HEALTH TECHNICAL MEMORANDUM 68

Building Component Series
Duct and panel assemblies

1993

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Health Technical Memorandum

Building components

Duct and panel assemblies

68

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Contents

1 Introduction

1.1 Background

This is one in the series of Health Technical Memoranda Building Components which provide design and specification guidance on building components for use in health buildings. This series supersedes all Component Data Base Mk3 and earlier Manufacturers Data Base information.

The numbers and titles of the series are:

54 User manual
55 Windows
56 Partitions
57 Internal glazing
58 Internal doorsets
59 Ironmongery
60 Ceilings
61 Flooring
62 Demountable storage system
63 Fitted storage system
64 Sanitary assemblies
65 Signs
66 Cubicle curtain track
67 Laboratory fitting out system
68 Duct and panel assemblies
69 Protection
70 Fixings

The technical information in this series is the result of research and development funded by the Department of Health as part of collaborative working arrangements over a number of years between the DOH, the NHS, the professions, and industry.

Any enquiries regarding the technical content of this HTM should be directed to: The HTM Building Components Manager, NWRHA, Gateway House, Piccadilly South, Manchester M60 7LP.

1.2 Scope and Status

This HTM contains design and specification guidance, and an illustrated description of a number of duct and panel assembly systems suitable for use in health buildings. The list is by no means exhaustive.

Although certain commonly used components are highlighted the same general principles are common to others.

Appendix A gives detailed performance and test data and supplementary design data.

It is intended as general guidance only to building design teams responsible for the specification, project design and performance requirements, and to manufacturers in the development of products to meet those requirements. It does not in any way diminish design team responsibility for project specifications and selection of components, or the responsibilities of manufacturers for the quality and fitness for purpose of their products.

1.3 Relationship to other data

This HTM is intended to be read in conjunction with HTMs 56, 64, and 70. It sets out to expand and supplement the information given in the individual HTMs.

The main sources of other data relevant to the systems are listed in the reference section. In particular, the attention of users and manufacturers is drawn to the performance tests for materials and components set out in Appendix A.

This HTM was prepared for printing in November 1991 and is based on data current at that date. Readers should ensure that they use the latest edition of all building legislation, British Standards, Health and Safety regulations, etc., and give preference to products and services from sources which have been registered under BSI Quality Assurance procedures or other equivalent certification schemes. Suppliers offering products other than to British Standards should provide test evidence to show that their products are at least equal to such standards.

1.4 Design Detail

This document contains guidance for specifiers and manufacturers on the design and use of duct and panel assemblies for use in health buildings.

Sanitary assemblies being commonly used components in health buildings, together with others where appropriate, serve to illustrate the principles which can generally be applied to panel assembly construction.

The illustrations of assemblies included in this document are indicative only of possible solutions based on the guidance given.

Manufacturers are encouraged to develop their own individual products, based on this guidance both for single and multiple application and which are also suitable for low demand upgrading work and high demand new build. Manufacturers may claim compliance with this HTM when their offered components conform with all the recommendations in this HTM and test certification is available to validate this.

A set of model working drawings which satisfy the requirements of this HTM are available. These may be purchased from the HTM Building Components Manager, North Western Regional Health Authority, Gateway House, Piccadilly South, Manchester M60 7LP.

1.5 Coding

The illustrations of the various assemblies shown in this document have been given mnemonic codes as this is often appropriate at project level.

1.6 Terminology

In this HTM the following definitions apply:

Dimensions given in this document are in accordance with BS 7307 part 1 1990.

Duct - Space formed or used to contain services and related fittings.

Panel - Fixed or removable panel supporting mounted components.

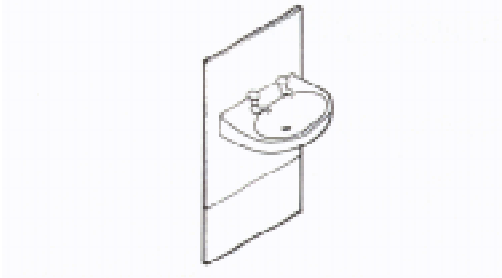
Subframe - Frame where appropriate supporting a panel and its related components and accessories.

Component - Prime constituent supported by the panel assembly.

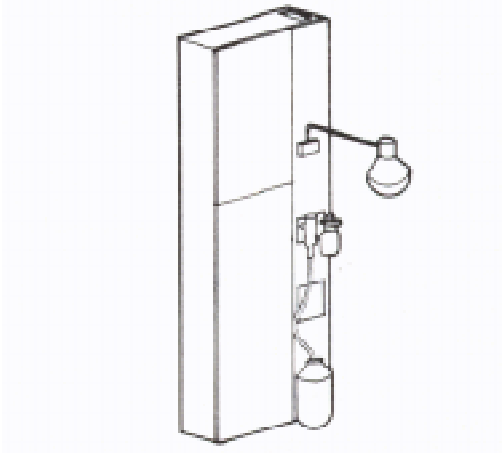
Assembly - Combination of component, panel, support system and appropriate accessories and services combined to form a practical product.

Accessories - Associated items related to the total component assembly, such as mirrors, soap holders, etc.

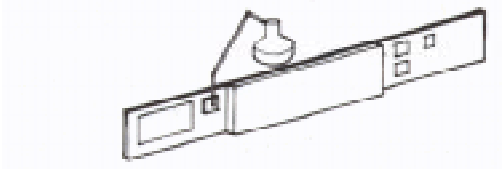
Services - Hot and cold water, drainage, medical gases, electrical and communication services, supply fittings etc.



Pre plumbed sanitary assembly



Bedside wardrobe duct



Bed head duct

2 Concept

2.1 General principles

Duct and panel assembly systems are based on the use of panel mounted components with ducted services.

Although similar principles can be applied to many other components, maximum benefit is achieved where easy access to services is required.

2.2 Benefits

The system offers the following benefits:

- **Hygiene** - Ease of cleaning, reduction of maintenance and decoration.
- **Convenience** - The ability to service or repair installations without general disruption or disturbance of the clinical area particularly in the case of rear access ducts.
- **Quality** - Factory made products allow for greater quality control and manufacturing accuracy.
- **Speed** - Reduced design time and rationalisation. Improved speed of construction/ installation.
- **Maintenance** - Ease and speed of maintenance.
- **Aesthetics** - Improved aesthetics. Hidden services with minimum loss of accessibility.
- **Site convenience** - Reduced site storage requirements, which would lead to less pilfering and vandalism prior to practical completion. Simpler and improved site fixings to lightweight masonry and hollow partitions particularly where sanitary ware and heavily serviced components requiring access are required.
- **Cost effectiveness** - The use of duct and panel assemblies in health buildings provides more cost effective solutions when compared with the total costs of exposed services systems. In the case of sanitary assemblies the panel also acts as a splash back.

2.3 Systems descriptions

Duct and panel assembly systems described in this document fit into 3 categories,

- **Proprietary systems**

Pre-serviced, factory assembled panel systems with components and their related services and accessories factory fitted and tested prior to delivery and site installation.

- **Piece part assemblies**

Project designed assemblies, where panels, components and related fittings and accessories are obtained from various sources and assembled, serviced and tested in a work shop or, on site under factory conditions prior to installation.

- **Self assembly method**

Project designed assemblies, where panels are constructed in joinery shops or on site under factory conditions and assembled with components and related fittings and accessories and tested prior to installation.

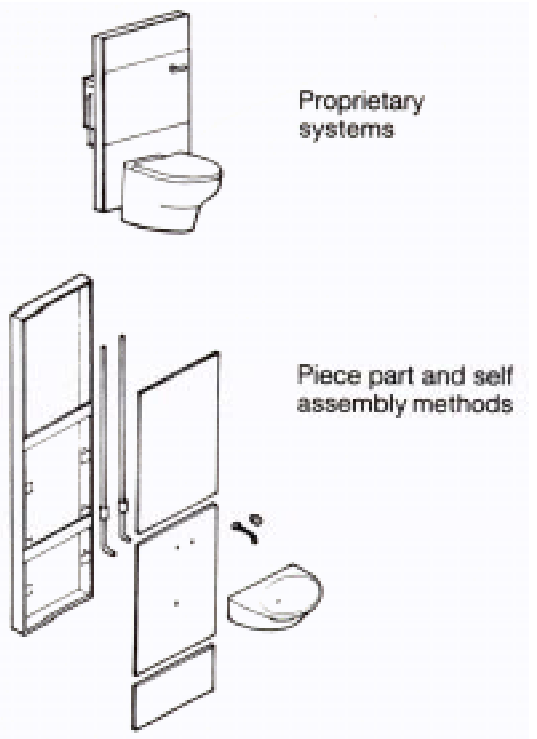
2.4 Types of assemblies

Pre-plumbed sanitary assemblies are most commonly used in health buildings. Other components such as: bed head services, communication facilities, Scottish wardrobes, X-ray panels, theatre panels, lighting panels, etc can also benefit from the panel assembly concept.

Component related accessories may also be required in certain instances although these may not necessarily be panel mounted.

2.5 Dimensions

It is recommended that any dimensions related to ergonomic function be followed. Further guidance can be obtained by reference to relevant Health Building Notes, especially 40, Common Spaces parts 1, 2, 3 and 4, and Health Technical Memorandum 56, 59, 60, 63 and 64. Other dimensions are suggested in the interest of practicality or economy, but these are optional.



3 Component parts of system

3.1 List of assemblies

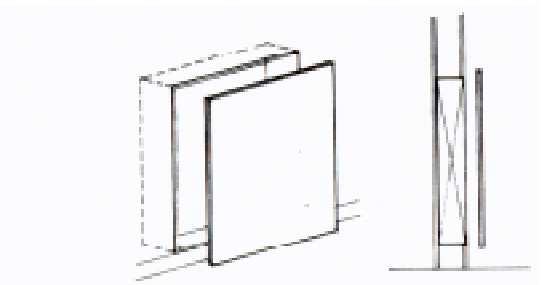
Assemblies

The duct and panel assemblies listed here offer 3 different duct and service access solutions.

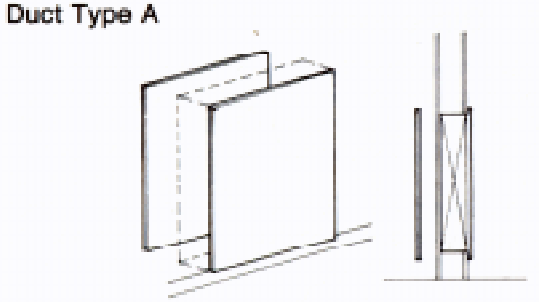
A Wall/partition ducts with access by removable front panels.

B Wall/partition ducts with access by removable rear panels or walk in duct.

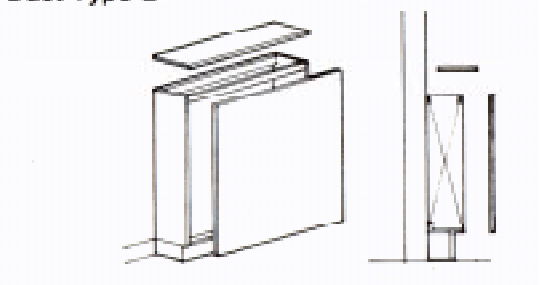
C Box ducts wall/floor mounted with access by removable top and or front panels.



Duct Type A



Duct Type B



Duct Type C

WC assemblies

WC assembly 1

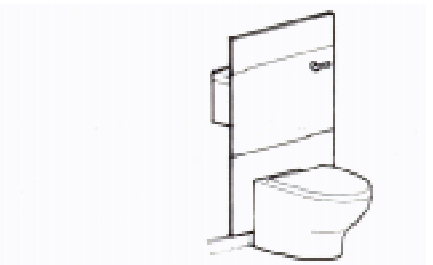
Hospital pattern WCs.
WC H/A or WC H/C with concealed cisterns.
Flush low height panel.
Duct dimension determined by cistern.
Access by removable front panel, duct type A.

WC assembly 2

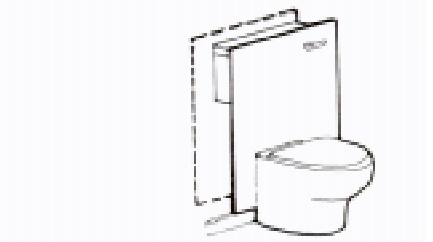
Hospital pattern WCs.
WC H/A or WC H/C with concealed cisterns.
Generally as WC 1 but with fixed panel.
Access from the rear by walk in duct or removable rear wall panel, type B.

WC assembly 3

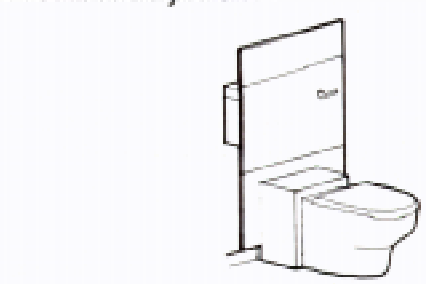
Hospital pattern WCs.
WC H/A or WC H/C with boxed extension for wheelchair use and concealed cisterns.
Flush low height panel generally as WC 1 with access by removable front panel, duct type A.
Boxed extension dimensioned to allow wheelchair transfer or sani chair to be located over WC pan.



WC Assembly WC 1



WC Assembly WC 2



WC Assembly WC 3

WC assembly 4

Hospital pattern WCs.
WC H/A or WC H/C with boxed out extension and concealed cistern.
Generally as WC 3 but with fixed panels with access from the rear by walk in duct or removable rear wall panel, duct type B.
Boxed out extension as WC 3.

WC assembly 5

Corbelled type WC with concealed cistern.
Flush low height panel generally as WC 1.
Access by removable front panel, duct type A.

WC assembly 6

Corbelled type WC with concealed cistern.
Generally as WC 5 but with fixed panel. Access from rear walk in duct or removable rear panel, duct type B.

WC assembly 7

Hospital pattern WCs.
WC H/A or WC H/C with concealed cisterns and 'plant on' boxed duct fixed to walls.
Dimensions of box duct determined by cistern.
Access by removable top or front panel, duct type C.
Boxed duct dimensions are variable to cater for differing services requirements.

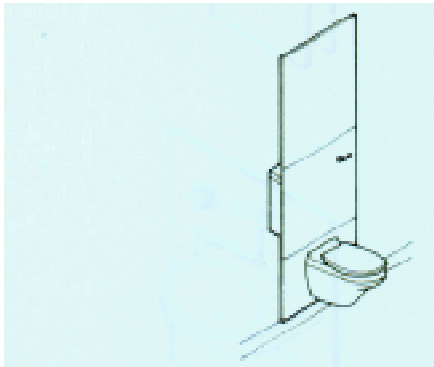
WC assembly options

WC assemblies 1, 2, 3, 4, 5 and 6 may have full height panels as a project option.

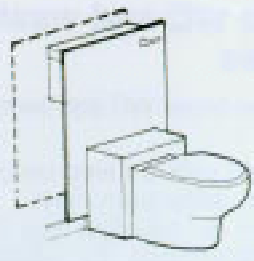
WC assemblies 1, 2, 3, 4, 5, 6 and 7 may be used singly in this form or in multiples combined with cubicle systems. Some manufacturers may be in a position to offer products suitable for both applications.

Associated accessory options to WC assemblies:

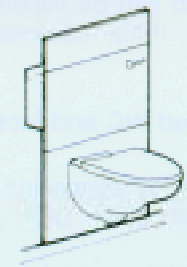
Grab rails
Toilet roll holders
Nurse call/assistance system.



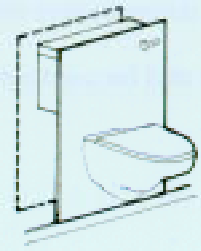
Optional Full Height Panels



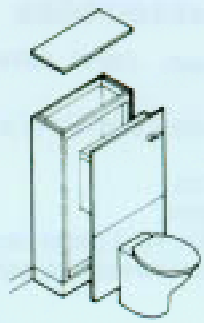
WC Assembly WC 4



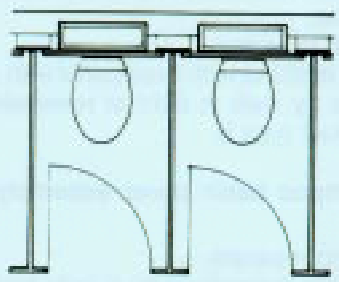
WC Assembly WC 5



WC Assembly WC 6



WC Assembly WC 7



Optional Multiple Combinations

Combined WC and wash basin assemblies

WC WB 1: Combined WC and semi inset vanity wash basin

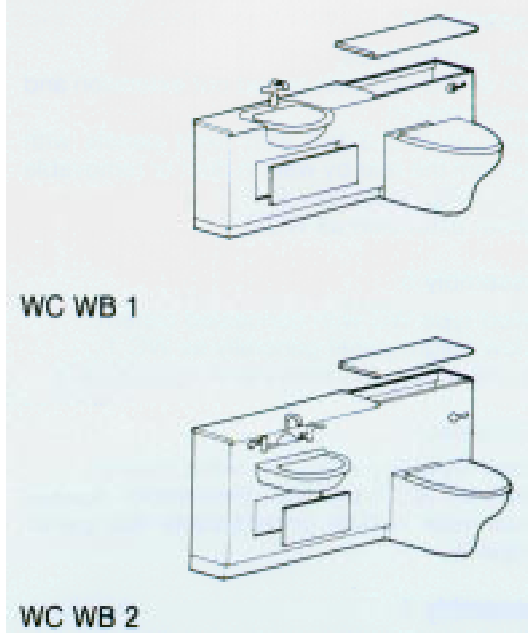
Back to wall WC with low level concealed cistern and semi inset vanity wash basin.
Low level 'plant on' box duct type C.
Dimensions determined by wash basin and cistern.
Access by removable top and front panels.

The box duct length can be varied to cater for site circumstances. This assembly can also incorporate a bidet.

WC WB 2: Combined WC and face fixed wash basin

Back to wall WC with concealed cistern and hospital pattern wash basin LB-H or LB-G face fixed to box duct.
Low level 'plant on' box duct type C, depth determined by concealed cistern, length can be varied to suit circumstances.
Access by removable top and front panels.
The waste to WB LB-G can be either an exposed bottle trap or a 90 degrees bend connected to a concealed trap.

This assembly can also be used with a bidet.



Associated accessory options to combined assemblies:

Grab rails	Electric shaving point
Toilet roll holder	Tooth brush/mug holder
Towel rail	Soap dispenser or dish
Mirror	Paper towel dispenser
Mirror light	Waste bin.
Nurse call/assistance	system.

Wash basin assemblies

WB 1. Wash basin, panel assembly front access

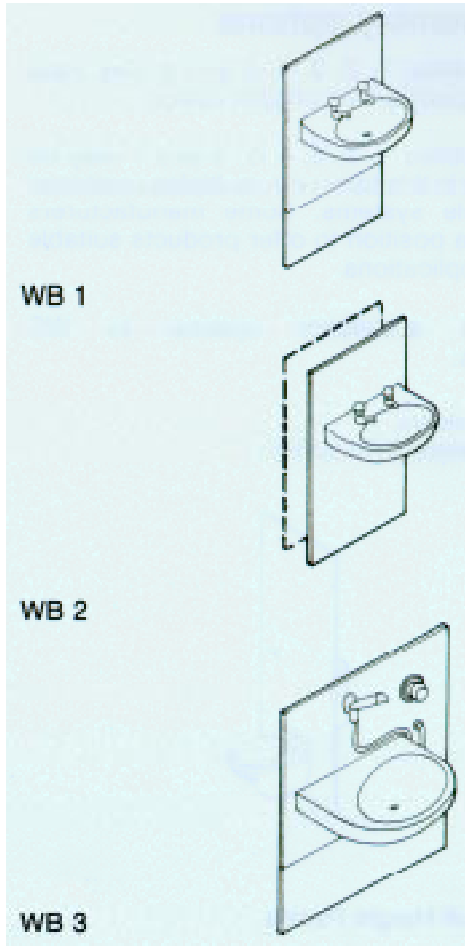
Hospital pattern basins LB-H/S-M-/L or LB G/S/M/L general basins.
Various basin heights.
Flush low height panel.
Access by removable front panel, duct type A.
Duct dimensions determined by supply and waste services.

WB 2. Wash basin, panel assembly rear access

Hospital pattern basins LB-H/S-M-/L or LB G/S/M/L general basins.
Various basin heights.
Generally as WB2 but with fixed panel with access from the rear by walk in duct or removable rear wall panel, duct type B.

WB 3. Shampoo basin panel assembly, front access

Flush low height panels.
Duct dimension determined by supply and waste services.
Access by removable front panel, duct type A.



WB 4. Shampoo basin, panel assembly rear access

Generally as WB 2 but with fixed panel access from the rear by walk in duct or removable rear wall panel, duct type B.

WB 5. Semi inset vanity basins, box duct assembly

Semi inset vanity unit, duct type C.
Dimensions determined by wash basin.
Access by removable front panel or doors.

This assembly can be used alone on this form or in conjunction with wc/bidet as in WC WH 1. Combined assembly.

WB 6. Wash basin, box duct assembly

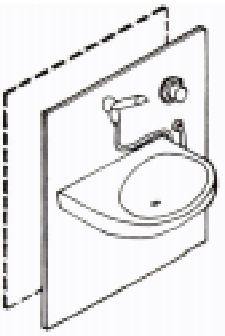
Hospital pattern basins LB-H/S-M-/L or LB G/S/M/L general basins, various basin heights,
Wash basins face fixed onto 'plant on' box duct, type C.
Duct depths determined by supply and waste services.
Access by removable front panel.

WB 7. Wash basin box duct assembly with work top

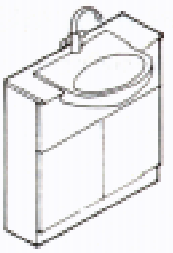
Inset vanity basin set into work top with cupboards below.
Access by cupboard doors.

The box duct dimensions are variable to cater for differing site conditions and can be extended horizontally or vertically to conceal services.

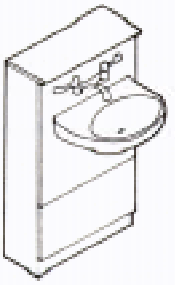
WB assemblies WB 1, 2, 3, 4, 5, 6 and 7 can be used alone or in multiples to suit project circumstances.



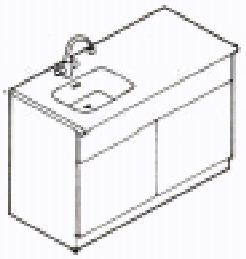
WB 4



WB 5



WB 6



WB 7

Associated accessory options to wash hand basin assemblies:

Grab rails
Towel rails
Mirror
Mirror light
Electric shaver point
Tooth brush/mug holder
Soap dispenser or dish
Paper towel dispenser
Waste bin.

Urinal assemblies

UR 1. Urinal panel assembly, front access

Hospital pattern H/1 urinal with concealed cistern.
Flush panels with front access.
Duct dimension determined by concealed cistern.
Access by removable front panels, duct type A.

UR 2. Urinal panel assembly, rear access

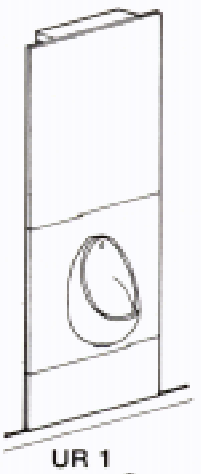
Generally as UR 1 but fixed panel with access by walk in duct or rear wall panel, duct type B.

UR 3. Urinal panel assembly with plant on box duct

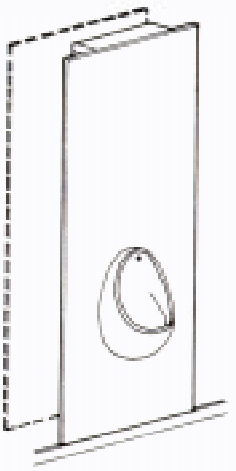
Generally as UR 1 but with panel assembly on 'plant on' box duct, type C.

All urinal assemblies can be used singly or in multiples. Where used in multiples up to 3 urinals may be flushed by 1 cistern.

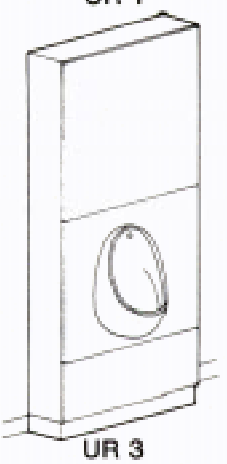
Plant on box ducts can be varied to suit site circumstances.



UR 1



UR 2



UR 3

Associated accessory options to urinal assemblies:

Grab rails
Modesty screens.

Bidet assemblies

BD 1. Bidet panel assembly, boxed extension

Hospital pattern BDH with boxed out extension and hand spray set.
Concealed cistern on flush panel with front access.
Duct dimension determined by water supply requirements, waste pipes and feed tank.
Access by removable front panel.
Duct type A.

BD 2. Bidet panel assembly, with box extension, rear access

Generally as BD 1 but with access by walk in duct or rear wall panel, duct type B.

BD 3. Bidet panel assembly with box extension and box duct

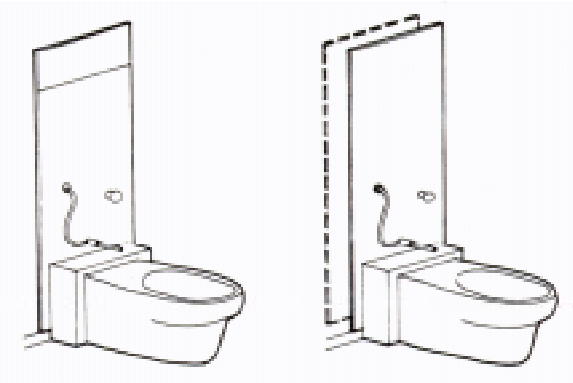
Generally as BD 1 but with plant on box duct type C.

Bidet panel assemblies can be used singly in conjunction with sanitary cubicles. Some manufacturers may be in a position to offer products suitable for both applications.

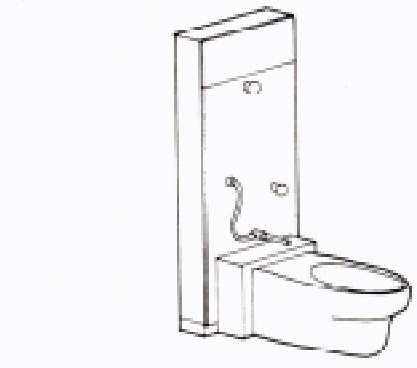
Plant on box ducts can be varied to suit site circumstances and bidet assemblies can be used in conjunction with WC and wash basin combined assemblies.

Associated accessory options to bidet assemblies:

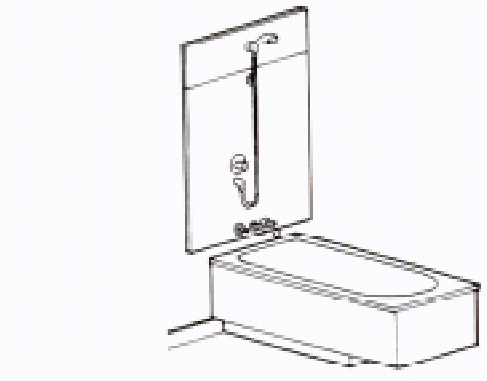
Grab rails
Toilet roll holder
Paper towel dispenser
Towel rail



BD 1 BD 2



BD 3



BA 1

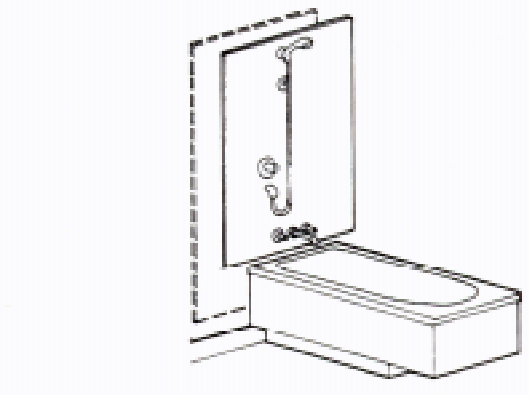
Bath assemblies

BA 1. Island bath, panel assembly front access

Hospital pattern BA H/M assisted bath in metal or plastic (suitably reinforced for use with patient hoist).
Flush panel with front access and removable plinth panel on 1 side. Duct dimension determined by supply pipes. Duct type A.

BA 2. Island bath, panel assembly, rear access

Generally as BA 1 but with fixed flush panel with rear access by walk in duct or rear wall/panel, duct type B.



BA 2

BA 3. Island bath, panel assembly with plant on box duct

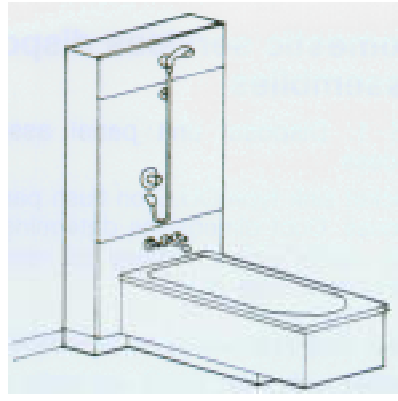
Generally as BA 1 but with panel assembly and plant on box duct, type C.

'Plant on' box ducts can be varied to suit site circumstances.

Associated accessory options to bath assemblies:

Grab rails
Towel rail
Soap dish
Clothes hook

Nurse call/assistance systems



BA 3

Domestic bath assembly

Access to domestic baths will normally be via standard panels on 1, 2 or 3 sides depending on the bath's location relative to wails.

SA 1

Shower assemblies

SA 1. Shower panel assembly front access

For use with shower trays.
St-i G/P or dished floor situations.
Flush panels with front access.
Duct dimension determined by water supply requirements.
Access by removable front panel, duct type A.

SA 2. Shower panel assembly rear access

Generally as SA 1 but fixed panel with access by walk in duct or rear wall panel, duct type 6.

SA 3. Shower panel assembly with 'plant on' box duct

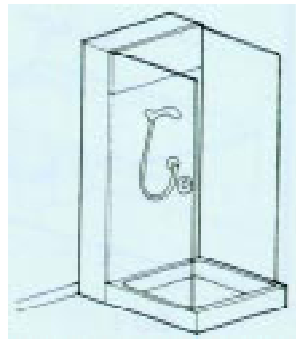
Generally as SA 1 but with panel assembly on 'plant on' box duct type C.

Shower assemblies may be used singly in conjunction with shower curtains or screens or in multiples in conjunction with cubicle systems. Some manufacturers may be in a position to offer products suitable for both applications.

SA 2

Associated accessory options to shower assemblies:

Grab rails
Towel rails
Soap dishes
Coat hooks
Stools
Curtain track
Closure panels/doors/curtains
Nurse call/assistance systems.



SA 3

Domestic services disposal assemblies

BS 1. Disposal unit panel assembly front access

Bucket sink type DU.G on flush panel with front access. Duct dimensions determined by supply and waste pipes. Access by removable front panel, duct type A.

BS 2. Disposal unit panel assembly rear access

Bucket sink type DUG generally as BS 1 but access by walk in duct or rear wall panel, duct type B.

BS 3. Disposal unit panel assembly with 'plant on' box duct and front access

Generally as BS 1 but with 'plant on' box duct type C.

Associated accessory options to bucket sink assemblies:

Shelves
Equipment hooks
Equipment racks.

DU 1. Disposal unit panel assembly front access

Hospital pattern disposal unit DUH on flush panel with front access, duct type A.

Duct dimension determined by cistern, waste and supply pipes. Access by removable front panel(s).

Also available as single disposal unit DUG or disposal unit, drainer and sink DUH and DUHS.

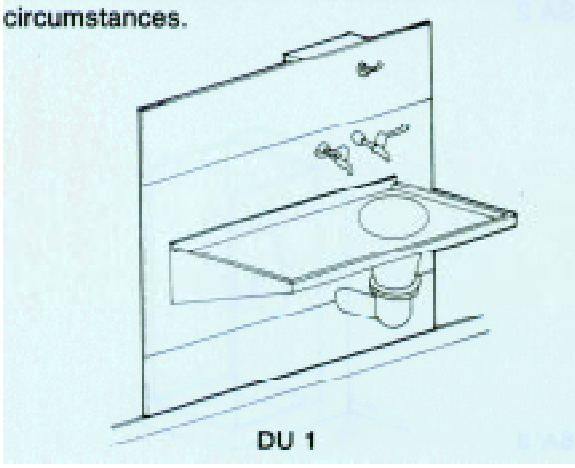
DU 2. Disposal unit panel assembly rear access

Generally as DU 1 but fixed flush panel with rear access by walk in duct or rear wall/panel, duct type B.

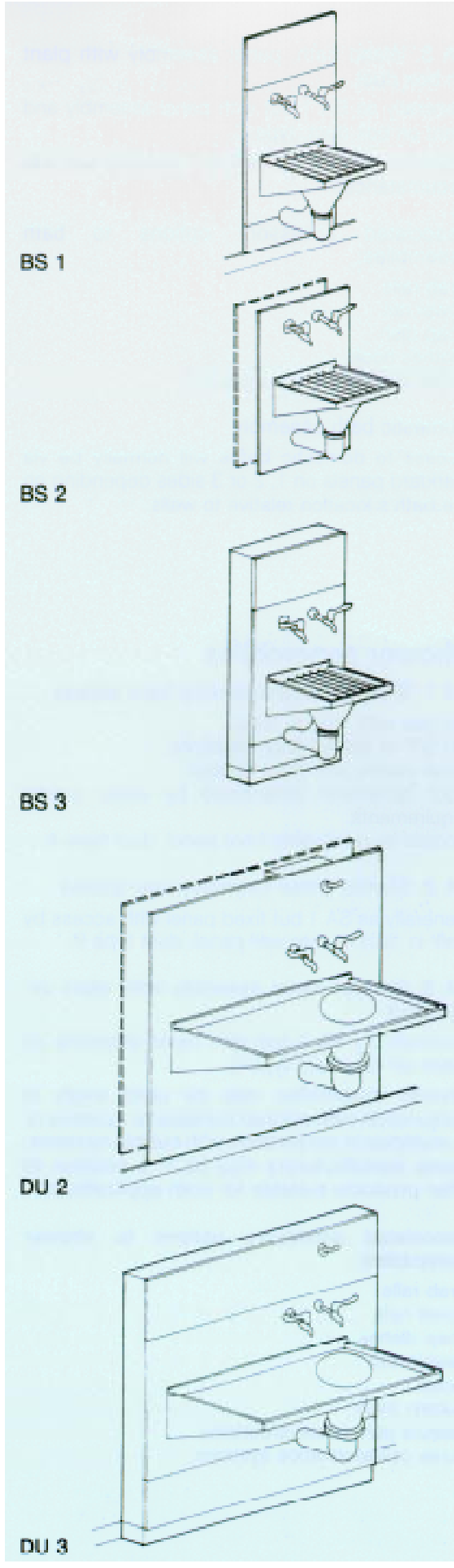
DU 3. Disposal unit panel assembly with 'plant on' box duct

Generally as DU 1 with panel assembly and plant on box duct type C.

Plant on box ducts can be varied to suit site circumstances.



DU 1



BS 1

BS 2

BS 3

DU 2

DU 3

Drinking water assemblies

DF 1. Drinking fountain. Panel assembly front access

Drinking fountain on flush panel with front access. Duct dimension determined by supply and waste pipes.

Access by removable front panel, duct type A.

DF 2. Drinking fountain. Panel assembly rear access.

Drinking fountain generally as DF 1 but access by walk in duct or rear wall panel, duct type B.

DF 3. Drinking fountain. Panel assembly with 'plant on' box duct

Generally as DF 1 but with 'plant on' box duct type C.

Associated accessory options to drinking fountain assemblies:
Paper towel dispenser
Waste bin.

Bed head assemblies

BH 1. Scottish wardrobe

Service duct. Full height wall mounted wardrobe incorporating duct for the following bed head services:

- Bed head light
- Nurse call system
- Radio/TV outlets
- 13 amp S/os
- Telephone outlet
- Medical gases/suction.

Plant on wardrobe/duct access to services by removable front or side panel, duct type C.

BH 2. Recessed duct horizontal bed head. Panel assembly

Recessed duct dimension determined by services, duct type A.

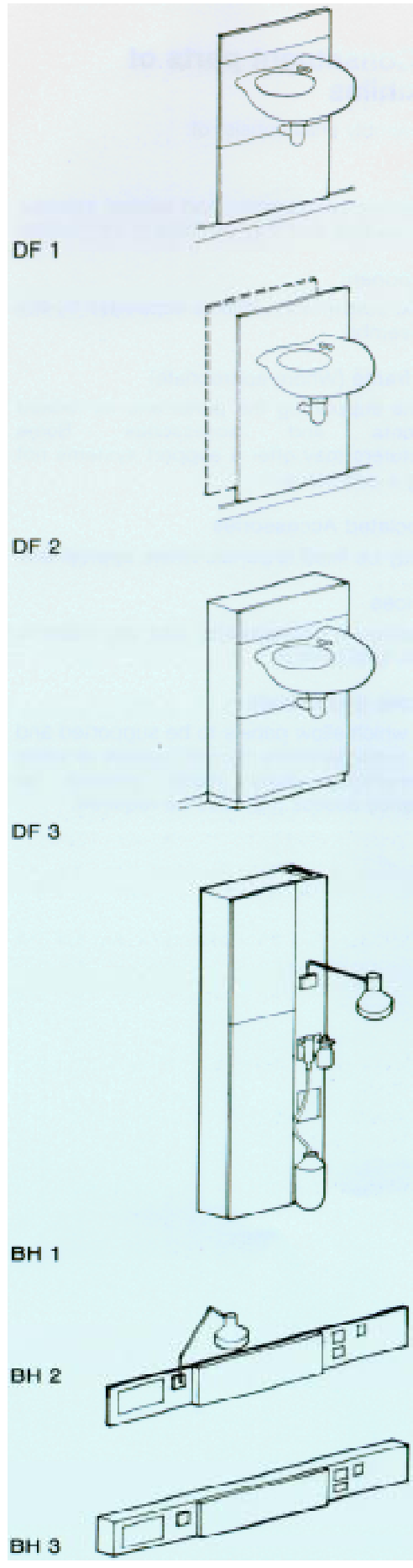
Removable front access panels, with bed head facilities mounted on for the following:

- Bed head light
- Nurse call system
- Radio/TV outlet
- 13 amp S/Os
- Telephone outlet
- Medical gases/suction.

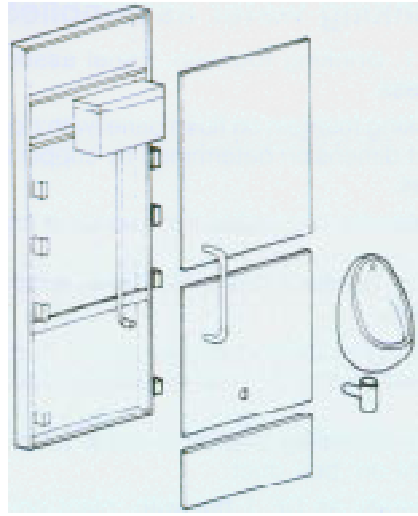
BH 3. Horizontal bed head. Plant on box duct. Panel assembly

Generally as BH 2 but with 'plant on' box duct, type C, for services to bed head facilities as BH 2.

Horizontal ducts should be designed to incorporate protection against damage b the bed, and may be continuous wall to wall panels or individual bed head units.



3.2 Constituent parts of assemblies



Each assembly shall consist of:

- **Panel**

This supports components and related services and accessories and may be fixed or removable.

- **Component**

The prime constituent which is supported by the panel assembly .

- **Sub frame** (Where appropriate)

The frame supporting the panel and its related components and accessories. Some manufacturers may offer a support systems not requiring a sub frame.

- **Associated Accessories**

These may be fixed to panels where appropriate.

- **Services**

These relate to components and are fixed to panels as appropriate.

- **Fixtures and Fittings**

Devices which allow panels to be supported and fixed to walls/partitions by sub frames or other fixing methods. Easy panel removal for maintenance access may also be required.

4 Performance

4.1 Strength and stability

A panel assembly should be capable of supporting:

- Dead loading, from the range of components mounted on or set into panels i.e. Sanitary ware, related accessories, bed head services, etc.
- Live loads, exerted during normal use, cleaning and maintenance, installation or removal. See also HTMs 56 and 64 and BS 6465.
- Panels, should remain flat, level and without distortion prior to installation, during use and when removed from maintenance. For details of performance requirements/tests refer to appendix A.

4.2 Surface finishes of panels

Panels should be finished in an appropriate material to provide the following:

- Durability - Capable of withstanding frequent cleaning, general knocks and abrasion in use.
- Imperviousness - Resistance to water, heat and moisture.
- Hygiene - Capable of being easily cleaned to aesthetic and clinical standards.
- Aesthetics - Choice of colours and finishes to co-ordinate to surrounding building elements.

Plastic laminates are commonly used as a finish for sanitary panel assemblies but other materials may be appropriate. Refer to Appendices for performance standards of surface finishes of panels and related exposed surfaces of assemblies.

These should be tested by the methods described in BS 3962, under the following part numbers and headings:

Part 2 Wet heat
Part 4 Marking by liquids
Part 5 Oils and fats
Part 6 Mechanical damage

Generally surface finishes should be specified as requiring a 'severe' rating under BS 6250 part 3.

Appendix B sets out the ratings for horizontal and vertical surfaces.

Finished surfaces should be smooth and free from application marks or telegraphing.

Plastic laminates should be specified in accordance with BS 3794 part 1 and tested in accordance with part 2 of that BS.

Attention should be paid to the edge treatments of panels. particularly of sanitary assemblies, to ensure resistance to damage and moisture ingress.

All metal components must be corrosion resistant.

4.3 Fire resistance/surface spread of flame

Duct and panel assemblies should be designed co conform with the Building Regulations 1985 part B, 2/3/4; as well as to HTM 81 and in relationship to partitions and walls to achieve the required fire performance. Fire resistance should be achieved within the structure of the partition/wail Independent of the assembly.

Refer to section 3 of the Building Regulations and section 11 of HTM 81. Panels within Health Buildings will generally be required to be class 0 or 1 surface spread of flame.

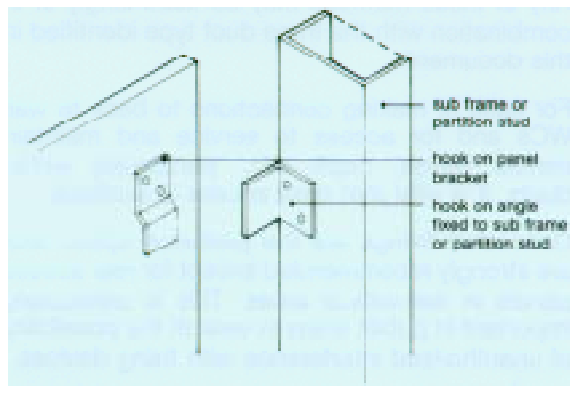
Some manufacturers may offer fire resisting panel systems but probably at much higher costs.

4.4 Accessibility/demountability

Adequate access to services is a prime aspect of duct and panel assemblies. Careful co-ordination of architectural and engineering design, with the size and position of access panels relative to items requiring replacement and maintenance, is necessary if full advantage is to be taken of the benefits of the system. Refer also to BS 8313.

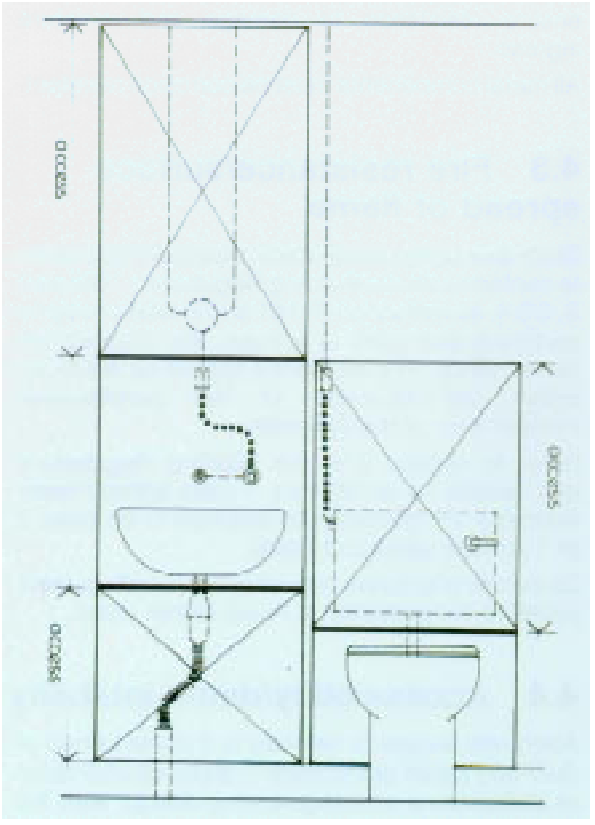
Removable panels, whether for front or rear access, must be of a suitable size and position to allow reasonable working area for replacement or maintenance.

The frequency of access to services will vary depending on the component, but ease of removal and replacement of access panels is necessary in all instances. The most common methods of providing access to services are:



Lift off panels: utilising hook on bracket systems to attach panels to partitions or subframes and

The size and position of access panels, whether front or rear, must be carefully co-ordinated with services requiring replacement or maintenance and should allow adequate working access to them.



Hinged panels: when component and access panels are hinged to open in the form of a door to provide access.

Various alternative means of fixing panels and providing access may be appropriate, for example:

Magnet catches

Spring catches

Nylon press fix connectors, etc.

Any of these methods may be used singly or in combination with the three duct type identified in this document.

For ease of making connections to back to wall WCs and for access to service and maintain control valves, traps, etc., particularly within ducts, it is vital that easy access is available.

Concealed fixings are the preferred option and are strongly recommended except for rear access panels in non-critical areas. This is particularly important in public areas in view of the possibility of unauthorized interference with fixing devices.

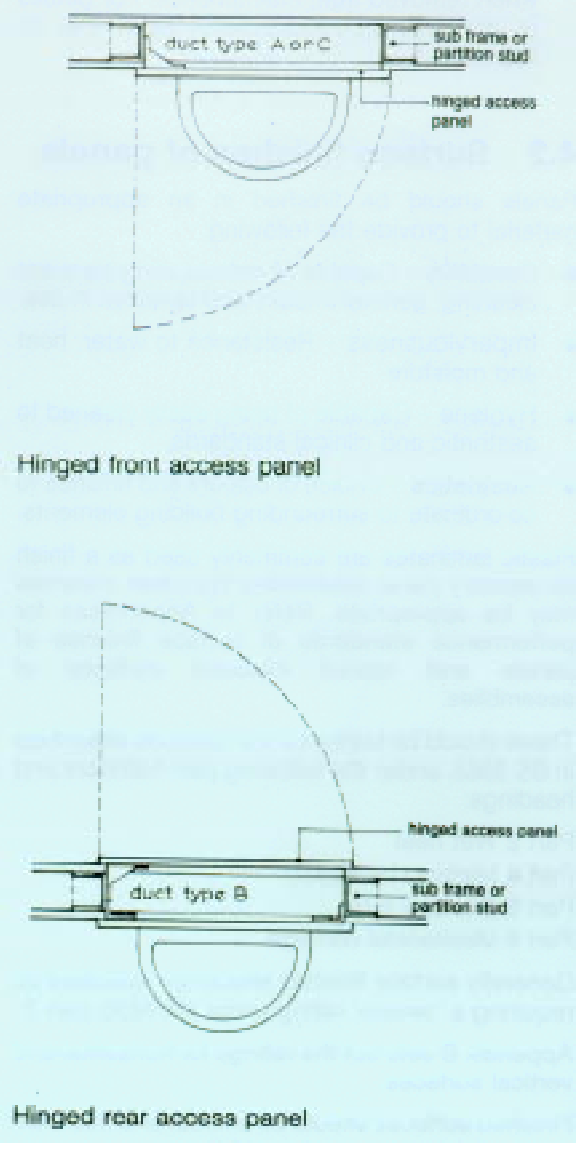
In areas where maximum security is necessary a panel locking system may be desirable. Refer to section 4.5.

4.5 Ironmongery and fitting

Duct and panel assemblies should be provided with all appropriate fittings which should allow for ease of operation, withstand mechanical wear and where appropriate, provide security and safety.

The performance of individual fittings must comply with relevant British Standards. All metal fittings should be corrosion resistant.

A form of locking is required as an option for all panel systems to prevent unauthorized removal of panels or access to panels expecially in areas where maximum security is necessary. This should ideally be located in an unobtrusive position and be of a type requiring a special tool or key to operate.



4.6 Ergonomics and dimensional data

Any dimensions given in this document are based on established ergonomic data or are suggested in the interest of economy or practicality.

Where variable dimensions are given the specifier should select those appropriate to project circumstances.

Non functionally critical dimensions may vary from manufacturer to manufacturer or from one material to another depending on production methods or techniques.

Specifiers should ensure that selected systems or assemblies are compatible with the projects design and construction system.

It is recommended that any dimensions related to ergonomic function be followed unless a contrary requirement is identified. Further guidance on appropriate ergonomic standards are available in related Health Building notes and Health Technical memorandum, especially HBN 40 parts, 1, 2, 3 and 4.

4.7 Sound Insulation

Where duct and panel assemblies are installed in hollow partitioning this may affect the sound insulating qualities of the partition thus creating potential problems in critical areas.

Ducts should not accentuate the passage of sound from one room to another or from the duct adjoining the room.

Walk in ducts or shared ducts should be designed to reduce the passage of sound from one sanitary area to another as far as is practicable.

This problem should be considered when designing the partition system. Guidance is given in HTM 56 under the heading 2.4 Sound Reduction.

4.8 Relationship to other elements/components

Duct and panel assemblies should be designed in relation to partitions, walls, floors and ceilings to achieve the required performance in respect of:

- Sound insulation
- Fire compartmentation/separation
- Engineering services and drainage to ensure accurate co-ordination and maximum benefit from the system.

The main consideration in co-ordinating engineering services will be:

- The accurate location of water supply and drainage connections for sanitary assemblies.
- Electrical and communication services for bed head assemblies, X-ray, operating theatre and lighting panels,
- Medical gases for bed head assemblies.

Early consideration must be given to the co-ordination of sanitary assemblies with engineering and drainage services and their relationship to the structures of the building.

Particular reference should be made to HIMs 64 and 56, sanitary assemblies and partitions.

5 Design application

5.1 Co-ordination with building and engineering design

Guidance given in this document is primarily concerned with the design and construction of pre-serviced panel assemblies.

Consideration of the type, location and size of ducts must be made at an early stage in the design process, in particular the type of duct.

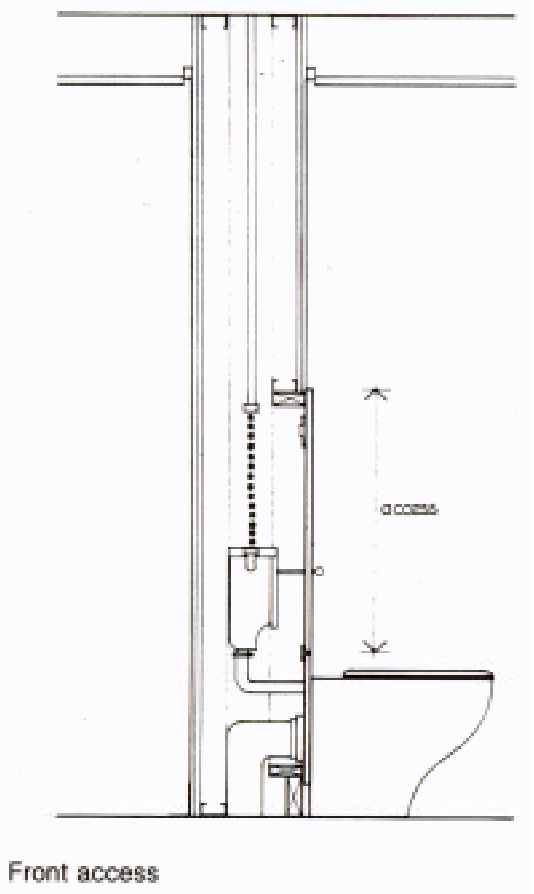
A Front access.

B Rear access or walk in.

C Plant on box ducts.

Designers/Architects should ensure that service connection points for duct and panel assemblies are co-ordinated with mains services. Early co-operation at the design stage with services engineers is essential.

The design of the main engineering supply and drainage services will be carried out by others on a project basis.



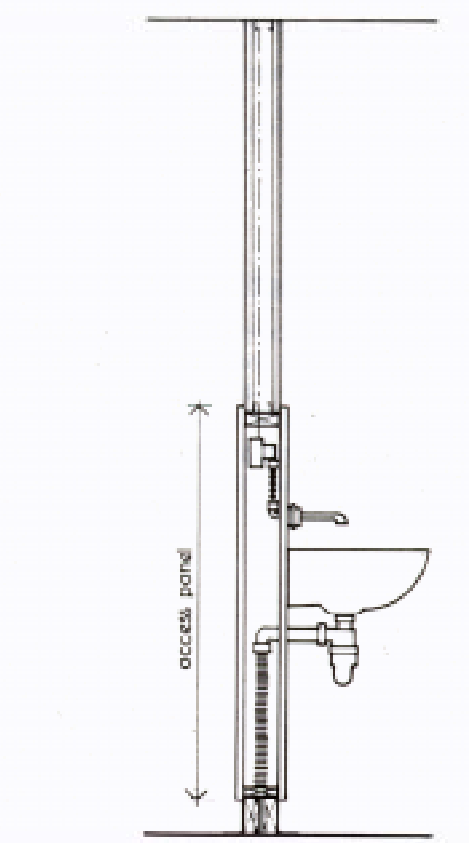
Front access

Wherever necessary there should be adequate consultation with the appropriate authorities, eg water, gas, electric, HSE etc., in order that the installations are in compliance with their various regulations.

The space within partitions and ducts must be sufficient to accommodate service runs and components. This is particularly important in respect of waste pipes, break tanks, cisterns, thermostatic valves, etc.

It is vitally important that the mains engineering services supplying a component are accurately positioned to allow for ready and early connection to component service tails.

Pipework for connection to an assembly must be tested and accepted before the panel and its components are fixed and any access panels secured.



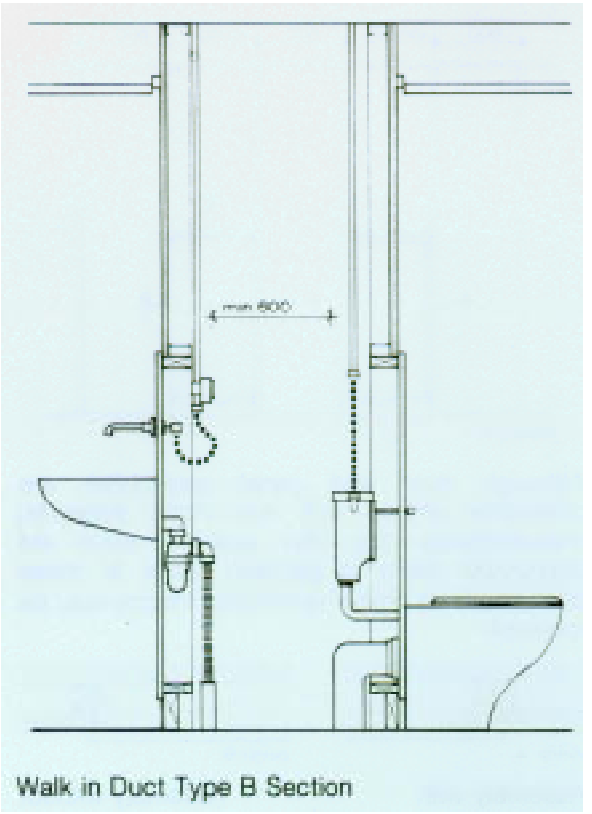
Rear access

Where it is not possible to provide complete access to supply pipework, pipes should be installed in unjointed lengths. Soldered joints may be permitted in some instances.

Where water and gas connections are required to mains services these should be by compression fitting or some other means which can be simply reconnected.

Where medical gases are enclosed by a duct assembly, provision must be made for adequate ventilation particularly to avoid oxygen build up within the cavity.

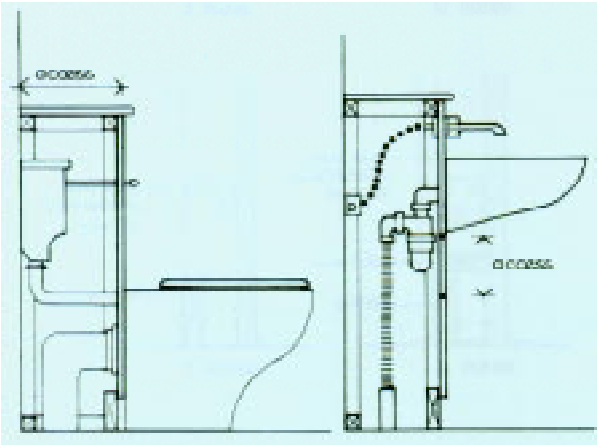
Flexible connections of an appropriate type offer positive advantages over rigid pipework for water supply services making site installation easier and less costly by reducing on site pipe bending. Flexible corrugated pipework for wastes can offer similar advantages but these must have smooth internal surfaces to facilitate easy cleaning.



Walk in Duct Type B Section

Type B rear access ducts enable services to be maintained without major disturbance to the clinical areas which they serve.

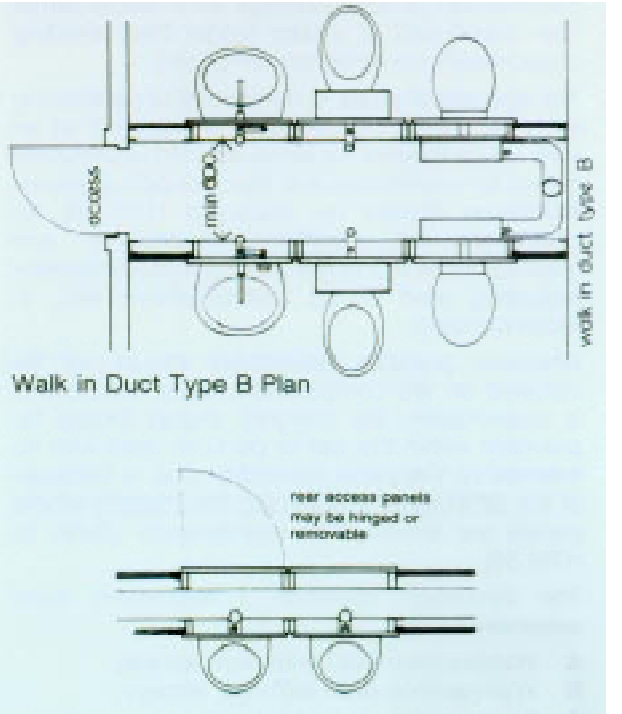
This situation may be obtained by forming walk in ducts which are large enough to provide access and working space or where access is possible from adjoining non clinical rooms such as cleaners' rooms or stores in which the room itself becomes a duct.



Typical Sections

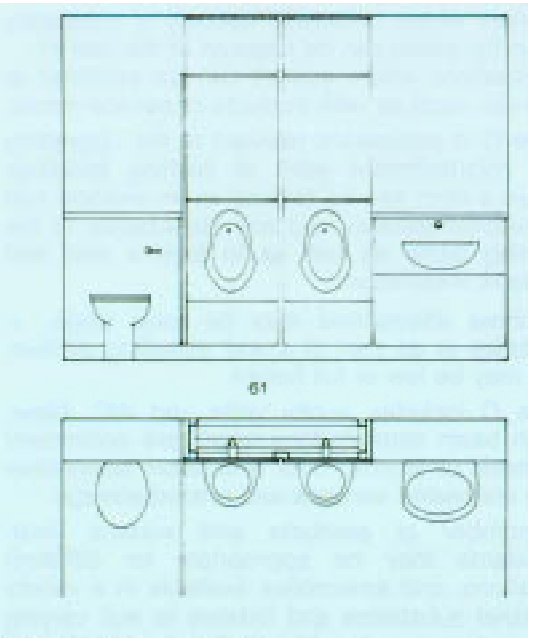
Where assemblies can be grouped together to achieve an economical services layout, it becomes feasible to position them together around a shared duct. This can also be used to accommodate other services such as, ventilation, extract, flues, etc.

With this form of duct no access panels are required on the assembly with consequent advantages of security and hygiene.



Walk in Duct Type B Plan

Type C 'plant on' box ducts can be wall to wall and floor to floor in existing buildings to conceal services and any disturbance to the existing fabric.



Box Duct Type C Plan

5.2 Use of components and design guidance

The benefits of using duct and panel assemblies are referred to in section 2.2 of this document (Benefits).

The decision to use the system should be taken at an early stage in the design process to ensure that installations are properly integrated in the construction of the buildings as a whole rather than introduced at a later stage, thus avoiding unnecessary construction difficulties.

The spacing of studs in demountable partitioning systems should be carefully co-ordinated at an early stage to allow for adequate and appropriate fixings for assemblies and their support systems. Reference should be made to HTM 56 for information on partition construction and consultation with the partitioning system sponser regarding stud layout, reinforcement etc., is recommended.

Wherever possible assemblies should not be installed on fire compartment walls. Where this is unavoidable, fire integrity should ideally be provided within the wall or partition itself with no reliance on the panel assembly. This is because of the difficulty of maintaining fire integrity where panels are removed for maintenance. (Refer to HTM 56).

The document identifies 3 alternative duct/ assembly types:

A Wall/partition duct with front access.
B Wall/partition duct with rear access.
C Plant on box duct with front or top access.

Type A is mainly appropriate in new buildings or fairly large upgradings.

Type B is particularly appropriate for use in wet areas, where the panel should be sealed against moisture at the junctions with the wall, or:
in areas where additional security is necessary when the panel can be secured at the rear or:
in situations where access can be achieved at the rear, such as walk in ducts or service rooms.

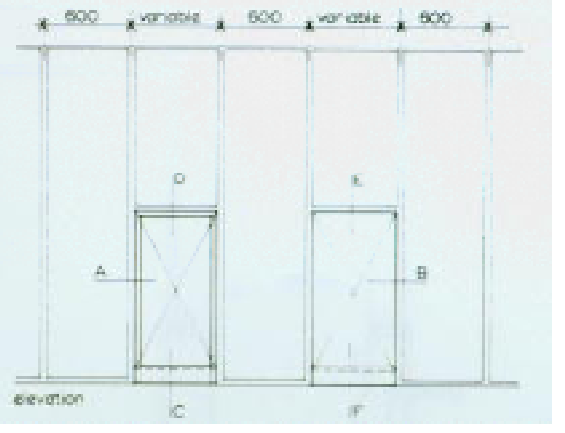
Type C is particularly relevant to the upgrading and refurbishment work of existing buildings where a duct can be formed on an existing wall to conceal services and any disturbance to the existing fabric as well as to form a neat and hygienic installation.

All three alternatives may be used singly, in multiples or as part of a wall panelling system, and may be low or full height.

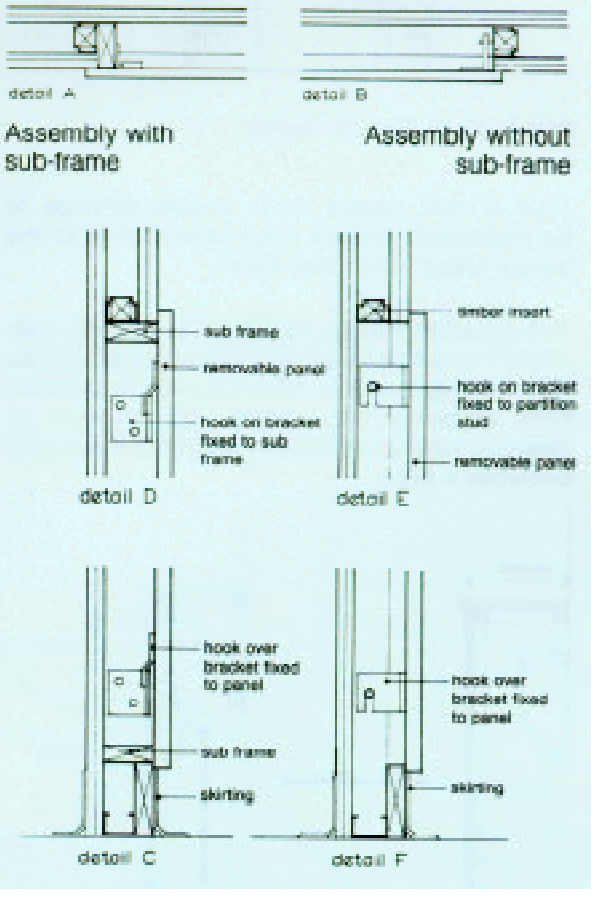
Type C includes vanity units and WC, bidet, wash basin combinations which are convenient methods of forming duct and panel assemblies with concealed services and related storage.

A number of products and surface finish standards may be appropriate for different situations, and assemblies available in a variety of panel substrates and finishes to suit varying circumstances and budgets. Careful selection of finish, edging and substrate to suit the appropriate components and situation is vital particularly in wet areas. Experience has shown that foil or tape edges are not suitable for use in health buildings.

Appendix A identifies the recommended performance requirements and testing standards.



Although duct and panel assemblies are commonly offered with sub frame supports, manufacturers may offer systems which are connected direct to partition studs. In these circumstances timber reinforcing inserts may be required.



5.3 Project documentation

Duct and panel assemblies should be enumerated and fully described in the specifications and bills of quantities.

A 1: 50 scale general arrangement layout plan may be used to show references of the assemblies and their related elements.

The following information should also be included:

- Reference and codes of all assemblies
- Method of support
- Ironmongery and fittings
- Builders work
- Related accessories
- Junctions with walls, sealants etc.
- Services/connections to wastes, water services, electrical services, earthing devices, taps, plugs, chains, etc.
- Assembly and fixing details.

If assemblies are to be supplied and fixed by the manufacturer then a list of at least 3 firms should be included in the bills of quantities and the main contractor instructed to obtain competitive tenders. The successful manufacturer then becomes a 'domestic Sub Contractor' to the main Contractor. If assemblies are to be supplied only by manufacturers, at least 3 quotations must be obtained prior to the main tender or alternatively this can be done by the General Contractor.

Quality samples should be inspected and agreed by the Architect/Designer before production commences. This is particularly important where piece part or self assembly is involved.

Compliance with tests and standards in appendix A should be verified.

6 Site practice

6.1 Sequences of work/programming

Duct and panel assemblies are generally produced as group 1 components, i.e. supplied and fixed as part of a building contract.

Components should be carefully planned and deliveries co-ordinated within the programme so that components may be installed and protected without delay to avoid damage, pilfering and the need to site storage.

Pre planning and accuracy in setting out is of particular importance so that co-ordination with the building and engineering elements is Achieved. In many instances it will be advantageous to complete decoration before final installations of the assemblies.

6.2 Product data

Site staff should be provided with the appropriate product information to enable them to carry out their duties effectively. It is suggested that this takes the form of copies of illustrations and data of selected products or manufacturers' catalogues, together with the schedule of products.

6.3 Fixing/site installations

In the case of proprietary systems and piece part assemblies reference should be made to manufacturers' details and guidance.

With the self assembly method the Architect/ Designer will be required to provide full details and specification. It is essential that particular reference should be made to any individual component, fixture, fitting materials or finishes, manufacturers' instructions and recommendations.

Where particularly heavy assemblies are to be installed the compatability of the supporting wall/partition and the assembly should be ensured and where necessary additional supports provided.

HTM 56 and 70 may provide useful reference data on fixings.

6.4 Co-ordination and site control

It is particularly important that site inspectors; controllers ensure that engineering services and drainage are accurately positioned in relationship to structures, partitions and assemblies.

6.5 Protection and storage

Wherever possible the need for storage on site should be avoided. Where this is unavoidable adequate protection of the assemblies against weather, vandalism, etc. should be provided.

Adequate protection against damage should also be provided after installation and prior to handover.

6.6 Procurement/specialist suppliers

The 3 systems described in paragraph 2.3 allow for 2 methods of procurement.

- Proprietary systems are currently available from a number of manufacturers.
- Piece part and self assembly systems should be fully described by specifications and drawing and included in the bills of quantities for the general contractor to tender against and be responsible for the supply and installation.

7 Maintenance

7.1 General

A Project maintenance manual should be compiled by the Architect or project designer and handed to the maintenance staff at practical completion of the contract. The manual should include the following information:

- Identification of manufacturer and type in the case of proprietary systems.
- A copy of the detail drawings and specifications in the case of 'Piece Part' and 'Self Assembly' systems.
- Guidance on access panel removal and replacement.
- General product and assembly maintenance and servicing details and recommendations.

To avoid inconvenience during maintenance it may be appropriate for spare assemblies to be held by works departments so that an exchange system can be operated thus alleviating the problem of out of use facilities.

7.2 Cleaning

Clear instructions should be included in maintenance manuals which should include details of cleaning methods and materials appropriate to the various finishes and materials specified.

Where available manufacturers' recommend-ations should be included in the manual.

Panels should be capable of withstanding regular cleaning:

- with hot water containing mild abrasive detergent as part of a regular cleaning programme

and

- disinfectation by any of the disinfectants in general use by the NHS in suitably diluted form.

Refer to Appendix B for performance criteria for cleaning.

Appendices

A Performance standards and tests

Categories of performance

Two categories of performance have been established for duct and panel assemblies as a means of relating user requirements to construction and finishes. These are similar to those listed in HTM 56, 58 and 69, and BS 5234 and DD171.

MD Medium Duty

Medium frequency of use primarily by those with some incentive to exercise care in areas of domestic character where assemblies are unlikely to be damaged by wheeled equipment.

HD Heavy Duty

High frequency of use by public and others in areas where medical/nursing procedures are carried out and where assemblies may be damaged by wheeled equipment, accident or mis-use.

Performance Tests

Duct and Panel assemblies in this HTM should comply generally with the requirements of:
BS 8131 1989. British Standard Code of Practice for Accommodation of Building Services in Ducts and
BS 1186 1990 parts 1 and 2. Timber for and Workmanship in Joinery.

Performance tests to which components should comply are set out below, and specifiers are advised to seek certification or other evidence of compliance with these tests.

Panels shall support any sanitary components or other fittings fixed to them.

B Test procedures

Summary of test procedures for panels

British Standard or test reference	Title	Requirement
BS 5234 (Part 2)	Heavyweight anchorage test (wash basin)	Heavy Duty Table 3
BS 5234 (Part 2)	Hard body impact test	5 N m
BS 4875 6.4 (Part 5)	Vertical impact test. (For medium duty panels)	Table 1 test level 4
BS 4875 6.7.2 (Part 7)	Strength of wall/panel attachment devices. (All panels)	2x the combined load of duct panel and fittings, any sub frame, appliances and services attached to panels together with any live loadings which is appropriate to the component or panel.
BS 4875 6.1.3 (Part 7)	Deflection of shelves. (Box duct assemblies, both categories)	Table 3 test level 4
BS 4875 6.1.4 (Part 7)	Strength of cabinet top and bottom surfaces. Units with headroom greater than 1050mm Units with headroom less than 1050mm (Scottish wardrobes both categories)	 Force in N. 1000 Force in N.450
BS 4875 6.1.5 (Part 7)	Strength of Clothes rail supports. (Scottish wardrobe)	Table 2 test level 4
BS 4875 6.2.2 (Part 7)	Strength of pivoted doors. (Hinged access panels and doors)	Test load in kilograms 40
BS 4875 6.2.3 (Part 7)	Wear and fatigue of pivoted doors. (Hinged access panels and doors)	Table 1 test level 4
BS 4875 6.2.4 (Part 7)	Slam open/shut of pivoted doors. (Hinged access panels and doors)	Table 1 test level 4

Summary of tests for worktops and tops of box duct assemblies

BS 4875 6.1 (Part 5)	Vertical Static load	Table 1 test level 4
BS 4875 6.2 (Part 5)	Sustained load test	Table 1 test level 4
BS 4875 6.4 (Part 5)	Vertical impact test	Table 1 test level 4
BS 4875 6.6.3 (Part 5)	Vertical fatigue test for worktops	Table 1 test level 4

Test criteria for surface finishes

Requirements for ratings as table 2 BS 3962 Part 2

Surface resistance to	Test method	Vertical surfaces for medium duty	All surfaces for heavy duty and horizontal
Wet heat	BS 3962 Part 2		
55 deg C		2	4
70 deg C		2	4
85 deg C		-	4
Dry heat	BS 3962 Part 3		
85 deg C		3	3
100 deg C		2	3
160 deg C		-	3
Cold liquids	BS 3962 Part 4		
Toilet spirits		3	5
Potable spirits		3	5
Disinfectant (phenol)*		3	5
Disinfectant (chloro)*		3	5
*using the specification for these liquids given in	BS 5910 Part 1.		
Mechanical damage	BS 3962 Part 6		
Scrape, surface penetration		3	5
Scrape penetration to substrate		5	5
Impact		3	5
Cross cut test		3	-

Flexible rating allowances: test results for any sample may include two failures of one rating point.

C Supplementary specification

Supplementary specification and design data

Materials and finishes for duct and panel assemblies

Plastic laminates are most commonly used for duct and panel assemblies but other finishes may be appropriate particularly in medium duty areas where less costly finishes and substrates may meet the performance requirements identified in this document. Manufacturers are encouraged to develop their own tested solutions but should pay careful attention to selecting appropriate substrates, finishes and edge details which are appropriate to the type of assembly and its situation.

Medium duty situations

Vertical surfaces to Component support and access panels, and box duct assembly carcases

- Melamine faced chipboard (MFC) with PVC edging. Care must be taken in achieving a satisfactory bond of edge to substrate, particularly in wet areas.
- Continuous (0.4mm) laminate on chipboard with post formed vertical edges and laminate or PVC horizontal edges.
- Acid catalyst lacquer on MDF with bull nosed vertical edges.
- Sprayed waterproof paint systems (for example Spraylux or Portaflek) on MDF with bull nosed vertical edges.

For duct and panel assemblies associated to sanitary components, attention must be paid to achieving a good waterproof joint between fittings, components and panels, to avoid any ingress of water likely to cause substrates such as MDF or chipboard to deteriorate.

In areas where assemblies will be subjected to extreme wet conditions the use of moisture resistant substrates is recommended.

Worktops and shelves for box duct assemblies

- Worktops should generally be constructed with one of the following:
- Plastic laminate, onto either MDF, chipboard or plywood, preferably with post formed front edges and with other edges lipped PVC or laminate;
  or
  Cast epoxy/polyester materials such as Corian, Surrell, or Avonite. These materials may be appropriate for worktops in some circumstances. These are available with a variety of inset bowls. Refer to manufacturers for details.
- Shelves should generally be constructed with plastic laminate onto MDF, chipboard or plywood, preferably with post formed front edges and with other edges lipped PVC or laminate.

  For laminate tops and shelves, care must be taken to achieve a satisfactory bond of edge to substrate particularly in wet areas.
- Waterproof spray paint systems. Applied strictly in accordance with manufacturers' instructions onto appropriate substrates. In wet areas a gloss coat may be appropriate.

Inset and semi inset basins into box duct assemblies

- Inset and semi inset wash basins should be installed in accordance with manufacturers' instructions and sealed as appropriate at all vulnerable junctions with worktops. Factory fitted sanitary worktop is the preferred solution.
- Where fretted or drilled to receive sanitary components, care must be taken to ensure a water-tight joint or that exposed and vulnerable edges of substrates are sealed.

Pipework and sanitary components

- Pipework and sanitary components etc, forming part of an assembly should comply with the relevant British Standards.
- Specifications and Bills of Quantities should be written to allow the use of flexible connections where appropriate.

Heavy duty situations

Vertical surfaces to component support and access panels, and box duct assembly carcases

- Post forming grade laminate onto MDF plywood or high density chipboard with post formed vertical edges and laminate faced horizontal edges.
- Melamine faced MDF with PVC edging on all edges.

Specification references for materials and finishes

BS 1186 Parts 1 and 2. Timber for and Workmanship in Joinery.

BS 3794 Parts 1 and 2. Post forming grade laminate.

BS 5669. Specification for wood chipboard and methods of test for particle board. Type III (moisture resistant) for laminate finished panels and worktop.

BS 6566. Plywood WBP type BS 1203.

BS 1142 Part 2. Medium density fibreboard, minimum density 750 Kgm^3. Available in standard and moisture resistant grades.

BS 1210. Wood screws.

BS 1204 Part 2. MR. Adhesive for use with clear and painted finishes.

BS 3815/3816. Cast epoxy and Polyester sheet for worktops with integral basins etc.

Acid catalyst lacquer. Ultra rapid 2 pack acid catalyst lacquer, clear and pigmented.'

References

Health Technical Memoranda
56 Partitions
58 Doorsets
64 Sanitary Assemblies
69 Protection

Other Department of Health data

Activity Data Base
Health Building Notes
HBN 40 Common Activity Spaces
Nucleus Hospitals

Statutory legislation

The Building Regulations
Model water byelaws
Byelaws of the statutory water undertakers
I.E.E. wiring regulations

British Standard Specifications and Codes of Practice

BS 476 Fire tests of materials and structures
Part 7 Surface spread of flame
Part 22 Determination of the fire resistance of non-loadbearing elements of construction

BS 1142 Fibre building boards
Part 2 Medium boards

BS 1204 Synthetic 'resin adhesives for wood

BS 1455 Plywood manufactured from tropical hardwood

BS 1186 Timber for and workmanship in joinery
Part 1 Specifications for timber
Part 2 Workmanship

BS 1449 Steel plate, sheet and strip

BS 3794 Decorative laminated sheets based on thermo-setting resins

BS 3962 Methods of testing for finishes for wooden furniture
Part 2 Assessment of surface resistance to wet heat
Part 3 Assessment of surface resistance to dry heat
Part 4 Assessment of surface resistance to cold liquids
Part 5 Assessment of surface resistance to cold oils and fats
Part 6 Assessment of resistance to mechanical damage

BS 4875 Parts 7 and 8 Strength and Stability of contract furniture

BS 6250 Part 3 Domestic and Contract Furniture. Specification for performance requirements for cabinet furniture

BS 5572 Code of Practice for sanitary pipework

BS 6465 Selection and installation of sanitary appliances

BS 6700 Specification for design installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages

BS 5234 Code of Practice for partitioning

BS 5268 Structural use of timber

BS 5628 Code of Practice for use of masonry

BS 5821 Method for rating sound insulation in buildings and of building elements

BS 5669 Specification for wood chipboard and methods of test for particle board

BS 8212 Code of Practice for dry lining and partitioning using gypsum plasterboard

BS 8313 Code of Practice for accommodation of services in buildings

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