

# Building log book toolkit



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TM31: 2006

# Building log book toolkit

A guide and templates for preparing  
building log books

CIBSE TM31: Revised 2006



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## Foreword

Climate change is widely accepted as being one of the most pressing challenges facing the world today. Atmospheric concentrations of carbon dioxide are rising fast, and global temperatures are almost certainly rising as a result. There is now a global imperative to reduce carbon dioxide emissions. The UK, the EU, Australia and a number of other nations have put in place plans and strategies to address climate change and created agencies to deliver them.

The United Kingdom is committed to delivering significant cuts in greenhouse gas emissions. Under the Kyoto Treaty a reduction of 12.5% must be achieved by the period 2008–2012. The government has committed itself to achieving a cut of 20% by 2010, although the recently published review of the climate change strategy suggests that this target may not be met. The 2003 Energy White Paper makes clear the ongoing requirement to achieve steady reductions, seeking a 60% cut by 2050.

Buildings generate almost 50% of UK carbon emissions, so these targets require significant improvements in the energy efficiency of the building stock. The recent changes to Part L of the Building Regulations and the forthcoming announcement of measures to implement the EU Directive on Energy Performance in Buildings will contribute further reductions. However, they do not include measures to require cost effective improvement of the energy efficiency of existing domestic buildings when other renovations or extensions, or both, are undertaken.

In England and Wales, Building Regulation L1c now requires all new and refurbished buildings to be provided with a building log book. Building owners and operators should now be provided with 'sufficient information about the building, the fixed building services and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and power than is reasonable in the circumstances'.

The building log book is intended to enable the building owner to operate the building in an energy efficient manner and according to the design intent. It should identify the major energy using systems and how to measure the energy they use. Only when owners monitor, benchmark and control energy use can they effectively manage it, deliver the required environment and control costs. Effective operation of the building services systems is vital to the efficient functioning of the building. Buildings in which these systems are well managed will be more energy efficient and are more likely to accommodate productive and satisfied occupants who do better business as a result. Building log book therefore offer significant benefits to owners and users, whether they are required by regulation or not.

This guidance on the preparation of building log books provides a standard approach for the industry. Owners can specify that they require a log book based on CIBSE TM31. Those who prepare log books have a common standard to use. Building Control bodies will be able to look for log book in this format when reviewing evidence of compliance with the new Part L.

The Institution consulted widely on the content of the first edition of the toolkit, and has taken account of user feedback in preparing this revision. It has also particularly sought to ensure that for small businesses the burden of providing log books is in keeping with the size of their buildings, and a small business case study and template are provided. This guidance and the tools provided with it are an important contribution to the ongoing reduction of carbon emissions and improved energy efficiency of the UK building stock.

Dr Hywel Davies  
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## TM31 Steering Committee

This edition of TM31 is a revision of the first edition, published in 2003, which was developed under the guidance of a Steering Committee comprising: Bryan Franklin (chairman), John Armstrong (consultant), John Coppin (Arup), John Field (Target Energy Services), Peter Grigg (BRE), Ted King (Office of the Deputy Prime Minister), Alan Knibb (Alan Knibb Property Services), George Moss (CR Burgess Commissioning Ltd), Saud Muhsinovic (Fulcrum Consulting, for DTI), Jeff Sadler (BRESEC), Neil Woodcock (formerly AYH plc) and Hywel Davies (CIBSE Research Manager).

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## Note from the publisher

This publication is primarily intended to provide guidance to those responsible for the design, installation, commissioning, operation and maintenance of building services. It is not intended to be exhaustive or definitive and it will be necessary for users of the guidance given to exercise their own professional judgement when deciding whether to abide by or depart from it.

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# Ten golden rules for log books:

1. Ensure the requirement for a log book is explicitly included in the clients brief and include it in the fee structure so there are resources to develop it. Log books are essential for compliance with building regulations in new buildings, major refurbishments and where significant works are carried out on building services.
2. Appoint a single person, e.g. the lead designer or consultant, to be responsible for producing the log book, even if final production is sub-contracted to specialist authors.
3. Start the process early and don't release sub-designers until they have summarised their section of the design and provided the required information to the log book author.
4. Use the distinctive CIBSE style so it is easily recognisable among the many other manuals likely to be found in the building operations room.
5. Keep the contents list reasonably close to the template so it retains a common structure that is recognisable to anyone working in the buildings industry.
6. Make it easy to read/use for all facilities managers and building operators. Use simple explanations with minimum jargon, utilising diagrams wherever possible.
7. At handover the log book should be between 20 pages (for a small/simple building having a floor area not greater than 200 m<sup>2</sup>) to 50 pages (for a large and/or complex building) in order to make it a useful and easily accessible summary. Buildings/tenancies less than 200 m<sup>2</sup> can use the 'small business' template which might give a log book of 5–10 pages.
8. The facilities manager should sign the log book at handover as a recognition of taking over responsibility for the log book.
9. Keep the log book up-to-date by doing an annual review as part of the quality assurance system, particularly with regard to energy performance, maintenance and alterations to the building.
10. Keep the log book in a designated location in the main building operations room - not to be removed without the facilities manager's approval.

## Important note:

Following this guidance and using the template should result in a 'good practice' building log book. If any of the template is omitted then designers/log book authors will need to ensure that it will still provide a means of compliance with the regulations.

This publication is supported by a CD-ROM that provides a template for developing building log books, plus three example log books based on real buildings.

# Building log book toolkit

## 1 Introduction

Purchasers of domestic appliance or cars expect to receive an owner's or user's manual. Until recently, when the owners took possession of a new building, they could not expect to receive a similar document for the building. Building log books are intended to provide a summary document describing how the building is intended to work, and how it is meant to be serviced. They also provide a means to log the energy use and maintenance of the services within the building.

Log books are intended to provide the sort of simple summary of a new or refurbished building that is not available amidst all the detail contained in O&M manuals. The building log book provides somewhere to record maintenance, energy performance and changes to the building. It will also provide a historical record of building alterations, maintenance and energy performance, which is often lacking at present.

Log books should improve the understanding, management and operation of buildings, resulting in more sustainable buildings with lower running costs. Building occupants should benefit as the information provided contributes to enhanced comfort, satisfaction and productivity.

The introduction of building log books supports government commitments under the Kyoto Agreement and also addresses the longer-term strategic goals of a 60% reduction in carbon dioxide emissions by 2050, identified by the Royal Commission on Environmental Pollution<sup>(1)</sup> and set out in the White Paper: *Our energy future – creating a low carbon economy*<sup>(2)</sup>. The log book templates included on the accompanying CD-ROM are part of the CIBSE's contribution towards meeting these important targets and improving the buildings industry in general.

### 1.1 The purpose of building log books

Ideally, buildings should be designed so that their operation is self-evident. In practice, this is very difficult to achieve and, as with any complex device, an overview of the fundamental principles behind the design will greatly facilitate operation and maintenance. Log books aim to solve a number of problems in the buildings industry:

- to span the gap between design and operation
- to improve the facilities manager's understanding of the design intent
- to enhance the commissioning and handover process

- to provide more concise and accessible information than that contained in operating and maintenance (O&M) manuals
- to provide a vehicle for recording building alterations and performance
- to provide useful information to letting agents and developers at the point of sale/letting.

Communication between the facilities manager (FM) and the design team is essential to ensure that the FM understands the original design intent. Poor understanding causes mismanagement, leading to a wide range of problems, particularly high energy consumption. This is particularly important where the initial building owner is not the ultimate occupier of the building, e.g. speculative developer or landlord. If more designers visited buildings well into occupancy, many would be concerned at how their designs were being misinterpreted and mismanaged<sup>(3)</sup>. Equally, many FMs are left trying to make the best of buildings that are inherently flawed.

### 1.2 Statutory requirements

Log books offer significant benefits to all building owners and users whether in the UK or overseas (see section 1.3). However, within the UK, statutory provisions relate to building log books.

Part L of the Building Regulations in England and Wales<sup>(4)</sup> contains a requirement for provision of the summary information contained in a log book for new buildings, major refurbishments and buildings where significant changes have been made to the building services. In Scotland the Building (Scotland) Regulations 2004<sup>(5)\*</sup> and the supporting guidance provided in Section 6 of the Technical Handbooks<sup>(6)</sup> apply and in Northern Ireland Part F (Conservation of fuel and power) of the Building Regulations (Northern Ireland)<sup>(7)</sup> applies.

In England and Wales, building log books provide the information required by Building Regulation L1c. This requirement is shown below, along with the guidance given in Approved Documents L2A<sup>(8)</sup> (ADL2A) and L2B<sup>(9)</sup> (ADL2B). The Approved Documents regard the information provided in the log book as an essential tool to promote energy efficient operation of buildings.

The commissioning and handover stages of a contract seldom receive the time and attention that they deserve, which means that the facilities manager rarely becomes conversant with the building before it is occupied. In England and Wales, Building Regulation L1b requires

\*At the time of publication, the Scottish Executive is considering proposals for amending the energy standards in the Building (Scotland) Regulations 2004<sup>(5)</sup> and the supporting guidance provided in Section 6 of the Technical Handbooks<sup>(6)</sup>

Part L of the Building Regulations<sup>(1)</sup> requires that:

L1 Reasonable provision shall be made for the conservation of fuel and power in buildings by: .....

c. providing to the owner sufficient information about the building and its building services and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and power than is reasonable in the circumstances.

From Approved Document L2A<sup>(8)</sup>:

### Section 3: Operating and Maintenance Instructions

#### Criterion 5 — Providing information

82 In accordance with Requirement L1(c), the owner of the building should be provided with sufficient information about the building, the *fixed building services* and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and power than is reasonable in the circumstances.

#### Building log-book

83 A way of showing compliance would be to produce information following the guidance in CIBSE TM31: *Building Log Book Toolkit*. The information should be presented in templates as or similar to those in the TM. The information could draw on or refer to information available as part of other documentation, such as the Operation and Maintenance Manuals and the Health and Safety file required by the CDM Regulations.

84 The data used to calculate the *TER* and the *BER* should be included in the log-book.

*It would also be sensible to retain an electronic copy of the input file for the energy calculation to facilitate any future analysis that may be required when altering or improving the building.*

proper commissioning to be carried out and documented. Including commissioning records in the building log book will ensure that this requirement is met and will improve handover information for facilities managers.

The O&M manual usually includes large amounts of very detailed information on the building. It is often not integrated and seldom gives a clear picture of the overall design philosophy. The FM is often left 'flying blind'<sup>(10)</sup>. To run the building effectively and efficiently the FM needs a simple statement of how the building is intended to work and the maintenance requirements.

Without a log book, newly appointed staff, consultants and contractors will be 'flying blind' when dealing with unfamiliar buildings or where there have been significant changes to the building. The lack of a logged history often leads to decisions that go against the original design intent. Until their introduction in 2002, there was no single document where building alterations could be logged as O&M manuals are often left unchanged following significant changes to the building. Equally, there was no

From Approved Document L2B<sup>(9)</sup> :

### Section 4: Providing information

89 In accordance with requirement L1(c), the owner of the building should be provided with sufficient information about the building, the *fixed building services* and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and power than is reasonable in the circumstances.

#### Building log book

90 A way of showing compliance would be to produce the necessary information following the guidance in CIBSE TM31: *Building Log Book Toolkit*, or to add it to the existing log book where this already exists. If an alternative guidance document is followed in preparing the log book, then the information conveyed and the format of presentation should be equivalent to TM31.

91 The information should be presented in templates as or similar to those in the TM. The information should be provided in summary form, suitable for day-to-day use. It could draw on or refer to information available as part of other documentation, such as the Operation and Maintenance Manuals and the Health and Safety file required by the CDM Regulations.

92 The new or updated logbook should provide details of:

- a. Any newly provided, renovated or upgraded *thermal elements* or controlled fittings;
- b. any newly provided *fixed building services*, their method of operation and maintenance;
- c. any newly installed energy meters; and
- d. any other details that collectively enable the energy consumption of the building and building services comprising the works to be monitored and controlled.

### Section 2: Guidance relating to building work

#### Controlled services

41 Where the work involves the provision or extension of controlled services, reasonable provision would be to: .....

- f. Demonstrate that the relevant information has been recorded in a new log book or incorporated into an update of the existing one as described in paragraphs 89 to 92.

single document where building performance can be recorded, which may result in continuously excessive energy consumption.

The building log book seeks to address all these problems so that buildings, which are valuable and complex assets, are managed more effectively and efficiently.

### 1.3 Benefits of log books

Simple, standard log book templates have been developed for use in all building sectors. The templates set out standard formats for documenting the building services systems in a given building. By promoting a standard approach and format, the whole industry will benefit.

In the long term, the potential benefits of log books present a significant step forward for the construction industry. Building log books will:

- improve understanding of buildings amongst the staff working in the building, those running the building and any external contractors/consultants that are new to the building
- help prevent inappropriate alterations to the building that compromise the overall design intent
- improve the commissioning and handover process
- improve energy efficiency by providing a clear mechanism and vehicle for monitoring building performance against good practice benchmarks and design estimates
- save time in searching for key information
- provide a focus for documents and information that might otherwise be dispersed
- provide useful marketing information to letting agents and developers at the point of sale/letting.

The log book helps:

- (a) *the client:*
  - to know more about the building he/she is acquiring
  - to sell/let the building with more confidence
- (b) *the designer:*
  - to ensure that the client's requirements are laid down throughout the process
  - to ensure that the actual design intent is passed to the facilities manager
- (c) *the facilities manager:*
  - to have a better understanding of the building
  - to develop a historical record of the building
- (d) *the occupants:*
  - to understand better how to use their space
  - through improved levels of comfort and energy efficiency.

### 1.4 Target audience

This document is targeted at all those seeking to develop a building log book. This includes building designers working on new buildings and major refurbishments but also includes those replacing or altering building services plant in existing buildings. In particular, this document addresses:

- the client, who briefs the design team to ensure that a good quality log book is produced
- the lead designer, who is most likely to be responsible for developing the log book
- any specialist O&M manual authors who are likely to be carrying out final production of the log book.

Section 8 includes some brief advice to facilities managers about how to use building log books.

## 2 What is a building log book?

The closest analogy to a building log book is the owner's manual supplied with a new car. Drivers need an easily understood overview of the car. Facilities managers need similar guidance for their buildings. Although buildings are complex, there has never been a simple 'users handbook' to help operate the building. In fact, the building log book goes much further than the car handbook as it includes performance monitoring and a system to record changes to the building and to the log book itself. However, the underlying principle is the same.

The building log book should be an easily accessible focal point of current information for all those working in the building. It has four main functions:

- *Building summary:* it is a summary of all the key information about the building including the original design, commissioning and handover details, and information on its management and performance. One of the main things it will provide is a strategic understanding of how the building is meant to work, i.e. the design intent. In being a summary it neither duplicates nor replaces the O&M manuals.
- *Reference point:* it is the single document in which key building energy information is recorded. It could be regarded as the hub document linking many other relevant documents. The log book should provide key references to the detail held in less accessible O&M manuals, BMS manuals and commissioning records. It should therefore be kept in a readily accessible (designated) location in the main building operations room and should not be removed without the approval of the facilities manager.
- *Source of information:* it provides a key source of information for anyone involved in the daily management or operation of the building and to anyone carrying out work on the building and its services. It will be relevant to new staff and external contractors/consultants and can play a role in their training and induction.
- *Dynamic document:* it is a place to log changes to the building and its operation. It is also used to log building performance and actions taken to improve that performance ('fine-tuning'). It is essential that it be kept up-to-date. Alterations should only be made with the approval of the

facilities manager and should be signed and dated by that person.

The O&M manual should not be 'recycled' into the log book. The log book should provide a concise summary of the principal energy consuming services in the building — it should avoid duplicating detailed material contained in the O&M manual. Continuing the analogy with a car, the closest analogy to the O&M manual is the detailed workshop manual.

The log book has the potential to ensure that facilities managers have ready access to information on the design, commissioning and energy consumption of their own building. This enables greater active fine tuning of the building with consequent energy savings. The log book also provides explicit information about the metering strategy implemented in the building, and on the scope for monitoring and benchmarking energy consumption data.

### 3 Relationship with other documents

Clearly, there are direct links between the building log book and O&M manual, record drawings etc. The best way to view these links is to see the log book as a summary of key information which refers the other relevant manuals, record drawings etc. It is perfectly acceptable to have overlap between the log book and these other documents but it is essential that the content and written style of the log book is simple and summary in nature. The relationship between the building log book and the health and safety file is somewhat unclear although this may be clarified by changes to the CDM regulations, which are currently under review<sup>(11)</sup>.

Some building services equipment manufacturers (e.g. boiler manufacturers) include 'equipment' log books when supplying their products. These are for logging maintenance carried out, and efficiency tests related to single items of equipment. In the case of boiler log books, they are located on or near the boiler itself. These equipment log books could be regarded as a sub-set of the overall building log book with clear references between the two. One function of the building log book is to list the equipment log books that exist and where they are located.

### 4 Specifying the log book in the brief

Where there is a statutory requirement to provide a log book, clients need to include this in their brief to the design team. However, the onus is also on the design team to ensure that it has been included in the client's brief and that suitable allowance has been made for its preparation in their fee so that sufficient resources are allotted to its development.

Using TM31 and its associated templates as a basis, the design brief might simply say: 'Develop a building log book using CIBSE TM31 main template'.

## 5 Developing a log book

The log book must be a summary document that is written in a style that will be easily understood by facilities managers and building operators, and non-technical readers. It should not be a heavily 'technical' document but a management tool for running the building. Prior to handover, the design team and contractor should train the FM to use the log book. A user's guide to log books is available from the Carbon Trust<sup>(12)</sup> and is included on the CD-ROM accompanying this TM.

### 5.1 How big should it be?

Completed log books will vary in size depending on the size and complexity of the building, as shown in Table 1. Buildings/tenancies with a floor area less than about 200 m<sup>2</sup> (approximately 10–15 occupants) can use the 'small business' template. For buildings greater than 200 m<sup>2</sup>, less than 20 pages is unlikely to include all the necessary information, even in a relatively small/simple building. Log books greater than 50 pages are unlikely to function as an easily accessible management summary, even for very large complex buildings. The templates include guidance on how long each section should be in order to keep the size under control as the log book develops.

### 5.2 What should it look like?

Paper based log books should generally be kept in a loose-leaf ring binder to allow the facilities manager (FM) to update the document easily. It is preferable to use a distinctive, well-labelled ring binder to make this stand out in a busy building operations room or in a small business environment.

It is anticipated that the FM might retain one paper copy for rapid and easy access. This copy would serve as the day-to-day master for easy reference and recording minor updates. However, it is anticipated that many organisations will also maintain an electronic version that can easily be updated. Web based log book software is now available which makes it even easier to view and update from any location. Electronic systems can also provide password protection to avoid unauthorised persons altering the log book. See section 8.4 for further guidance on keeping the log book up-to-date.

### 5.3 Who should produce it?

It is ultimately the client's responsibility to produce the log book. However, while a building is being produced or altered, those employed to do so have a duty to ensure that statutory requirements are met. The team therefore needs to alert the client to the requirement for a log book and the client should establish who will be responsible for developing the log book. In some circumstances this may be the planning supervisor or 'HOBO' ('handover of office building operations') manager<sup>(13)</sup>. In other cases, the main contractor may have someone in-house that can take on this role. However, the design team holds almost all the relevant information that is required for the log book. The lead designer (or consultant) may therefore be the most appropriate person to take responsibility for overseeing

the development of the building log book, even if its final production is sub-contracted to specialist authors.

This should be an ongoing process and not be left until the last minute as is often the case with O&M manuals. It is highly likely that specialist O&M authors working for the lead designer will be given the task of actually producing the document near the end of the process. However, the log book needs to include summary information and explanations about the building that only the design team can provide. It is therefore recommended that the design team write these simple explanations as they go along, e.g. the log book system data sheets (see section 8 of the main template), to be collated by the responsible person or specialist author near the end of the design process.

The planning supervisor (PS) already has responsibility for overseeing the development of the health and safety file, and has an ongoing role to ensure that key documents like O&M manuals are produced. However, the information required for the log book is held by the design team and much of it will need to be written/drawn by the designers. It is therefore preferable that the lead designer be responsible for this work rather than the PS.

A single point of responsibility is always required to produce a log book. However, in major projects the expectation that a specialist can be appointed and then everyone else can sit back and relax is wrong and will lead to problems. In some cases the person responsible will also act as the log book author whereas other projects may require someone to take on the role of a log book collator/co-ordinator with a number of sub authors. In other cases authorship may be sub-contracted entirely with the responsible person remaining in the design team.

For speculative shell-and-core developments with a subsequent fit-out stage, see section 5.6.

It is recommended that the client make it a contractual requirement that the copyright of the log book is assigned to the client. It is also recommended that the lead designer and the log book author should examine their respective professional indemnity insurance policies to ensure that it provides suitable protection against any future claims.

## 5.4 When should it be produced?

Development of the log book should be started early in the design process. Delay will lead to problems as time and fees are squeezed tightly in the later stages and original design team members may move on to other projects. The lead designer should not release sub-designers until they have summarised their section of the design and it has been submitted to (and accepted by) the log book author. The person responsible for the log book (e.g. lead designer) should build up a draft log book throughout the design process, ready for final production near to handover.

It can be useful to the design process to have a working draft of the log book around RIBA Stage D/E to underpin the remainder of the design and to act as a focal point for the design team. This can enhance team working and the integrated design aspects required to produce an energy efficient building. This is particularly necessary when operating under a 'design and build' contract.

## 5.5 How many copies?

It is anticipated that only one paper copy would be produced and given to the facilities manager (FM) at handover. This could act as the day-to-day master copy for easy reference and minor updating etc. An electronic back-up copy should be kept to allow the FM to carry out more permanent updates, e.g. at annual or quarterly reviews. It is essential that an electronic back-up copy is kept in a separate place for recovery in the event of emergencies. Online log books avoid the need for paper documentation and allow easy access/updating from any location.

## 5.6 Shell-and-core fit-out

The main shell-and-core design team should develop the log book as far as they can based on the shell-and-core design. This preliminary log book should then formally be handed over to the fit-out team who should finalise it to reflect the actual space and services handed over to the tenant. The preliminary log book should highlight where the initial design team has not been able to provide the necessary details and has left space for information about the fit-out to be added. Once the preliminary log book is handed over, the fit-out team should take responsibility for development of the log book during fit-out before handover and occupancy. In most cases, it should be possible for the main log book template to be used in this way although minor modifications may be required to meet particular circumstances. Where there are multiple tenancies, then a number of log books will need to be passed to, or developed by, the fit-out team, see section 5.7.

## 5.7 Multiple tenancies

Where a building is to be divided into multiple tenancies, it might be appropriate to have one central overall log book for the whole building with subsidiary log books for each tenancy. The landlord would normally be responsible for the overall building and any central plant and would therefore be responsible for the central log book. The tenants would be responsible for their particular subsidiary log book as they need to continuously log energy performance etc. The management responsibilities of the landlord and tenants need to be clearly set out in both the central and subsidiary log books. Where tenancies are relatively small (e.g. less than 200 m<sup>2</sup>, i.e. approximately 10–15 occupants) then the 'small business' template could be used to develop the log book.

In most cases, it should be possible for the main log book template to be used to develop both the central and sub log books although minor modifications will be necessary to reflect 'central' or 'subsidiary' status and to meet particular circumstances. The front of the log book should state whether it is the central log book or a subsidiary log book. The central log book should list details of all the sub-tenancies, the tenancy managers and the locations of the subsidiary log books. The subsidiary log books should highlight the landlord's details and the location of the central log book. It may be beneficial for each tenant to hold a copy of the central log book but this must be clearly marked 'COPY' to distinguish it from the master.

Where significant changes are made to the building, its services or to individual tenancies, the landlord should

inform the tenant and vice versa. The annual quality assurance review(s) (see section 8.4) carried out by the landlord and tenants should trigger this exchange of information.

## 5.8 How long should it take?

Log books will vary significantly in both size and complexity, see Table 1. The larger and more complex the building, the longer it is likely to take to develop the building log book. Rules of thumb for how long it may take are shown in Table 2.

The greatest time will probably be spent on preparing simple floor plans, diagrams of the design philosophy and systems, and a suitable summary of the sub-metering arrangements.

**Table 1** Likely size of completed log books

Building size	Template	Likely size of completed log book (at handover)
Small business, floor area < 200 m <sup>2</sup> (approx. 10–15 occupants)	Small business template	5–10 pages
Small/simple building, floor area 200 to 2000 m <sup>2</sup>	Main template	25–35 pages
Large/complex building, floor area > 2000 m <sup>2</sup>	Main template	35–50 pages

**Table 2** Likely development time for log books

Building	Template	Likely development time
Very small business, floor area < 200 m <sup>2</sup> (approx. 10–15 occupants)	Small business template	0.5–1.5 days
Small to medium/simple, floor area 200 to 2000 m <sup>2</sup>	Main template	2–5 days
Large/complex, floor area > 2000 m <sup>2</sup>	Main template	5–10 days

## 5.9 Design assessments

Section 6 of the log book should include a summary description of the National Calculation Methodology<sup>(14)</sup> assessment of carbon emissions used to show compliance. The log book appendix should also include a summary of the inputs and outputs to any software used for this assessment.

## 5.10 Changes during the defects liability period

Where changes are made to the building or its services during the defects liability period, the log book needs to be updated as discussed in section 8.4. Updating the log book during this period would usually be the designer's responsibility although this will depend on the specific contractual arrangements.

# 6 Using the CIBSE log book templates

The log book templates included on the accompanying CD-ROM provide an easy to use framework for developing log books. The templates are provided in Microsoft® Word. The 'small business' template (for buildings/tenancies less than 200 m<sup>2</sup> floor area, i.e. approximately 10–15 occupants) provides a quick and easy means of producing a simple log book. For a simple building with a floor area greater than 200 m<sup>2</sup> it should be a relatively straightforward process of filling-in readily accessible information into the main template. For larger and more complex buildings the template may need to be modified to include special aspects of the building design.

## 6.1 Keep a common style

There are significant benefits in making all log books look reasonably similar, throughout the buildings industry. Using the distinctive CIBSE style will ensure that it is easily recognisable amongst the many other manuals likely to be found in building operations rooms. In the same way, it is important to keep the contents list reasonably close to the template so that it retains a common structure recognisable to anyone working in the buildings industry. This is particularly important for new facilities managers and any external contractors/consultants that need to carry out work in the building. Keeping this common 'look and feel' to the log book will benefit the whole industry as it will provide a familiar focal point in the wealth of information relevant to the operation of buildings.

## 6.2 Template structure

The overall contents list of the main template (and hence all future log books) is shown below:

- 1 Building history
- 2 Purpose and responsibilities
- 3 Links to other key documents
- 4 Main contacts
- 5 Commissioning, handover and compliance
- 6 Overall building design
- 7 Summary of areas and occupancy
- 8 Summary of main building services plant
- 9 Overview of controls/bms
- 10 Occupant information
- 11 Metering, monitoring and targeting strategy
- 12 Building energy performance records
- 13 Maintenance review
- 14 Results of in-use investigations

Appendix: relevant compliance and test certificates

Following the above guidance and using the template should result in a 'good practice' building log book. If any part of the template is omitted then designers/authors will need to ensure that it will still meet the requirements of building control and the recommendations given in the Approved Documents.

### 6.3 Obtaining a finished log book

The templates are simple Microsoft® Word documents that require the user to enter the appropriate information into blank areas. In practice, the blank areas already contain explanatory notes. It is therefore simply a matter of deleting or overwriting anything in the templates printed in blue italic type. Notes printed in green italic type should be left for the facilities manger to complete. Gathering the information beforehand will greatly assist completion of the template.

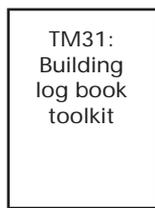
### 6.4 How to use the templates and examples

The accompanying CD-ROM contains various files, see Figure 1. In particular, it includes electronic versions of the main template for developing building log books, a 'small business' template and three example log books based on real buildings. CD-ROM does not automatically copy any files to the hard drive. However, the required files can be copied on to the hard drive if preferred. The log book templates are formatted for Microsoft® Word. They can be imported into other word processing or desktop publishing software although this may cause some changes to formatting etc. Users of online log book software should ensure that the resulting log book follows the template closely.

### 6.5 Setting up energy logging procedures

Monitoring building energy performance is underpinned by setting up an easy to use meter reading pro-forma. Once the metering strategy and schedule have been determined, the designer can set up a tailored meter reading pro-forma based on that shown in Figure 2. Examples of these tailored pro-formas are shown in GPG 348<sup>(12)</sup>, which is included on the CD-ROM that accompanies this publication. Guidance on producing metering strategies and schedules is given in CIBSE TM39: *Building energy metering*<sup>(15)</sup>. All the meters in the metering strategy should be included, with the meter name and code at the top of the 'meter reading' and 'consumption' columns. A blank

#### Printed publication



#### Files on associated CD-ROM

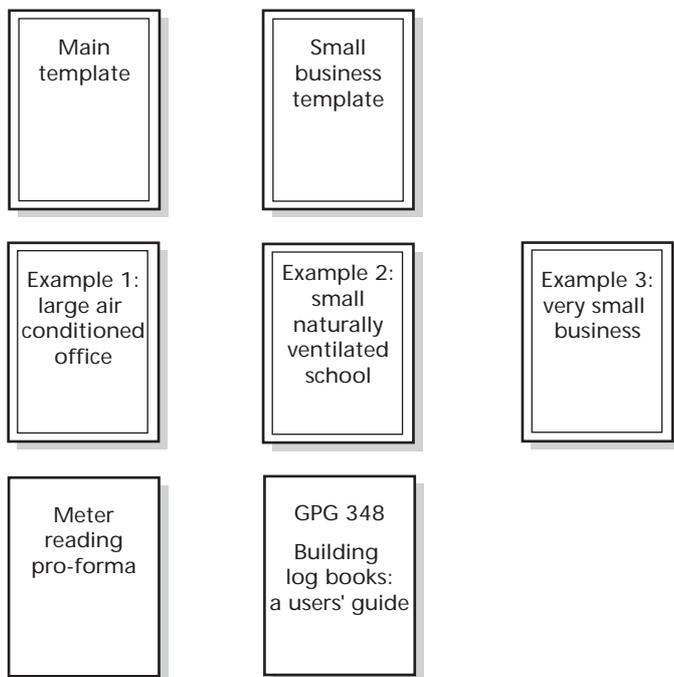


Figure 1 Outline of TM31 toolkit

template for a meter reading pro-forma is provided on the accompanying CD-ROM. Where meters do not read in kilowatt-hours (kW·h), the designer/log book author should provide appropriate conversion factors in the log book and on the tailored meter reading pro-forma. In particular, where oil, LPG or other fuels are used, values for their energy content should be provided. See CIBSE Guide F: *Energy efficiency in buildings*<sup>(16)</sup> for appropriate values.

Year:		Meter code/plant item:		Meter code/plant item:	
Date	Time	Meter reading	Consumption / kW·h	Meter reading	Consumption / kW·h
Annual total:					

Pro-forma continues for other plant items

Notes:  
 (1) Subtract previous meter reading to obtain consumption (in kW·h) over a period  
 (2) Try to take meter readings at regular intervals (e.g. monthly, quarterly etc.) to enable comparison

Figure 2 Meter reading pro-forma

The pro-forma allows regular main and sub-meter readings to be recorded and kept in a separate file (i.e. preferably not in the log book as this will become too bulky). Energy consumption in kW·h can then be calculated and totalled to obtain the main end-use energy consumption. GPG 348<sup>(12)</sup> shows facilities managers how to use this pro-forma to obtain building performance indicators using a worked example based on the air conditioned office example building on the CD-ROM.

## 7 Three example log books

Even though the templates indicate what might be inserted by the log book developer, it is still difficult to get a good idea of what the finished product should look like. For this reason, three example log books have been included on the accompanying CD-ROM. In order to show the range of log books, the first example is a log book for a complex air conditioned office and the second is a log book for a relatively simple naturally ventilated school building. The third example shows a log book for a very small office, based on the separate 'small business' template. These buildings are briefly described below to allow a comparison with the reader's own building.

### 7.1 Example 1: large air conditioned office

Vermont Court is a 7-storey prestige air conditioned office located in the City of London. The building is a steel-framed, lightweight concrete structure with stone cladding. Two atria, on the west and east sides of a central office space, provide daylight to the floors. The building has two basement levels providing service areas for the offices, plant rooms, storage areas and car parking. The first floor comprises office space with increased floor-to-ceiling height, raised floors and increased services provision for dealing room facilities. The remainder of the building is general office space. Full air conditioning with humidity control is provided via central air handling plant, chillers and boilers, all supplied via fan coil units.

### 7.2 Example 2: small naturally ventilated school

Carlton primary school in Purford, Essex provides seven classrooms accommodating 210 pupils between the ages of 4 and 11. The school is also used by local residents for evening events. It is a naturally ventilated, low rise brick construction with light wells in the roof to provide both daylight and ventilation to classrooms. Central heating boilers supply radiators and a gas fired storage water heater provides hot water for hand washing and catering. Fully equipped kitchens provide meals cooked on-site.

### 7.3 Example 3: very small office

No. 3 Wilson House is a small office tenancy within Wilson House in South London. The premises, which are used by a computer consultancy, are on two levels. The main office is at ground level with a relatively high ceiling. Stairs lead to a mezzanine level which can be self

contained. The premises are naturally ventilated with openable windows. Space heating and hot water is provided by a gas fired condensing boiler. General lighting is low energy compact florescent throughout.

## 8 Using a log book

Prior to handover, the design team should train the facilities manager (FM) to use the building log book. The objective is to ensure that the FM would be able to use the log book to:

- operate and manage the building to its maximum potential
- record significant changes made to the building throughout its life and ensure that inappropriate changes are not made that would contradict the design intent
- summarise historical performance of the building; the log book would include a metering strategy setting out how to monitor performance
- educate the building management staff, incoming consultants/contractors and the occupants of the building as to the intended use of the building and, for example, the reasons for not leaving windows open etc.

Guidance on using building log books is covered in more detail in the Carbon Trust's Good Practice Guide GPG 348: *Building log books — a user's guide*<sup>(12)</sup>, a copy of which is included on the accompanying CD-ROM.

### 8.1 Responsibility for the log book

After handover, the FM should take over responsibility for the log book and sign the log book to record this transfer of responsibility. The key responsibilities of the FM with regard to the log book are as follows:

- to ensure that the log book is correct and up-to-date at handover, or when passing it on to a successor
- to ensure that the log book is kept up-to-date on an ongoing basis, including any changes to the building fabric, services, operation or management
- to ensure that building maintenance and energy performance are logged annually, or more frequently where appropriate
- to ensure that all those working in the building are made aware of the relevant information contained in the log book
- to ensure that the log book is kept in its designated location at all times.

A change of FM should result in a formal handover, the log book being signed by the new incumbent.

In a tenanted building, the landlord should ultimately be responsible for the log book. However, the landlord may decide to include responsibility for maintaining the log book in the leasing agreement. This will depend upon the terms of the lease, e.g. whether or not the landlord is

responsible for the operation of central plant. In multi-tenanted buildings, sub-log books will be required for each significant tenancy, see section 5.7. Again, responsibility for keeping the log book up-to-date could be written into the tenancy agreement.

## 8.2 Who might use the log book?

Clearly, all building operations staff should have reasonably direct access to the log book. There may also be other staff in the building that require access to the information contained in the log book. However, for reasons of security, direct access to the log book should be restricted. The FM should be the ultimate authority as to who may have access. The FM should always ensure that they know who is accessing the information, and why it is being accessed.

Only the FM should be allowed formally to maintain, alter and update the log book. Each change should be signed and dated by the FM to ensure a clear historical record of the building. The FM may decide to ask others to provide the information, e.g. develop diagrams or energy figures, but there should be an authorising signature before this information is entered into the log book. Fully electronic and online log books can provide password protection that will help ensure that updates/alterations are only carried out by appropriate staff.

## 8.3 Where should it be kept?

Paper copies should be kept in a designated location in the main building operations room identified by means of a clear sign. This should indicate that the log book is not to be removed without the authority of the facilities manager. Electronic copies should be kept on the FM's PC or server with a back-up copy kept in a separate place. URLs for online log books should be kept as simple and obvious as possible and should be recorded in separate place. The log book should clearly state:

'This log book is to be kept at all times in [room name/number and designated location in that room]. An electronic master is be kept at: [server/PC reference, directory name and file name].'

## 8.4 Keeping it up-to-date

The log book should be reviewed annually by the facilities manager as part of the organisation's quality assurance (QA) procedures.

The QA manual might say:

'Review the building log book annually (or more often) to ensure that all the information is up-to-date and correct. The review date and any updates should be recorded in the log book. This review should record significant alteration to the building and engineering services or changes in occupancy/use. It should also include an assessment of the energy performance and maintenance of the building.'

This annual review should act as a trigger to ensure that the log book is brought fully up-to-date and that the annual energy assessment has been carried out. The review should consider all aspects of the building including:

- architectural
- building services (including controls)
- energy performance
- occupancy and use
- building management
- maintenance.

Where necessary, the log book should be updated (or added to) and the facilities manager (FM) should record these changes in the building history in section 1 of the log book.

Where a page has been added as a result of an alteration to the building or, say, if new energy records are inserted, the new page should be numbered, for example, '13a' if it follows page 13. Pages that have been updated should be retained in order to maintain a historical record of the building, but should be marked 'SUPERSEDED'. It is important to ensure that annotations and amendments to the paper 'master' copy are transferred to the electronic copy. Each new version of the electronic copy of the log book should be clearly dated and kept in a designated folder on the FM's personal computer (PC) or server.

In multi-tenanted buildings, information should be exchanged between the tenants and landlord about any significant changes to the building, its services or to individual tenancies. The annual quality assurance review(s) carried out by the landlord and tenants should trigger this exchange of information.

Where staff movement ('churn') has a significant effect on the operation and management of the building, this might be recorded as a change to the building in the building history in section 1 of the log book.

## 8.5 Logging energy performance

As part of the annual review, the facilities manager should ensure that energy performance is recorded and compared with appropriate benchmarks and the designer's estimates of what the building should consume. Regular main and subsidiary meter readings should be recorded on the meter reading pro-forma set up by the log book author, see section 6.5. This allows consumption in kW·h to be calculated and totalled to obtain the main end-use consumptions. Overall performance and end-use performance can then be observed over time and compared to good practice benchmarks and design estimates. Energy consumption benchmarks are available from the Carbon Trust ([www.thecarbontrust.co.uk](http://www.thecarbontrust.co.uk)) and CIBSE Guide F: *Energy efficiency in buildings*<sup>(16)</sup>. See Good Practice Guide GPG 348<sup>(12)</sup> for a step-by-step approach to logging energy performance.

CIBSE TM22: *Energy assessment and reporting method*<sup>(17)</sup> provides software to help assess building energy performance, using either a simple or a detailed approach. TM22 includes benchmarks for a range of buildings. Benchmarks for a wider range of buildings are available in the series of Energy Consumption Guides produced by the Carbon Trust, e.g. ECG 019: *Energy use in offices*<sup>(18)</sup>, and in CIBSE Guide F<sup>(16)</sup>.

## 9 Log books for existing buildings

There are distinct benefits to owners and operators of existing buildings to prepare, and put into use, a building log book. Preparing the log book will often provide a better understanding of the design intent and hence improve building management. Ongoing use of the log book provides a means of recording building performance. In this way, the log book should facilitate improved energy consumption and reduced emissions to the atmosphere from most existing buildings. Preparation of log books for existing buildings may be linked to refurbishment work, or to replacement and renovation of specific services or elements.

In England and Wales, Building Regulations Approved Document L2B<sup>(9)</sup> covers works in existing buildings, in particular the replacement of controlled services or fittings. This could include the replacement or upgrading of systems and the installation of new systems.

On completion of the work, the building logbook should be brought up to date (or a new one prepared if it does not already exist). The new or updated logbook should provide details of:

- (a) Any newly provided, renovated or upgraded thermal elements\*
- (b) any newly provided fixed building services, their method of operation and maintenance,
- (c) any newly installed energy meters
- (d) and any other details that collectively enable energy consumption to be monitored and controlled.

For example, where boiler replacement is undertaken, a log book would need to be prepared covering that new boiler plant and, preferably, the whole heating system. Where a log book already exists then it would need to be updated, as discussed in section 8.4.

Approved Document L2B<sup>(9)</sup> also suggests that where the work involves the provision of a controlled service, reasonable provision would be to:

- e. Demonstrate that reasonable provision of energy meters has been made for effective monitoring of the performance of newly installed plant (see paragraphs 67 to 69); and
- f. Demonstrate that the relevant information has been recorded in a new log book or incorporated into an update of the existing one as described in paragraphs 89 to 92.'

Replacement boilers would therefore need appropriate metering and a new/updated metering strategy would need to be included in the new log book.

\*Thermal element means a wall, floor or roof but does not include windows, doors, roof windows or roof-lights, see ADL2B<sup>(9)</sup> for a full definition

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