HTM update

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Inventures
Introduction

Reason for new publications:
• Legislation
• H and S requirements
• Improved clarity
• New and revised standards
• Changes in NHS Trust management
• Improvements in NHS Estate management techniques
OBJECTIVES OF HTMs AND HBNs

• To inform the reader of particular requirements of healthcare buildings with respect to building engineering and management functions.

• To provide a source of specialist information, not available from other sources, to assist the reader carry out the objective above.
HTM OBJECTIVES

Healthcare building life-cycle
HTM Core Subjects and how they relate to National and International Standards
CORE SUBJECTS

• HTM 00 Policies and principles (applicable to all HTM in this series)
• HTM 01 Decontamination
• HTM 02 Medical gases
• HTM 03 Ventilation systems
• HTM 04 Water systems
• HTM 05 Fire safety
• HTM 06 Electrical services
• HTM 07 Environment and sustainability
• HTM 08 Specialist services
HTM 00 Policies and principles

Best practice guidance for healthcare engineering

2006

• commonly applicable statutory and legislative requirements.
• professional and technical support.
• development of operational policies (advocates service-user involvement etc.)
• emergency preparedness etc and the ability of the organisation to continue to provide healthcare throughout emergency situations and to recover quickly. (also see HBN 00-07)
• staff training, systems and operation and maintenance procedures.
• maintaining engineering systems to provide optimum performance and maximise the potential for critical service availability.
• design and access availability with regard to engineering services.
HTM 00

- Statutory and Legislative requirements
- Lists common statutory and legislation
- Makes recommendations regarding “Risk and/or priority assessment”, for design, maintenance and operation of services (3.8...) (formerly HTM 2050) (also see HBN 00-07)
Professional and technical support

• Recommends the appointment of:

• Designated persons; (from the Trust Board!)
• Authorising Engineers;
• Authorised Persons;
• Competent Persons.
   For each service e.g. water, electricity, med gas, ventilation systems, etc.
Operational policy

Requires trusts to develop:

• Board adopted policies, for the designated person to manage, the suitability of the service, for the board; (5.1...)

• Operational procedures, to enable the trust to manage the delivery of the service operationally; (5.5...)
Operational policy cont.

- Records management; *(5.12...)*
- Security, the management of the service to ensure its availability, including, physical barriers and “permits to work”; *(5.18..)*
- Contractor control and monitoring *(5.23...)*
Emergency preparedness and contingency planning

• Requires trust to meet the requirements of Civil Contingencies Act 2004, and
• NHS Emergency Planning Guidance 2005

Also applicable to PFI, PPP and LIFT projects  (6.13)
Emergency planning

Healthcare organisations may encounter such scenarios as:

• unplanned interruption to a utility supply (gas, water, electricity etc);

• unexpected equipment and service distribution failures (telephones, water pipework, medical gases etc);

• a civil incident (act of terrorism, civil disturbance etc);

• an environmental incident (floods, transport incident, storm damage etc).
Training

• The guidance requires trust to have systems in place to ensure:
• Personnel are trained, including:
  Internally, medical staff, support services,
  Externally, consultants, contractors
• Training plans;
• Training records are held
Maintenance

Requires trust to maintain, their systems, and for them to be optimised in terms of:

Effectiveness; Reliability;
Robustness; Safety;
Monitoring; and record
HBN 00-07
Resilience planning for the healthcare estate  (May 07)

• Replaces in part HTM 2050
• Replaces other NHS Estates and DoH guidance
• To be read with all other HTMs and HBNs
• Has many relevant sections for the construction of Healthcare Buildings
• Has many relevant sections for the Engineering Services in Healthcare Buildings
Section 3
Procuring resilient facilities

Action points
• Understand the principles
• Analyse the threats and hazards (Risk Register)
• List the risks to be mitigated
• Identify the resilience requirements
• Incorporate the resilience requirements into the project brief
• Review the design proposal to ensure that the requirements have been met
• Control delivery
Resilience is the ability of the building and engineering infrastructure to continue operating in extraordinary circumstances.

Resilient facilities are those that have the following features:

robustness – the system or facility should be able to absorb the effects of an event and continue to operate at the required level;

redundancy – where robustness cannot be absolutely guaranteed, it is essential to provide more than one of a key facility or sub-system;

reconfigurability – the unanticipated risk is often the most devastating. To be truly resilient, a system or facility should be adaptable to cope with the effects of an unexpected event.

Responsibility of All including the Client and Designers (3.3)
Resilient facilities
what might this mean for Engineering systems?

Box 10: Hypothetical examples of resilience requirements

These are examples of resilience requirements developed from a risk assessment:

1. “The completed facility incorporates the means to control the approach of vehicles so that a potential vehicle bomb cannot approach within 25 m of an occupied area.”

2. “Provision for at least two entrances to the facility that will have sufficient space to assemble and operate a casualty decontamination facility capable of processing 10 casualties per hour – four to be on stretchers.”

3. “Provision for an electricity supply system that is capable, in the absence of mains electricity, of sustaining the essential load of the facility for a period of not less than 200 hours.”
An example of electrical resilience

“Provision for an electricity supply system that is capable, in the absence of mains electricity, of sustaining the essential load of the facility for a period of not less than 200 hours.” (was 192 hours in HTM 2011)
Resilient Electrical systems
Resilience of engineering services

- Steam mains
- Water storage
- Water supply (connections)
- Emergency generator connections
- Fire suppression of high value equipment
- Fire suppression of operationally sensitive resources
- Dual fuel boilers
HTM 03 (2007)
Specialised ventilation for healthcare premises

- Replaces HTM 2025 (1994)
- To be read with:
  - HBN etc. e.g. HBN 26 Theatres
  - HBN 4 Supp 1 Isolation rooms
HTM 04 (2006)

Water systems
Health Technical Memorandum
04-01: The control of Legionella, hygiene, “safe” hot water, cold water and drinking water systems

Part A: Design, installation and testing
• HTM 04 Parts A and B
  Replaces:
• HTM 2027; (1995)
• HTM 2040; (1993)
• HGN safe water and surface temperatures (PART); (1998)

Complies with:
• HSE (L)8 ACOP Legionnaires’ disease: the control of legionella bacteria in water systems. (2000)
Main changes and points

• Compliance with L8
• Hot Water to circulate at minimum 55°C
• Amended TMV maintenance
• 5m rule for dead legs (9.49)
• One blender serving several outlets (9.49)
• No blenders in staff ONLY areas (except Disabled WC)
• BMS monitoring:
  incomer, all cal connections, sentinel for H & C (10.1)
• BMS monitoring:
  incomer, all calorifier connections, sentinel for H & C (10.1)
• microbiological tests
• L8 and HTM 04 Risk Assessments required on completion of major modifications or new installations
• Section 18 details documentation
Electrical trace heating

- The trace heating system should be monitored for short-circuit and open-circuit conditions. (9.52)
- Temperature alarms should be provided (set to 50°C) to warn of a failure of the trace heating system or a deterioration in its performance. (9.53)
Operational issues

- HTM acknowledges, The Water Supply (Water Quality) Regulations permit cold water to be delivered at temperatures up to 25°C, although in normal circumstances it will be well below 20°C.
- Microbiological tests for legionella, required for systems in poor condition or not operating correctly. Trust infection control team will advise.
FireCode HTM 05  (Replaces HTM 80 Series)

• HTM 05-01 Managing healthcare fire safety July 06
• HTM 05-02 Guidance in support of functional provisions for healthcare premises Jan 07
• HTM 05-03 Operational provisions:

  Part B Fire detection and alarm systems Oct 06
  Part C Textiles and furnishings June 07
  Part D Commercial enterprises on healthcare premises (supersedes FPN 5) Dec 06
  Part E Escape lifts in healthcare premises (supersedes FPN 3) Aug 06
  Part F Arson prevention in NHS premises (supersedes FPN 6) Dec 06
  Part G Laboratories on healthcare premises (supersedes FPN 10) Dec 06
  Part H Reducing unwanted fire signals (supersedes FPN 11) Dec 06
  Part J Guidance on fire engineering of healthcare premises Jan 08
  Part L NHS fire statistics 1994/95–2004/05 (supersedes FPN 9 NHS) March 07

• HTM 83 Fire safety in healthcare premises – general fire precautions Mar 94
• HTM 86 Fire risk assessment in hospitals Apr 94
• HTM 88 Fire precautions in housing providing NHS-supported living in the community Nov 01
HTM 05-02  2007
Fire Precautions Healthcare Premises

• Replaces HTM 81 and 85  (1996)
• Must be read with other parts of HTM 05
• Must be read with
  HBN 00-07 Resilience planning
Section 3  Principles of life safety

Fire Suppression systems are required when they are located adjacent to “Patient Access Areas” in the following areas:

- Boilerhouse (main),
- Commercial enterprises,
- Laundry, stores
- Main kitchens,
- Refuse collection/ incineration,
- Main electrical switchgear (should also include generators etc),

Central store,
Flammable store,
Local medical gas
Main stores,
Works

Additional areas may be added as required by HBN 00-07 Resilience Planning
Additional Fire Suppression systems are required when they are located adjacent to “Very High Dependency” departments e.g. ICU, CCU etc.

in the following areas:

Central staff change
Medical records
Pharmaceutical (manufacturing)

Sterile services department
Pathology

Additional areas may be added as required by HBN 00-07 Resilience Planning

(3.17 and Table 1)
HTM 05-02 Smoke dampers

- Required in all compartments and sub-compartments
- Includes floors and ceilings
- Most smoke dampers to be connected to fire alarm system
- Fire proof ductwork encouraged

- Note: HTM 60, false ceilings not to be used as fire barriers
HTM 05-03 Part B 2006
Detection Systems (replaces HTM 82)

• Replaces HTM 82 (1996)
• Must be read with other parts of HTM 05
• Must be read with
  HBN 00-07 Resilience planning
HTM 05-03 Part B
Detection Systems

• BS 5839:2002 category L1 system should be provided throughout all parts of hospital premises.

• BS 5839:2002 Category L2 or L3 system should be provided for other healthcare premises.

Note, for stand alone offices or clinics additional detection may be required to due to the value of medical records etc.
also see HBN 00-07 Resilience Planning
Where can detectors be omitted?

by Risk Assessment, detectors may be omitted in the following areas:

• voids and roof spaces of any depth which contain only:
  (i) MICC or wiring clipped to a metal tray or within metal conduit or trunking;
  (ii) non-combustible pipework and ducts;
  (iii) metal or plastic pipes used for water supply or drainage;
• bath/shower rooms;
• toilets in staff areas;
• small cupboards (less than 1 m\(^2\));
• operating theatres (new).
HTM 06  (2006 & 2007)
Electrical services
supply and distribution

Replaces:
• HTM 2007;  (1993)
• HTM 2011;  (1992)
• HTM 2014;  (1993)
• HTM 2020;  (1998)
• HTM 2021.  (1993)

16 documents replaced by 6!!
Main changes

• Improved load profiling
• Improved consumption information
• Harmonics
• Categorises clinical and business risk....
### Figure 6  Patient clinical risk categories

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<td>1</td>
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<td>5</td>
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<tr>
<td>Support service circulation</td>
<td>Ambulant care and diagnostics</td>
<td>Emergency care and diagnostics</td>
<td>Special medical locations</td>
<td>Life support/complex surgery</td>
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### Figure 7  Non-clinical and business continuity risks

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<td>1</td>
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<tr>
<td>Business support services</td>
<td>Building services safety and security</td>
<td>Building services environmental control</td>
<td>Medical support services</td>
</tr>
</tbody>
</table>
Figure 17  Dual-primary and dual-secondary supply – unified and dual-unified infrastructure

Distribution strategies
• Generation risks
• Generation options
• Load acceptance
• Transformer and switch room design
• Escape and working space in electrical plant rooms
• Fire management of electrical systems (see HTM 05)
• Design and management of protection of electrical systems
• UPS/IPS installations
• MEIGaN guidance (MHRA)
• Diagnostic imaging rooms
• Mobile imaging electrical connections
• Validation, commissioning, training and records
HTM 07 Environment and sustainability

- HTM 07-01 Safe management of healthcare waste Nov 06
- HTM 07-02 EnCO$_2$de – making energy work in healthcare Jan 06
- HTM 07-03 Transport management and car-parking Feb 06
- HTM 07-05 The treatment, recovery, recycling and safe disposal of waste electrical and electronic equipment July 07
- HTM 07-06 Disposal of pharmaceutical waste in community pharmacies Sept 07
EnCO₂de

your one stop guidance for all your Energy and Environmental needs!
EnCO$_2$de Foundations

It is not prescriptive.

It draws together best practice guidance so that healthcare organisations can determine a way forward that best suits their situation.
EnCO₂de Aims

• The aim of EnCO₂de is to ensure that everyone involved in managing, procuring and using buildings and equipment thinks about the implications of energy use; today and in the future. In short – it puts energy at the heart of the health service.

NOTE
like any guidance it needs for construction works it needs to be specified in the contract to have its full effect
Who should use EnCO$_2$de?

• Encode provides sufficient information for any healthcare organisation to manage its daily energy-saving activities, and to plan effectively to make the most of the opportunities that lie ahead.
Energy Policy

How to manage energy.....
Environmental Policy

• Would typically incorporate the energy policy and include the following:
  • Carbon trading
  • Reduce the environmental impact of: transport (green transport plan), life energy cycle of the buildings, materials and energy consumed within the buildings
  • Improve sustainability: choose sustainable sources for materials, e.g. wood, choose sustainable sources for fuels e.g. bio fuel, wind power, solar, etc.
• Early Involvement preferably prior to AIP
• Responsibility of Designers to fully involve themselves in the AIP and Design Stages
• Taking the opportunities!!!
  Refurbishment
  New Build
• Setting project-specific energy and carbon objectives
Early decisions for building projects – building fabric (4.69....)

- The role of thermal mass (4.76)
- Health Considerations (4.86)
- The People Factor (4.88)
- The benefit of high ceilings (4.89)
- The importance of airtightness (4.93)
- Insulation (4.97)
- Orientation
Early decisions about heat and power (4.100...)

- Lighting, Ventilation, Insulation......
- Metering (4.109)
- Centralised versus decentralised systems (4.110...)
- Renewable energy sources: Biomass, CHP, Solar, PV, Wind.... (4.119....)
Other early considerations (4.137..)

- Manageability and maintainability (4.137..)
- Resilience (4.142...)
- Commissioning (4.145...)
- Training
- Documentation (4.146...)

Resilience/Monitoring/Management
# Project Design Checklists

<table>
<thead>
<tr>
<th>Project design checklist</th>
<th>Yes/No (tick)</th>
<th>Follow-up actions</th>
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<tbody>
<tr>
<td>1. Has the brief been met?</td>
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<tr>
<td>Have clients' requirements and Encode design guidance been satisfied?</td>
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<tr>
<td>Have project-specific energy objectives been met?</td>
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<tr>
<td>Have the mandatory annual energy and carbon targets been met or exceeded?</td>
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<td>Have the original environmental objectives (eg achieving an “excellent” rating) been met?</td>
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<td>Have whole-life cost objectives been achieved?</td>
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<tr>
<td>2. Energy regulations</td>
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<tr>
<td>Have the Building Regulations been satisfied (particularly those relating to energy usage)?</td>
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<td>Has every effort been made to go well beyond the minimum energy standards set in the Building Regulations?</td>
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<tr>
<td>Has a building log book been prepared showing design estimates of future consumption?</td>
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<td>Has the building been certified in accordance with the Energy performance of Buildings Directive (EPBD)? (post-2006)</td>
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<td>Has there been an investigation to determine whether the building or project will need to be registered under the EU Emissions Trading Scheme?</td>
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<tr>
<td>3. Design integration</td>
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<tr>
<td>Has every effort been made to include renewables?</td>
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<tr>
<td>Can thermal storage, heat recovery, free cooling be used to minimise services further?</td>
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<tr>
<td>Has natural ventilation been optimised to minimise services?</td>
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<tr>
<td>Has daylight been optimised to minimise services?</td>
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<tr>
<td>Has every effort been made to minimise requirements for services?</td>
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<td>Will individual services operate without conflict?</td>
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<td>4. Building fabric</td>
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<td>Project design checklist</td>
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<td>Follow-up actions</td>
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<tr>
<td><strong>9. Metering</strong></td>
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<tr>
<td>Has a metering strategy been developed and included in the building’s log-book?</td>
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<tr>
<td>Has a strategy been developed for monitoring and reporting measurements from meters?</td>
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<tr>
<td>Are all departments or smaller individual buildings individually metered?</td>
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<td>Are all sub-meters shown on the design drawings?</td>
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<td>Have detailed operation and maintenance manuals been prepared including details of</td>
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<tr>
<td>design, commissioning, equipment and so on?</td>
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<tr>
<td><strong>10. Lighting</strong></td>
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<tr>
<td>Has every effort been made to bring in additional daylight?</td>
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<td>Will the daylight be utilised in conjunction with responsive controls?</td>
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<tr>
<td>Have lighting controls been zoned in relation to occupants needs?</td>
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<tr>
<td>Has every effort been made to avoid over-lighting compared to recommended illuminance</td>
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<td>levels?</td>
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<tr>
<td>Can lighting be provided by more localised systems (e.g. task lighting)?</td>
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<tr>
<td>Are the light sources (lamps, luminaires and control gear) the most efficient possible?</td>
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<td><strong>11. Motors</strong></td>
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<td>Have high-efficiency motors been specified throughout the design?</td>
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<td>Have variable speed drives (VSDs) been specified where appropriate?</td>
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<td><strong>12. Building management system and other controls</strong></td>
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<tr>
<td>Is there a suitable balance between central and local control?</td>
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<td>Will the facilities management team have suitable overall controls that encourage</td>
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<td>good operation (e.g. building management system (BMS))?</td>
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<tr>
<td>Do occupants have good local controls with simple interfaces?</td>
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<tr>
<td>Does the BMS provide central control, monitoring and alarms with a good user interface?</td>
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Chapter 5

Technical notes for building services
Topics

- heat and power sources;
- space and water heating;
- ventilation and cooling;
- lighting;
- motors and drives;
- controls;
- "small power”;
- specialist services.

Day light linking lights, CO2 controlled Ventilation

Energy Saving Low Loss Motors
HTM 08 Specialist services

- HTM 08-06 Pathology laboratory gas systems

And to come this year
- HTM 08 - 04 - Specialist Services, Pneumatic Tube systems to replace (HTM 2009)
- HTM 08 - 02 - Specialist Services, Lifts to replace (HTM2024)
- HTM 01 - 07 - Decontamination in primary Care
Where to get further information

- Department of Health Knowledge & Information Portal
  http://195.92.246.148/nhsestates/knowledge/knowledge_content/home/home.asp

- CIBSE
  http://www.cibse.org/

- The Carbon Trust
  http://www.carbontrust.co.uk/default.ct

- IHS Technical Indexes, UK
  http://uk.ihs.com/

- Barbour
  http://www.barbour-index.co.uk/barbourinfo/
Special Interest Groups.

Healthcare

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Mission Statement
To improve the performance of Healthcare buildings by increasing awareness amongst all building professionals and supporting the implementation of relevant Standards and legislation aimed at improving the effective use of Healthcare Buildings. As with most of the other Groups and Societies