MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

AIR HANDLING UNITS &

HTM 03-01

SPECIALIST CARE NEEDS SPECIALIST AIR

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

LEARNING OUTCOMES

INTERPRETATION & UNDERSTANDING

To separate and intepret guidance from actual legislation in order to assess the need for compliance and the challenges this entails.

DESIGN CONSIDERATIONS

Develop a full and comprehensive design understanding of the guidance given in HTM 03-01 relating to AHU design and its associated component sections

INNOVATIONS HTM 03-01 & THE LAW

Current AHU innovations which may benefit healthcare AHU's and the potential consequences of failing to follow the guidance

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

WHAT IS HTM?

THE HEALTH TECHNICAL MEMORANDUM

SPECIALIST CARE NEEDS SPECIALIST AIR

HEALTH TECHNICAL MEMORANDUM

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

THE HEALTH TECHNICAL MEMORANDUM

ADVICE & GUIDANCE

On the design, installation and operation of specilaised building and engineering technology used in the delivery of healthcare

STANDARDS & POLICIES

The focus remains on healthcare specific elements of standards, policies & up to date established best practice

DUTY OF CARE

Healthcare providers havre a duty of care to ensure that appropriate governance arrangements are in place and are managed effectively.

SPECIALIST CARE NEEDS SPECIALIST AIR

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

CONSIDERATIONS

HEALTH & SAFETY

MAINTENANCE & INSPECTION

BUILDING REGS Incl. ErP

PATIENT & STAFF COMFORT

CAPITAL & RUNNING COSTS

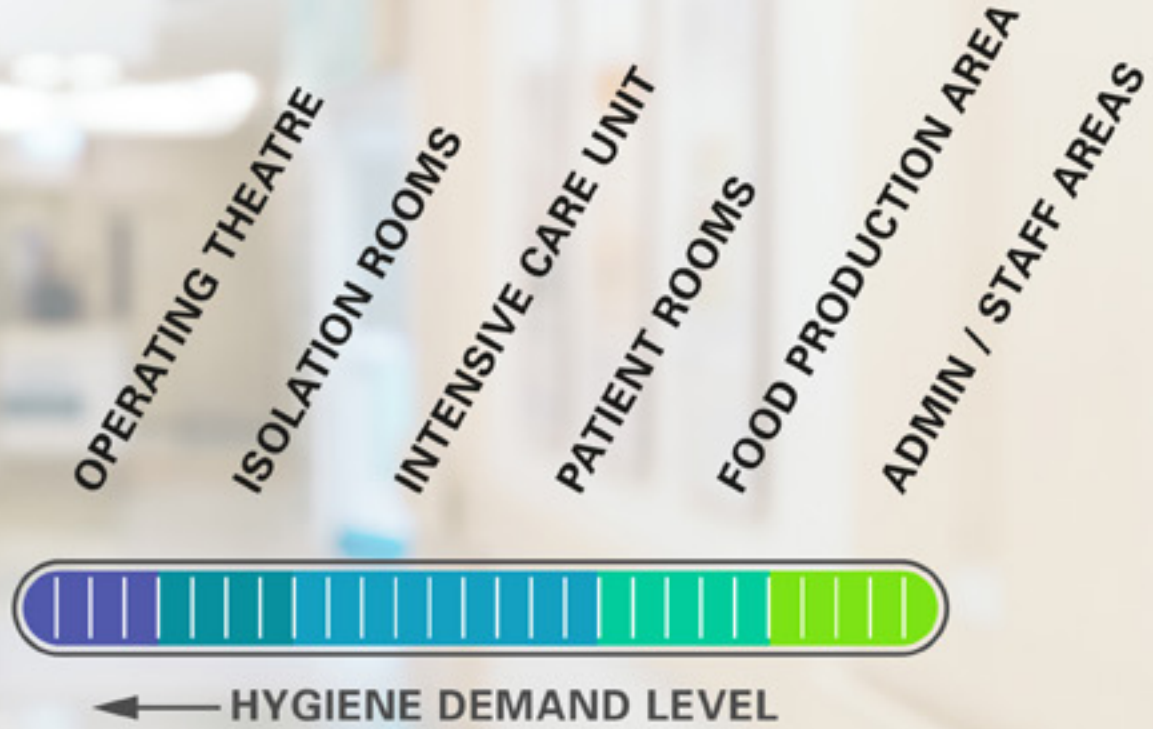
SPECIALIST CARE NEEDS SPECIALIST AIR

CONSIDERATIONS

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

HEALTH & SAFETY

In healthcare premises, certain activities will necessitate the provision of ventilation equipment with additional special features in order to achieve and maintain specific conditions. These may be needed in order to assist with the treatment of patients or maintain the health and safety of staff.



SPECIALIST CARE NEEDS SPECIALIST AIR

CONSIDERATIONS

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AIR MANAGEMENT EXPERTS

PATIENT & STAFF COMFORT

Patient and staff comfort is based on diverse needs of care teams and patients throughout the facility and includes: temperature, air quality, noise and other special needs like humidification to keep the focus on patient care.

Infection Control

Separate extract / supply airflows & room pressure management.

Hazard Control

Multi filtration stages & microbially inert design.

Climate Control

Heating / cooling and humidity control options.

Energy Control

High efficiency energy recovery and variable speed fans.

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CONSIDERATIONS

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AIR MANAGEMENT EXPERTS

MAINTENANCE & INSPECTION

Location and internal access is of primary concern for healthcare and HTM 03-01 specification units to ensure simple cleaning and maintenance. Prevention of dust, bacterial traps, moisture pooling, corrosion and contamination is key.

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CONSIDERATIONS

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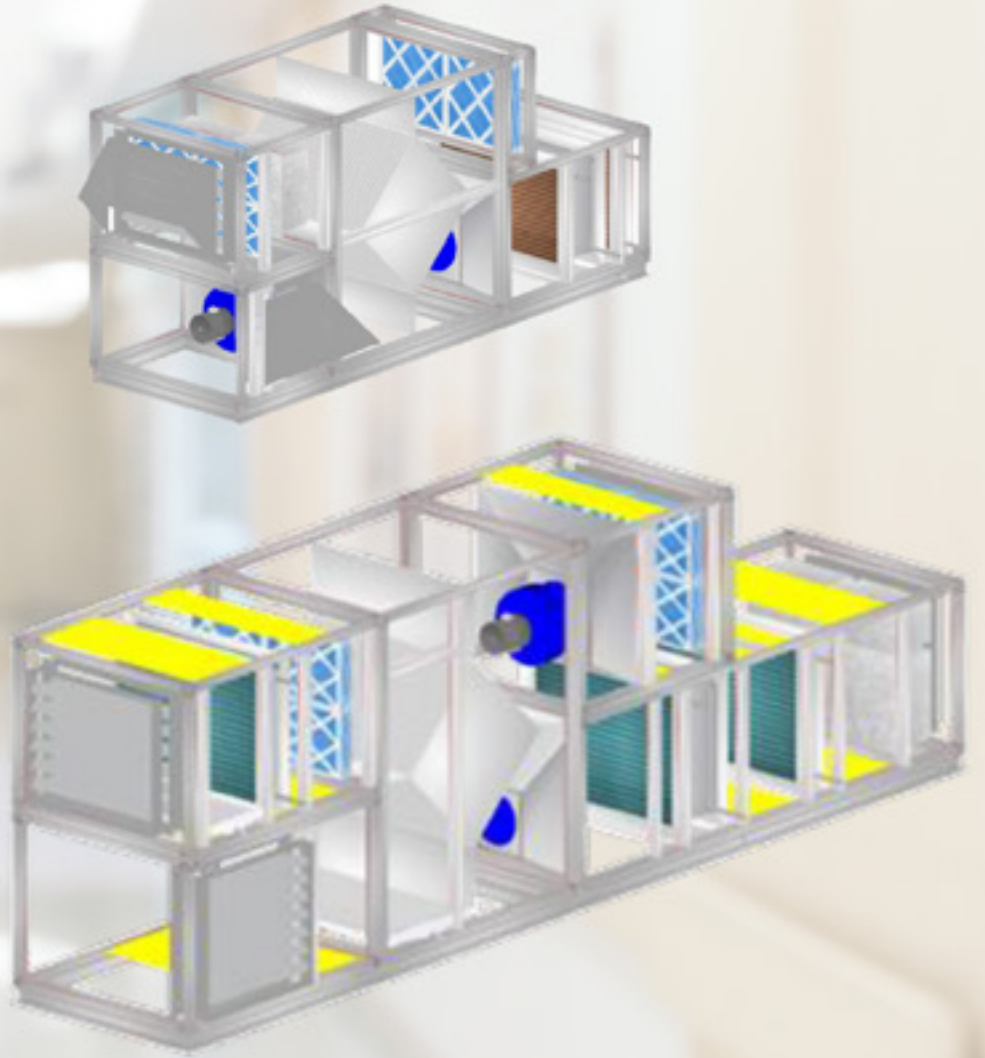
AIR MANAGEMENT EXPERTS

CAPITAL & RUNNING COSTS

an HTM 03-01 AHU can cost significantly more than a standard AHU performing the same duty.

The additional requirements in HTM 03-01 also mean that units are considerably larger.



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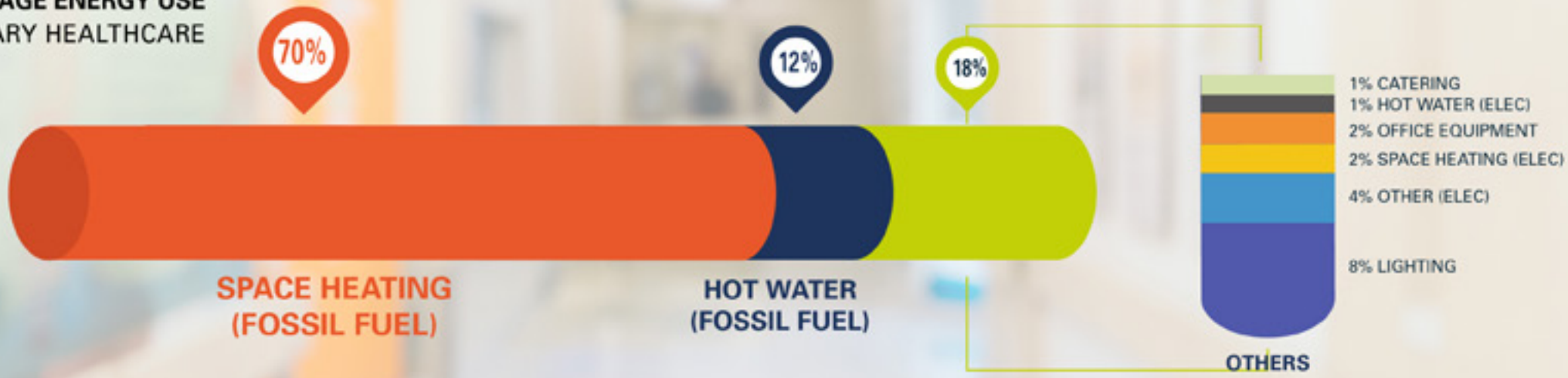
AIR MANAGEMENT EXPERTS

CONSIDERATIONS

The UK's healthcare sector spends more than £400 million per year on energy. Unfortunately, a significant proportion of this is wasted, meaning that money is wasted too. Carbon Trust

PERCENTAGE ENERGY USE
IN PRIMARY HEALTHCARE



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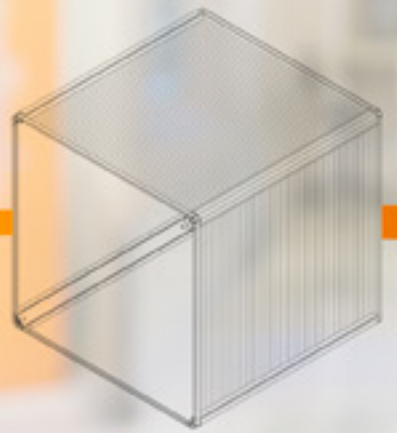
AIR MANAGEMENT EXPERTS

CONSIDERATIONS

BUILDING REGS INCL. ERP

ErP compliant LOT6

ErP 2016
67%
recovery



ErP 2018
73%
recovery

SPECIALIST CARE NEEDS SPECIALIST AIR

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

DESIGN PRINCIPLES

OF HTM 03-01

SPECIALIST CARE NEEDS SPECIALIST AIR

DESIGN PRINCIPLES

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

HTM 03-01
AHU DESIGN

INTERNAL COMPONENTS

Driven by hygiene & maintenance requirements

EXTERNAL BUILD

Additional quality requirements

SPECIFIED CONDITIONS

Application based internal & environmental conditions

SPECIALIST CARE NEEDS SPECIALIST AIR

DESIGN PRINCIPLES

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

INTERNAL COMPONENTS

- Positive pressure
- Non-combustable
- Corrosion resistant
- Cleanable drainpans
- Energy recovery

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DESIGN PRINCIPLES

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

EXTERNAL BUILD

- Structural integrity
- Raised base frame
- Air tightness
- View ports & illumination
- Hinged access doors
- Noise reduction

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DESIGN PRINCIPLES

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AIR MANAGEMENT EXPERTS

SPECIFIED CONDITIONS

- Peak heating & cooling load
- Air purity levels
- Humidity
- Condensation risk

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AHU SELECTIONS

OF HTM 03-01

SPECIALIST CARE NEEDS SPECIALIST AIR

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

INLET SECTION

- Intake damper with motorised actuator

- Extract should be located on a different building face from the supply but as a minumum there should be 4m between them to prevent unwanted recirculation.

FROST COIL

- Frost coil - raises the intake ambient above dew point to protect filters and components from wetting out
- Options for low/medium pressure hot water, steam or electric

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

PRIMARY FILTERS

- Front withdrawal to minimise bypass leakage
- Upstream side of filter visible for inspection via viewport
- Graded and type tested in accordance with ISO 16890
- Direct reading dial type gauge required

AHU SELECTIONS

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

HEAT RECOVERY

RUN AROUND COIL

68% minimum efficiency

No contamination risk between supply & extract.

Twin, run & standby pump for mission critical areas

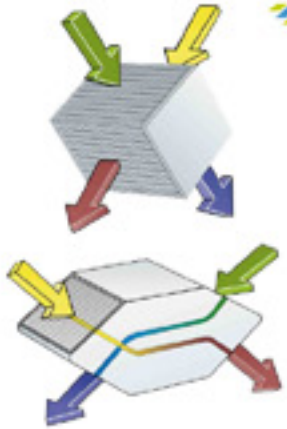
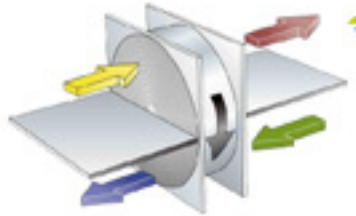


PLATE HEAT EXCHANGER

Up to 80% efficiency & separate airstreams

Low air leakage and high efficiency

Custom built stainless steel drain tray



THERMAL WHEEL

Up to 90% efficiency for less critical areas

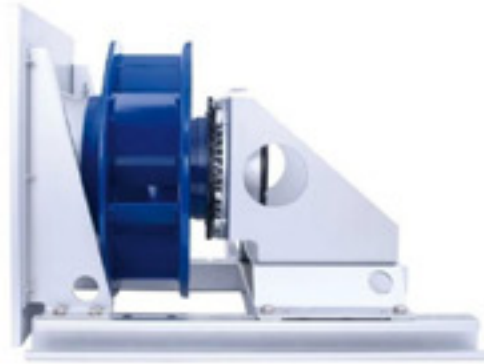
High corrosion resistance.

Low maintenance & operating costs

SPECIALIST CARE NEEDS SPECIALIST AIR

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

FAN SECTION



FANS:

Duty standby or with spare fan assembly

Option for run & standby belt drives

POSITIVE PRESSURE:

All condensate drains under positive pressure

OTHERS:

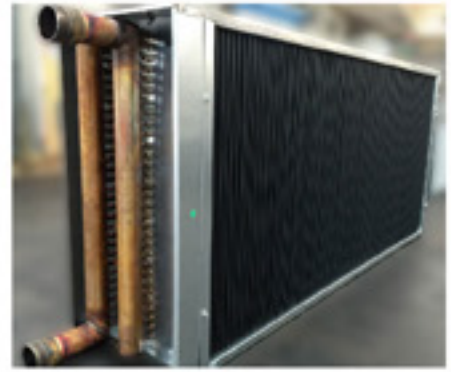
Thermistors plus options for:

- Lifting beams
- Fan guards
- Diffuser blast plate

SPECIALIST CARE NEEDS SPECIALIST AIR

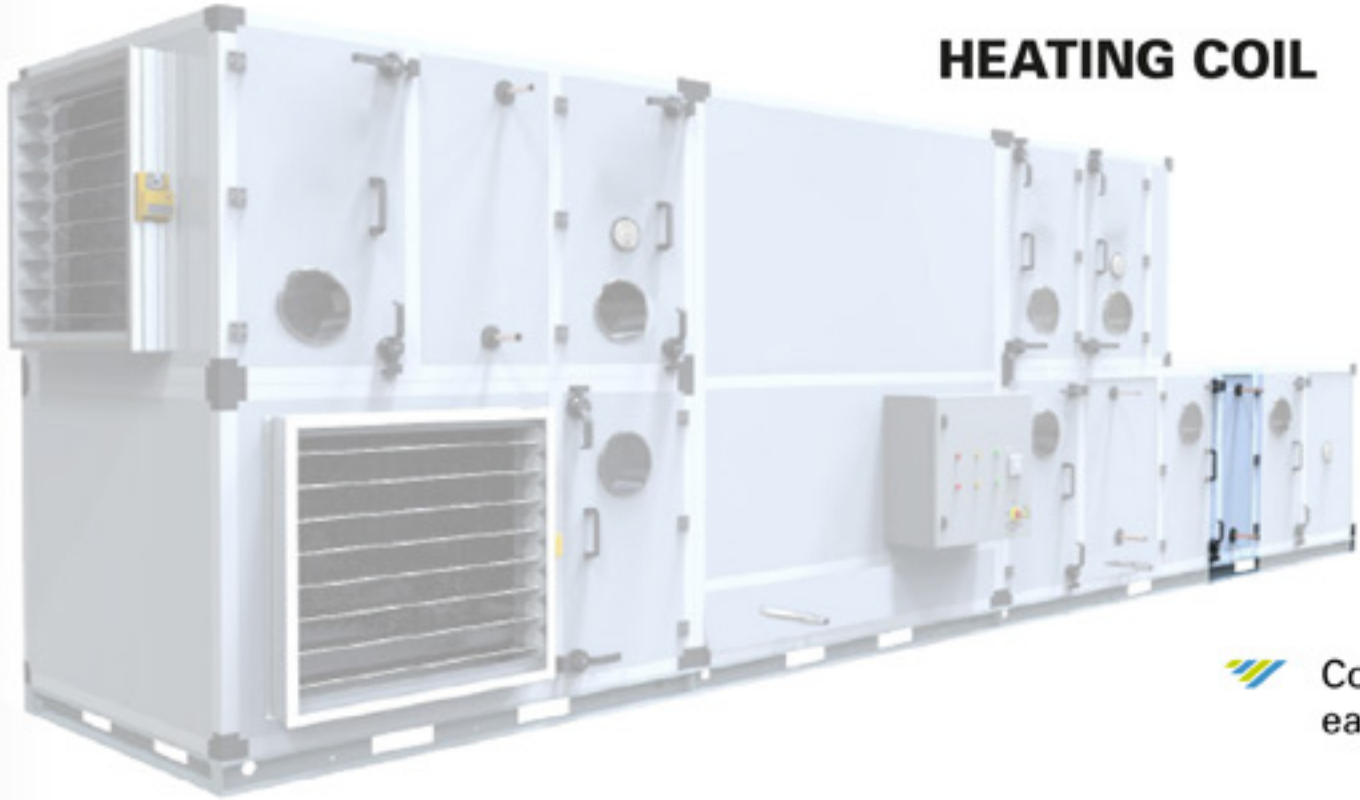
MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

COOLING COIL



- Standard construction is from corrosion resistant materials to minimise electrolytic action from condensation including stainless steel casing and option for vinyl coated & electro-plated copper fins
- Sufficient tube spacing allows easy access for decontamination via washdown.
- Removeable eliminator section and independent drainage systems with cleanable or removable draintray
- Options for cold water, DX,

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS



HEATING COIL

- Copper tube, copper fin construction with easy access for cleaning & decontamination
- Options for low/medium pressure hot water, steam or electric

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

SECONDARY FILTRATION

- Option for high capacity rigid bag to prevent ‘bag dumping’ in critical areas
- Option for front withdrawal to minimise bypass leakage & for galvanised / stainless / powder coated frames
- Graded and type tested in accordance with ISO 16890
- Direct reading dial type gauge required

SPECIALIST CARE NEEDS SPECIALIST AIR

Data from HTM 03-01 with ISO class based on EVIA (European Ventilation Industry Association) remediation

MANSFIELD POLLARD AIR MANAGEMENT EXPERTS

GENERAL FILTERS

- BS EN 779 Grade - Eurovent Grade - ISO 16890	% Arrestance	Notes and typical healthcare applications
G1 EU1 -	<65	Metal-mesh grease filter
G2 EU2 ISO COURSE ≥ 30%	65 to <80	Coarse primary filter
G3 EU3 ISO COURSE ≥ 45%	80 to <90	Primary air intake; Return air; Energy recovery device protection
G4 EU4 ISO COURSE ≥ 60%	>90	General-purpose tempered air supply

FINE FILTERS

- BS EN 779 Grade - Eurovent Grade - ISO 16890	% Efficiency	Notes and typical healthcare applications
F5 EU5 ISO ePM_{10} ≥ 50%	40 to <60	General-purpose panel /bag filter
F6 EU6 ISO $ePM_{2.5}$ ≥ 50%	60 to <80	Basic grade bag filter
F7 EU7 ISO ePM_1 ≥ 50%	80 to <90	Medium grade bag or pleated paper Conventional operating theatre supply air
F8 EU8 ISO ePM_1 ≥ 70%	90 to <95	High grade bag or pleated paper
F9 EU9 ISO ePM_1 ≥ 80%	>95	Basic HEPA filter – level 8 clean rooms

NOTE: EN 13053:2019 "If a single stage filter system is used for supply air, a filter minimum ISO ePM_1 50% shall be fitted

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

UNIT DESIGN

- All internal components must not support combustion
- If unit is external, suitable weather protection is required i.e. stainless, aluminium, galv or powder coating
- Viewing ports should be at a convenient height and be illuminated by fittings to at least IP55 rating
- Access doors should be a minimum of 500mm wide
- Base frame should be raised to sufficient height to allow fitment of drain trap
- Any item requiring a drain to be on the positive pressure side of the fan

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

VENTILATION COMPLIANCE

OF HTM 03-01

SPECIALIST CARE NEEDS SPECIALIST AIR

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

COMPLIANCE

SPECIALIST VENTILATION AREAS

The following departments will usually have specialised ventilation requirements (either for a single room or throughout a suite of rooms)

operating department

laser surgery unit

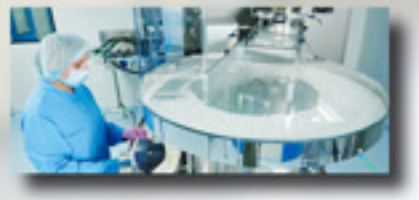
operative imaging unit

intensive treatment unit

infectious diseases isolation unit

immunocompromised patients

manufacturing pharmacy



specialised imaging, X-ray and scanning unit

pathology containment laboratories

mortuary and dissection suite

research laboratories

sterile services department

emerging treatment technologies, including gene therapy & stem cell units

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AIR MANAGEMENT EXPERTS

REDUCED SCOPE AREAS

COMPLIANCE

non-critical

HTM 03-01

VALUE ENGINEER

- component choice
- layout & size
- materials
- thermal wheel
- lights, viewports

APPLICATION SPECIFIC AHU

general

standard ventilation unit design

SPECIALIST CARE NEEDS SPECIALIST AIR

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

HTM 03-01 & THE LAW

COMPLIANCE

Health & Safety at Work Act 1974

COSHH Regulations 2002

DESIGN

"If the ventilation plant has been installed to dilute or contain harmful substances (the definition of which now includes microorganisms), its failure may expose people to unacceptable levels of hazard. Proven failures can give rise to a civil suit against the designers and operators by the individuals who have been affected. This would be in addition to the actions brought as a result of breaching the statutory requirements.

Ecodesign Directive for Energy Related Products (ErP)

Part L Building Regs

MAINTENANCE

"The correct operational maintenence and cleaning of the AHU and connecting systems is a stautory requirement and all procedures must be documented and stored for future reference.

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MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

INNOVATIONS

OF HTM 03-01

SPECIALIST CARE NEEDS SPECIALIST AIR

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

INNOVATIONS

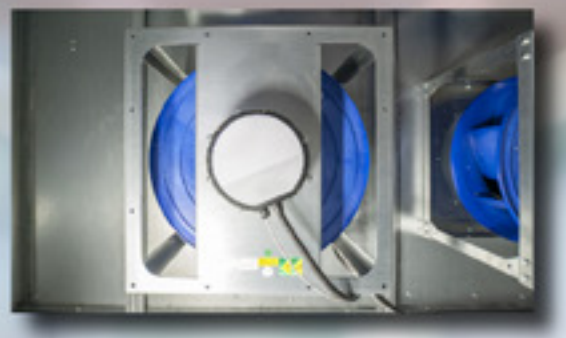
MINIMISE DOWNTIME

FAN ARRAY

Allows for redundancy in case of failure

Smaller fans, easier to change

COMMANDO PLUGS



Non-skilled maintenance requirement

cost and time saving

UV COIL

Cooling coil & drain pan sterilisation

maintain coil efficiency

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AIR MANAGEMENT EXPERTS

HTM 03-01 CPD

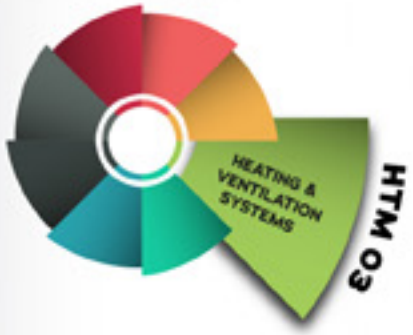
SUMMARY

SPECIALIST CARE NEEDS SPECIALIST AIR

MANSFIELD POLLARD
AIR MANAGEMENT EXPERTS

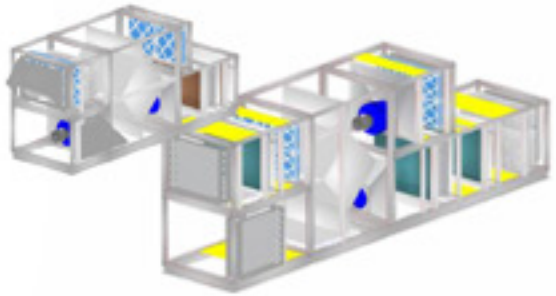
SUMMARY

HTM 03-01



- Advice and guidance
- Installation, operation & maintenance

IMPACTS:



- More expensive
- Larger
- Complex energy & design requirements

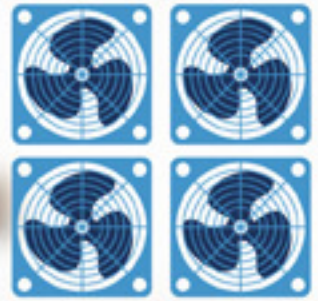
DESIGN CONSIDERATIONS:

- Design principles
- Framework & component sections

COMPLIANCE:

- Critical and non-critical AHU's
- Consequences of non-complinace

INNOVATIONS:



- technologies available to minimise downtime & improve performance

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