3 Sanitary installations and cloakrooms

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Alan Tye Design Ltd is a practice specialising in product design and architectural components

KEY POINTS:

- *women now demand parity with men: this means twice as many appliances for them*
- *unisex facilities providing for babies and small children are essential*
- *results of research into facilities for disabled people will cause further changes*

Contents

1 INTRODUCTION

1.01 Installation standards

Most sanitary installations are unsatisfactory. Professor Kira has emphasised two key factors:

- At the production end, there are no installation manufacturers, only material and appliance producers. Companies make dissimilar products such as dinner plates and WCs because they are ceramic, others make taps because they are metal and no one can conceive of an integrated entirety.
- Prefabricated or pre-assembled bathrooms can achieve far superior results than on-site work and is the best current method; but far more work is needed in the design of products and cleaning equipment.
- At the user end, the public are unaware of what to demand. Manufacturers do not know what the user needs as they sell through builders' merchants who somewhat arbitrarily decide and control what is to be sold.

Strong words, but in essence undeniably correct and one of the reasons why sanitary installations are so inadequate. Architects need to be much more critical and demanding about what manufacturers supply.

Public and semi-public conveniences are places where one is obliged to perform the most private functions in public with strangers of the same sex.

Quite different gangways are needed on a Tube train where to brush closely against Mr X is acceptable, as opposed to between two urinal rows where to brush against the same Mr X is almost criminal. Apart from the football club type of situation where camaraderie permits closeness or the traditional factory where closeness is born of economic necessity and lack of care, the fundamental point of planning spacing in public installations is that psychological not just physical clearances and spacing are required.

The purely physical and unacceptably tight spacing of proprietary sanitary wall systems naturally encourage users not to care about installations which are not really designed for them. Certainly more design work is needed on this subject; for at the moment we generally both design and accept degrading and crude installations.

1.02 Types of installation

Installations can be:

1 Public conveniences, provided by municipalities, transport undertakings (including motorway service stations), shopping centres etc. Use of these facilities are generally open to any member of the public
2 Semi-public conveniences: theatres, stadia, refreshment houses, etc. where use is restricted to patrons of the provider
3 Private multi-use installations for staff in offices, factories, etc. and in hostels and old persons' homes
4 Domestic facilities.

All these will be covered in this chapter, although types 1 and 2 tend to differ only in superficial ways such as the standard and type of finishes.

1.03 Activity spaces

A number of different spaces are shown in the diagrams: space occupied by the appliance itself, additional space required by the user (the activity space), and further space required for luggage or circulation. In many cases these latter spaces may overlap on occasion. Common sense will dictate when this is appropriate, and when it is not.

2 NUMBERS OF APPLIANCES REQUIRED

The recommendations given in Tables I to XIII are derived principally from BS 6465: Part 1:1994, and are the minimum requirements.

In all situations, attention is drawn to the necessity to provide facilities for the disabled, baby changing and also for the disposal of sanitary towels and continence aids.

A common mistake is inadequate numbers of WCs for females, leading to long queues. Always err on the generous side.

Table XIV gives figures for various building types of the numbers of appliances to be provided for a total of 100 people evenly divided between the sexes. Toilets for wheelchair users are not included.

3 EARLY PLANNING

3.01 Guide to planning areas

In the previous edition of this book, if you wished to establish an overall sanitary installation area you could obtain the approximate size of an installation for any number of persons from a graph. This has not been included here, because:

- The numbers of items of equipment required in various building types has been significantly altered in the new edition of BS 6465, and, in particular

Table I Staff toilets in offices, shops, factories and other non-domestic premises used as place of work

Sanitary appliances for any group of staff		
Number of persons at work	**Number of WCs**	**Number of washing stations**
1 to 5	1	1
6 to 25	2	2
26 to 50	3	3
51 to 75	4	4
76 to 100	5	5
Above 100	One additional WC and washing station for every unit or fraction of a unit of 25 persons	

Alternative scale of provision of sanitary appliances for use by male staff only		
Number of men at work	**Number of WCs**	**Number of urinals**
1 to 15	1	1
16 to 30	2	1
31 to 45	2	2
46 to 60	3	2
61 to 75	3	3
76 to 90	4	3
91 to 100	4	4
Above 100	One additional WC for every unit or fraction of a unit 50 men provided at least an equal number of additional urinals are provided	

If public also use staff toilets, add 1 to each number of conveniences above

If work involves heavy soiling of hands and forearms	
Number of persons at work	**Number of washing stations**
1 to 50	1 per 10
more than 50	1 additional per 20 or part of 20

Table II Sanitary facilities for customers in shops and shopping malls having a net sales area more than 1000 m² and assuming equal numbers of male and female customers

Sales area of shop	Appliances	Male	Female
1000 m² to 2000 m²	WC	1	2
	Urinal	1	Nil
	Wash basin	1	2
	Toilet for disabled people	1 unisex	
	Baby-changing facilities	1 unisex *not* in disabled toilet	
2001 m² to 4000 m²	WC	1	4
	Urinal	2	Nil
	Wash basin	2	4
	Toilet for disabled people	1 unisex	
	Baby-changing facilities	2 unisex	
Greater than 4000 m²	In proportion to the size of the net sales area		

Table III Sanitary provision in restaurants, cafés, canteens and fast food outlets assuming equal numbers of male and female customers

Appliances	For male customers	For female customers
WC	1 per 100 up to 400 males. For over 400 males, add at the rate of 1 per 250 males of part thereof	2 per 50 up to 200 females. For over 200, add at the rate of 1 per 100 females or part thereof
Urinal	1 per 50 males	–
Wash basin	1 per WC and in addition 1 per 5 urinals or part thereof	1 per WC
Toilet for disabled people	1 unisex compartment should be reasonably close by but may be shared by other facilities (such as shops)	
Bucket/cleaners' sink	Adequate provision should be made for cleaning facilities including at least one cleaners' sink	

Table IV Sanitary provision in public houses and licensed bars
Assume 4 persons per 3 m² of EDA (effective drinking area) and 75%/25% male/female in public houses without public music and singing licences, 50%/50% elsewhere.

Appliances	For male customers	For female customers
WC	1 for up to 150 males plus 1 for every additional 150 males or part thereof	1 for up to 12 females plus 1 for 13 to 30 females plus 1 for every additional 25 females or part thereof
Urinal	2 for up to 75 males plus 1 for every additional 75 males or part thereof	
Wash basin	1 per WC and in addition 1 per 5 urinals or part thereof	1 per 2 WCs
Toilets for disabled persons	1 unisex	
Bucket/cleaners' sink	Adequate provision should be made for cleaning facilities including at least one bucket/cleaners' sink	

Table V Sanitary provision in buildings used for public entertainment
Assume, unless otherwise indicated, equal numbers of male and female customers. In cinema, multiplexes etc. where use is spread over all the time the building is open, assume 75% of total capacity, otherwise use 100%.

Appliances	Males	Females
WC	In single-screen cinemas, theatres, concert halls and similar premises without licensed bars: 1 for up to 250 males plus 1 for every additional 500 males or part thereof	For single-screen cinemas, theatres, concert halls and similar premises without licensed bars: 2 for up to 40 females 3 for 41 to 70 females 4 for 71 to 100 females plus 1 for every additional 40 females or part thereof
Urinal	In single-screen cinemas, theatres, concert halls and similar premises without licensed bars: 2 for up to 100 males plus 1 for every additional 80 males or part thereof	
Wash basins	1 per WC and in addition 1 per 5 urinals or part thereof	1, plus 1 per 2 WCs or part thereof
Toilets for disabled people	1 unisex minimum	
Bucket/cleaner's sink	Adequate provision should be made for cleaning facilities including at least one cleaner's sink	

If premises include a licensed bar, additional provision as Table IV will be needed.

Table VI Sanitary provision in swimming pools
Assume 50% male and 50% female users.

Appliances	For bathers	
	Male	**Female**
WC	2 for up to 100 males plus 1 for every additional 100 males or part thereof	1 per 5 females for up to 50 females plus 1 for every additional 10 females or part thereof
Urinal	1 per 20 males	
Wash basin	1 per WC and in addition 1 per 5 urinals or part thereof	1, plus 1 per 2 WCs or part thereof
Shower	1 per 10 males	1 per 10 females
Toilets for disabled people	1 unisex minimum	

Toilets for spectators should be provided as Table V and for staff as Table I.

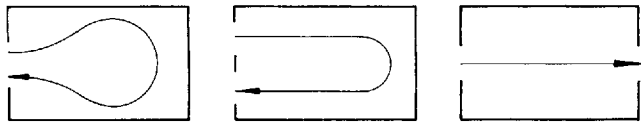
Table VII Sanitary provision in Stadia

	Urinals	WCs	Wash hand basins
Male	1 per 70 males	1 for every 600 males, but minimum of 2 per toilet area	1 per 300 males, but minimum of 2 per toilet area
Female		1 for every 35 females, but minimum of 2 per toilet area	1 per 70 females, but minimum of 2 per toilet area
For disabled people	Where there is provision for more than 10 spectators with disabilities, provide at least 2 suitable unisex compartments within 40 m travel distance. Generally 1 unisex special WC per 12–15 disabled spectators		

Table VIII Minimum sanitary provision in stadia for different male:female ratios

Capacity of stand/ area	Type of provision	Male:female ratio			
		90/10	85/15	80/20	75/25
500		450:50	425:75	400:100	375:125
	Male urinals	7	7	6	6
	Male WCs	2	2	2	2
	Male whbs	2	2	2	2
	Female WCs	2	3	3	4
	Female whbs	2	2	2	2
1000		900:100	850:150	800:200	750:250
	Male urinals	13	13	12	11
	Male WCs	2	2	2	2
	Male whbs	3	3	3	3
	Female WCs	3	5	6	8
	Female whbs	2	3	3	4
2000		1800:200	1700:300	1600:400	1500:500
	Male urinals	26	25	23	22
	Male WCs	3	3	3	3
	Male whbs	6	6	6	5
	Female WCs	6	9	12	15
	Female whbs	3	5	6	8
3000		2700:300	2550:450	2400:600	2250:750
	Male urinals	39	37	35	33
	Male WCs	5	5	4	4
	Male whbs	9	9	8	8
	Female WCs	9	13	18	22
	Female whbs	5	7	9	11
5000		4500:500	4250:750	4000:1000	3750:1250
	Male urinals	65	61	58	54
	Male WCs	8	8	7	7
	Male whbs	15	15	14	13
	Female WCs	15	22	29	36
	Female whbs	8	11	15	18

- The ratio of provision for women as against provision for men, plus the greater space required by them, means that in many cases the area of female installations needs to exceed considerably that for male installations, which tends to reverse what has been the case until now.
- BS 6465: Part 2 has recently been issued. This gives design sizes of appliances (which may not correspond exactly with sizes available from manufacturers), and also recommends activity and circulation dimensions.



3.1 *Circulation through sanitary installation*

These changes mean that there is no body of experience until a number of installations conforming to the new BS 6465 have been designed and built.

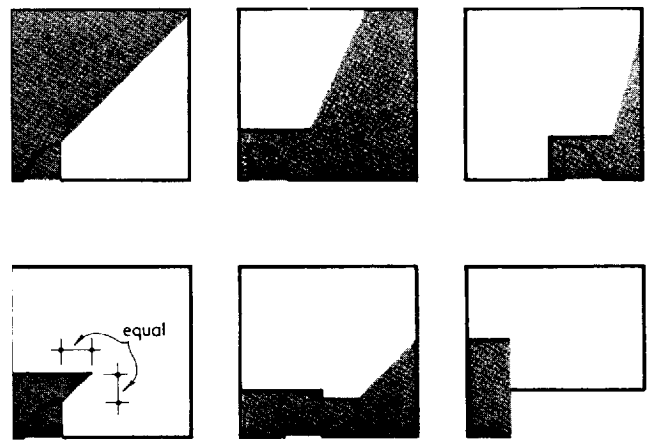
3.02 Planning the space

The planning of installations of types 1, 2 and 3 in **1.03** above requires sensitivity to the requirements of privacy and discretion. It is desirable that circulation of people through the sanitary area space is essentially one way, **3.1**. Single entry/exit plans can, however, work satisfactorily provided that the paths of users do not cross each other and the entry is wide enough. Placing the appliances in order of use simplifies circulation and reduces the distance walked. Hygiene should be encouraged by placing washing and drying facilities between the WC and/or urinal and the exit.

Vision is traditionally seriously considered in the planning of lavatories, although sound and odour are sources of considerable concern for many people and should also be considered, particularly in larger installations.

3.03 Vision

In larger installations, vision should be obstructed by the configuration of the entrance and in principle, entrance doors should be avoided, **3.2**. In smaller installations doors should open inwards and be hung so as to screen the appliances and the user as far as possible when opened. The doors to adjacent male and female rooms should not be close to each other as this is psychologically disturbing and aggravates vision problems. Consideration should also be given to positioning of mirrors and to the gap created by the hinges. Doors should be self-closing wherever possible.



3.2 *Various screening arrangements for small installations, showing the areavisible from outside in each case*

3.04 Noise

It is difficult and costly to satisfactorily insulate lavatories acoustically and this problem should be tackled by planning isolation if possible.

3.05 Odour

Except in extremely well-naturally ventilated installations, some form of forced ventilation or air conditioning is desirable, particularly so in confined areas. Manually switched fans which continue to run for a set period after being switched off are useful in domestic situations.

3.06 Vandalism

No unsupervised installation can resist vandals. Even with the most vandal-resistant equipment (which would have to exclude all

Table IX Sanitary provision in schools

Type of school	Appliances	Number recommended	Remarks
Special	Fittings	1/10 of the number of pupils rounded up to the next nearest whole number	
	WC only	Girls: all fittings	
	Urinal and WC	Boys: not more than 2/3 of fittings should be urinals	
	Wash basin	As for secondary school	
	Shower	Although not required by statute, it is suggested that sufficient showers should be provided for physical education	
	Toilet for disabled person	At least 1 unisex depending on nature of special school	
	Bucket/cleaner's sink/slop hopper	At least one per floor	
Primary	Fittings	Aggregate of 1/10 of the number of pupils under 5 years old and 1/20 of the number of others. Not less than 4. Rounded up to the nearest whole number	
	WC only	Girls: all fittings	
	Urinal and WC	Boys: not more than 2/3 of fittings should be urinals	
	Wash basin	As for secondary school	
	Shower	Although not required by statute, it is suggested that sufficient showers should be provided for physical education	
	Toilet for disabled person	At least 1 unisex unless number of disabled pupils exceeds 10. Then provide 1 per 20 disabled pupils or part of 20	
	Bucket/cleaner's sink/slop hopper	At least one per floor	
Secondary	Fittings	1/20 of the number of pupils. Not less than 4. Rounded up to the nearest whole number	
	WC only	Girls: all fittings	
	Wash basin	1 in each washroom. At least 2 basins per 3 fittings	See clause 7
	Shower	As for primary school	
	Toilet for disabled person	As for primary school	
Nursery and play	WC	1 per 10 pupils (not less than 4)	
	Washbasins	1 per WC	See clause 7
	Sink	1 per 40 pupils	
Boarding	WC	1 per 5 boarding pupils	Where sanitary accommodation for day pupils is accessible to, and suitable for the needs of boarders, these requirements may be reduced to such an extent as may be approved in each case. See clause 7
	Wash basin	1 per 3 pupils for the first 60 boarding pupils; 1 per 4 pupils for the next 40 boarding pupils; 1 for every additional 5 boarding pupils;	
	Bath	1 per 10 boarding pupils	
	Shower	May be provided as alternative to not more than 3/4 of the minimum number of baths	
	Toilet for disabled person	As for primary school	

Table X Sanitary provision in dwellings

Type of dwellings	Appliances	Number per dwelling	Remarks
Dwellings on one level, e.g. bungalows and flats	WC	1 for up to 5 persons 2 for 6 or more	Except for single person's accommodation, where 1 WC is provided, the WC should be in a separate compartment. Where 2 WCs are provided 1 may be in the bathroom
	Bath/shower	1	
	Wash basin	1	
	Sink	1	
Dwellings on one or more levels e.g. houses and maisonettes	WC	1 for up to 4 persons 2 for 5 or more	Except for single person's accommodation, where 1 WC is provided, the WC should be in a separate compartment. Where 2 WCs are provided 1 may be in the bathroom
	Bath/shower	1	
	Wash basin	1	
	Sink	1	

For provision for disabled visitors see para. 4.06

Table XI Sanitary provision in accommodation for elderly people and sheltered housing

Type of accommodation	Appliances	Number per dwelling	Remarks
Self-contained for 1 or 2 elderly persons, or grouped apartments for 2 less-active elderly persons	WC	1	An additional WC may be provided in the bathroom.
	Bath/shower	1	Bathroom within apartment
	Wash basin	1	
	Sink	1	
Grouped apartments for less-active elderly persons	WC	1	
	Wash basin	1	
	Sink	1	
	Bath/shower	Not less than 1 per 4 apartments	Some may be Sitz baths or level access showers.
Additional provisions for communal facilities			
Common room for self-contained or grouped apartments	WC	1	Minimum number required. Should be available for use by visitors
	Wash basin	1	
The pantry or kitchen for self-contained or grouped apartments	Sink	1	Adjacent to common room
Laundry room for grouped apartment schemes	Sink	1	
	Washing machine	1	
	Tumble drier	1	
Cleaner's room	Bucket/cleaner's sink		1 in each cleaner's room

Table XII Sanitary provision in residential homes and nursing homes

Type of accommodation	Appliances	Number recommended	Remarks
Residents	WC	1 per 4 persons	An adjacent wash basin is also required
	Bath	1 per 10 persons	
	Wash basin	1 to each bedsitting room	
Staff	WC	At least 2 for non-residential staff	
	Wash basin	1	In WC compartment
Visitors	WC	1	
	Wash basin	1	In WC compartment
Kitchen	Sink	As appropriate	
Toilets for disabled people		A minimum of 1 depending on the number of disabled persons	
Cleaner's room	Bucket/cleaner's sink	1	In each cleaner's room
Other	Bed pan cleaning/disposal	As appropriate	Service area
	Wash basin	1	In each medical room, hairdressing, chiropodist, non-residential staff toilets and kitchen areas

Where en-suite facilities are provided, toilets for visitors and staff should also be provided.

Table XIII Sanitary provision in hotels

Type of accommodation	Appliances/facilities	Number required	Remarks
Hotel with en-suite accommodation	En-suite	1 per residential guest bedroom	Containing bath/shower, WC and wash basin
	Staff bathroom	1 per 9 residential staff	
	Bucket/cleaner's sink	1 per 30 bedrooms	At least 1 on every floor
Hotels and guest houses without en-suite accommodation	WC	1 per 9 guests	
	Wash basin	1 per bedroom	
	Bathroom	1 per 9 guests	Containing: bath/shower, wash basin and additional WC
	Bucket/cleaners' sink	1 per floor	
Tourist hostels	WC	1 per 9 guests	
	Wash basin	1 per bedroom or 1 for every 9 guests in a dormitory	
	Bathroom	1 per 9 guests	Containing: bath/shower, wash basin and additional WC
	Bucket/cleaners' sink	1 per floor	
All hotels	Toilet for disabled person	All hotels should provide at least 1 unisex compartment for disabled people	

Hotels incorporating other uses such as conference entertainment facilities, bars and restaurants may need additional provision as previous tables.

Table XIV Comparison of requirements in different buildings types for 100 people evenly divided between the sexes

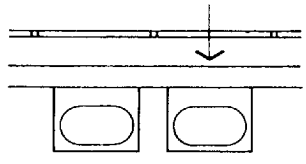
	For men			For women	
	Urinals	WCs	WHBs	WCs	WHBs
Workplaces	2	3	3	3	3
Workplaces where more dirty conditions are met	2	3	5	3	5
Shop customers:					
1000–2000 m²	1	1	1	2	2
2000–4000 m²	2	1	2	4	4
Restaurants etc	1	1	2	2	2
Pubs etc.	2	1	2	3	2
Entertainment buildings	2	1	2	3	3
Swimming pools	3	2	3	10	6
Stadia	1	2	2	2	2
Schools:					
Special	3	2	2	5	2
Primary and secondary	1	1	2	2	2
Nursery	10 WCs and 10 WHBs for all				
Boarding	20 WCs and 30 WHBs for all				

ceramics) an unsupervised facility will inevitably become sub-standard. In such situations the use of an attendant will result in a high standard being maintained, possibly with reduced costs. A well-designed installation, easily kept clean, with an open layout, a high level of general lighting and robust equipment securely fixed will reduce the problem. Where vandal-resistant appliances are thought necessary, stainless steel is considerably less prone to damage than ceramics, but all designs should allow for individual items to be replaced. Pipework, traps, cisterns, electrical supplies, etc. should all be fully concealed and this is, of course, also highly desirable for hygiene and appearance. The modular plastic panel is not desirable in areas likely to be vandalised.

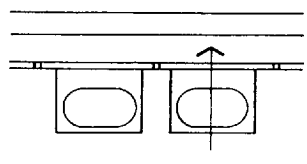
3.07 Ducts

As it is equally unacceptable to have pipes inside a room or outside it, ducts are an inevitable detail of sanitary installations. Although pipes are frequently buried into wall structures, notably in Germany where appropriate pipework fittings exist, the UK situation is that we consider access is needed to critical points such as traps and cisterns. To achieve this access, ducts may be walk-in or have access from one or other sides. For hygiene, cleaning maintenance, structural soundness and planning flexibility, plan **3.3** is superior to **3.4**.

Although if the appliance could be part of the wall, plan **3.4** would be very useful, in practice this plan usually results in the adoption of a standard ceramic appliance on a sheet plastic panel with its attendant impractical problems, details and module (which, in addition, seldom correctly relate to required activity spaces or correct operational heights).



3.3 *Service duct, access from rear*



3.4 *Service duct, access from front*

On the other hand, **3.3** demands more detailed work from the architect and it is not always possible to utilise adjacent room areas for access.

Once the duct is provided it is logical and more hygienic to bring the water supplies directly through the duct wall to wall-mounted valves, rather than the pipework passing through the wall, sanitaryware, then on to deck-mounted valves.

It is similarly illogical to have traps hanging from appliances in the room if there is space in the duct for them, although some sanitaryware makes this unavoidable. Ducts should avoid maintenance problems and not have ferrous metal in their construction.

3.08 Tiles and modules

As UK manufacturers have never accepted the 100 mm modular tile (except as a special) and as UK manufacturers will not make sanitaryware modular, it is difficult to find a reason for choosing one module or another for the sanitary installation. It is, however, obvious, in view of the quite differing requirements of the various appliances and the individual situation, that any module should be as small as practicable. The best module is probably that used in Alvar Aalto's office of 1 mm!

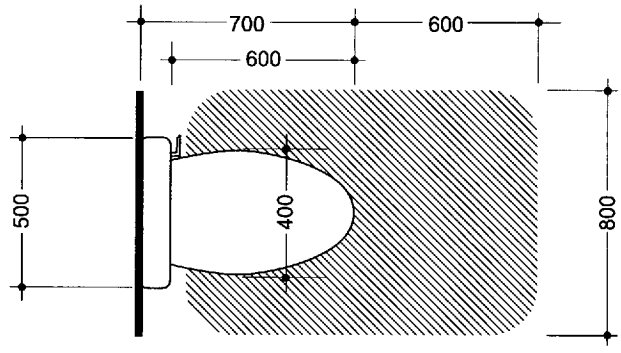
4 DETAILED CONSIDERATIONS OF APPLIANCES

4.01 WCs

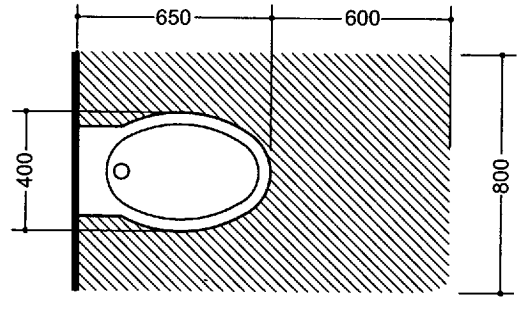
The principal appliance in any installation is the water closet or WC. This may be free-standing within a bathroom, or placed in a compartment or cubicle by itself, or with a hand-rinse basin.

A WC compartment is totally enclosed by walls that reach down to the floor and up to the ceiling, and has its own lighting and ventilation system. A cubicle is enclosed by light partitions that do not reach floor or ceiling. It shares the lighting and ventilation of the larger space of which it is a part.

3.5a shows the appliance, complete with cistern, and its normal activity space. If the cistern is at high level, or situated within a



3.5a *WC and activity space. A duct mounted or high-level cistern would allow the WC pan to be placd closer to the wall*



3.5b *Bidet and activity space*

duct, the space for the appliance is correspondingly reduced. However, it may then be found difficult to accommodate a sanitary bin in a place acceptable to the user. **3.5b** shows a bidet and its activity space.

In the UK it is normal for a WC cubicle door to open inwards (see **4.03**). This causes difficulties in entering some cubicles because there is nowhere to stand clear of the door swing. There is also a danger of clothes soiling by contact with the edge of the WC pan. BS 6465 now asks for a cylindrical volume 450 mm in diameter clear of all obstructions such as WC pan, door swing or toilet paper holder.

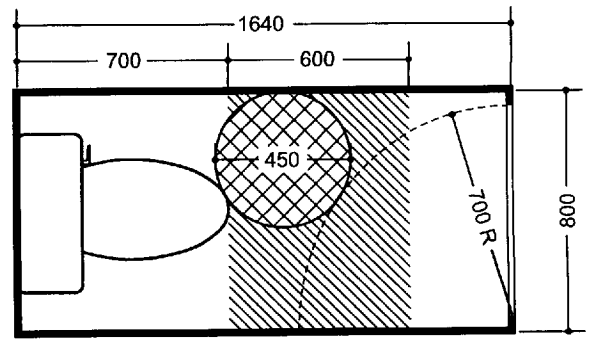
There are three basic types of WC compartment and cubicle (excluding those also containing a hand-rinse basin):

- A compartment in a house or flat where the user will be in indoor clothing and without impedimenta
- A cubicle in an office or factory, where the user is likely also to be in light clothing with no impedimenta
- A cubicle or compartment in a public place, such as a shopping centre or an airport, where the user may be in a coat and have heavy luggage, shopping or even a baby carrier that cannot, for security, be left outside.

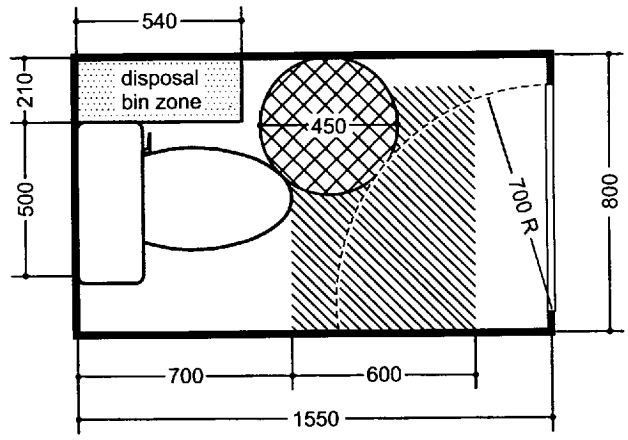
3.6 shows a 'standard' WC cubicle with inward-opening door, the leaf of which is 700 mm wide. It is seen that with a normal pan central in the cubicle width, the cubicle is 1640 mm in depth. **3.7** shows an alternative where the pan is offset towards the door hinge side to provide space for a sanitary bin. In this case the depth is reduced to 1550 mm. These two designs are suitable for the first two situations above.

3.8 to **3.10** show designs appropriate where there is likely to be luggage etc.

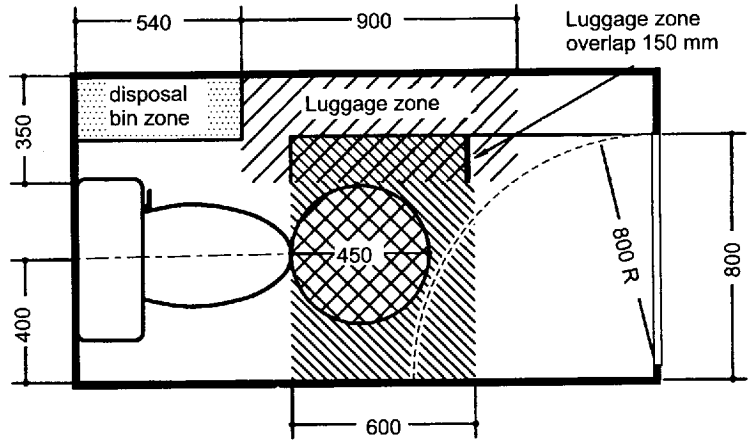
It is seen that the width of a 'standard' cubicle is 800 mm. This width is also preferred by ambulant disabled people (see **4.05**).



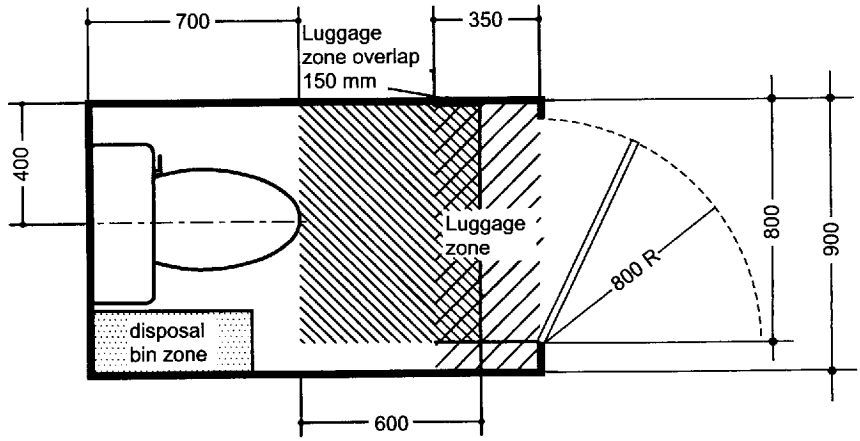
3.6 *WC cubicle, inward-opening door, no sanitary bin zone*



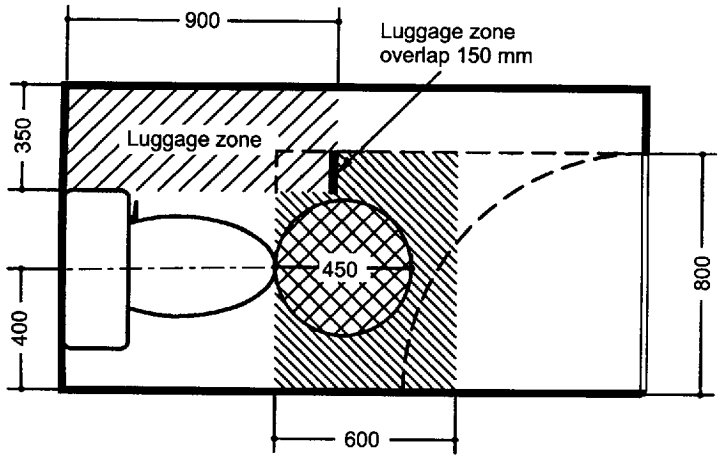
3.7 *WC cubicle, inward-opening door, sanitary bin zone*



3.8 *Public WC cubicle, inward-opening door*



3.9 *Public WC cubicle, outward-opening door*



3.10 *Alternative public WC cubicle, inward-opening door, no sanitary bin*

However, many women find this width too narrow for them, and prefer a width of 900 mm as minimum, with a door opening 800 mm. A wider cubicle may also be needed for people who are oversize.

WC compartments and cubicles may also have to accommodate the following:

- Hand-rinse basin (see **4.03**)
- Large toilet roll holder and dispenser
- Bin for the disposal of sanitary dressings or continence aids
- Dispenser for disposable toilet seat covers
- Brush
- Shelf
- Clothes hooks

4.02 Height of WCs

There is no standard height of pan, but most are around 400 mm to the top of the pan, allow a further 25 mm for the seat. There was a vogue for pans as low as 250 mm at one time, because of medical advice that more of a squatting attitude was beneficial. However, there now seems to be little movement towards the 'health closet', as it is hampered by Western tradition, the difficulty of the elderly or infirm to use a low-level WC and the uselessness of a low WC as a seat or urinal which are common functions in domestic bathrooms.

A pan of height 355 mm is available for use in junior schools. Slightly higher pans are recommended for WCs for disabled people, and these are 450 mm to the top of the seat. People who find a WC seat too low can use removeable seat raisers which are available in a number of different heights.

4.03 Doors

Traditionally in the UK doors to WC compartments and cubicles open inwards. The advantages claimed for this are:

- Privacy, particularly when the door lock is missing or broken
- Elimination of hazard to those outside the cubicle
- The doors are hung so that empty cubicles have open doors and are easily found.

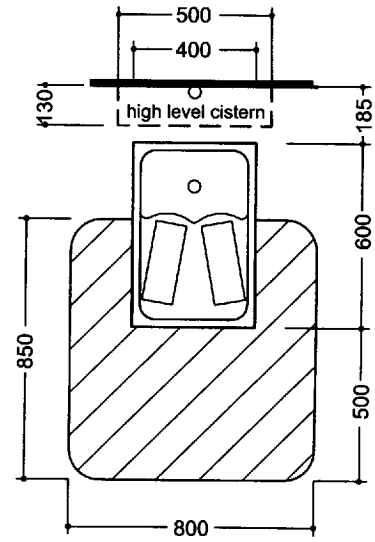
The disadvantages are:

- Restriction of space within the compartment
- Difficulty of reaching anyone taken ill within (a not-uncommon situation).

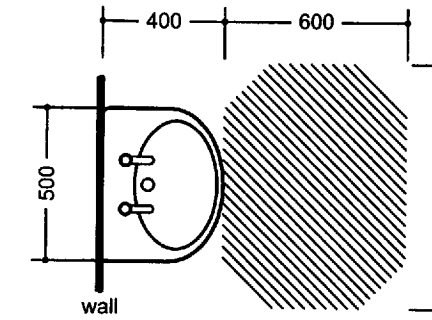
Inward-opening doors can be designed so that they can be lifted off their hinges should access be necessary when someone has fallen against one.

4.04 Squatting WCs

Some people prefer a squatting WC, **3.11**. These are common in continental public conveniences, and also where there is a substantial Asian population. They can be accommodated in a 'standard' cubicle, although there should be grip handles fixed to the side walls. When intended for use by Muslims the compartment should not face or back in the direction of Mecca, and a low level cold water tap should be provided in addition to the flushing cistern.



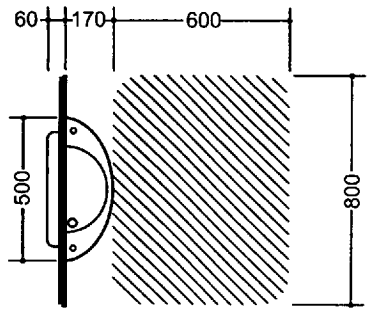
3.11 *Squatting WC and activity space*



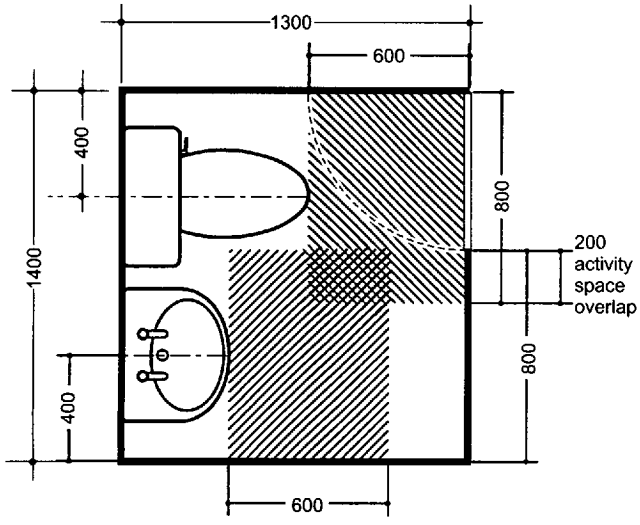
3.12 *Hand-rinse basin and activity space*

4.05 WC compartments with hand-rinse basins

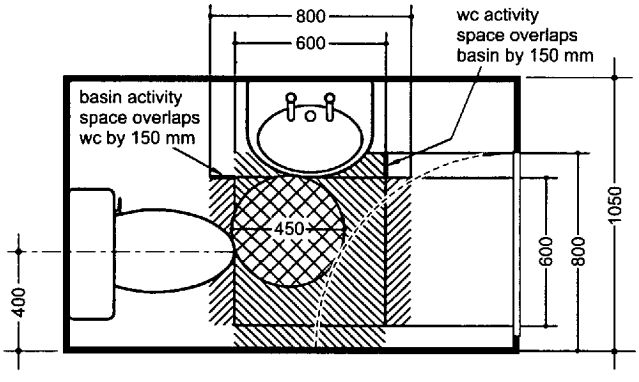
It is often desirable, and may be mandatory, for a compartment or cubicle to incorporate hand-rinsing facilities. **3.12** shows such an appliance with its activity space – which may overlap that of the WC. Where space is tight, a very small inset design may be used as shown in **3.13**.



3.13 *Recessed hand-rinse basin and activity space*



3.14 *WC and washbasin compartment, appliances on same wall*



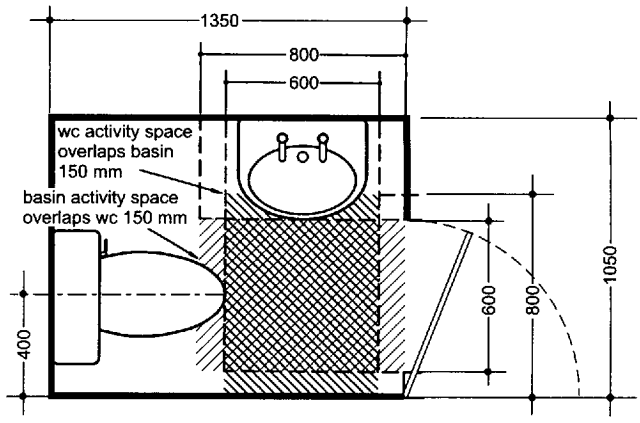
3.15 *WC and washbasin compartment, inward-opening door, appliances on adjacent walls*

3.14 to **3.18** show alternative designs of compartments with standard hand-rinse basins.

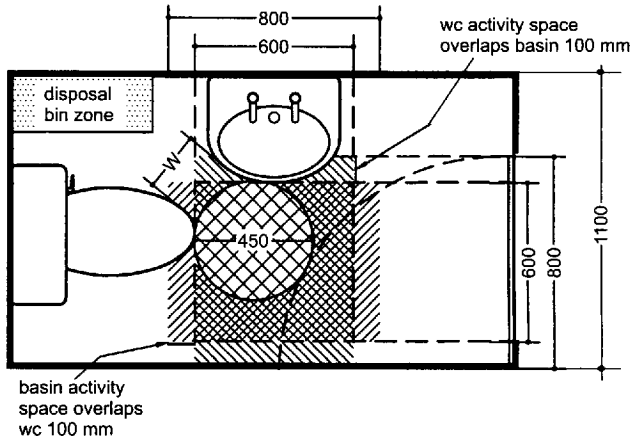
4.06 WC compartments for wheelchair users

Disabled people are remarkably adaptable and often of necessity extremely determined to manage for themselves in buildings designed primarily for able-bodied people. For many ambulant disabled people the difficulties are surmountable, but for wheelchair users the problems are more serious. If an area is not negotiable by a wheelchair the user is forbidden entry; this is intolerable, and may be illegal, in any new building.

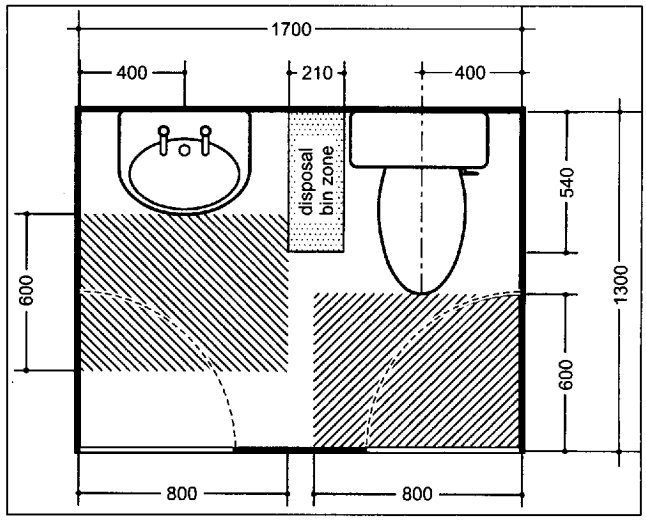
Therefore proper consideration should be given to the provision of WC and washing facilities for disabled people. Selwyn Goldsmith's book *Designing for the disabled* is the most comprehensive study available. There is hardly any ergonomic evidence on this subject and the standard plans shauld be regarded as principles rather than unalterable working drawings.



3.16 *WC and washbasin cubicle, outward-opening door, appliances on adjacent walls*



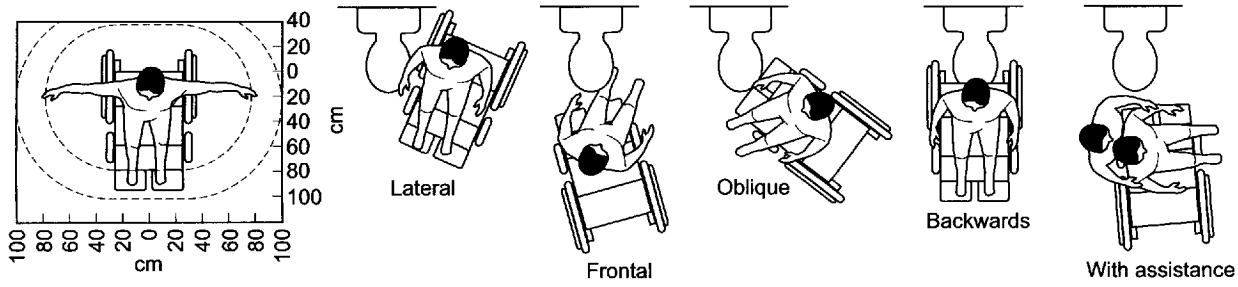
3.17 *WC and washbasin cubicle, sanitary bin zone, appliances on adjacent walls*



3.18 *WC and washbasin cubicle, sanitary bin zone, appliances on same wall*

WC compartments for disabled people are usually unisex; situated outside male and female multi-user facilities; this has several advantages:

- Husbands and wives can assist each other which is not possible in single-sex compartments



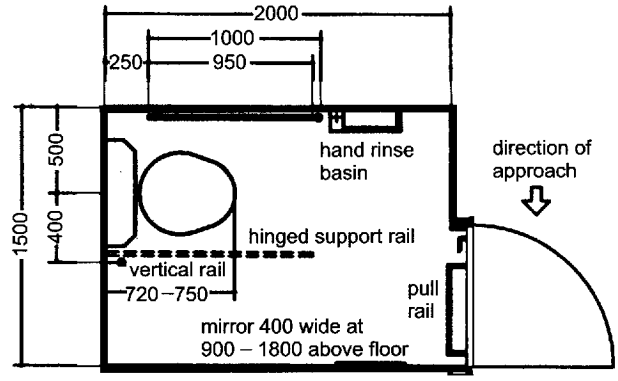
3.19 *A disabled person can transfer from a wheelchair to a sanitary appliance in a variety of ways. Toilets and bathrooms likely to be used by them should allow for a wheelchair turning circle of 1500 mm*

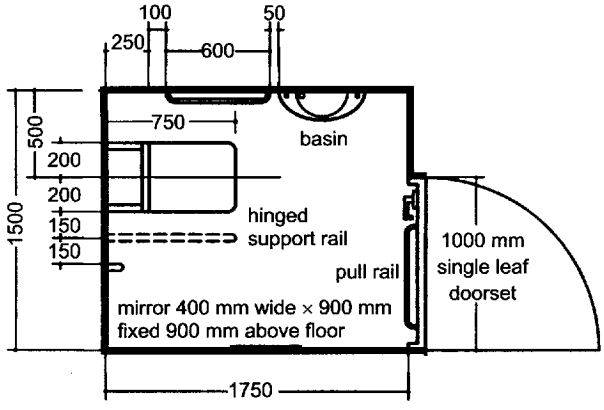
- They avoid the cost of duplicated facilities; one decent unisex facility is more economic than two inadequate single-sex units
- They simplify signposting and access for disabled people.

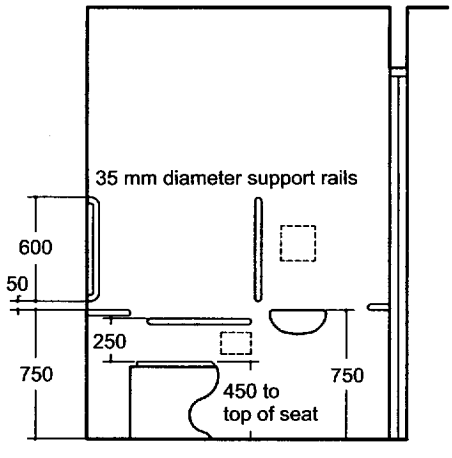
A WC compartment for general use by disabled people should allow for frontal or lateral transfer from the wheelchair, with space for an attendant to assist. **3.19** shows the various means of transfer that a wheelchair user might have to employ.

In WCs for wheelchair users a hand-rinse basin should be installed where it can be conveniently reached by a person seated on the WC. However, it is desirable that the basin is also usable from the wheelchair. These opposing criteria together with the requirements for handrails and supports present a difficult problem often resulting in a poor or even unworkable compromise.

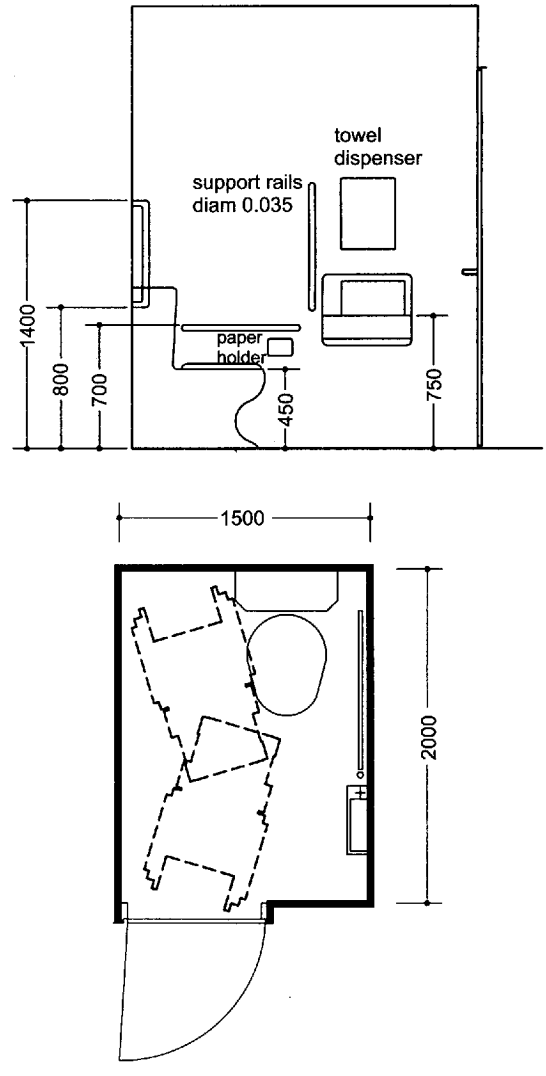
Part M of the Building Regulations gives a standard design of compartment for a wheelchair user, **3.20**. Such standardisation is recommended because of use by visually impaired people. The handed version is permissible.



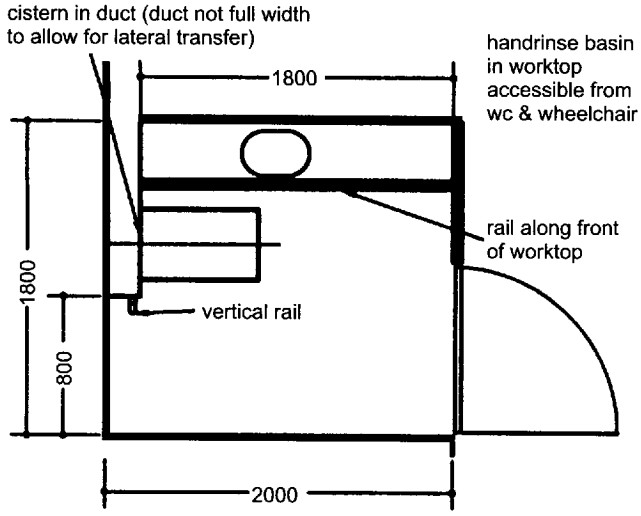




3.20 *Wheelchair-accessible WC compartment from Approved Document B*



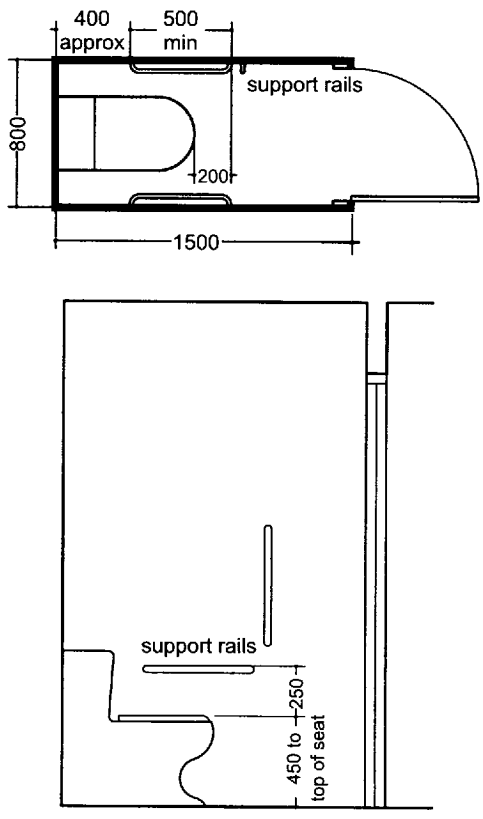
3.21 *WC cubicles for the wheelchair user (from* Designing for the disabled)



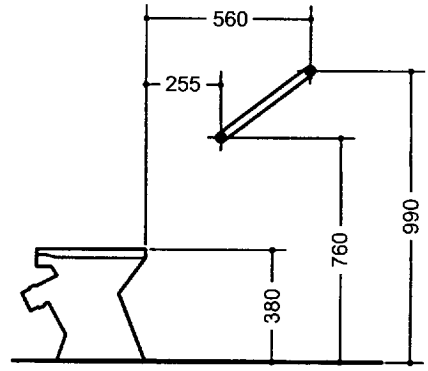
3.22 *An alternative facility (by Alan Tye Design)*

Selwyn Goldsmith's recommended WC compartment for chair-bound users, **3.21**, may be compared to an alternative plan by Alan Tye Design, **3.22**, embodying the principles of Selwyn Goldsmith's recommendations in a neat and pleasant facility.

There is controversy over the use of wheelchair-accessible WCs by other people such as the ambulant disabled and pregnant women. In some cases access to the WC is restricted to registered disabled people with a RADAR key. Since many people are temporarily disabled at some time in their lives, and are therefore not eligible for registration, this should only apply where constant abuse makes it essential. On the other hand, the combination of wheelchair accessible toilet and baby-changing facility should be deplored.



3.23 *WC compartment for ambulant disabled person from Approved Document M. the outward-opening door is preferred for people using crutches, but an inward-opening door can be used if the compartment is at least 200 mm deeper*



3.24 *Inclined rails mounted on walls of WC*

4.07 WC compartments for ambulant disabled

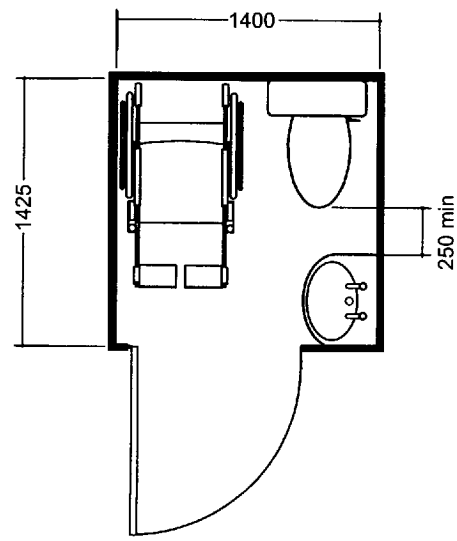
The standard facility for ambulant disabled people as given in Building Regulation Approved Document M (1992) is shown in **3.23**. The difference from a standard facility is principally in the provision of support and grab rails. People with visual impairment appreciate a standardised layout.

The narrow width is desirable as it allows the user to use the support rails on both sides of the compartment to raise themselves. In large public or semi-public conveniences, at least one cubicle should provide for ambulant disabled people.

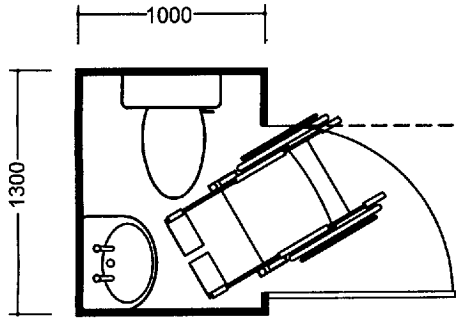
Alexander Kira points out that grab rails, **3.24**, for able-bodied people, the elderly and children would virtually obviate the need for special provision for the disabled.

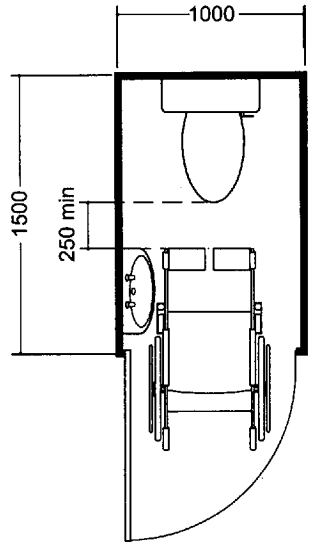
4.08 WC provision in domestic property

It is becoming clear that many people wish to stay in their own homes as long as possible when increasing disability or age occurs. Also, wheelchair users would like to make visits to their friends. This has led the Access Committee for England to recommend that all new houses and flats should be wheelchair accessible if possible, and that they should have WCs at entrance level which can be used by a wheelchair user, although the chair itself may not be able to be fully accommodated inside the WC compartment with the door shut. **3.25** and **3.26** show three ways of achieving this.



3.25 *Small wheelchair-accessible WC compartment at entrance level in a family house*





3.26 *Even smaller WCs for entrance level WCs in family houses. In these, transfer cannot be achieved with the door shut*

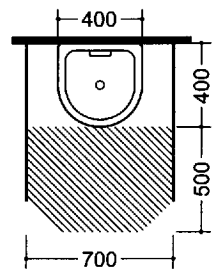
4.09 Urinals

Although a number of female urinal designs have been produced, none have been successful. However, they are ubiquitous in public and semi-public facilities for men, and research shows that there is often over-provision of WCs for men.

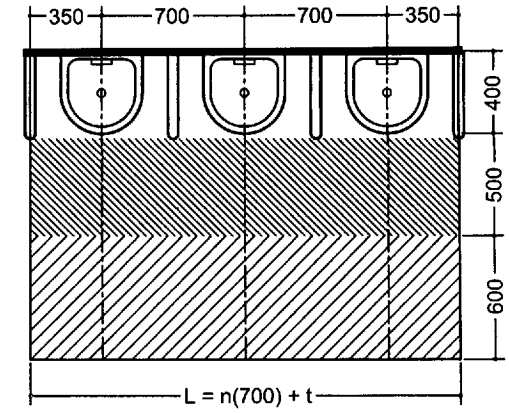
Urinals are of two types: slab and bowl. Slabs are rarely used these days because they are more difficult to service and repair than bowls. A bowl and its activity area are shown in **3.27**.

Urinals are usually provided in ranges. In the past a centre-to-centre dimension of 600 mm was common, but it is now accepted that this is too close. It is also desirable to have small modesty screens between bowls. **3.28** shows a range of urinals with activity and circulation spaces.

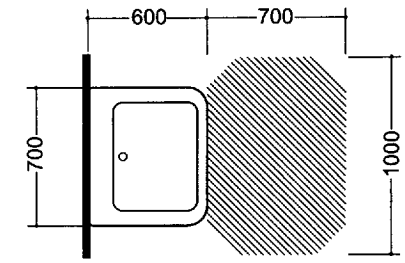
Urinal bowls are usually fixed with their forward rims 610 mm above floor level. One in each range should be lower at 510 mm for use by small boys.



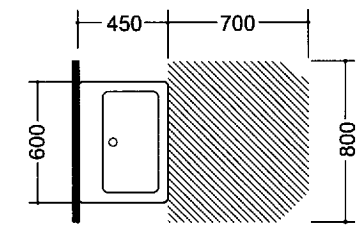
3.27 *Single urinal and activity space*



3.28 *Range of urinals, activity and circulation spaces*



3.29 *Domestic washbasin and activity spaces*



3.30 *Non-domestic washbasin and activity space*

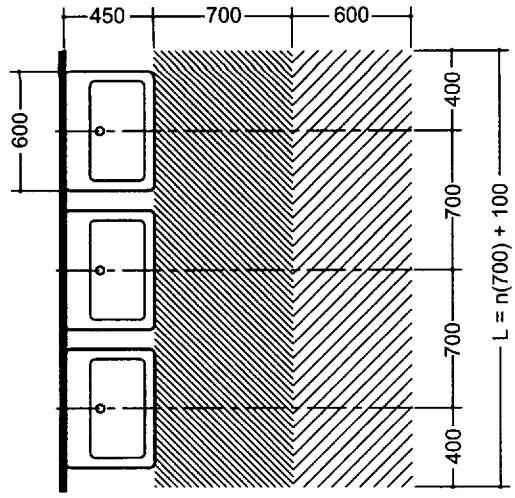
4.10 Washbasins

Washbasins come in a variety of sizes. The standard domestic washbasin, **3.29** is for washing the face and the upper part of the body and for wet shaving as well as hand-rinsing. A slightly smaller washbasin, **3.30**, is common in non-domestic situations such as factories, offices and schools where they are often used in ranges **3.31**. Sometimes washbasins are set into a flat top forming a vanitory unit, and the dimensions of these do not vary significantly from the standard.

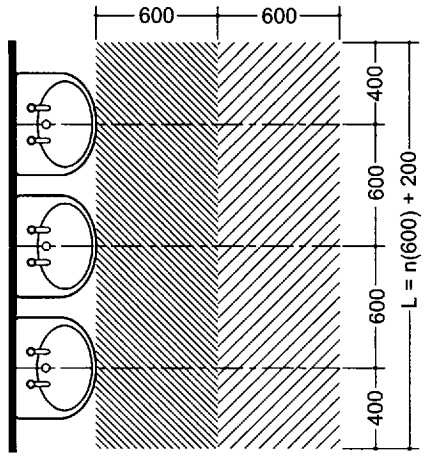
Hand-rinse basins have already been mentioned in connection with WC compartments. When they are used in a range the dimensions in **3.32** should be followed.

The traditional fixing height of basins is 785 or 800 mm to the rim. For adults this height requires considerable bending as one is actually washing one's hands below the rim height. Alexander Kira suggests a height of 865 to 915 mm, but for normal use by a wide range of users 850 mm is preferred. The Department of Health recommends 760 mm in hospitals.

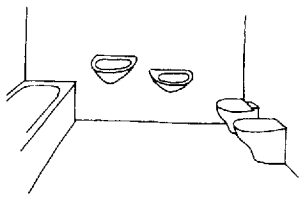
In any case, these heights would be unsatisfactory for small children, who need to be encouraged to wash their hands. A washbasin fitted at 700 mm could be provided for them, and **3.33** shows a family bathroom provided with a second basin for the children. A common alternative to provide a small step-up for children to use the standard basin. This would not be appropriate in a public convenience, where a lower washbasin should be provided unless a dedicated children's facility such as described in



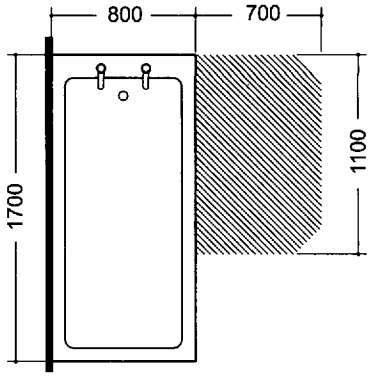
3.31 *Range of non-domestic washbasins, activity and circulation spaces*



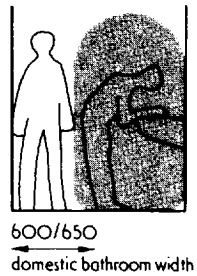
3.32 *Range of hand-rinse basins (non-recessed), activity and circulation spaces*



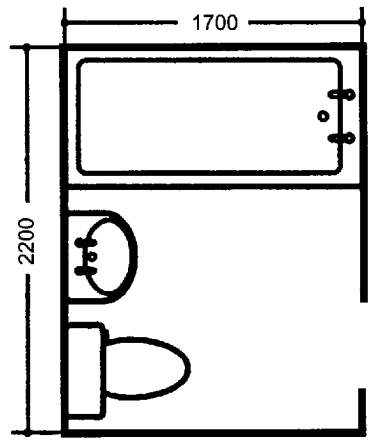
3.33 *Family bathroom incorporating second washbasin for children's use*



3.34 *Bathtub and activity space*



3.35 *Minimum width in domestic bathroom*



3.36 *Minimum bathroom including WC*

4.15 is nearby. Children also deserve and appreciate consideration in the placement of dryers, towels, coat hooks and mirrors, etc.

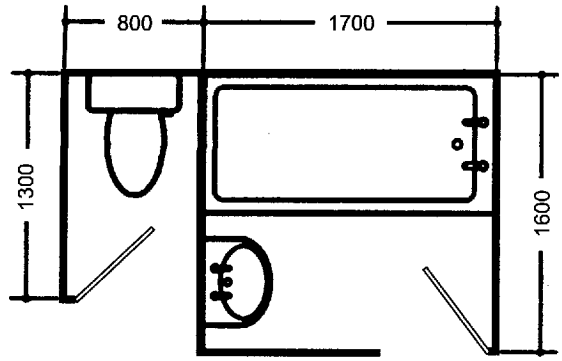
As already shown, basins specifically for wheelchair users have rims 750 mm high. Plumbing, etc. underneath such basins should be arranged not to obstruct the knees of the user in the chair.

4.11 Baths and bathrooms

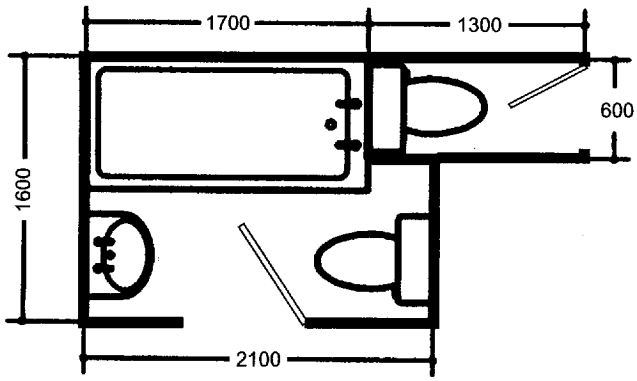
Baths are also available in many sizes, shapes and types; but the standard one and its activity area are shown in **3.34**. Baths are now rarely found outside bathrooms; and bathrooms normally also include at least a washbasin. The minimum width of a domestic bathroom is illustrated in **3.35**. All bathrooms should ideally be large enough for undressing and dressing, and for someone to lend a hand. Three domestic bathroom arrangements are shown in **3.36** to **3.38** and variations on these are also appropriate in non-domestic situations such as hotels, schools etc. A matrix of virtually all possible arrangements will be found in BS 6465: Part 2.

Baths can be provided for disabled people which have rims at 380 mm above the floor instead of the normal 500 mm. Alternatively, the bath may be set with the trap below floor level. It should have as flat a bottom as possible and should not be longer than 1.5 m; lying down is not encouraged.

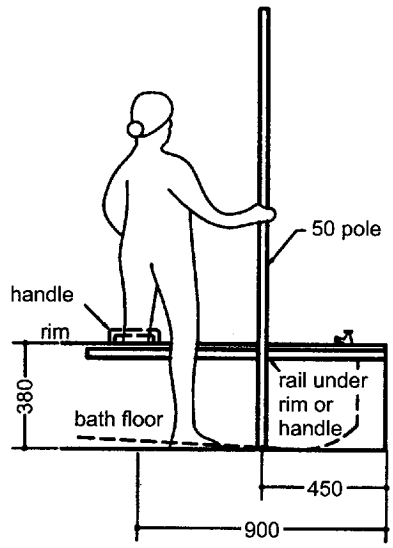
Other special baths tip up or have openable sides. However, a standard bath with a mobility aid is usually more practical, particularly in the home. Lifting and lowering devices are available that can be fixed to a floor, wall or ceiling – or can even be simply sat on the floor. As suggested above, all bathrooms should ideally provide for handrails; a pole is invaluable for anyone less than fully agile **3.39**. Adaptation of the standard bath



3.37 *WC in separate compartment adjacent to bathroom*



3.38 *WC in separate compartment adjacent to bathroom also containing WC*



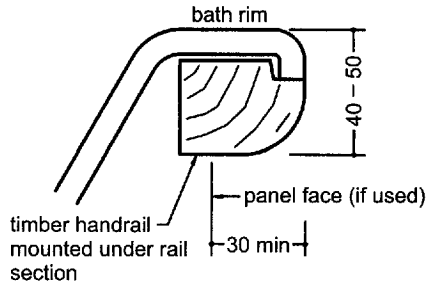
3.39 *Aids for getting in and out of the bath: pole, handle and rim. Maximum height of rim from floor 380 mm*

rim to make it easier to grasp is shown in **3.40**. A seat at rim height is useful for sitting on to wash legs and feet.

Bathroom and lavatory doors should preferably open out, with locks operable from the outside in emergencies.

4.12 Taps

Choose taps that can be manipulated by small and arthritic fingers. Surgeons' taps are not recommended, however, as in extreme cases ordinary taps can be modified to provide similar facility. Under a European standard it is now obligatory in new installations for the



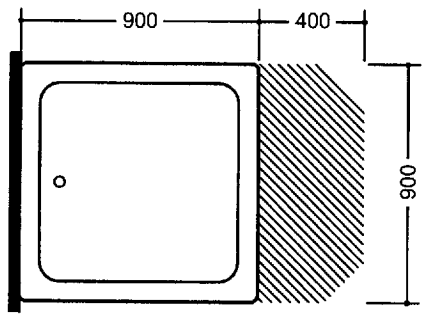
3.40 *Bath rim adapted for easy gripping*

cold tap to be on the right and the hot on the left, unless there are compelling reasons otherwise: this is in order to assist visually impaired people. Tops should be boldly colour coded, additional tactile identification is currently under discussion.

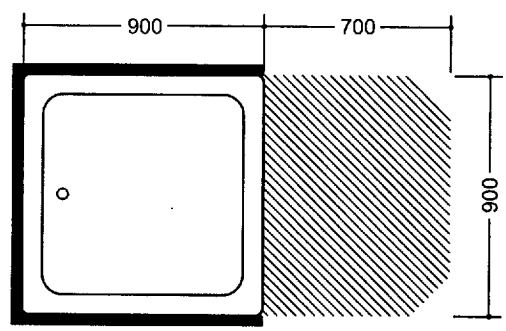
4.13 Showers

It is becoming common to install showers which are more economical in water and energy use than bathtubs. Disabled people in particular often find it easier to shower than to get in and out of a tub.

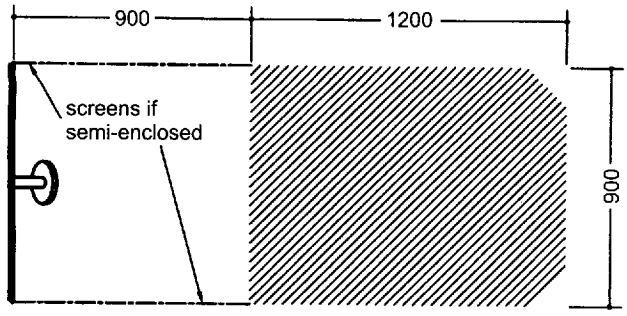
Showers come with and without trays and enclosures, **3.41** to **3.43**. Trays are not altogether suitable for disabled people unless they can be installed with the rim level with the floor and provided with a duckboard. Continental practice of an impervious non-slip bathroom floor laid to fall to a gulley has not been traditionally followed in the UK, although this can be ideal for a wheelchair user. A shower installation specifically designed for an elderly or disabled person is shown in **3.44**. The compartment should be well heated, with a fold-away seat and with pegs for clothes on the dry side, divided from the wet with a shower curtain. The water supply should be automatically controlled to supply only between 35°C



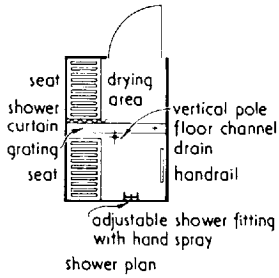
3.41 *Unenclosed shower with tray, and activity space. This is for access from one side of the tray, and to facilitate initial drying within the shower. A nearby area of 1100 × 900 will be needed for final drying and dressing*



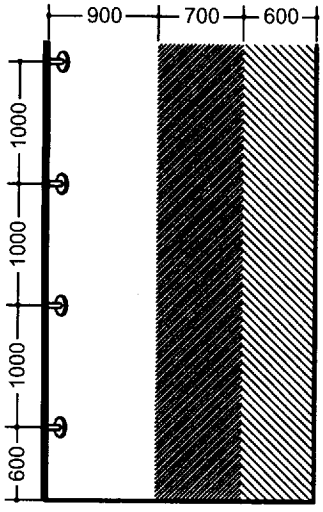
3.42 *Enclosed shower with tray, and activity space adequate for drying. A nearby dressing space is presumed*



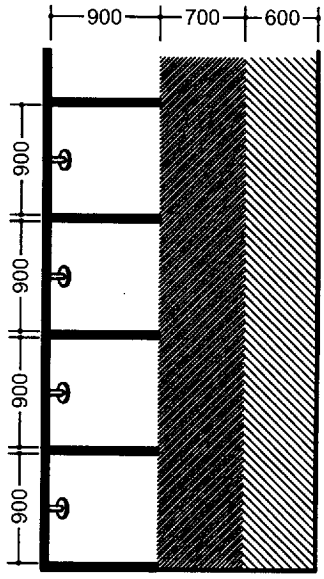
3.43 *Unenclosed shower without tray, and activity space for drying and dressing*



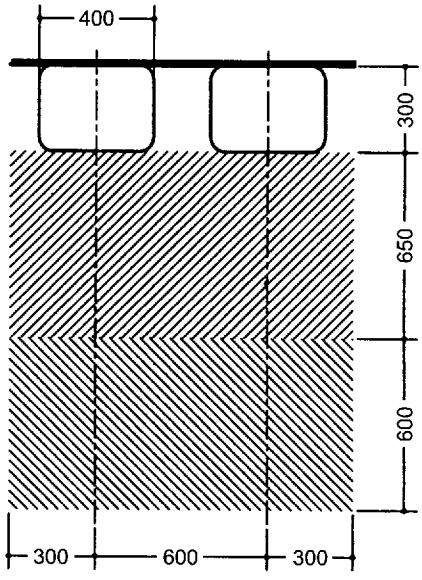
3.44 *Plan of shower room for elderly or disabled person, showing seats and aids*



3.45 *Range of unenclosed showers, activity and circulation spaces*



3.46 *Range of semi-enclosed showers, activity and circulation spaces*



3.47 *Range of hand dryers, activity and circulation spaces*

and 49°C. The shower head should be on the end of a flexible hose, with a variety of positions available for clipping it on.

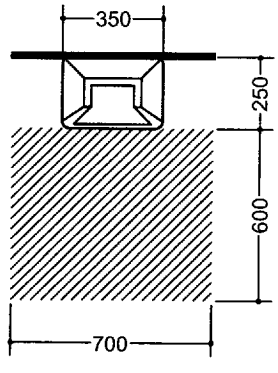
In sports centres and swimming pools showers are provided in ranges as **3.45** or **3.46**.

BS 6465: Part 2 recommends 900 mm square as the minimum size for a shower enclosure, but most of the shower trays and enclosures manufactured are between 700 mm and 800 mm square.

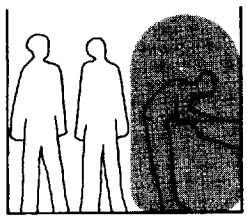
4.14 Public conveniences

In addition to the appliances covered above, public installations also include drying facilities **3.47** which could be electric hand dryers or roller towels. Occasionally disposal for sanitary towels and continence aids is provided outside cubicles, **3.48**, although this is not recommended practice.

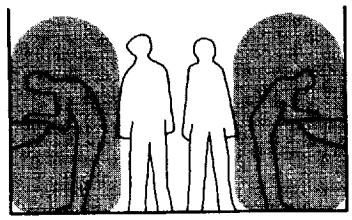
The factors affecting the widths of public conveniences are covered in **3.49** to **3.51**. Appliances should be arranged so that the



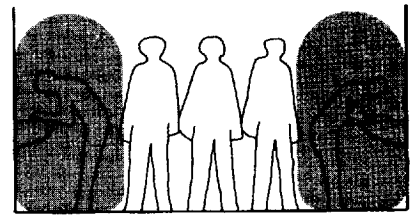
3.48 *Sanitary towel or continence aid disposal apliance not in a cubicle and activity space*



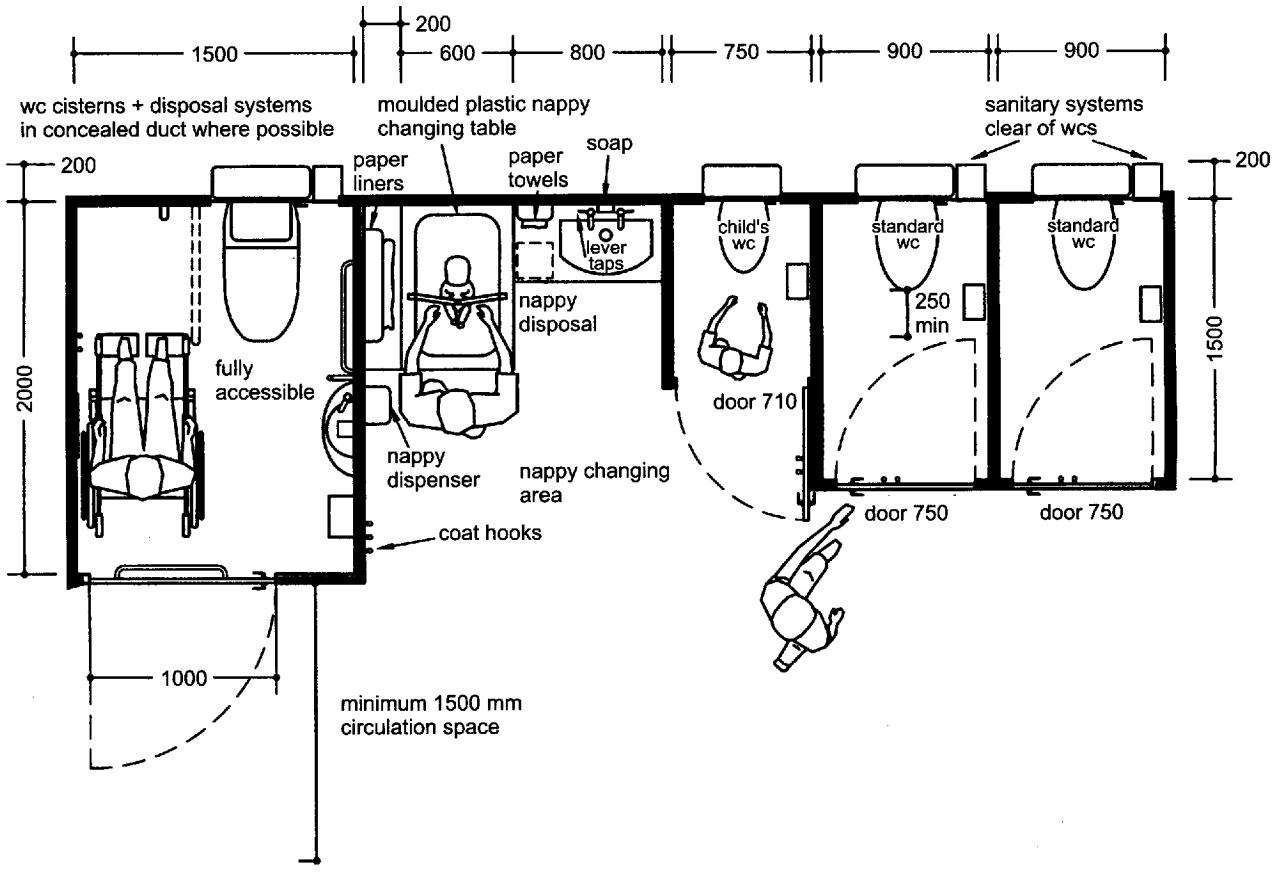
3.49 *Minimum width in a public in a public installation with appliances on one side*

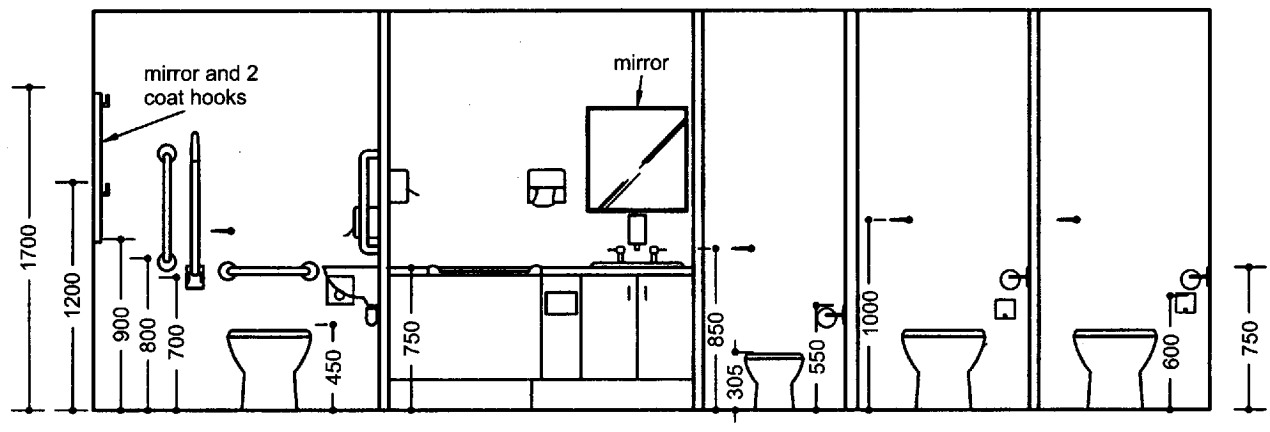


3.50 *Minimum width in a public in a public installation with appliances on both sides*



3.51 *Width of a larger public installation*





3.52 *Layout for a public convenience including wheelchair access compartment, child's WC and nappy-changing facility. This design is suitable for a ladies' facility, although nappy changing, child's WC and wheelchair access would be ideally unisex*

space is concentrated into larger areas, as it is psychologically and practically preferable to be able to see the whole of the room on entering. Narrow dead ends and corridors should be avoided and the circulation pattern planned to ensure that washing facilities are provided between WC/urinals and the exit to encourage hand washing.

Circulation areas must be considered as being around both appliance and activity spaces rather than merely around appliances, although some encroachment of the circulation area into the appliance/activity space will normally be acceptable depending on the likelihood of full use of appliances.

4.15 Baby changing

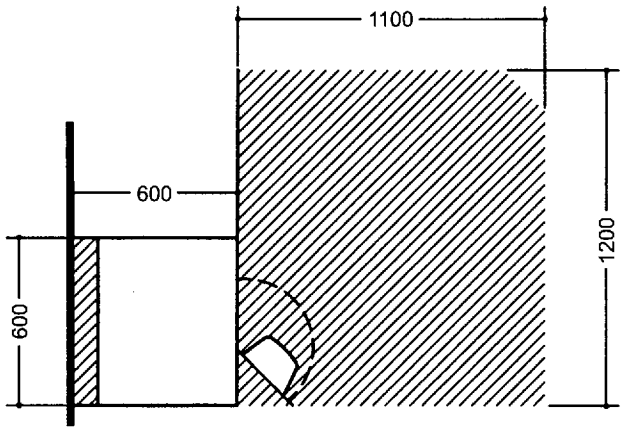
A full public installation should include a baby-changing facility and a child's WC. An arrangement recommended by The Continence Foundation and All Mod Cons, and designed by the Women's Design Service is shown in **3.52**.

4.16 Miscellaneous sanitary appliances

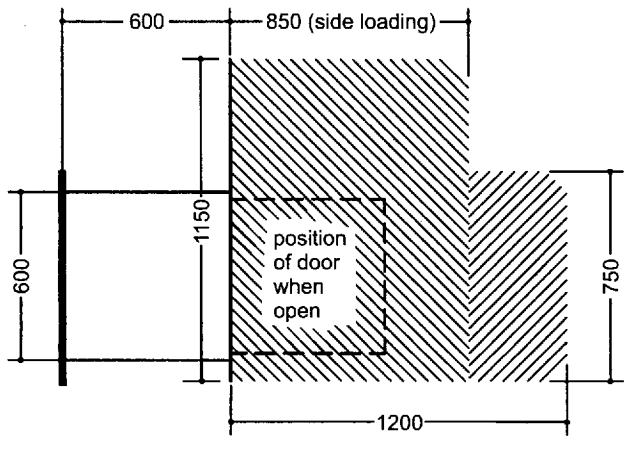
Some other water-using appliances and their activity spaces are shown in **3.53** to **3.56**.

4.17 Cleaning manual/mechanical

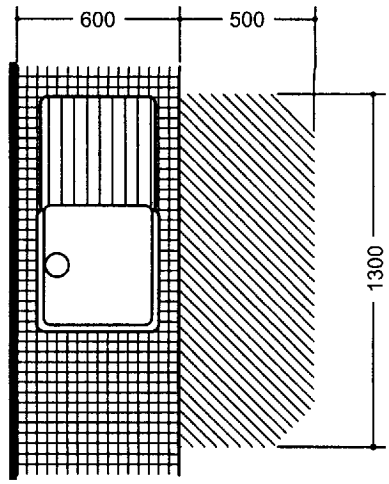
Cleanliness can either be visual or bacteriologically sterile or both. Most people are happy with visual cleanliness and would be unhappy with a dirty-looking though sterile installation. Good design and detailing therefore plays a vital part in sanitary accommodation cleanliness.



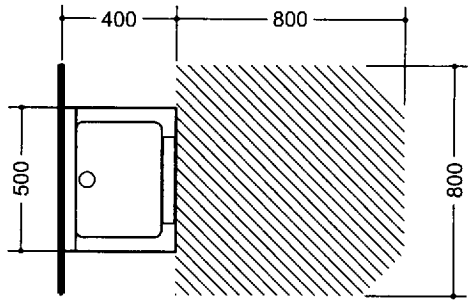
3.53 *Clothes washing machine and activity space*



3.54 *Dishwasher and activity space*



3.55 *Kitchen sink and activity space*



3.56 *Bucket/cleaners sink and activity space*

Cleaning is rarely considered very seriously in sanitary areas, for most proprietary appliances are badly designed and uncleanable, producing dark shadows around down-to-floor appliances, cubicle feet, etc. and too often one sees pipes and cistern exposed.

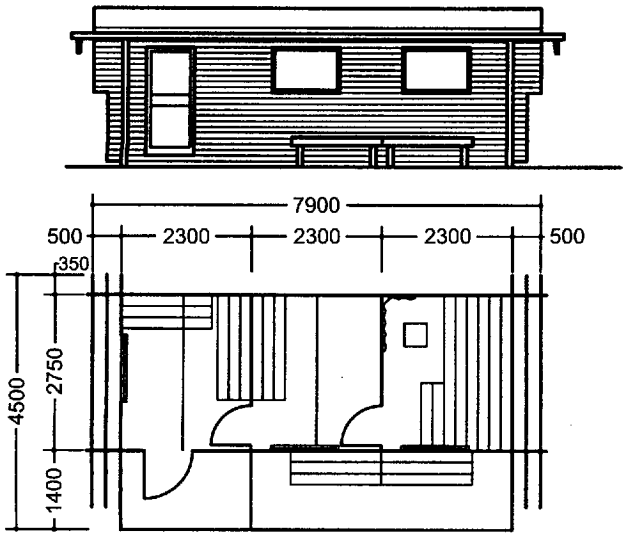
Consider carefully the cleaning method to be employed, and be critical of what manufacturers supply; for besides hygienic and aesthetic factors, dirty installations encourage sloppy use and vandalism. One should ensure that all surfaces are capable of thorough cleansing; floor details should be coved wherever possible and all possible interruptions of the floor, such as legs, pedestals and pipes, avoided.

Wall-mounted appliances are preferred, although many wall-mounted WCs leave so little floor clearance as actually to aggravate the cleaning problem. Appliances designed to eliminate uncleanable areas should be chosen; they should be cleanable not only in the appliance itself but also at its junction with the structural surfaces. Generally, the appliance is cleaned but the wall is not, so all appliances need upstands. Appliances should not be placed so close together that cleaning between them is hampered. Wall-mounted valves over washbasins promote better cleaning than deck-mounted ones.

5 SAUNAS

5.01 Origin of the sauna

The sauna, **3.57**, is essentially Finnish and in its original form is a one-room hut built of logs, with a rudimentary furnace or stove, over which rocks are piled, in one corner. Steps lead up to a slatted wooden platform along one side of the room where naked bathers



3.57 *Outdoor sauna with verandah, changing room, washing room and sauna room*

sit or lie in the hot air under the roof. The stove heats the room by convection and the rocks reach a high temperature. After sitting in the dry heat for some minutes, the bather produces steam from time to time by throwing small quantities of water onto the hot rocks.

The temperature varies from 88°C to 110°C and, provided that the moisture is properly absorbed by the wooden walls of the room, the air will not become saturated. Because the human body can stand a higher degree of dry heat than wet heat, the temperature is higher in a sauna than in a Turkish bath. After perspiration, bathers beat themselves with leafy birch twigs, wash and plunge into a nearby lake or take a cold shower. The cycle is repeated a few times until finally there is a period of rest while the body cools down completely. The time taken for the complete operation varies from 90 to 120 minutes.

5.02 Dimensions

The sauna room should be between 2.3 and 2.6 m high and have a minimum floor area of 1.8 × 2.1 m. Benches should be 600 to 760 mm wide and the platform at least 460 mm wide. The stove will take up 0.560 to 0.650 m^2 of floor area and will stand about 1.070 m high. Outside the sauna room, showers are required and if possible a cold 4–10°C plunge bath. Space for dressing and resting should be provided. Cubicles will strictly limit the maximum number of bathers, and an open layout is more flexible. Provision should be made for clothes lockers and a few dressing cubicles, and the rest of the area is occupied by resting couches/chairs and small tables.

Of the total number of bathers in an establishment at any time, 20–25 per cent are likely to be in the sauna room, an equal number in the shower/washing room and the remainder in the dressing/resting areas.

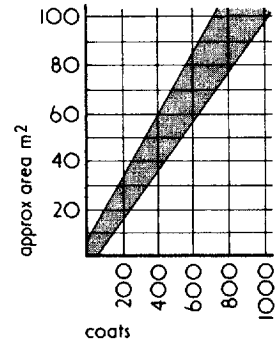
6 HYDRO-THERAPY SPA BATHS

This healthy new development in bathroom equipment is an alternative to the sauna. Spa baths or 'swirlpools' are small hydro-therapy pools that provide turbulent hot water as massage for the relief of aches, tensions and fatigue or simply for pleasure. These pools are usually of one-piece glass-fibre construction, available in a variety of sizes and shapes which are relatively easy and low-cost to install and are used indoors or out.

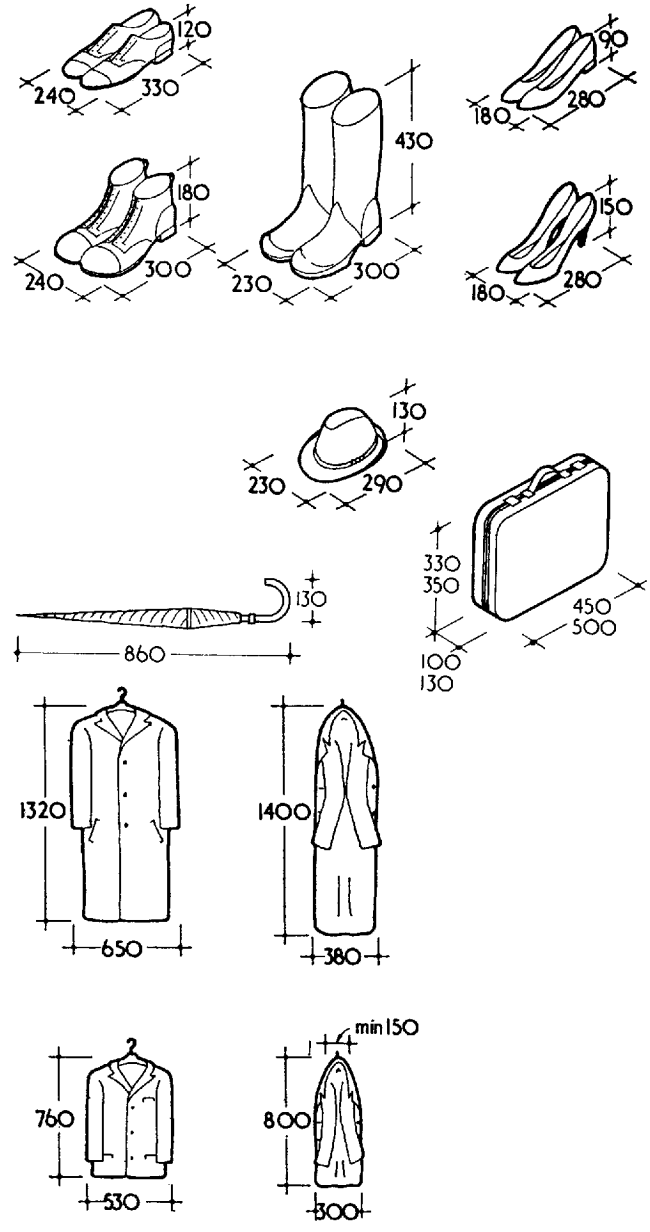
7 PUBLIC CLOAKROOMS

7.01 Calculating cloakroom areas

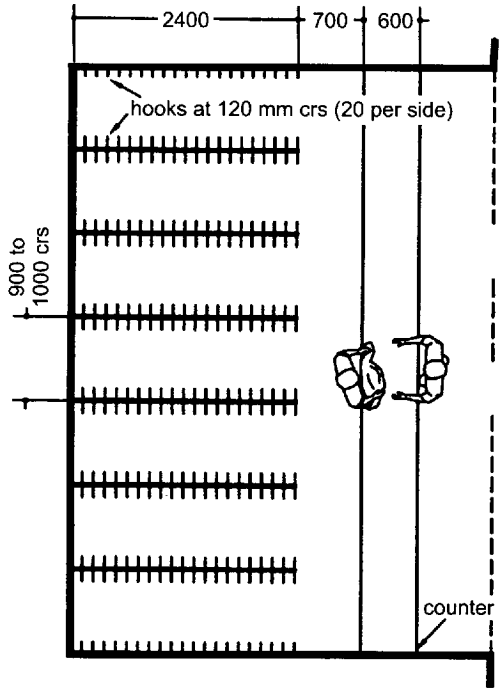
In the early planning stages, if you merely wish to establish an overall cloakroom area, you can obtain the size of a cloakroom to suit any number of coats from the graph, **3.58** (courtesy of G. & S. Allgood Ltd).



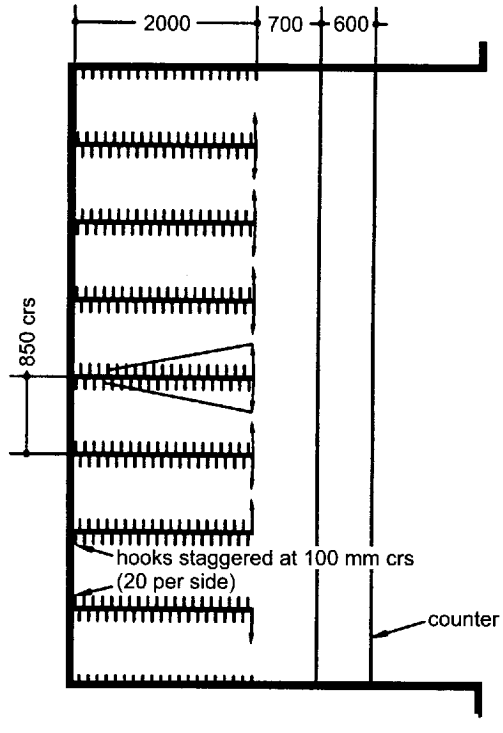
3.58 *Approximate guide to areas of cloakroom accommodation for use in early planning stage*



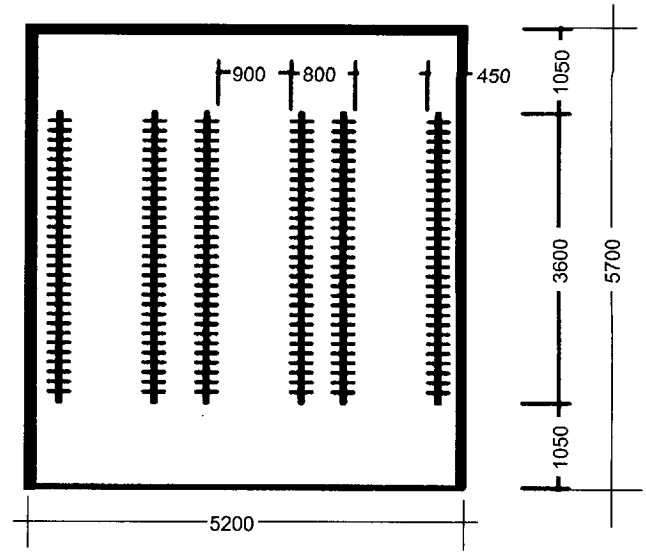
3.59 *Sizes of items commonly stored in cloakrooms*



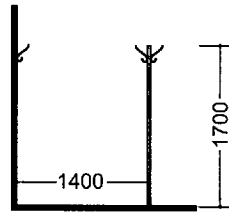
3.60 *Fixed rows of hooks. 0.08 m^2 per user including counter, 0.1 m^2 including 1200 mm on public side*



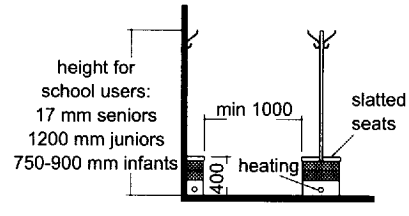
3.61 *Hinged rows of hooks, 0.007 m^2 per user incuding counter, 0.09 m^2 including 1200 mm on public side*



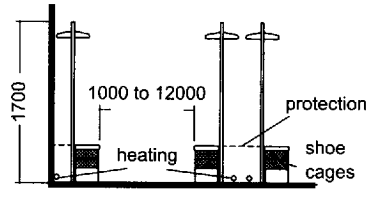
3.62 *Method of calculating space required by each user: 6 rows each 3600 mm long of double tier hangers at 150 mm centres = 300 hangers area of room = 5.7 × 5.2= 29.6 m^2 Hewnce space allowance 0.098 m^2 per user*



3.63 *Hooks in line: 0.16 m^2 per user including circulation*



3.64 *Hooks with seating: 0.02 m^2 per user including circulation*



3.65 *Hooks with seating: 0.26 m^2 per user including circulation*

7.02 Items commonly stored

Typical sizes of items stored are given in **3.59**.

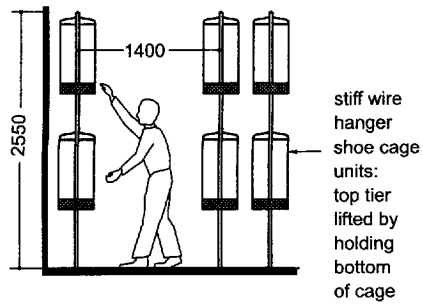
7.03 Attended storage

Typical arrangements and space requirements per user are shown in **3.60** and **3.61**.

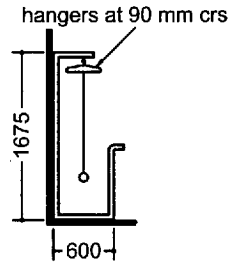
7.04 Unattended storage

The space allowances per user in **3.62** to **3.66** are based upon hangers or hooks at 150 mm in rows 3600 mm long with 1050 mm clear circulation space at ends of rows.

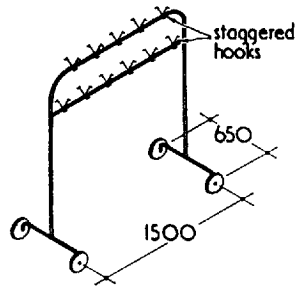
The proprietary system given in **3.67** provides unattended locked storage for coats and umbrellas.



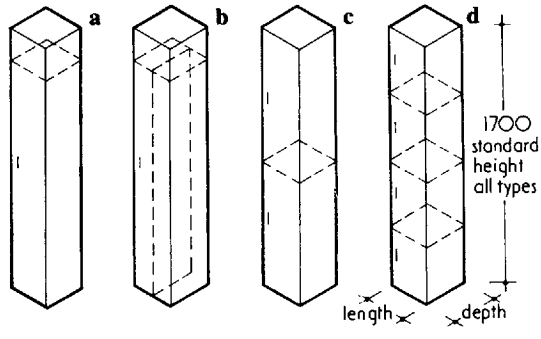
3.66 *Double tier hangers: 0.13 m^2 per user including circulation*



3.67 *Proprietry system affording security: 0.16 m^2 per user including circulation*

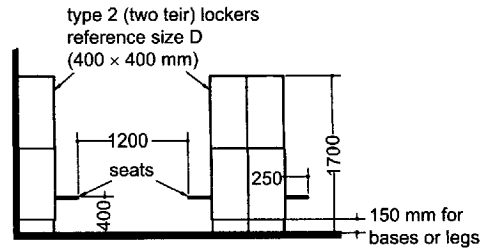


3.68 *Mobile coat rack*

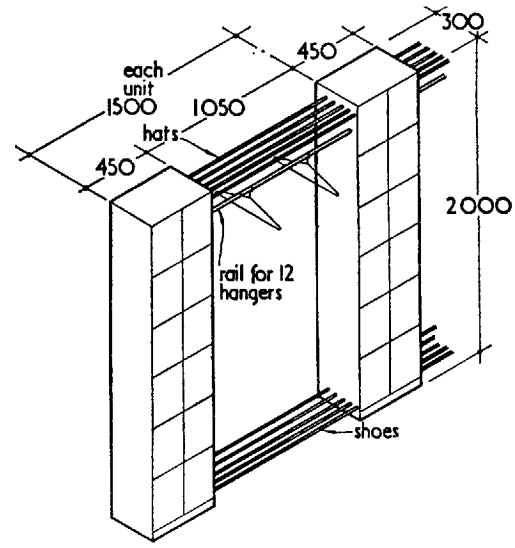


	reference size (mm)					
	A	B	C	D	E	F
length	300	300	300	400	400	500
depth	300	400	500	400	500	500

3.69 *Lockers:* **a** *type 1a with hat shelf;* **b** *type 1b withhat shelf and vertical divider. Not available in A, B or C* **c** *type 2, two tier;* **d** *type 3, three, four, five or six tier*



3.70 *Cross-section of lockers with seats*



3.71 *Lockers with coat rail, hat and shoe racks*

7.05 Mobile storage

These are proprietary units and the measurements shown in **3.68** are approximate.

7.06 Lockers

Lockers may be full height with a hat shelf and space to hang a coat and store shoes or parcels; or half height to take a jacket; or quarter height to take either parcels or folded clothes, **3.69** and **3.70**. Combination units such as **3.71** are also available.

Note: Many of the units shown in this chapter are proprietary systems and metric measurements are only approximate. Manufacturers should be consulted after preliminary planning stages.

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