035	Trox Fan coil unit	Sales Office
XBU900036	Trox Fan coil unit	Accounts Office
XBU900037	Trox Fan coil unit	Canteen
XBU900038	Airdale AHU	Offices
XBU900039	Trox Fan coil unit	G8
XBU900040	Trox Fan coil unit	G8

Client "sees" the air conditioning systems as one system

VOL001 Whole Building

Energy Assessor needs to identify all the air conditioning sub systems in order to be able to comment on the energy efficiency of each one.

(Note: colour coded to map asset register entries)

Packaged Split system G9

Controls for this air conditioning sub system

VOL001/SYS001/XBU900023	Linked Packaged Unit "small family"	G8
VOL001/SYS001/XBU900024	Linked Packaged Unit "small family"	G8
VOL001/SYS001/XBU900039	Terminal Unit	G8
VOL001/SYS001/XBU900040	Terminal Unit	G8
VOL001/SYS001/Control	Controls for this air conditioning sub system	

VOL001/SYS002/XBU900025	Packaged Split system	G9
VOL001/SYS002/Control	Controls for this air conditioning sub system	

OR

VOL001/SYS002/XBU900025	Packaged Split system	G9
VOL001/SYS002/XBU900026	Packaged Split system	G9
VOL001/SYS002/Control	Controls for XBU900025	G9
VOL001/SYS002/Control	Controls for XBU900026	G9

VOL001/SYS003/XBU900026	Packaged Split system	G9
VOL001/SYS003/Control	Controls for this air conditioning sub system	

VOL001/SYS004/XBU900027	Packaged Split system	Foyer
VOL001/SYS004/Control	Controls for this air conditioning sub system	

VOL001/SYS005/XBU900028	Linked Mitsubishi Split "large family"	Offices
VOL001/SYS005/XBU900029	Linked Mitsubishi Split "large family"	Offices
VOL001/SYS005/XBU900030	Linked Mitsubishi Split "large family"	Offices
VOL001/SYS005/XBU900031	Linked Mitsubishi Split "large family"	Offices
VOL001/SYS005/XBU900032	Linked Mitsubishi Split "large family"	Offices
VOL001/SYS005/XBU900038	Airdale AHU (heating only)	Offices
VOL001/SYS005/XBU900033	Trox Fan coil unit	Director
VOL001/SYS005/XBU900034	Trox Fan coil unit	Director PA
VOL001/SYS005/XBU900035	Trox Fan coil unit	Sales Office
VOL001/SYS005/XBU900036	Trox Fan coil unit	Accounts Office
VOL001/SYS005/XBU900037	Trox Fan coil unit	Canteen
VOL001/SYS005/Control	Controls for this air conditioning sub system	